

NCC RADIO TEST REPORT

Test Standard	NCC LP0002(2018-01-10)
Trade name	MI
Product name	米兔智慧積木
Model No.	ZNM01IQI
Test Result	Pass

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of CCS.Inc.

The sample selected for test was production product and was provided by manufacturer.



Approved by:

A handwritten signature in black ink, appearing to read "Sam Chuang", written over a horizontal line.

Sam Chuang
Manager

Tested by:

A handwritten signature in black ink, appearing to read "Jerry Chuang", written over a horizontal line.

Jerry Chuang
Engineer

Revision History

Rev.	Issue Date	Revisions	Revised By
00	March 27, 2018	Initial Issue	Doris Chu
01	May 2, 2018	Correct the Applicant Address	Doris Chu

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	臺灣小米通訊有限公司
Applicant Address	(100) 台北市中正區幸市里新生南路 1 段 50 號 2 樓之 2
Equipment	米兔智慧積木
Brand name	MI
Model No.	ZNM01IQI
Model Discrepancy	N/A
EUT Functions	BLE4.0
Received Date	March 1, 2018
Date of Test	March 19, 2018 ~ March 22, 2018
Output Power(W)	BLE: 0.00028W
Power Operation	☐ AC 120V/60Hz ☐ Adapter(Not for sale) ☐ POE(Not for sale) ☐ Host System ☐ DC Type: ☒ Battery ☐ DC Power Supply ☐ External DC adapter

1.2 EUT CHANNEL INFORMATION

Frequency Range	2402MHz-2480MHz
Modulation Type	GFSK for BLE-1Mbps
Number of channel	40 Channels

Remark:

Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Category	☒ Integral: antenna permanently attached ☐ External dedicated antennas ☐ External Unique antenna connector			
Antenna Type	☐ PIFA ☐ PCB ☐ Dipole ☐ Printed ☐ Coils ☐ Slot ☒ Chip			
Antenna Gain	Frequency:	2402MHz	2440MHz	2480MHz
	Gain:	-0.081dBi	-0.351dBi	-0.507dBi
Antenna Brand	Microgate			
Antenna Model	MGMA3216H2450-A02			

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 1.4003
RF output power, conducted	+/- 1.1372
Power density, conducted	+/- 1.4003
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683
3M Semi Anechoic Chamber / 40G~60G	+/- 1.8509
3M Semi Anechoic Chamber / 60G~75G	+/- 1.9869
3M Semi Anechoic Chamber / 75G~110G	+/- 2.9651
3M Semi Anechoic Chamber / 110G~170G	+/- 2.7807
3M Semi Anechoic Chamber / 170G~220G	+/- 3.6437
3M Semi Anechoic Chamber / 220G~325G	+/- 4.2982

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at
No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Timmy Wang	
Radiation	Jerry Chuang	
RF Conducted	Timmy Wang	

Remark: The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Spectrum Analyzer	R&S	FSV 40	101073	10/02/2017	10/01/2018
Power Meter	Anritsu	ML2495A	1012009	09/18/2017	09/17/2018
Power Sensor	Anritsu	MA2411B	917072	09/18/2017	09/17/2018

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Bilog Antenna	Sunol Sciences	JB3	A030105	06/20/2017	06/19/2018
EMI Test Receiver	R&S	ESCI	100064	05/17/2017	05/16/2018
Horn Antenna	ETS LINDGREN	3116	00026370	01/04/2018	01/03/2019
Loop Ant	COM-POWER	AL-130	121051	03/21/2018	03/20/2019
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	01/02/2018	01/09/2019
K Type Cable	Huber+Suhner	SUCOFLEX 102	22470/2	01/02/2018	01/09/2019
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	07/31/2017	07/30/2018
Pre-Amplifier	EMCI	EMC 012635	980151	08/01/2017	07/31/2018
Spectrum Analyzer	Agilent	E4446A	US42510252	11/27/2017	11/26/2018
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Test S/W	EZ-EMC (CCS-3A1RE)				

AC Conducted Emissions Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
EMI Test Receiver	R&S	ESCI	100064	05/17/2017	05/16/2018
LISN	R&S	ENV216	101054	05/18/2017	05/17/2018
LISN	Schwarzbeck	NSLK8128	5012	04/25/2017	04/24/2018
Test S/W	CCS-3A1-CE				

Remark: Each piece of equipment is scheduled for calibration once a year.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	N/A				

Support Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	Notebook	Lenovo	Yoga I3	N/A	N/A
2	N/A				
3					
4					

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with NCC LP0002(2018-01-10), ANSI C63.10:2013 and KDB 558074 D01 v04.

1.9 LP0002 SECTION 2.7 RESTRICTED BANDS OF OPERATIONS

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
0.090 ~ 0.110	240.00 ~ 285.00	3332.0 ~ 3339.0
0.490 ~ 0.510	322.00 ~ 335.40	3345.8 ~ 3358.0
2.172 ~ 2.198	399.90 ~ 410.00	3500.0 ~ 4400.0
3.013 ~ 3.033	485.00 ~ 510.00	4500.0 ~ 5250.0
4.115 ~ 4.198	608.00 ~ 614.00	5350.0 ~ 5460.0
5.670 ~ 5.690	703.00 ~ 748.0	7250.0 ~ 7750.0
6.200 ~ 6.300	758.00 ~ 803.00	8025.0 ~ 8500.0
8.230 ~ 8.400	825.00 ~ 915.00	9000.0 ~ 9200.0
12.265 ~ 12.600	930.00 ~ 1240.0	9300.0 ~ 9500.0
13.340 ~ 13.430	1300.0 ~ 1427.0	10600 ~ 12700
14.965 ~ 15.020	1435.0 ~ 1626.5	13250 ~ 13400
16.700 ~ 16.755	1660.0 ~ 1785.0	14470 ~ 14500
19.965 ~ 20.020	1805.0 ~ 1880.0	15350 ~ 16200
25.500 ~ 25.700	1885.0 ~ 1900.0	17700 ~ 21400
37.475 ~ 38.275	1905.0 ~ 1985.0	22010 ~ 23120
73.500 ~ 75.400	2010.0 ~ 2025.0	23600 ~ 24000
108.00 ~ 138.00	2110.0 ~ 2170.0	31200 ~ 31800
149.90 ~ 150.05	2200.0 ~ 2300.0	36430 ~ 36500
156.70 ~ 156.90	2310.0 ~ 2390.0	38600 以上
162.01 ~ 167.17	2483.5 ~ 2900.0	---
167.72 ~ 173.20	3260.0 ~ 3267.0	---

2. TEST SUMMERY

NCC Standard Section	Report Section	Test Item	Result
2.2	1.2	Antenna Requirement	Pass
2.3	4.1	AC Conducted Emission	Pass
3.10.1.6(2)(A)	4.2	6 dB Bandwidth	Pass
-	4.2	Occupied Bandwidth(99%)	-
3.10.1.2(1)(C)	4.3	Output Power Measurement	Pass
3.10.1.6(2)(B)	4.4	Power Spectral Density	Pass
3.10.1.5	4.5	Conducted Band Edge	Pass
3.10.1.5	4.5	Conducted Emission	Pass
3.10.1.5	4.6	Radiation Band Edge	Pass
3.10.1.5	4.6	Radiation Spurious Emission	Pass
2.8	4.7	Receiver	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	BLE Mode (1Mbps)
Test Channel Frequencies	1.Lowest Channel : 2402MHz 2.Middle Channel : 2440MHz 3.Highest Channel : 2480MHz

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

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3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	DC 5V
Test Mode	☒ Mode 1:EUT power by battery.
Worst Mode	☐ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	DC 5V
Test Mode	Mode 1:EUT power by battery.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☒ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)
Worst Polarity	☒ Horizontal ☐ Vertical

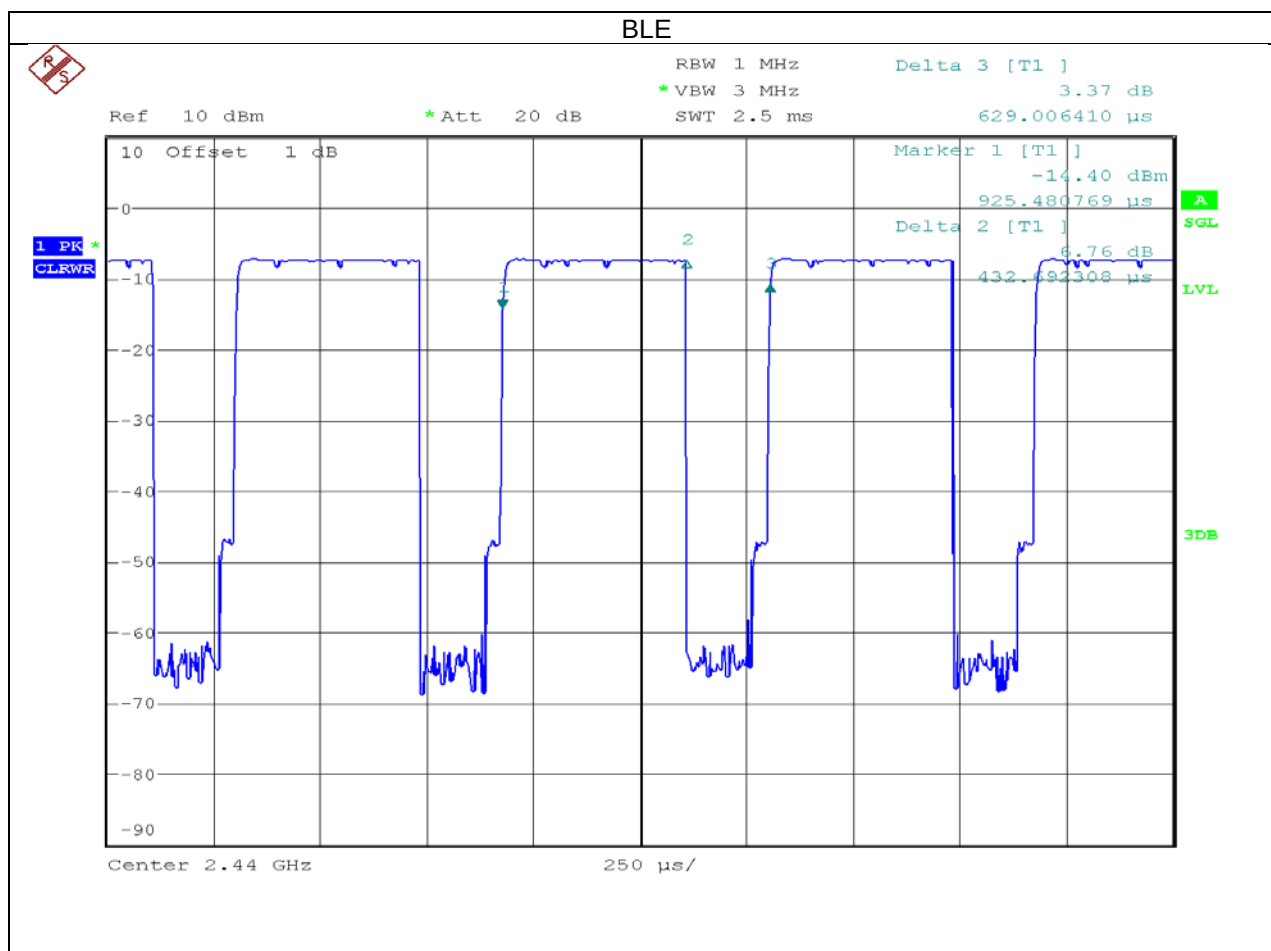
Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	DC 5V
Test Mode	Mode 1: EUT power by battery.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. The worst mode was recorded in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case was recorded in this report.
3. For below 1G AC power line conducted emission and radiation emission were performed the EUT transmit at the highest output power channel as worst case.

3.3 EUT DUTY CYCLE

Duty Cycle				
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)
BLE	0.433	0.629	68.79	1.62



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a)

Frequency Range (MHz)	Limits(dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

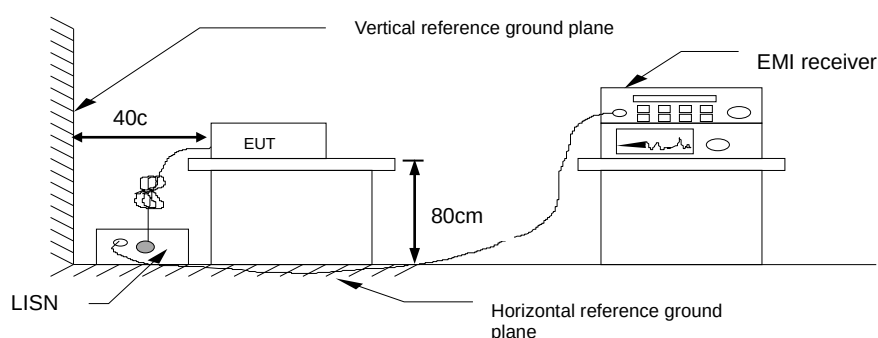
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup



4.1.4 Test Result

Note: EUT is a DC operating device, so the test item is not necessary performed.

4.2 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

4.2.1 Test Limit

According to LP0002 section 3.10.1.6(2)(A),

6 dB Bandwidth :

Limit	Shall be at least 500kHz
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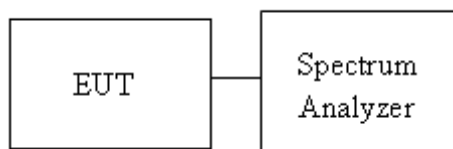
Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as KDB 558074 D01 v04, Section 8.1 and ANSI 63.10:2013 clause 6.9.2,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth and 99% Bandwidth.
4. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup

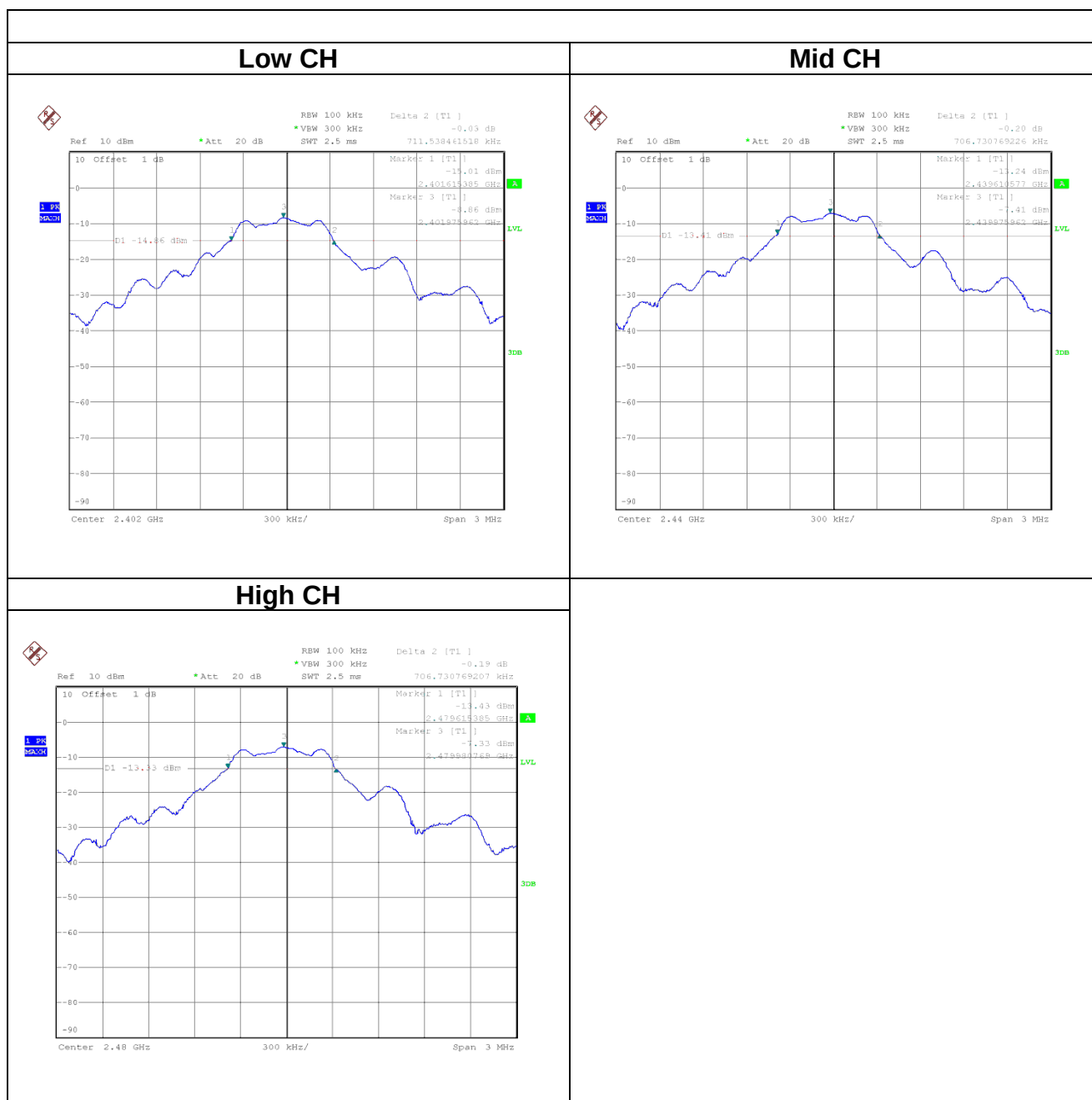


4.2.4 Test Result

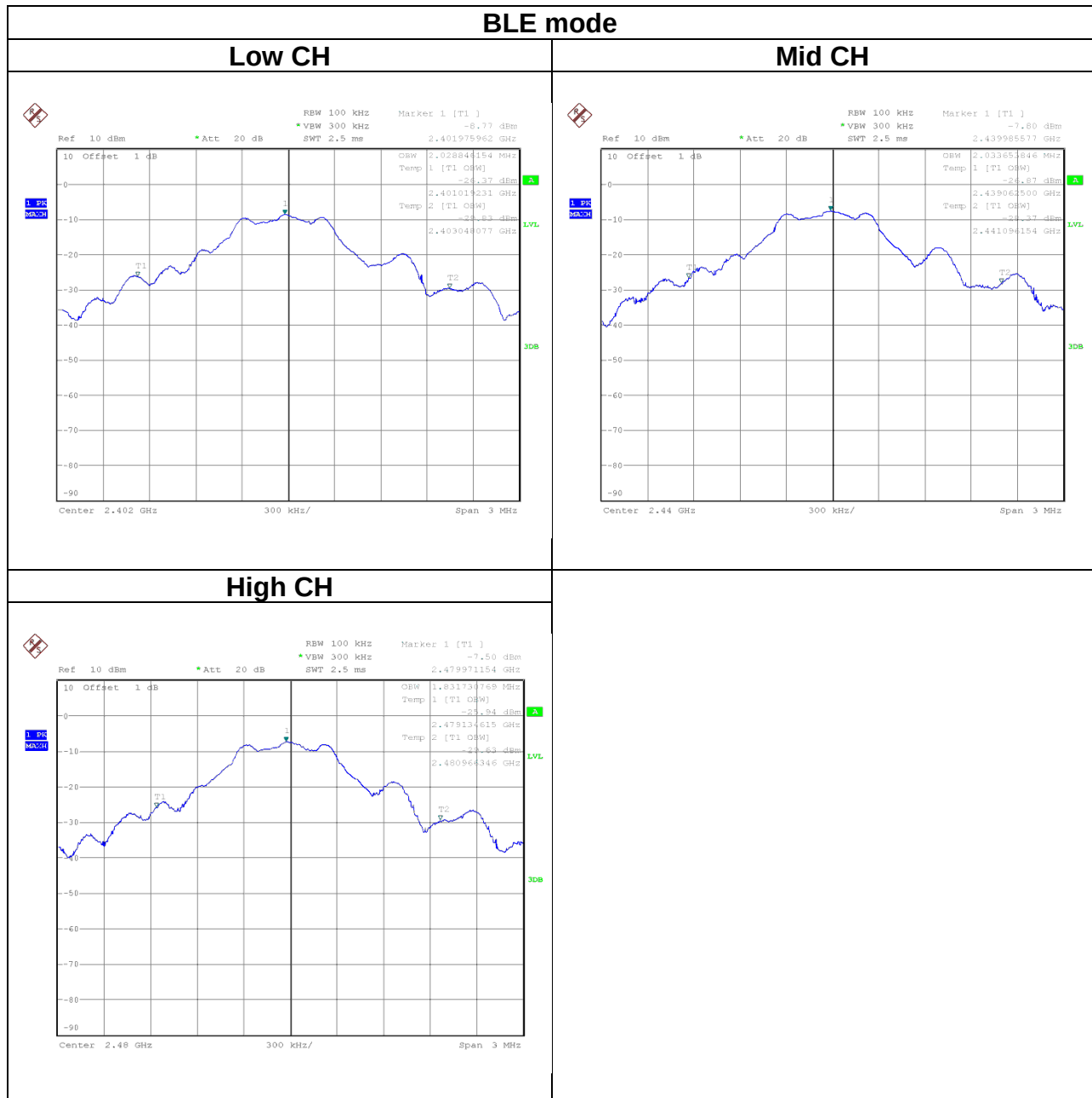
Test mode: BLE mode / 2402-2480 MHz				
Channel	Frequency (MHz)	OBW(99%) (MHz)	6dB BW (MHz)	6dB limit (kHz)
Low	2402	2.03	0.712	>500
Mid	2440	2.03	0.707	
High	2480	1.83	0.707	

Test Data

6 dB Bandwidth



99% Bandwidth



4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to LP0002 section 3.10.1.2(1)(C),

Peak output power :

For systems using digital modulation in the 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt(30dBm), based on the use of antennas with directional gain not exceed 6 dBi. If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. In case of point-to-point operation, the limit need to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Limit	☒ Antenna not exceed 6dBi : 30dBm ☐ Antenna with DG greater than 6dBi : [Limit = 30 – (DG– 6)] ☐ Point-to-point operation :
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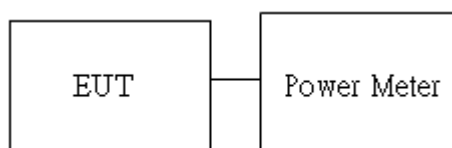
Average output power : For reporting purposes only.

4.3.2 Test Procedure

Test method Refer as KDB 558074 D01 v04, Section 9.1.2.

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

4.3.3 Test Setup



4.3.4 Test Result

Peak output power :

BT LE Mode					
Config.	CH	Freq. (MHz)	PK Power (dBm)	PK Power (W)	FCCLimit (dBm)
BLE Data rate: 1Mbps	0	2402	-5.98	0.00025	30
	19	2440	-5.52	0.00028	
	39	2480	-7.76	0.00017	

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to LP0002 section 3.10.1.6(2)(B) and 3.10.1.3,

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Limit	☒ Antenna not exceed 6 dBi : 8dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 8 – (DG– 6)] ☐ Point-to-point operation :
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4.4.2 Test Procedure

Test method Refer as KDB 558074 D01 v04, Section 10.2

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 30kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss and Duty Factor were compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

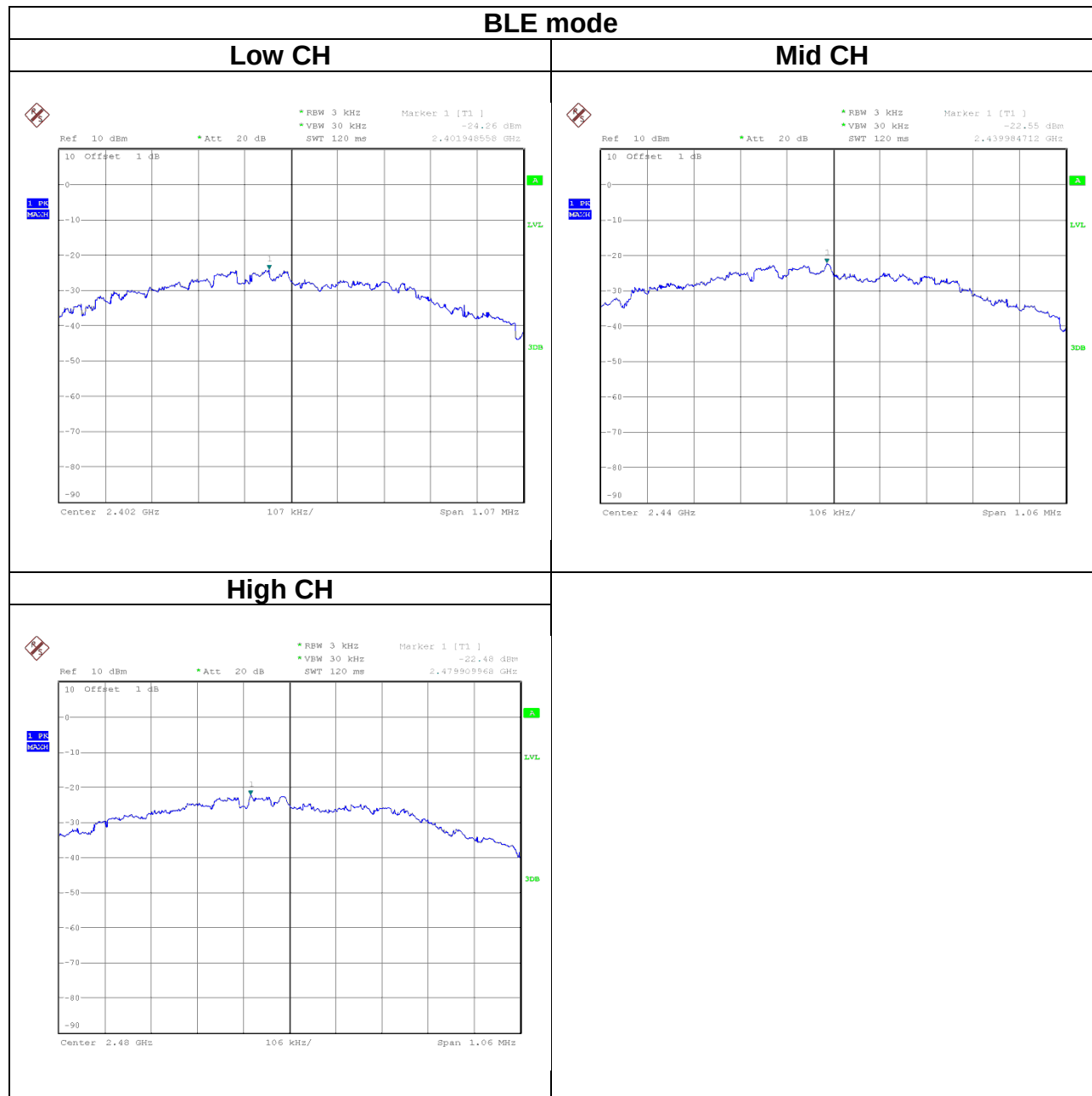
4.4.3 Test Setup



4.4.4 Test Result

Test mode: BLE mode / 2402-2480 MHz			
Channel	Frequency (MHz)	PPSD (dBm)	IC/FCC limit (dBm)
Low	2402	-24.26	8
Mid	2440	-22.55	
High	2480	-22.48	

Test Data



4.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

According to LP0002 section 3.10.1.5,

In any 100 kHz bandwidth outside the authorized frequency band,

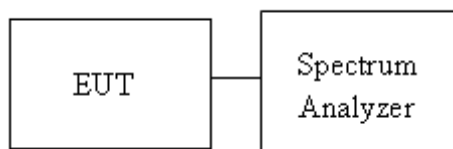
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

4.5.2 Test Procedure

Test method Refer as KDB 558074 D01 v04, Section 11.

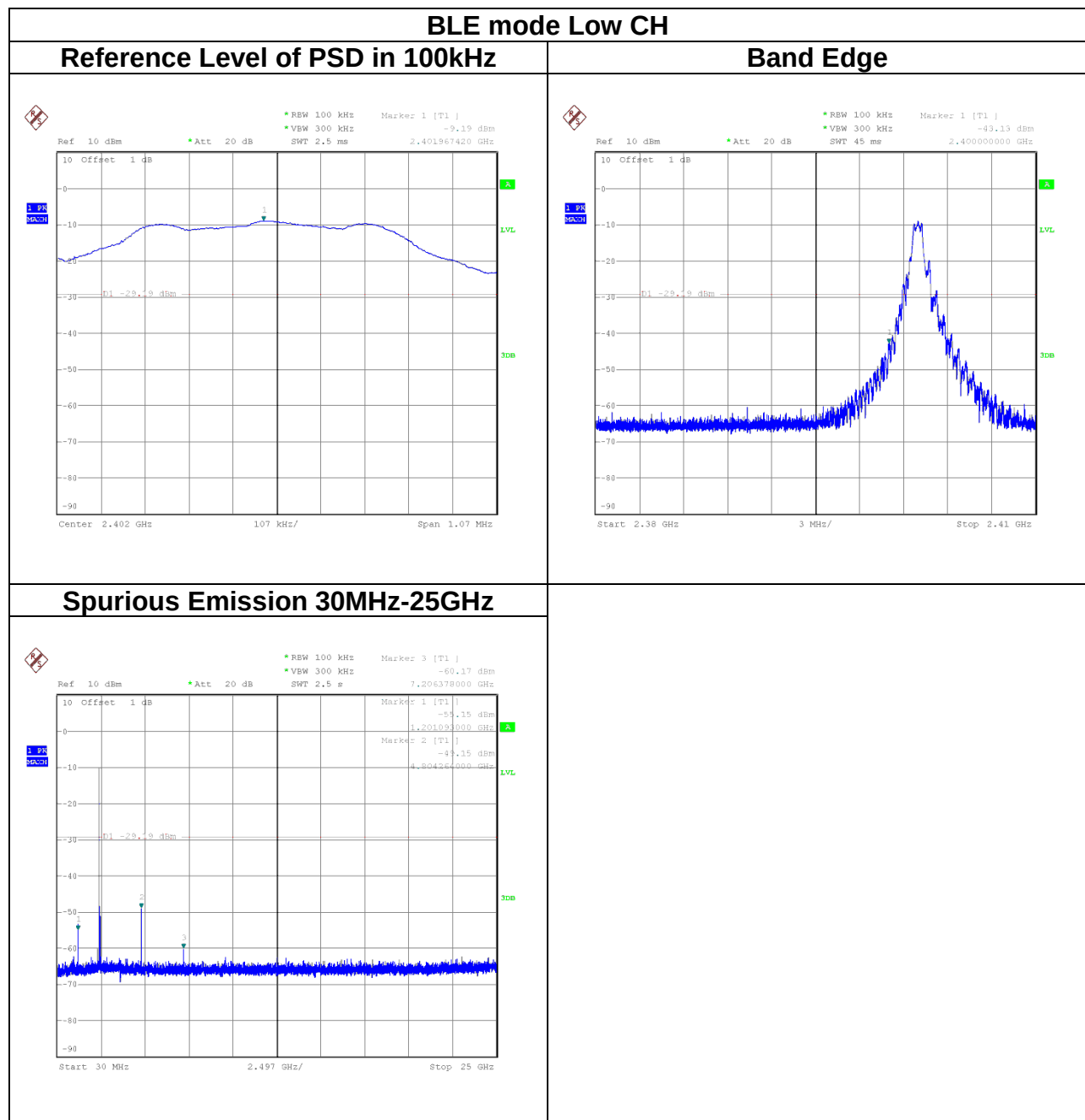
1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted 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.

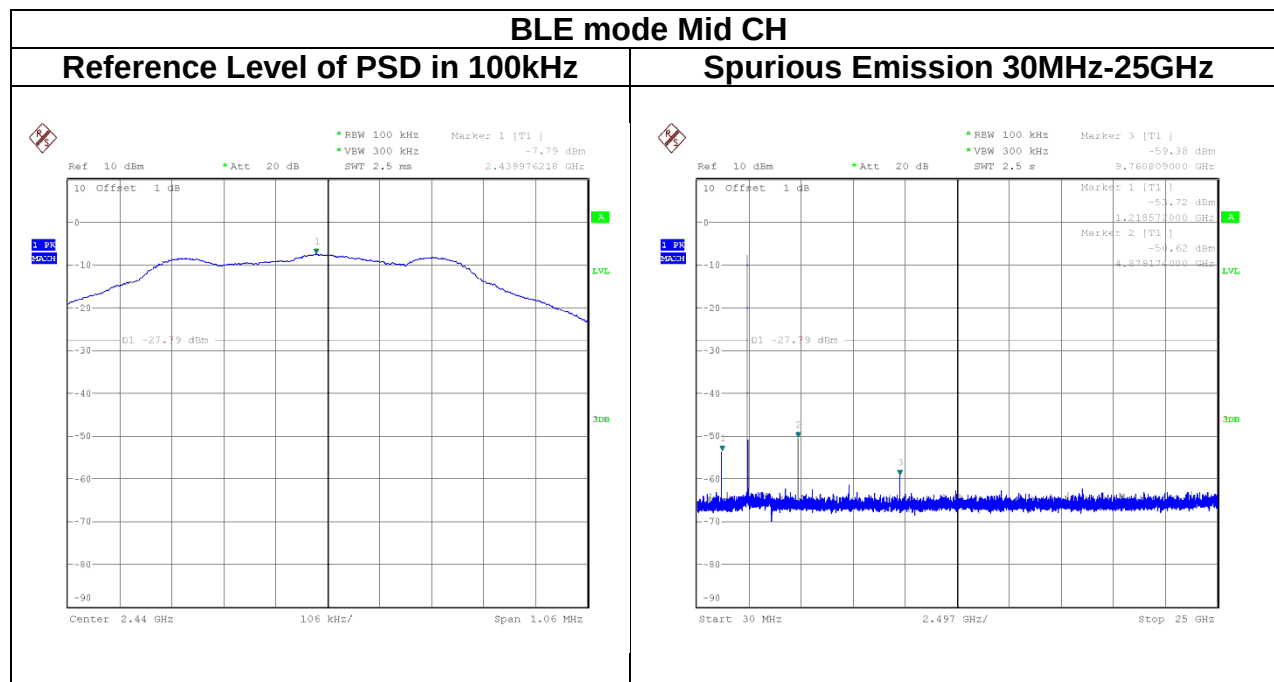
4.5.3 Test Setup

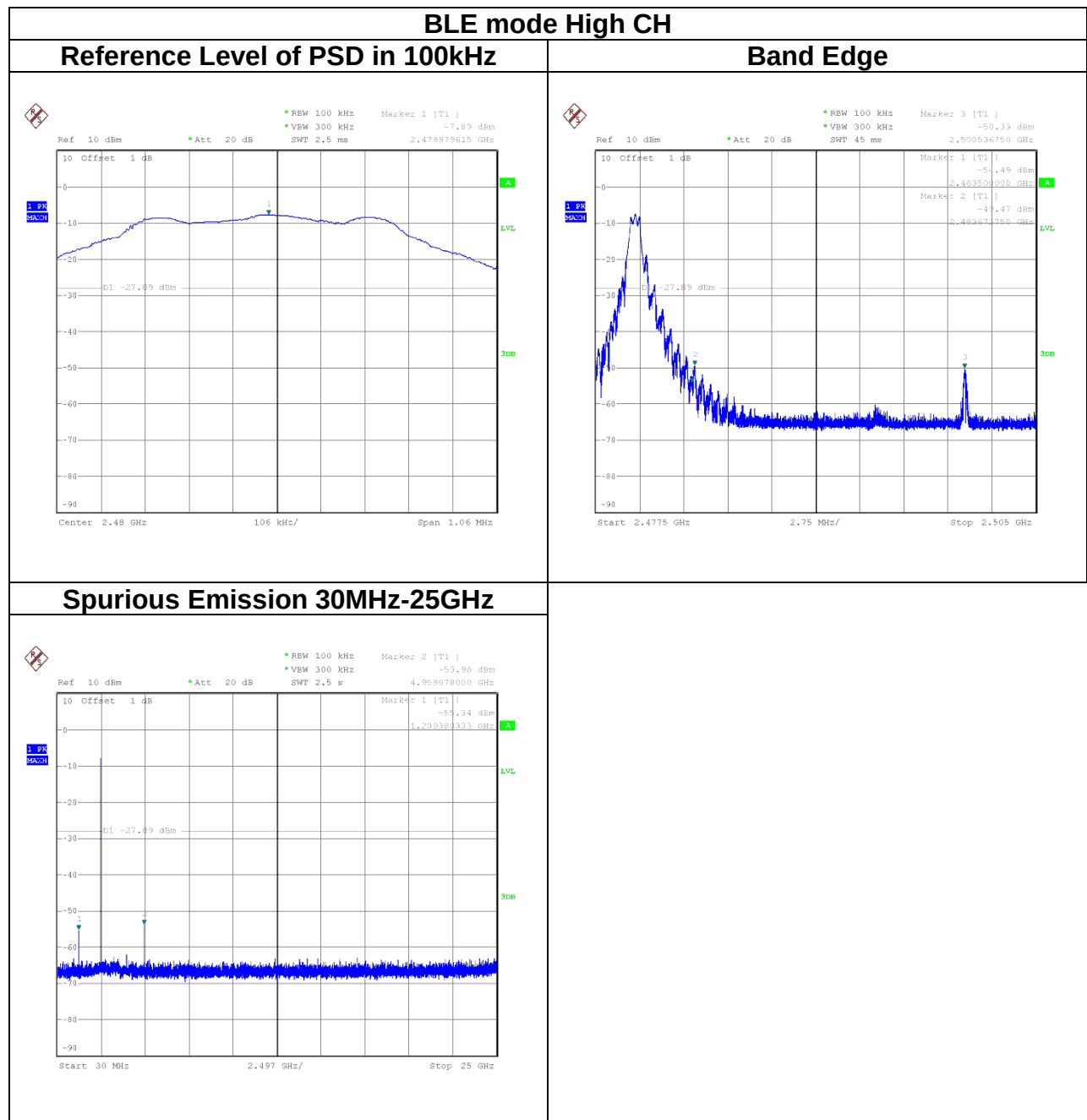


4.5.4 Test Result

Test Data







4.6 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.6.1 Test Limit

According to LP0002 section 3.10.1.5 and section 2.8,

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

4.6.2 Test Procedure

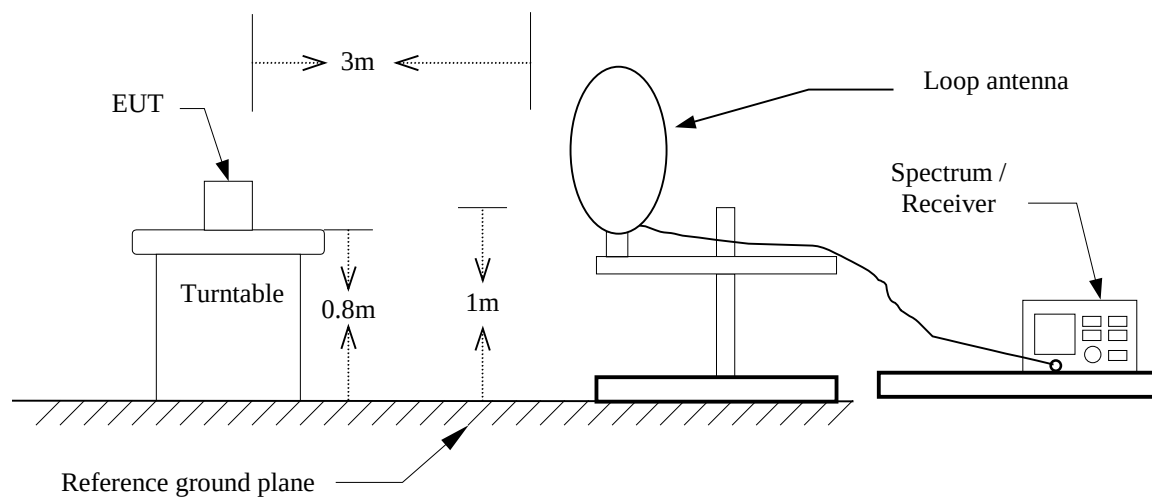
Test method Refer as KDB 558074 D01 v04, Section 12.1.

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 30MHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
5. The SA setting following :
 - (1) Below 1G : RBW = 100kHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2) Above 1G :
 - (2.1) For Peak measurement : RBW = 1MHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW
· If Duty Cycle $\geq$ 98%, VBW=10Hz.
· If Duty Cycle < 98%, VBW $\geq$ 1/T.

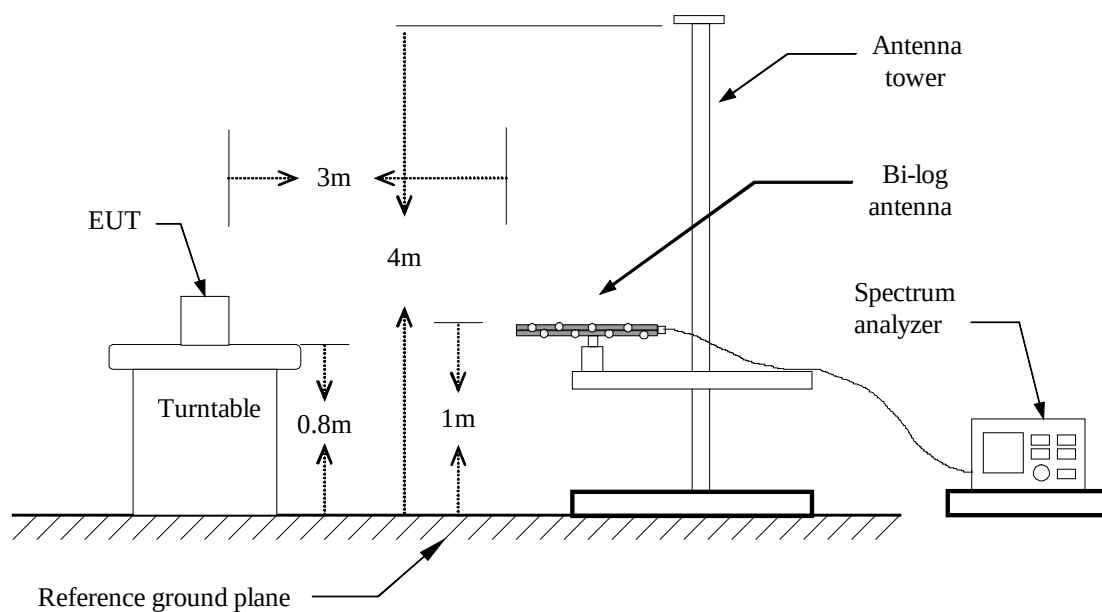
Configuration	Duty Cycle (%)	VBW
BLE	68.79	3kHz

4.6.3 Test Setup

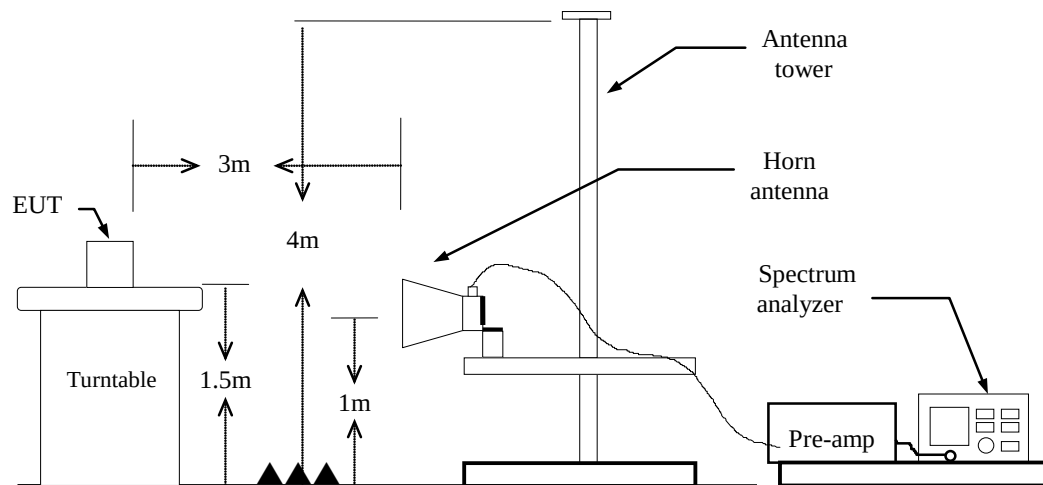
9kHz ~ 30MHz



30MHz ~ 1GHz



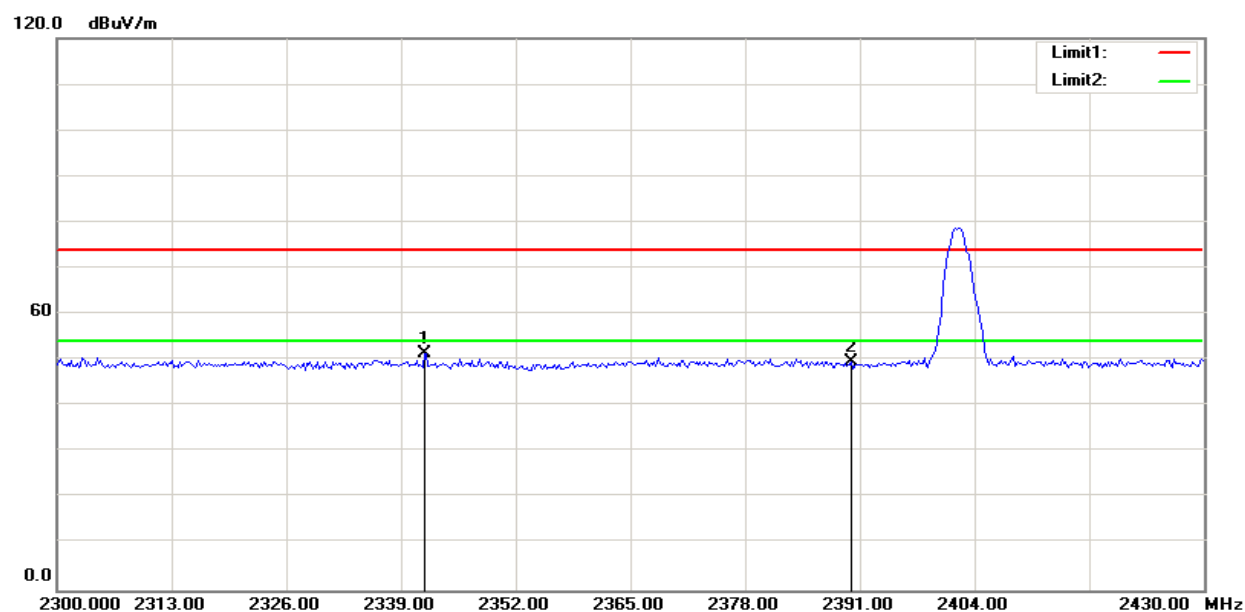
Above 1 GHz



4.6.4 Test Result

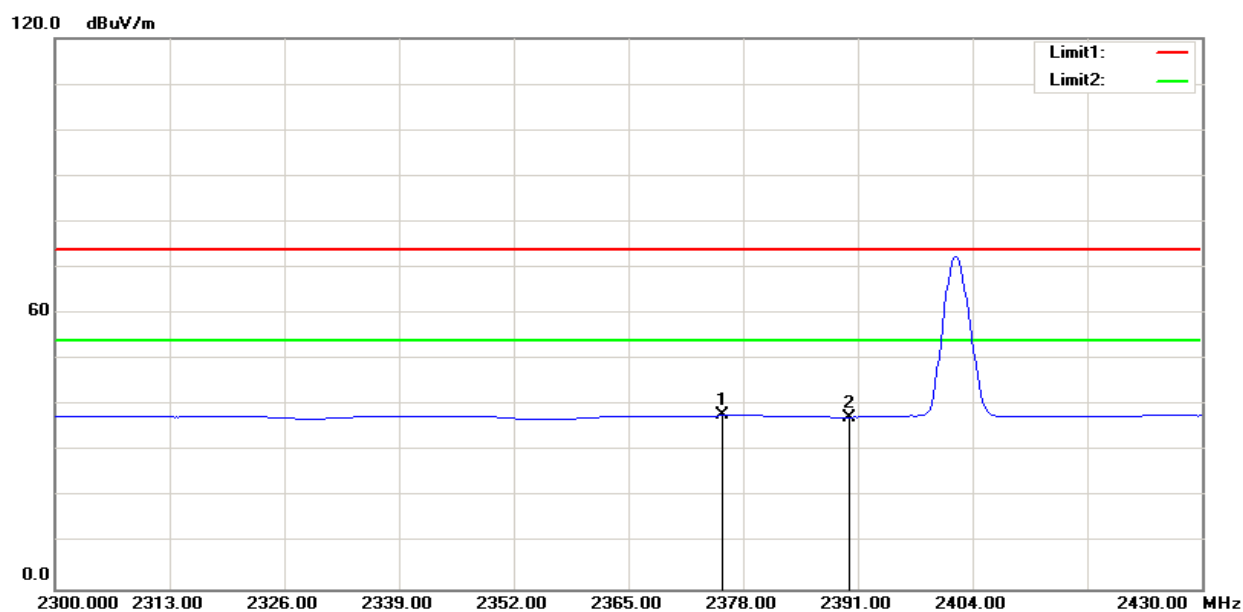
Band Edge Test Data

Test Mode	BLE Low CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Band Edge	Test Date	March 22, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	DC 5V



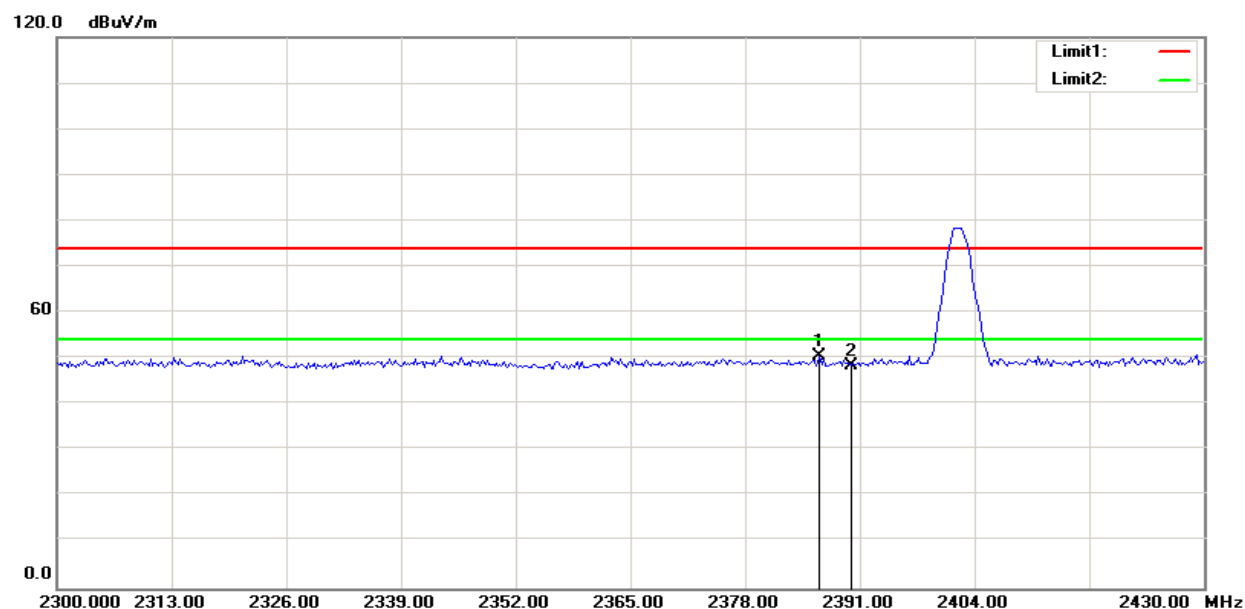
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2341.667	59.10	-7.73	51.37	74.00	-22.63	Peak
2390.000	57.24	-7.57	49.67	74.00	-24.33	Peak

Test Mode	BLE Low CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Band Edge	Test Date	March 22, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	DC 5V



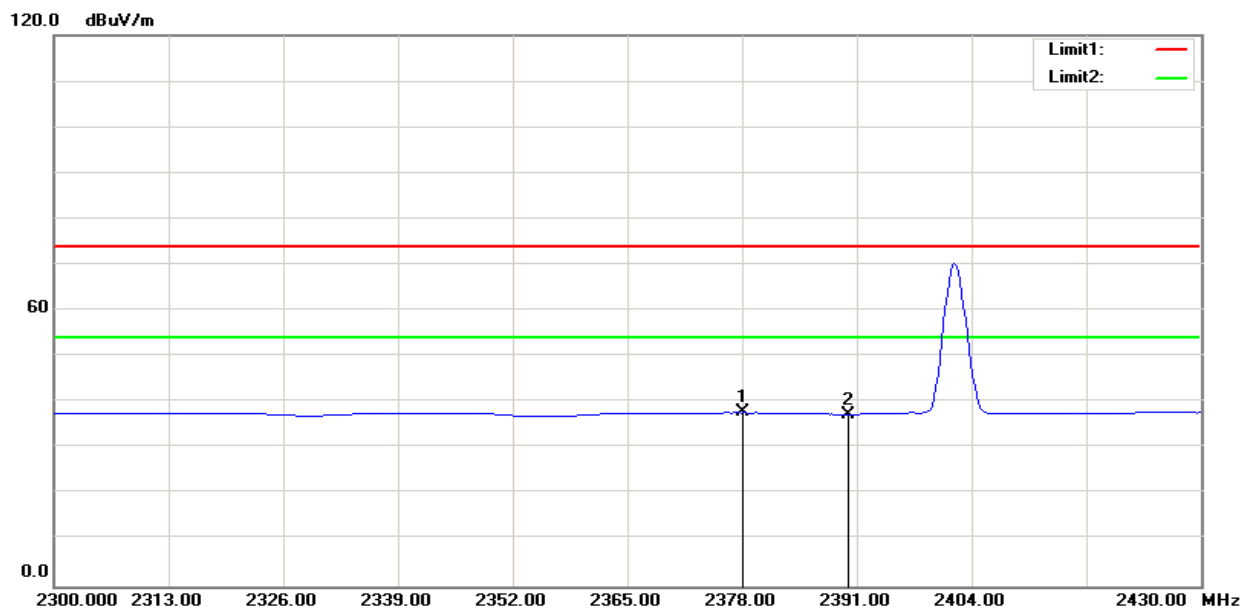
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2375.625	45.46	-7.62	37.84	54.00	-16.16	AVG
2390.000	45.02	-7.57	37.45	54.00	-16.55	AVG

Test Mode	BLE Low CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Band Edge	Test Date	March 22, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	DC 5V



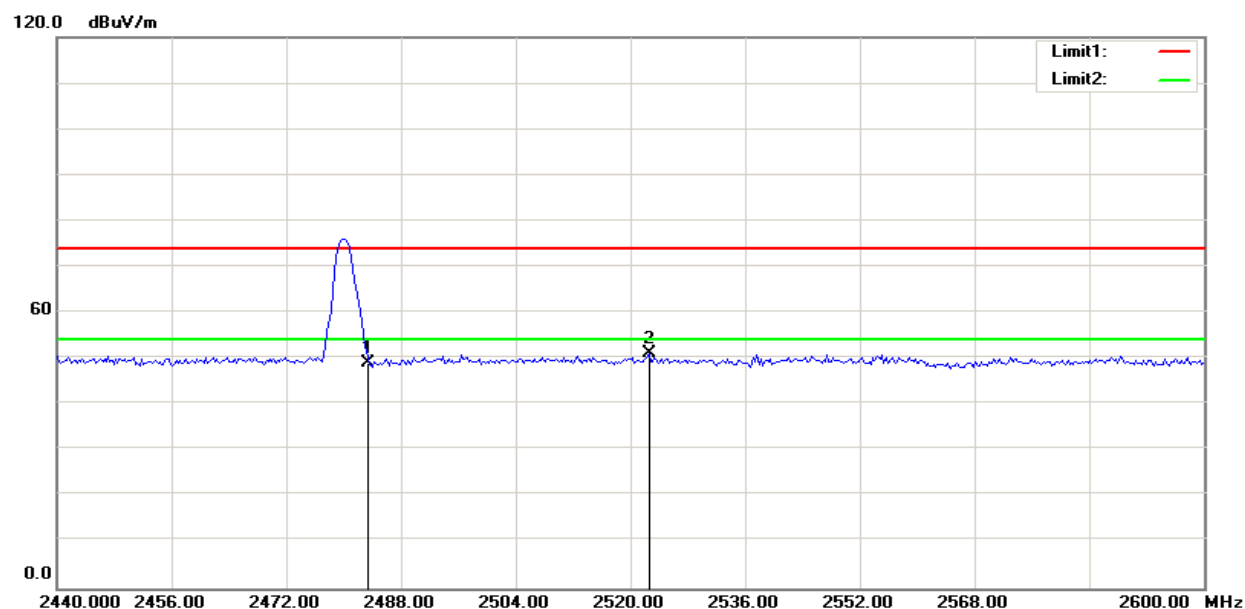
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2386.458	58.06	-7.58	50.48	74.00	-23.52	Peak
2390.000	56.02	-7.57	48.45	74.00	-25.55	Peak

Test Mode	BLE Low CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Band Edge	Test Date	March 22, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	DC 5V



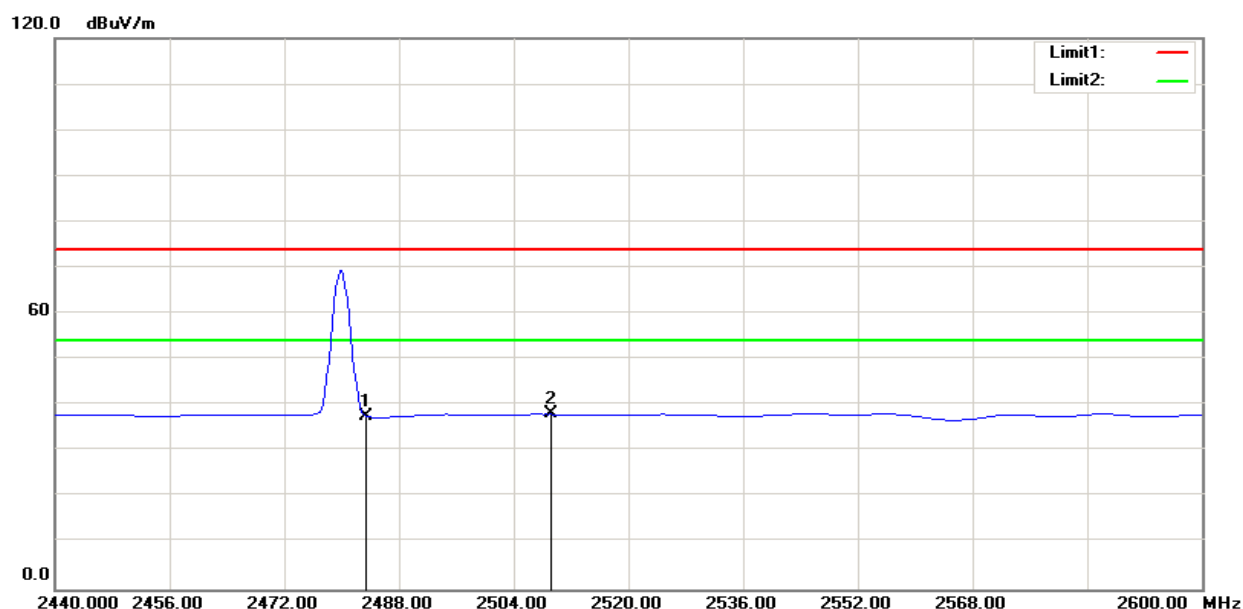
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2378.125	45.45	-7.61	37.84	54.00	-16.16	AVG
2390.000	45.01	-7.57	37.44	54.00	-16.56	AVG

Test Mode	BLE High CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Band Edge	Test Date	March 22, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	DC 5V



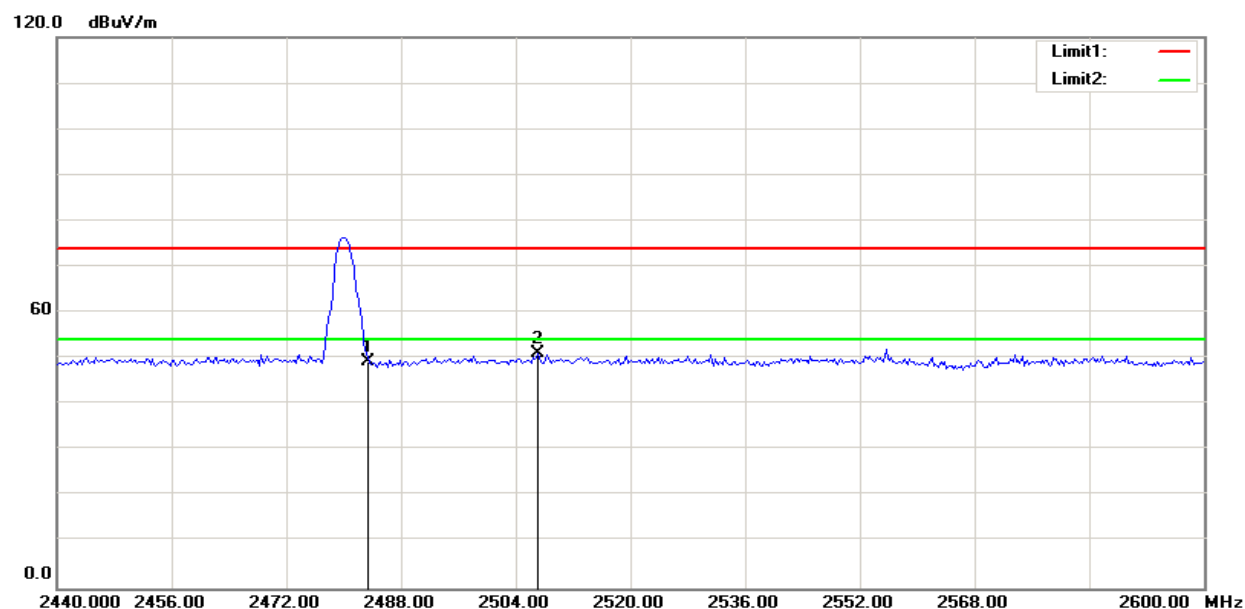
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.500	56.39	-7.26	49.13	74.00	-24.87	Peak
2522.564	58.17	-7.15	51.02	74.00	-22.98	Peak

Test Mode	BLE High CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Band Edge	Test Date	March 22, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	DC 5V



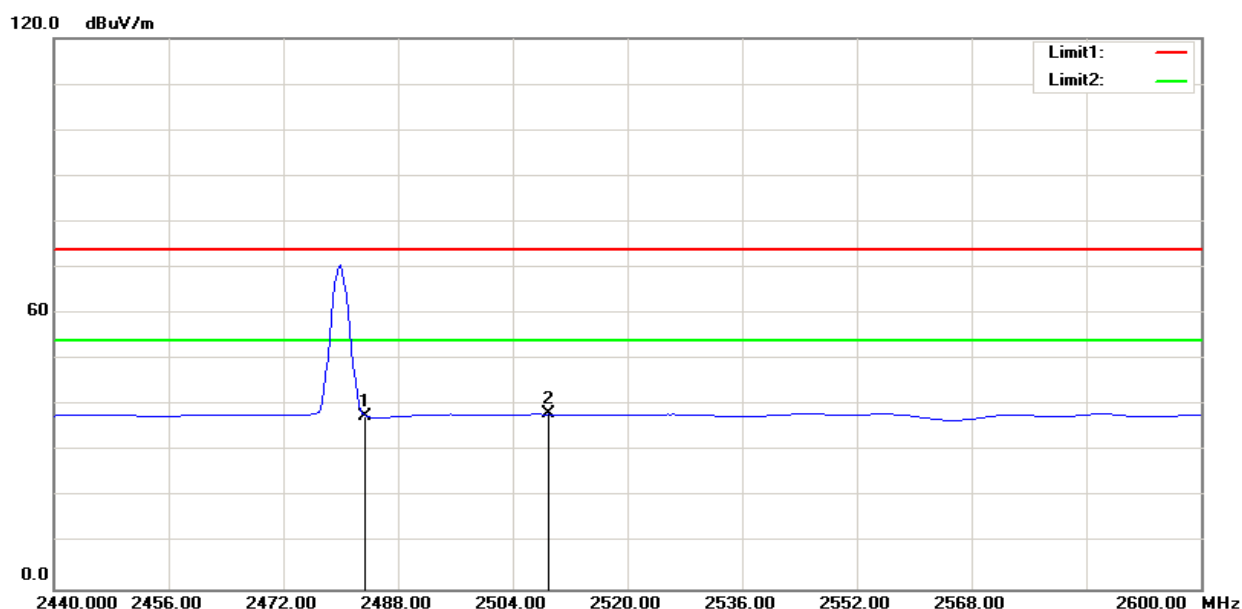
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.500	44.91	-7.26	37.65	54.00	-16.35	AVG
2509.231	45.30	-7.18	38.12	54.00	-15.88	AVG

Test Mode	BLE High CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Band Edge	Test Date	March 22, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak	Test Voltage	DC 5V



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.500	56.75	-7.26	49.49	74.00	-24.51	Peak
2507.180	58.40	-7.19	51.21	74.00	-22.79	Peak

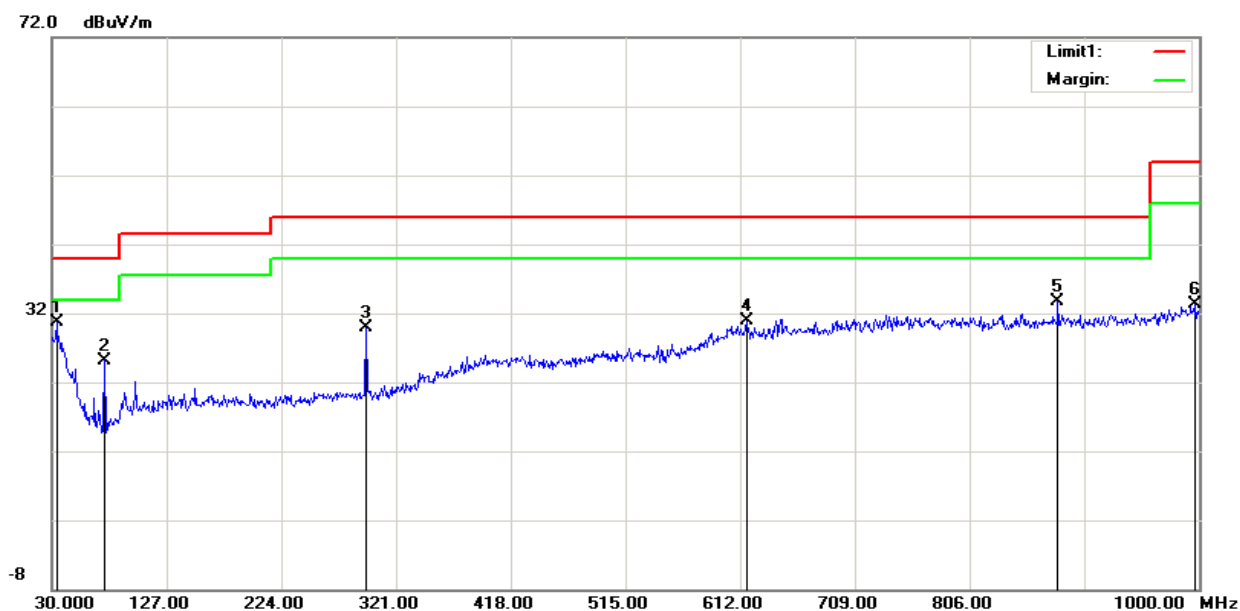
Test Mode	BLE High CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Band Edge	Test Date	March 22, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average	Test Voltage	DC 5V



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.500	44.93	-7.26	37.67	54.00	-16.33	AVG
2508.974	45.30	-7.19	38.11	54.00	-15.89	AVG

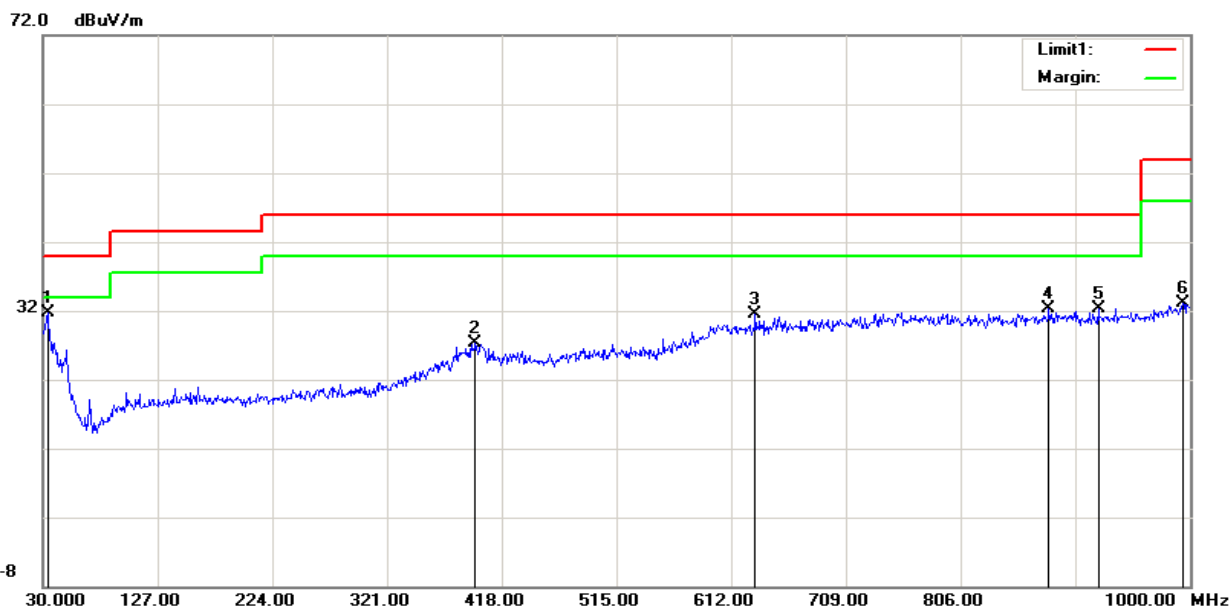
Below 1G Test Data

Test Mode	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Item	30MHz-1GHz	Test Date	March 23, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Qusi-peak	Test Voltage	DC 5V



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
33.8800	8.14	22.54	30.68	40.00	-9.32	peak
74.6200	14.62	10.58	25.20	40.00	-14.80	peak
295.7800	14.03	15.86	29.89	46.00	-16.11	peak
617.8200	6.02	24.81	30.83	46.00	-15.17	peak
880.6900	7.30	26.35	33.65	46.00	-12.35	peak
997.0900	5.35	27.92	33.27	54.00	-20.73	peak

Test Mode	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Item	30MHz-1GHz	Test Date	March 23, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Qusi-peak	Test Voltage	DC 5V

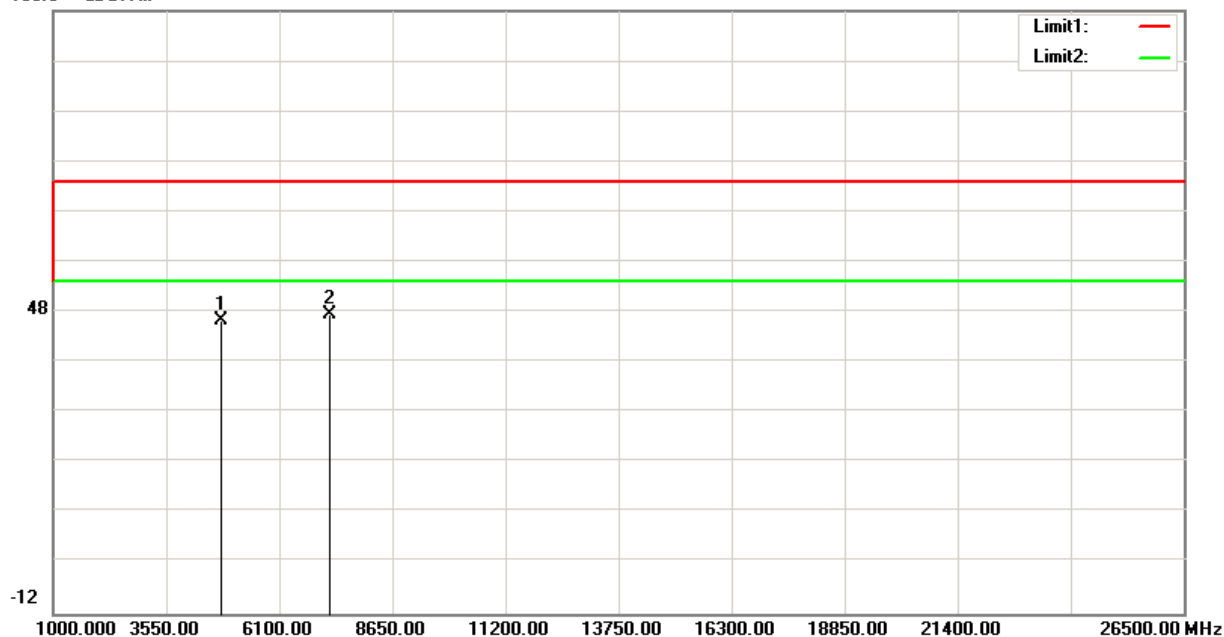


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
33.8800	9.24	22.54	31.78	40.00	-8.22	peak
395.6900	6.27	21.09	27.36	46.00	-18.64	peak
632.3700	6.51	24.92	31.43	46.00	-14.57	peak
880.6900	5.91	26.35	32.26	46.00	-13.74	peak
922.4000	5.74	26.54	32.28	46.00	-13.72	peak
994.1800	5.36	27.84	33.20	54.00	-20.80	peak

Above 1G Test Data

Test Mode	BLE Low CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Harmonic	Test Date	March 22, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	DC 5V

108.0 dBuV/m

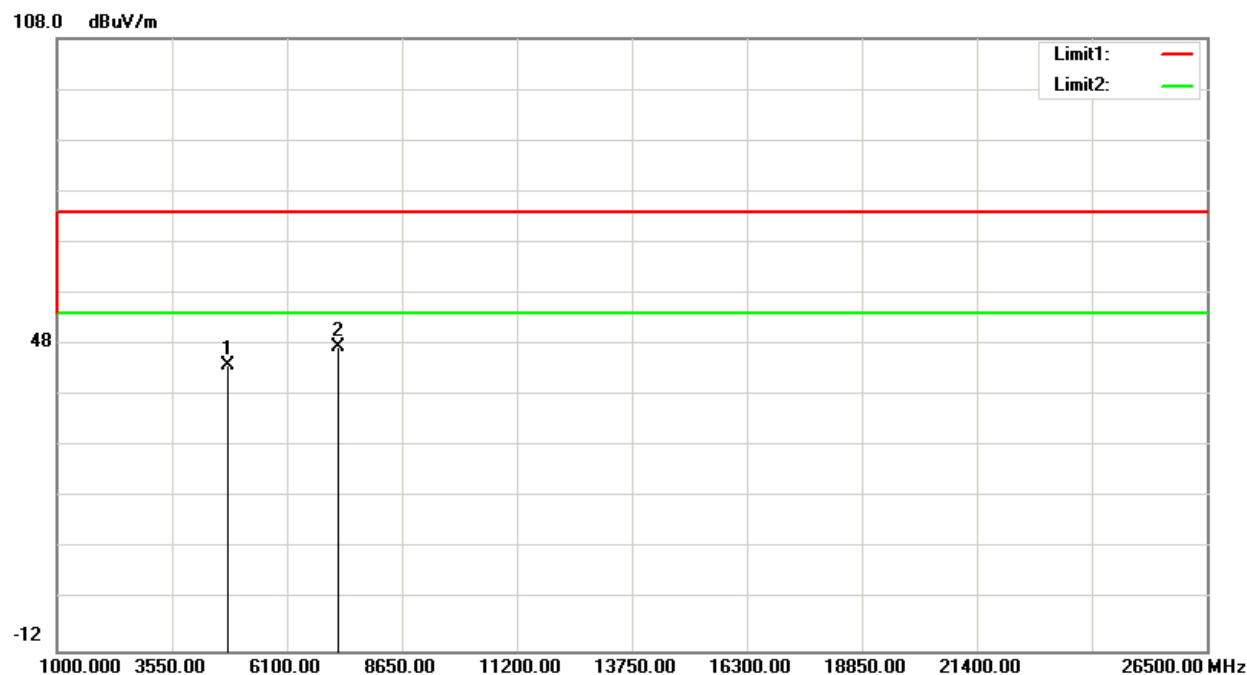


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4800.481	46.87	-0.38	46.49	74.00	-27.51	peak
7252.404	42.27	5.21	47.48	74.00	-26.52	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	BLE Low CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Harmonic	Test Date	March 22, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	DC 5V

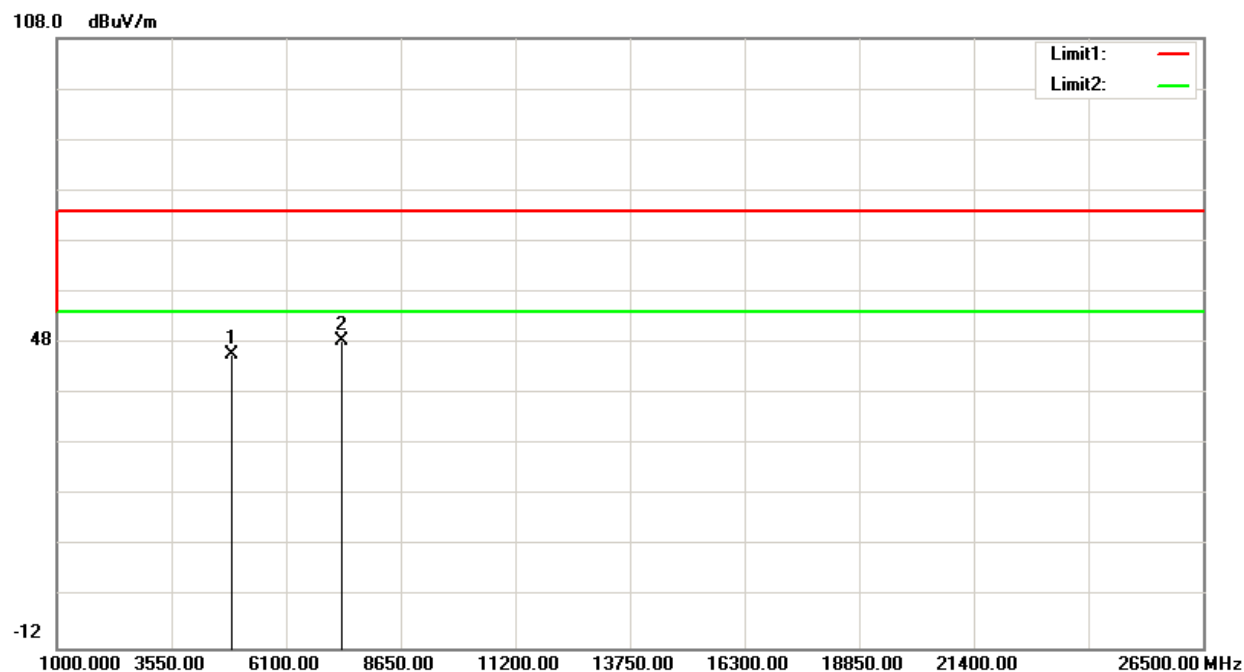


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4800.481	44.45	-0.38	44.07	74.00	-29.93	peak
7252.404	42.37	5.21	47.58	74.00	-26.42	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	BLE Mid CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Harmonic	Test Date	March 22, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	DC 5V

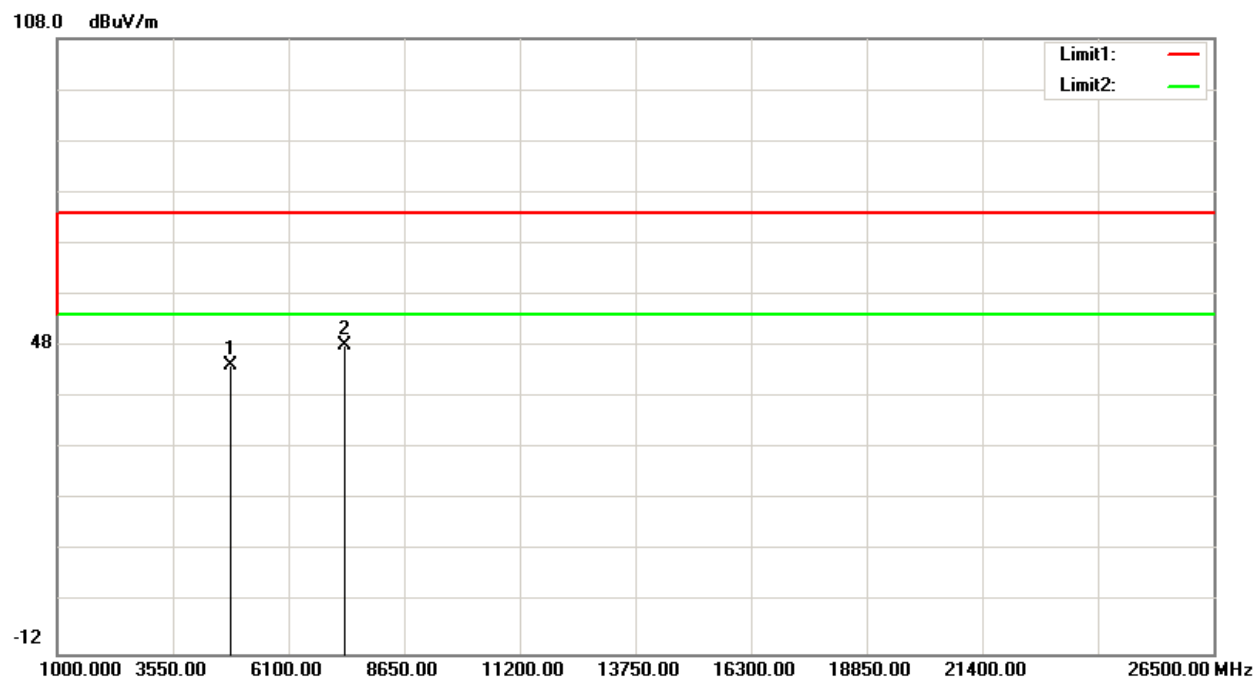


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4882.212	45.70	-0.07	45.63	74.00	-28.37	peak
7334.135	42.82	5.50	48.32	74.00	-25.68	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	BLE Mid CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Harmonic	Test Date	March 22, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	DC 5V

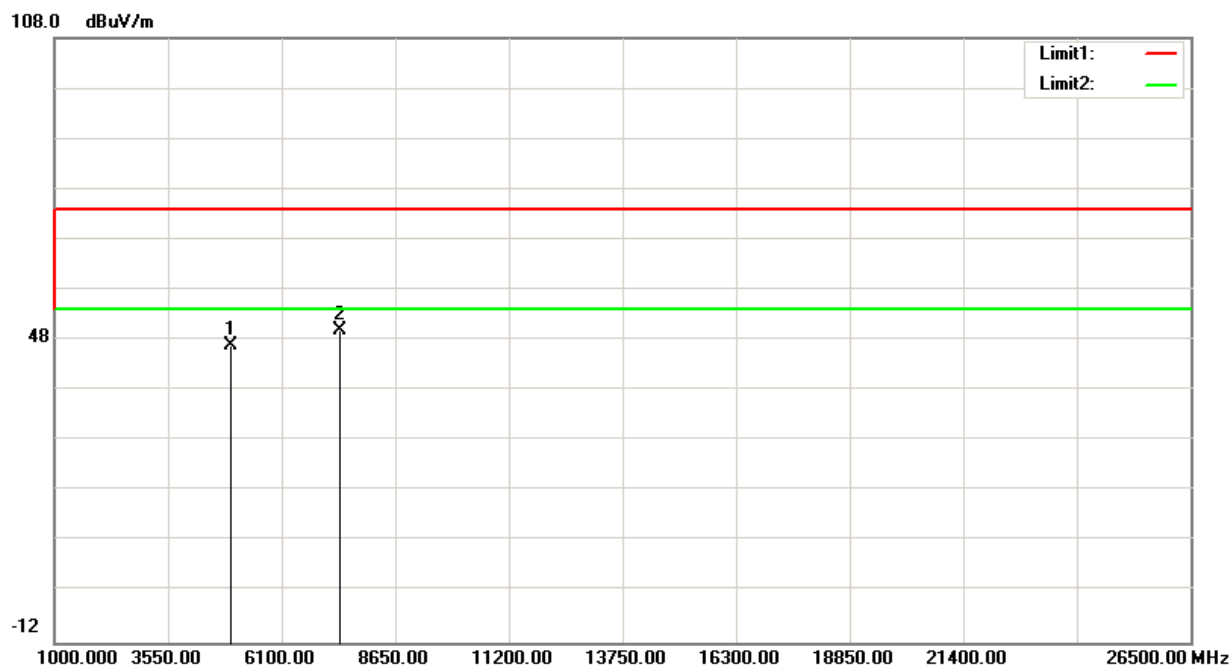


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4841.346	44.45	-0.22	44.23	74.00	-29.77	peak
7334.135	42.56	5.50	48.06	74.00	-25.94	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	BLE High CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Harmonic	Test Date	March 22, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	DC 5V

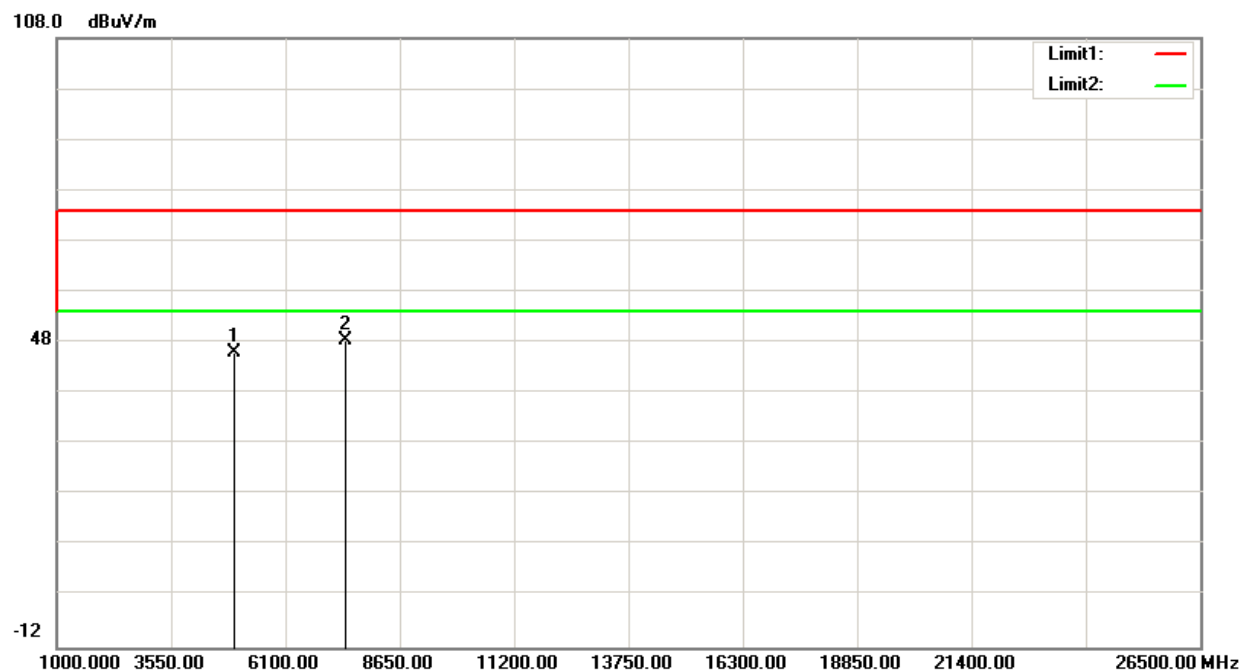


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4963.942	46.66	0.24	46.90	74.00	-27.10	peak
7415.865	44.02	5.79	49.81	74.00	-24.19	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	BLE High CH	Temp/Hum	24(°C)/ 50%RH
Test Item	Harmonic	Test Date	March 22, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage	DC 5V



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4963.942	45.67	0.24	45.91	74.00	-28.09	peak
7456.731	42.42	5.94	48.36	74.00	-25.64	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

4.7 RADIATION EMISSION FOR RECEIVER

4.7.1 Test Limit

According to LP0002 section 2.8,

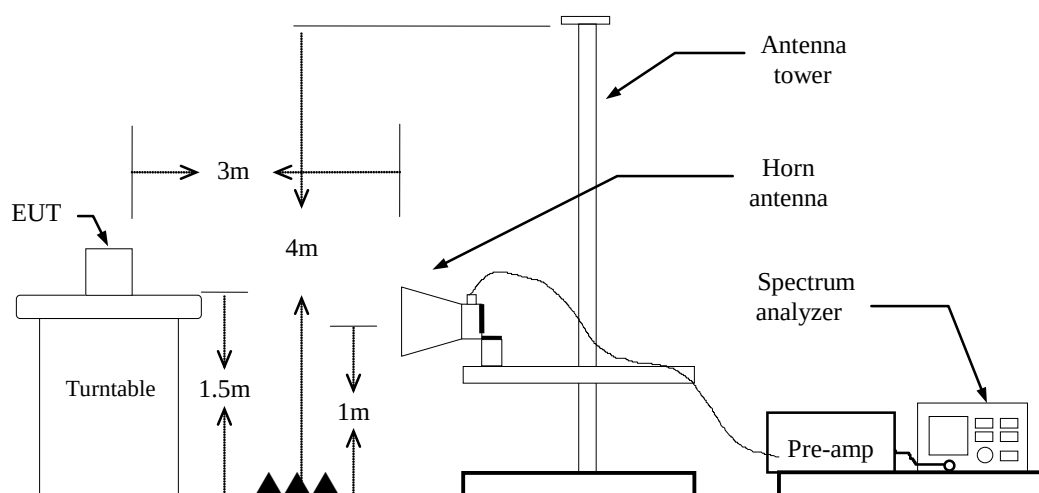
Above 30 MHz

Frequency	Field Strength (microvolts/m)	Measurement Distance (metres)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

4.7.2 Test Procedure

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 1GHz to 26.5GHz set the Highest Output power channels with the EUT transmit.
4. The SA setting following: RBW = 1M, VBW = 3M, Sweep Time = 500ms

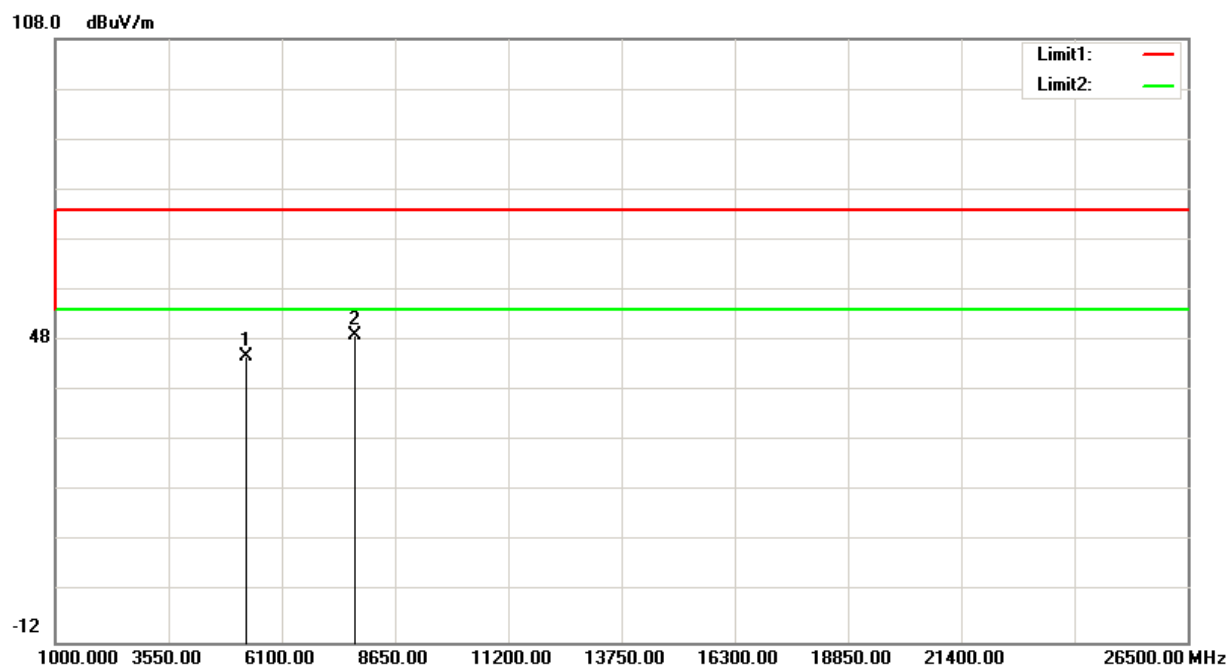
4.7.3 Test Setup



4.7.4 Test Result

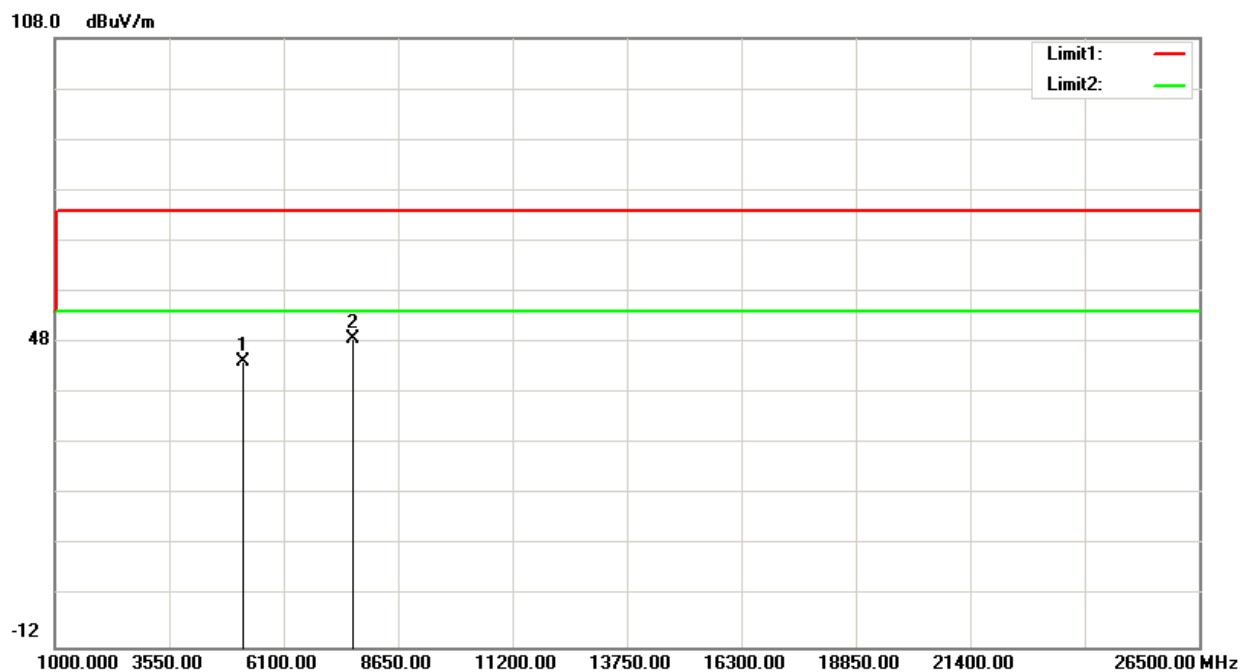
Test Data

Test Mode:	BT Mode	Temp/Hum	24(°C)/ 50%RH
Test Item	Receiver	Test Date	March 22, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage:	DC 5V



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5290.865	44.58	0.28	44.86	74.00	-29.14	peak
7742.788	43.06	5.94	49.00	74.00	-25.00	peak

Test Mode:	BT Mode	Temp/Hum	24(°C)/ 50%RH
Test Item	Receiver	Test Date	March 22, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Average	Test Voltage:	DC 5V



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5209.135	44.03	0.30	44.33	74.00	-29.67	peak
7661.058	42.70	5.99	48.69	74.00	-25.31	peak