

FCC- TEST REPORTReport Number : **68.950.22.0357.01** Date of Issue: **May 10, 2022**

Model : MWB-S-WB01-2

Product Type : Bluetooth & 2.4GHz Wi-Fi dual band Communication Module

Applicant : GD Midea Air-Conditioning Equipment Co., Ltd.

Address : Lingang Road, Beijiao, Shunde 528311 Foshan, Guangdong

: PEOPLE'S REPUBLIC OF CHINA

Manufacturer : GD Midea Air-Conditioning Equipment Co., Ltd.

Address : Lingang Road, Beijiao, Shunde 528311 Foshan, Guangdong

: PEOPLE'S REPUBLIC OF CHINA

Test Result : ☒ **Positive** ☐ **Negative**Total pages including
Appendices : 40

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint
Road 2, Nanshan District
Shenzhen 518052
P.R. China

Telephone: 86 755 8828 6998

Fax: 86 755 8288 5299

FCC Registration No.: 514049

3 Description of the Equipment Under Test

Product:	Bluetooth & 2.4GHz Wi-Fi dual band Communication Module
Model no.:	MWB-S-WB01-2
Brand name:	Midea
FCC ID:	2ADQOMWBSWB012
Rating:	5VDC, 0.5A, 0.25W
RF Transmission Frequency:	2402-2480MHz
No. of Operated Channel:	40
Modulation:	DSSS, OFDM
Antenna Type:	PCB Antenna
Antenna Gain:	0 dBi
Description of the EUT:	EUT is a Bluetooth & 2.4GHz Wi-Fi dual band Communication Module with Bluetooth and WIFI function which operated at 2.4GHz.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2020 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB558074 D01 v05r02 DTS Measurement Guidance and ANSI C63.10 (2013).

5 Summary of Test Results

Technical Requirements
FCC Part 15 Subpart C

Test Condition		Test Site	Test Result
§15.207	Conducted emission AC power port	Site 1	N/A
§15.247 (b) (1)	Conducted peak output power	Site 1	PASS
§15.247(a)(1)	20dB bandwidth	---	N/A
§15.247(a)(1)	Carrier frequency separation	---	N/A
§15.247(a)(1)(iii)	Number of hopping frequencies	---	N/A
§15.247(a)(1)(iii)	Dwell Time	---	N/A
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	Site 1	PASS
§15.247(e)	Power spectral density	Site 1	PASS
§15.247(d)	Spurious RF conducted emissions	Site 1	PASS
§15.247(d)	Band edge	Site 1	PASS
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	Site 1	PASS
§15.203	Antenna requirement	See note 2	PASS

Note 1: N/A=Not Applicable.

Note 2: The EUT uses a PCB antenna, which gain is 0dBi. In accordance to §15.203 and RSS-GEN 6.8, it is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2ADQOMWBSWB012, complies with Section 15.209, 15.247 of the FCC Part 15, Subpart C rules.

Note: The report is for BLE only

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: April 1, 2022

Testing Start Date: April 1, 2022

Testing End Date: April 24, 2022

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Reviewed by:

Prepared by:

Tested by:



John Zhi
Project Manager



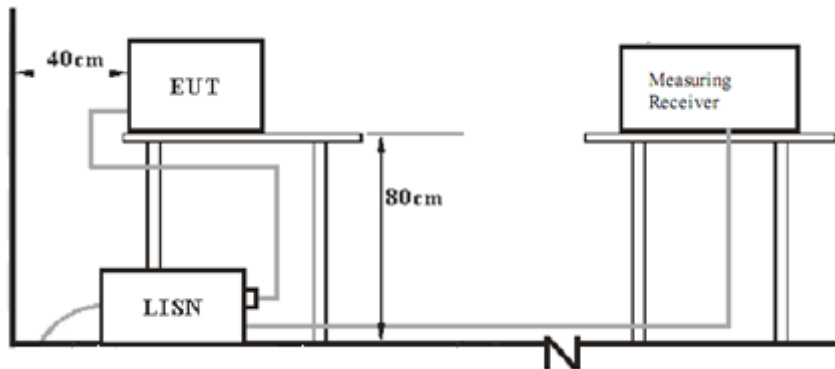
Mark Chen
Project Engineer



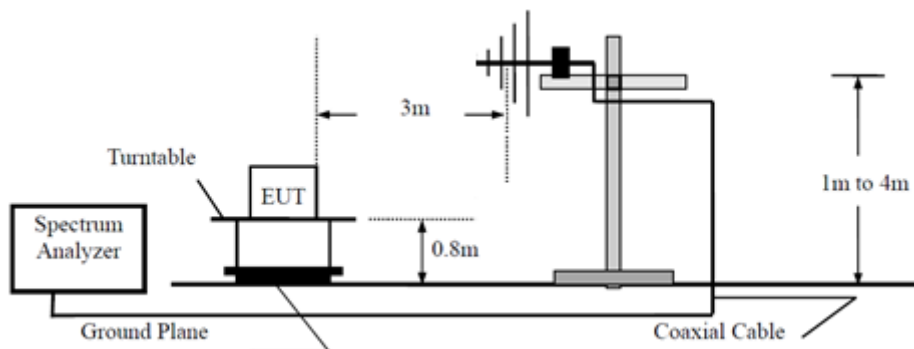
Carry Cai
Test Engineer

7 Test Setups

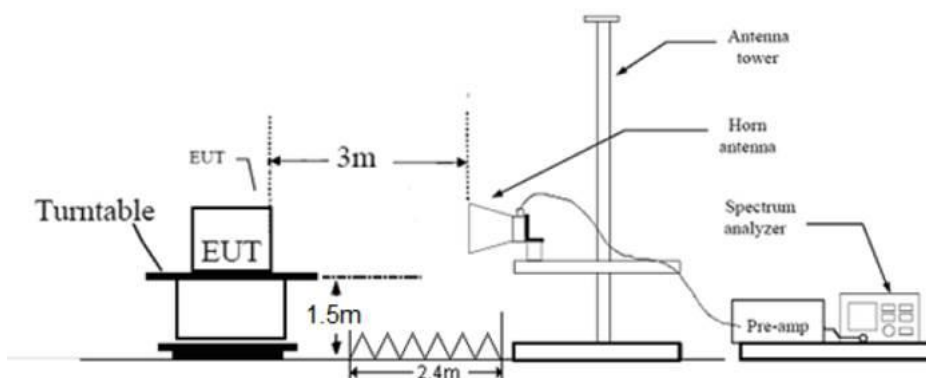
7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups Below 1GHz

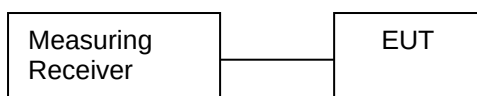


Above 1GHz



7.3 Conducted RF test setups

Conducted RF test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Notebook	Lenovo	X220	---
--	---	---	

Test software: iComm_HW_Tool_1.3.2_lite Test Tool, which used to control the EUT in continues transmitting mode.

The system was configured to channel 0, 19, and 39 for the test.

9 Technical Requirement

9.1 Conducted Emission

Test Method

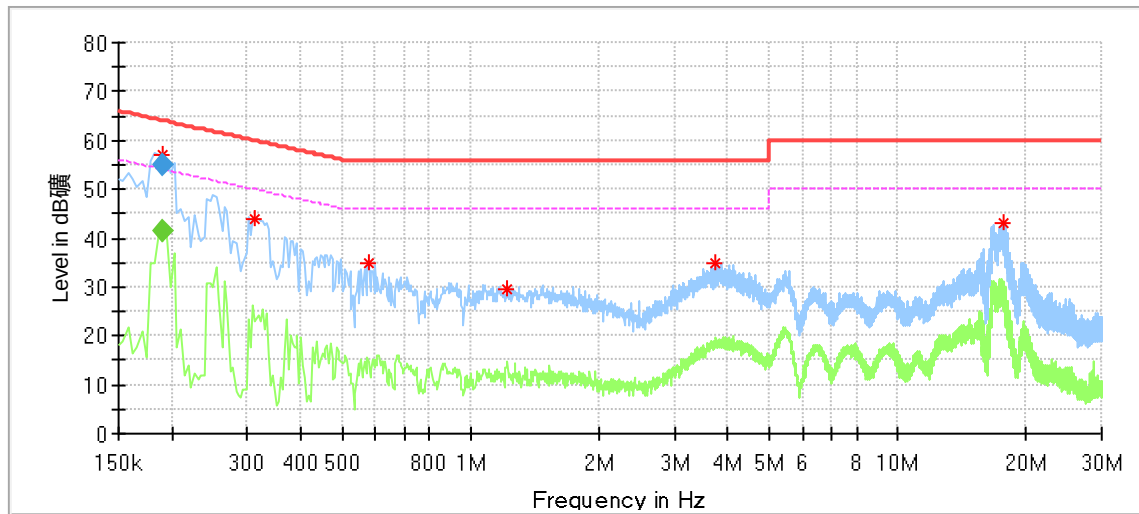
1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

Model: MWB-S-WB01-2
 Test mode: Transmit
 Test Voltage: AC 120V/60Hz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB/m)
0.189500	57.18	---	64.04	6.86	L1	9.24
0.314000	44.09	---	59.86	15.78	L1	9.22
0.578000	34.71	---	56.00	21.29	L1	9.20
1.222000	29.48	---	56.00	26.52	L1	9.20
3.750000	34.94	---	56.00	21.06	L1	9.27
17.726000	43.05	---	60.00	16.95	L1	9.42

Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB/m)
0.189500	---	41.40	54.06	12.65	L1	9.24
0.189500	55.02	---	64.06	9.04	L1	9.24

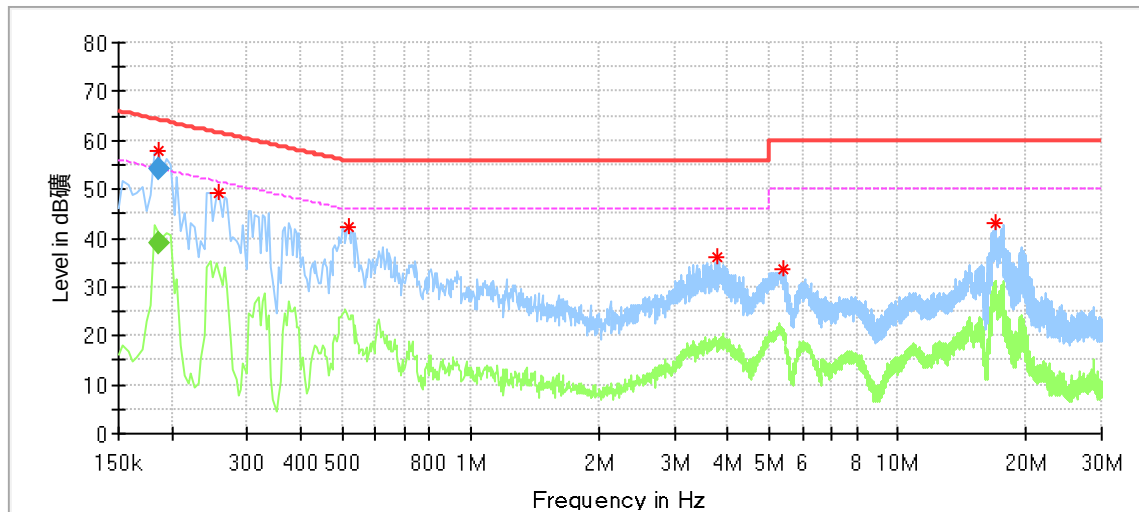
Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

Model: MWB-S-WB01-2
 Test mode: Transmit
 Test Voltage: AC 120V/60Hz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB/m)
0.185500	57.66	---	64.39	6.74	N	9.40
0.258000	49.14	---	61.50	12.35	N	9.39
0.518000	42.15	---	56.00	13.85	N	9.40
3.786000	36.03	---	56.00	19.97	N	9.46
5.370000	33.54	---	60.00	26.46	N	9.51
16.874000	43.13	---	60.00	16.87	N	9.67

Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB/m)
0.185500	---	39.16	54.24	15.08	N	9.40
0.185500	54.03	---	64.24	10.21	N	9.40

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

9.2 Conducted peak output power and e.i.r.p.

Test Method

1. Use the following spectrum analyzer settings:
RBW > the 6dB bandwidth of the emission being measured, VBW $\geq$ 3RBW, Span $\geq$ 3RBW
Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

Limits:

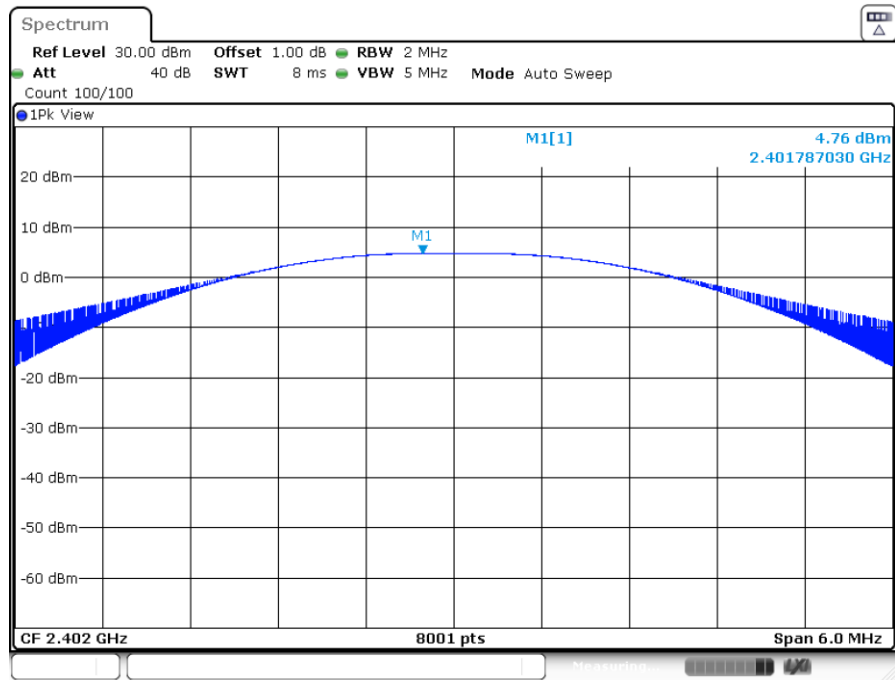
Conducted peak output power:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤ 1	≤ 30

Test result as below

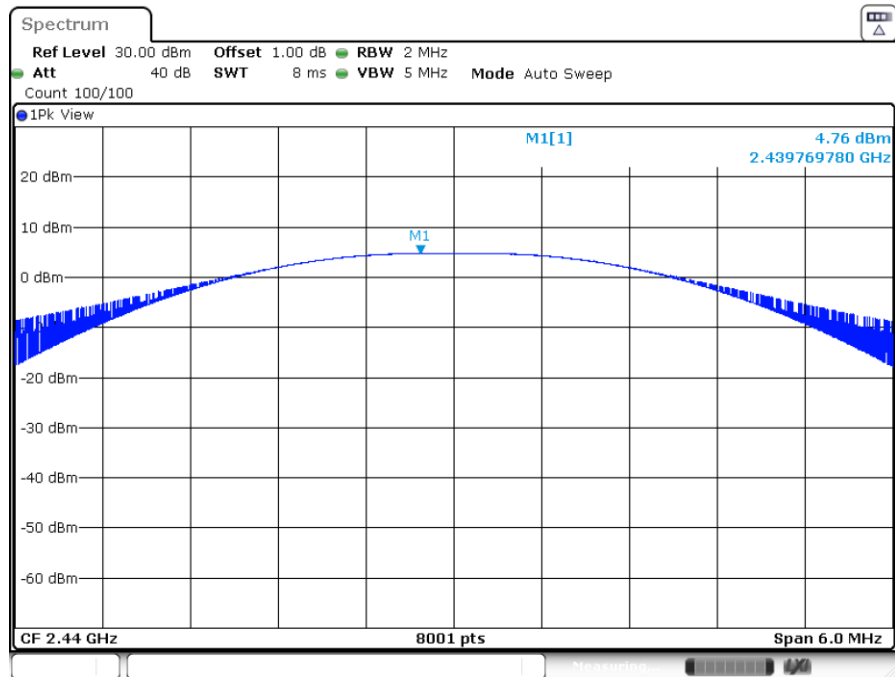
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	4.76	Pass
Middle channel 2440MHz	4.76	Pass
High channel 2480MHz	4.87	Pass

Low channel 2402MHz



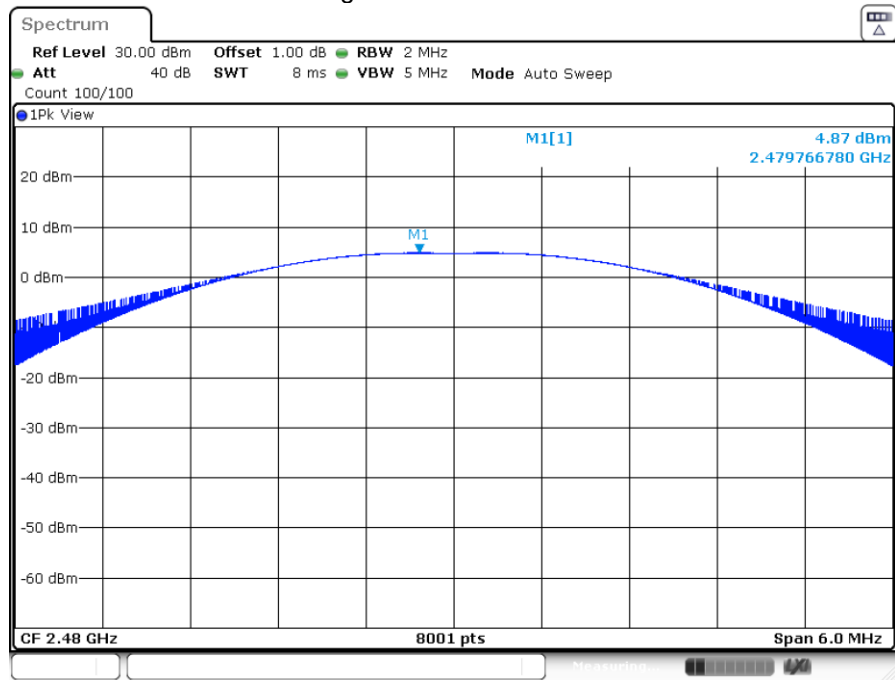
Date: 8.APR.2022 15:22:06

Middle channel 2440MHz



Date: 8.APR.2022 15:23:55

High channel 2480MHz



Date: 8.APR.2022 15:25:26

9.3 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW $\geq$ 3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

Limit

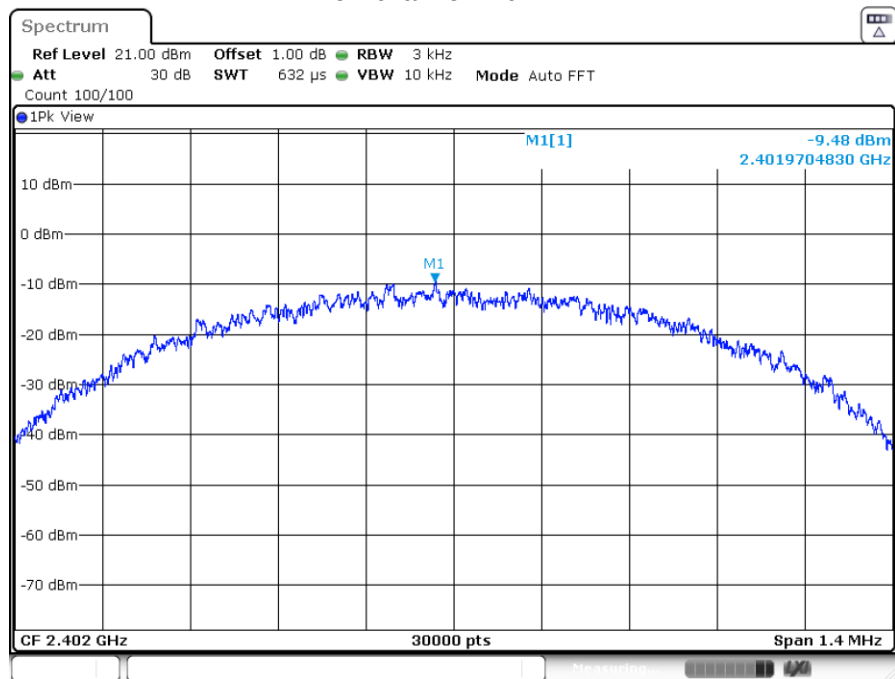
Limit [dBm/3KHz]

$\leq 8\text{dBm/3KHz}$

Test result

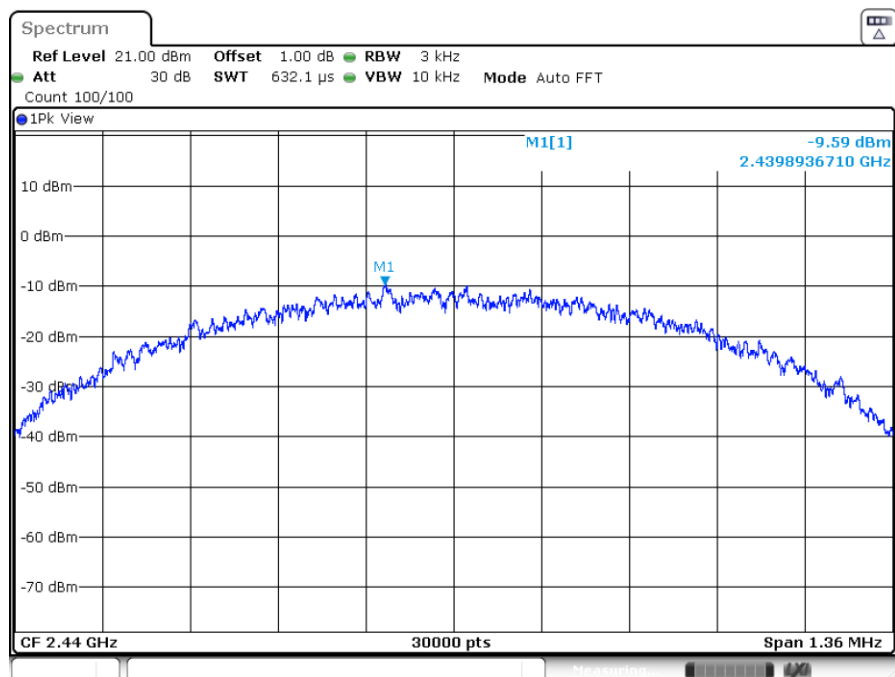
Frequency MHz	Power spectral density dBm/3KHz	Result
Top channel 2402MHz	-9.48	Pass
Middle channel 2440MHz	-9.59	Pass
Bottom channel 2480MHz	-9.17	Pass

Low channel 2402MHz



Date: 8.APR.2022 15:22:12

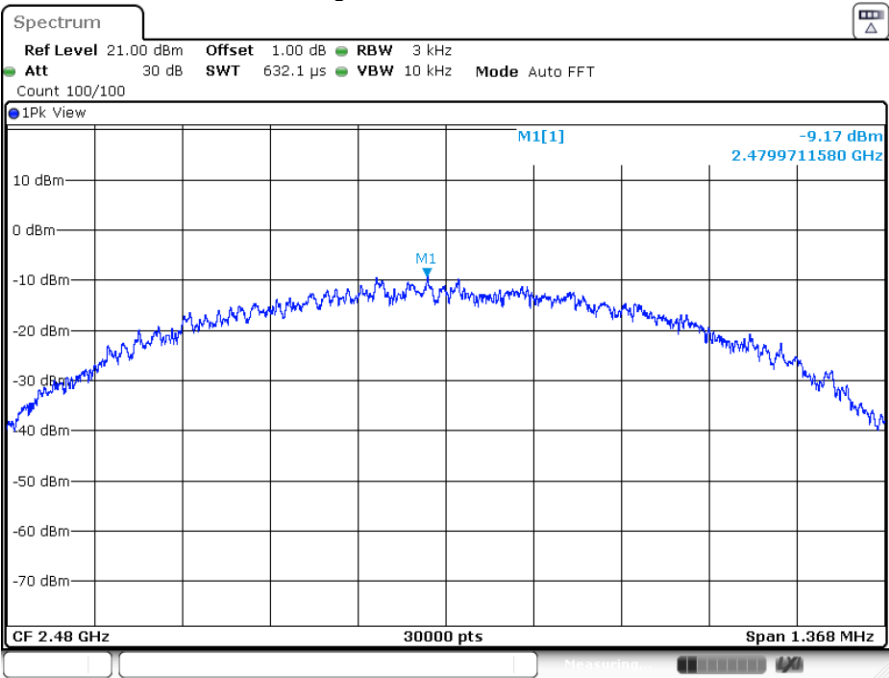
Middle channel 2440MHz



Date: 8.APR.2022 15:24:01



High channel 2480MHz



Date: 8.APR.2022 15:25:32

9.4 6 dB Bandwidth and 99% Occupied Bandwidth

Test Method

1. Use the following spectrum analyzer settings:
RBW=100K, VBW $\geq$ 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be $\geq$ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]

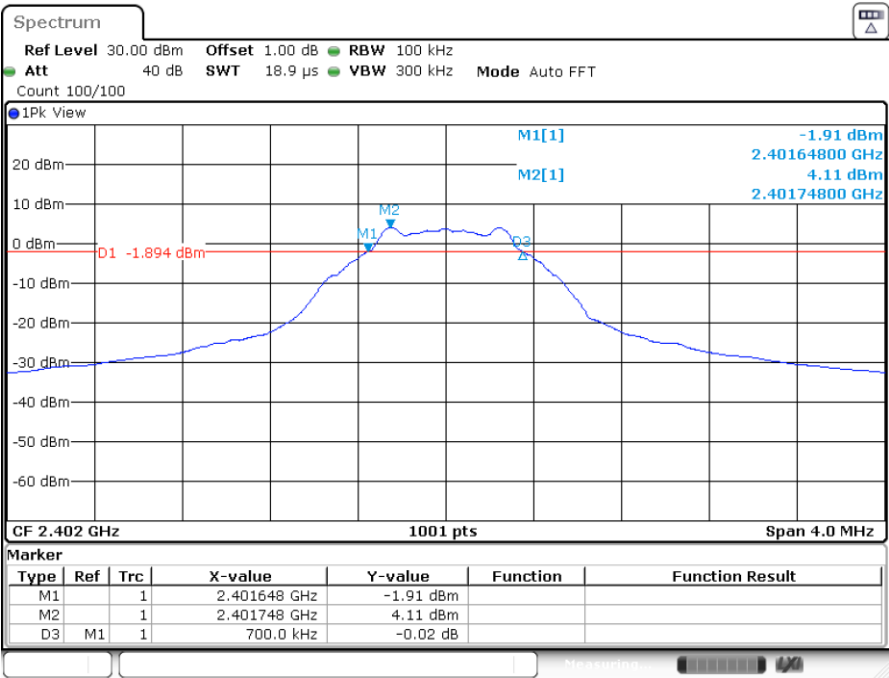
≥ 500

Test result

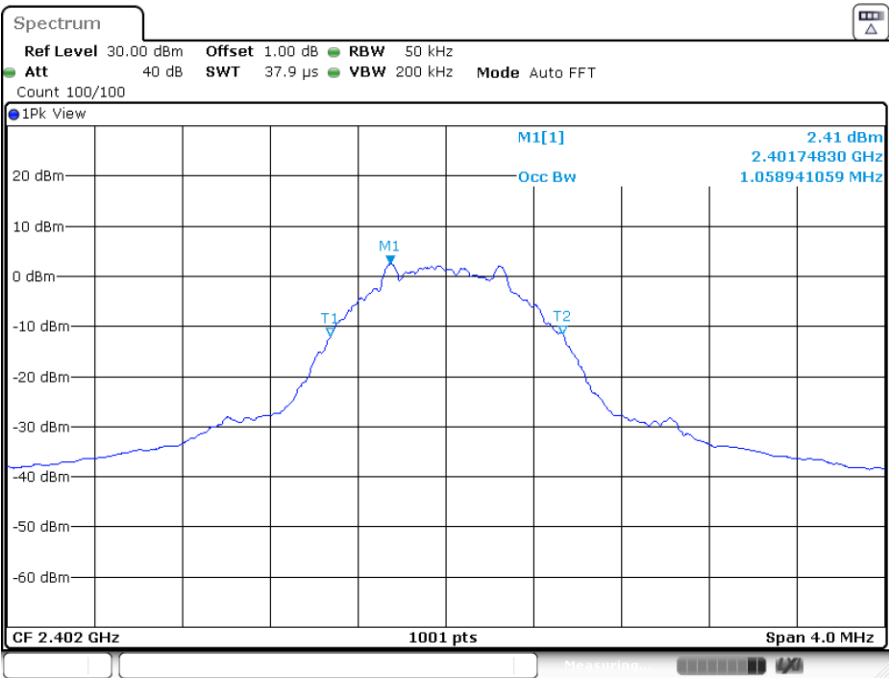
Frequency MHz	6dB bandwidth kHz	99% bandwidth kHz	Result
Bottom channel 2402MHz	700	1059	Pass
Middle channel 2440MHz	680	1063	Pass
Top channel 2480MHz	684	1075	Pass



Low channel 2402MHz



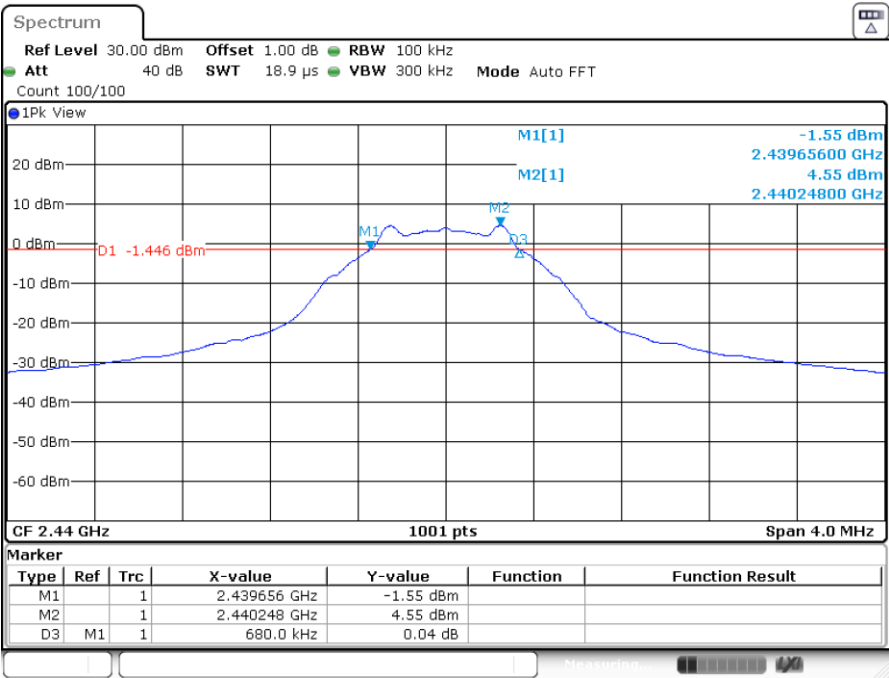
Date: 8.APR.2022 15:21:48



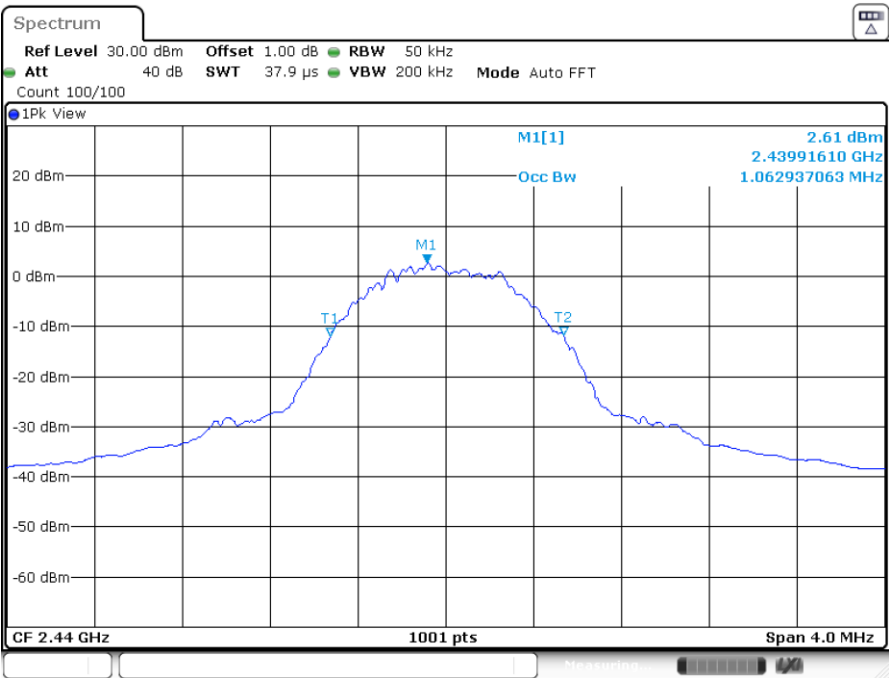
Date: 8.APR.2022 15:21:59



Middle channel 2440MHz

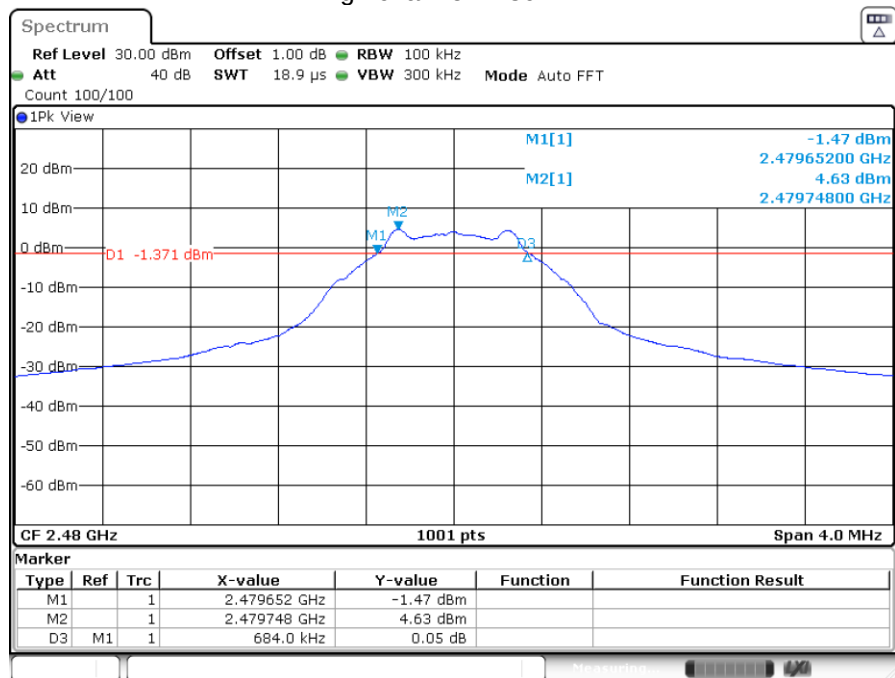


Date: 8.APR.2022 15:23:38

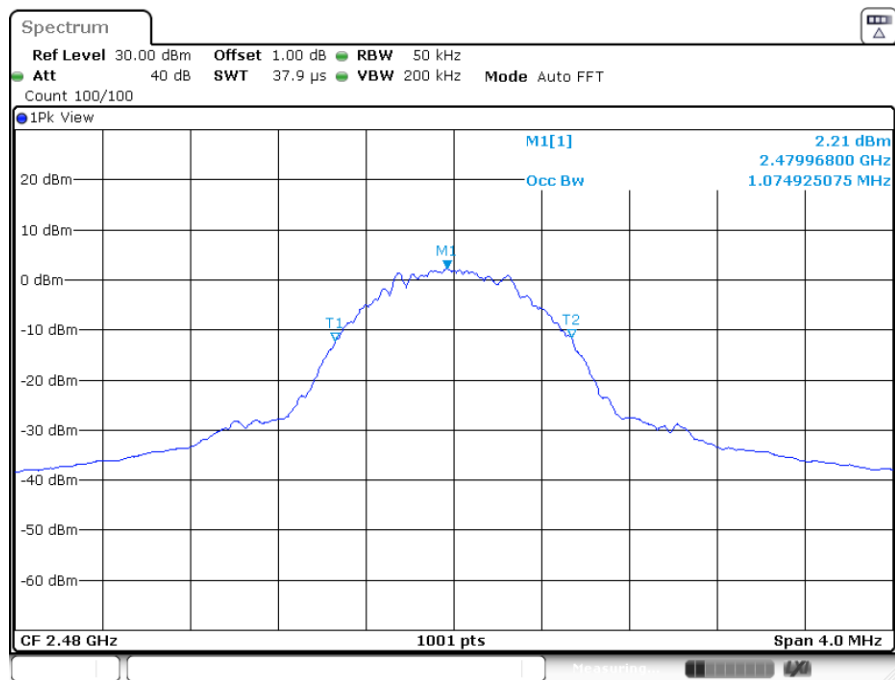


Date: 8.APR.2022 15:23:49

High channel 2480MHz



Date: 8.APR.2022 15:25:08



Date: 8.APR.2022 15:25:19

9.5 Spurious RF conducted emissions

Test Method

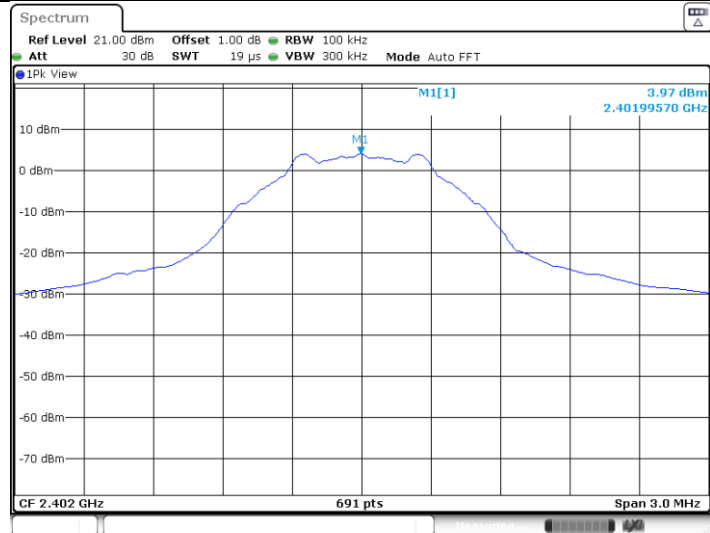
1. Establish a reference level by using the following procedure:
 - a. Set RBW=100 kHz. VBW $\geq$ 3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
 - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
 - a. Set the center frequency and span to encompass frequency range to be measured.
 - b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

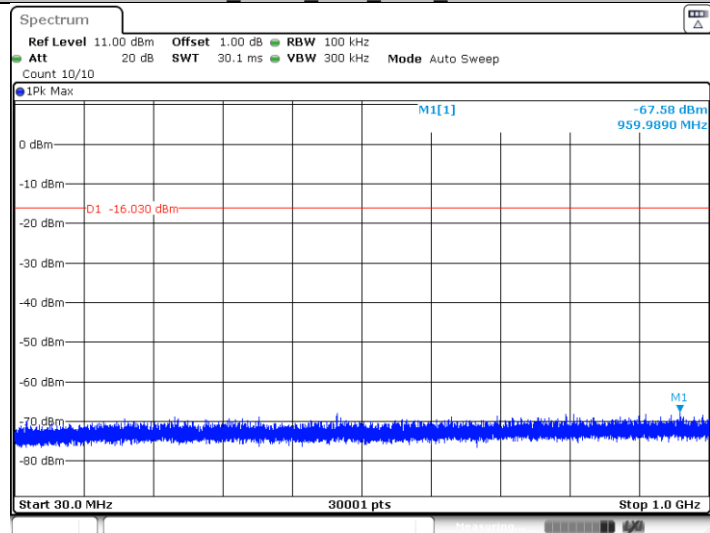
TestMode	Antenna	Channel	FreqRange(MHz)	RefLevel	Result(dBm)	Limit(dBm)	Verdict
BLE	Ant1	2402	Reference	3.97	3.97	---	PASS
			30~1000	30~1000	-67.58	≤ -16.03	PASS
			1000~26500	1000~26500	-48.59	≤ -16.03	PASS
		2440	Reference	3.84	3.84	---	PASS
			30~1000	30~1000	-66.76	≤ -16.16	PASS
			1000~26500	1000~26500	-52.29	≤ -16.16	PASS
		2480	Reference	4.59	4.59	---	PASS
			30~1000	30~1000	-66.56	≤ -15.41	PASS
			1000~26500	1000~26500	-52.25	≤ -15.41	PASS

BLE_BT4.0_Ant1_2402_0-Reference



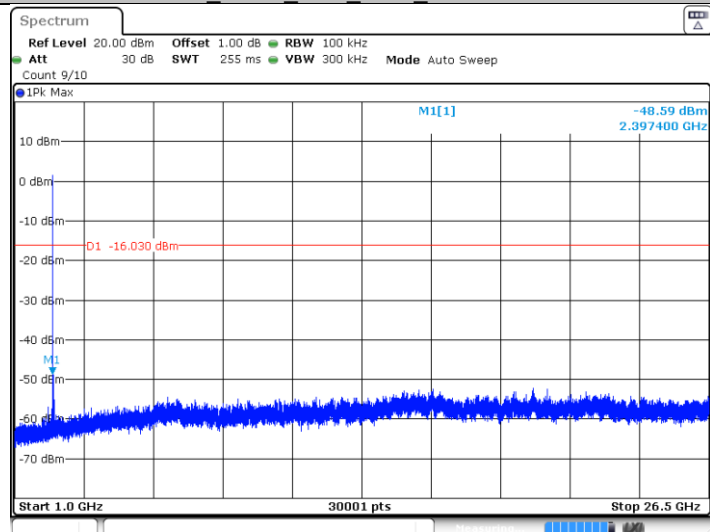
Date: 8 APR 2022 15:22:28

BLE_BT4.0_Ant1_2402_30-1000



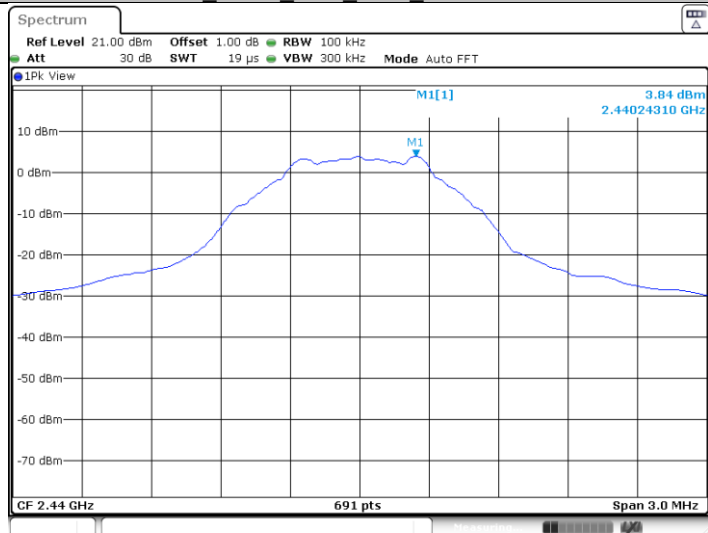
Date: 8 APR 2022 15:22:34

BLE_BT4.0_Ant1_2402_1000-26500



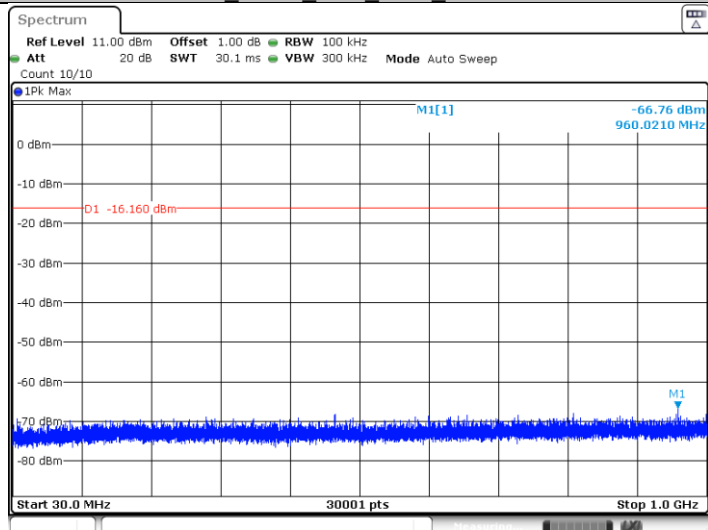
Date: 8 APR 2022 15:22:42

BLE_BT4.0_Ant1_2440_0-Reference



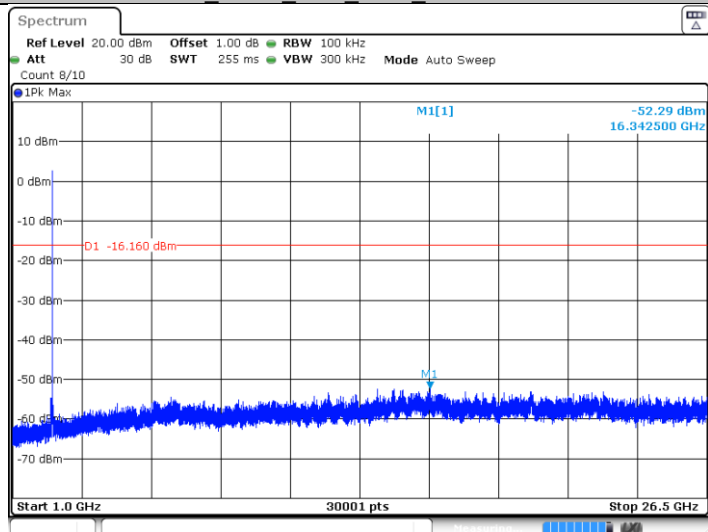
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BLE_BT4.0_Ant1_2440_30-1000



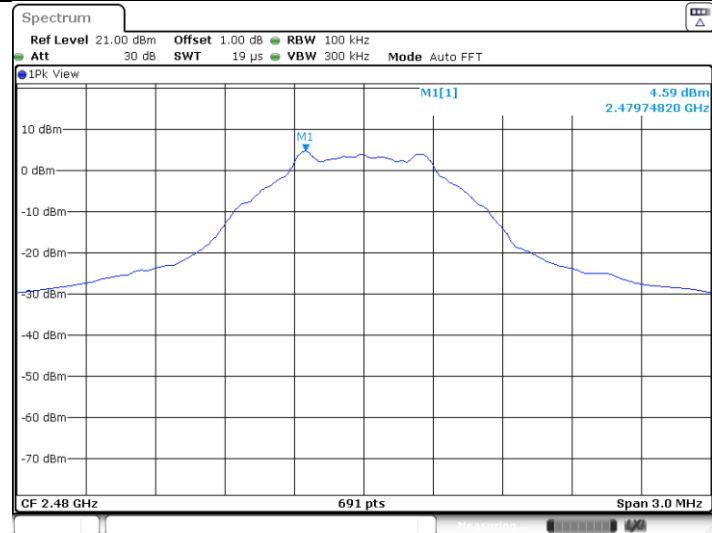
Date: 8 APR 2022 15:24:13

BLE_BT4.0_Ant1_2440_1000-26500



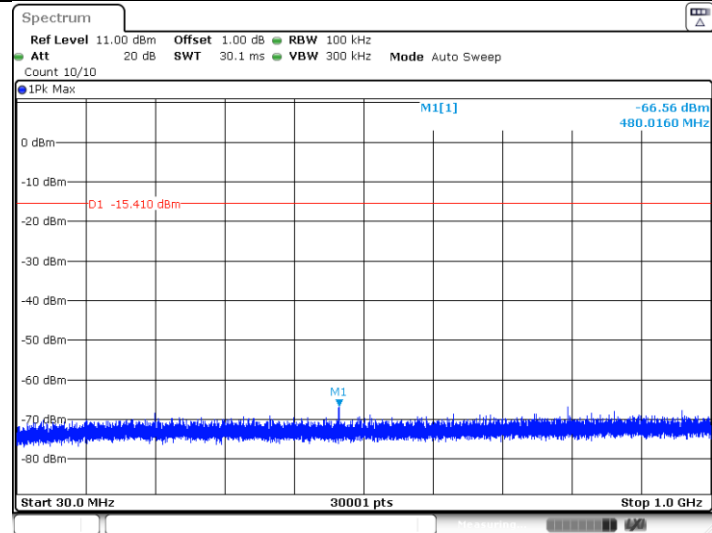
Date: 8 APR 2022 15:24:21

BLE_BT4.0_Ant1_2480_0-Reference



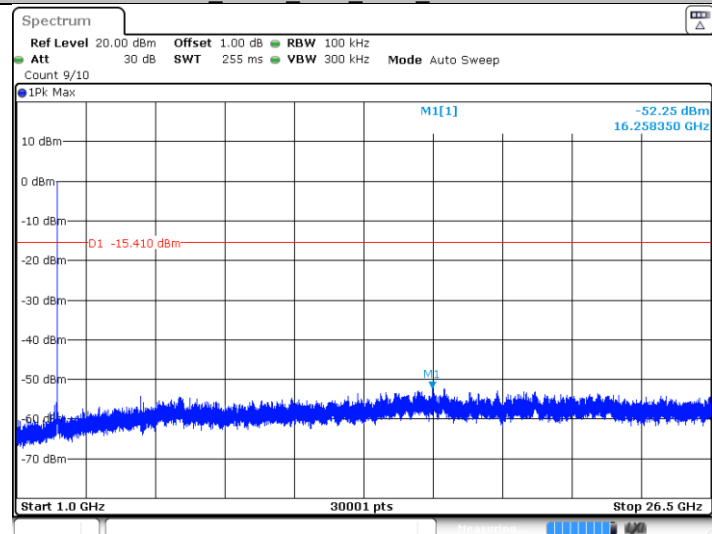
Date: 8.APR.2022 15:25:47

BLE_BT4.0_Ant1_2480_30-1000



Date: 8.APR.2022 15:25:53

BLE_BT4.0_Ant1_2480_1000-26500



Date: 8.APR.2022 15:26:01

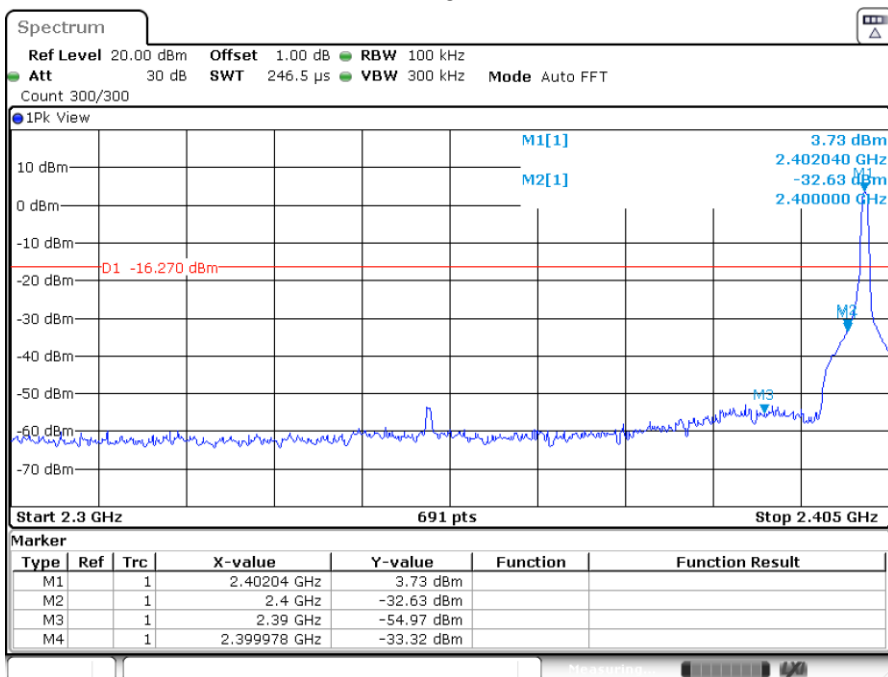
9.6 Band edge

Test Method

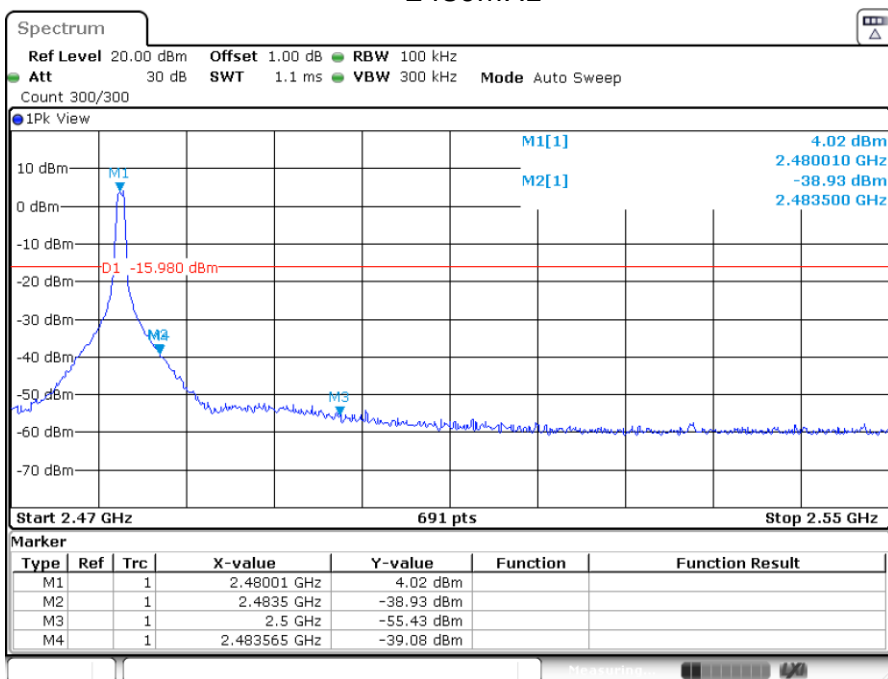
- 1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW $\geq$ RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

Band edge testing**2402MHz**

Date: 8.APR.2022 15:22:21

2480MHz

Date: 8.APR.2022 15:25:41

9.7 Spurious radiated emissions for transmitter

Test Method

- 1: The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
- 3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5: Use the following spectrum analyzer settings According to C63.10:

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious
 RBW = 100 KHz to 120KHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Peak unwanted emissions Above 1GHz:

Span = wide enough to capture the peak level of the in-band emission and all spurious
 RBW = 1MHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1000 MHz

- a) RBW = 1 MHz.
- b) $VBW \geq [3 \times RBW]$.
- c) Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq RBW / 2$.
 Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
- d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
- e) Sweep time = auto.
- f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of $1 / D$, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
- g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is $[10 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
 - 2) If linear voltage averaging mode was used in the preceding step e), then the correction

factor is $[20 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Limit

The radio emission outside the operating frequency band 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. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

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. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

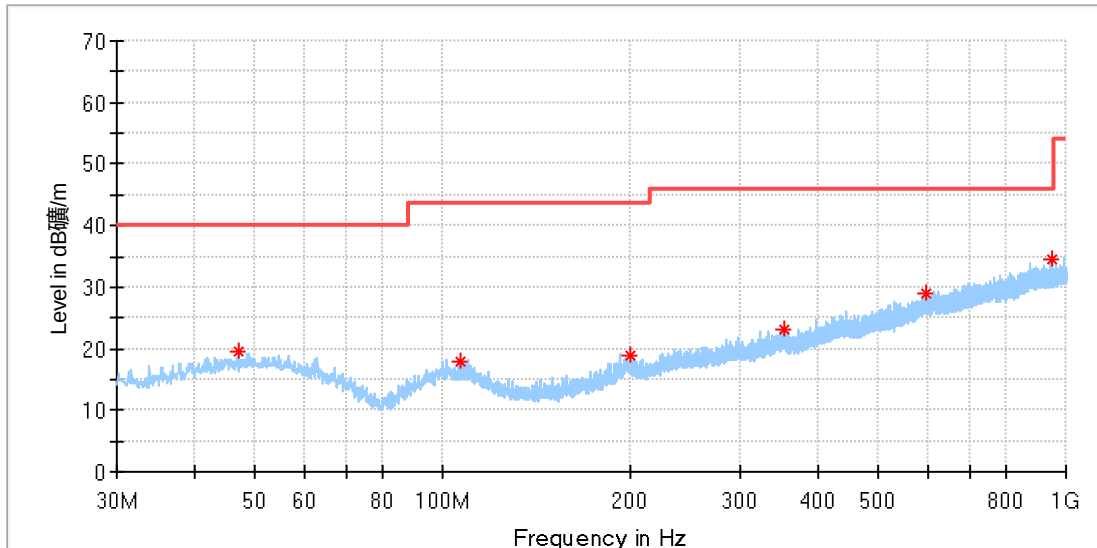
Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

Spurious radiated emissions for transmitter

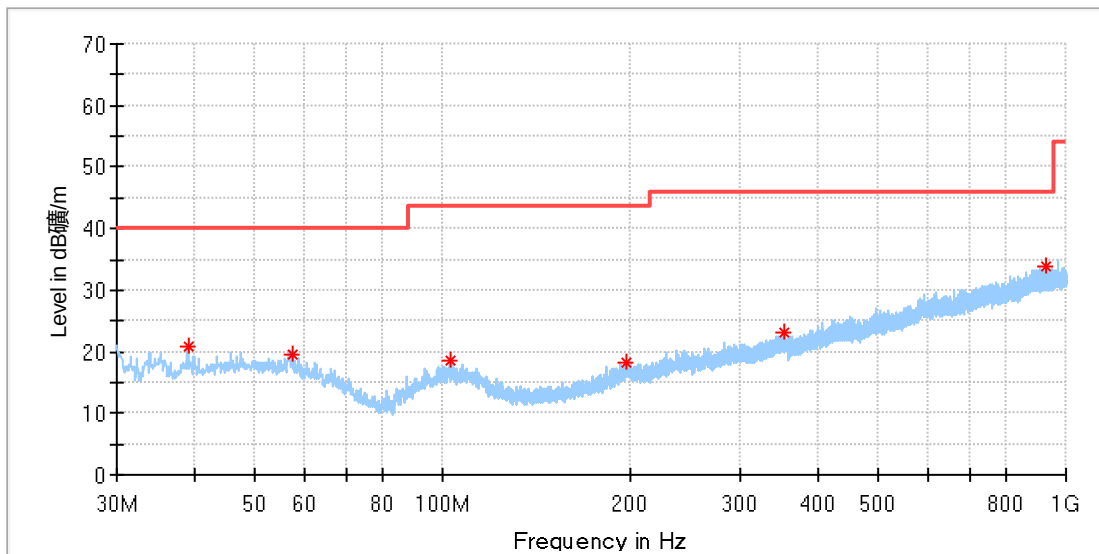
According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

30MHz-1GHz:



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
47.035625	19.50	40.00	20.50	200.0	H	331.0	20.80
106.690625	17.99	43.50	25.51	200.0	H	0.0	19.12
199.386250	18.78	43.50	24.72	200.0	H	0.0	19.46
354.161875	23.11	46.00	22.89	200.0	H	281.0	23.65
596.480000	29.07	46.00	16.93	100.0	H	79.0	28.51
952.651875	34.57	46.00	11.43	100.0	H	0.0	32.67

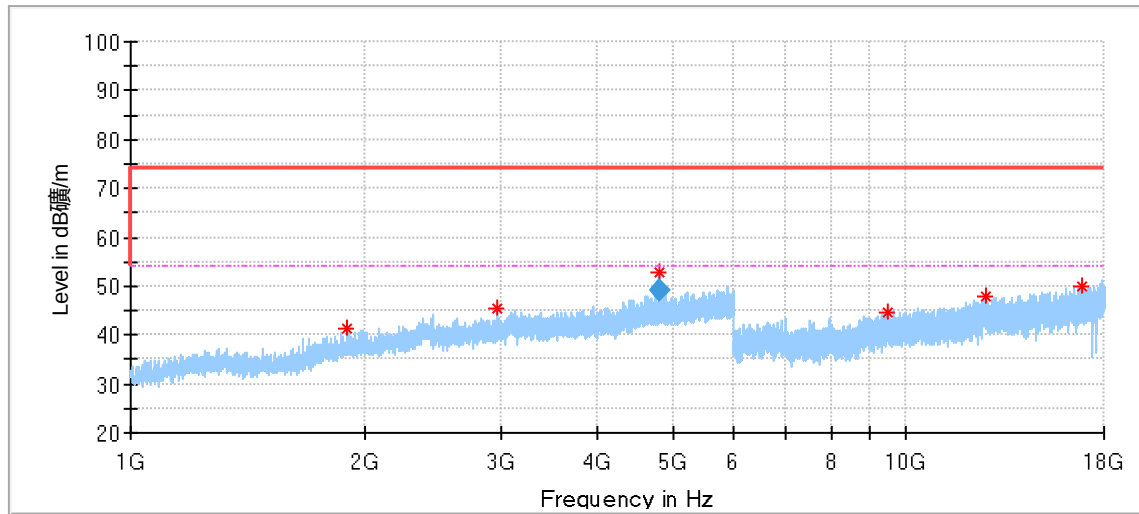


Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.033125	20.85	40.00	19.15	100.0	V	302.0	19.14
57.523750	19.51	40.00	20.49	100.0	V	0.0	20.38
102.568125	18.49	43.50	25.01	200.0	V	99.0	19.38
197.628125	18.37	43.50	25.13	200.0	V	181.0	19.56
353.070625	23.02	46.00	22.98	100.0	V	268.0	23.62
929.796250	33.78	46.00	12.22	200.0	V	6.0	32.58

1GHz-18GHz:

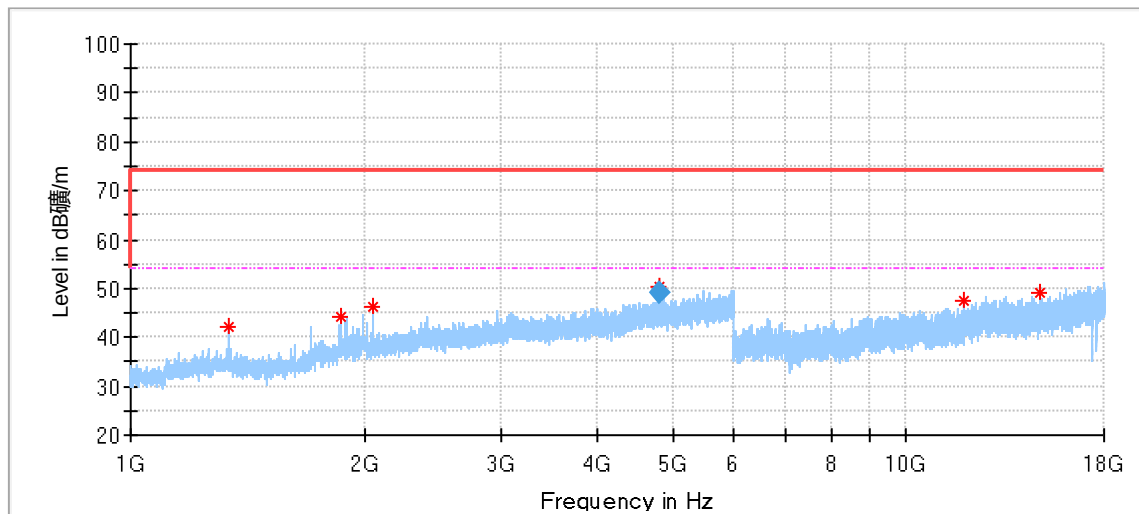
M/N: MWB-S-WB01-2

Operating Condition: Tx 2402MHz



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1904.500000	41.26	74.00	32.74	150.0	H	157.0	-4.88
2975.500000	45.54	74.00	28.46	150.0	H	284.0	-1.15
4804.500000	52.62	74.00	21.38	150.0	H	59.0	3.57
9497.500000	44.71	74.00	29.29	150.0	H	172.0	12.85
12646.500000	48.06	74.00	25.94	150.0	H	255.0	16.75
16820.000000	49.88	74.00	24.12	150.0	H	60.0	21.77
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4804.500000	49.02	54.00	4.98	150.0	H	59.0	3.57

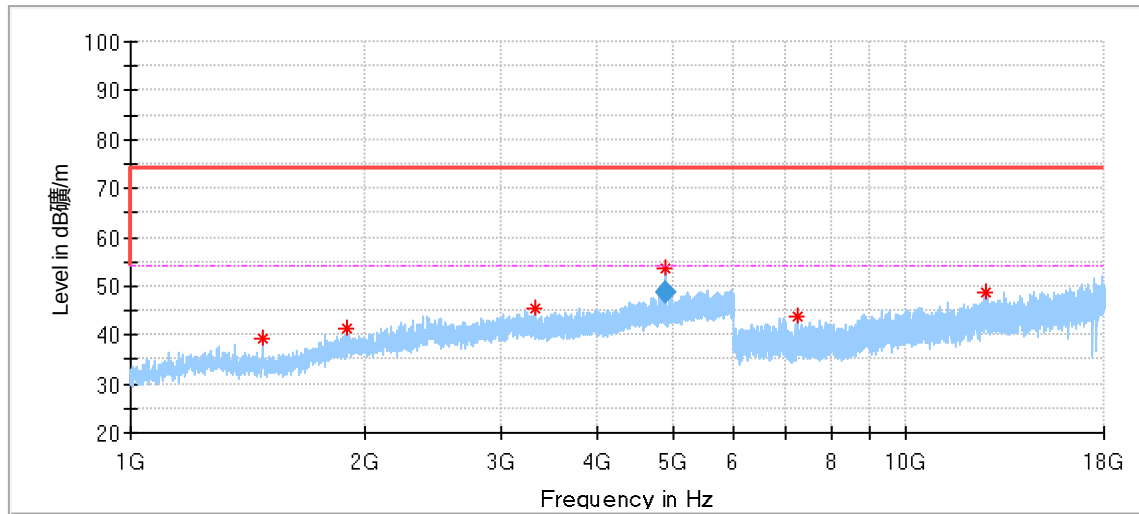


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1337.000000	42.06	74.00	31.94	150.0	V	203.0	-8.63
1871.000000	44.22	74.00	29.78	150.0	V	177.0	-5.05
2055.500000	46.21	74.00	27.79	150.0	V	194.0	-4.65
4805.000000	50.33	74.00	23.67	150.0	V	10.0	3.57
11853.000000	47.37	74.00	26.63	150.0	V	263.0	14.27
14863.500000	49.07	74.00	24.93	150.0	V	153.0	17.24
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4805.000000	49.05	54.00	4.95	150.0	V	10.0	3.57

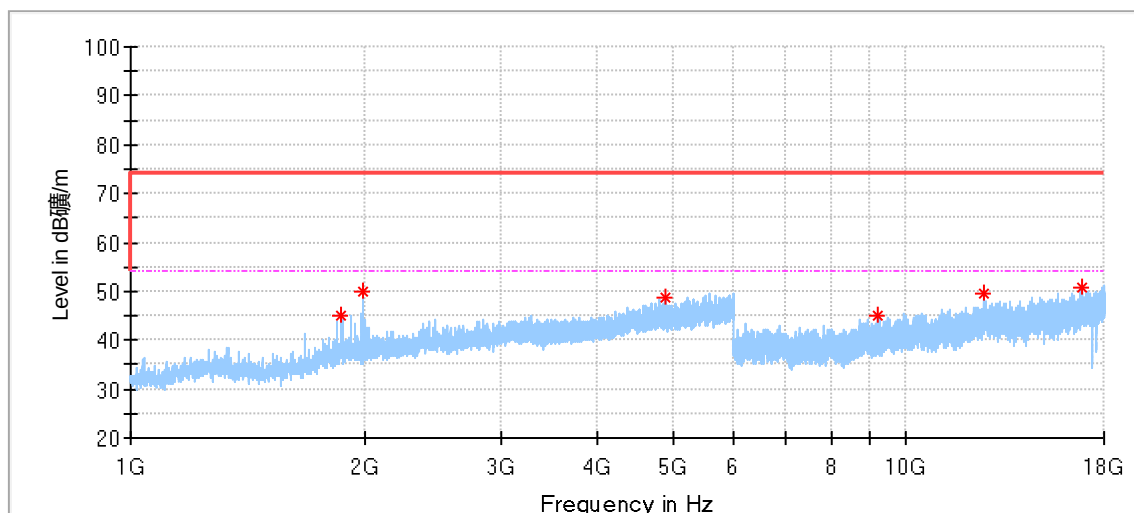
M/N: MWB-S-WB01-2

Operating Condition: Tx 2440MHz



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1481.500000	39.10	74.00	34.90	150.0	H	248.0	-9.21
1898.000000	41.17	74.00	32.83	150.0	H	356.0	-4.94
3317.000000	45.42	74.00	28.58	150.0	H	69.0	-0.50
4880.500000	53.61	74.00	20.39	150.0	H	221.0	3.91
7254.500000	43.95	74.00	30.05	150.0	H	91.0	8.84
12645.500000	48.52	74.00	25.48	150.0	H	33.0	16.76
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4880.500000	48.89	54.00	5.11	150.0	H	221.0	3.91

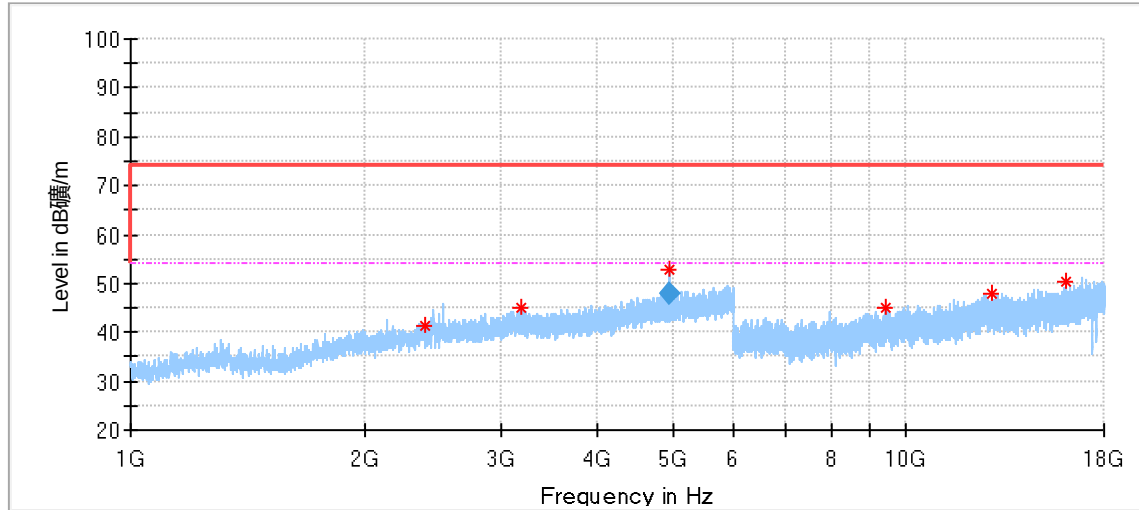


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1870.000000	45.14	74.00	28.86	150.0	V	183.0	-5.07
1992.500000	49.92	74.00	24.08	150.0	V	148.0	-4.73
4880.500000	48.58	74.00	25.42	150.0	V	4.0	3.91
9211.000000	44.82	74.00	29.18	150.0	V	27.0	11.42
12633.500000	49.65	74.00	24.35	150.0	V	133.0	16.62
16817.000000	50.80	74.00	23.20	150.0	V	106.0	21.77

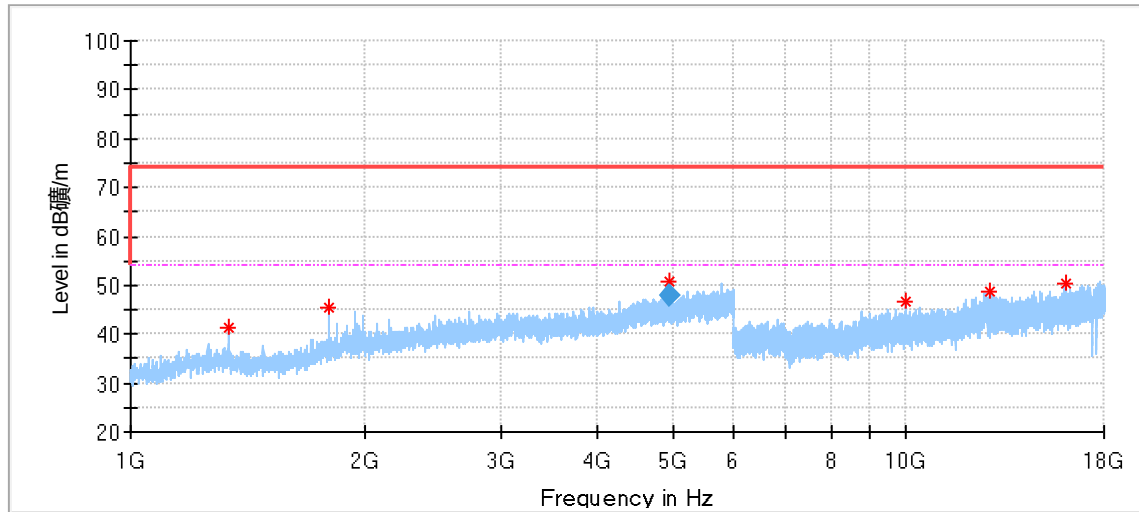
M/N: MWB-S-WB01-2

Operating Condition: Tx 2480MHz



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2390.000000	41.16	74.00	32.84	150.0	H	67.0	-2.93
3193.500000	45.14	74.00	28.86	150.0	H	59.0	-0.26
4960.500000	52.95	74.00	21.05	150.0	H	67.0	3.92
9435.500000	44.86	74.00	29.14	150.0	H	80.0	12.62
12930.000000	47.73	74.00	26.27	150.0	H	216.0	15.92
16104.000000	50.25	74.00	23.75	150.0	H	272.0	19.79
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4960.500000	48.03	54.00	5.97	150.0	H	67.0	3.92



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1335.000000	41.17	74.00	32.83	150.0	V	194.0	-8.59
1798.500000	45.60	74.00	28.40	150.0	V	176.0	-6.03
4960.000000	50.74	74.00	23.26	150.0	V	356.0	3.92
9981.000000	46.47	74.00	27.53	150.0	V	356.0	12.35
12845.500000	48.88	74.00	25.12	150.0	V	78.0	15.54
16113.000000	50.36	74.00	23.64	150.0	V	188.0	19.80
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4960.000000	48.02	54.00	5.98	150.0	V	356.0	3.92

Remark:

- (1) Data of measurement within frequency range 18-26GHz are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so test data does not present in this report.
- (2) Level=Reading Level + Correction Factor
 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
 Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
 (The Reading Level is recorded by software which is not shown in the sheet)

10 Test Equipment List

List of Test Instruments

Radiated spurious emission:

Description	Manufacturer	Model no.	Equipment ID	Serial no.	cal interval (year)	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	1	2022-6-4
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9162	68-4-80-19-003	284	1	2022-2-2
Wave Guide Antenna	ETS	3117	68-4-80-19-001	00218954	1	2022-5-24
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-001	100745	1	2022-10-10
Pre-amplifier	Rohde & Schwarz	SCU 08F2	68-4-29-19-004	08400018	1	2022-10-10
Sideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	12827	1	2022-7-21
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	1	2022-7-27
Attenuator	Mini-circuits	UNAT-6+	68-4-81-21-002	15542	1	2022-8-23
3m Semi-anechoic chamber	TDK	9X6X6	68-4-90-19-006	----	3	2023-5-28
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.02	N/A	N/A

Conducted emission:

Description	Manufacturer	Model no.	Equipment ID	Serial no.	cal interval (year)	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-14-001	101782	1	2022-6-4
LISN	Rohde & Schwarz	ENV4200	68-4-87-14-001	100249	1	2022-6-5
LISN	Rohde & Schwarz	ENV432	68-4-87-16-001	101318	1	2022-6-5
LISN	Rohde & Schwarz	ENV216	68-4-87-14-002	100326	1	2022-6-5
ISN	Rohde & Schwarz	ENY81	68-4-87-14-003	100177	1	2022-6-5
ISN	Rohde & Schwarz	ENY81-CA6	68-4-87-14-004	101664	1	2022-6-5
High Voltage Probe	Schwarzbeck	TK9420(VT9420)	68-4-27-14-001	9420-584	1	2022-6-5
RF Current Probe	Rohde & Schwarz	EZ-17	68-4-27-14-002	100816	1	2022-6-5
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	1	2022-6-3
Test software	Rohde & Schwarz	EMC32	68-4-90-14-003-A10	Version9.15.00	N/A	N/A
Shielding Room	TDK	CSR #1	68-4-90-19-004	----	3	2022-11-07

Conducted RF test:

Description	Manufacturer	Model no.	Equipment ID	Serial no.	cal interval (year)	cal. due date
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	1	2022-6-3

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Spurious Emission 30MHz-3000MHz	Horizontal: 4.70dB; Vertical: 4.67dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.65dB; Vertical: 4.63dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.51dB; Vertical: 4.50dB;
Uncertainty for Conducted Emission in shielding room (68-4-90-19-004) 9kHz-150KHz	3.62dB
Uncertainty for Conducted RF test	RF Power Conducted: 1.31dB Frequency test involved: 0.6×10^{-7} or 1%