Report Number: SZ1803FR11

RF Test Report

Applicant	:	PEAG, LLC dba JLab Audio
Product Type	:	Speaker with bluetooth
Model Number	:	CRASHER SLIM Speaker
FCC ID	:	2AHYVCRSHSLIM
EUT Rated Voltage	:	DC 5V
Test Voltage	:	120 Vac / 60 Hz
Receive Date	:	Jan. 12 , 2018
Test Period	:	Jan 15 ~ Jan. 29 , 2018
Issued Date	:	Mar. 02 , 2018
Applicable Standards	:	FCC 47 CFR PART 15 SUBPART C ANSI C63.10:2013
Test Result	:	Complied

Testing Laboratory

A Test Lab Techno Corp.

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American Association for Laboratory Accreditation number: 3464.02

Approved By	:	Hai Wang	Reviewed By	:	Mick. zhang
(Manager)		(Hai. Wang)	(Testing Engineer)		(Mick. Zhang)

Revision History

Rev.	Issue Date	Revisions
00	Mar. 02, 2018	Initial Issue

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1 General Information

1.1 Summary of Test Result

Standard		Test Item	Result
FCC	IC		
15.207	RSS-Gen 8.8	AC Power Conducted Emission	PASS
15.247(d)	RSS-Gen 8.9	Transmitter Radiated Emissions	PASS
15.247(b)(3)	RSS-247 5.4 (4), 5.4 (6) (ii)	Max. Output Power and E.I.R.P.	PASS
15.247(a)(2)	RSS-247 5.2 (1)	6dB RF Bandwidth & 99% Occupied Banwidth	PASS
15.247(e)	RSS-247 5.2 (2)	Power Spectral Density	PASS
15.247(d)	RSS-247 5.5	Out of Band Conducted Spurious Emission	PASS
15.203	RSS-Gen 8.3	Antenna Requirement	PASS

Standard	Description
CFR47, Part 15, Subpart C §15.247	Intentional Radiators
ANSI C63. 10: 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ANSI C63. 4: 2014	American National Standard for methods of measurement of radio – noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
KDB 558074 D01 v04	Guidance For Performing Compliance Measurements On Digital Transmission Systems (DTS) Operating Under Section 15.247
Standard IC	Description
RSS-247 ISSUE 2: Feb., 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence - Exempt Local Area Network (LE- LAN) Devices
RSS-Gen ISSUE 4: Nov., 2014	Spectrum Management and Telecommunications Radio Standards Specification – General Requirements and Information for the Certification of Radio Apparatus

The test results of this report relate only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

A Test Lab Techno Corp. tested the above equipment under the requirements outlined in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. Based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

A Test Lab Techno Corp. will not be liable for any loss or damage resulting from false, inaccurate, inappropriate or incomplete product information provided by the customer.

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

1.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conducted Emission	9kHz ~ 150KHz	2.6
	150kHz ~ 30MHz	2.6
Radiated Emission	30MHz ~ 1000MHz	5.6
	1000MHz ~ 18000MHz	5.5
	18000MHz ~ 26500MHz	4.9
	26500MHz ~ 40000MHz	4.9
Conducted Output Power	+0.26 dB / -0.29 dB	
RF Bandwidth	4.95%	
Power Spectral Density	+0.72 dB / -0.78 dB	

2 EUT Description

Applicant	PEAG, LLC dba JLab Audio 2281 Las Palmas Drive,Suite 101 Carlsbad, CA 92011	
Manufacturer	Musilab Electronic (DongGuan) Co., Ltd No.5 Huanwei Street,Fugang,Qingxi Town, Dongguan,Guangdong,China	
Product Type	Speaker with bluetooth	
Trade Name	N/A	
Model No.	CRASHER SLIM Speaker	
FCC ID	2AHYVCRSHSLIM	
Frequency Range	Bluetooth LE: 2402 ~ 2480 MHz	
Modulation Type	GFSK	
Channel Numbers	40ch	
Operate Temp. Range	-20 ~ 50℃	
Antenna information	Type	Max. Gain (dBi)
	PCB Antenna	0
Max. Peak Conducted Output Power	0.00086 W / -0.63 dBm	

3 Test Methodology

3.1. Mode of Operation

Decision of Test ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmit mode
Mode 2: Bluetooth LE Continuous TX mode

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in TX mode only.

By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “X axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

Note: The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

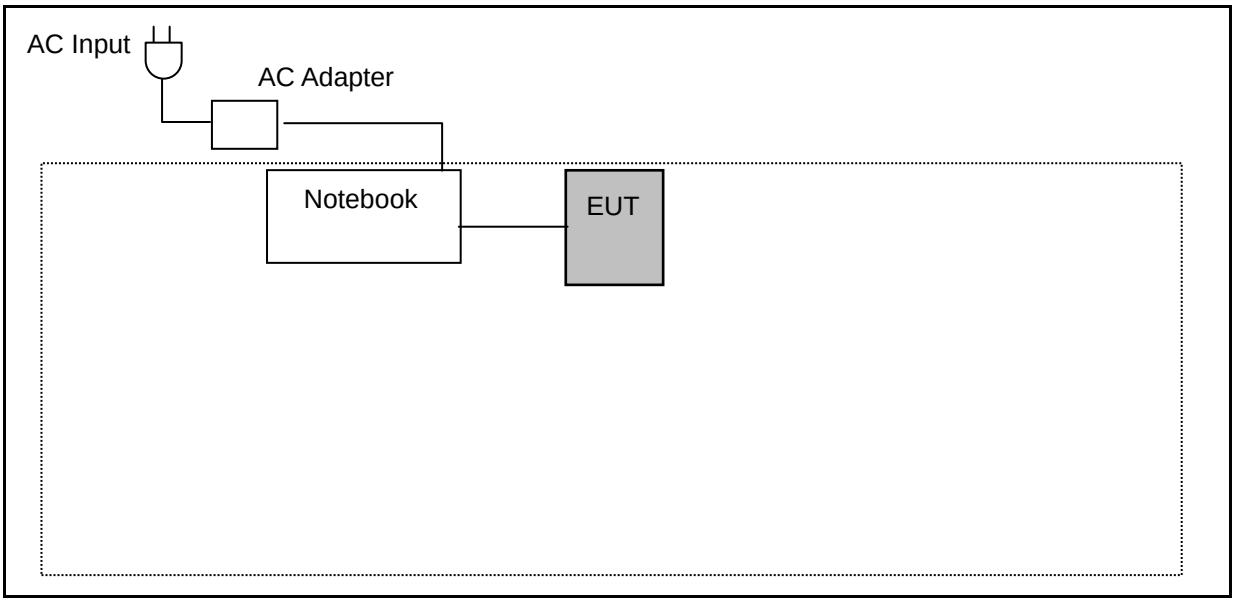
3.2. EUT Exercise Software

1	Setup the EUT shown on “Configuration of Test System Details”.
2	Turn on the power of all equipment.
3	Turn on TX function
4	EUT run test program.

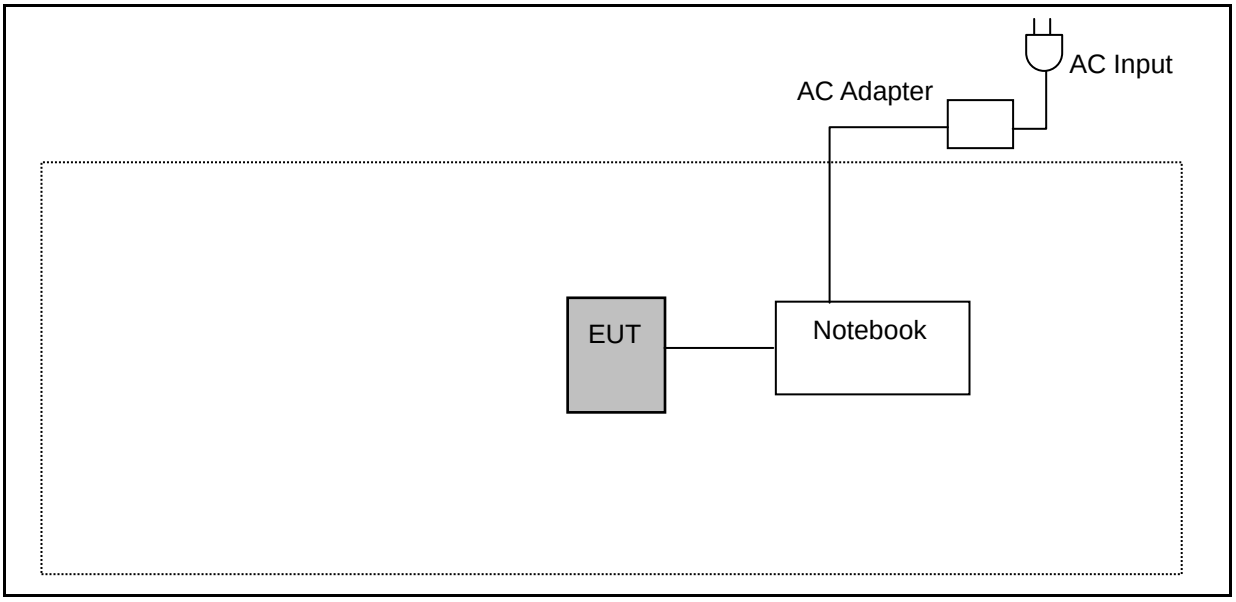
Measurement Software	
1	EZ-EMC Ver. ATL-03A1-1
2	EZ-EMC Ver ATL-ITC-3A1-1

3.3. Configuration of Test System Details

Conducted Emission



Radiated Emissions



3.4. Test Instruments

For Conducted Emission

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Test Receiver	R&S	ESCI	101923	05/19/2017	1 year
LISN	R&S	ENV216	101942	09/09/2017	1 year
LISN	R&S	ENV216	101943	08/19/2017	1 year
RF Cable	EMCI	EMCCFD400	433LFC	05/19/2017	1 year
Test Site	ATL	CE	CE	N.C.R.	-----

For Radiated Emissions_966A

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Preamplifier (10kHz~3GHz)	EMCI	EMC001330	980300	09/19/2017	1 year
Preamplifier (0.1GHz~26.5GHz)	EMCI	EMC012645SE	980318	09/19/2017	1 year
Preamplifier (26.5GHz~40GHz)	EMCI	EMC2654045	980028	08/29/2017	1 year
Bilog Antenna (30MHz~1.4GHz)	Schwarzbeck	VULB 9168	672	11/15/2017	1 year
Horn Antenna (1GHz~18GHz)	ETS	3117	00204949	11/15/2017	1 year
Horn Antenna (18GHz~26.5GHz)	ETS	3160-09	00202549	11/15/2017	1 year
Horn Antenna (18GHz~40GHz)	ETS	3116	00086467	09/19/2017	1 year
Receiver (3Hz~26.5GHz)	Keysight	N9038A	MY51210179	09/19/2017	1 year
Spectrum Analyzer (3Hz~43GHz)	Keysight	N9030A	MY55410268	09/19/2017	1 year
Cable (30MHz~1GHz)	EMCI	N/A	1066LFC	09/19/2017	1 year
Cable (1GHz~18GHz)	EMCI	N/A	160719	09/19/2017	1 year
Cable (1GHz~18GHz)	EMCI	N/A	160324	09/19/2017	1 year
Cable (1GHz~18GHz)	EMCI	N/A	160322	09/19/2017	1 year
Test Site	欧衡	MFAC3M	RE-026	08/29/2017	1 year

Note: N.C.R. = No Calibration Request.

For Conducted

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Power Sensor	Anritsu	U2021XA	SG54130003	09/19/2017	1 year
Spectrum Analyzer (10Hz~26.5GHz)	Agilent	N9020A	MY53420615	09/19/2017	1 year
Spectrum Analyzer (9KHz~26.5GHz)	Agilent	E4445A	MY46181814	19/09/2017	1 year
Programmable temp & humi chamber	ETAI	9712A	647	09/19/2017	1 year
Test Site	ATL	RF	RF	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

3.5. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

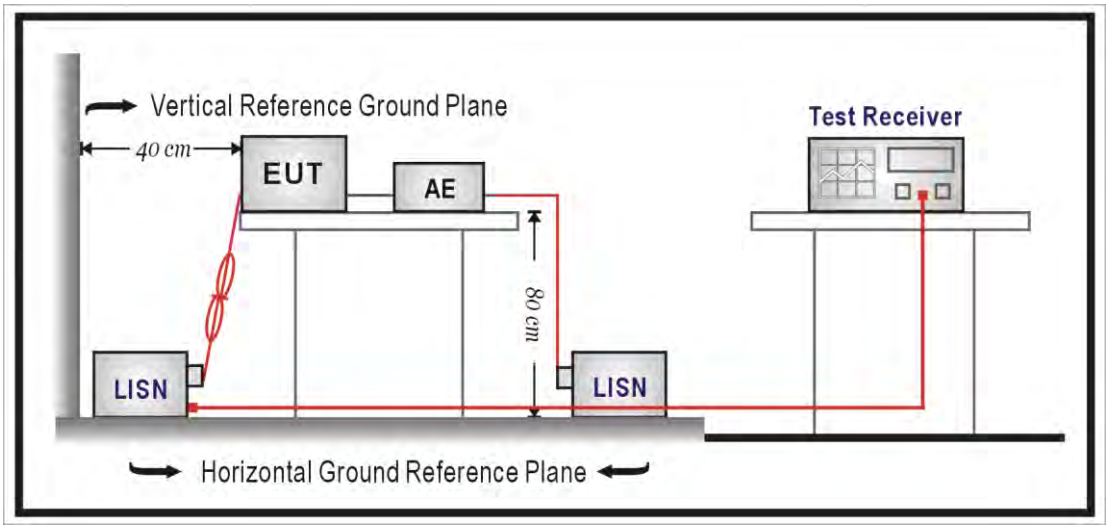
4 Measurement Procedure

4.1. AC Power Line Conducted Emission Measurement

■ **Limit**

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

■ **Test Setup**



■ **Test Procedure**

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50Ω// 50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50Ω// 50uH coupling impedance with 50ohm termination.

Tabletop device shall be placed on a non-conducting platform, of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The wall of screened room shall be located 40cm to the rear of the EUT. Other surfaces of tabletop or floor standing EUT shall be at least 80cm from any other ground conducting surface including one or more LISNs. For floor-standing device shall be placed under the EUT with a 12mm insulating material.

Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a resolution bandwidth of 9 kHz. The equipment under test (EUT) shall be meet the limits in section 4.1, as applicable, including the average limit and the quasi-peak limit when using respectively, an average detector and quasi-peak detector measured in accordance with the methods described of related standard. When all of peak value were complied with quasi-peak and average limit from 150kHz to 30MHz then quasi-peak and average measurement was unnecessary.

The AMN shall be placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for AMNs mounted on top of the ground reference plane. This distance is between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment shall be at least 0,8 m from the AMN. If the mains power cable is longer than 1m then the cable shall be folded back and forth at the centre of the lead to form a bundle no longer than 0.4m. All of interconnecting cables that hang closer than 40cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long. All of EUT and AE shall be separate place more than 0.1m. All 50 Ω ports of the LISN shall be resistively terminated into 50 Ω loads when not connected to the measuring instrument.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

4.2. Radiated Emission Measurement

■ **Limit**

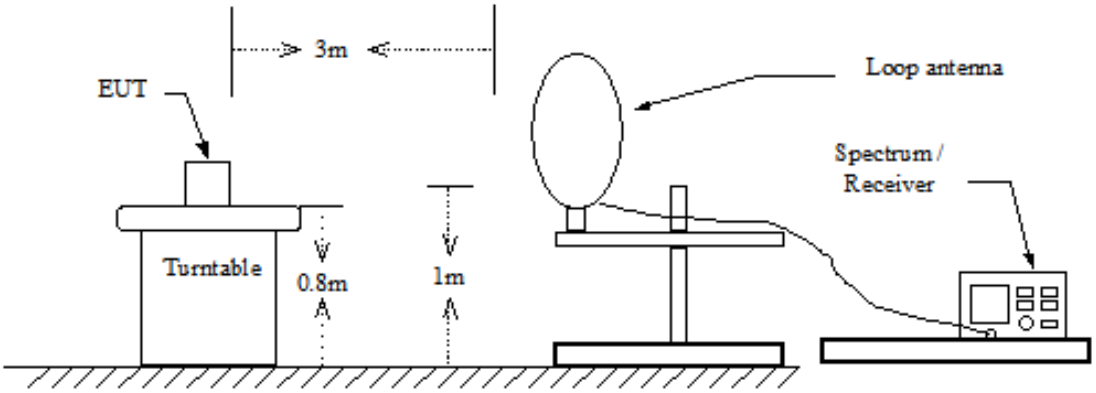
According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

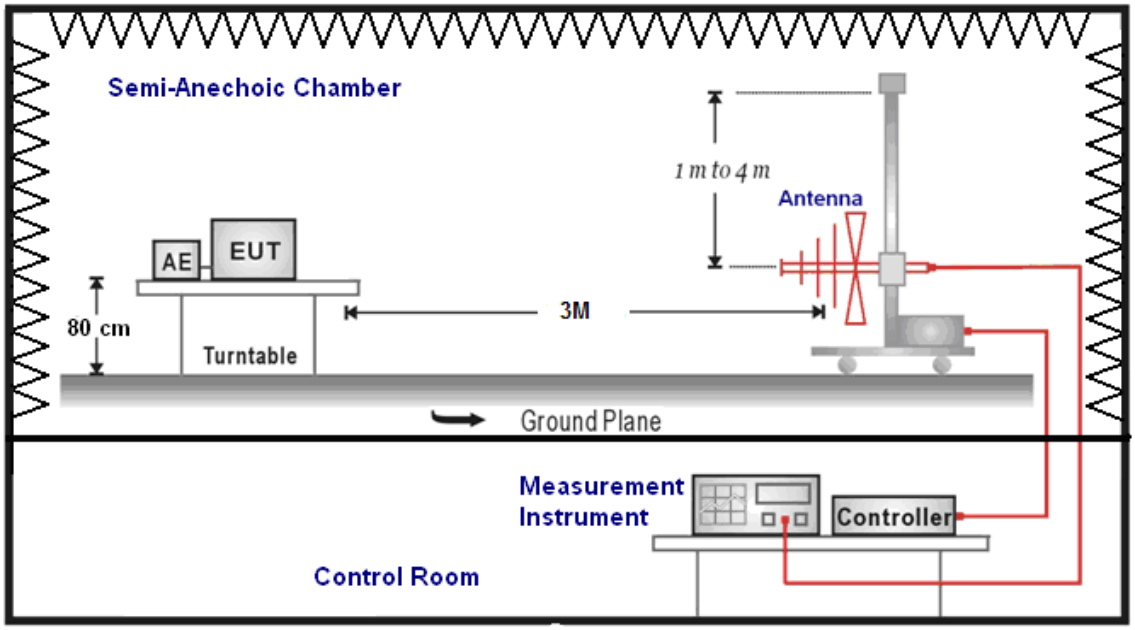
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this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

■ **Setup**

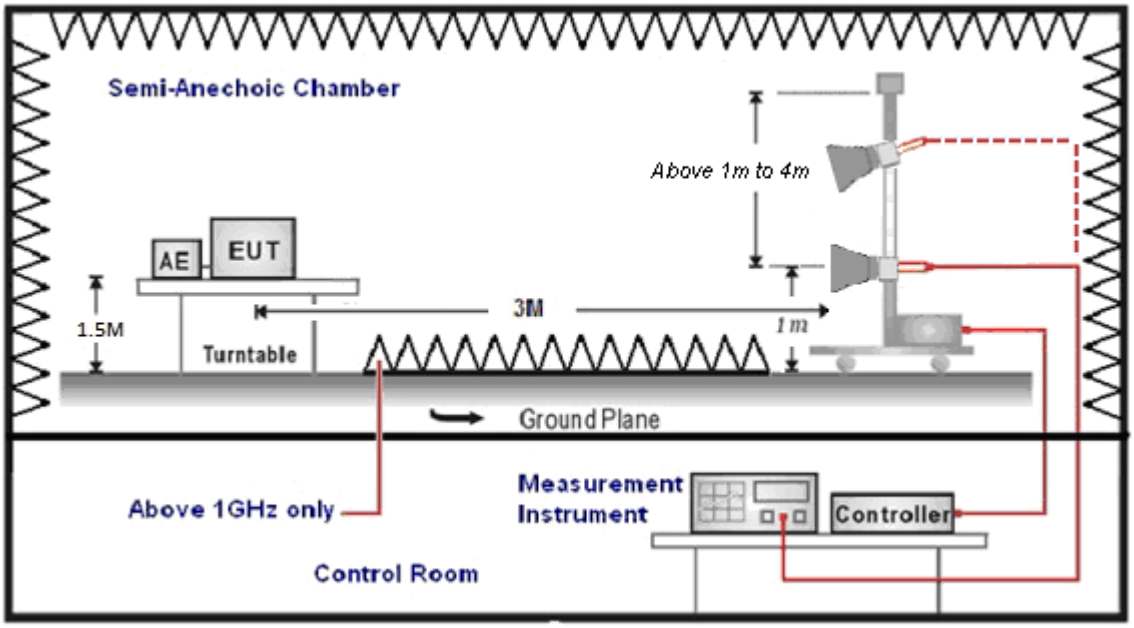
9kHz ~ 30MHz



Below 1GHz



Above 1GHz


Semi-Anechoic Chamber
Above 1m to 4m
AE
EUT
1.5M
3M
1m
Turntable
Ground Plane
Above 1GHz only
Measurement
Instrument
Controller
Control Room

■ **Test Procedure**

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 or 1.5 meters height(below 1GHz use 0.8m turntable / above 1GHz use 1.5m turntable), top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements when Duty cycle >98% / 1/T for average measurements when Duty cycle <98%. A nonconductive material surrounded the EUT to supporting the EUT for standing on tree orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna was used in frequencies 1 – 26.5 GHz at a distance of 1 meter. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20dB/decade).

For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts pre meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro colts per meter (dBuV/m).

The actual field is intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

(1) Amplitude (dBuV/m) = FI (dBuV) +AF (dBuV) +CL (dBuV)-Gain (dB)

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

(2) Actual Amplitude (dBuV/m) = Amplitude (dBuV)-Dis(dB)

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

(a) For fundamental frequency : Transmitter Output < +30dBm

(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

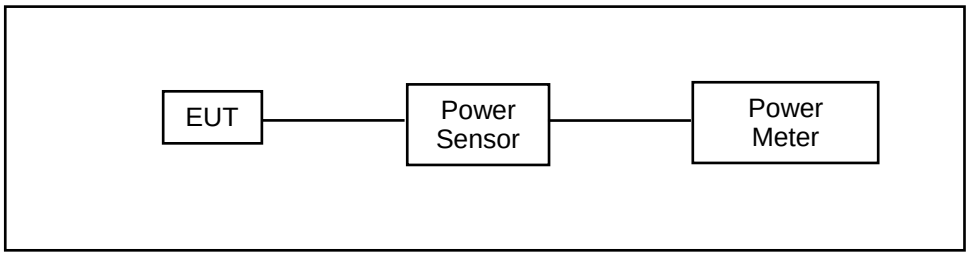
Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4.3. Maximum Conducted Output Power Measurement

- **Limit**

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm.

- **Test Setup**



- **Test Procedure**

The testing follows the Measurement Procedure of ANSI C63.10-2013 section 11.9.2.3 Method AVGPM.

The tests below are run with the EUT's transmitter set at high power in TX mode. The EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to power sensor..

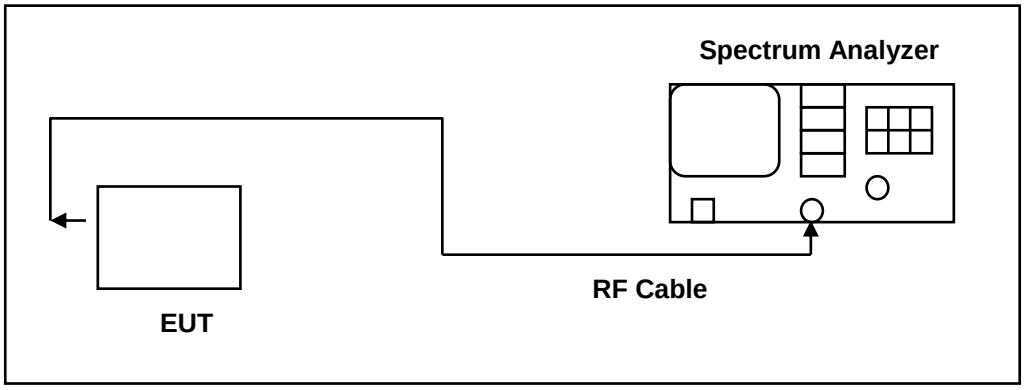
4.4. 6dB RF Bandwidth Measurement

■ **Limit**

6dB RF Bandwidth: Systems using digital modulation techniques may operate in the 2400–2483.5 MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

99 % Occupied Bandwidth: N/A

■ **Test Setup**



■ **Test Procedure**

The EUT tested to DTS test procedure of KDB558074D01 for compliance to FCC 47CFR 15.247 requirements.

6dB RF Bandwidth: The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A peak output reading was taken, a DISPLAY line was drawn 6 dB lower than peak level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

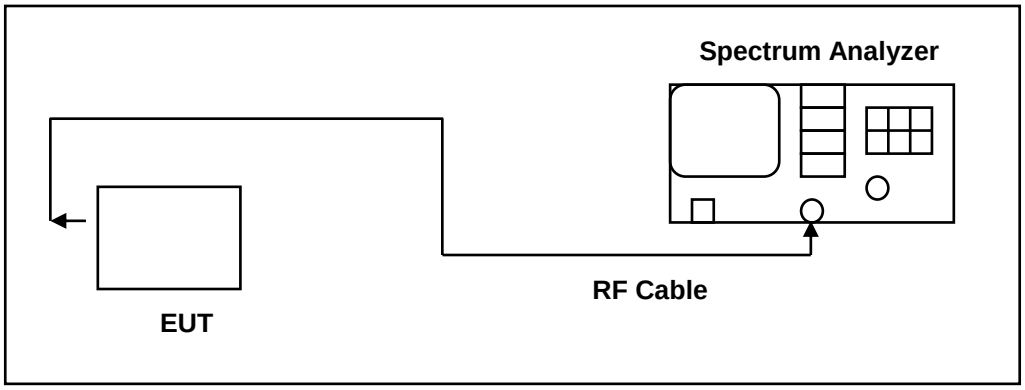
The test was performed at 3 channels (Channel low, middle, high)

4.5. Maximum Power Density Measurement

■ **Limit**

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.

■ **Test Setup**



■ **Test Procedure**

The EUT tested to DTS test procedure of KDB558074D01 section 10.2 Method PKPSD for compliance to FCC 47CFR 15.247 requirements.

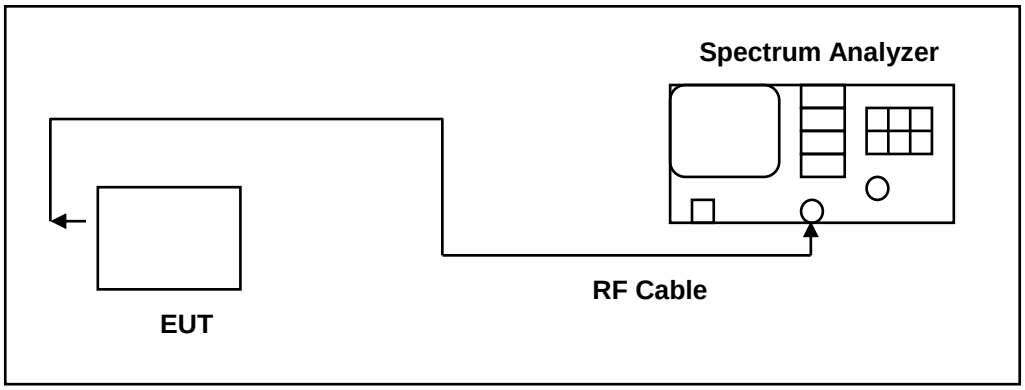
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 × RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.6. Out of Band Conducted Emissions Measurement

■ **Limit**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

■ **Test Setup**



■ **Test Procedure**

In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function. All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band. The test was performed at 3 channels.

4.7. Antenna Measurement

- **Limit**

For intentional device, according to 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

- **Antenna Connector Construction**

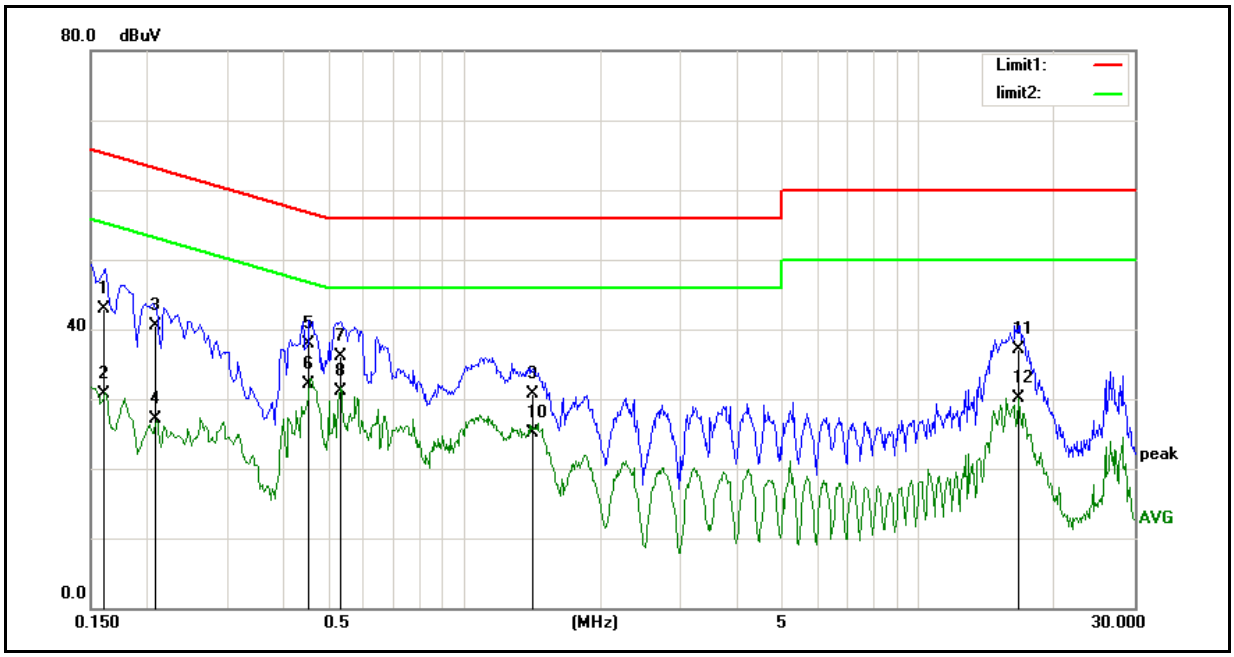
See section 2 – antenna information.

5 Test Results

Annex A. Conducted Emission

■ **Test Result**

Standard:	FCC Part 15.247	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Test Mode:	Mode 1	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Description:			

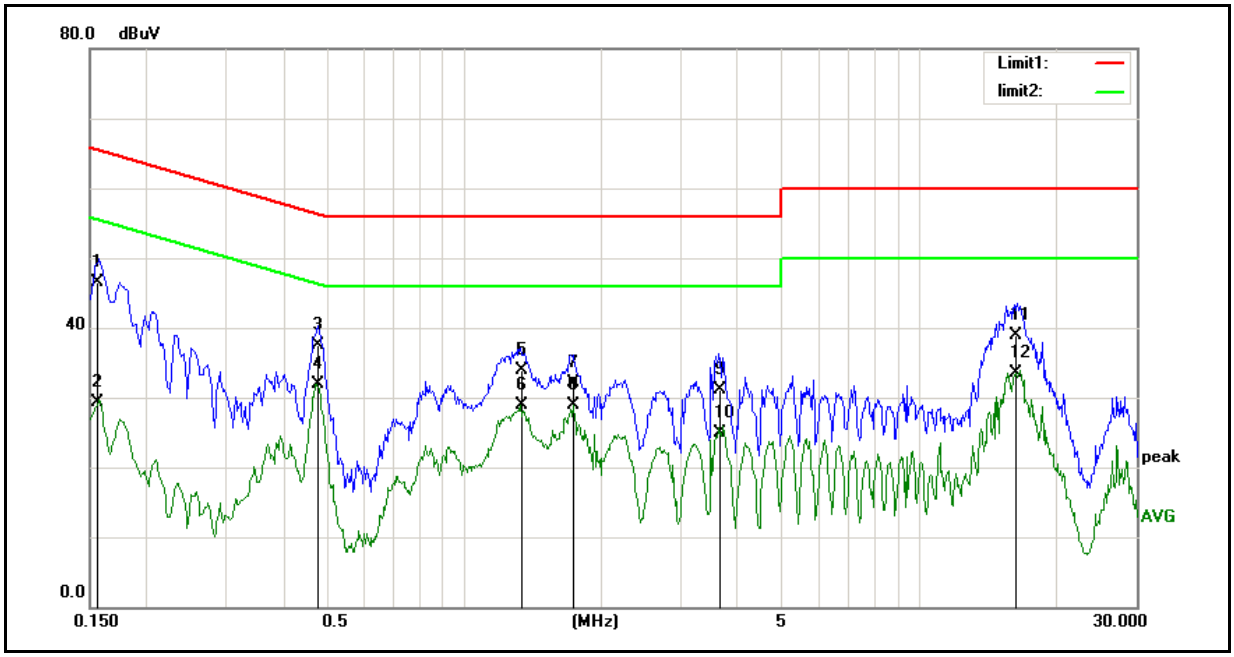


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1602	31.54	11.40	42.94	65.45	-22.51	QP
2	0.1602	19.24	11.40	30.64	55.45	-24.81	AVG
3	0.2091	29.49	11.06	40.55	63.24	-22.69	QP
4	0.2091	16.13	11.06	27.19	53.24	-26.05	AVG
5	0.4566	27.66	10.24	37.90	56.75	-18.85	QP
6	0.4566	21.87	10.24	32.11	46.75	-14.64	AVG
7	0.5347	26.01	10.17	36.18	56.00	-19.82	QP
8	0.5347	20.94	10.17	31.11	46.00	-14.89	AVG
9	1.4156	20.56	10.10	30.66	56.00	-25.34	QP
10	1.4156	15.03	10.10	25.13	46.00	-20.87	AVG
11	16.6040	27.03	10.16	37.19	60.00	-22.81	QP
12	16.6040	19.88	10.16	30.04	50.00	-19.96	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Standard:	FCC Part 15.247	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Test Mode:	Mode 1	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Description:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1553	34.99	11.43	46.42	65.71	-19.29	QP
2	0.1553	17.81	11.43	29.24	55.71	-26.47	AVG
3	0.4757	27.25	10.21	37.46	56.41	-18.95	QP
4	0.4757	21.77	10.21	31.98	46.41	-14.43	AVG
5	1.3444	23.73	10.10	33.83	56.00	-22.17	QP
6	1.3444	18.87	10.10	28.97	46.00	-17.03	AVG
7	1.7419	21.91	10.11	32.02	56.00	-23.98	QP
8	1.7419	18.77	10.11	28.88	46.00	-17.12	AVG
9	3.6433	20.91	10.15	31.06	56.00	-24.94	QP
10	3.6433	14.73	10.15	24.88	46.00	-21.12	AVG
11	16.3259	28.78	10.16	38.94	60.00	-21.06	QP
12	16.3259	23.29	10.16	33.45	50.00	-16.55	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Annex B. Conducted Test Results

■ **Test Result**

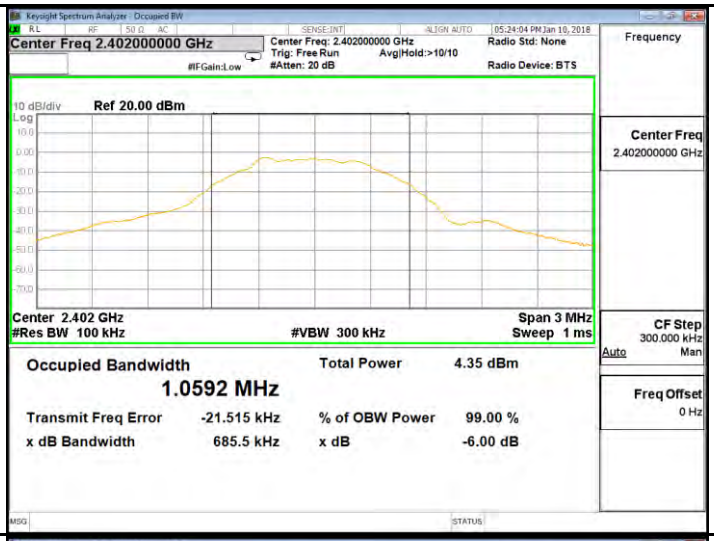
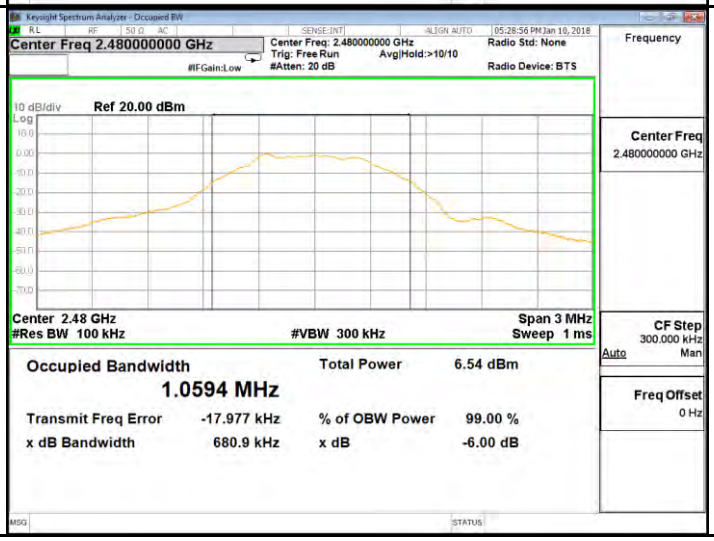
Test Item	Maximum Conducted Output Power				
Test Mode	Mode 2: Bluetooth LE Continuous TX mode				
Frequency (MHz)	Average Power		Peak Power		Limit (dBm)
	(dBm)	(W)	(dBm)	(W)	
2402	-2.28	0.00059	-1.72	0.00067	< 30
2440	-1.74	0.00067	-1.22	0.00076	< 30
2480	**-0.63**	**0.00086**	**-0.09**	**0.00098**	< 30

Note: The relevant measured result has the offset with cable loss already.

■ **Test Result**

Test Item	6dB RF Bandwidth Measurement	
Test Mode	Mode 2: Bluetooth LE Continuous TX mode	
Frequency (MHz)	Measurement Results (kHz)	Limit (kHz)
2402	685.5	> 500
2440	685.7	> 500
2480	680.9	> 500

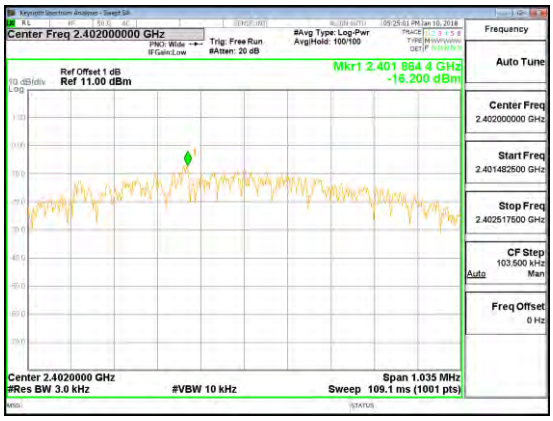
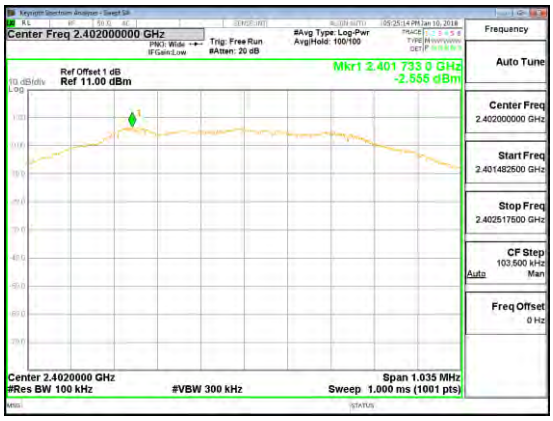
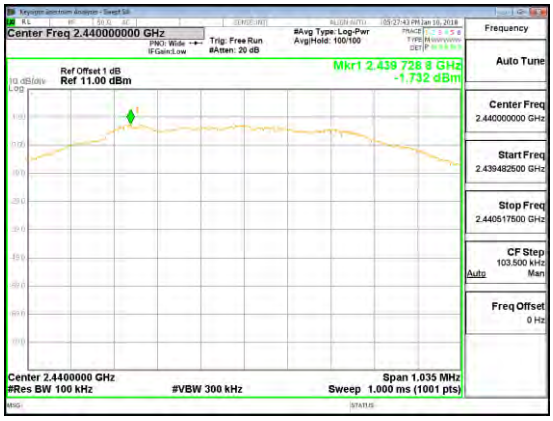
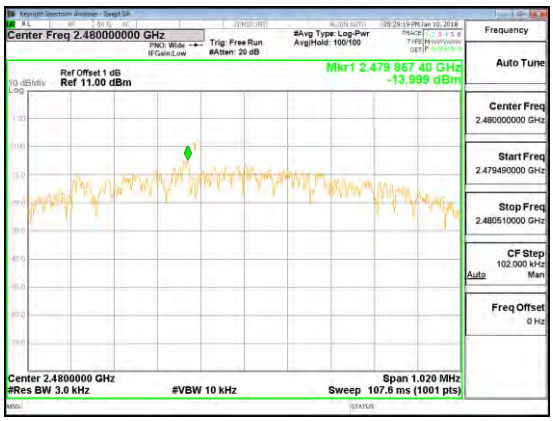
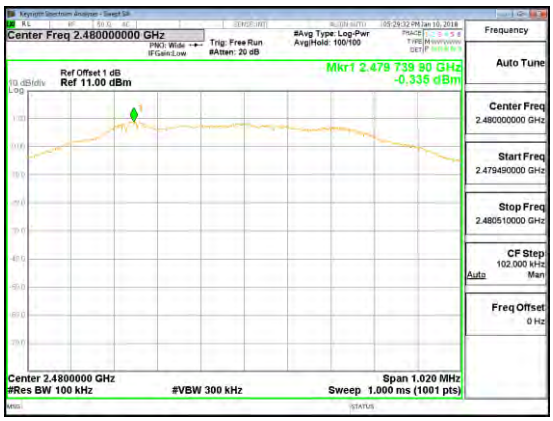
■ **Test Graphs**

Test Item	6dB RF Bandwidth Measurement
Test Mode	Mode 2: Bluetooth LE Continuous TX mode
2402 MHz	
2440 MHz	
2480 MHz	

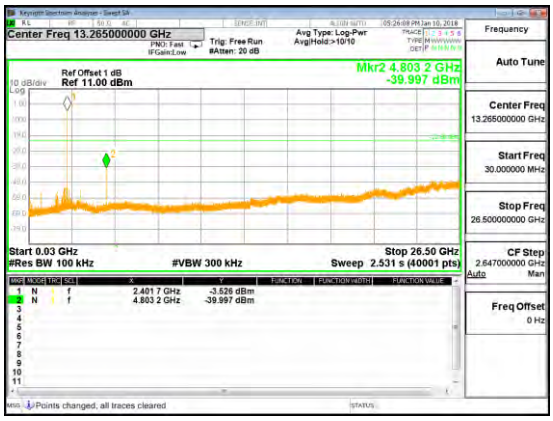
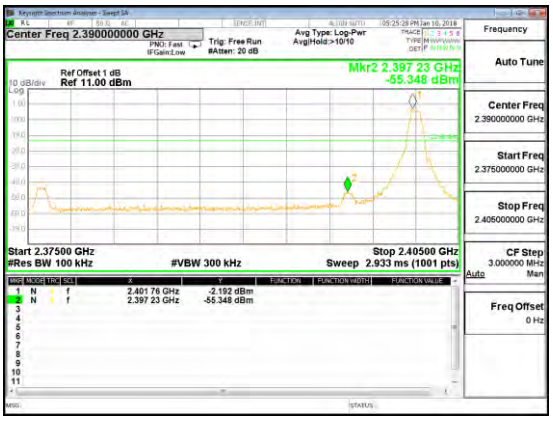
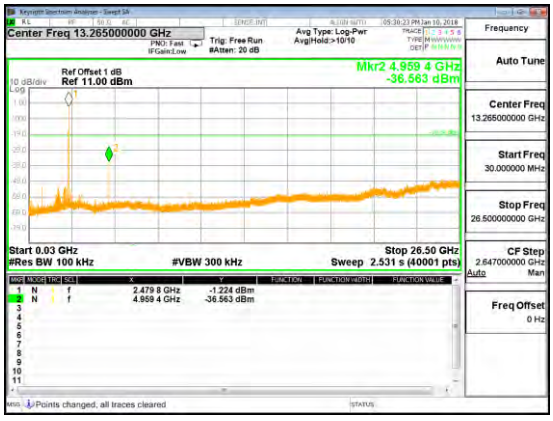
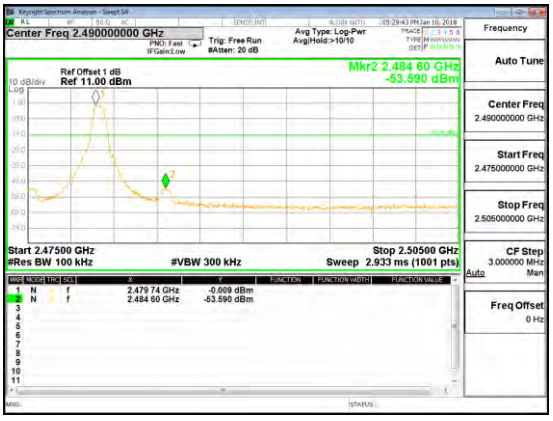
■ **Test Result**

Test Item	Maximum Power Density Measurement	
Test Mode	Mode 2: Bluetooth LE Continuous TX mode	
Frequency (MHz)	Measurement Results (dBm/3KHz)	Limit (dBm)
2402	-16.20	< 8
2440	-15.33	< 8
2480	-14.00	< 8

■ **Test Graphs**

Test Item	Maximum Power Density & Conducted Spurious Emission (Reference level)	
Test Mode	Mode 2: Bluetooth LE Continuous TX mode	
MHz	Maximum Power Density	Conducted Spurious Emission (Reference level)
2402		
2440		
2480		

■ **Test Graphs**

Test Item	Out of Band Conducted Emissions & Conducted Band Edge	
Test Mode	Mode 2: Bluetooth LE Continuous TX mode	
MHz	Out of Band Conducted Emissions	Conducted Band Edge
2402		
2440		N/A
2480		

Annex C. Radiated Emission Measurement

■ **Test Result**

Below 1GHz

Standard:	FCC Part 15.247	Test Distance:	3m
Test Mode:	Mode 1	Power:	DC 3.7V
		Temp.(℃)/Hum.(%RH):	26(℃)/60%RH

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
52.2079	33.61	-10.91	22.70	40.00	-17.30	QP	H
113.7142	39.23	-13.74	25.49	43.50	-18.01	QP	H
309.9977	33.07	-9.86	23.21	46.00	-22.79	QP	H
360.4476	32.57	-8.67	23.90	46.00	-22.10	QP	H
701.7607	27.75	-1.93	25.82	46.00	-20.18	QP	H
810.2653	27.84	0.42	28.26	46.00	-17.74	QP	H
64.4330	35.03	-11.69	23.34	40.00	-16.66	QP	V
119.8555	38.27	-13.06	25.21	43.50	-18.29	QP	V
312.1792	31.09	-9.82	21.27	46.00	-24.73	QP	V
487.3150	28.91	-5.23	23.68	46.00	-22.32	QP	V
625.0779	27.98	-3.13	24.85	46.00	-21.15	QP	V
776.8777	27.06	0.16	27.22	46.00	-18.78	QP	V

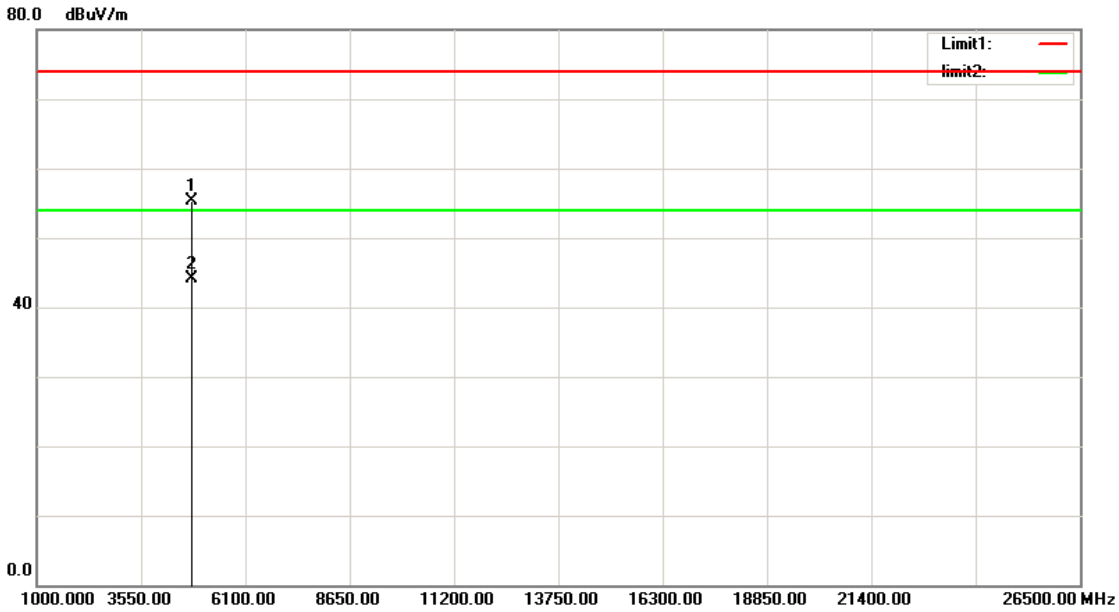
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Above 1GHz

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Harmonic	Power:	DC 3.7V
Frequency:	2402MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Horizontal



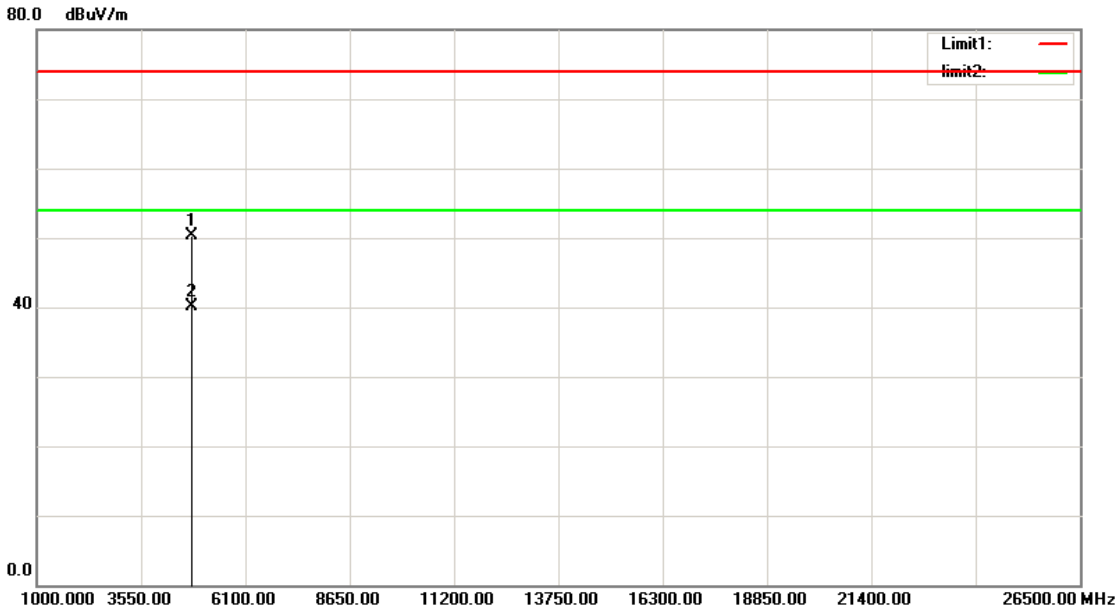
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	59.73	-4.35	55.38	74.00	-18.62	peak
2	4804.000	48.44	-4.35	44.09	54.00	-9.91	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Harmonic	Power:	DC 3.7V
Frequency:	2402MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Vertical



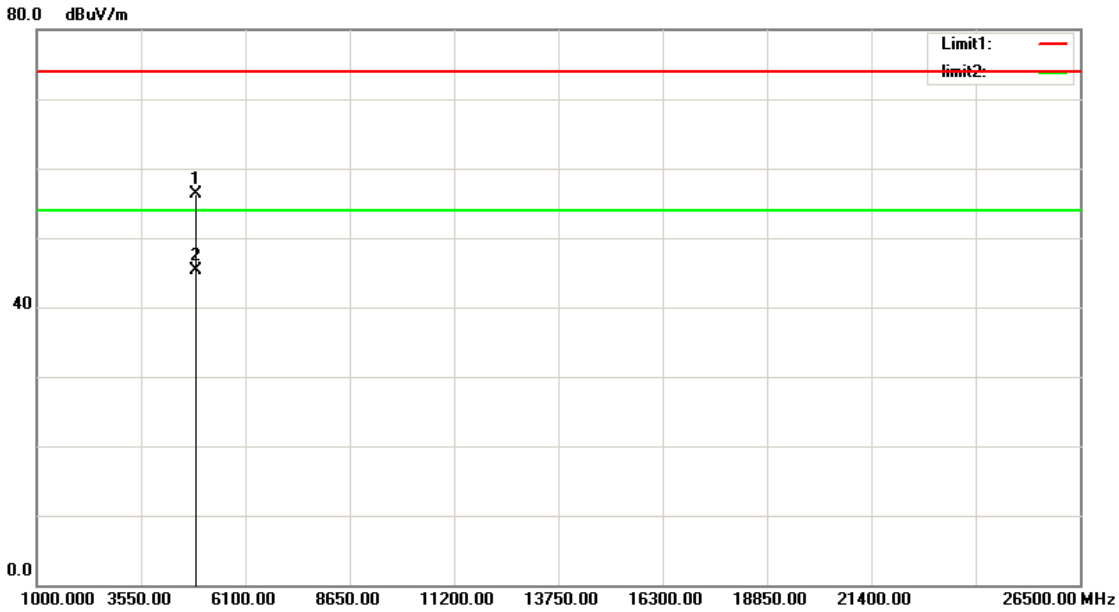
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	54.70	-4.35	50.35	74.00	-23.65	peak
2	4804.000	44.52	-4.35	40.17	54.00	-13.83	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Harmonic	Power:	DC 3.7V
Frequency:	2440MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Horizontal



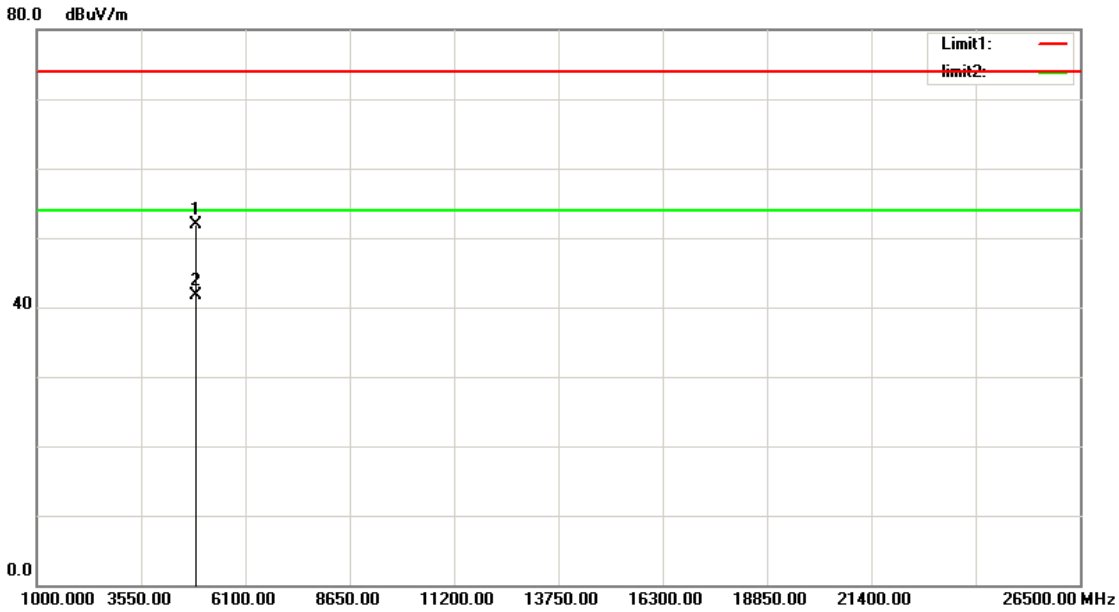
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	60.58	-4.37	56.21	74.00	-17.79	peak
2	4880.000	49.69	-4.37	45.32	54.00	-8.68	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Harmonic	Power:	DC 3.7V
Frequency:	2440MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Vertical



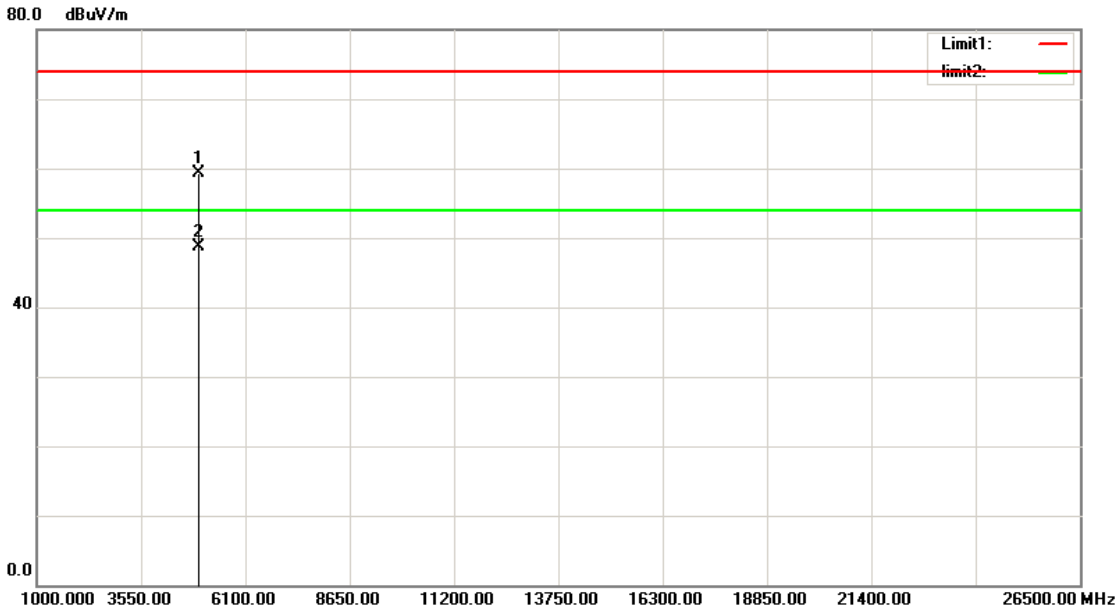
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	56.19	-4.37	51.82	74.00	-22.18	peak
2	4880.000	46.11	-4.37	41.74	54.00	-12.26	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Harmonic	Power:	DC 3.7V
Frequency:	2480MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Horizontal



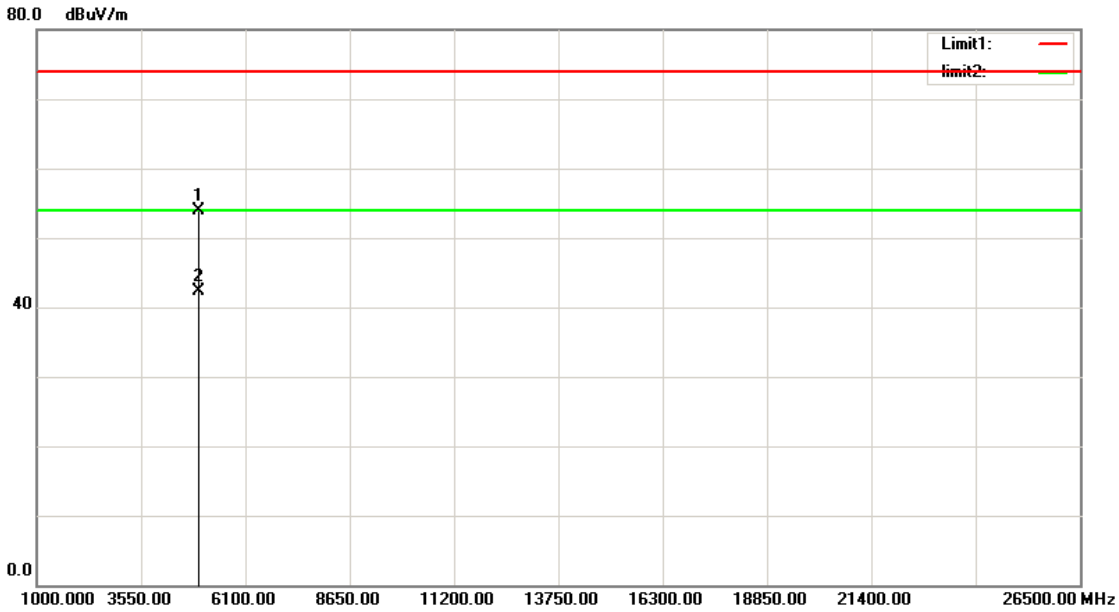
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	63.79	-4.39	59.40	74.00	-14.60	peak
2	4960.000	53.13	-4.39	48.74	54.00	-5.26	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Harmonic	Power:	DC 3.7V
Frequency:	2480MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	58.23	-4.39	53.84	74.00	-20.16	peak
2	4960.000	46.74	-4.39	42.35	54.00	-11.65	AVG

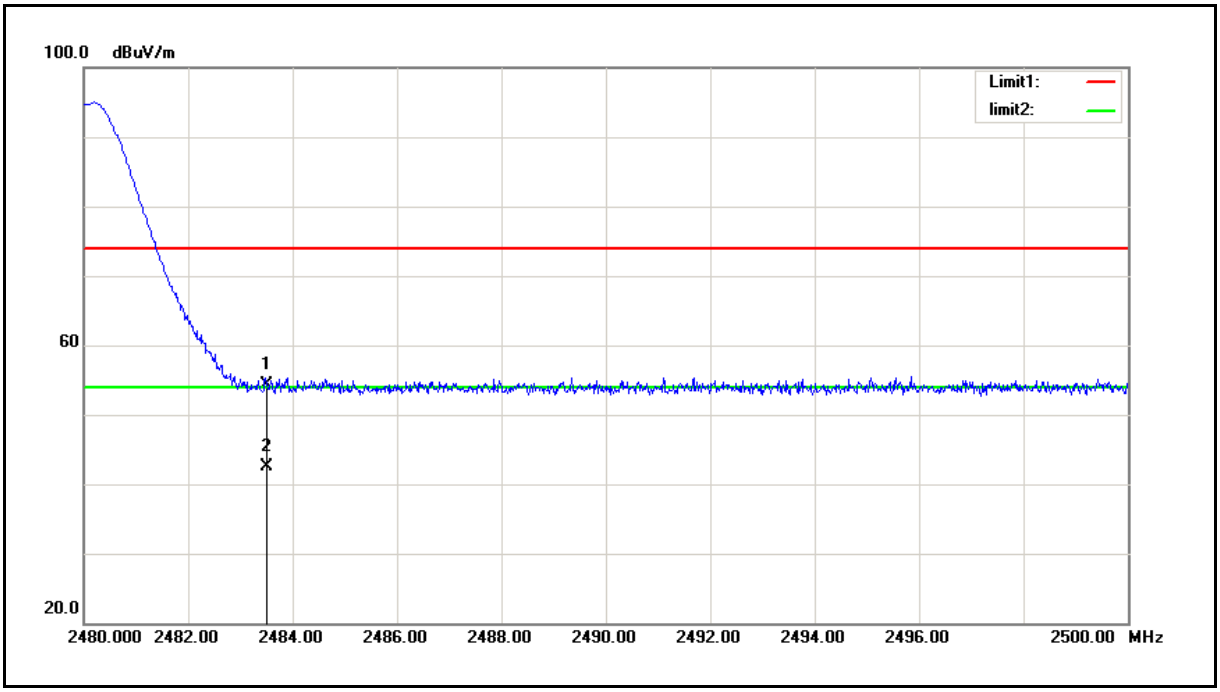
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Band Edge

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	DC 3.7V
Frequency:	2402MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Horizontal



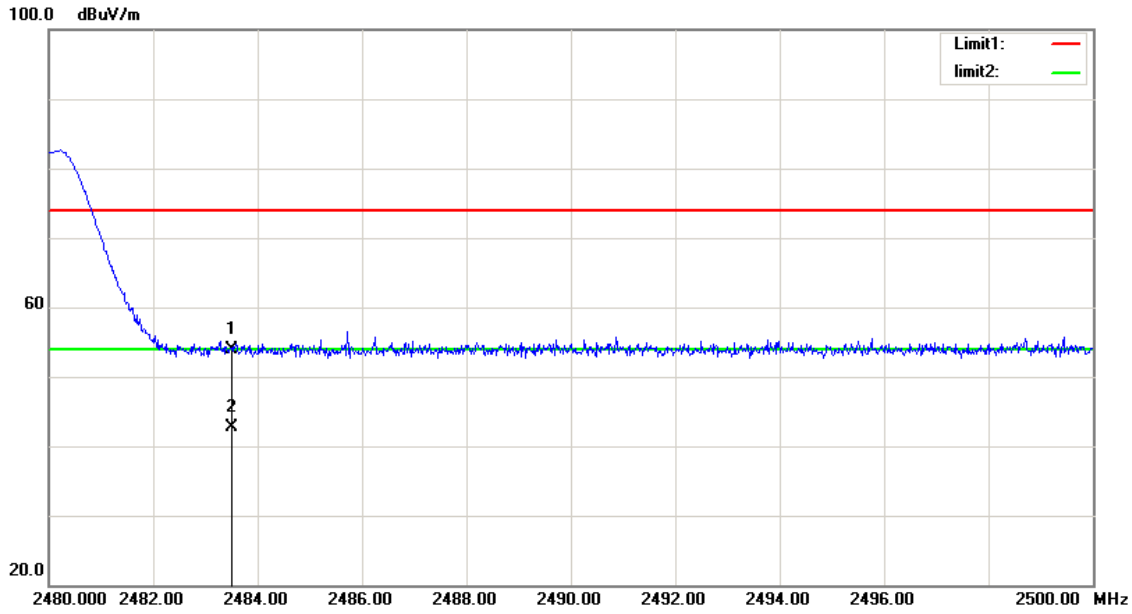
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	14.52	39.83	54.35	74.00	-19.65	peak
2	2483.500	2.77	39.83	42.60	54.00	-11.40	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	DC 3.7V
Frequency:	2402MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Vertical



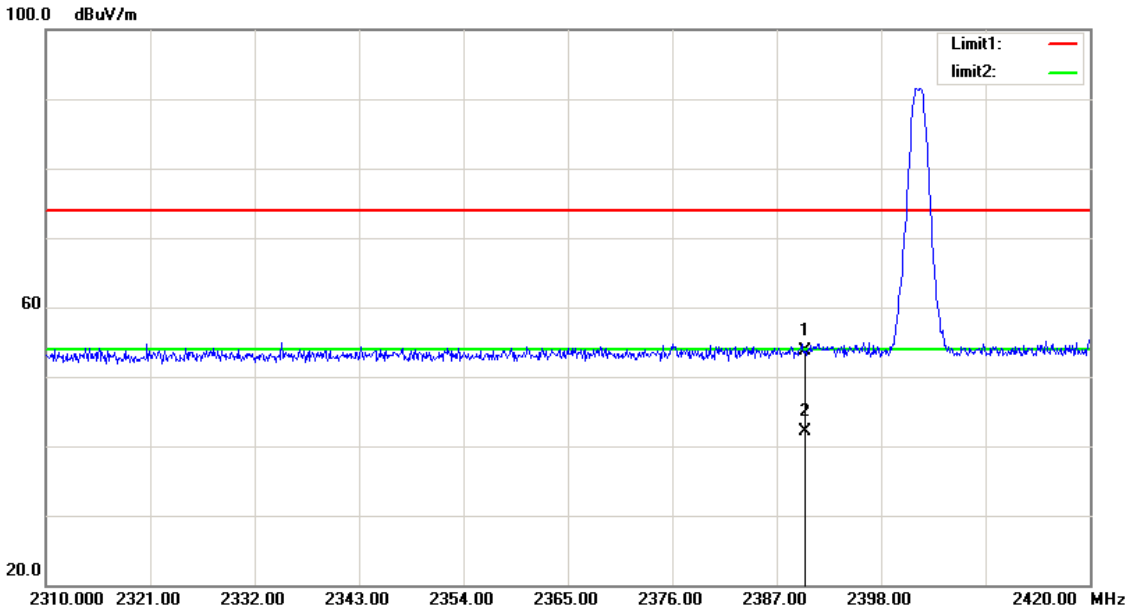
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	14.05	39.83	53.88	74.00	-20.12	peak
2	2483.500	2.78	39.83	42.61	54.00	-11.39	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	DC 3.7V
Frequency:	2480MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Horizontal



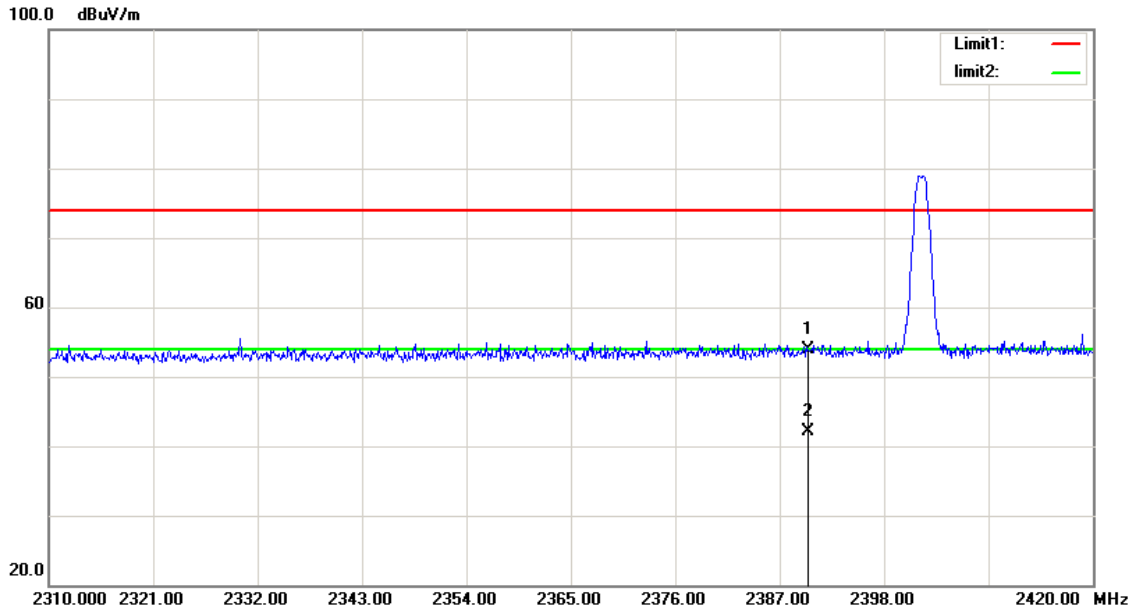
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	14.24	39.41	53.65	74.00	-20.35	peak
2	2390.000	2.64	39.41	42.05	54.00	-11.95	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	DC 3.7V
Frequency:	2480MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Ant.Polar.:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	14.42	39.41	53.83	74.00	-20.17	peak
2	2390.000	2.63	39.41	42.04	54.00	-11.96	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.