FCC/ IC - TEST REPORT

Report Number	:	**68.912.20.0013.01**	Date of Issue:	August 7, 2020
Model	:	**WWL1-W, WWL1-W-CUST, WWL3-W, WWL3-W-CUST, WWL3-RL-W, WWL3-RL-W-CUST, WWL5-RL-W, WWL5-RL-W-CUST**		
Product Type	:	WaveLinx Lite Wallstation		
Applicant	:	Cooper Lighting LLC		
Address	:	1121 Hwy 74 s., Peachtree City, GA 30269, United States		
Production Facility	:	LEEDARSON LIGHTING CO., LTD		
Address	:	Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China		
Test Result	:	**n Positive** **o 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 City, 518052, P. R. China
FCC Registration Number:	514049
FCC Designation Number:	CA5009
ISED#:	10320A
Telephone:	86 755 8828 6998
Fax:	86 755 8828 5299

3 Description of the Equipment under Test

Product/PMN:	WaveLinx Lite Wallstation
Model no./HVIN:	WWL5-RL-W
FCC ID:	2AKCY-WWLBLE
IC:	4706A-WWLBLE
Ratings:	120-270VAC, 50/60Hz, 5mA
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	PIFA antenna
Antenna Gain:	2.4dBi
Description of the EUT:	The Equipment Under Test (EUT) is a WaveLinx Lite Wallstation supports 2.4GHz Bluetooth Low Energy functions.

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2019 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 5, Amendment 1, March 2019	General Requirements and Information for the Certification of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices

All the test methods were according to KDB558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10 (2013).

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5 Summary of Test Results

Test Condition		Test Site	Test Result		
			Pass	Fail	N/A
§15.207 RSS-GEN 8.8	Conducted emission AC power port	Site 1	☒	☐	☐
§15.247 (b) (3) & RSS-247 5.4(d)	Conducted peak output power	Site 1	☒	☐	☐
§15.247(a)(1) RSS-247 5.1(b)	20dB bandwidth	---	☐	☐	☒
§15.247(a)(1) §RSS-247 5.1(b)	Carrier frequency separation	---	☐	☐	☒
RSS-247 5.4(d)	Equivalent Isotropic Radiated Power	Site 1	☒	☐	☐
RSS-GEN 6.7	99% Occupied Bandwidth	Site 1	☒	☐	☐
§15.247(a)(1)(iii) RSS-247 5.1(d)	Number of hopping frequencies	---	☐	☐	☒
§15.247(a)(1)(iii) RSS-247 5.1(d)	Dwell Time	---	☐	☐	☒
RSS-GEN 6.7	6dB bandwidth and 99% Occupied Bandwidth	Site 1	☒	☐	☐
§15.247(e) RSS-247 5.2(b)	Power spectral density	Site 1	☒	☐	☐
§15.247(d) RSS-247 5.5	Spurious RF conducted emissions	Site 1	☒	☐	☐
§15.247(d) RSS-247 5.5	Band edge	Site 1	☒	☐	☐
§15.247(d) & §15.209 & §15.205 RSS-247 5.5 & RSS-Gen 6.13	Spurious radiated emissions for transmitter	Site 1	☒	☐	☐
§15.203 RSS-Gen 6.8	Antenna requirement	Note 2	☒	☐	☐

Note 1: N/A=Not Applicable.
Note 2: The EUT uses a PIFA antenna, which gain is 2.4dBi. In accordance to RSS-Gen 6.8, 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: 2AKCY-WWLBLE and IC: 4706A-WWLBLE complies with Section 15.207, 15.205, 15.209, 15.247 of the FCC Part 15, Subpart C Rules; RSS-Gen Issue 5 and RSS-247 issue 2.

SUMMARY:

All tests according to the regulations cited on page 5 were

n - Performed

o - **Not** Performed

The Equipment under Test

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

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

Sample Received Date: July 28, 2020

Testing Start Date: July 28, 2020

Testing End Date: August 3, 2020

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

Reviewed by:	Prepared by:	Tested by:
Laurent Yuan	Henry Chen	Louise Liu
EMC Project Manager	EMC Project Engineer	EMC Test Engineer

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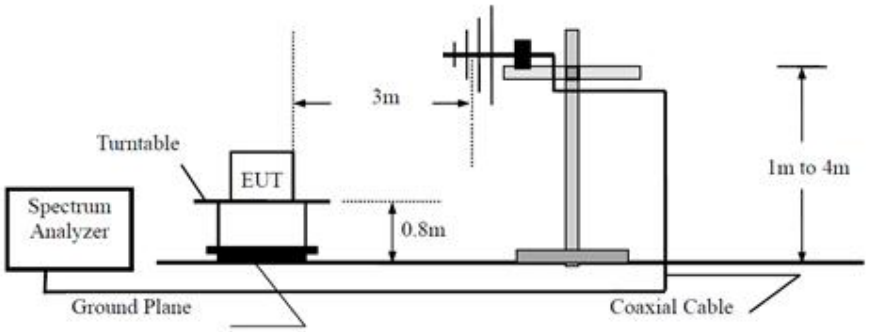
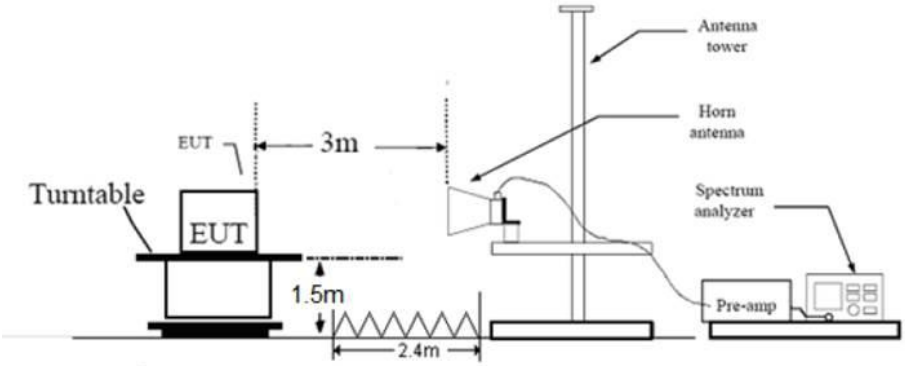
7 Test Setups

7.1 Radiated test setups

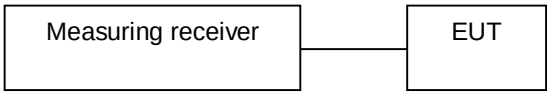
Below 1GHz



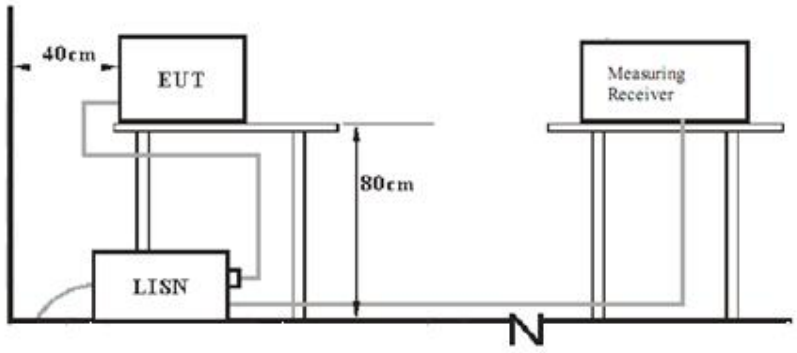
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
---	---	---	---

Test software information:

Test Software Version	EMI_Test_Tool	
Modulation	Setting TX Power	Packet Type
GFSK	8dBm	/

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

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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

According to §15.207 & RSS-GEN 8.8, 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

Remark: "*" Decreasing linearly with logarithm of the frequency

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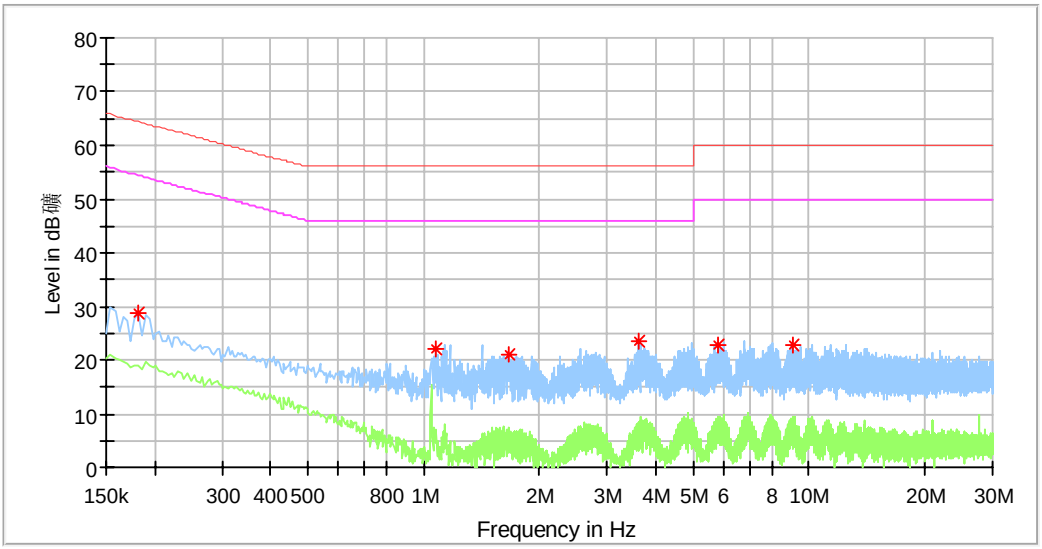
Conducted Emission

Product Type	:	WaveLinx Lite Wallstation
M/N	:	WWL5-RL-W
Operating Condition	:	Normal working with transmitting
Test Specification	:	Power Line, Live
Comment	:	AC 120V/60Hz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.182000	28.85	---	64.39	35.55	L1	10.3
1.078000	22.08	---	56.00	33.92	L1	10.3
1.666000	20.97	---	56.00	35.03	L1	10.3
3.634000	23.62	---	56.00	32.38	L1	10.4
5.782000	22.95	---	60.00	37.05	L1	10.5
9.130000	22.75	---	60.00	37.25	L1	10.6

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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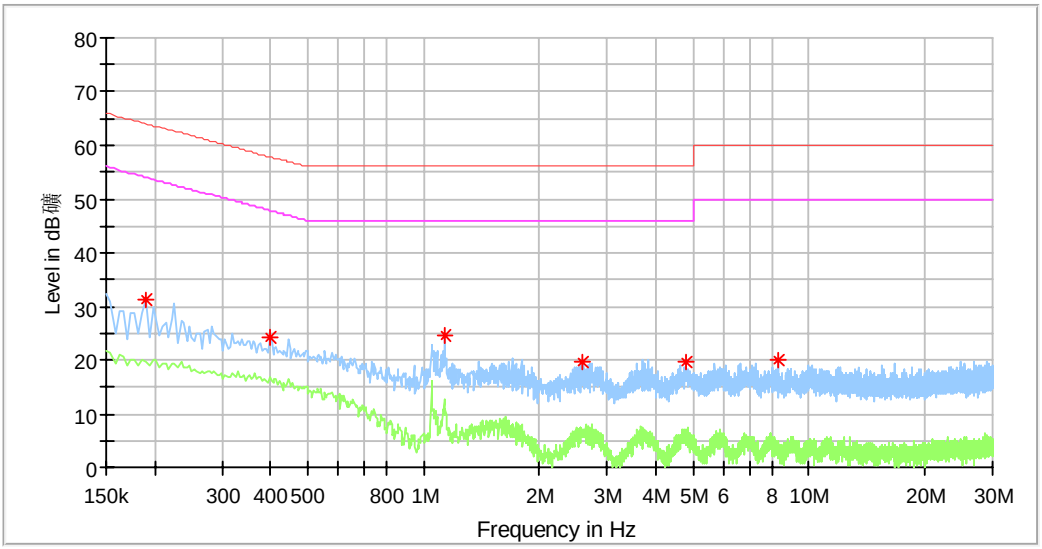
Conducted Emission

Product Type	:	WaveLinx Lite Wallstation
M/N	:	WWL5-RL-W
Operating Condition	:	Normal working with transmitting
Test Specification	:	Power Line, Neutral
Comment	:	AC 120V/60Hz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.190000	31.38	---	64.04	32.66	N	10.3
0.398000	24.10	---	57.90	33.79	N	10.3
1.134000	24.71	---	56.00	31.29	N	10.3
2.594000	19.69	---	56.00	36.31	N	10.4
4.806000	19.52	---	56.00	36.48	N	10.5
8.290000	20.09	---	60.00	39.91	N	10.7

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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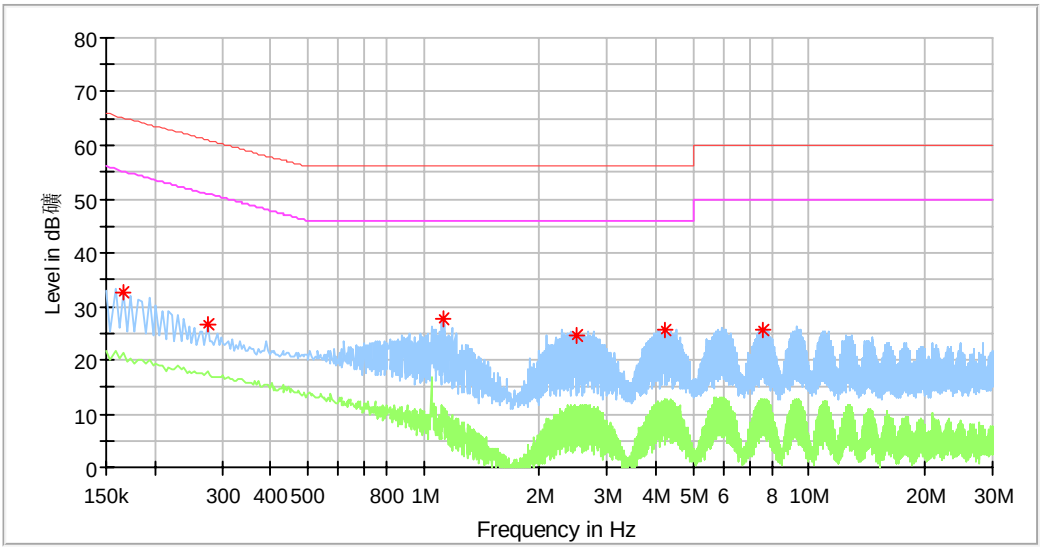
Conducted Emission

Product Type	:	WaveLinx Lite Wallstation
M/N	:	WWL5-RL-W
Operating Condition	:	Normal working with transmitting
Test Specification	:	Power Line, Live
Comment	:	AC 270V/60Hz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.166000	32.80	---	65.16	32.36	L1	10.3
0.274000	26.66	---	61.00	34.33	L1	10.3
1.118000	27.64	---	56.00	28.36	L1	10.3
2.490000	24.71	---	56.00	31.29	L1	10.4
4.234000	25.53	---	56.00	30.47	L1	10.4
7.574000	25.66	---	60.00	34.34	L1	10.6

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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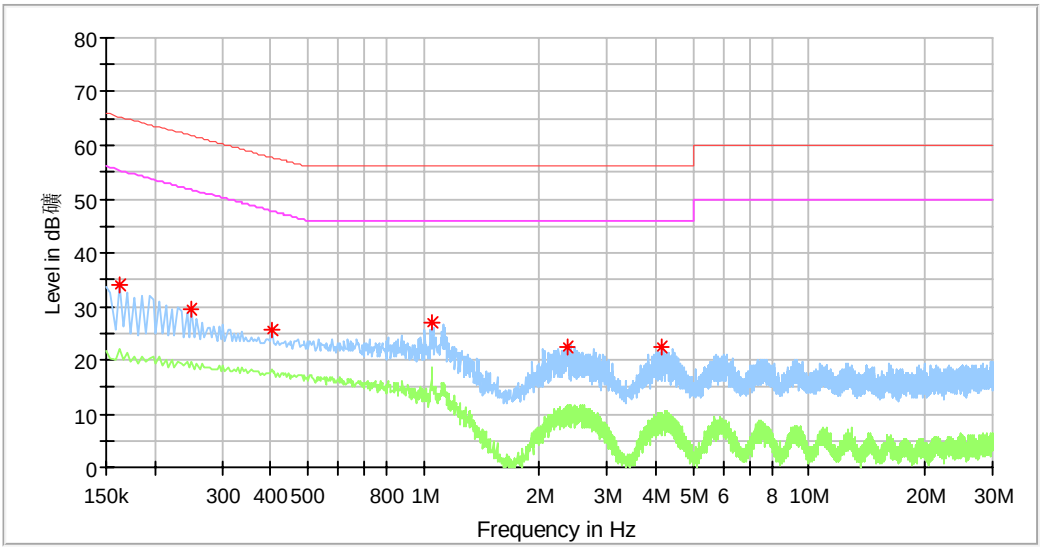
Conducted Emission

Product Type	:	WaveLinx Lite Wallstation
M/N	:	WWL5-RL-W
Operating Condition	:	Normal working with transmitting
Test Specification	:	Power Line, Neutral
Comment	:	AC 270V/60Hz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.162000	33.87	---	65.36	31.49	N	10.3
0.250000	29.41	---	61.76	32.34	N	10.3
0.402000	25.51	---	57.81	32.30	N	10.3
1.050000	27.08	---	56.00	28.92	N	10.3
2.358000	22.50	---	56.00	33.50	N	10.4
4.142000	22.55	---	56.00	33.45	N	10.5

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. Connect the power meter to the EUT
   a) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
   b) At all times the EUT is transmitting at its maximum power control level.
   c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Adjust the measurement in dBm by adding 10log (1/x), where x is the duty cycle to the measurement result.

Limits

According to §15.247 (b) (1) & RSS-247 5.4(d), conducted peak output power limit as below:

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

For e.i r.p:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤4	≤30

Test result as below table

Frequency MHz	Conducted Peak Output Power dBm	Antenna Gain(dBi) dBi	EIRP(dBm) dBm	Result
Bottom channel 2402MHz	6.75	2.4	9.15	Pass
Middle channel 2440MHz	6.34	2.4	8.74	Pass
Top channel 2480MHz	6.15	2.4	8.55	Pass

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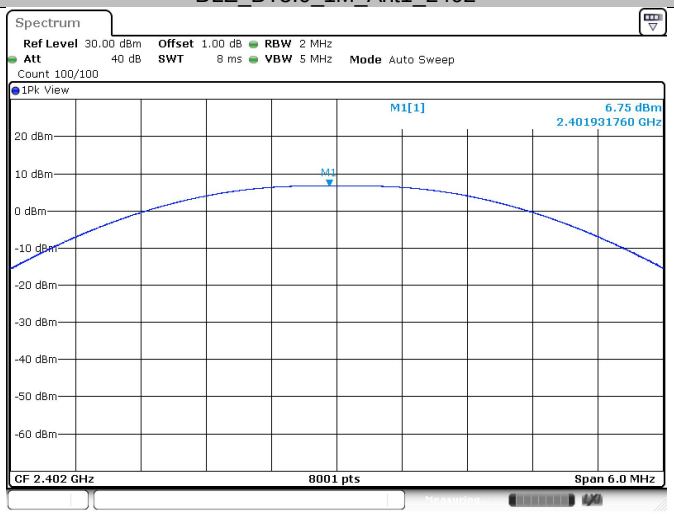
Test Graphs

BLE_BT5.0_1M_Ant1_2402



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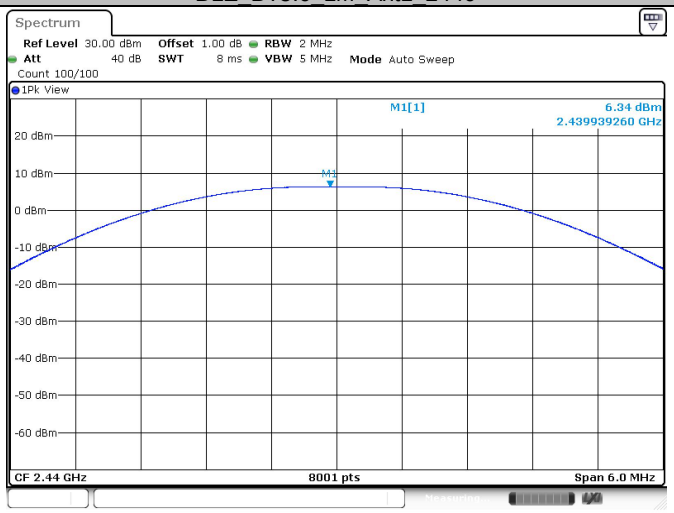

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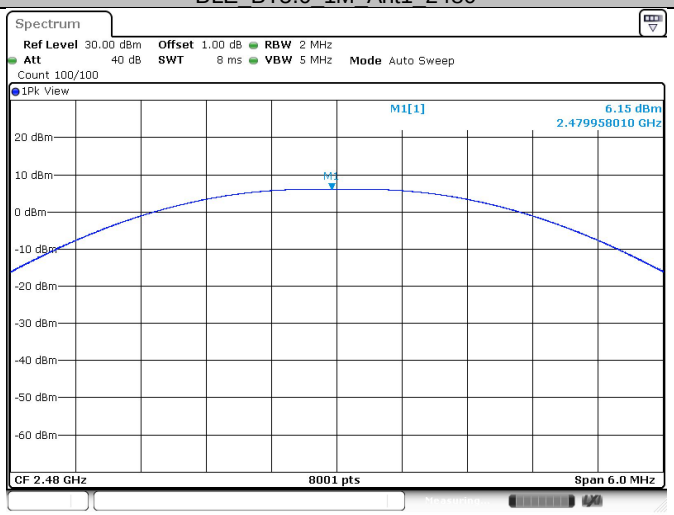

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9.3 6 dB Bandwidth and 99% Occupied Bandwidth

Test Method

1. Use the following spectrum analyzer settings:
RBW=100K, VBW≥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 ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]
≥500

Test result

Frequency MHz	6dB bandwidth MHz	99% bandwidth MHz	Result
Bottom channel 2402MHz	0.716	1.027	Pass
Middle channel 2440MHz	0.712	1.027	Pass
Top channel 2480MHz	0.704	1.031	Pass

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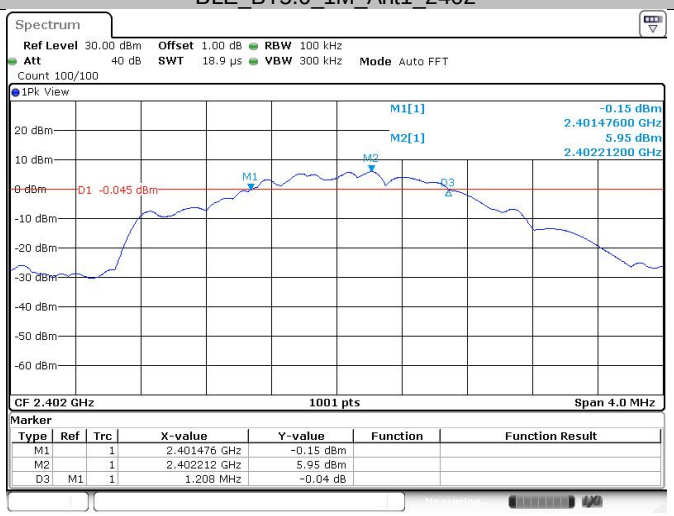
Test Graphs

BLE_BT5.0_1M_Ant1_2402



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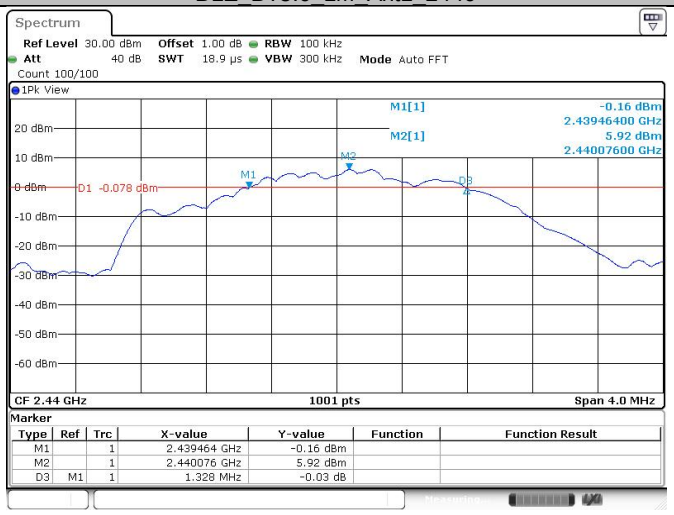

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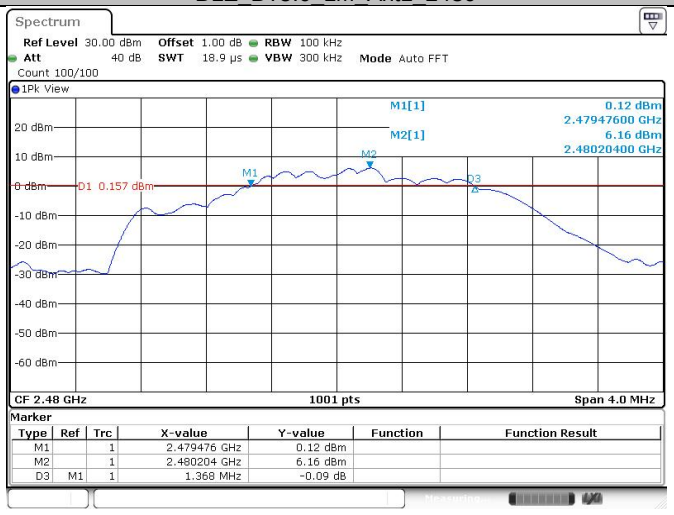

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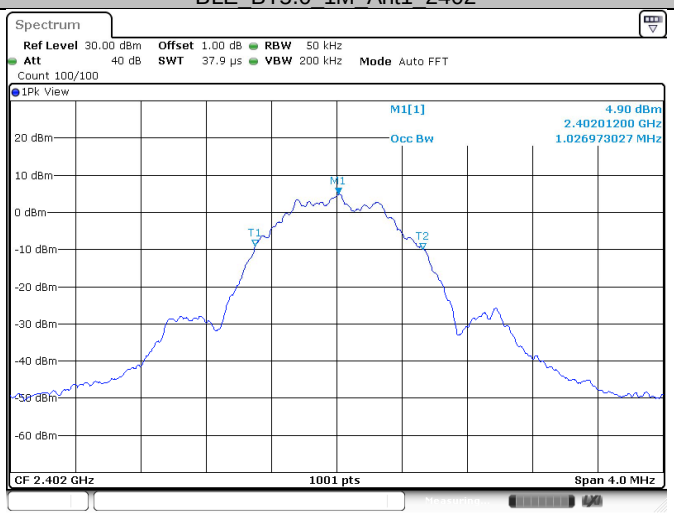

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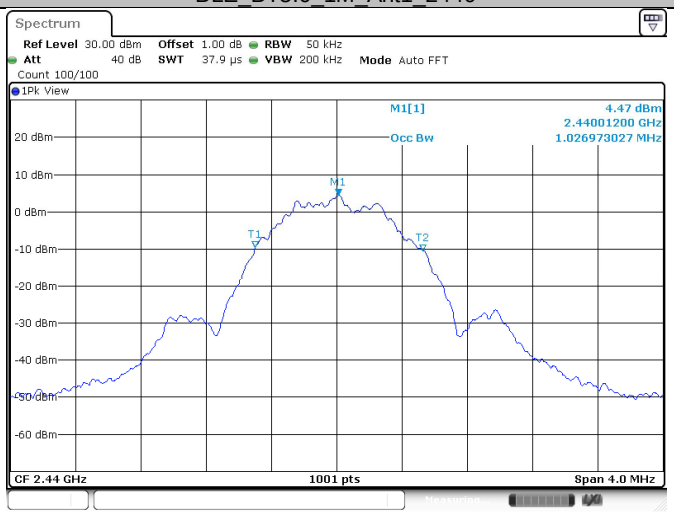

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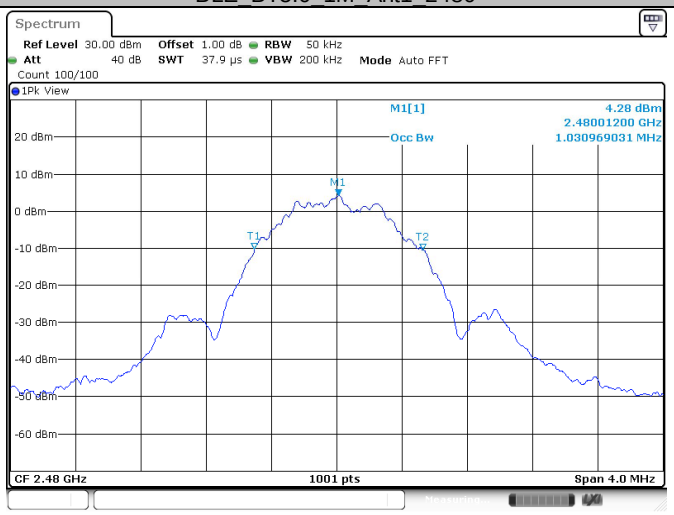

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9.4 Power spectral density

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≥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]
≤8

Test result

Frequency **MHz**	Power spectral density **dBm/10KHz**	Result
Top channel 2402MHz	-3.37	Pass
Middle channel 2440MHz	-3.88	Pass
Bottom channel 2480MHz	-3.92	Pass

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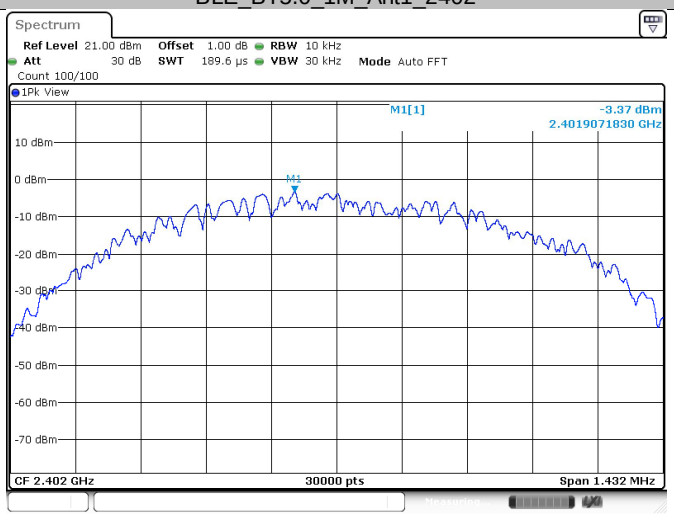
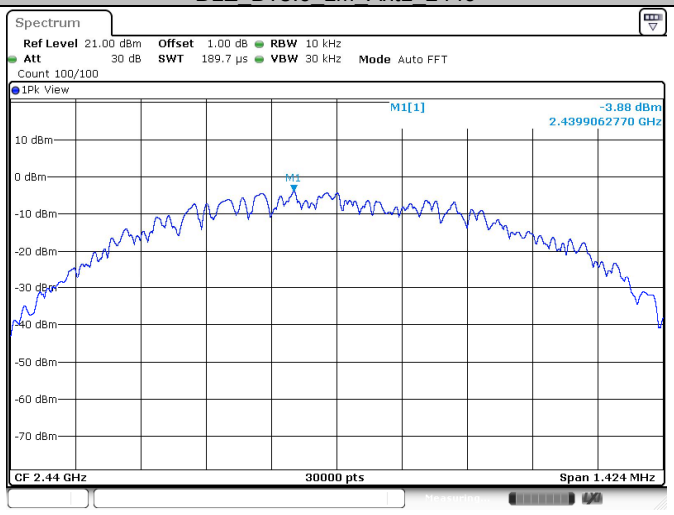
Test Graphs

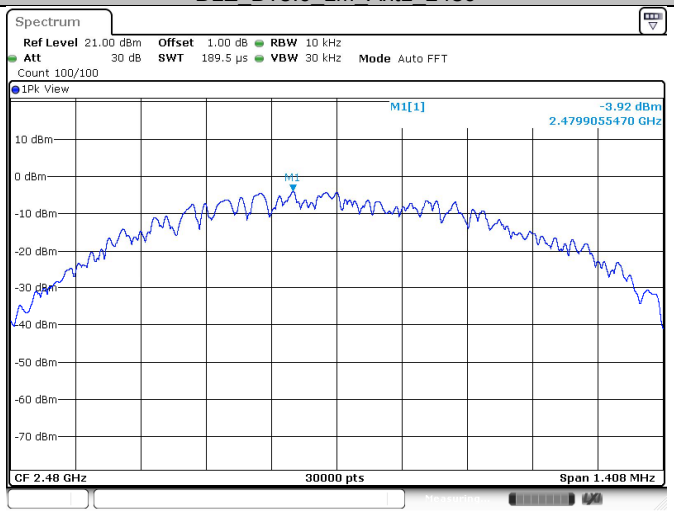
BLE_BT5.0_1M_Ant1_2402



BLE_BT5.0_1M_Ant1_2440



BLE_BT5.0_1M_Ant1_2480



9.5 Spurious RF conducted emissions

Test Method

1. Establish a reference level by using the following procedure:
   a. Set RBW=100 kHz. VBW≥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

Test Result:

Test Mode	Antenna	Channel (MHz)	Freq Range (MHz)	Ref Level (dBm)	Result (dBm)	Limit (dBm)	Verdict
BLE	ANT1	2402	30~1000	6.15	-67.05	-13.85	PASS
BLE	ANT1	2402	1000~26500	6.15	-42.83	-13.85	PASS
BLE	ANT1	2440	30~1000	5.54	-67.77	-14.46	PASS
BLE	ANT1	2440	1000~26500	5.54	-52.54	-14.46	PASS
BLE	ANT1	2480	30~1000	5.49	-68.24	-14.51	PASS
BLE	ANT1	2480	1000~26500	5.49	-52.6	-14.51	PASS

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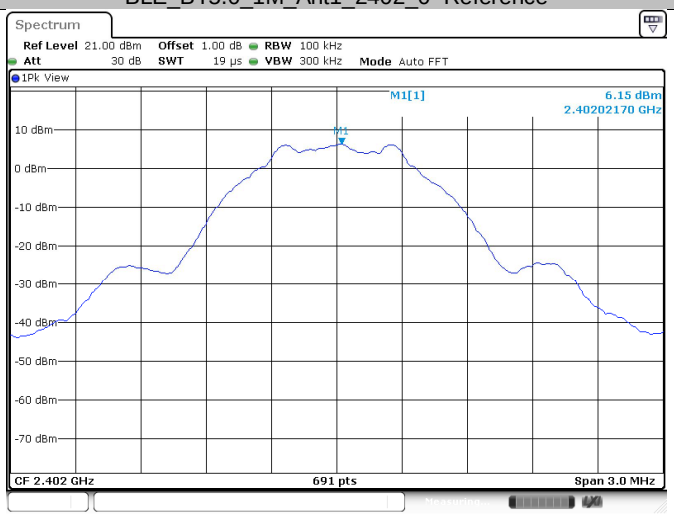
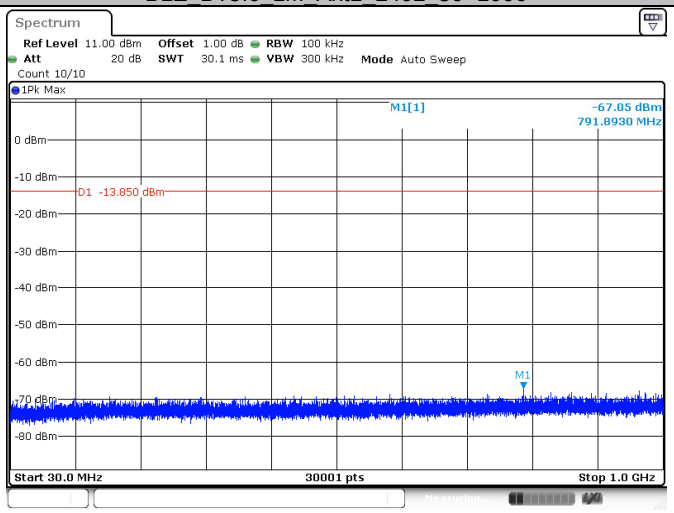
Test Graphs

BLE_BT5.0_1M_Ant1_2402_0~Reference



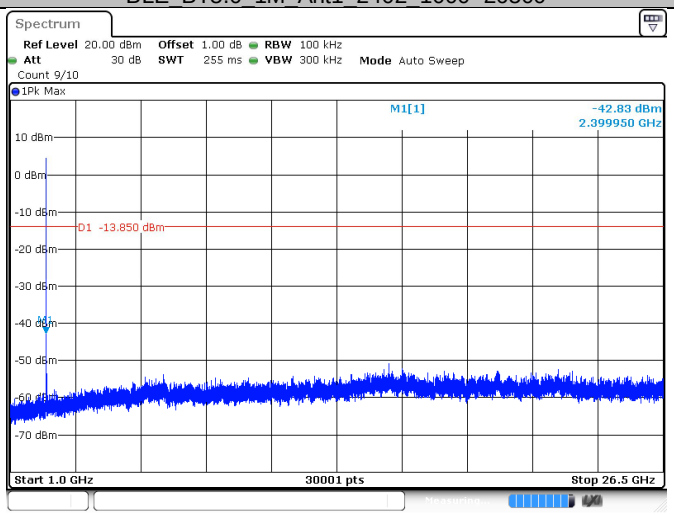
Date: 28.JUL.2020 16:24:55

BLE_BT5.0_1M_Ant1_2402_30~1000



Date: 28.JUL.2020 16:25:01

BLE_BT5.0_1M_Ant1_2402_1000~26500



Date: 28.JUL.2020 16:25:09

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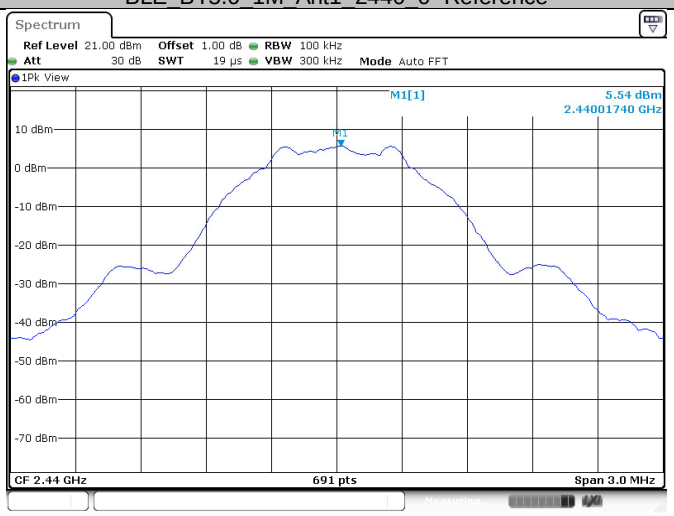
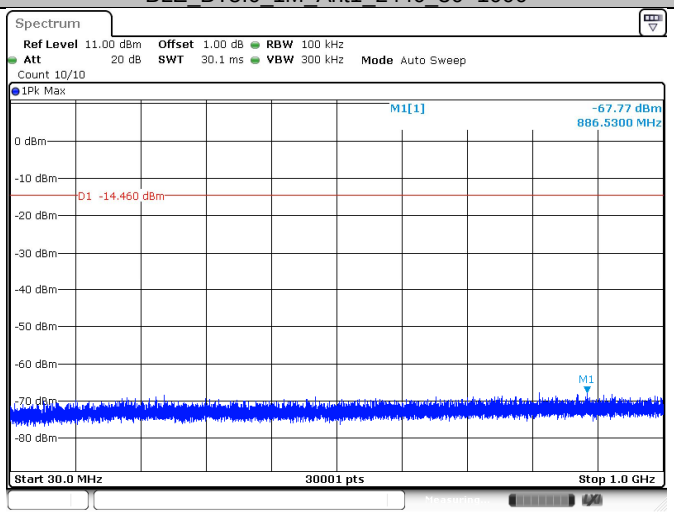
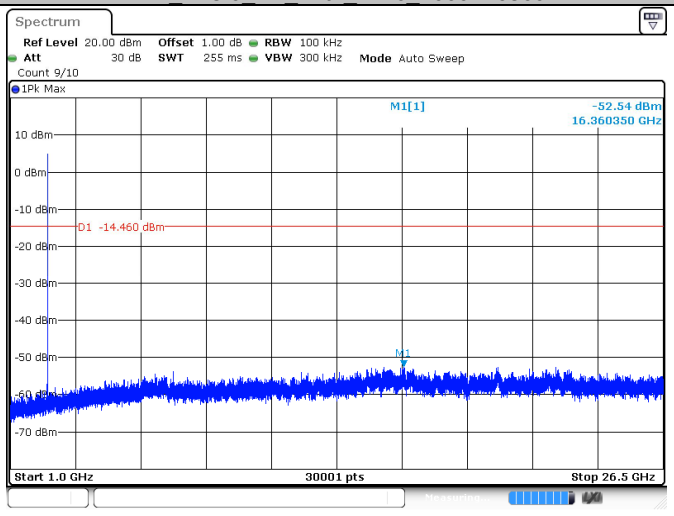
BLE_BT5.0_1M_Ant1_2440_0~Reference



BLE_BT5.0_1M_Ant1_2440_30~1000



BLE_BT5.0_1M_Ant1_2440_1000~26500



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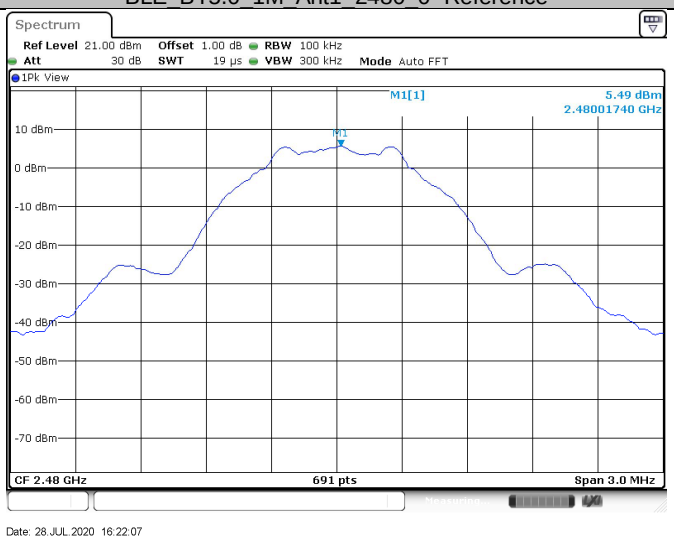
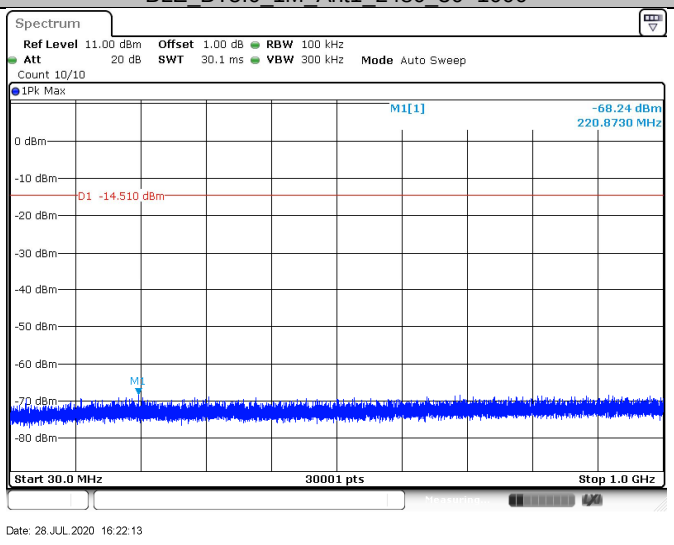
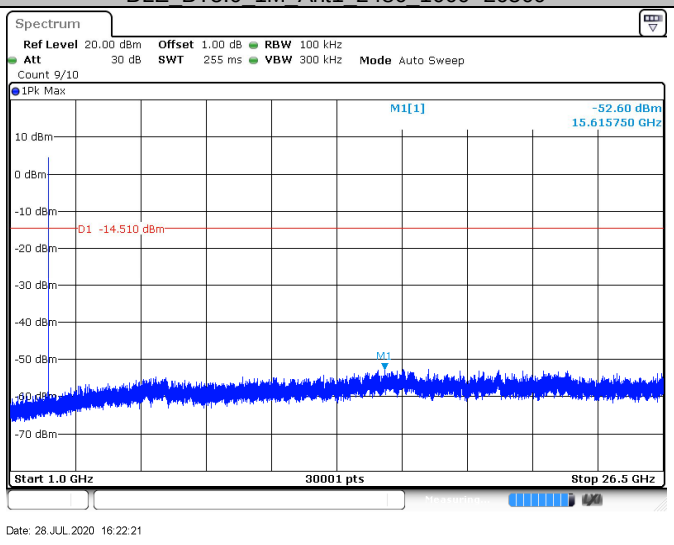
BLE_BT5.0_1M_Ant1_2480_0~Reference



BLE_BT5.0_1M_Ant1_2480_30~1000



BLE_BT5.0_1M_Ant1_2480_1000~26500



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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≥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

Test result

Test Mode	Channel (MHz)	Reference Level(dBm)	Result (dBm)	Limit (dBm)	Verdict
BLE	2402	5.97	-49.56	-14.03	PASS
BLE	2480	5.97	-51.57	-14.4	PASS

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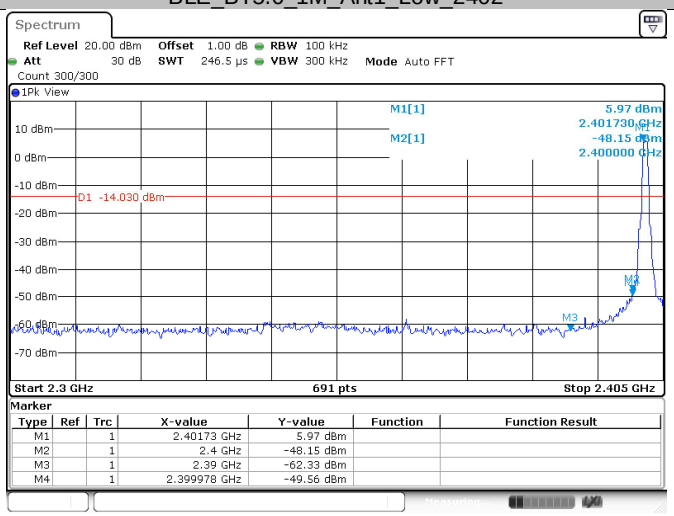
Test Graphs

BLE_BT5.0_1M_Ant1_Low_2402



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40173 GHz	5.97 dBm		
M2		1	2.4 GHz	-48.15 dBm		
M3		1	2.39 GHz	-62.33 dBm		
M4		1	2.399978 GHz	-49.56 dBm		

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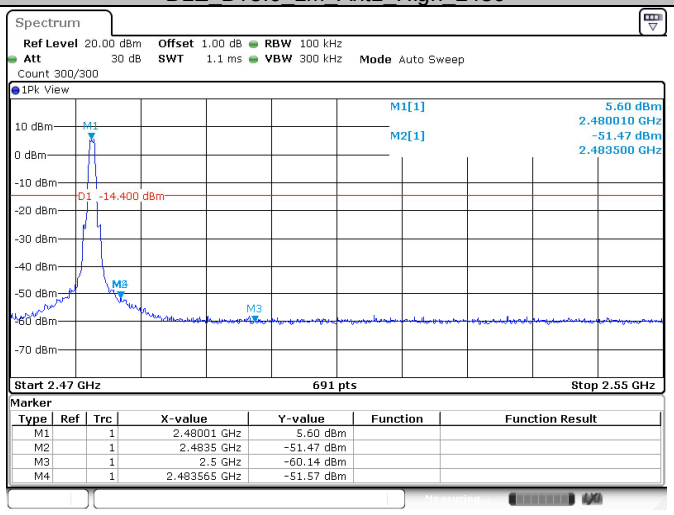
BLE_BT5.0_1M_Ant1_High_2480



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48001 GHz	5.60 dBm		
M2		1	2.4835 GHz	-51.47 dBm		
M3		1	2.5 GHz	-60.14 dBm		
M4		1	2.483565 GHz	-51.57 dBm		

Date: 28.JUL.2020 16:22:01

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 = 1MHz.
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 section RSS-GEN 8.10, 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

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.

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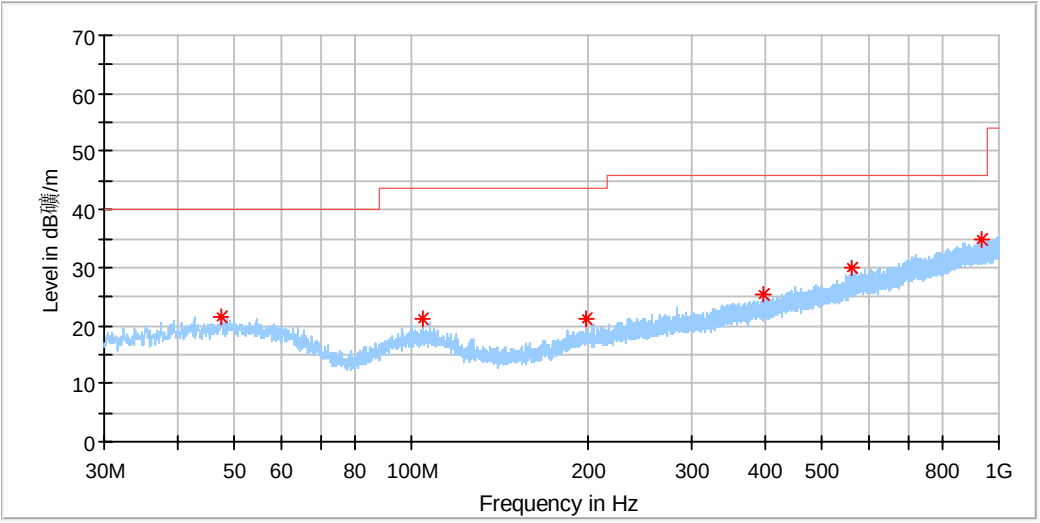
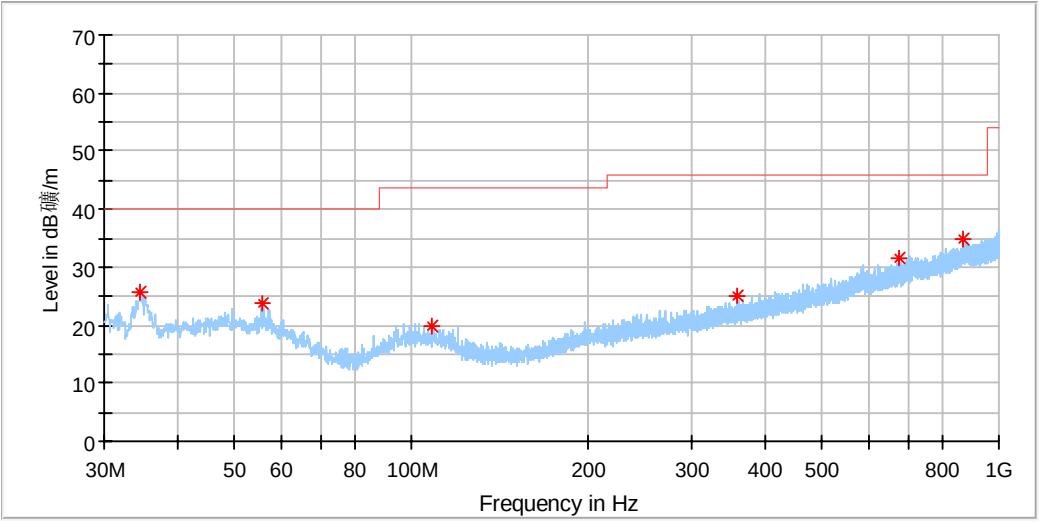
Spurious radiated emissions for transmitter

Transmitting spurious emission test result as below:

Below 1G:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
47.278125	21.64	40.00	18.36	100.0	H	229.0	18
104.629375	21.14	43.50	22.36	100.0	H	112.0	17
198.173750	21.04	43.50	22.46	100.0	H	0.0	16
398.600000	25.40	46.00	20.60	100.0	H	247.0	21
563.863750	29.91	46.00	16.09	100.0	H	266.0	24
939.132500	34.70	46.00	11.30	100.0	H	174.0	29



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.607500	25.78	40.00	14.22	100.0	V	133.0	16
55.947500	23.82	40.00	16.18	200.0	V	298.0	18
108.266875	19.70	43.50	23.80	100.0	V	66.0	17
357.981250	24.96	46.00	21.04	200.0	V	177.0	20
676.444375	31.51	46.00	14.49	100.0	V	332.0	26
867.776875	34.93	46.00	11.07	100.0	V	0.0	29

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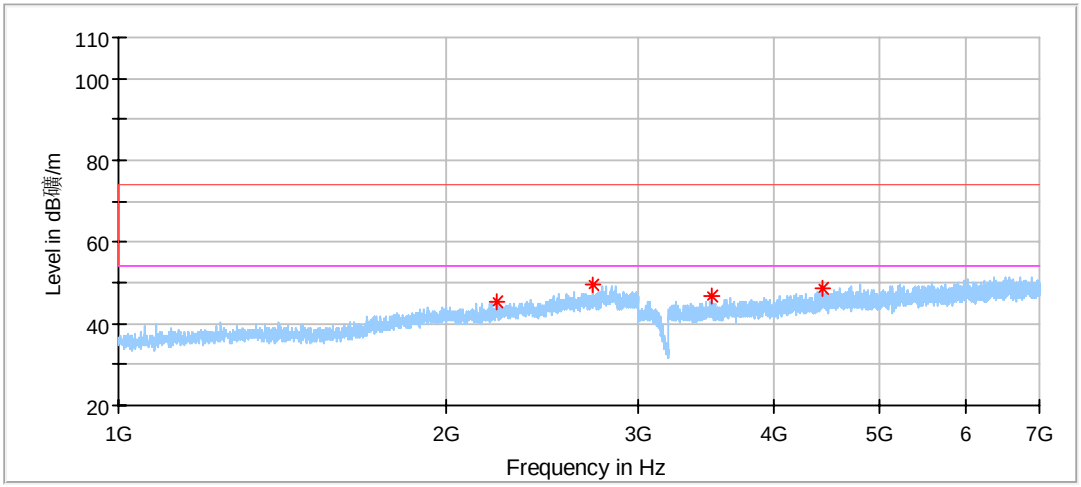
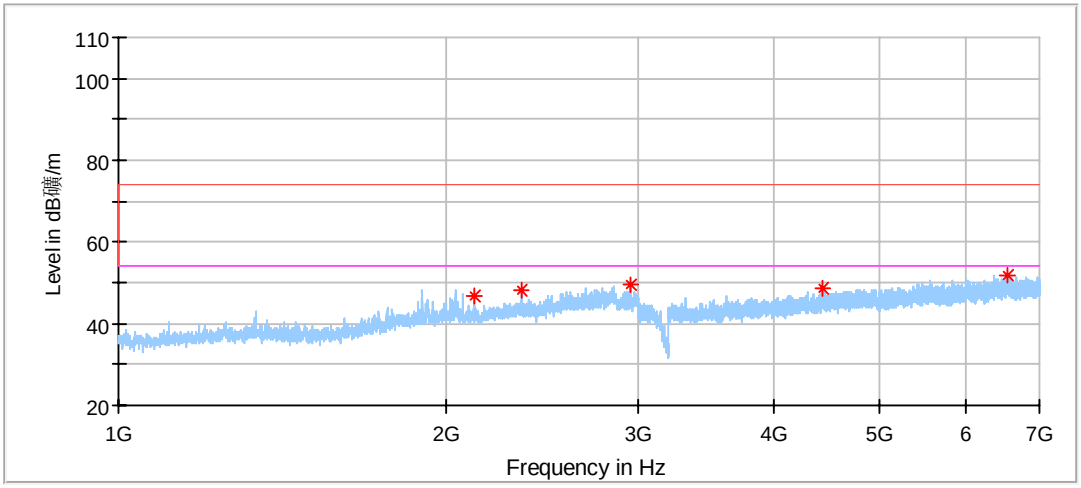
Low channel 2402MHz Test Result



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2226.500000	45.53	74.00	28.47	150.0	H	290.0	-4.1
2725.000000	49.43	74.00	24.57	150.0	H	138.0	-1.4
3499.500000	46.73	74.00	27.27	150.0	H	197.0	-1.0
4425.500000	48.70	74.00	25.30	150.0	H	197.0	2.9



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2119.500000	47.00	74.00	27.00	150.0	V	186.0	-4.3
2342.000000	47.98	74.00	26.02	150.0	V	186.0	-3.3
2954.000000	49.42	74.00	24.58	150.0	V	319.0	-0.8
4429.500000	48.62	74.00	25.38	150.0	V	173.0	3.1
6533.500000	51.90	74.00	22.10	150.0	V	122.0	7.0

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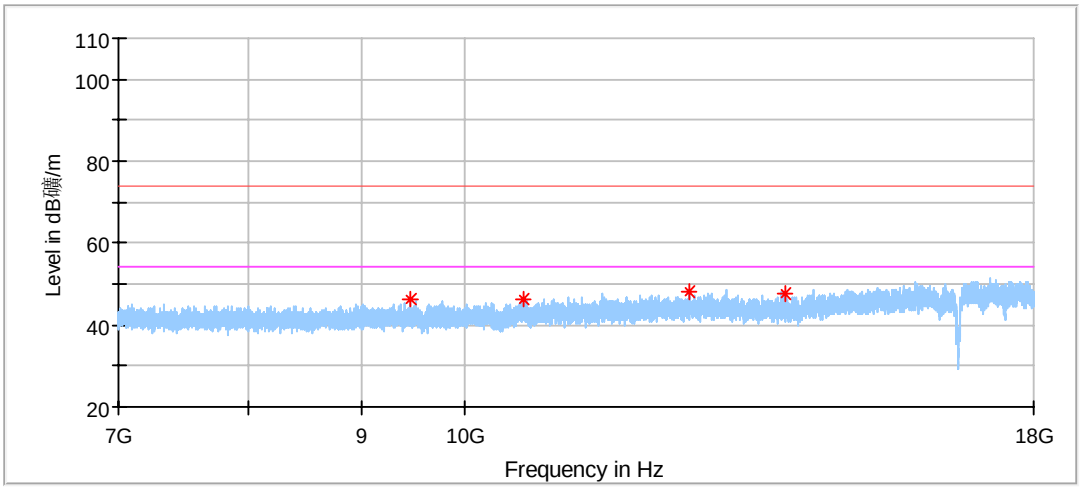
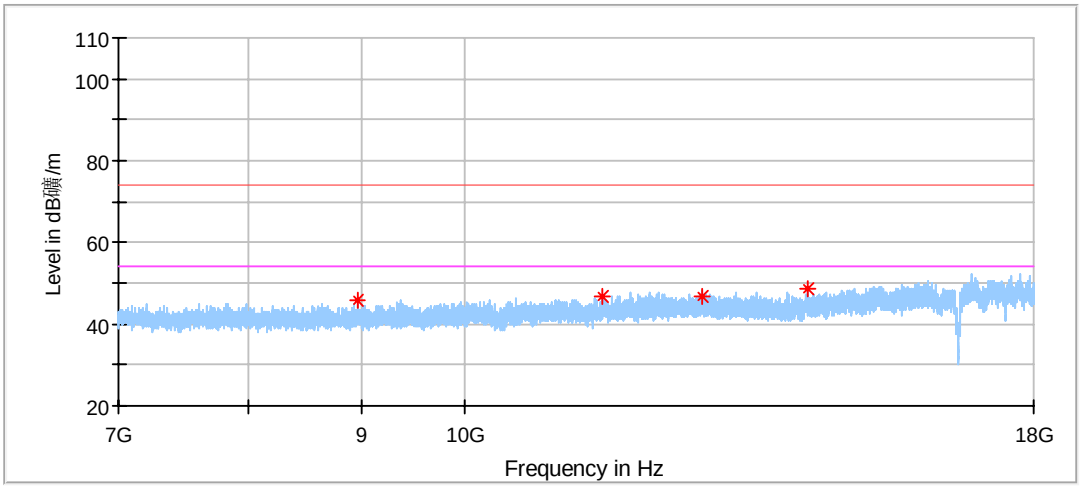


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
9452.500000	46.43	74.00	27.57	150.0	H	188.0	7.3
10620.500000	46.10	74.00	27.90	150.0	H	303.0	8.1
12623.000000	48.04	74.00	25.96	150.0	H	0.0	9.9
13917.500000	47.75	74.00	26.25	150.0	H	234.0	10.0



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
8957.000000	45.96	74.00	28.04	150.0	V	14.0	6.9
11539.000000	46.92	74.00	27.08	150.0	V	152.0	8.8
12777.000000	46.89	74.00	27.11	150.0	V	37.0	10.1
14250.000000	48.44	74.00	25.56	150.0	V	198.0	10.6

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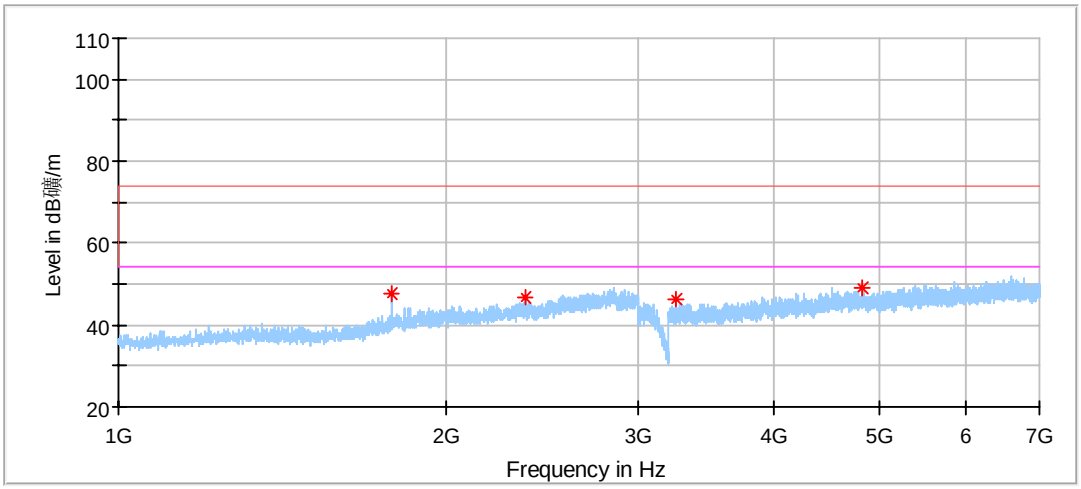
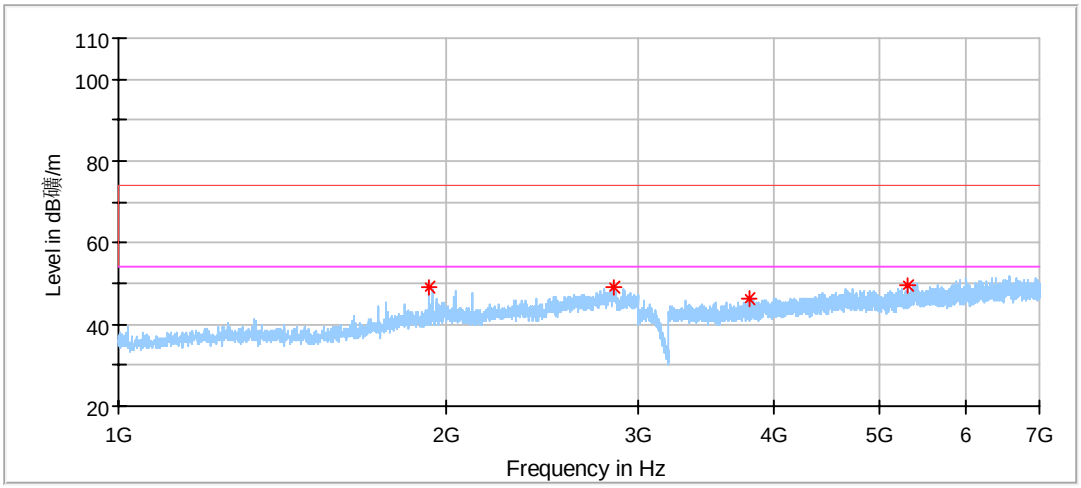
Middle channel 2440MHz Test Result



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1779.500000	47.58	74.00	26.42	150.0	H	358.0	-5.9
2360.500000	46.94	74.00	27.06	150.0	H	67.0	-3.3
3249.500000	46.22	74.00	27.78	150.0	H	325.0	-1.7
4810.000000	49.04	74.00	24.96	150.0	H	78.0	3.0



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1927.000000	49.26	74.00	24.74	150.0	V	153.0	-4.5
2849.500000	49.25	74.00	24.75	150.0	V	199.0	-0.7
3790.000000	46.40	74.00	27.60	150.0	V	97.0	0.1
5300.500000	49.73	74.00	24.27	150.0	V	33.0	2.6

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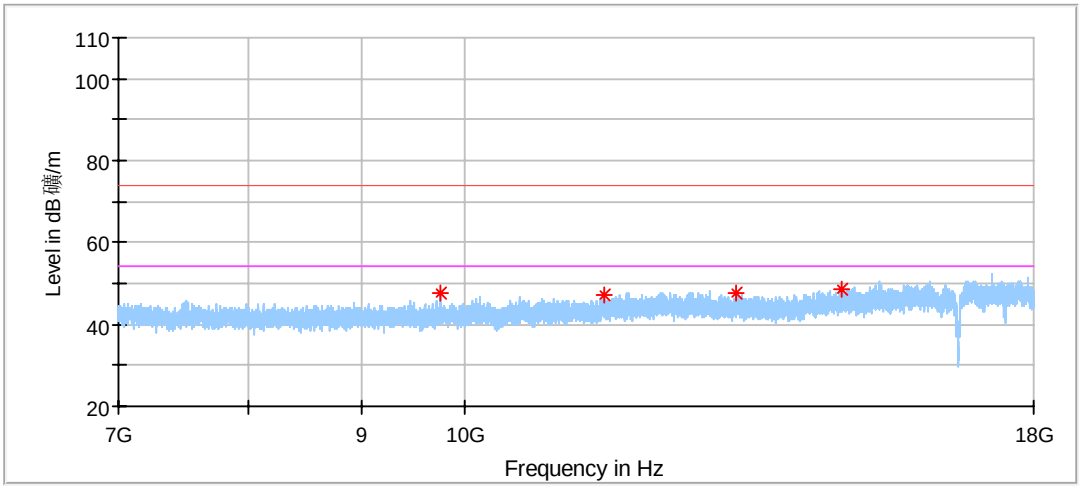
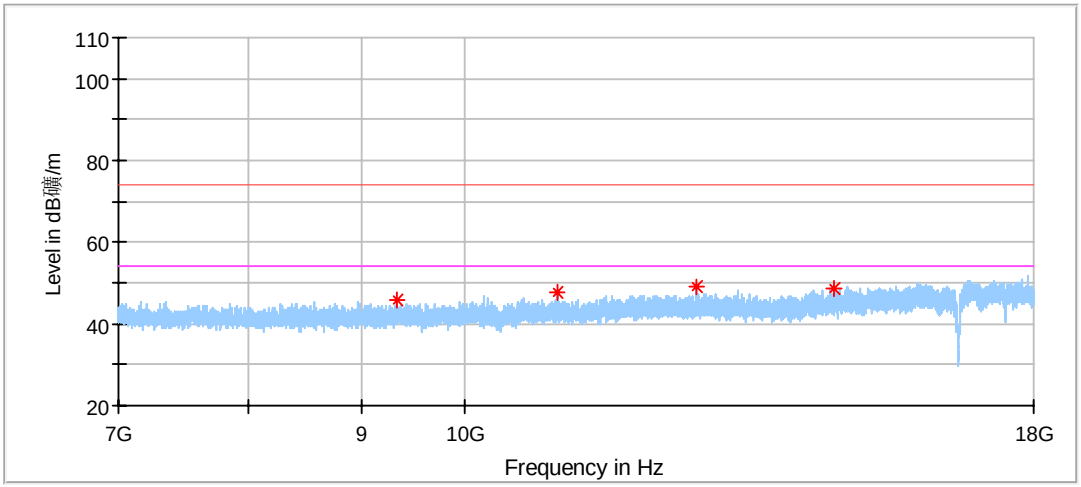


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
9762.000000	47.79	74.00	26.21	150.0	H	139.0	7.7
11555.000000	47.40	74.00	26.60	150.0	H	346.0	8.9
13237.500000	47.84	74.00	26.16	150.0	H	24.0	10.1
14764.000000	48.47	74.00	25.53	150.0	H	185.0	11.7



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
9326.500000	45.68	74.00	28.32	150.0	V	336.0	7.3
11012.500000	47.81	74.00	26.19	150.0	V	356.0	8.2
12712.000000	48.85	74.00	25.15	150.0	V	198.0	10.2
14638.000000	48.55	74.00	25.45	150.0	V	0.0	11.3

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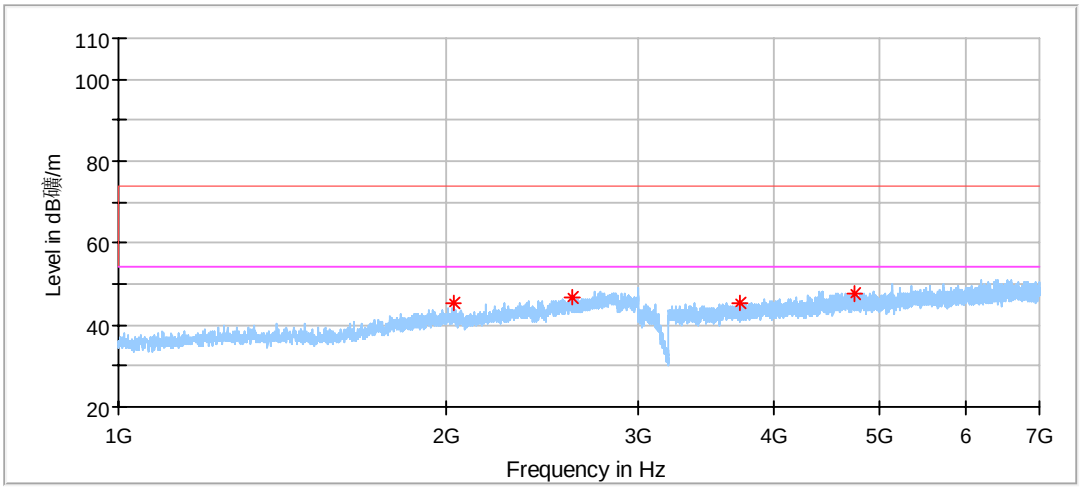
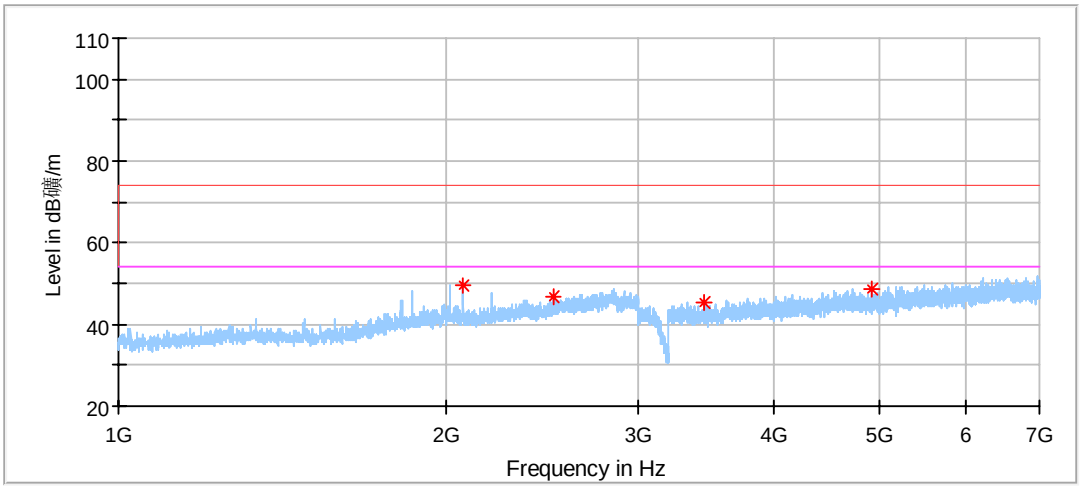
High channel 2480MHz Test Result



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2031.000000	45.33	74.00	28.67	150.0	H	215.0	-4.5
2604.000000	46.76	74.00	27.24	150.0	H	149.0	-2.0
3719.500000	45.44	74.00	28.56	150.0	H	119.0	0.1
4734.500000	47.84	74.00	26.16	150.0	H	190.0	3.0



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2071.500000	49.57	74.00	24.43	150.0	V	145.0	-4.3
2509.000000	46.98	74.00	27.02	150.0	V	4.0	-2.3
3445.500000	45.48	74.00	28.52	150.0	V	136.0	-1.1
4917.500000	48.52	74.00	25.48	150.0	V	116.0	2.5

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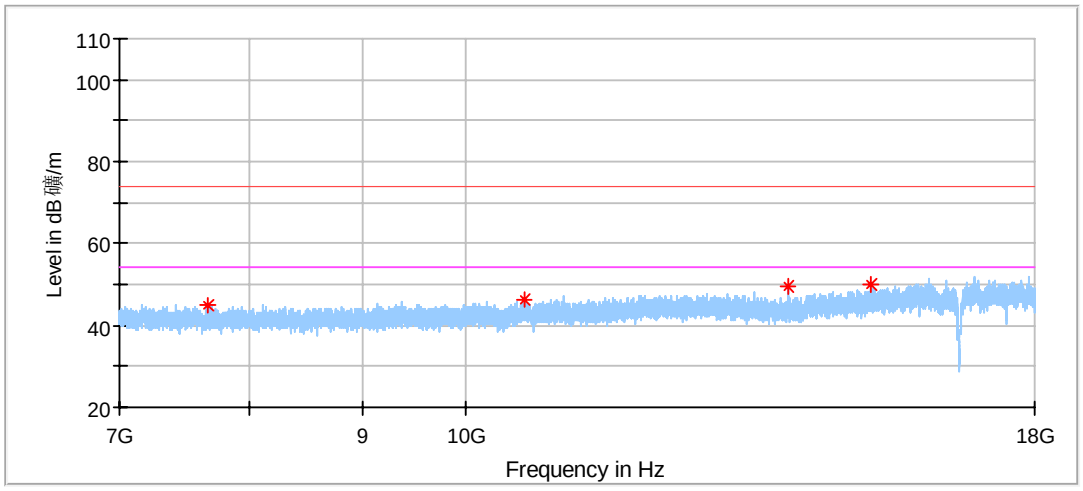
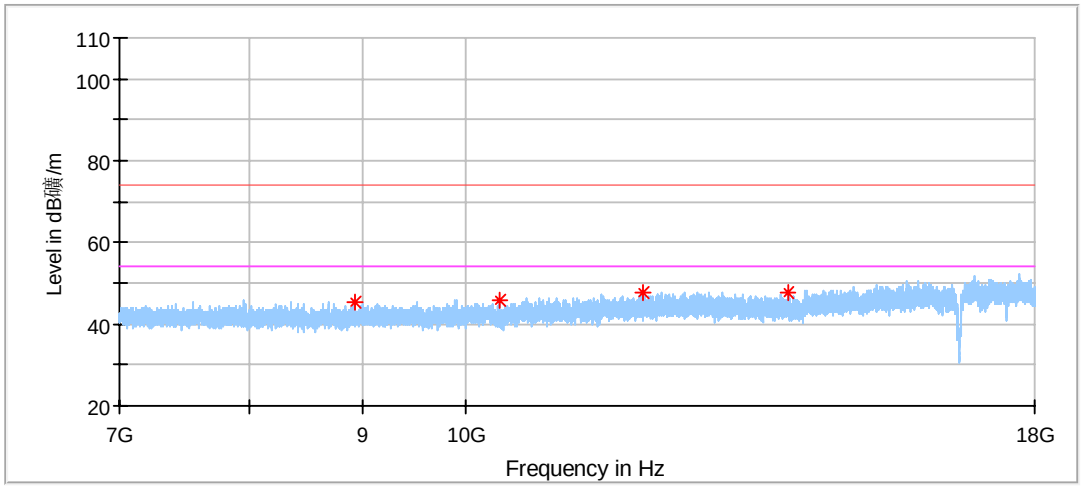


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7667.000000	45.07	74.00	28.93	150.0	H	37.0	6.2
10631.500000	46.41	74.00	27.59	150.0	H	356.0	8.2
13962.000000	49.51	74.00	24.49	150.0	H	244.0	9.9
15204.000000	49.82	74.00	24.18	150.0	H	106.0	12.5



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
8921.000000	45.52	74.00	28.48	150.0	V	24.0	6.8
10355.500000	46.05	74.00	27.95	150.0	V	47.0	8.2
12010.500000	47.89	74.00	26.11	150.0	V	348.0	9.8
13967.000000	47.64	74.00	26.36	150.0	V	359.0	10.0

Remark:

(1) Data of measurement within frequency range18-26GHz 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)

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10 Test Equipment List

Radiated Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 7	68-4-74-19-001	102176	1	2021-6-29
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	68-4-80-14-002	707	1	2021-8-4
Horn Antenna	Rohde & Schwarz	HF907	68-4-80-14-005	102294	1	2021-7-14
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	1	2021-7-6
Pre-amplifier	Rohde & Schwarz	SCU 18	68-4-29-14-001	102230	1	2021-6-21
Attenuator	Agilent	8491A	68-4-81-16-001	MY39264334	1	2021-6-21
3m Semi-anechoic chamber	TDK	9X6X6	68-4-90-14-001	----	3	2022-10-28
Test software	Rohde & Schwarz	EMC32	68-4-90-14-001-A10	Version10.35.02	N/A	N/A

TS8997 Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	68-4-48-14-001	108272	1	2021-6-21
Vector Signal Generator	Rohde & Schwarz	SMBV100A	68-4-48-18-001	262825	1	2021-6-21
Communication Synthetical Test Instrument	Rohde & Schwarz	CMW 270	68-4-48-18-003	101251	1	2021-6-21
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	1	2021-6-21
Vector Signal Generator	Rohde & Schwarz	SMU 200A	68-4-48-14-003	105324	1	2021-6-22
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	68-4-93-14-003	101226/100851	1	2021-6-21
Power Splitter	Weinschel	1580	68-4-85-14-001	SC319	1	2021-7-16
10dB Attenuator	Weinschel	4M-10	68-4-81-14-003	43152	1	2021-6-21
10dB Attenuator	R&S	DNF	68-4-81-14-004	DNF-001	1	2021-6-21
10dB Attenuator	R&S	DNF	68-4-81-14-005	DNF-002	1	2021-6-21
10dB Attenuator	R&S	DNF	68-4-81-14-006	DNF-003	1	2021-6-21
10dB Attenuator	R&S	DNF	68-4-81-14-007	DNF-004	1	2021-6-21
Test software	Rohde & Schwarz	EMC32	68-4-48-14-003-A10	Version 10.60.10	N/A	N/A
Test software	Tonscend	System for BT/WIFI	68-4-74-14-006-A13	Version 2.6.77.0518	N/A	N/A
Shielding Room	TDK	TS8997	68-4-90-19-003	----	1	2020-11-07

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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 Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.81dB; Vertical: 4.89dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.69dB; Vertical: 4.68dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.89dB; Vertical: 4.87dB;
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 Power Spectral Density Conducted measurement	1.17dB
Uncertainty Evaluation for Spurious emissions Conducted measurement	1.43dB
Uncertainty Evaluation for Humidity	0.936%
Uncertainty Evaluation for Temperature	0.195 °C

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