FCC Part 15C Test Report
FCC ID: 2BDPI-JSPQ3M

Applicant:	HUIZHOU JUSTPRO MUSICAL INSTRUMENTS CO., LIMITED
Address:	SHIKENGZAI DIDUAN BLK, DANSHUI ST, FLAT 8, 10 FL, SHENDAFORTUNE BLDG., HUIYANG DIST, HUIZHOU, CHINA
Manufacturer:	HUIZHOU JUSTPRO MUSICAL INSTRUMENTS CO., LIMITED
Address:	SHIKENGZAI DIDUAN BLK, DANSHUI ST, FLAT 8, 10 FL, SHENDAFORTUNE BLDG., HUIYANG DIST, HUIZHOU, CHINA
EUT:	Mini Guitar Amp
Trade Mark:	N/A
Model Number:	Q-3M, Q-4M, Q-5M, Q-6M
Date of Receipt:	Oct. 28, 2021
Test Date:	Oct. 28, 2021 - Nov. 08, 2025
Date of Report:	Nov. 08, 2025
Prepared By:	Shenzhen DL Testing Technology Co., Ltd.
Address:	101-201, Comprehensive Building, Tongzhou Electronics Longgang Factory Area, No.1 Baolong Fifth Road, Baolong Community, Baolong Street, Longgang District, Shenzhen, China
Applicable Standards:	FCC PART 15 C 15.247 ANSI C63.10:2020
Test Result:	Pass
Report Number:	DLE-251106013R

Prepared by(Engineer):	Ken Tan	Ken Tan
Reviewer(Supervisor):	Jack Bu	Jack Bu
Approved(Manager):	Jade Yang	Jade Yang

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.205, 15.209, 15.247(d)	Radiated Spurious Emission	PASS	
15.205, 15.247(d)	Band Edge Emission& Conducted Spurious Emissions	PASS	
15.247(b)	Peak Output Power	PASS	
15.247(a)(2)	6dB Bandwidth	PASS	
15.247(e)	Power Spectral Density	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

Test lab: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Comprehensive Building, Tongzhou Electronics Longgang Factory Area, No.1 Baolong Fifth Road, Baolong Community, Baolong Street, Longgang District, Shenzhen, China

FCC Test Firm Registration Number: 854456
Designation Number: CN1307
IC Registered No.: 27485
CAB ID.: CN0118

1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2** ·providing a level of confidence of approximately **95** % 。

No.	Item	Uncertainty
1	Conducted Emission Test	±2.56dB
2	RF power,conducted	±0.42dB
3	Spurious emissions,conducted	±2.76dB
4	All emissions,radiated(<1G)	±3.65dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%
8	6dB Bandwidth	±0.2MHz
9	Power Spectral Density	±2.45dBm

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Mini Guitar Amp
Trademark	N/A
Model No.:	Q-3M
Model Difference	Q-4M, Q-5M, Q-6M (All models are same except for the model name and colors)
Sample ID:	DLE-251106013-001#
Operation Frequency:	2402~2480MHz
Channel numbers:	40 Channels
Modulation technology:	GFSK
Antenna Type:	PCB Antenna
Antenna gain:	1.69 dBi
Power Supply:	DC 5V/2A Battery: DC 3.7V/2200mAh

Note:

1.For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2. The EUT's all information provided by client.
3. EUT Only supports 2 Mpbs.

BLE Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	10	2422	20	2442	30	2462
01	2404	11	2424	21	2444	31	2464
02	2406	12	2426	22	2446	32	2466
03	2408	13	2428	23	2448	33	2468
04	2410	14	2430	24	2450	34	2470
05	2412	15	2432	25	2452	35	2472
06	2414	16	2434	26	2454	36	2474
07	2416	17	2436	27	2456	37	2476
08	2418	18	2438	28	2458	38	2478
09	2420	19	2440	29	2460	39	2480

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH00
Mode 2	CH19
Mode 3	CH39

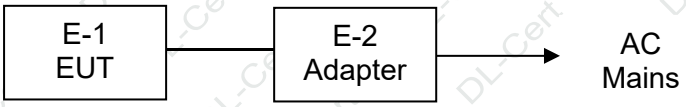
For Conducted Emission	
Final Test Mode	Description
Mode 1	CH00
Mode 2	CH19
Mode 3	CH39

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH00
Mode 2	CH19
Mode 3	CH39

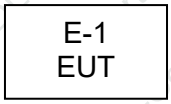
Note: 1. The measurements are performed at the highest, middle, lowest available channels.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Power line conducted emission Test



Radiated Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
E-1	Mini Guitar Amp	Q-3M, Q-4M, Q-5M, Q-6M	N/A	EUT
E-2	Adapter	HW-200325CP1	N/A	Model: HW-200325CP1 Input: 100-240V~ 50/60Hz 1.8A Output: DC 5V/2A, DC 9V/2A, DC 12V/2A, DC 15V/3A, DC 20V/3.25A

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.5 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the end product.

Max output power Setting			
Test software Version	Test program: FCC V1.1.0.2		
Mode	CH00	CH19	CH39
Data Rate	2Mbps	2Mbps	2Mbps

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation test, Band-edge test and 6db bandwidth test equipment

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
Comprehensive Tester	ROHDE&SCHWARZ	CMW500	106504	Oct. 25, 2025	Oct. 24, 2026
Spectrum Analyzer	KEYSIGHT	N9020A	MY55370280	Oct. 25, 2025	Oct. 24, 2026
Signal Source	Agilent	N5182A	MY46240766	Oct. 25, 2025	Oct. 24, 2026
Signal Source	Agilent	83752A	3610A01631	Oct. 25, 2025	Oct. 24, 2026
Probe	KEYSIGHT	U2021XA	MY55210018	Oct. 25, 2025	Oct. 24, 2026
Attenuator	MAIWEI	MANASR0206S2	DLE-160	Oct. 25, 2025	Oct. 24, 2026
RF Control Box	MAIWEI	MW100-RFCB	DLE-179	Oct. 25, 2025	Oct. 24, 2026
RF Control Box	MAIWEI	MW200-RFCB	DLE-180	Oct. 25, 2025	Oct. 24, 2026
DC power	LODESTAR	LP532DE	LP1908158	Oct. 25, 2025	Oct. 24, 2026
966 chamber	YIHENG	966 Room	966	Nov. 06, 2023	Nov. 05, 2026
Spectrum Analyzer	Agilent	E4408B	MY50140780	Oct. 25, 2025	Oct. 24, 2026
EMI Receiver	R&S	ESRP7	101393	Oct. 25, 2025	Oct. 24, 2026
Amplifier	Schwarzbeck	BBV9743B	00153	Oct. 25, 2025	Oct. 24, 2026
Amplifier	EMEC	EM01G8GA	00270	Oct. 25, 2025	Oct. 24, 2026
Active Loop Antenna	Daze	ZN30900A	SEL0097	Oct. 27, 2026	Oct. 26, 2026
Broadband Trilog Antenna	Schwarzbeck	VULB9162	00306	Oct. 27, 2026	Oct. 26, 2026
Horn Antenna	Schwarzbeck	BBHA9120D	02139	Oct. 27, 2026	Oct. 26, 2026
966 Cable 1#	ChengYu	966	004	Oct. 25, 2025	Oct. 24, 2026
966 Cable 2#	ChengYu	966	003	Oct. 25, 2025	Oct. 24, 2026
Temperature Controller	Terchy	MHQ	120	Oct. 25, 2025	Oct. 24, 2026

Conduction Test equipment

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
843 Shielded Room	YIHENG	843 Room	843	Nov. 05, 2023	Nov. 04, 2026
EMI Receiver	R&S	ESR	101421	Oct. 25, 2025	Oct. 24, 2026
LISN	R&S	ENV216	102417	Oct. 25, 2025	Oct. 24, 2026
Clamp	COM-POWER	CLA-050	431072	Oct. 27, 2026	Oct. 26, 2026
3-Loop Antenna	DAZE	ZN30401	13021	Oct. 27, 2026	Oct. 26, 2026
ISN T8	Schwarzbeck	NTFM 8158	101135	Oct. 25, 2025	Oct. 24, 2026
ISN T5	Schwarzbeck	NTFM 8158	101136	Oct. 25, 2025	Oct. 24, 2026
843 Cable 1#	ChengYu	CE Cable	001	Oct. 25, 2025	Oct. 24, 2026
843 Cable 1#	ChengYu	CL Cable	002	Oct. 25, 2025	Oct. 24, 2026

Peak Output Power Test Equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Power Meter	Agilent	E4419B	230480	Oct. 31, 2025	Oct. 30, 2026
2	RF Cable	Rosenberger	MWX322	MY50510202	Oct. 31, 2025	Oct. 30, 2026
3	10dB Attenuator	Rosenberger	2AS102-K10S3	N/A	Oct. 31, 2025	Oct. 30, 2026

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.50	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

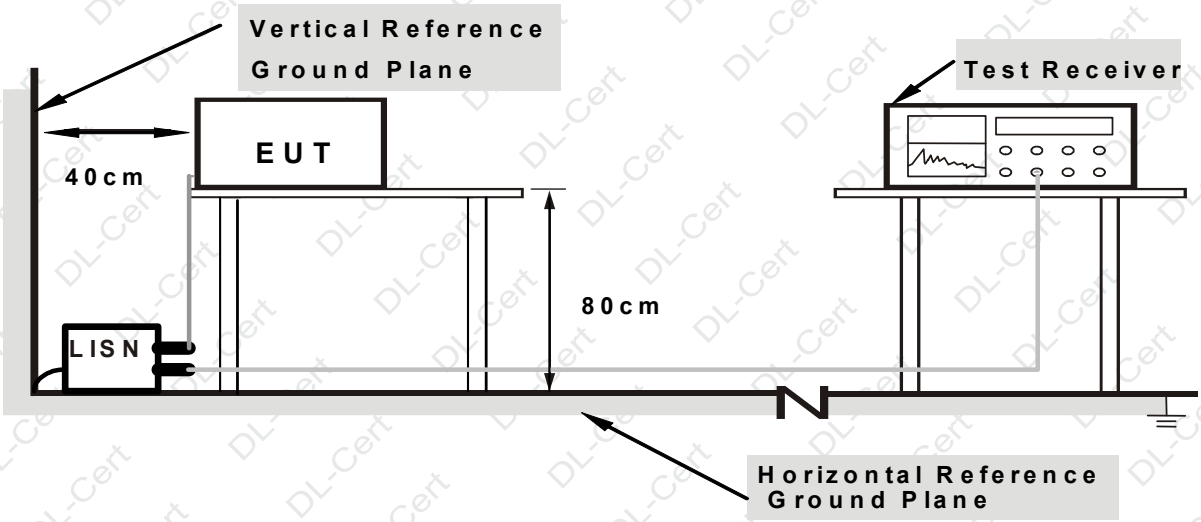
d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

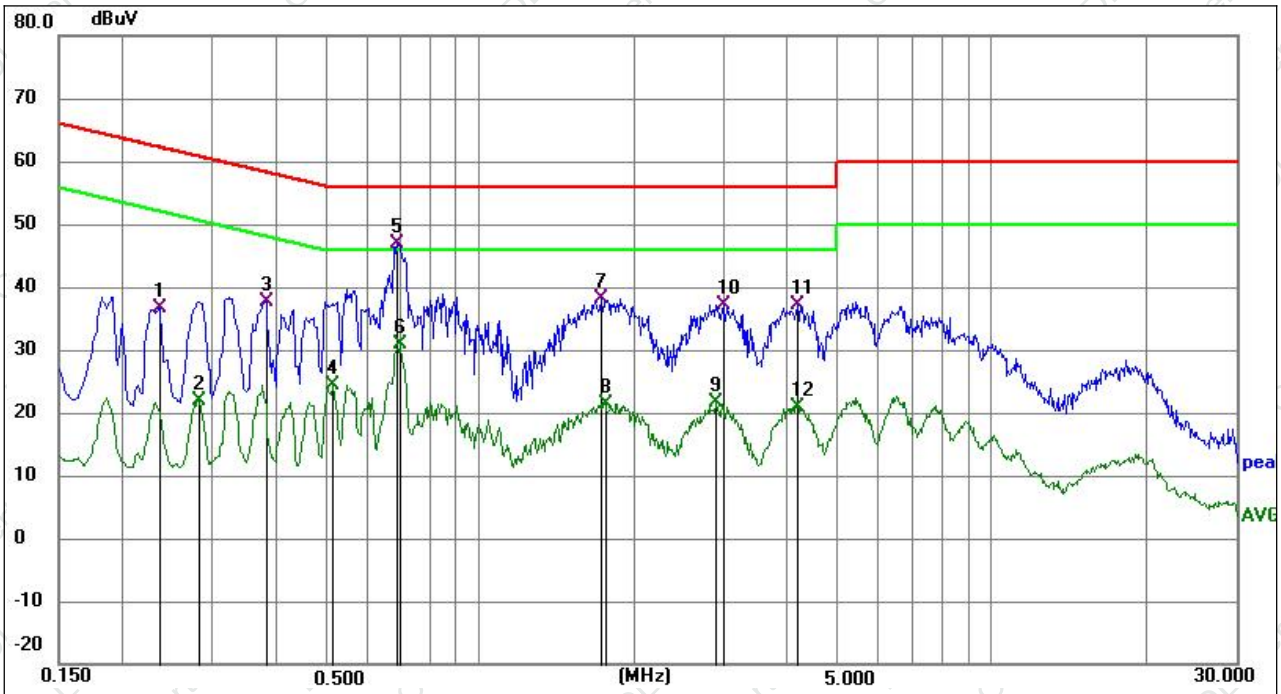
3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.
We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

3.1.6 TEST RESULTS

All the modes were tested, the data of the worst mode 1 was recorded in the following pages, and the others modulation methods do not exceed the limits.

Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1

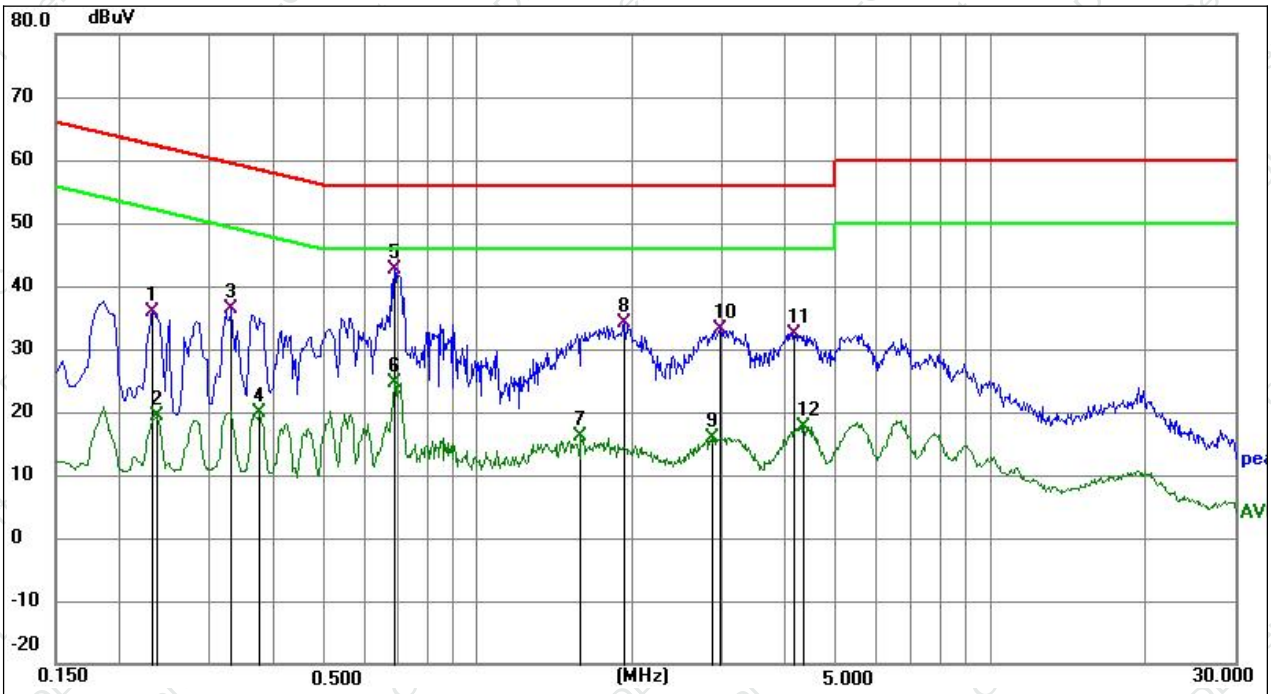


Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2354	25.87	10.69	36.56	62.26	-25.70	QP
2	0.2805	11.25	10.70	21.95	50.80	-28.85	AVG
3	0.3795	27.04	10.70	37.74	58.29	-20.55	QP
4	0.5144	13.64	10.70	24.34	46.00	-21.66	AVG
5 *	0.6854	36.14	10.64	46.78	56.00	-9.22	QP
6	0.6990	20.13	10.63	30.76	46.00	-15.24	AVG
7	1.7295	27.43	10.76	38.19	56.00	-17.81	QP
8	1.7564	10.74	10.76	21.50	46.00	-24.50	AVG
9	2.8950	10.87	10.75	21.62	46.00	-24.38	AVG
10	2.9895	26.42	10.76	37.18	56.00	-18.82	QP
11	4.1595	26.26	10.87	37.13	56.00	-18.87	QP
12	4.1595	10.02	10.87	20.89	46.00	-25.11	AVG

Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1



Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2310	25.35	10.61	35.96	62.41	-26.45	QP
2	0.2354	8.67	10.61	19.28	52.26	-32.98	AVG
3	0.3300	25.66	10.69	36.35	59.45	-23.10	QP
4	0.3750	9.24	10.72	19.96	48.39	-28.43	AVG
5 *	0.6854	31.78	10.92	42.70	56.00	-13.30	QP
6	0.6854	13.70	10.92	24.62	46.00	-21.38	AVG
7	1.5854	5.06	10.99	16.05	46.00	-29.95	AVG
8	1.9365	23.03	10.99	34.02	56.00	-21.98	QP
9	2.8814	5.00	10.97	15.97	46.00	-30.03	AVG
10	2.9760	22.16	10.96	33.12	56.00	-22.88	QP
11	4.1774	21.48	10.98	32.46	56.00	-23.54	QP
12	4.3170	6.66	11.01	17.67	46.00	-28.33	AVG

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	25GHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height 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.

d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to1.5 metre.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel

Note:

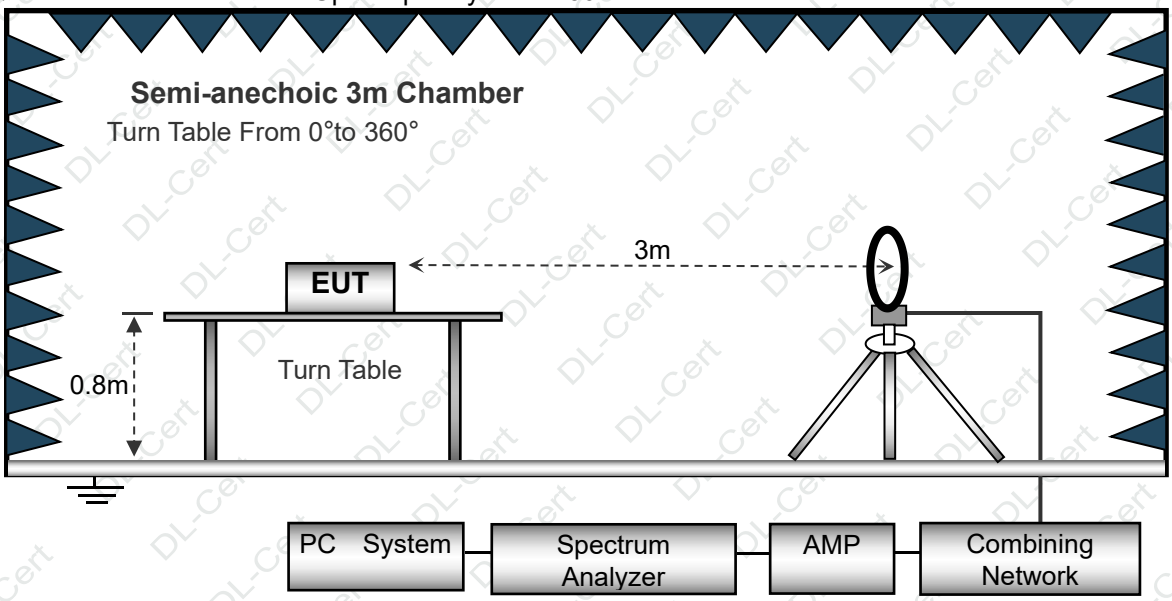
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

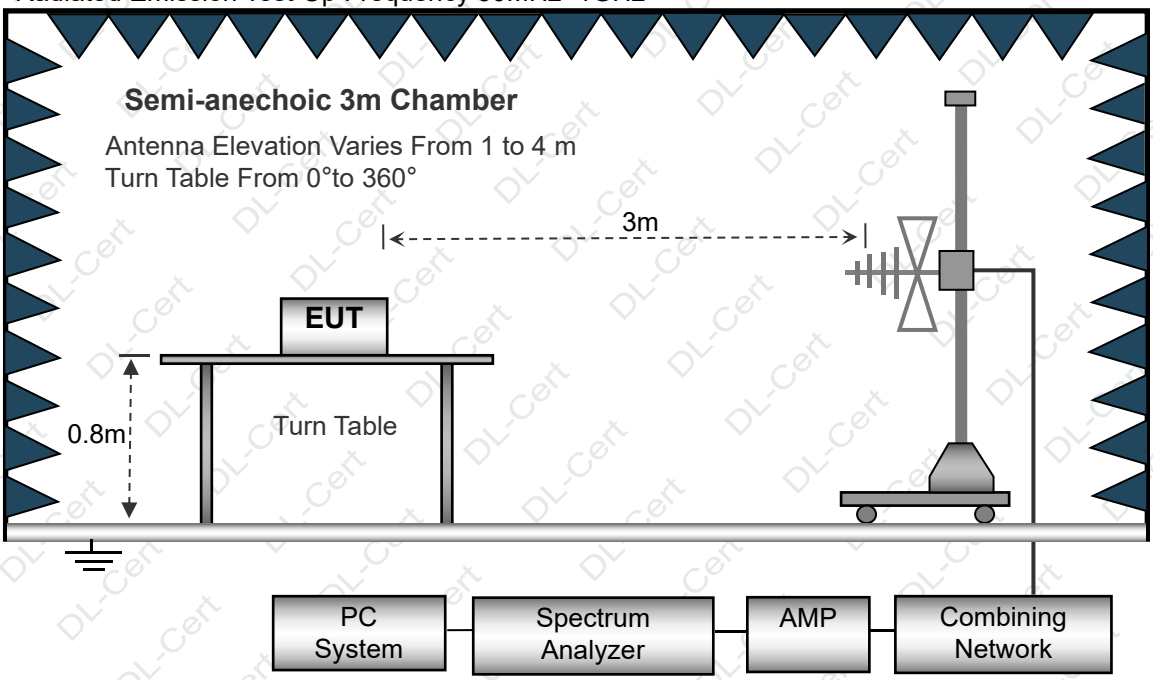
No deviation

3.2.4 TEST SETUP

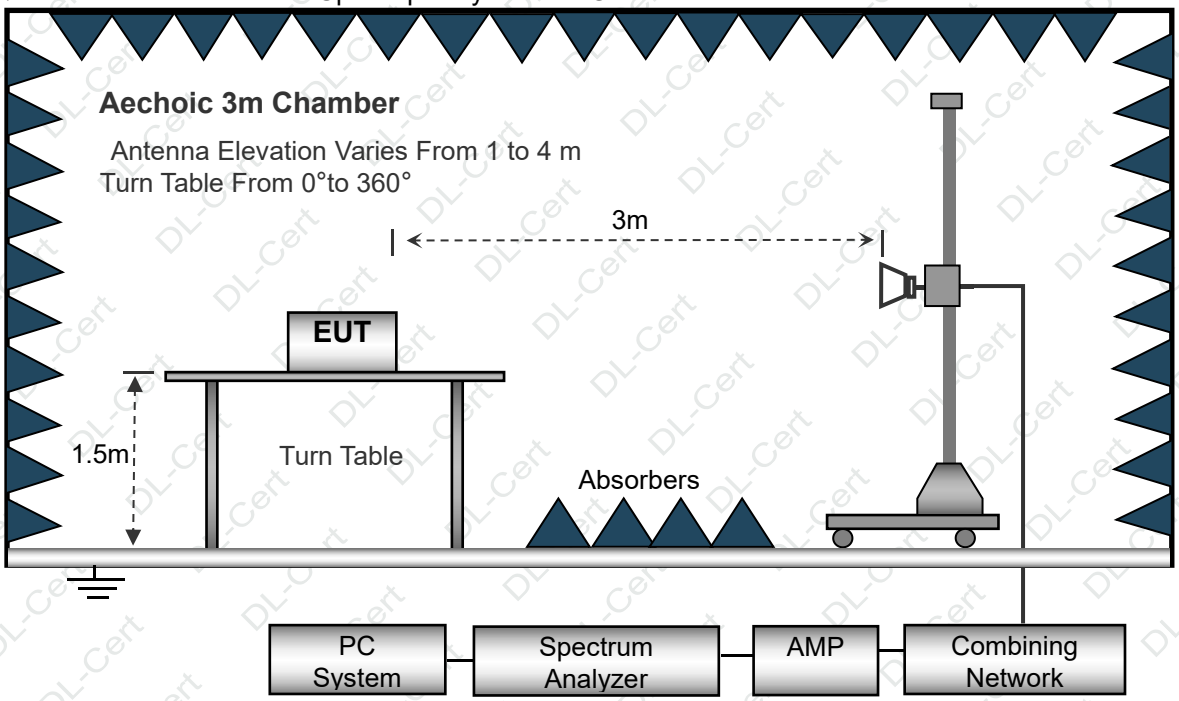
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

Temperature:	20℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 1	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

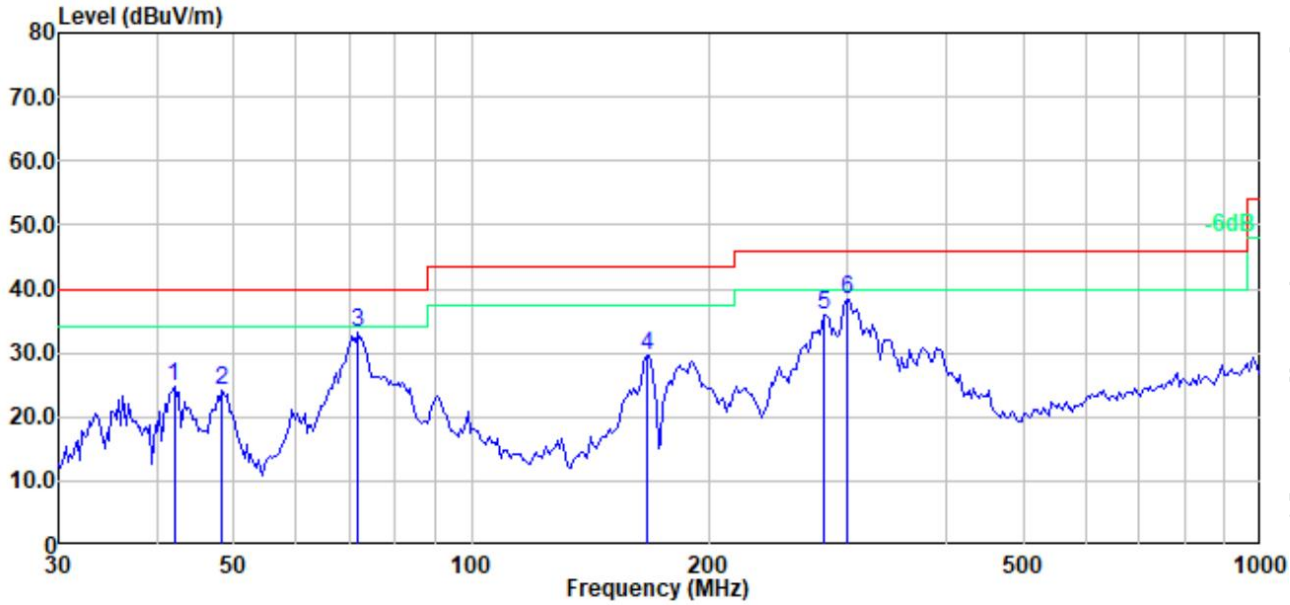
NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

All the modes were tested, the data of the worst mode 1 was recorded in the following pages, and the others modulation methods do not exceed the limits.

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 3.7V		
Test Mode :	Mode 1		



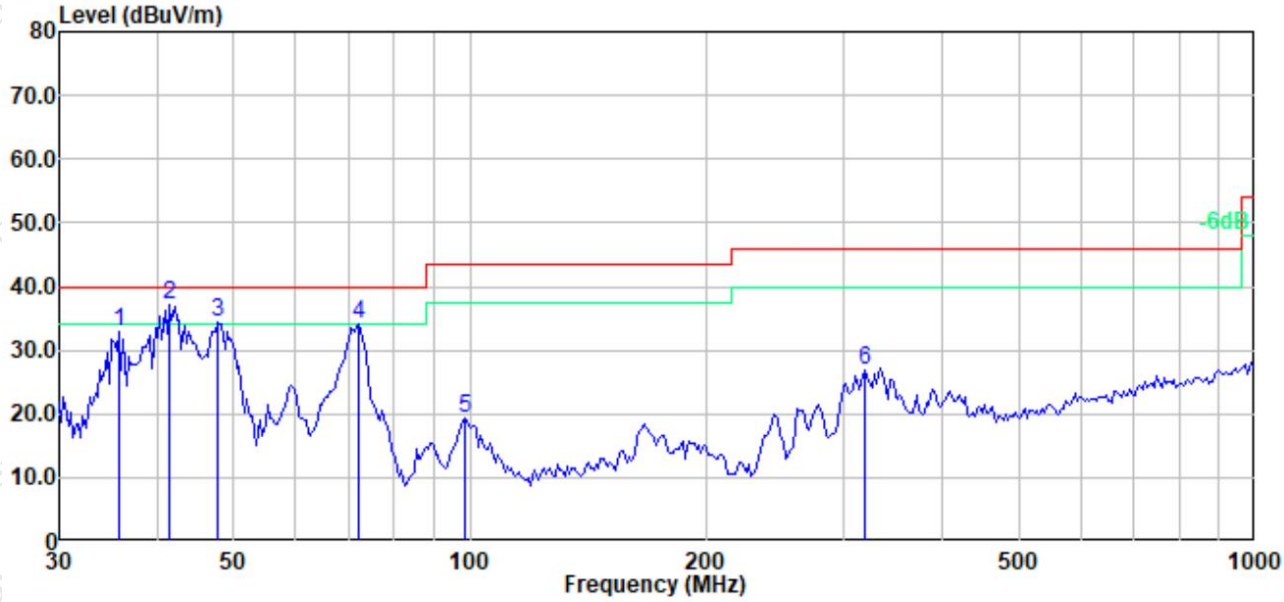
	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV/m	dB/m	dBuV/m	dB		
1	42.035	39.13	24.86	-14.27	40.00	-15.14	Horizontal	QP
2	48.378	38.36	24.12	-14.24	40.00	-15.88	Horizontal	QP
3	71.705	49.91	33.10	-16.81	40.00	-6.90	Horizontal	QP
4	166.639	44.03	29.71	-14.32	43.50	-13.79	Horizontal	QP
5	280.294	50.13	35.81	-14.32	46.00	-10.19	Horizontal	QP
6	298.593	51.34	38.27	-13.07	46.00	-7.73	Horizontal	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Level - Limit;

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 3.7V		
Test Mode :	Mode 1		



	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV/m	dB/m	dBuV/m	dB		
1	35.762	47.71	32.85	-14.86	40.00	-7.15	Vertical	QP
2	41.448	51.36	37.10	-14.26	40.00	-2.90	Vertical	QP
3	47.703	48.60	34.34	-14.26	40.00	-5.66	Vertical	QP
4	72.211	50.88	34.00	-16.88	40.00	-6.00	Vertical	QP
5	98.375	36.94	19.21	-17.73	43.50	-24.29	Vertical	QP
6	318.088	39.17	26.91	-12.26	46.00	-19.09	Vertical	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Level - Limit;

3.2.8 TEST RESULTS (1GHZ~25GHZ)

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402									
V	4804	75.22	52.12	2.78	27.38	53.26	74.00	-20.74	Pk
V	4804	60.38	52.12	2.78	27.38	38.42	54.00	-15.58	AV
V	7206	76.38	52.16	3.08	27.41	54.71	74.00	-19.29	Pk
V	7206	60.05	52.16	3.08	27.41	38.38	54.00	-15.62	AV
V	16132	65.16	52.12	7.36	41.52	61.92	74.00	-12.08	PK
H	4804	75.27	52.12	2.78	27.38	53.31	74.00	-20.69	Pk
H	4804	60.38	52.16	2.78	27.41	38.41	54.00	-15.59	AV
H	7206	76.38	52.16	3.08	27.41	54.71	74.00	-19.29	Pk
H	7206	60.05	52.12	3.08	27.38	38.39	54.00	-15.61	AV
H	16132	64.77	51.53	7.36	41.52	62.12	74.00	-11.88	PK
operation frequency:2440									
V	4880	75.24	52.23	2.86	27.44	53.31	74.00	-20.69	Pk
V	4880	60.32	52.23	2.86	27.44	38.39	54.00	-15.61	AV
V	7323	76.37	52.26	3.12	27.49	54.72	74.00	-19.28	Pk
V	7323	60.09	52.26	3.12	27.49	38.44	54.00	-15.56	AV
V	16132	65.16	52.23	7.36	41.52	61.81	74.00	-12.19	PK
H	4882	75.27	52.23	2.86	27.44	53.34	74.00	-20.66	Pk
H	4882	60.38	52.26	2.86	27.49	38.47	54.00	-15.53	AV
H	7323	76.38	52.26	3.12	27.49	54.73	74.00	-19.27	Pk
H	7323	60.05	52.23	3.12	27.44	38.38	54.00	-15.62	AV
H	16132	64.79	51.53	7.36	41.52	62.14	74.00	-11.86	PK
operation frequency:2480									
V	4960	75.29	51.74	2.93	27.46	53.94	74.00	-20.06	Pk
V	4960	60.35	51.74	2.93	27.46	39.00	54.00	-15.00	AV
V	7440	75.04	49.98	3.15	27.52	55.73	74.00	-18.27	Pk
V	7440	57.74	49.98	3.15	27.52	38.43	54.00	-15.57	AV
V	16132	65.16	51.53	7.36	41.52	62.51	74.00	-11.49	PK
H	4960	75.27	51.74	2.93	27.46	53.92	74.00	-20.08	Pk
H	4960	60.38	51.74	2.93	27.46	39.03	54.00	-14.97	AV
H	7440	76.38	49.98	3.15	27.52	57.07	74.00	-16.93	Pk
H	7440	57.95	49.98	3.15	27.52	38.64	54.00	-15.36	AV
H	16132	64.73	51.53	7.36	41.52	62.08	74.00	-11.92	PK

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
   Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.3 RADIATED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.205

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	2300MHz
Stop Frequency	2520
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

3.3.2 TEST PROCEDURE

Above 1GHz test procedure as below:

a. 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height 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.

d. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel,the Highest channel

Note:

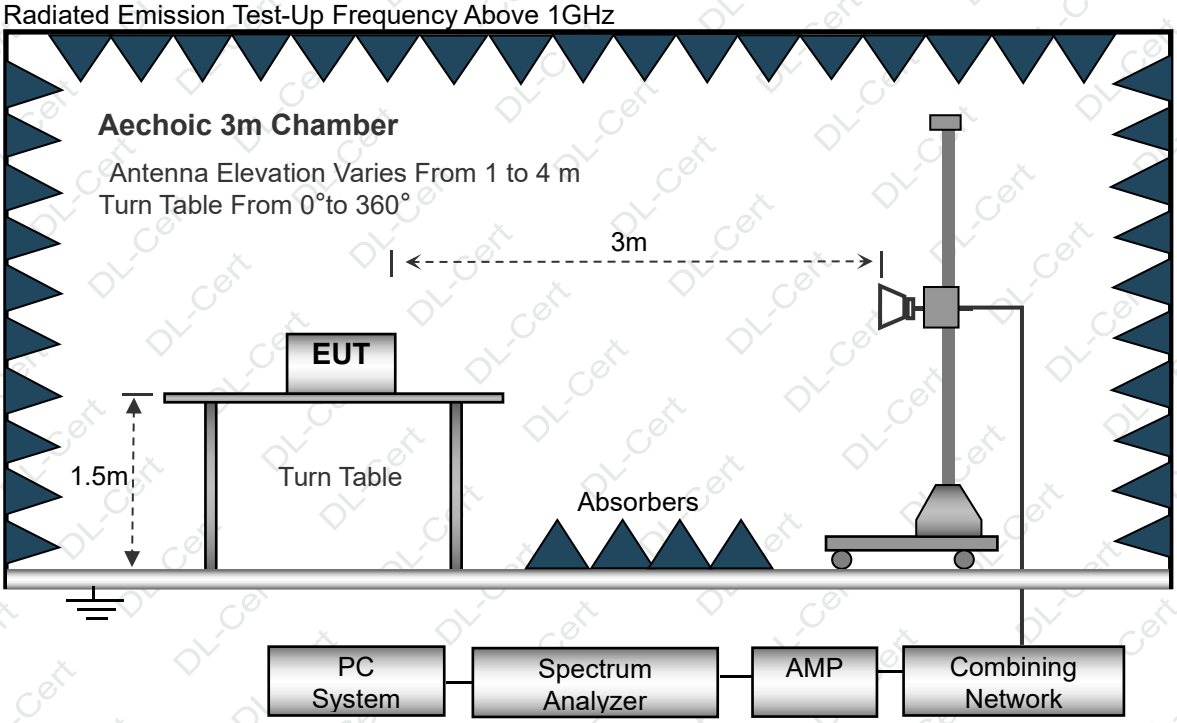
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



3.3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.6 TEST RESULT

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402									
V	2390.00	76.87	52.12	2.73	27.38	54.86	74.00	-19.14	PK
V	2390.00	66.37	52.12	2.73	27.38	44.36	54.00	-9.64	AV
V	2400.00	78.15	52.16	2.78	27.41	56.18	74.00	-17.82	PK
V	2400.00	65.80	52.16	2.78	27.41	43.83	54.00	-10.17	AV
H	2390.00	77.66	52.12	2.73	27.38	55.65	74.00	-18.35	PK
H	2390.00	65.78	52.12	2.73	27.38	43.77	54.00	-10.23	AV
H	2400.00	77.37	52.16	2.78	27.41	55.40	74.00	-18.60	PK
H	2400.00	66.45	52.16	2.78	27.41	44.48	54.00	-9.52	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2480									
V	2483.50	76.37	52.12	2.73	27.38	54.36	74.00	-19.64	PK
V	2483.50	66.86	52.12	2.73	27.38	44.85	54.00	-9.15	AV
V	2500.00	77.86	52.16	2.78	27.41	55.89	74.00	-18.11	PK
V	2500.00	65.73	52.16	2.78	27.41	43.76	54.00	-10.24	AV
H	2483.50	76.35	52.12	2.73	27.38	54.34	74.00	-19.66	PK
H	2483.50	65.37	52.12	2.73	27.38	43.36	54.00	-10.64	AV
H	2500.00	76.17	52.16	2.78	27.41	54.20	74.00	-19.80	PK
H	2500.00	67.15	52.16	2.78	27.41	45.18	54.00	-8.82	AV

Remark:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.4 CONDUCTED BAND EDGE EMISSION&CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

3.4.1 APPLICABLE STANDARD

in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in15.209(a).
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

3.4.2 TEST PROCEDURE

Using the following spectrum analyzer setting:
Set the RBW = 100KHz.
Set the VBW = 300KHz.
Sweep time = auto couple.
Detector function = peak.
Trace mode = max hold.
Allow trace to fully stabilize.

3.4.3 DEVIATION FROM STANDARD

No deviation.

3.4.4 TEST SETUP

3.4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.4.6 TEST RESULTS

Pass

Please refer to Appendix I BLE Test Data.

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4. PEAK OUTPUT POWER

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

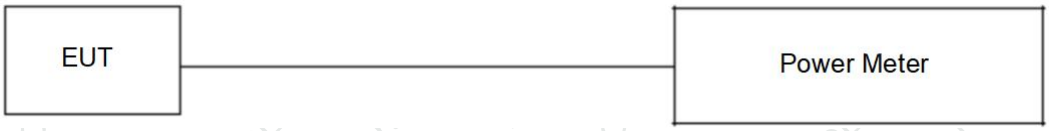
4.1.1 TEST PROCEDURE

1. The RF output of EUT was connected to the power meter by RF cable.
2. Set to the maximum power setting and enable the EUT transmit continuously.
Measure the conducted output power and record the results in the test report.
3. Set to the maximum power setting and enable the EUT transmit continuously.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

Pass

Please refer to Appendix I BLE Test Data.

5. POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	= the frequency band of operation
RB	RBW ≥ 3kHz
VB	VBW ≥ 3RBW
Detector	power averaging (rms) or sample detector (when rms not available).
Trace	rms/average
Sweep Time	Auto

5.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP

5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 TEST RESULTS

Pass

Please refer to Appendix I BLE Test Data.

6. 6DB BANDWIDTH TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range(MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

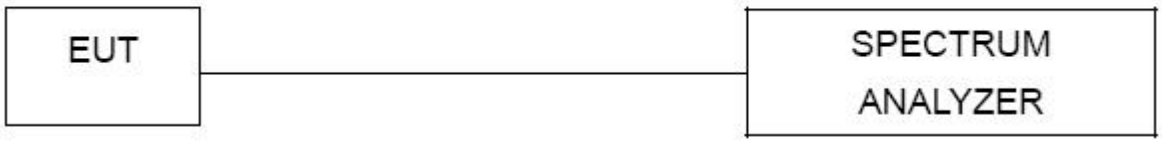
6.1.1 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

Pass

Please refer to Appendix I BLE Test Data.

7. ANTENNA REQUIREMENT

7.1 STANDARD REQUIREMENT

15.203 requirement: 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.

7.2 EUT ANTENNA

The EUT antenna is PCB Antenna, It comply with the standard requirement.

8. TEST SEUUP PHOTO

Reference to the appendix for details.

9. EUT PHOTO

Reference to the appendix for details.

※※※※※ **END OF REPORT** ※※※※※