FCC - TEST REPORT

Report Number	:	**68.950.21.0421.01**	Date of Issue:	**2021-10-13**
Model	:	**AM001**		
Product Type	:	Z CAM IPMAN AMBR		
Applicant	:	Shenzhen ImagineVision Technology Limited		
Address	:	1A, F5, TCL International E City, 1001 Zhong Shan Park Road, Nan Shan, 518055 Shenzhen, PEOPLE'S REPUBLIC OF CHINA		
Manufacturer	:	Shenzhen ImagineVision Technology Limited		
Address	:	1A, F5, TCL International E City, 1001 Zhong Shan Park Road, Nan Shan, 518055 Shenzhen, PEOPLE'S REPUBLIC OF CHINA		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	**38**		

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1 Table of Contents

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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 8828 5299
FCC Registration No.:	514049
FCC Designation Number:	CA5009
IC Registration No.:	10320A

3 Description of the Equipment Under Test

Product:	Z CAM IPMAN AMBR
Model no.:	AM001
FCC ID:	2AENNZCAMAMBR2107
Options and accessories:	HDMI Cable and Type-C Cable
Rating:	6.2V-18VDC, 1.5A
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	Integrated antenna
Antenna Gain:	Ant 0: 2.4G=4.43 dBi, 5G=4.59 dBi Ant 1: 2.4G=4.22 dBi, 5G=5.33 dBi
Description of the EUT:	The equipment supports Bluetooth Low Energy/Bluetooth BR+EDR /WIFI functions. The TX and RX range is 2402MHz-2480MHz for Bluetooth, 2412MHz – 2462MHz for 2.4GHz Wi-Fi, 5180MHz – 5240MHz 5745MHz – 5825MHz for 5GHz Wi-Fi.

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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 KDB 558074 D01 15.247 Meas Guidance v05r02 and ANSI C63.10 (2013).

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5 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart C						
Test Condition		Pages	Test Site	Test Result		
				Pass	Fail	N/A
§15.207	Conducted emission AC power port	10	Site 1	☒	☐	☐
§15.247 (b) (1)	Conducted peak output power	13	Site 1	☒	☐	☐
§15.247(a)(1)	20dB bandwidth	---	---	☐	☐	☒
§15.247(a)(1)	Carrier frequency separation	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Number of hopping frequencies	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Dwell Time	---	---	☐	☐	☒
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	17	Site 1	☒	☐	☐
§15.247(e)	Power spectral density	15	Site 1	☒	☐	☐
§15.247(d)	Spurious RF conducted emissions	21	Site 1	☒	☐	☐
§15.247(d)	Band edge	26	Site 1	☒	☐	☐
§15.247(d)	Spurious radiated emissions for transmitter	28	Site 1	☒	☐	☐
§15.203	Antenna requirement	See note 2		☒	☐	☐

Note 1: N/A=Not Applicable.
Note 2: The EUT uses an Integrated antenna, which gain is Ant 0: 2.4G=4.43 dBi, 5G=4.59 dBi, Ant 1: 2.4G=4.22 dBi, 5G=5.33 dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AENNZCAMAMBR2107 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

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:	2021-06-03
Testing Start Date:	2021-06-04
Testing End Date:	2021-07-23

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

Reviewed by:	Prepared by:	Tested by:
John Zhi	Warlen Song	Carry Cai
Project Manager	Project Engineer	Test Engineer

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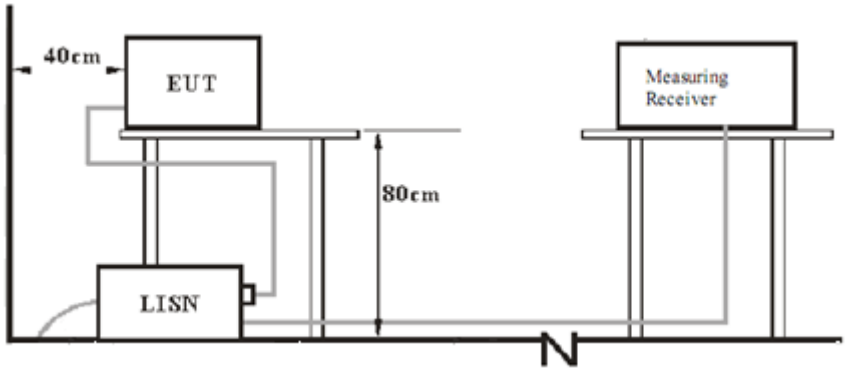
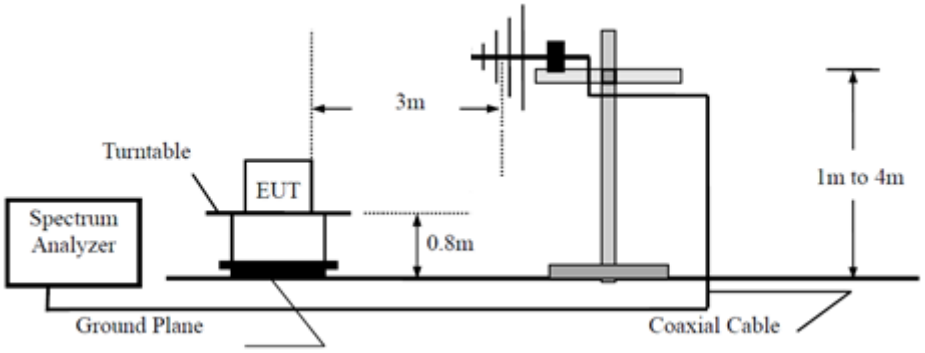
7 Test Setups

7.1 AC Power Line Conducted Emission test setups

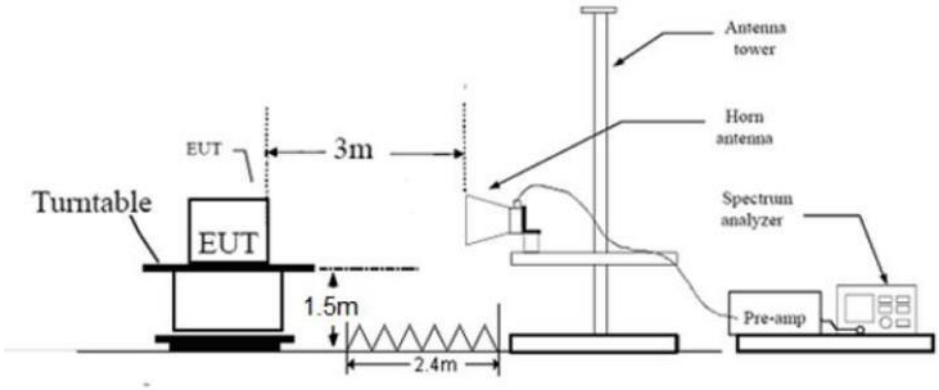


7.2 Radiated test setups

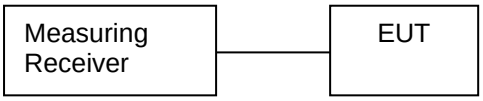
Below 1GHz



Above 1GHz



7.3 Conducted RF test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Notebook	Lenovo	X240	---
Adapter	Apple	A1357	---

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9 Technical Requirement

9.1 Conducted Emission Test

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 an 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

According to §15.207, conducted emissions limit as below:

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

*Decreasing linearly with logarithm of the frequency

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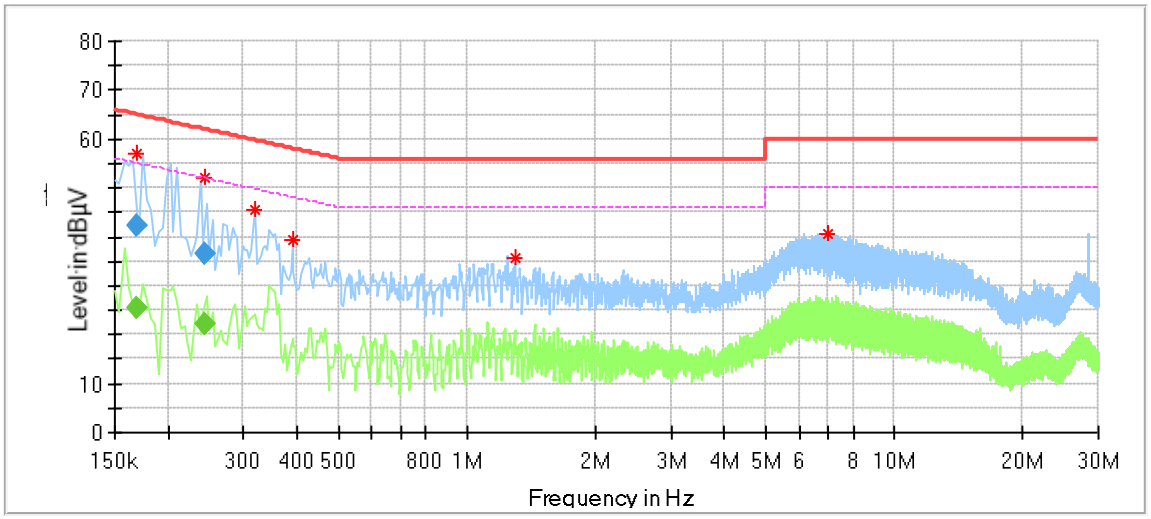
Conducted Emission

Product Type	:	Z CAM IPMAN AMBR
M/N	:	AM001
Operating Condition	:	Charging + Transmit
Test Specification	:	Power Line, Live
Comment	:	AC 120V/60Hz (External adapter)



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.169500	56.86	---	64.77	7.91	L1	9.64
0.242500	52.24	---	62.17	9.93	L1	9.64
0.318000	45.46	---	59.76	14.29	L1	9.64
0.390000	39.41	---	58.06	18.66	L1	9.64
1.294000	35.83	---	56.00	20.17	L1	9.67
6.966000	40.77	---	60.00	19.23	L1	9.83

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.169500	---	25.30	54.99	29.68	L1	9.64
0.169500	42.43	---	64.99	22.55	L1	9.64
0.242500	---	22.06	52.01	29.95	L1	9.64
0.242500	36.61	---	62.01	25.40	L1	9.64

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)

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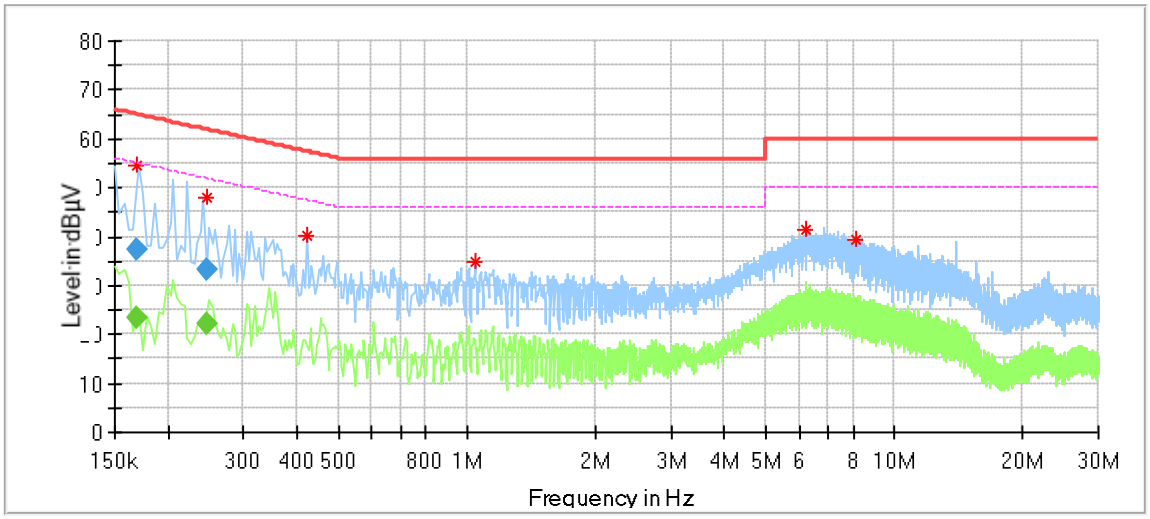
Conducted Emission

Product Type	:	Z CAM IPMAN AMBR
M/N	:	AM001
Operating Condition	:	Charging + Transmit
Test Specification	:	Power Line, Neutral
Comment	:	AC 120V/60Hz (External adapter)



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.169500	54.68	---	64.96	10.28	N	9.62
0.245500	47.85	---	62.03	14.18	N	9.63
0.422000	40.30	---	57.41	17.10	N	9.63
1.046000	34.73	---	56.00	21.27	N	9.65
6.206000	41.32	---	60.00	18.68	N	9.80
8.170000	39.28	---	60.00	20.72	N	9.85

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.169500	---	23.58	54.99	31.40	N	9.62
0.169500	37.39	---	64.99	27.59	N	9.62
0.245500	---	22.21	51.91	29.70	N	9.63
0.245500	33.18	---	61.91	28.73	N	9.63

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)

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9.2 Conducted peak output power

Test Method

1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the power meter by RF cable. The path loss was compensated to the results for each measurement.
2. Use the following spectrum analyzer settings:
   RBW > the 6dB bandwidth of the emission being measured, VBW≥3RBW, Span≥3RBW
   Sweep = auto, Detector function = peak, Trace = max hold.
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

According to §15.247 (b) (1), conducted peak output power limit as below:

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

Test result as below table

Frequency MHz	Conducted Peak Output Power dBm	Result
Bottom channel 2402MHz	0.64	Pass
Middle channel 2440MHz	0.45	Pass
Hight channel 2480MHz	-0.14	Pass

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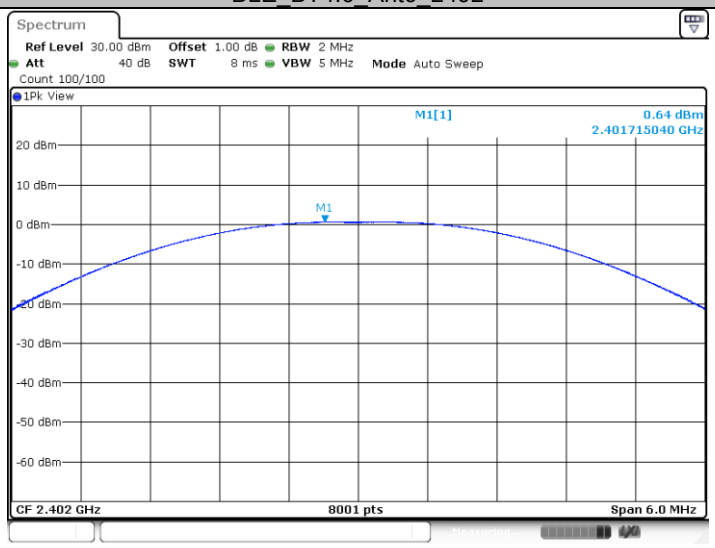
BLE_BT4.0_Ant0_2402



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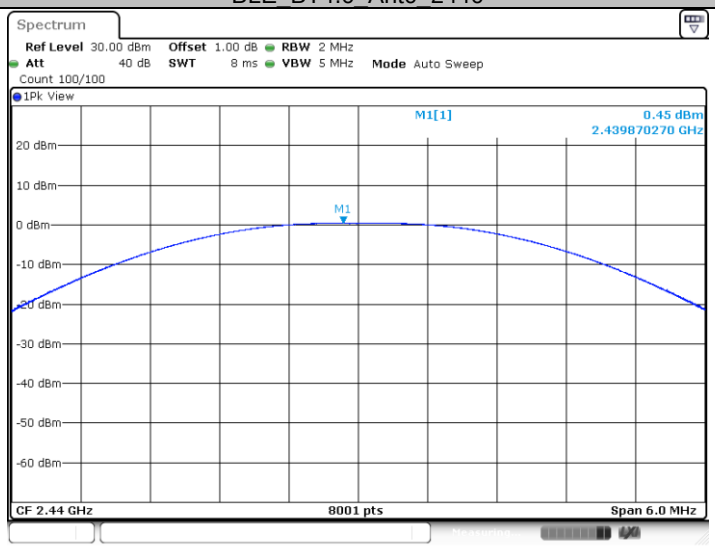

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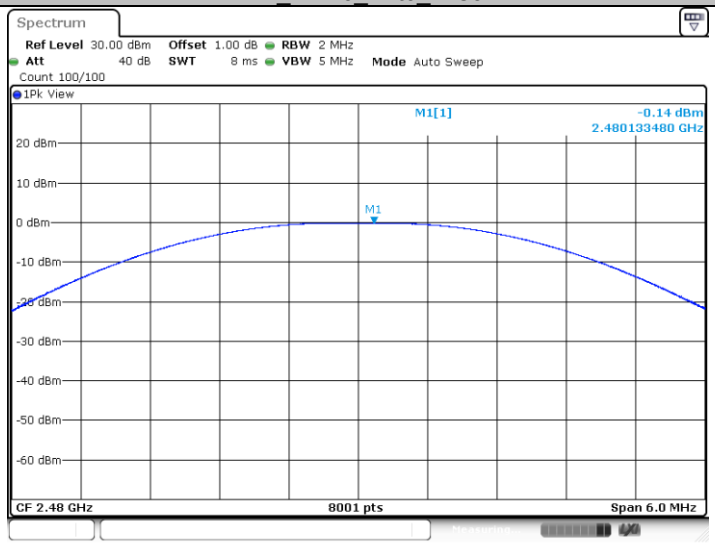

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9.3 Power spectral density

Test Method

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

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set analyzer center frequency to DTS channel center frequency. RBW=10kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
3. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
4. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm/3KHz]
≤8

Test result

Frequency **MHz**	Power spectral density **dBm/3KHz**	Result
Bottom channel 2402MHz	-13.83	Pass
Middle channel 2440MHz	-13.98	Pass
Top channel 2480MHz	-14.51	Pass

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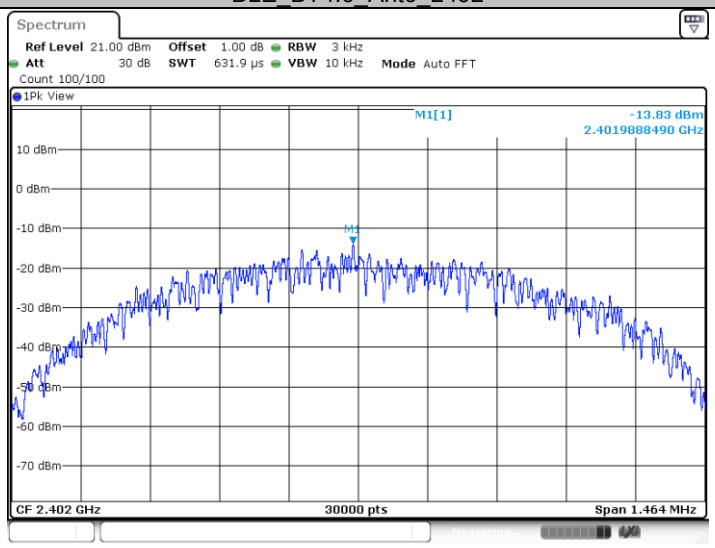

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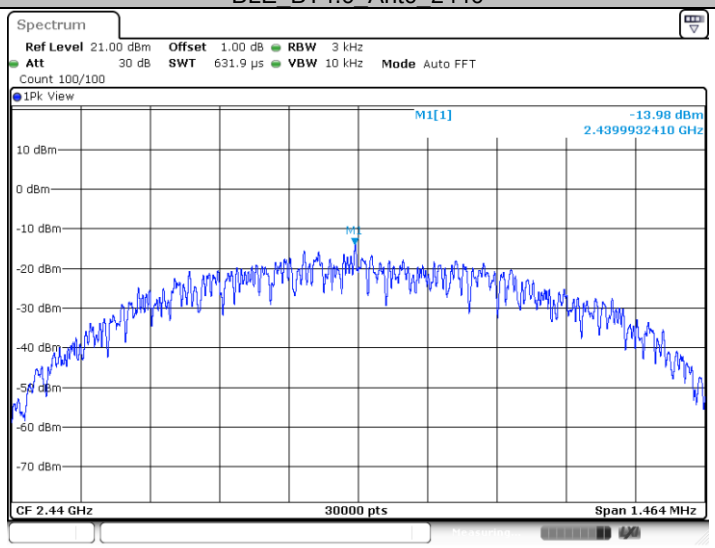

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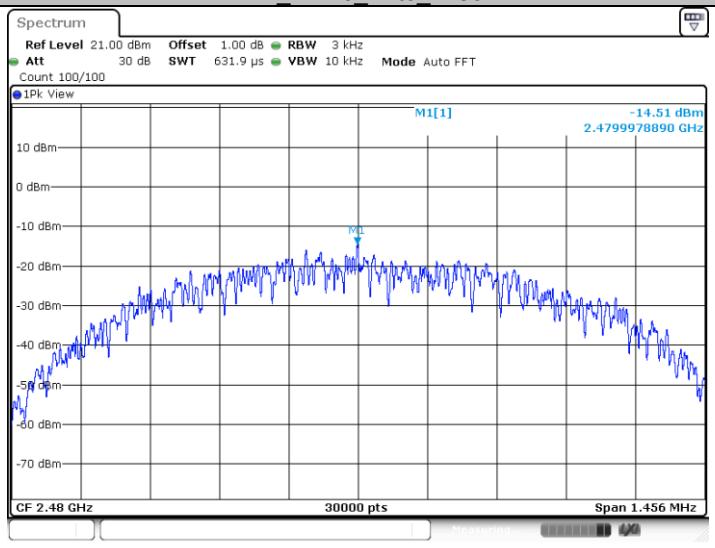

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9.4 6 dB Bandwidth and 99% Occupied Bandwidth

Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following test receiver settings:
   Span = approximately 5 times the 6dB bandwidth, centered on a hopping channel
   RBW =100KHz, VBW≥3RBW,
   Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
5. Repeat above procedures until all frequencies measured were complete.

Limit

Limit [kHz]
≥500

Test result

Frequency MHz	6dB bandwidth kHz	99% bandwidth kHz	Result
Bottom channel 2402MHz	732	1063	Pass
Middle channel 2440MHz	732	1063	Pass
Top channel 2480MHz	728	1063	Pass

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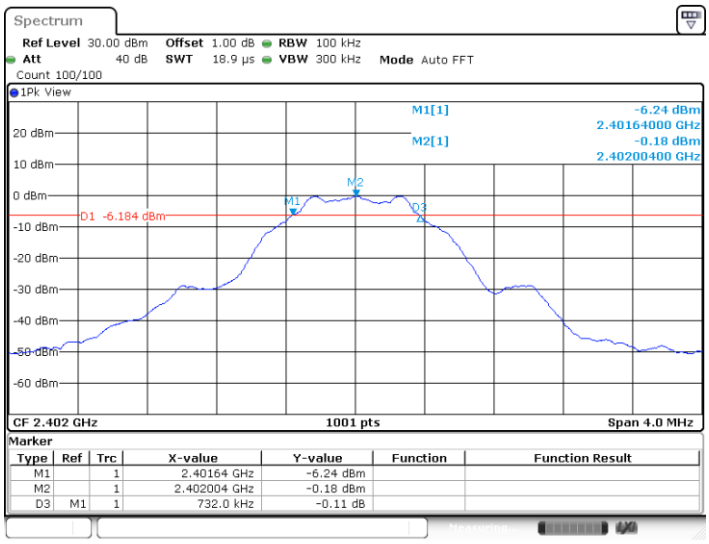
6 dB Bandwidth

Low channel 2402MHz



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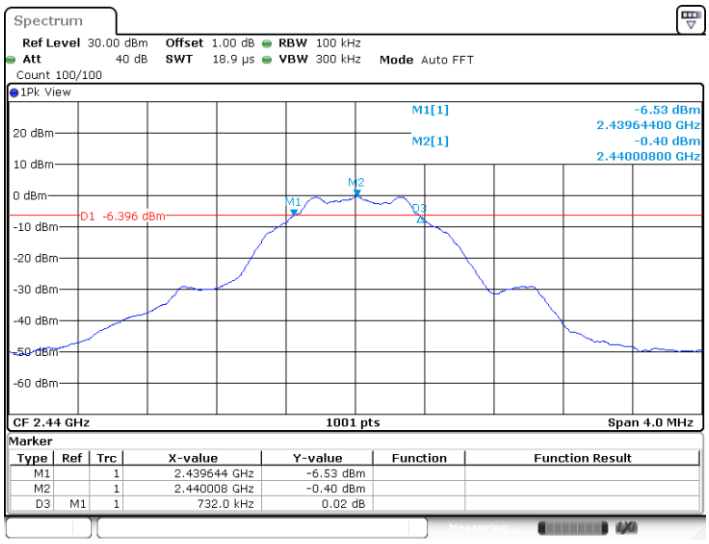
Middle channel 2440MHz



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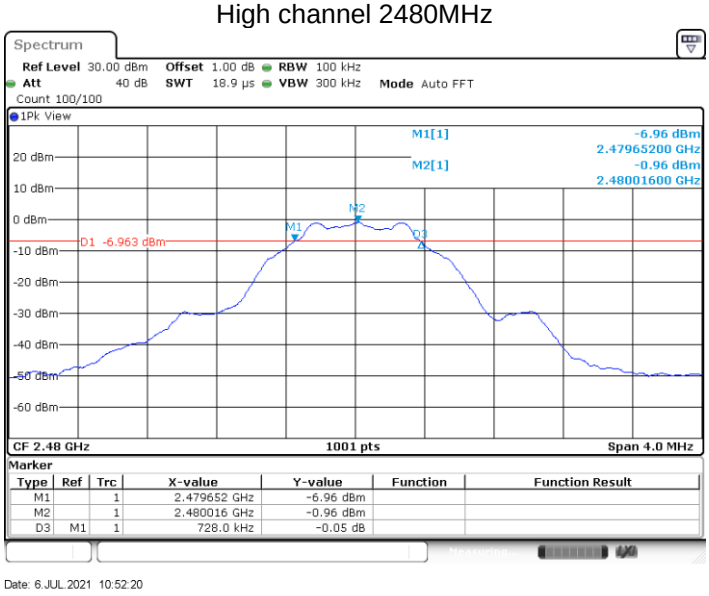
6 dB Bandwidth

High channel 2480MHz



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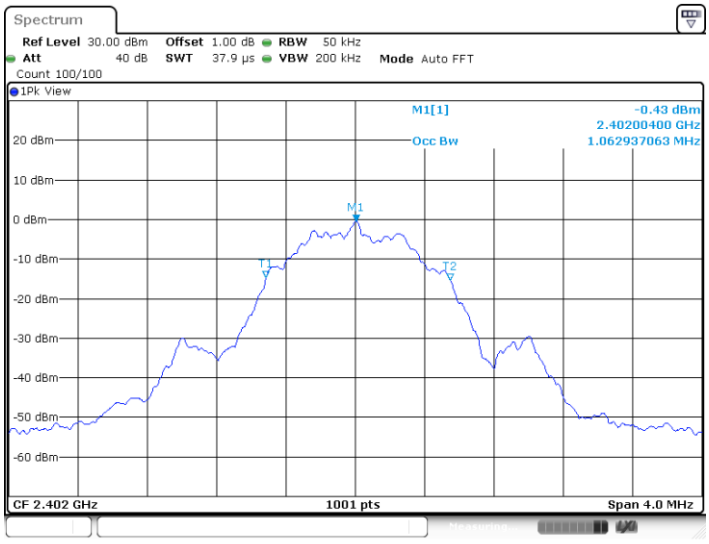
99% Bandwidth

Low channel 2402MHz



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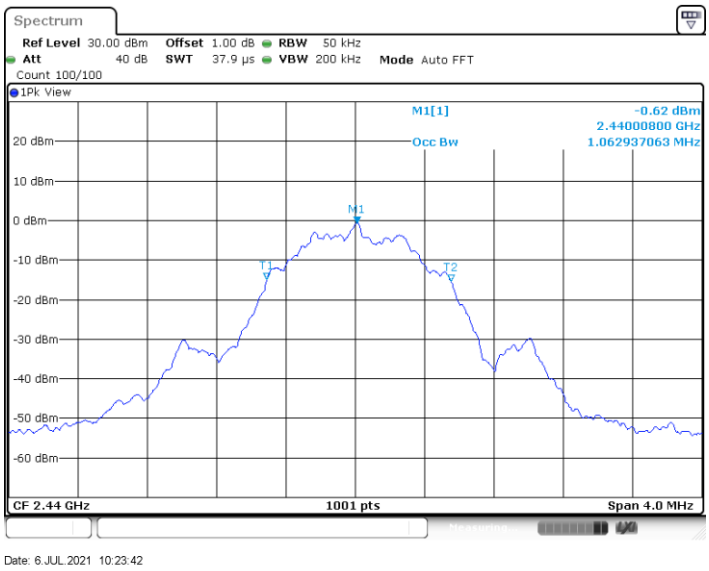
99% Bandwidth

Middle channel 2440MHz



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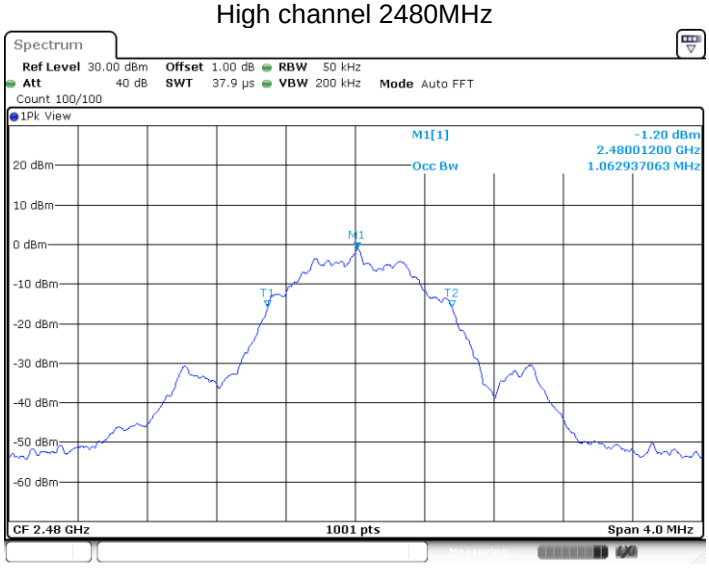
High channel 2480MHz



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9.5 Spurious RF conducted emissions

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
   RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
3. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
4. The level displayed must comply with the limit specified in this Section. Submit these plots.
5. Repeat above procedures until all frequencies measured were complete.

Limit

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

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Spurious RF conducted emissions

TestMode	Antenna	Channel (MHz)	FreqRange (MHz)	RefLevel	Result (dBm)	Limit (dBm)	Verdict
BLE_BT4.0	Ant0	2402	Reference	-0.17 dBm	-0.17	---	PASS
		2402	30~1000	30~1000 MHz	-67.68	<=-20.17	PASS
		2402	1000~26500	1000~26500 MHz	-49.58	<=-20.17	PASS
		2440	Reference	-0.37 dBm	-0.37	---	PASS
		2440	30~1000	30~1000 MHz	-67.76	<=-20.37	PASS
		2440	1000~26500	1000~26500 MHz	-50.53	<=-20.37	PASS
		2480	Reference	-0.92 dBm	-0.92	---	PASS
		2480	30~1000	30~1000 MHz	-68.06	<=-20.92	PASS
		2480	1000~26500	1000~26500 MHz	-50.43	<=-20.92	PASS

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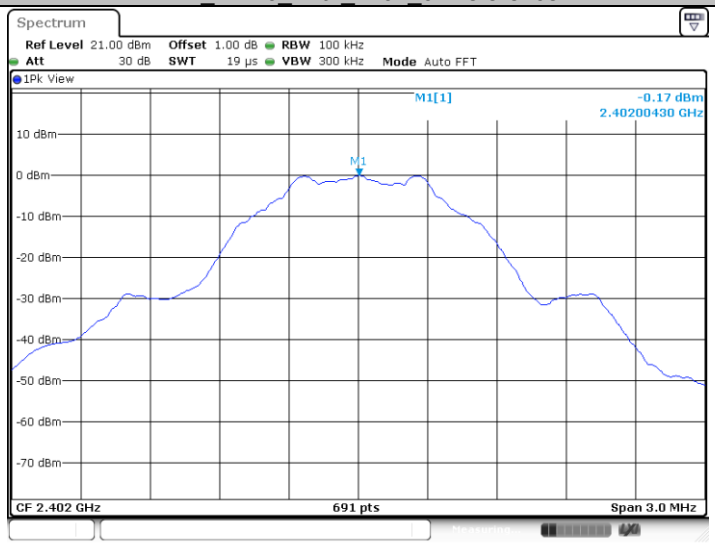
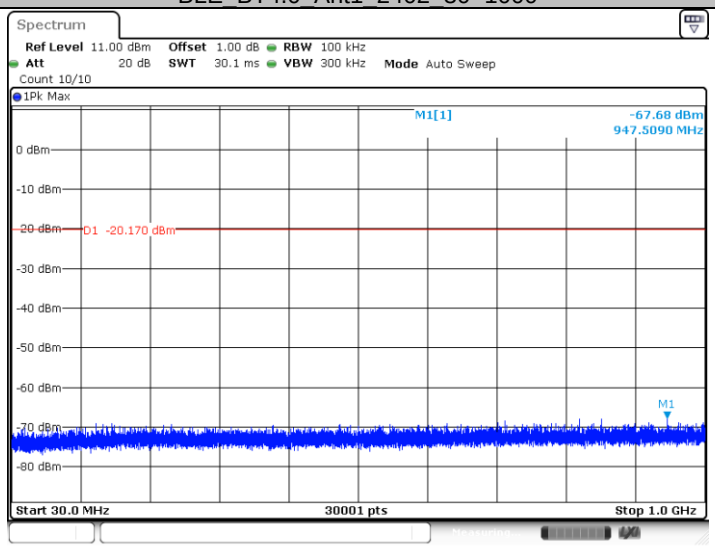
BLE_BT4.0_Ant1_2402_0~Reference



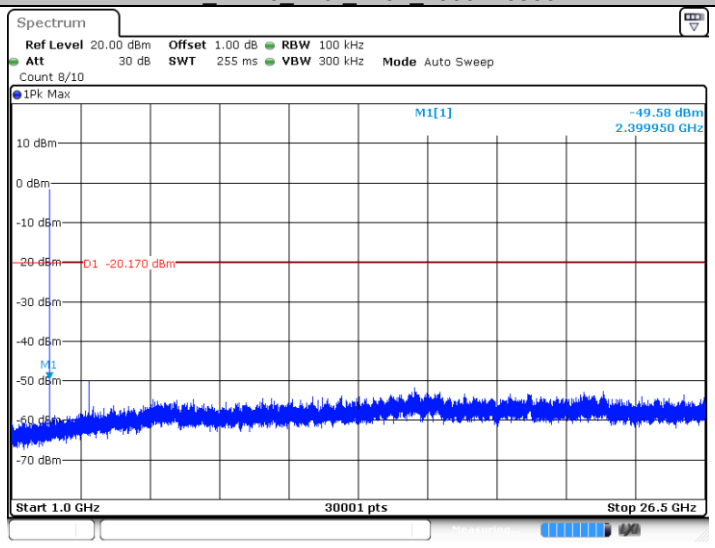
Date: 6.JUL.2021 10:21:30

BLE_BT4.0_Ant1_2402_30~1000



Date: 6.JUL.2021 10:21:36

BLE_BT4.0_Ant1_2402_1000~26500



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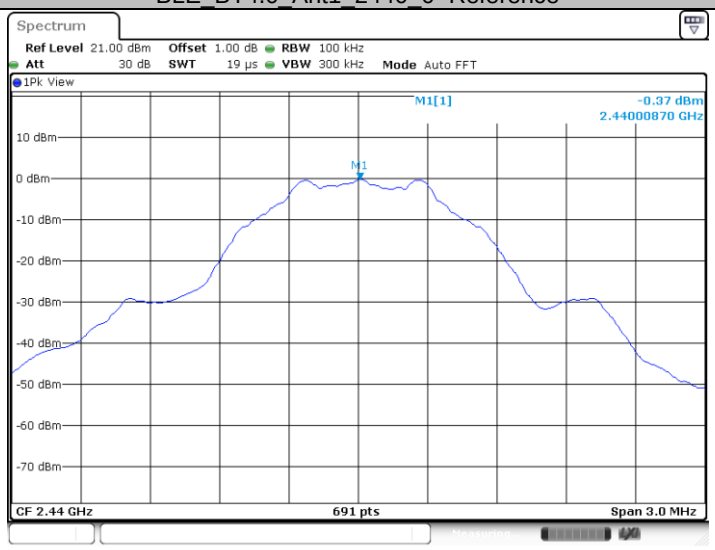
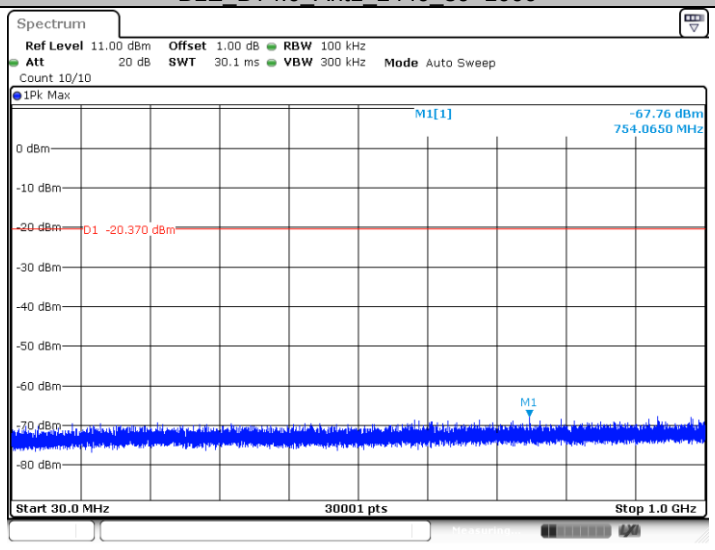
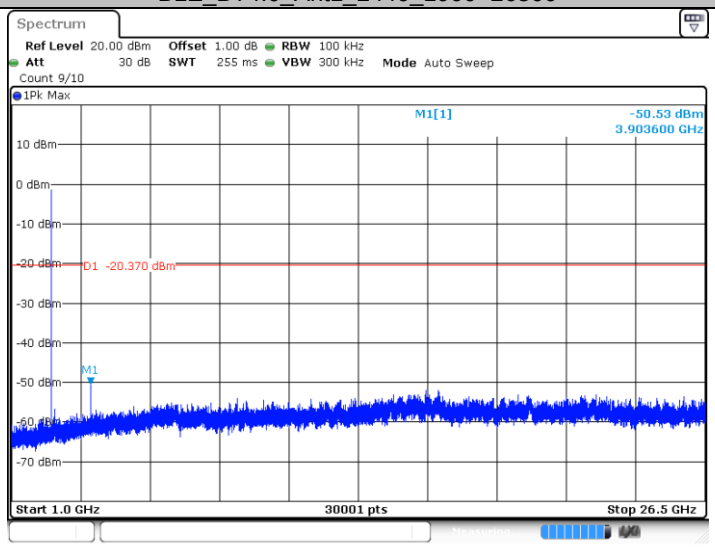
BLE_BT4.0_Ant1_2440_0~Reference



BLE_BT4.0_Ant1_2440_30~1000



BLE_BT4.0_Ant1_2440_1000~26500



BLE_BT4.0_Ant1_2480_0~Reference

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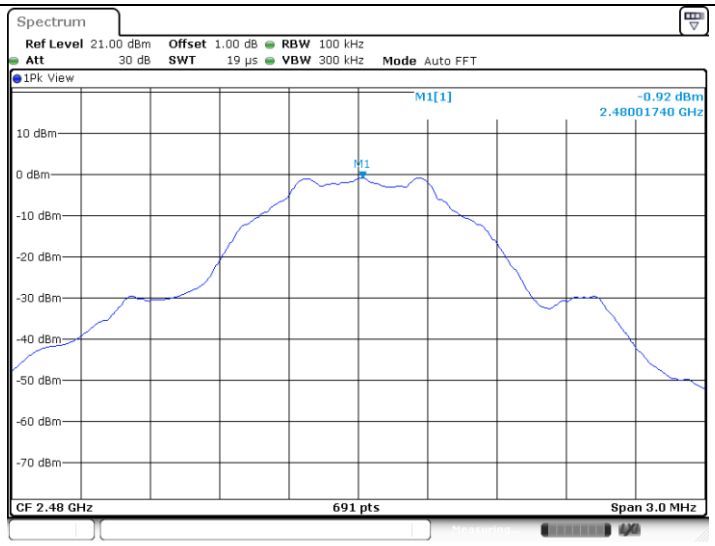
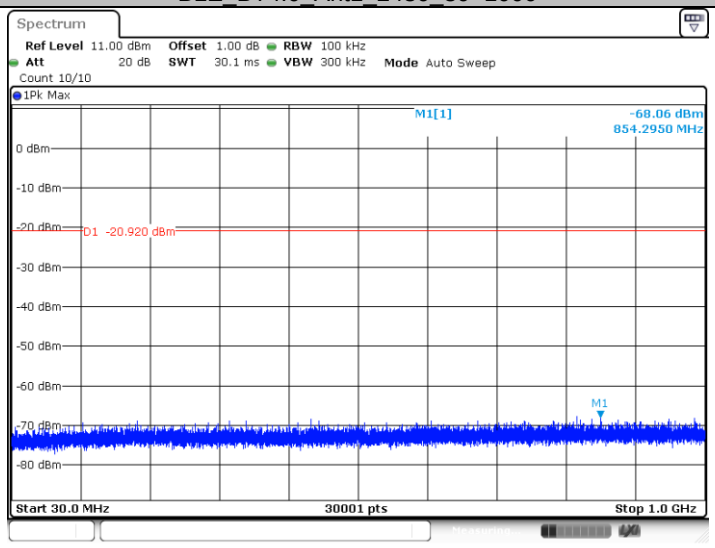
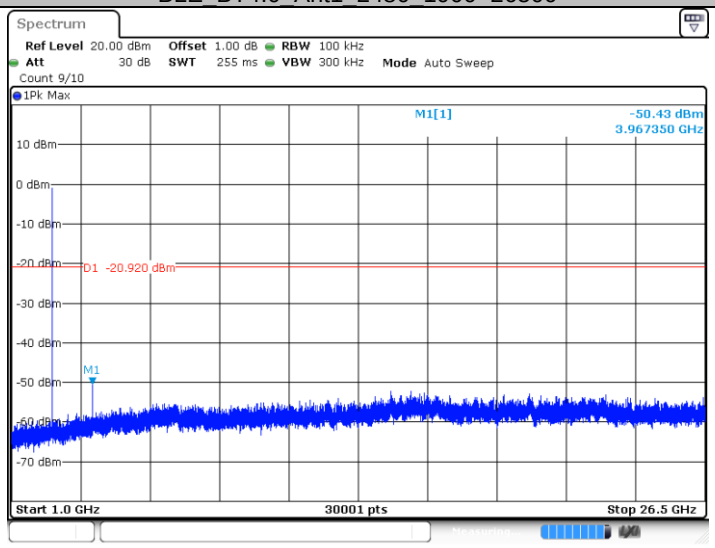


BLE_BT4.0_Ant1_2480_30~1000



BLE_BT4.0_Ant1_2480_1000~26500



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9.6 Band edge

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency
6. Set to the maximum power setting and enable the EUT hopping mode, repeat the test.

Limit

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

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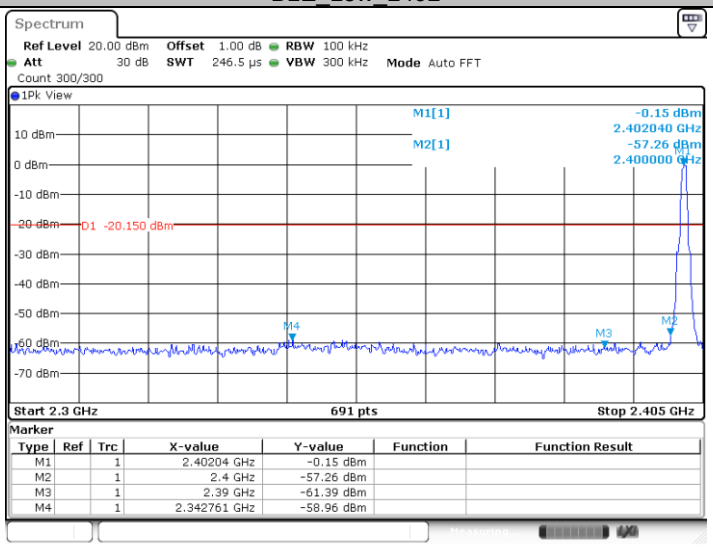
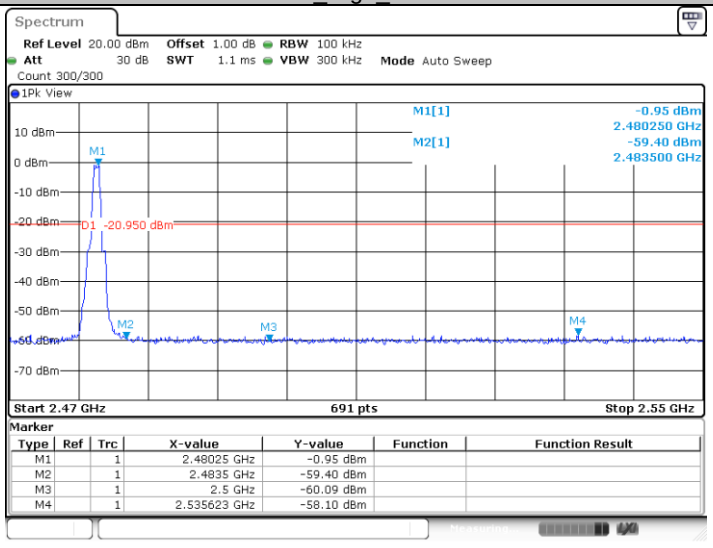
Band edge testing

TestMode	Antenna	ChName	Channel (MHz)	RefLevel (dBm)	Result (dBm)	Limit (dBm)	Verdict
BLE_BT4.0	Ant0	Low	2402	-0.15	-58.96	<=-20.15	PASS
		High	2480	-0.95	-58.1	<=-20.95	PASS

BLE_Low_2402



BLE_High_2480



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9.7 Spurious radiated emissions for transmitter

Test Method

1: The EUT was place 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 ≥[3 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)] \ 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 section15.205, must comply with the radiated emission limits specified in section 15.209.

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

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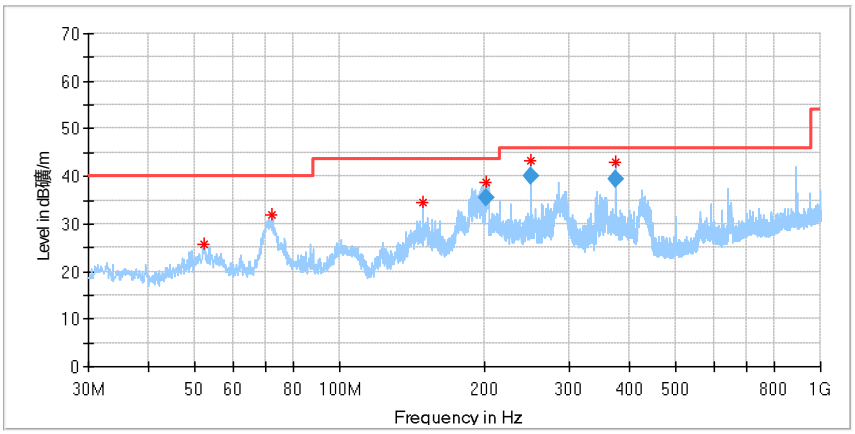
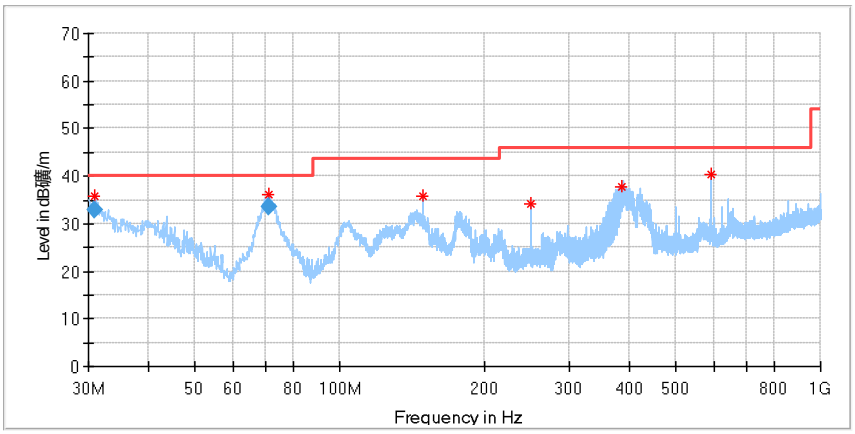
Spurious radiated emissions for transmitter

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.

30MHz to 1000MHz:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.310000	25.59	40.00	14.41	200.0	H	17.0	15.28
72.134375	31.80	40.00	8.20	100.0	H	68.0	10.58
148.461250	34.56	43.50	8.94	200.0	H	243.0	9.91
201.750625	38.91	43.50	4.59	100.0	H	252.0	13.32
250.008125	43.31	46.00	2.69	100.0	H	317.0	14.38
375.016875	42.94	46.00	3.06	100.0	H	353.0	17.67
Frequency	**QuasiPeak**	**Limit**	**Margin**	**Height**	**Pol**	**Azimuth**	**Corr.**
201.750625	35.39	43.50	7.61	100.0	H	252.0	13.32
250.008125	40.17	46.00	5.83	100.0	H	317.0	14.38
375.016875	39.55	46.00	6.45	100.0	H	353.0	17.67



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.970000	35.80	40.00	4.20	100.0	V	78.0	11.49
71.285625	36.26	40.00	3.74	200.0	V	0.0	10.81
148.461250	35.75	43.50	7.75	100.0	V	0.0	9.91
249.947500	34.05	46.00	11.95	100.0	V	154.0	14.37
386.232500	37.91	46.00	8.09	100.0	V	0.0	17.96
593.933750	40.00	46.00	6.00	100.0	V	154.0	22.36
Frequency	**QuasiPeak**	**Limit**	**Margin**	**Height**	**Pol**	**Azimuth**	**Corr.**
30.970000	32.86	40.00	7.14	100.0	V	78.0	11.49
71.285625	33.58	40.00	6.42	200.0	V	0.0	10.81

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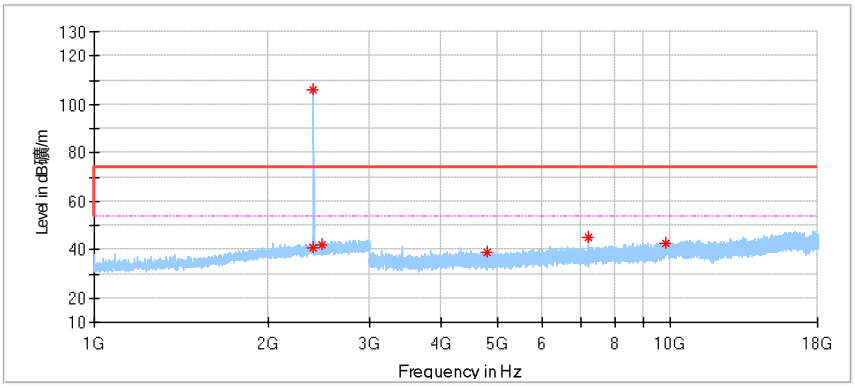
1GHz -18GHz:

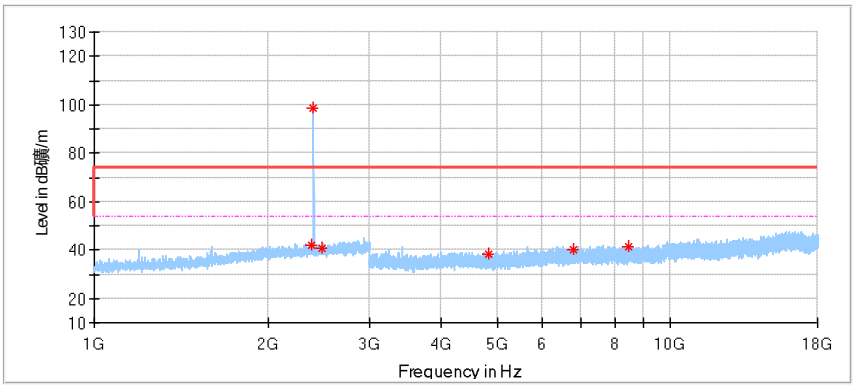
2402MHz

Horizontal:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2390.000000	40.93	74.00	33.07	150.0	H	18.0	-2.96
2402.380952	106.19	74.00	-32.19	150.0	H	4.0	-2.99
2487.142857	41.86	74.00	32.14	150.0	H	18.0	-2.69
4816.500000	38.85	74.00	35.15	150.0	H	225.0	2.16
7205.500000	44.90	74.00	29.10	150.0	H	173.0	6.80
9809.000000	42.81	74.00	31.19	150.0	H	276.0	10.53

Vertical



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2386.666667	41.96	74.00	32.04	150.0	V	179.0	-2.95
2402.380952	98.82	74.00	-24.82	150.0	V	295.0	-2.99
2486.666667	40.79	74.00	33.21	150.0	V	0.0	-2.69
4827.500000	38.01	74.00	35.99	150.0	V	96.0	2.22
6796.500000	40.11	74.00	33.89	150.0	V	22.0	6.43
8471.000000	41.64	74.00	32.36	150.0	V	145.0	8.13

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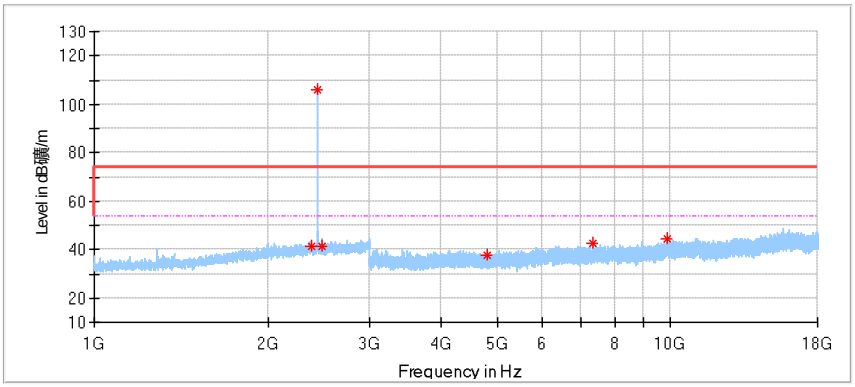
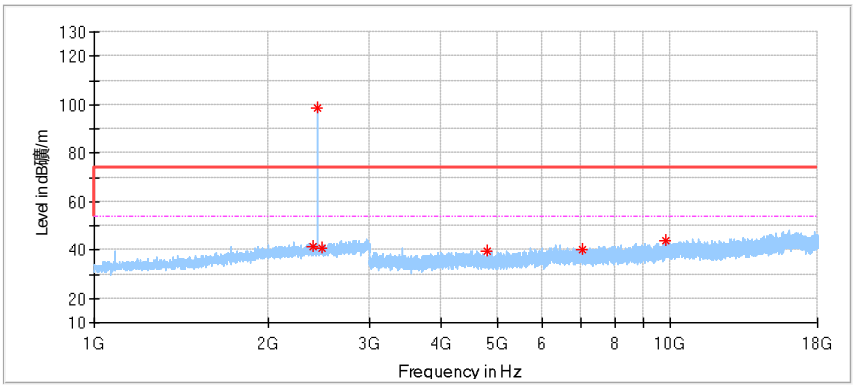
2440MHz
Horizontal:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2387.619048	41.58	74.00	32.42	150.0	H	96.0	-2.95
2440.000000	105.86	74.00	-31.86	150.0	H	13.0	-2.90
2482.380952	41.43	74.00	32.57	150.0	H	70.0	-2.69
4815.500000	37.83	74.00	36.17	150.0	H	198.0	2.16
7319.500000	42.61	74.00	31.39	150.0	H	22.0	7.04
9900.500000	44.52	74.00	29.48	150.0	H	198.0	10.72

Vertical



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2390.476191	41.47	74.00	32.53	150.0	V	166.0	-2.96
2440.476191	98.71	74.00	-24.71	150.0	V	307.0	-2.90
2485.714286	40.51	74.00	33.49	150.0	V	83.0	-2.69
4809.500000	39.74	74.00	34.26	150.0	V	246.0	2.17
7034.000000	40.40	74.00	33.60	150.0	V	120.0	6.82
9834.000000	43.78	74.00	30.22	150.0	V	120.0	10.98

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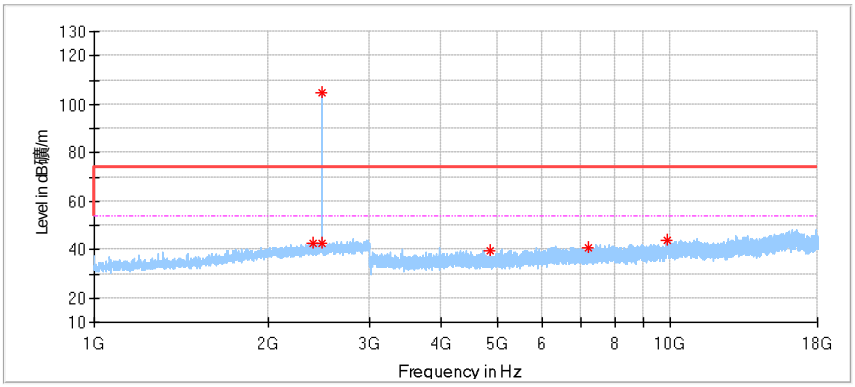
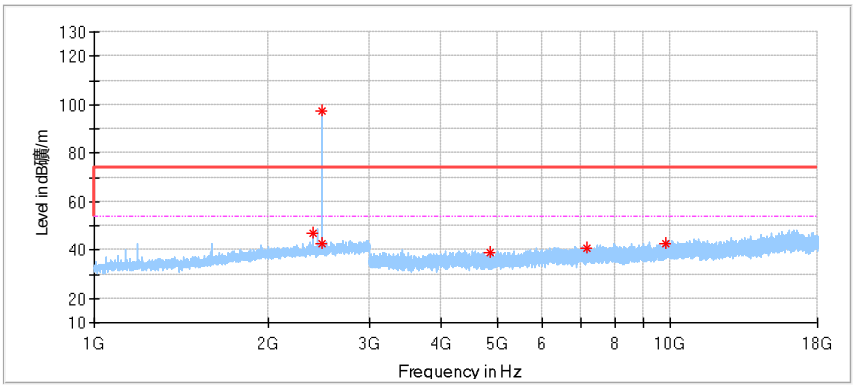
2480MHz
Horizontal:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2393.809524	42.84	74.00	31.16	150.0	H	8.0	-2.97
2480.476191	104.93	74.00	-30.93	150.0	H	353.0	-2.69
2487.619048	42.31	74.00	31.69	150.0	H	304.0	-2.69
4858.500000	39.49	74.00	34.51	150.0	H	251.0	2.41
7220.500000	40.60	74.00	33.40	150.0	H	199.0	6.85
9852.500000	43.91	74.00	30.09	150.0	H	149.0	11.31

Vertical



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2390.952381	46.98	74.00	27.02	150.0	V	224.0	-2.96
2480.476191	97.40	74.00	-23.40	150.0	V	250.0	-2.69
2485.714286	42.46	74.00	31.54	150.0	V	218.0	-2.69
4861.000000	38.96	74.00	35.04	150.0	V	223.0	2.42
7180.500000	40.68	74.00	33.32	150.0	V	328.0	6.71
9791.500000	42.73	74.00	31.27	150.0	V	50.0	10.21

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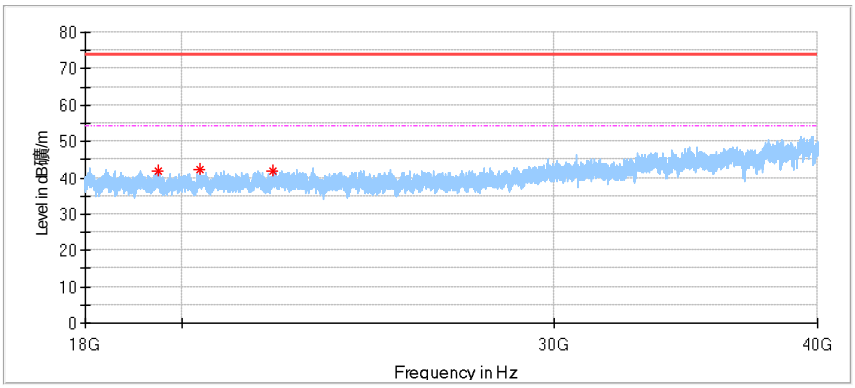
Above 18GHz:

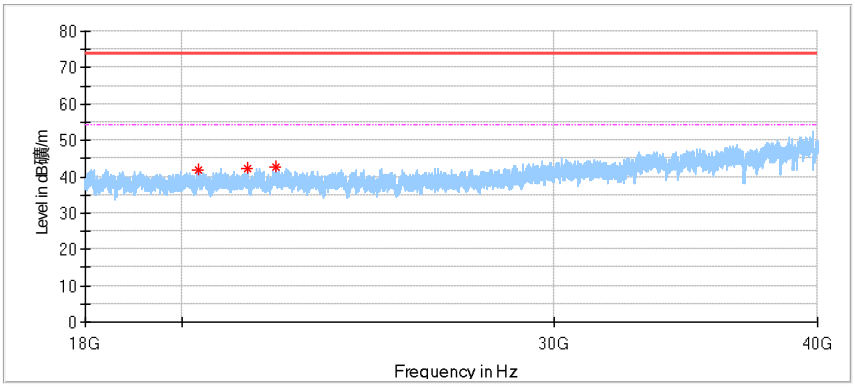
2402MHz

Horizontal:



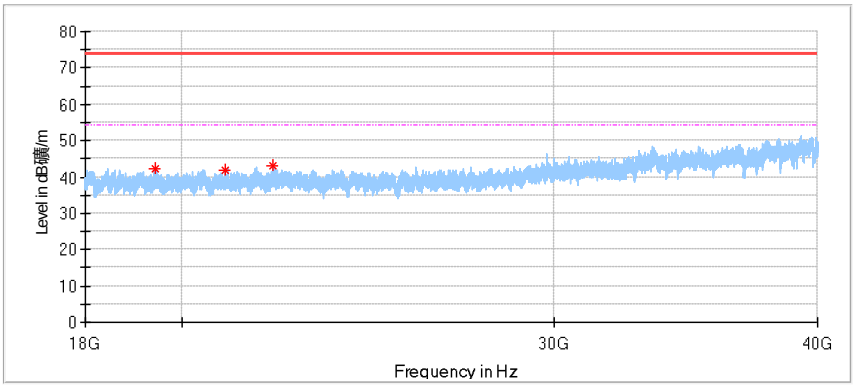
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
19482.937500	41.93	74.00	32.07	150.0	H	0.0	-1.36
20380.125000	42.06	74.00	31.94	150.0	H	0.0	-0.70
22087.875000	41.90	74.00	32.10	150.0	H	79.0	0.64

Vertical



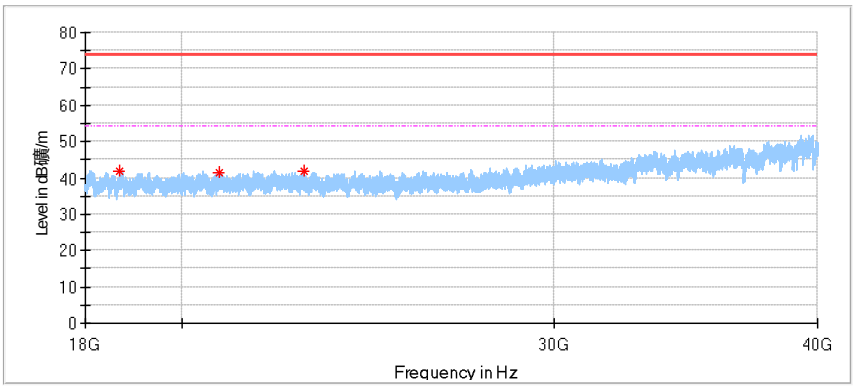
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
20365.687500	41.93	74.00	32.07	150.0	V	286.0	-0.73
21486.312500	42.28	74.00	31.72	150.0	V	45.0	0.31
22151.125000	42.58	74.00	31.42	150.0	V	126.0	0.75

2441MHz
Horizontal:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
19437.562500	42.11	74.00	31.89	150.0	H	276.0	-1.51
20961.750000	41.93	74.00	32.07	150.0	H	141.0	0.16
22099.562500	42.89	74.00	31.11	150.0	H	114.0	0.66

Vertical



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18688.187500	41.89	74.00	32.11	150.0	V	260.0	-1.86
20831.812500	41.51	74.00	32.49	150.0	V	16.0	-0.09
22863.375000	41.92	74.00	32.08	150.0	V	207.0	1.02

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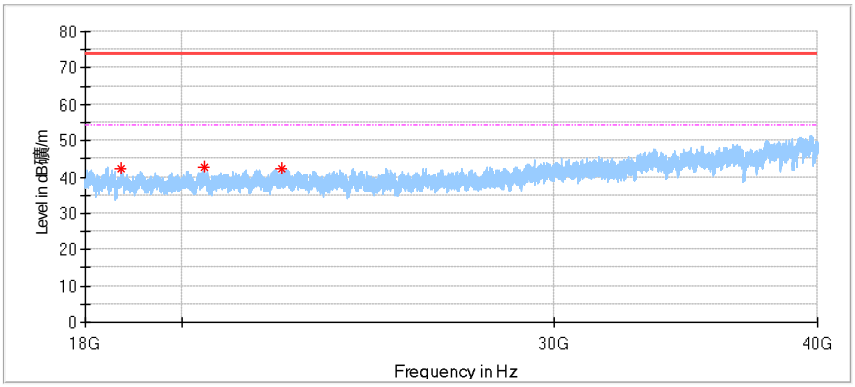
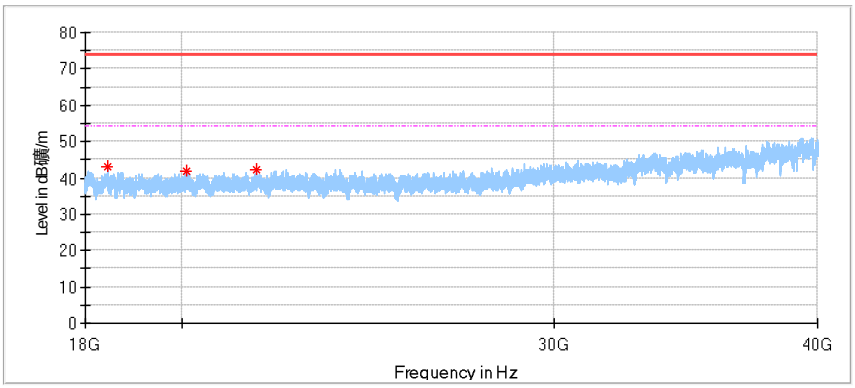
2480MHz
Horizontal:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18702.625000	42.36	74.00	31.64	150.0	H	218.0	-1.88
20486.687500	42.66	74.00	31.34	150.0	H	345.0	-0.52
22286.562500	42.10	74.00	31.90	150.0	H	0.0	0.93

Vertical



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18437.937500	43.02	74.00	30.98	150.0	V	344.0	-1.87
20115.437500	41.71	74.00	32.29	150.0	V	344.0	-1.33
21703.562500	42.08	74.00	31.92	150.0	V	264.0	0.46

Remark:

(1) Data of measurement within this frequency range shown “--” in the table above means the reading of emissions are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(2) We test Low channel, Middle channel and High channel, only the worse case recorded in this report.
(3) Corrected Amplitude = Read level + Corrector factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

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10 Test Equipment List

List of Test Instruments

Radiated Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2022-6-4
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2022-2-2
Wave Guide Antenna	ETS	3117	68-4-80-19-001	2022-5-24
Sideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	2021-8-5
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-001	2021-10-25
Pre-amplifier	Rohde & Schwarz	SCU 08F2	68-4-29-19-004	2021-10-25
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	2021-7-30
3m Semi-anechoic chamber	TDK	9X6X6	----	2022-12-29

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2022-6-4
LISN	Rohde & Schwarz	ENV4200	100249	2022-6-5
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2022-6-5
Test software	Rohde & Schwarz	EMC32	Version9.15.00	N/A

Conducted RF Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2022-6-3
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2022-6-3
Power Splitter	Weinschel	1580	SC319	2022-6-3
Test software	Tonscend	System for BT/WIFI	Version 2.5.77.0418	N/A

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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	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV432 or ENV4200)	3.21dB
Uncertainty for Radiated Spurious Emission 25MHz-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: 5.05dB; Vertical: 5.04dB;
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10^{-7} or 1%
Uncertainty Evaluation for Humidity	0.936%
Uncertainty Evaluation for Temperature	0.195 °C

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