



# FCC Part 15C Test Report

## FCC ID: 2AMA4-FUNING

Product Name:	FUNING BOARD
Trademark:	<b>FUNING BOARD</b>
Model Name :	FUNING BOARD
Prepared For :	<b>FUNING(Shenzhen)Co.,Ltd</b>
Address :	Room 705B, Building Huiyicaifuzhongxin, Bulong Road, Longhua District, Shenzhen City
Prepared By :	<b>Shenzhen BCTC Technology Co., Ltd.</b>
Address :	No.101, Yousong Road, Longhua New District, Shenzhen, China
Test Date:	May. 18 –May 26, 2017
Date of Report :	May 26, 2017
Report No.:	BCTC-FY170100185E



## VERIFICATION OF COMPLIANCE

**Applicant's name** .....: **FUNING(Shenzhen)Co.,Ltd**  
**Address**.....: Room 705B, Building Huiyicaifuzhongxin, Bulong Road,  
Longhua District, Shenzhen City  
**Manufacture's Name** .....: **FUNING(Shenzhen)Co.,Ltd**  
**Address**.....: Room 705B, Building Huiyicaifuzhongxin, Bulong Road,  
Longhua District, Shenzhen City

### Product description

**Product name**.....: FUNING BOARD

**Trademark:**



**Model Name:** FUNING BOARD

**Serial Model:** N/A

**Standards:** FCC Part15.249  
ANSI C63.10-2013

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

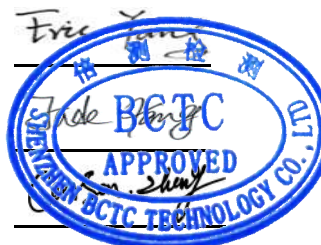
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**Test Result** ..... : **Pass**

**Prepared by(Engineer):** Eric Yang

**Reviewer(Supervisor):** Jade Yang

**Approved(Manager):** Carson Zhang





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## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207(a)	Conducted Emission	PASS	
15.209(a)&&15.249(a) &15.249(c)&15.205(a)	Fundamental &Radiated Spurious Emission Measurement	PASS	
15.215(c)	Bandwidth	PASS	
15.249(d)	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

### 1.1 TEST FACILITY

Shenzhen BCTC Technology Co., Ltd.

Add.:No.101,Yousong Road,Longhua New District, Shenzhen,China

FCC Registration No.:187086

### 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , 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	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	FUNING BOARD	
Trade Name	<b>FUNING BOARD</b>	
Model Name	FUNING BOARD	
Serial Model	N/A	
Model Difference	N/A	
Product Description	Operation Frequency:	2402.501~2475.501 MHz
	Modulation Type:	GFSK
	Number Of Channel	147 CH
	Antenna Designation:	Please see Note 3.
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Channel List	Please refer to the Note 2.	
Power Source	DC 3.7V	
Connecting I/O Port(s)	Please refer to the User's Manual	
hardware version	-	
Software version	-	

Note:

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



2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402.501	71	2437.501	121	2462.501
02	2403.001	72	2438.001	122	2463.001
03	2403.501	73	2438.501	123	2463.501
04	2404.001	74	2439.001	124	2464.001
05	2404.501	75	2439.501	125	2464.501
06	2405.001	76	2440.001	126	2465.001
07	2405.501	77	2440.501	127	2465.501
08	2406.001	78	2441.001	128	2466.001
09	2406.501	79	2441.501	129	2466.501
10	2407.001	80	2442.001	130	2467.001
11	2407.501	81	2442.501	131	2467.501
\	\	\	\	\	\
\	\	\	\	\	\
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\	\	\	\	\	\
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\	\	\	\	\	\
41	2422.501	102	2453.001	140	2472.001
42	2423.001	103	2453.501	141	2472.501
43	2423.501	104	2454.001	142	2473.001
44	2424.001	105	2454.501	143	2473.501
45	2424.501	106	2455.001	144	2474.001
46	2425.001	107	2455.501	145	2474.501
47	2425.501	108	2456.001	146	2475.001
48	2426.001	109	2456.501	147	2475.501
49	2426.501	110	2457.001		
50	2427.001	111	2457.501		

3.

Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	FPCB Antenna	N/A	1dBi	



## 2.2 DESCRIPTION OF TEST MODES

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

For All Mode	Description	Modulation Type
Mode 1	CH01	GFSK
Mode 2	CH77	
Mode 3	CH147	
Mode 4	Link mode	

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) Fully-charged battery is used during the test

## 2.3 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 firmware of the final end product power parameters

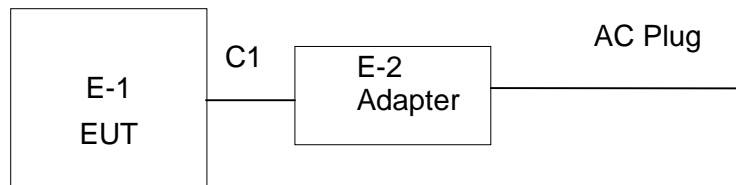
Frequency	2402.501	2440.501 MHz	2475.501 MHz
Channel	Low	Middle	High



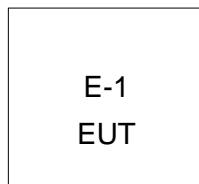


## 2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

### Conducted Emission Test




### Radiated Spurious Emission Test



## 2.5DESCRIPTION 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	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	FUNING BOARD		FUNING BOARD	N/A	EUT
E-2	Adapter	N/A	KA1602-0502000EUU	N/A	Lab Provide

Item	Shielded Type	Ferrite Core	Length	Note
C-1	N/A	N/A	1.0m	USB cable unshielded

#### Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.



## 2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

### Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4407B	MY45108040	2016.08.27	2017.08.26
2	Test Receiver (9kHz-7GHz)	R&S	ESPI	101318	2016.08.27	2017.08.26
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB 9168	VULB91 68-438	2016.08.27	2017.08.26
4	Horn Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA9120D	1201	2016.09.03	2017.09.03
5	Horn Antenna (14GHz-40GHz)	SCHWARZBECK	BBHA 9170	9170-181	2016.09.03	2017.09.03
6	Amplifier (9KHz-6GHz)	SCHWARZBECK	BBV9744	9744-0037	2016.08.27	2017.08.26
7	Amplifier (1GHz-18GHz)	SCHWARZBECK	BBV9718	9718-309	2016.08.27	2017.08.26
8	Amplifier (18GHz-40GHz)	SCHWARZBECK	BBV 9721	9721-205	2016.08.27	2017.08.26
9	Loop Antenna (9KHz-30MHz)	SCHWARZBECK	FMZB1519B	00014	2016.09.03	2017.09.03
10	RF cables1 (9kHz-1GHz)	R&S	R203	R20X	2016.08.27	2017.08.26
11	RF cables2 (1GHz-40GHz)	R&S	R204	R21X	2016.08.27	2017.08.26
12	Antenna connector	Florida RF Labs	N/A	RF 01#	2016.08.27	2017.08.26
13	Power Metter	ANRITSU	ML2487A	6K00001568	2016.08.27	2017.08.26
14	Power Sensor (AV)	ANRITSU	ML2491A	030989	2016.08.27	2017.08.26
15	Signal Analyzer 9kHz-26.5GHz	Agilent	N9010A	MY48030494	2016.08.27	2017.08.26
16	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	2016.08.27	2017.08.26
17	D.C. Power Supply	LongWei	PS-305D	010964729	2016.08.27	2017.08.26

### Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESCI	1166.5950K03-1011 65-ha	2016.08.27	2017.08.26
2	LISN	SCHWARZBECK	NSLK8127	8127739	2016.08.27	2017.08.26
3	LISN	R&S	NSLK8126	8126487	2016.08.27	2017.08.26
4	RF cables	R&S	R204	R20X	2016.08.27	2017.08.26
5	Attenuator	R&S	ESH3-Z2	143206	2016.08.27	2017.08.26



### 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
	Quas -peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

0.15 -0.5	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

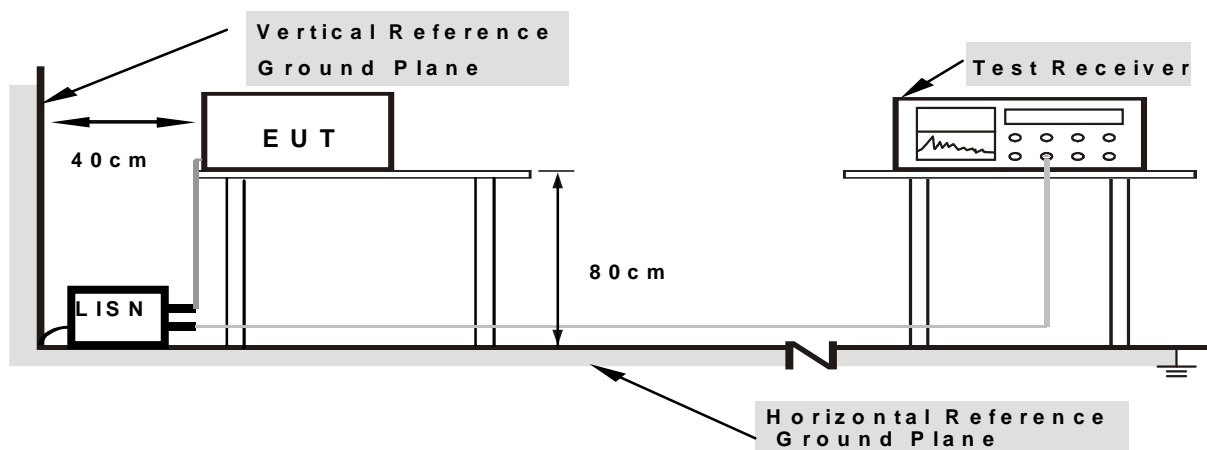
### 3.1.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- 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 cm from other units and other metal planes

### 3.1.5 EUT OPERATING CONDITIONS

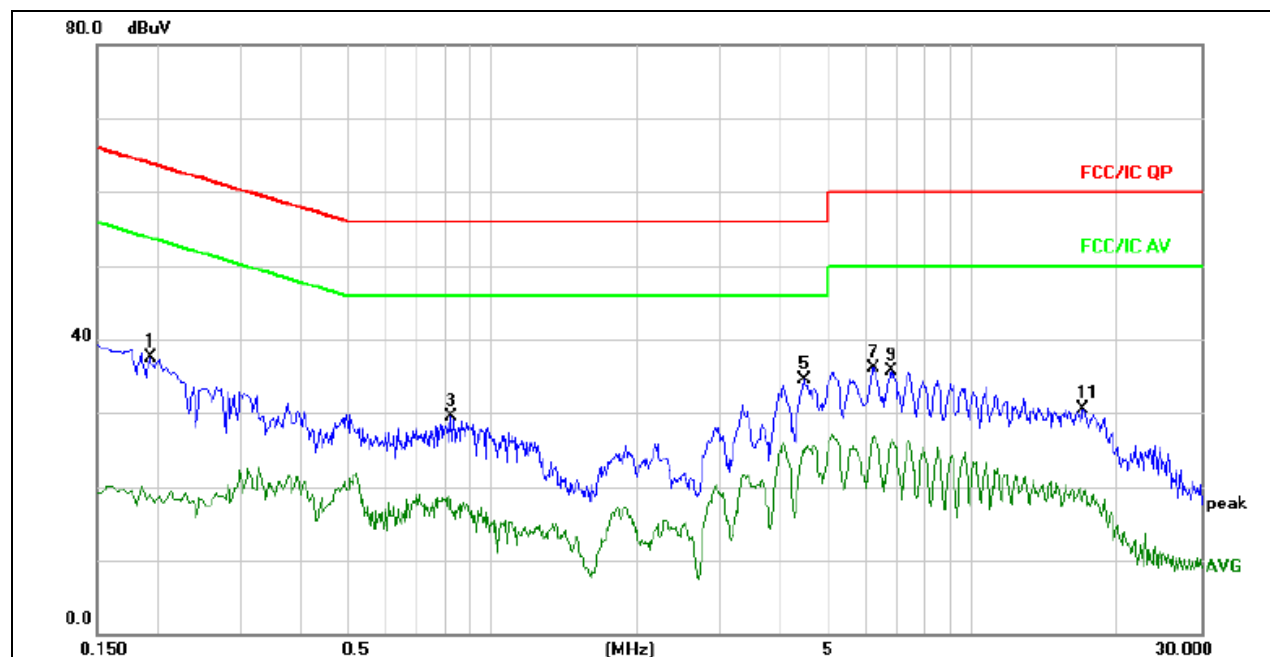
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.



### 3.1.6 TEST RESULTS

Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC120V/60Hz	Test Mode :	Mode4



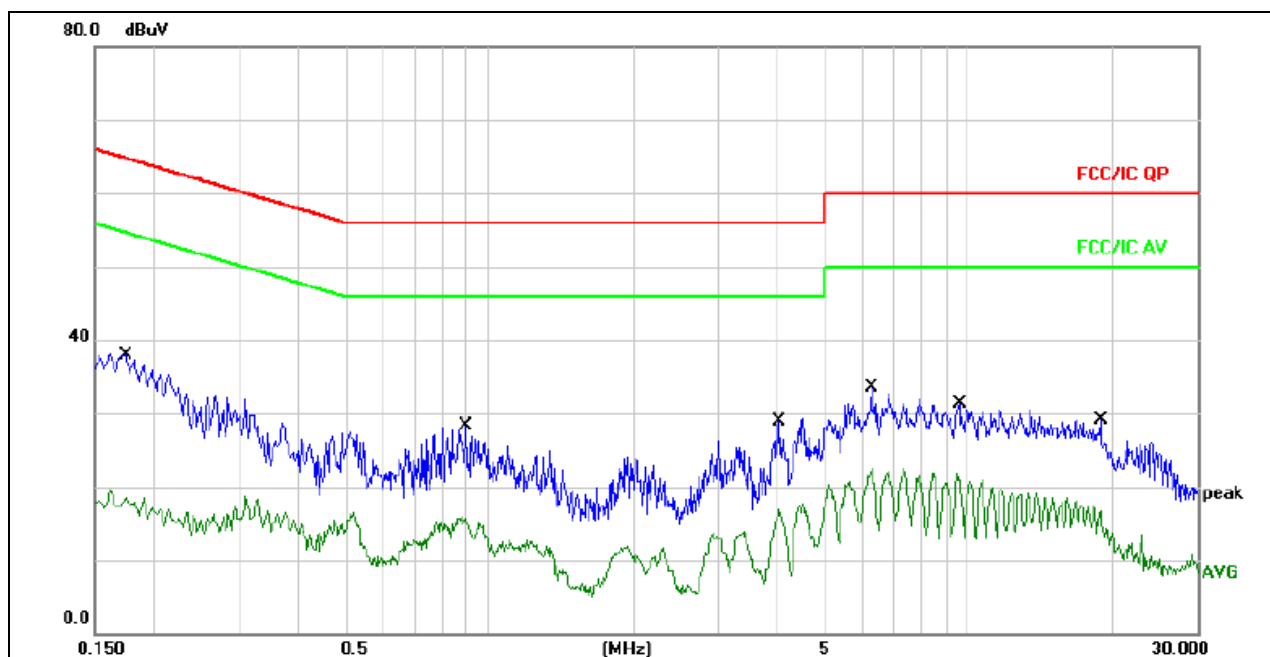
Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1940	27.84	9.65	37.49	63.86	-26.37	QP	
2		0.1940	10.40	9.65	20.05	53.86	-33.81	AVG	
3		0.8180	19.83	9.69	29.52	56.00	-26.48	QP	
4		0.8180	9.13	9.69	18.82	46.00	-27.18	AVG	
5		4.4740	24.70	9.73	34.43	56.00	-21.57	QP	
6	*	4.4740	16.16	9.73	25.89	46.00	-20.11	AVG	
7		6.2260	26.29	9.78	36.07	60.00	-23.93	QP	
8		6.2260	17.15	9.78	26.93	50.00	-23.07	AVG	
9		6.7820	25.88	9.79	35.67	60.00	-24.33	QP	
10		6.7820	16.71	9.79	26.50	50.00	-23.50	AVG	
11		17.0740	20.59	9.89	30.48	60.00	-29.52	QP	
12		17.0740	10.37	9.89	20.26	50.00	-29.74	AVG	



Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC120V/60Hz	Test Mode :	Mode4



Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1740	28.16	9.66	37.82	64.76	-26.94	QP	
2		0.1740	9.84	9.66	19.50	54.76	-35.26	AVG	
3		0.8980	18.56	9.69	28.25	56.00	-27.75	QP	
4		0.8980	6.19	9.69	15.88	46.00	-30.12	AVG	
5		4.0340	19.12	9.73	28.85	56.00	-27.15	QP	
6		4.0340	7.11	9.73	16.84	46.00	-29.16	AVG	
7	*	6.2700	23.74	9.78	33.52	60.00	-26.48	QP	
8		6.2700	12.78	9.78	22.56	50.00	-27.44	AVG	
9		9.5980	21.39	9.82	31.21	60.00	-28.79	QP	
10		9.5980	12.00	9.82	21.82	50.00	-28.18	AVG	
11		18.8940	19.29	9.86	29.15	60.00	-30.85	QP	
12		18.8940	7.67	9.86	17.53	50.00	-32.47	AVG	



### 3.2 RADIATED EMISSION MEASUREMENT

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

20dBc in any 100 kHz bandwidth outside the operating frequency band. 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).

#### FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower



Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
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

- The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 and 1.5 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.
- For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

Note:

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

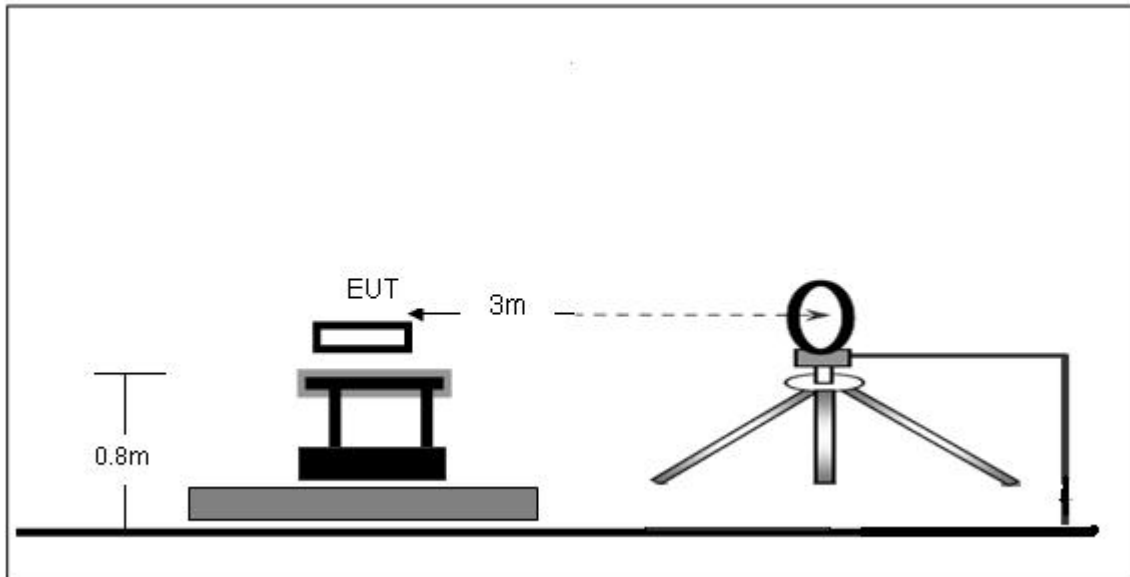
### 3.2.3 DEVIATION FROM TEST STANDARD

No deviation

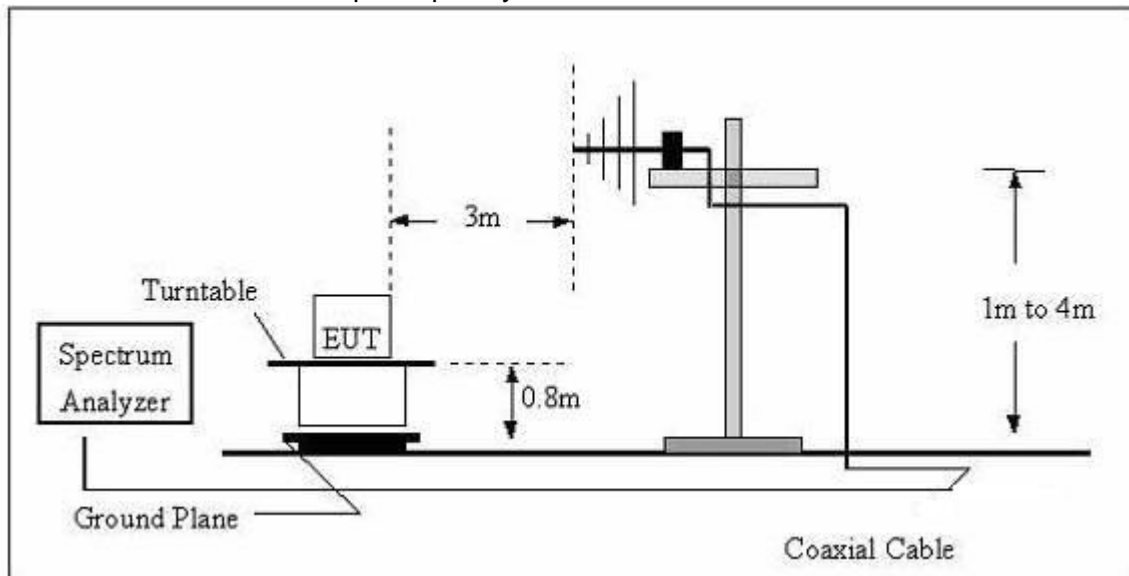


### 3.2.4 TEST SETUP

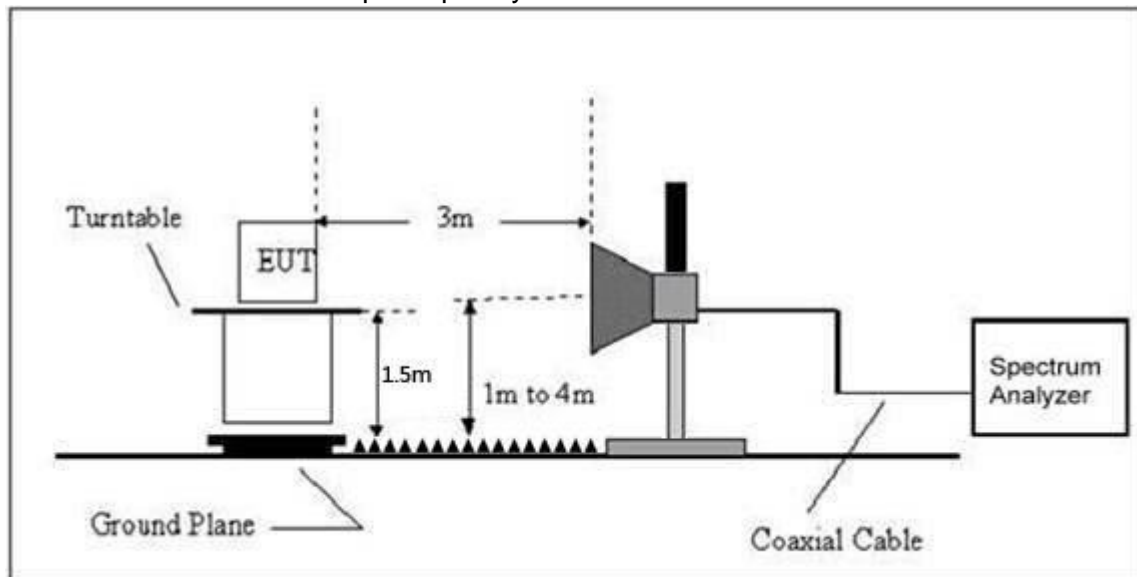
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



#### (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 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



### 3.2.6 TEST RESULTS

Radiated Spurious Emission (Below 30MHz )

Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	---
Test Voltage :	AC120V/60Hz		
Test Mode :	Mode 4		

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.

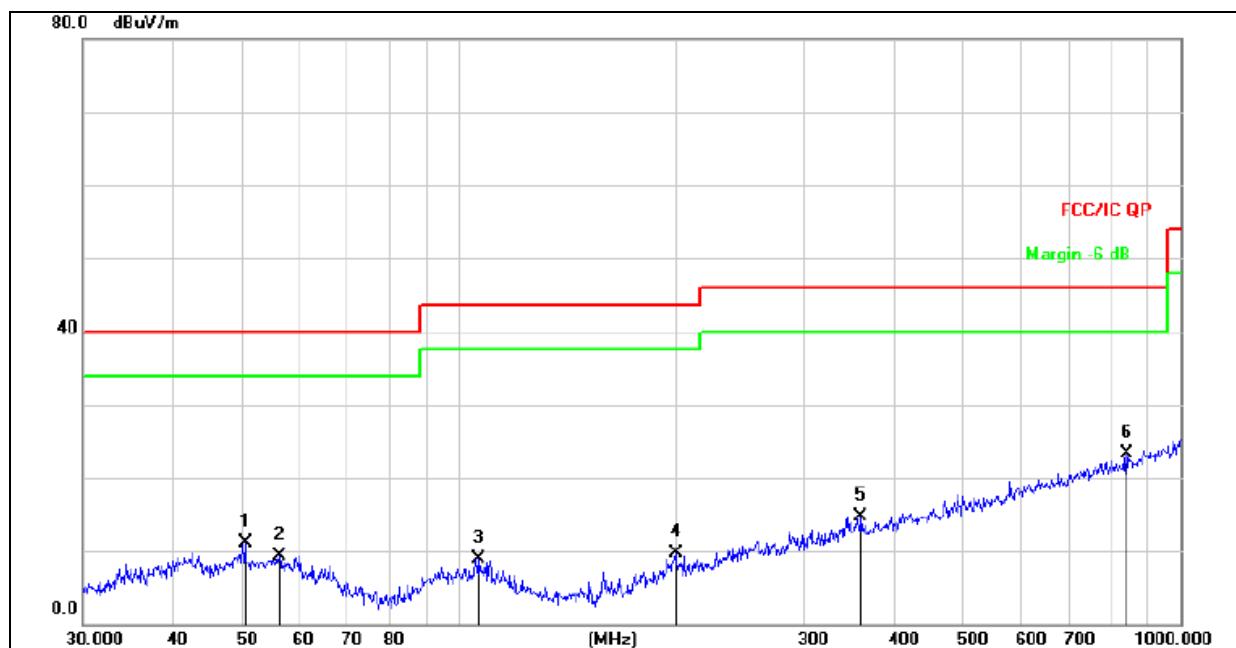
Distance extrapolation factor =  $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.



Radiated Spurious Emission (Between 30MHz – 1GHz)

Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 3.7V		
Test Mode : (Worst)	Link Mode		

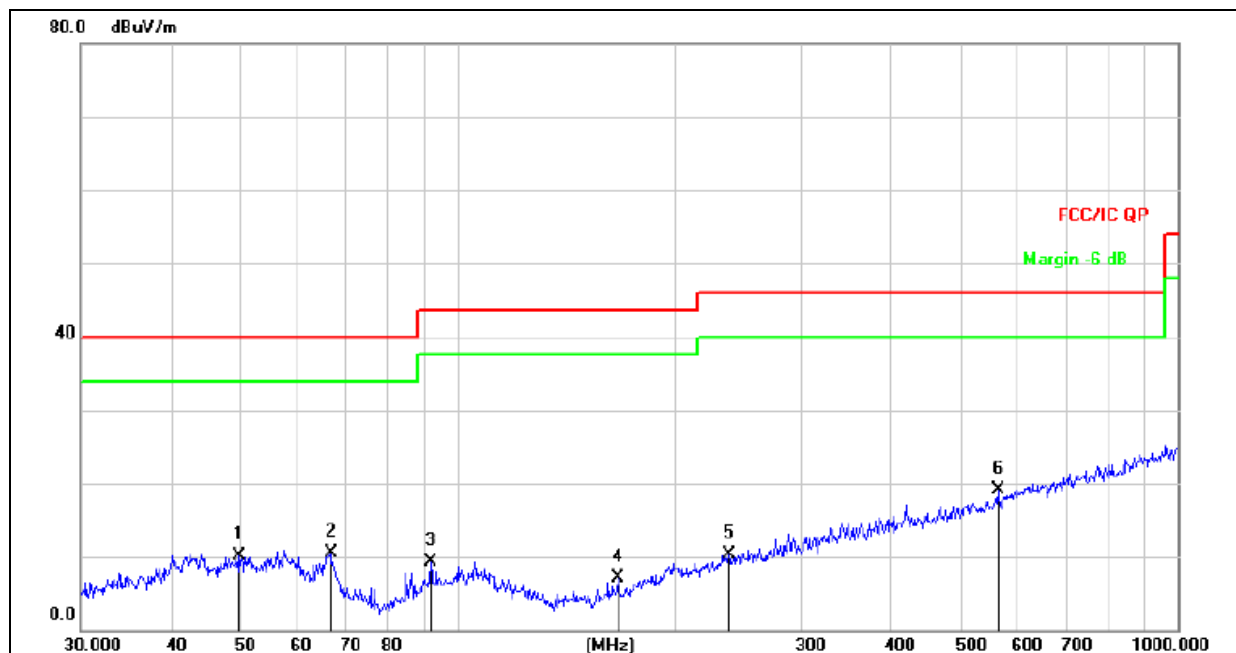


Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		50.4089	25.82	-14.77	11.05	40.00	-28.95	QP
2		56.1974	24.82	-15.43	9.39	40.00	-30.61	QP
3		106.3850	25.19	-16.24	8.95	43.50	-34.55	QP
4		199.2855	25.41	-15.69	9.72	43.50	-33.78	QP
5		360.4476	25.15	-10.40	14.75	46.00	-31.25	QP
6	*	842.1296	23.71	-0.47	23.24	46.00	-22.76	QP



Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 3.7V		
Test Mode : (Worst)	Link Mode		



Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		49.7068	24.85	-14.73	10.12	40.00	-29.88	QP
2		66.7325	27.98	-17.45	10.53	40.00	-29.47	QP
3		91.8163	27.03	-17.76	9.27	43.50	-34.23	QP
4		167.2368	25.60	-18.59	7.01	43.50	-36.49	QP
5		238.3102	24.40	-14.19	10.21	46.00	-35.79	QP
6	*	562.6624	24.91	-5.82	19.09	46.00	-26.91	QP


Radiated Spurious Emission ( 1GHz to 10<sup>th</sup> harmonics)

## GFSK

	Freq.	Receiver Reading	Detector	Polar	Corrected Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 2402.501MHz	2402.501	85.23	PK	H	13.85	99.08	114	Pass
	2402.501	68.43	Ave	H	13.85	82.28	94	Pass
	4805.002	51.34	PK	H	19.33	70.67	74	Pass
	4805.002	30.24	Ave	H	19.33	49.57	54	Pass
	12355.000	28.47	PK	H	17.81	46.28	74	Pass
	17850.000	21.56	PK	H	25.39	46.95	74	Pass
	2402.501	84.78	PK	V	13.85	98.63	114	Pass
	2402.501	66.86	Ave	V	13.85	80.71	94	Pass
	4805.002	48.89	PK	V	19.33	68.22	74	Pass
	4805.002	28.48	Ave	V	19.33	47.81	54	Pass
	12355.000	26.08	PK	V	17.81	43.89	74	Pass
	17850.000	20.12	PK	V	25.39	45.51	74	Pass
Middle Channel 2440.501MHz	2440.501	82.05	PK	H	13.94	95.99	114	Pass
	2440.501	65.92	Ave	H	13.94	79.86	94	Pass
	4881.002	50.36	PK	H	19.43	69.79	74	Pass
	4881.002	29.85	Ave	H	19.43	49.28	54	Pass
	12355.000	27.36	PK	H	17.81	45.17	74	Pass
	17850.000	19.63	PK	H	25.39	45.02	74	Pass
	2440.501	83.02	PK	V	13.94	96.96	114	Pass
	2440.501	67.27	Ave	V	13.94	81.21	94	Pass
	4881.002	48.76	PK	V	19.43	68.19	74	Pass
	4881.002	28.04	Ave	V	19.43	47.47	54	Pass
	12355.000	25.19	PK	V	17.81	43.00	74	Pass
	17850.000	18.68	PK	V	25.39	44.07	74	Pass
Upper Channel 2475.501MHz	2475.501	84.68	PK	H	14.02	98.70	114	Pass
	2475.501	67.41	Ave	H	14.02	81.43	94	Pass
	4951.002	47.39	PK	H	19.51	66.90	74	Pass
	4951.002	26.83	Ave	H	19.51	46.34	54	Pass



12355.000	25.63	PK	H	17.81	43.44	74	Pass
17850.000	21.42	PK	H	25.39	46.81	74	Pass
2475.501	83.77	PK	V	14.02	97.79	114	Pass
2475.501	65.64	Ave	V	14.02	79.66	94	Pass
4951.002	45.25	PK	V	19.51	64.76	74	Pass
4951.002	27.13	Ave	V	19.51	46.64	54	Pass
12355.000	27.52	PK	V	17.81	45.33	74	Pass
17850.000	19.86	PK	V	25.39	45.25	74	Pass

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Meter Reading + Factor

Margin = Emission Level - Limit

Other harmonics emissions are lower than 20dB below the allowable limit.



## 4. BANDWIDTH TEST

### 4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.249) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.249	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	100KHz
VB	$\geq$ RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

#### 4.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW $\geq$  RBW, Sweep time = Auto.

#### 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

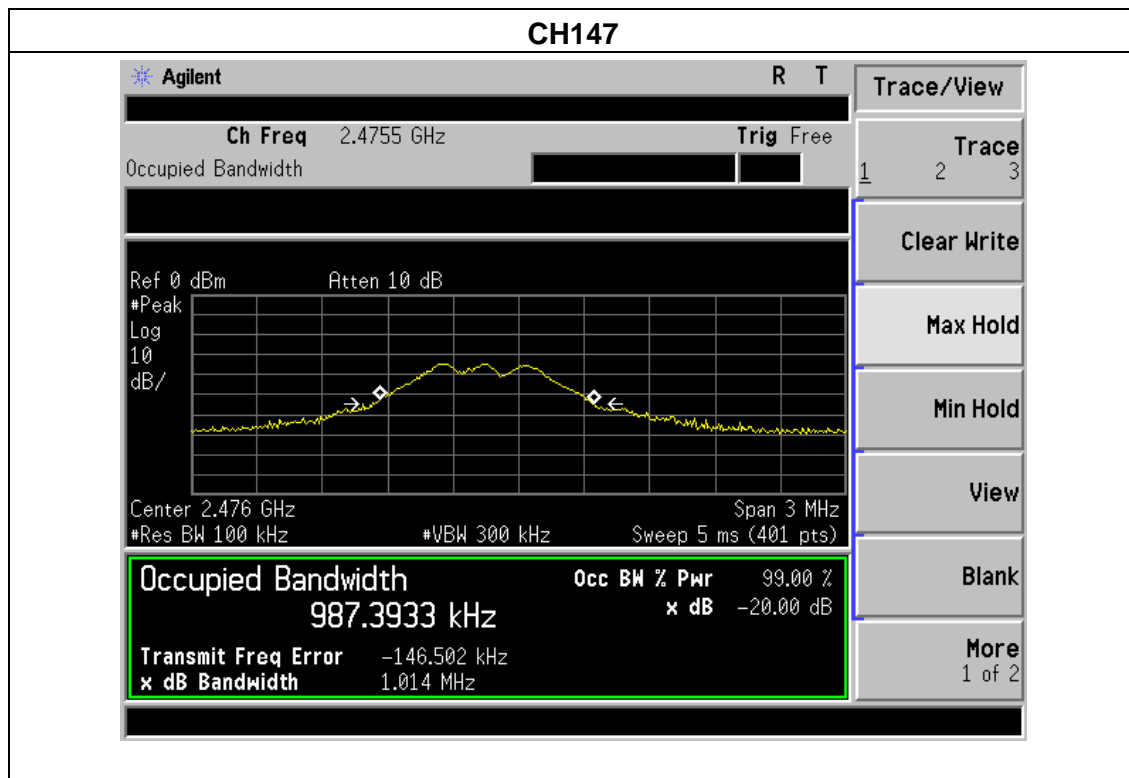
EUT :	FUNING BOARD	Model Name :	FUNING BOARD
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH01 /CH77 /CH147		

	Frequency	20dB Bandwidth (kHz)	Result
GFSK	2402.501 MHz	1181	<b>PASS</b>
	2440.501 MHz	1022	<b>PASS</b>
	2475.501 MHz	1014	<b>PASS</b>



GFSK







## 5. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

### APPLICABLE STANDARD

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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. 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. Attenuation below the general limits specified in §15.209(a) is not required. 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 in §15.209(a)(c)

### TEST PROCEDURE

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

#### Note:

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



### 5.1 DEVIATION FROM STANDARD

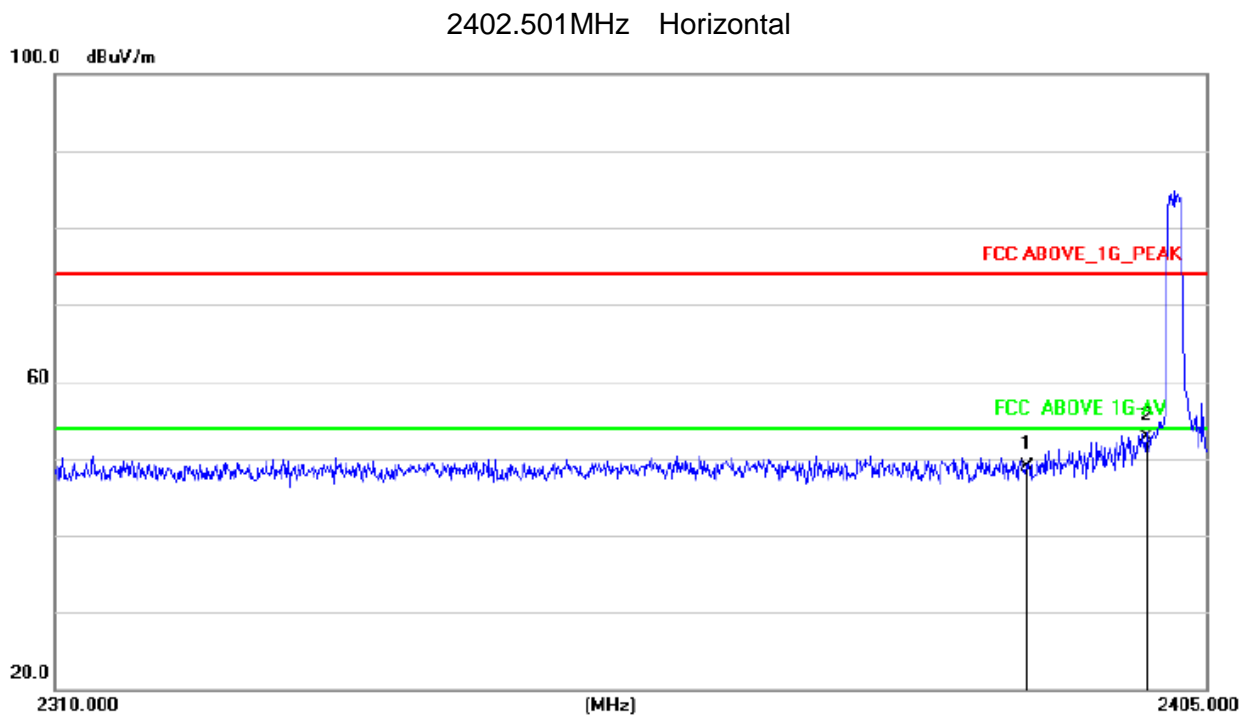
No deviation.

### 5.2 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.

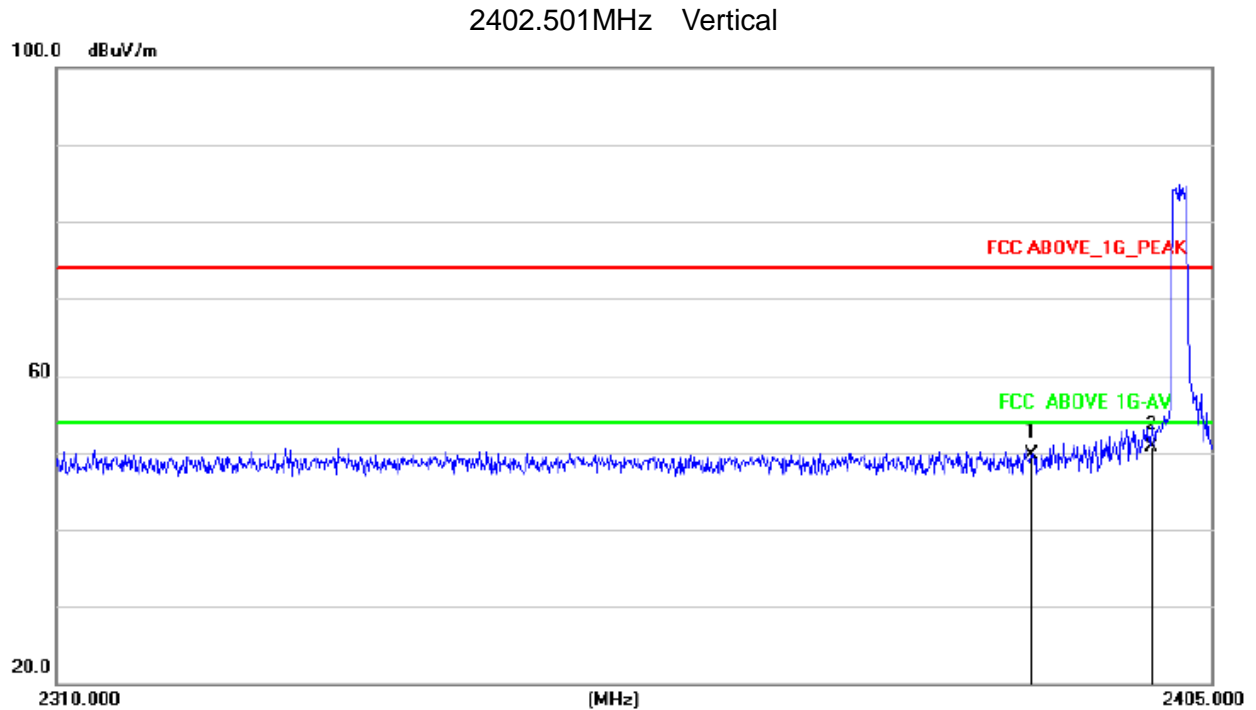
### 5.3 TEST RESULTS

Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH01/ CH147		



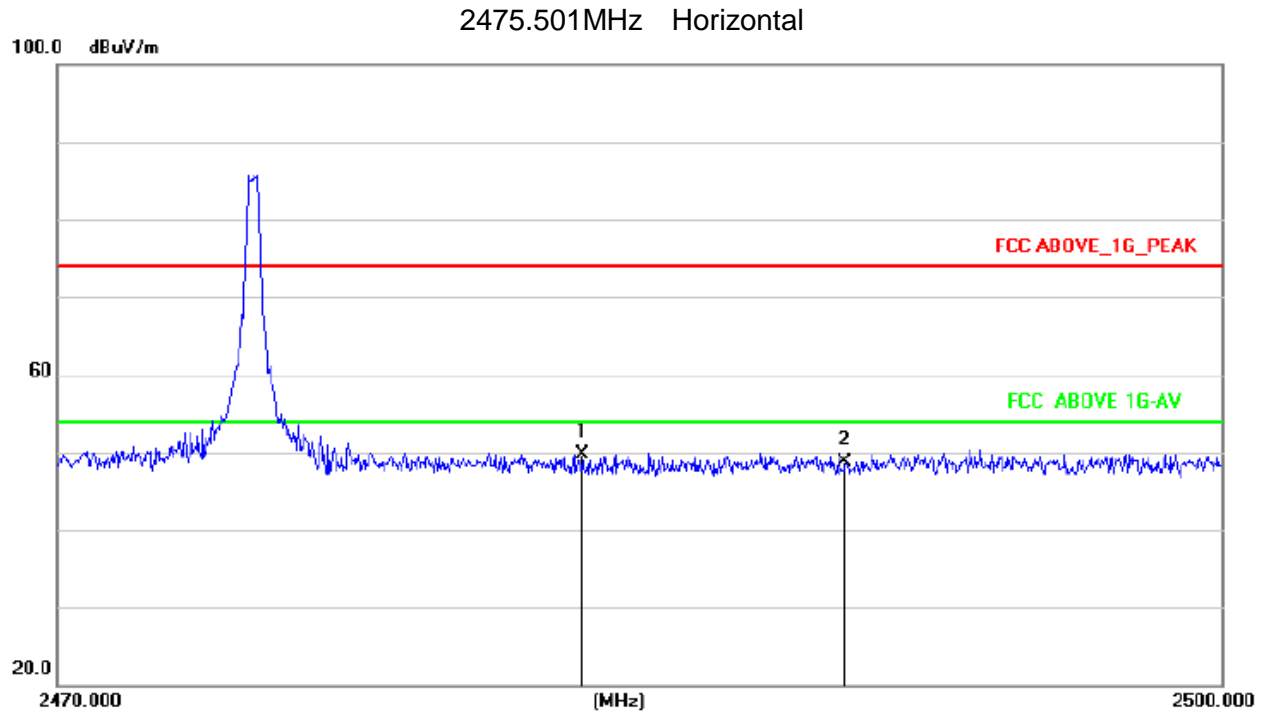
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dB/m	dB Detector
1		2390.000	52.12	-3.18	48.94	74.00	-25.06 peak
2	*	2400.000	55.91	-3.24	52.67	74.00	-21.33 peak

If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.



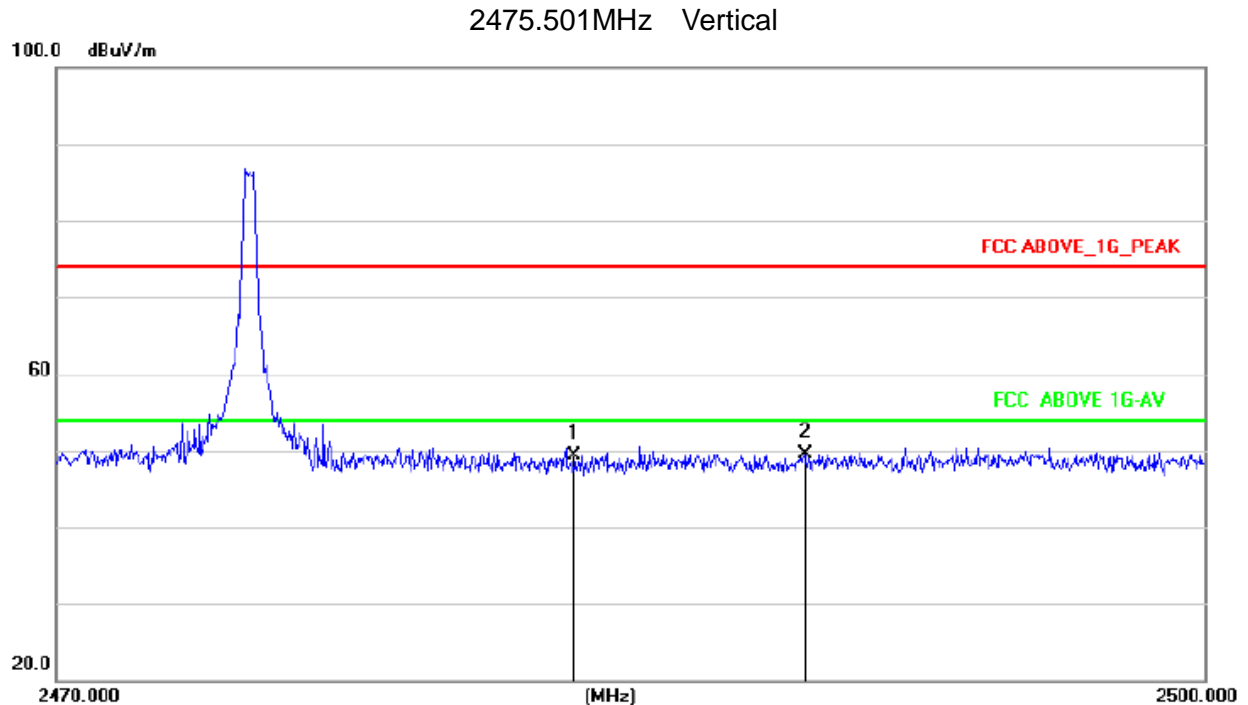
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		2390.000	52.98	-3.18	49.80	74.00	-24.20	peak
2	*	2400.000	54.00	-3.24	50.76	74.00	-23.24	peak

If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	2483.500	53.28	-3.53	49.75	74.00	-24.25	peak
2		2490.270	52.18	-3.54	48.64	74.00	-25.36	peak

If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dB/m	dB Detector
1		2483.500	52.90	-3.53	49.37	74.00	-24.63 peak
2	*	2489.530	52.96	-3.53	49.43	74.00	-24.57 peak

If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.





## **6. ANTENNA REQUIREMENT**

### **6.1 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.

### **6.2 EUT ANTENNA**

The EUT antenna is Integrated (FPCB) antenna. It complies with the standard requirement.

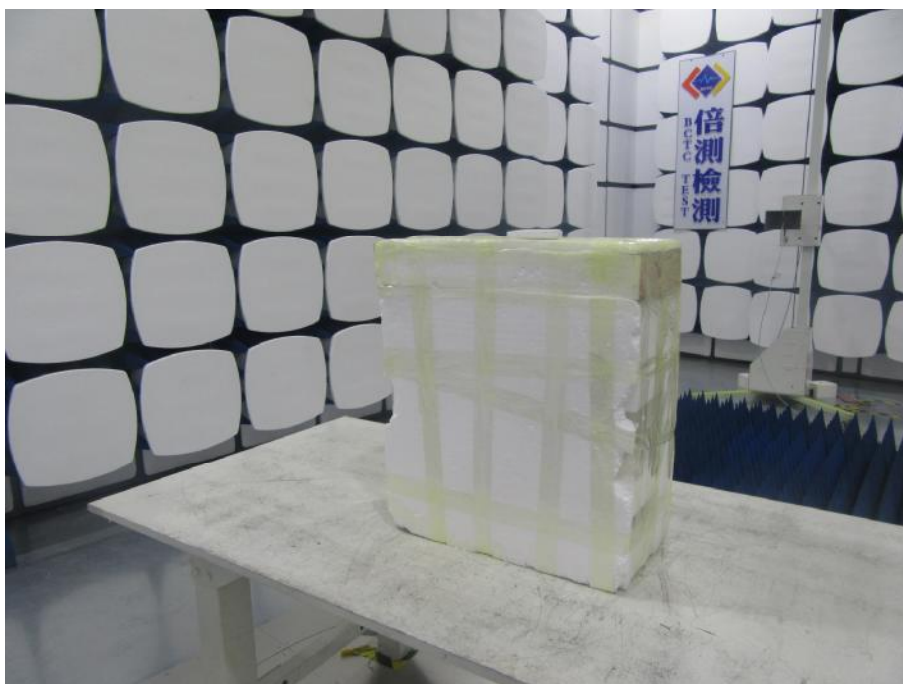
## 7. EUT TEST PHOTO

### Conducted Measurement Photos

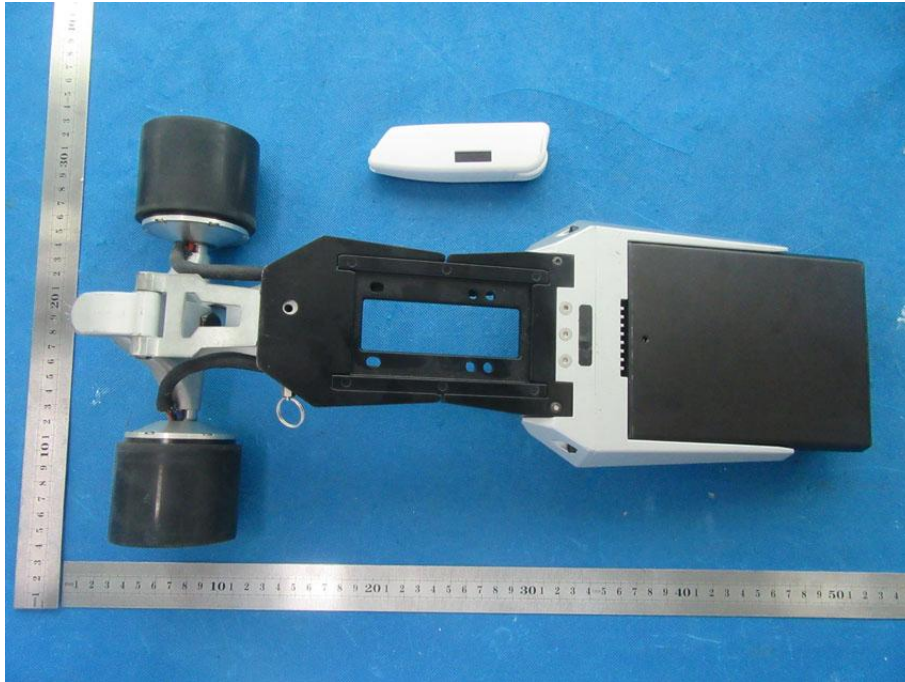




### Radiated Measurement Photos



## 8. EUT PHOTO







\*\*\*\*\* END OF REPORT \*\*\*\*\*