



# FCC Part 15C Test Report

## FCC ID: 2AKFLC5000

Product Name:	C5000 Mobile Data Terminal
Trademark:	N/A
Model Name :	C5000 C5100, H942, H941, H951
Prepared For :	Shenzhen Handheld-Wireless Technology Co., Ltd
Address :	16th Floor, Block B, Dongfangtiande Bldg., Minzhi Street, Longhua New District, Shenzhen, China
Prepared By :	Shenzhen BCTC Technology Co., Ltd.
Address :	No.101, Yousong Road, Longhua New District, Shenzhen, China
Test Date:	Nov. 10 – Nov. 20, 2016
Date of Report :	Nov. 22, 2016
Report No.:	BCTC-LH161111868-2E



### TEST RESULT CERTIFICATION

**Applicant's name** .....: Shenzhen Handheld-Wireless Technology Co., Ltd  
**Address** .....: 16th Floor, Block B, Dongfangtiande Bldg., Minzhi Street, Longhua New District, Shenzhen, China  
**Manufacture's Name** .....: Shenzhen Handheld-Wireless Technology Co., Ltd  
**Address** .....: 16th Floor, Block B, Dongfangtiande Bldg., Minzhi Street, Longhua New District, Shenzhen, China

**Product description**

**Product name**.....: C5000 Mobile Data Terminal  
**Trademark**.....: N/A  
**Model and/or type reference** .: C5000  
 C5100, H942, H941, H951  
**Standards**.....: FCC Part15.247  
 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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Testing Engineer : Eric Yang  
 Eric Yang

Reviewer Supervisor : Jade Yang  
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<b>Table of Contents</b>		<b>Page</b>
<b>1 . SUMMARY OF TEST RESULTS</b>		<b>5</b>
1.1 TEST FACILITY		5
1.2 MEASUREMENT UNCERTAINTY		5
<b>2 . GENERAL INFORMATION</b>		<b>6</b>
2.1 GENERAL DESCRIPTION OF EUT		6
2.2 DESCRIPTION OF TEST MODES		7
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED		8
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)		8
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS		9
<b>3 . EMC EMISSION TEST</b>		<b>10</b>
3.1 CONDUCTED EMISSION MEASUREMENT		10
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS		10
3.1.2 TEST PROCEDURE		10
3.1.3 DEVIATION FROM TEST STANDARD		10
3.1.4 TEST SETUP		11
3.1.5 EUT OPERATING CONDITIONS		11
3.1.6 TEST RESULTS		11
3.2 RADIATED EMISSION MEASUREMENT		14
3.2.1 RADIATED EMISSION LIMITS		14
3.2.2 TEST PROCEDURE		15
3.2.3 DEVIATION FROM TEST STANDARD		15
3.2.4 TEST SETUP		15
3.2.5 EUT OPERATING CONDITIONS		16
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)		17
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)		18
3.2.8 TEST RESULTS (1GHZ~25GHZ)		20
3.3 RADIATED BAND EMISSION MEASUREMENT		21
3.3.1 TEST REQUIREMENT:		21
3.3.2 TEST PROCEDURE		21
3.3.3 DEVIATION FROM TEST STANDARD		22
3.3.4 TEST SETUP		22
3.3.5 EUT OPERATING CONDITIONS		22
<b>4 . POWER SPECTRAL DENSITY TEST</b>		<b>26</b>
4.1 APPLIED PROCEDURES / LIMIT		26
4.1.1 TEST PROCEDURE		26



	<b>Page</b>
4.1.2 DEVIATION FROM STANDARD	26
4.1.3 TEST SETUP	26
4.1.4 EUT OPERATION CONDITIONS	26
4.1.5 TEST RESULTS	27
<b>5 . BANDWIDTH TEST</b>	<b>29</b>
5.1 APPLIED PROCEDURES / LIMIT	29
5.1.1 TEST PROCEDURE	29
5.1.2 DEVIATION FROM STANDARD	29
5.1.3 TEST SETUP	29
5.1.4 EUT OPERATION CONDITIONS	29
5.1.5 TEST RESULTS	29
<b>6 . OUTPUT POWER TEST</b>	<b>31</b>
6.1 APPLIED PROCEDURES / LIMIT	31
6.1.1 TEST PROCEDURE	31
6.1.2 DEVIATION FROM STANDARD	31
6.1.3 TEST SETUP	31
6.1.4 EUT OPERATION CONDITIONS	31
6.1.5 TEST RESULTS	32
<b>7 . ANTENNA REQUIREMENT</b>	<b>33</b>
7.1 STANDARD REQUIREMENT	33
7.2 EUT ANTENNA	33
<b>8 . TEST SEUUP PHOTO</b>	<b>34</b>
<b>9 . EUT PHOTO</b>	<b>36</b>



## 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	Conducted Emission	PASS	
15.249	Fundamental & Radiated Spurious Emission Measurement	PASS	
15.249	Bandwidth	PASS	
15.205	Restricted Bands Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

### NOTE:

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

### 1.1 TEST FACILITY

Shenzhen BCTC Technology Co., Ltd.

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

FCC Registered No.: 187086

### 1.2 MEASUREMENT UNCERTAINTY

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



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	C5000 Mobile Data Terminal	
Trademark	N/A	
Model Name	C5000 C5100, H942, H941, H951	
Model Difference	The product's different for model name and outlook color.	
Product Description	The EUT is a C5000 Mobile Data Terminal	
	Operation Frequency:	2402~2480 MHz
	Modulation Type:	GFSK
	Bit Rate of Transmitter	2Mbps
	Number Of Channel	40 CH
	Antenna type:	Internal Antenna
	Antenna Gain (dBi)	1.5dBi
	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	DC 3.7V from battery DC 5V from Adapter	
Adapter	Model:GME10C-050200FU I/P:AC 100-240V 50/60Hz 0.28A O/P:DC 5V 2.0A	
hardware version	--	
Software version	--	
Serial number	--	
Connecting I/O Port(s)	Please refer to the User's Manual	

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	20	2440		
02	2404	21	2442		
~	~	~	~		
9	2418	39	2478		
10	2420	40	2480		

## 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.

Pretest Mode	Description
Mode 1	CH01
Mode 2	CH20
Mode 3	CH40
Mode 4	Link Mode

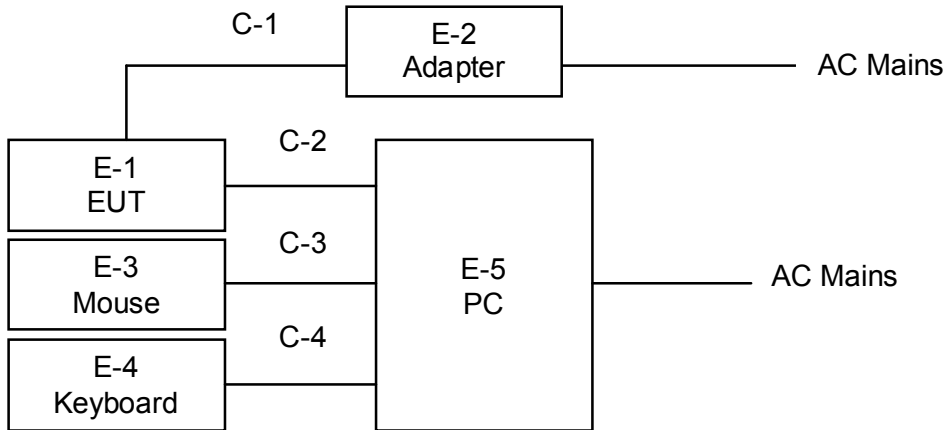
For Radiated Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH20
Mode 3	CH40

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

### 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted & Radiated 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	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	C5000 Mobile Data Terminal	N/A	C5000	N/A	EUT
E-2	Adapter	N/A	GME10C-050200FU	N/A	
E-2	Mouse	AUPM	B036	N/A	
E-3	Keyboard	BTK	K015	N/A	
E-4	PC	ASUS	AWT8000	N/A	PC does not supply power to EUT.

Item	Shielded Type	Ferrite Core	Length	Note
C-1	No	No	0.8m	DC Line
C-2	NO	NO	0.8M	Mini USB cable
C-3	NO	NO	0.8M	Mouse cable(USB)
C-4	NO	NO	1.2M	Keyboard cable(USB)

Note: For detachable type I/O cable should be specified the length in cm in 『Length』 column.





## 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

### Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	E4407B	MY45109572	2016.08.27	2017.08.26
2	Test Receiver	R&S	ESPI	101396	2016.08.27	2017.08.26
3	Bilog Antenna	SCHWARZBECK	VULB9160	VULB9160-3369	2016.08.27	2017.08.26
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2016.08.27	2017.08.26
5	Spectrum Analyzer	Agilent	N9020A	MY5051041	2016.08.27	2017.08.26
6	Horn Antenna	SCHWARZBECK	9120D	9120D-1275	2016.08.29	2017.08.28
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2016.07.06	2017.07.05
8	Amplifier	SCHWARZBECK	BBV9718	9718-270	2016.08.27	2017.08.26
9	Amplifier	SCHWARZBECK	BBV9743	9743-119	2016.08.27	2017.08.26
10	Loop Antenna	ARA	PLA-1030/B	1029	2016.06.07	2017.06.06
11	Power Meter	R&S	NRVS	100696	2016.08.27	2017.08.26
12	Power Sensor	R&S	URV5-Z4	0395.1619.05	2016.08.27	2017.08.26
13	RF cables	R&S	N/A	N/A	2016.08.27	2017.08.26
14	966 chamber	ChengYu	966 Room	966	2016.08.27	2017.08.26

### Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESCI	1166.5950K03-101165-ha	2016.08.27	2017.08.26
2	LISN	R&S	NSLK8126	8126466	2016.08.27	2017.08.26
3	LISN	R&S	NSLK8126	8126487	2016.08.27	2017.08.26
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2016.08.27	2017.08.26
5	RF cables	R&S	R204	R20X	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
	Quasi-peak	Average	
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

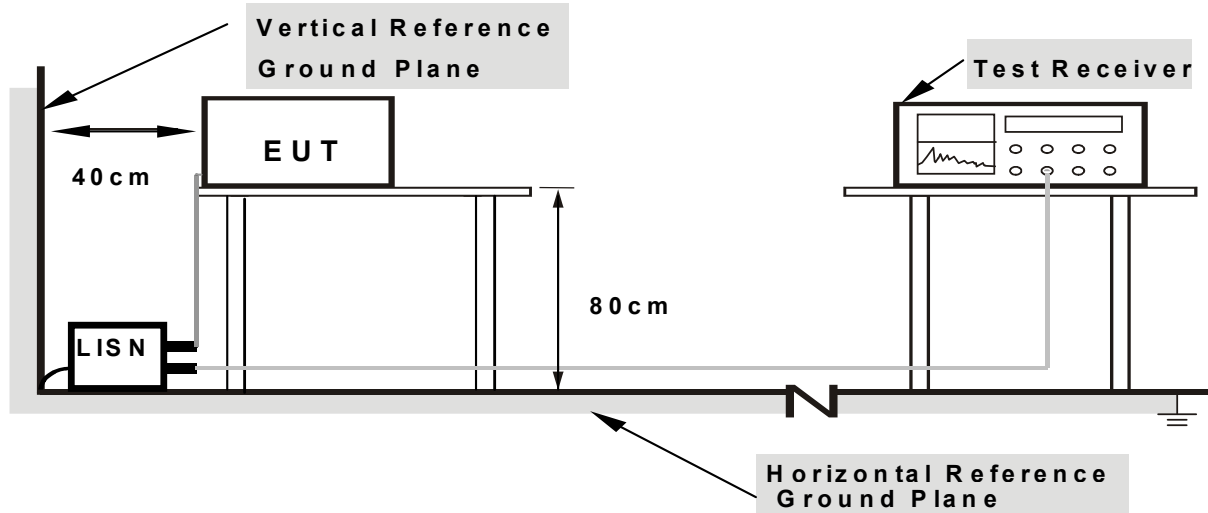
##### 3.1.2 TEST PROCEDURE

- 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

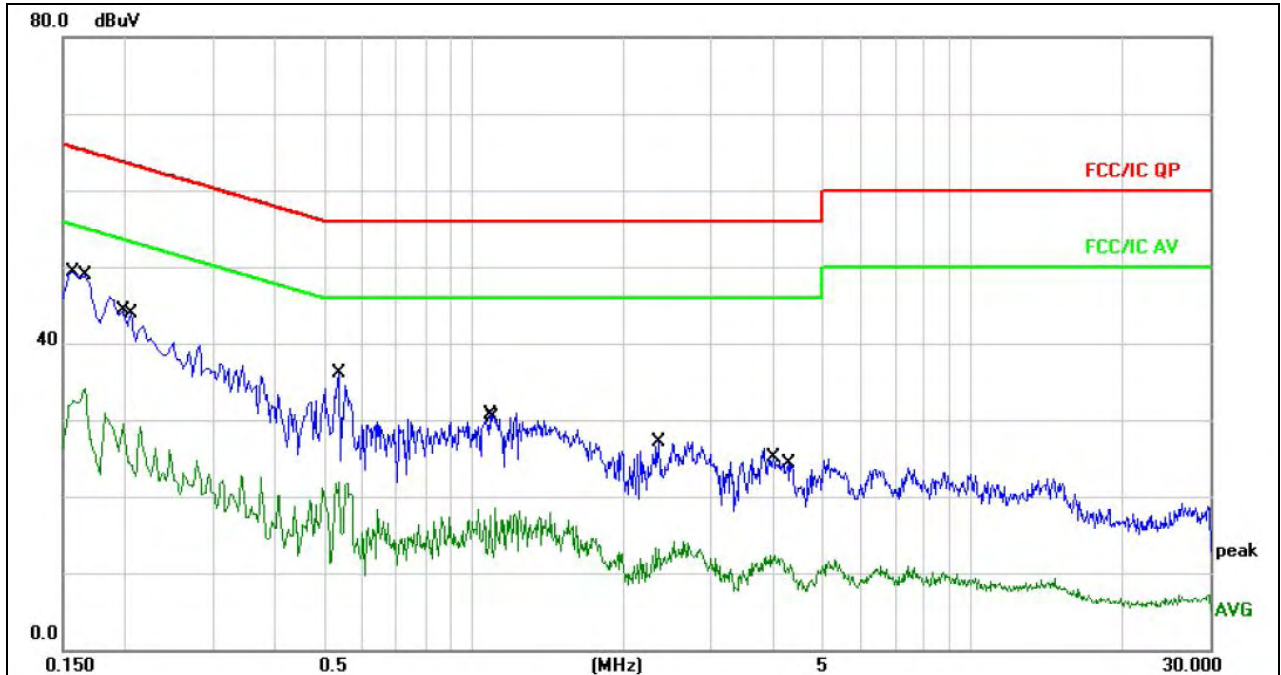
### 3.1.5 EUT OPERATING CONDITIONS

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.

### 3.1.6 TEST RESULTS



Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V from adapter input AC 120V/60Hz	Test Mode :	Mode 4



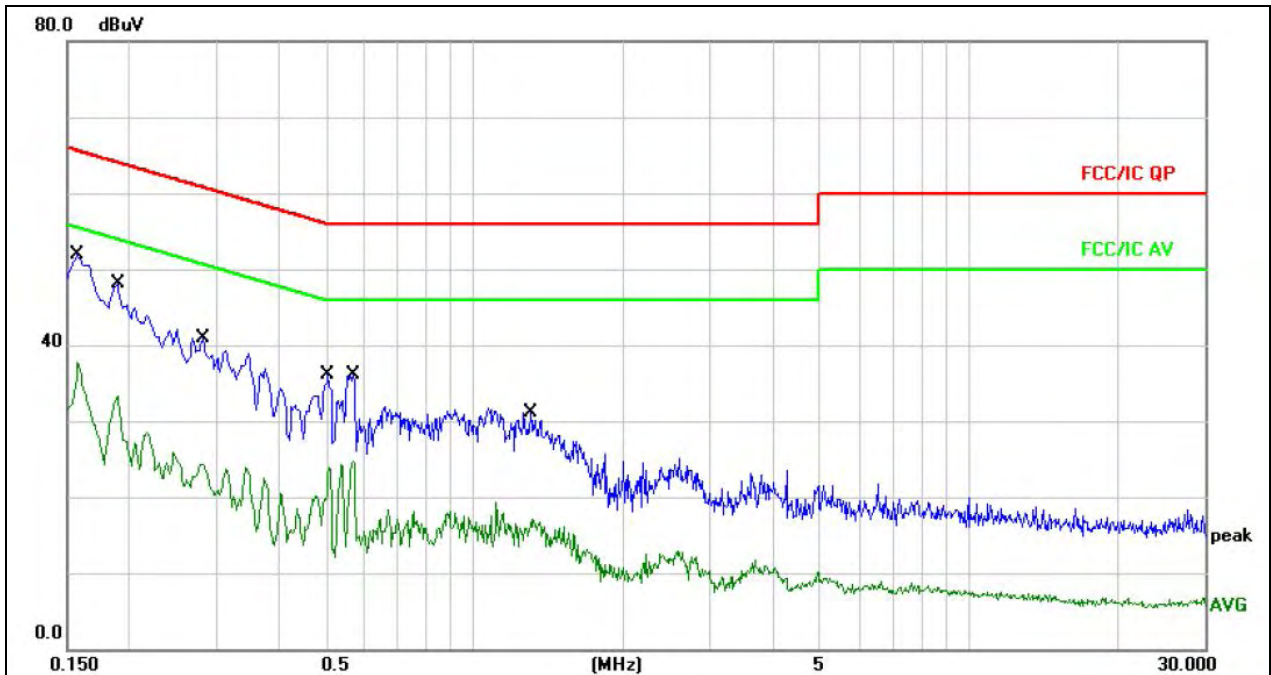
Remark:

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	*	0.1580	39.30	10.05	49.35	65.56	-16.21	QP	
2		0.1660	24.14	10.06	34.20	55.15	-20.95	AVG	
3		0.1980	19.53	10.06	29.59	53.69	-24.10	AVG	
4		0.2060	33.75	10.07	43.82	63.36	-19.54	QP	
5		0.5380	25.96	10.12	36.08	56.00	-19.92	QP	
6		0.5380	11.74	10.12	21.86	46.00	-24.14	AVG	
7		1.0820	20.50	10.17	30.67	56.00	-25.33	QP	
8		1.1100	8.40	10.17	18.57	46.00	-27.43	AVG	
9		2.3220	3.03	10.18	13.21	46.00	-32.79	AVG	
10		2.3500	16.82	10.18	27.00	56.00	-29.00	QP	
11		4.0180	2.18	10.16	12.34	46.00	-33.66	AVG	
12		4.2819	14.07	10.16	24.23	56.00	-31.77	QP	



Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from adapter input AC 120V/60Hz	Test Mode :	Mode 4



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	*	0.1580	41.80	10.05	51.85	65.56	-13.71	QP	
2		0.1580	27.64	10.05	37.69	55.56	-17.87	AVG	
3		0.1900	38.03	10.06	48.09	64.03	-15.94	QP	
4		0.1900	23.28	10.06	33.34	54.03	-20.69	AVG	
5		0.2819	30.78	10.09	40.87	60.76	-19.89	QP	
6		0.2819	14.23	10.09	24.32	50.76	-26.44	AVG	
7		0.5060	25.89	10.12	36.01	56.00	-19.99	QP	
8		0.5060	14.21	10.12	24.33	46.00	-21.67	AVG	
9		0.5700	25.95	10.12	36.07	56.00	-19.93	QP	
10		0.5700	14.54	10.12	24.66	46.00	-21.34	AVG	
11		1.2980	20.89	10.17	31.06	56.00	-24.94	QP	
12		1.2980	6.96	10.17	17.13	46.00	-28.87	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:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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:

- Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).
- Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

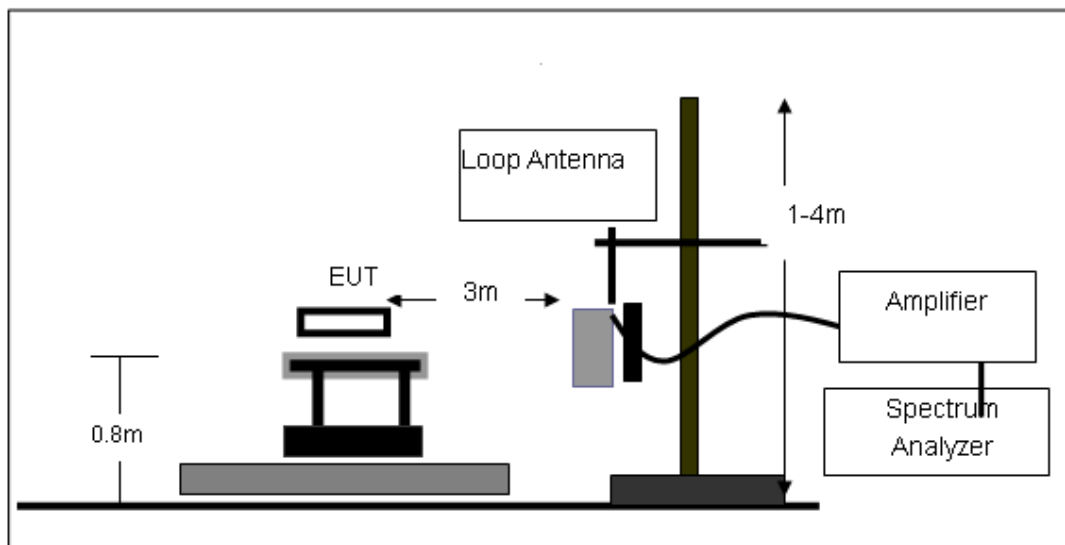
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.2.3 DEVIATION FROM TEST STANDARD

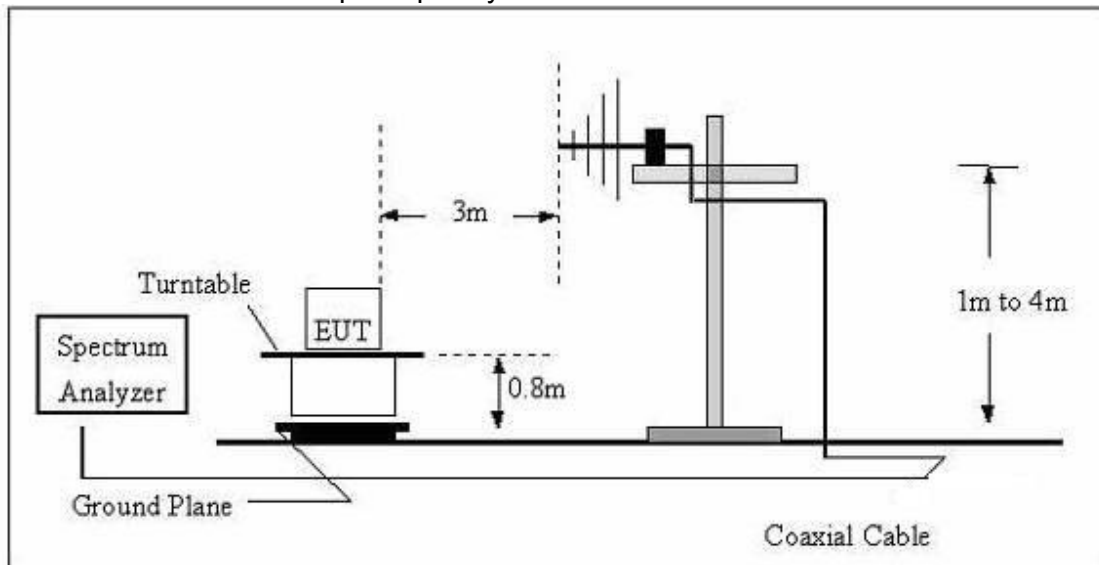
No deviation

### 3.2.4 TEST SETUP

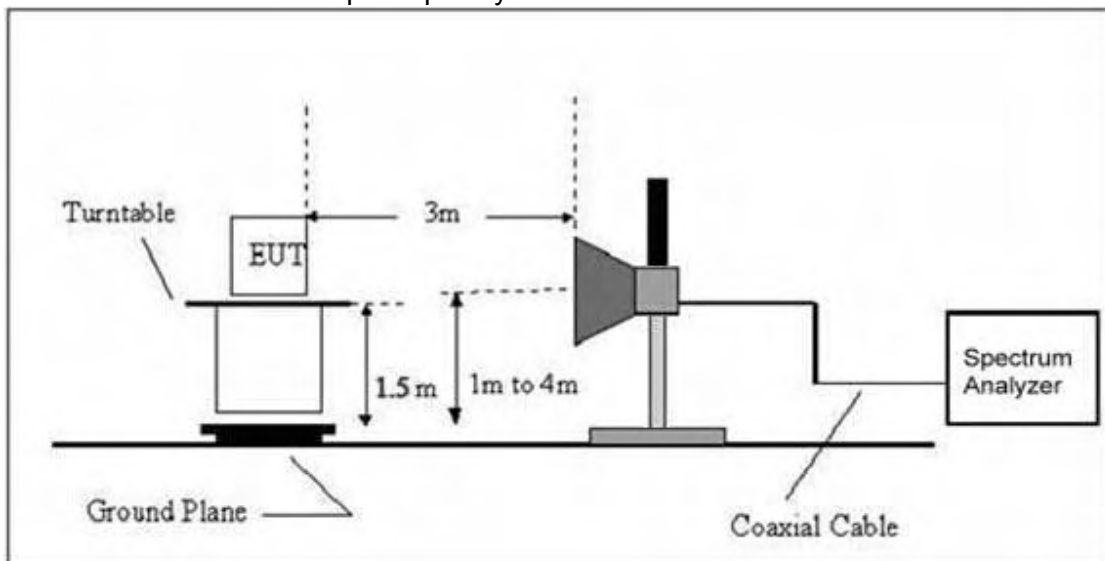
(A) Radiated Emission Test-Up Frequency Below 30MHz



## (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°C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 5V from adapter input AC 120V/60Hz
Test Mode :	Mode 4	Polarization :	--

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State 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.

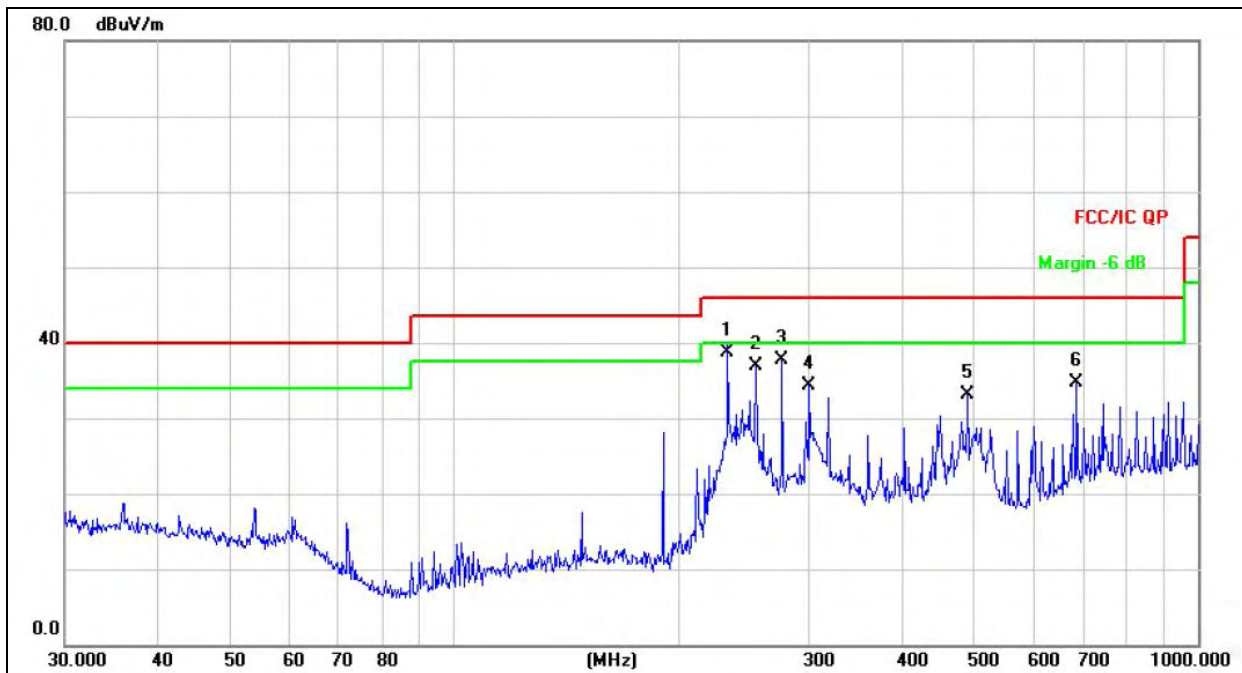
Distance extrapolation factor =  $40 \log(\text{specific distance}/\text{test distance})$ (dB);

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



**3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)**

Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 5V from adapter input AC 120V/60Hz		
Test Mode :	Mode 4		

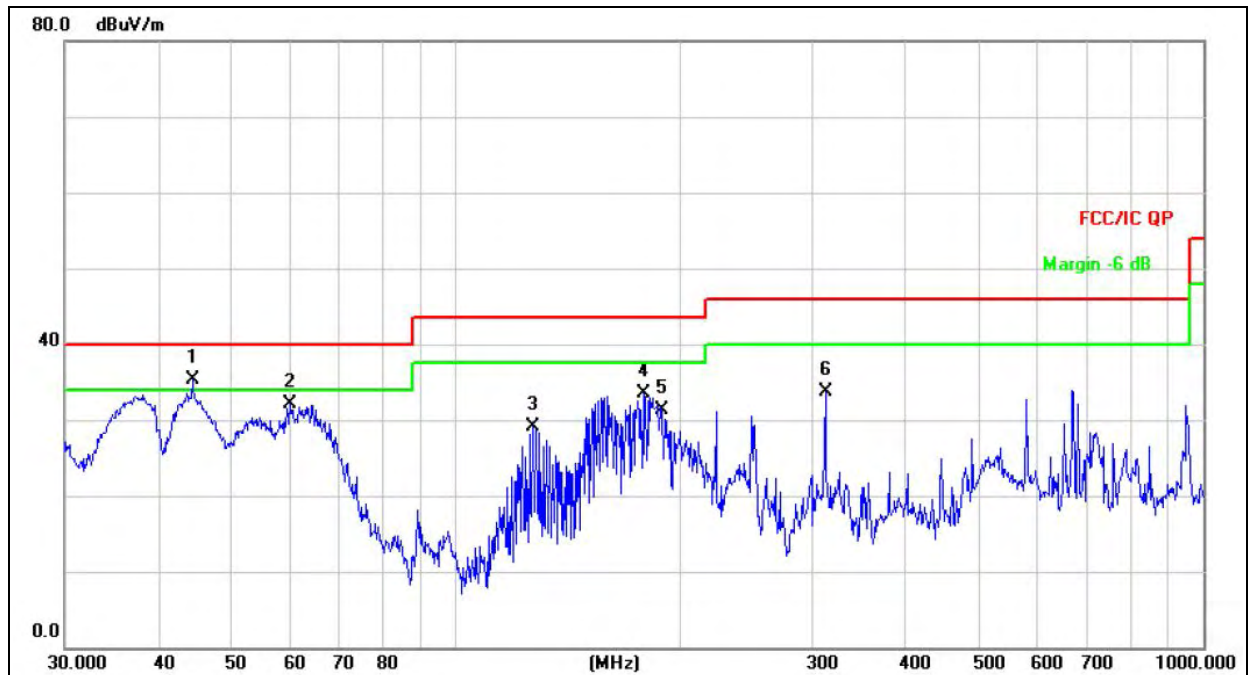


Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	*	233.3487	53.49	-14.87	38.62	46.00	-7.38	QP
2		254.7284	51.00	-14.07	36.93	46.00	-9.07	QP
3		276.1235	50.92	-13.27	37.65	46.00	-8.35	QP
4		300.3672	46.93	-12.57	34.36	46.00	-11.64	QP
5		490.7447	41.32	-8.31	33.01	46.00	-12.99	QP
6		687.1507	39.25	-4.59	34.66	46.00	-11.34	QP



Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 5V from adapter input AC 120V/60Hz		
Test Mode :	Mode 4		



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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	*	44.4308	44.73	-9.40	35.33	40.00	-4.67	QP
2		60.0691	43.55	-11.52	32.03	40.00	-7.97	QP
3		126.7723	43.50	-14.31	29.19	43.50	-14.31	QP
4		178.1327	47.64	-14.17	33.47	43.50	-10.03	QP
5		189.0743	46.82	-15.46	31.36	43.50	-12.14	QP
6		312.1794	45.99	-12.27	33.72	46.00	-12.28	QP



**3.2.8 TEST RESULTS (1GHZ~25GHZ)**

Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
<b>operation frequency:2402</b>									
V	4804.00	59.37	38.53	7.78	23.25	51.87	74.00	-22.13	PK
V	4804.00	45.74	38.53	7.78	23.25	38.24	54.00	-15.76	AV
V	7206.00	57.17	38.33	7.52	24.55	50.91	74.00	-23.09	PK
V	7206.00	44.54	38.33	7.52	24.55	38.28	54.00	-15.72	AV
V	16132.00	49.95	38.75	10.36	26.57	48.13	74.00	-25.87	PK
H	4804.00	60.20	38.53	7.78	23.25	52.70	74.00	-21.30	PK
H	4804.00	45.62	38.53	7.78	23.25	38.12	54.00	-15.88	AV
H	7206.00	56.89	38.33	7.52	24.55	50.63	74.00	-23.37	PK
H	7206.00	44.27	38.33	7.52	24.55	38.01	54.00	-15.99	AV
H	16132.00	49.69	38.75	10.36	26.57	47.87	74.00	-26.13	PK
<b>operation frequency:2440</b>									
V	4880.00	60.30	38.65	7.78	23.61	53.04	74.00	-20.96	PK
V	4880.00	45.78	38.65	7.78	23.61	38.52	54.00	-15.48	AV
V	7320.00	57.67	38.78	7.35	24.78	51.02	74.00	-22.98	PK
V	7320.00	44.59	38.78	7.35	24.78	37.94	54.00	-16.06	AV
V	16132.00	48.20	38.75	10.36	26.57	46.38	74.00	-27.62	PK
H	4880.00	61.36	38.65	7.78	23.61	54.10	74.00	-19.90	PK
H	4880.00	46.50	38.65	7.78	23.61	39.24	54.00	-14.76	AV
H	7320.00	57.38	38.78	7.35	24.78	50.73	74.00	-23.27	PK
H	7320.00	44.71	38.78	7.35	24.78	38.06	54.00	-15.94	AV
H	16132.00	49.86	38.75	10.36	26.57	48.04	74.00	-25.96	PK
<b>operation frequency:2480</b>									
V	4960.00	61.11	38.69	7.78	23.83	54.03	74.00	-19.97	PK
V	4960.00	46.06	38.69	7.78	23.83	38.98	54.00	-15.02	AV
V	7440.00	57.52	38.65	7.22	24.78	50.87	74.00	-23.13	PK
V	7440.00	44.17	38.65	7.22	24.78	37.52	54.00	-16.48	AV
V	16132.00	50.08	38.75	10.36	26.57	48.26	74.00	-25.74	PK
H	4960.00	61.31	38.69	7.78	23.83	54.23	74.00	-19.77	PK
H	4960.00	46.09	38.69	7.78	23.83	39.01	54.00	-14.99	AV
H	7440.00	57.33	38.65	7.22	24.78	50.68	74.00	-23.32	PK
H	7440.00	44.09	38.65	7.22	24.78	37.44	54.00	-16.56	AV
H	16132.00	50.40	38.75	10.36	26.57	48.58	74.00	-25.42	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:

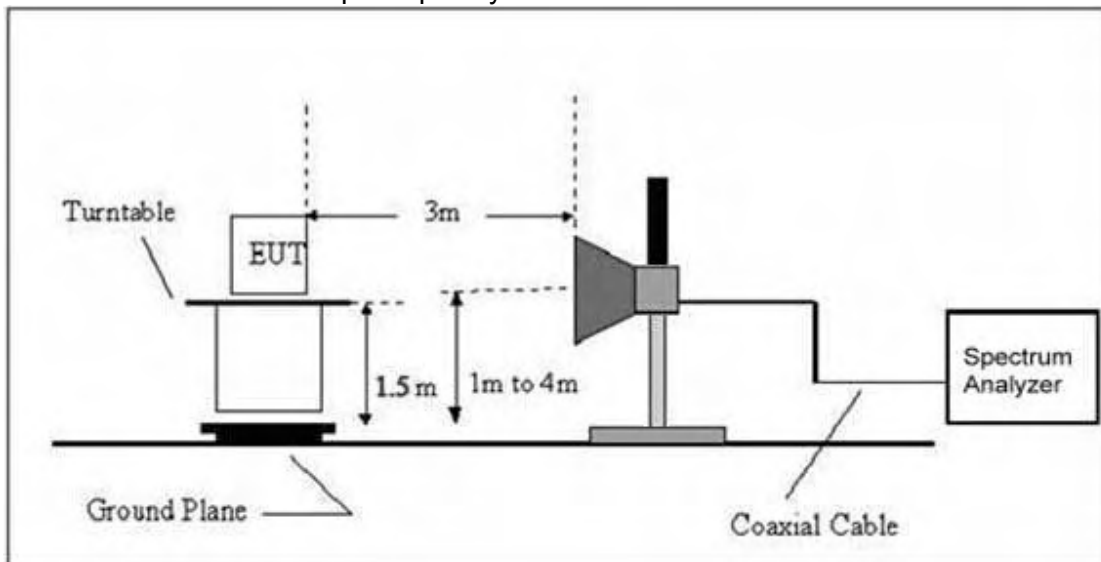
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 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

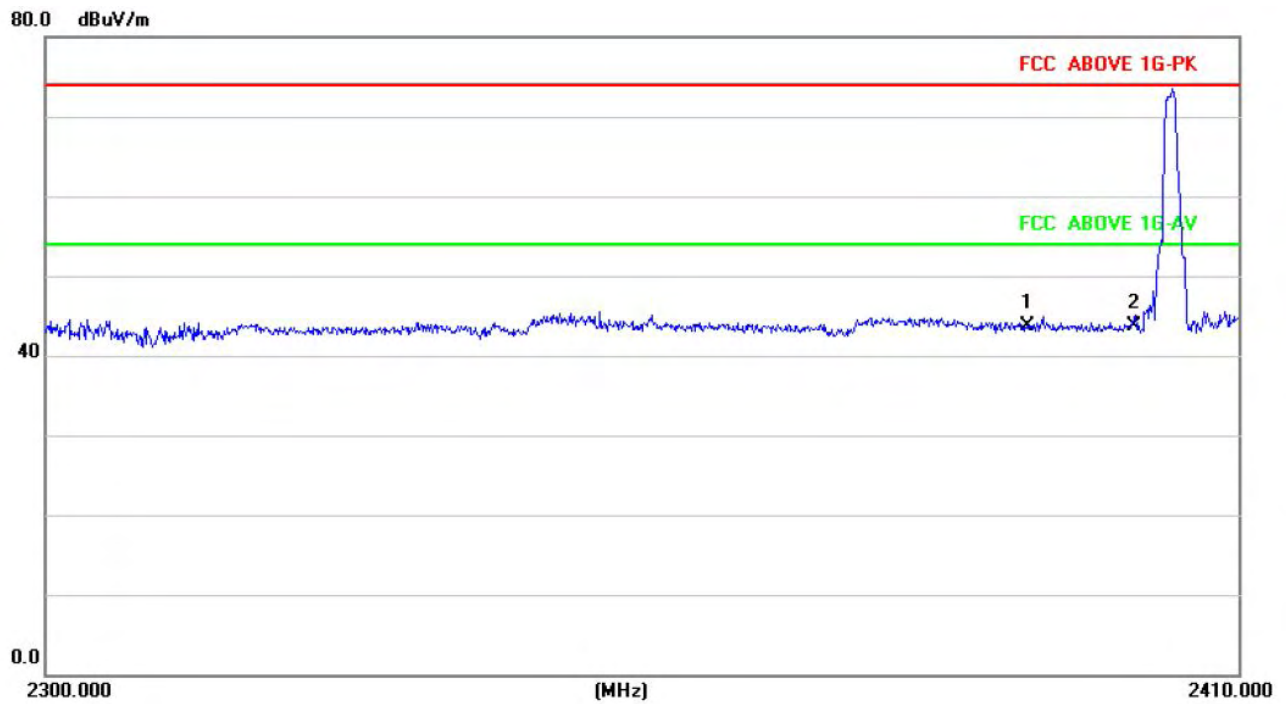
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

The plot only show the Horizontal's average data.



### 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
<b>operation frequency:2402</b>									
V	2390.00	67.43	38.06	7.42	20.15	56.94	74.00	-17.06	PK
V	2390.00	56.02	38.06	7.42	20.15	45.53	54.00	-8.47	AV
V	2400.00	67.64	38.06	7.42	20.15	57.15	74.00	-16.85	PK
V	2400.00	55.59	38.06	7.42	20.15	45.10	54.00	-8.90	AV
H	2390.00	67.72	38.06	7.42	20.15	57.23	74.00	-16.77	PK
H	2390.00	56.05	38.06	7.42	20.15	45.56	54.00	-8.44	AV
H	2400.00	67.59	38.06	7.42	20.15	57.10	74.00	-16.90	PK
H	2400.00	55.99	38.06	7.42	20.15	45.50	54.00	-8.50	AV

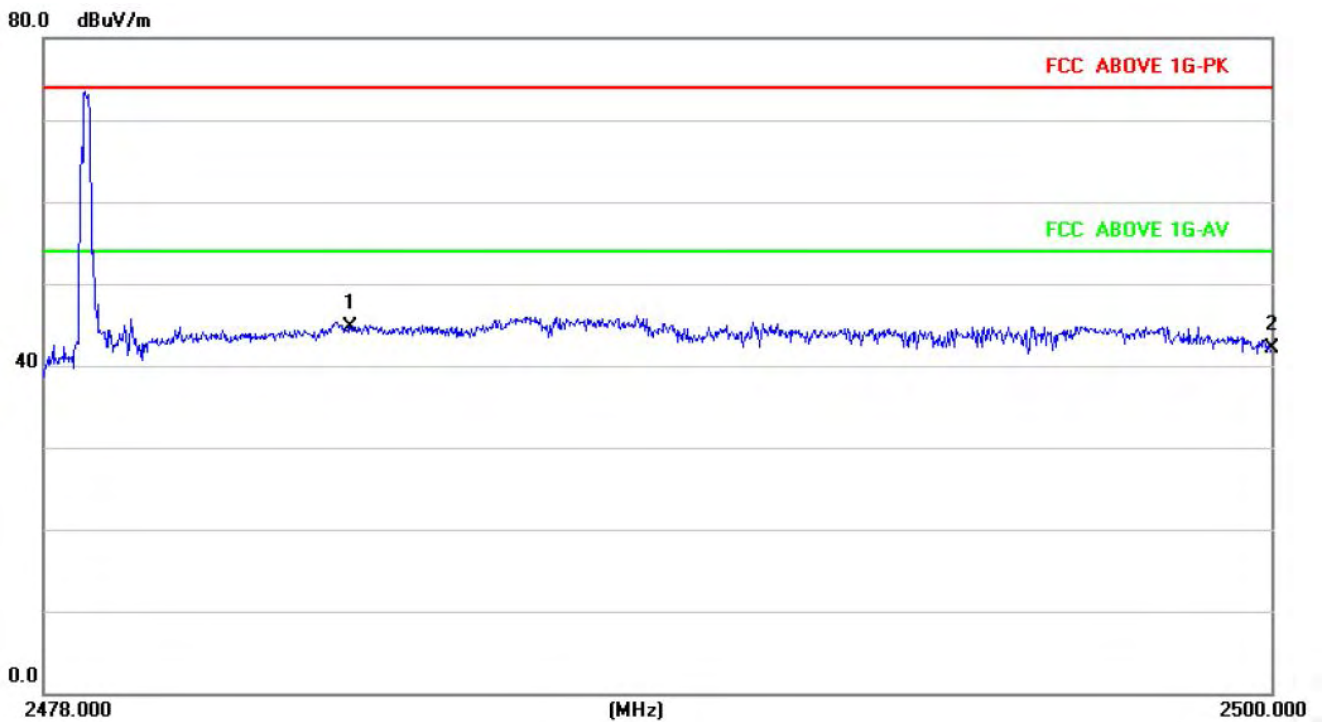




Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
<b>operation frequency:2480</b>									
V	2483.50	67.64	38.17	7.42	20.51	57.40	74.00	-16.60	PK
V	2483.50	56.26	38.17	7.42	20.51	46.02	54.00	-7.98	AV
V	2500.00	67.58	38.20	7.45	20.54	57.37	74.00	-16.63	PK
V	2500.00	55.70	38.20	7.45	20.54	45.49	54.00	-8.51	AV
H	2483.50	67.76	38.17	7.42	20.51	57.52	74.00	-16.48	PK
H	2483.50	56.30	38.17	7.42	20.51	46.06	54.00	-7.94	AV
H	2500.00	67.38	38.20	7.45	20.54	57.17	74.00	-16.83	PK
H	2500.00	56.55	38.20	7.45	20.54	46.34	54.00	-7.66	AV

**Remark:**

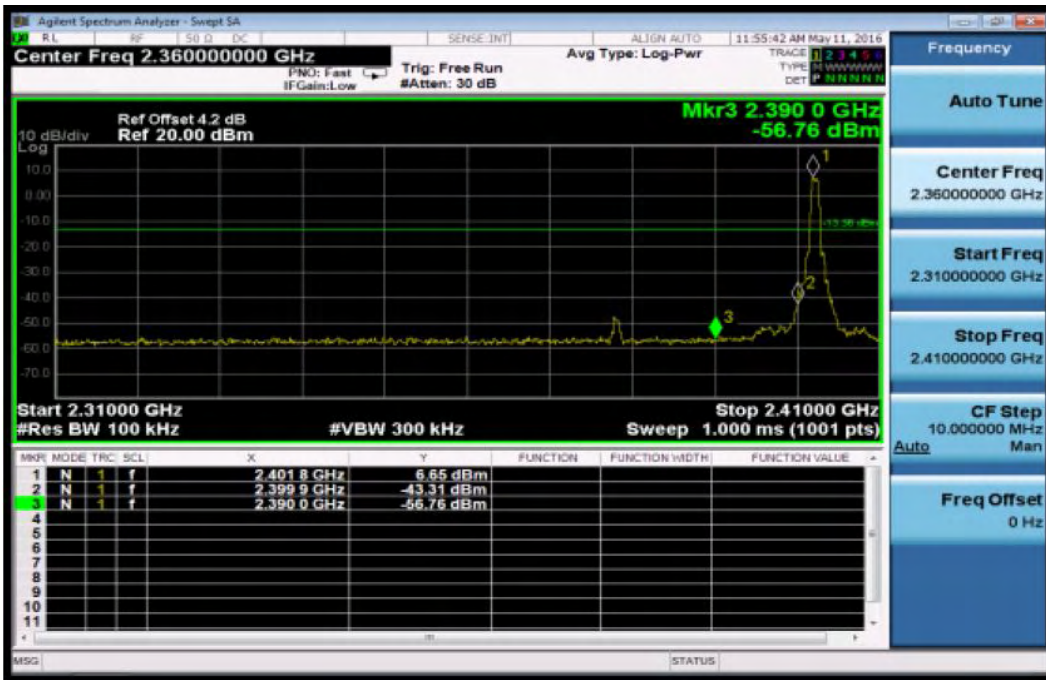
1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.







For conducted





### 4. POWER SPECTRAL DENSITY TEST

#### 4.1 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

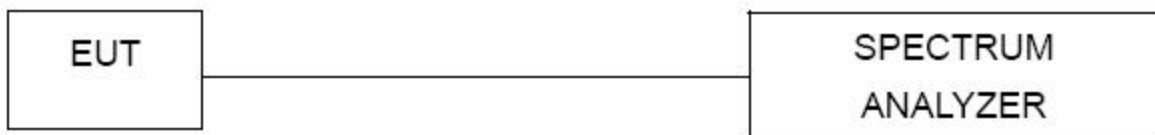
#### 4.1.1 TEST PROCEDURE

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:  $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$ .
4. Set the VBW  $\geq 3 \times \text{RBW}$ .
5. Detector = RMS.
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.

#### 4.1.2 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 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

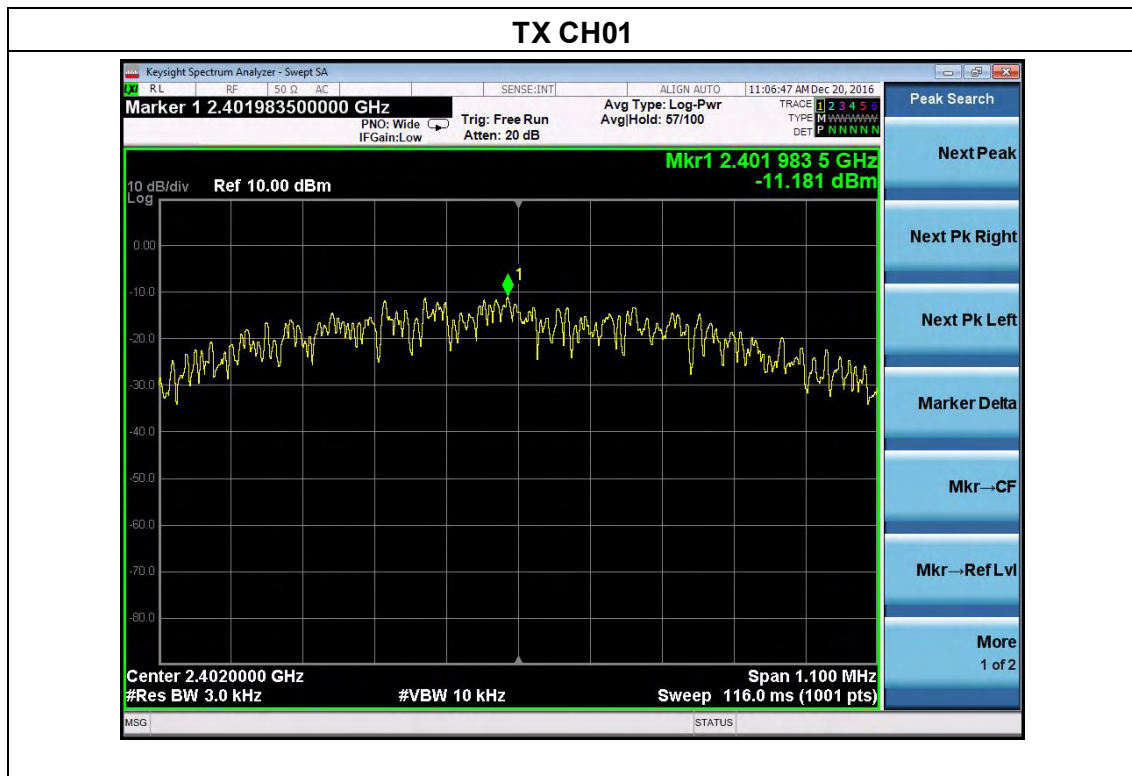
Note: Power Spectral Density(dBm)=Reading+Cable Loss



4.1.5 TEST RESULTS

Temperature :	25°C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V from battery
Test Mode :	TX Mode		

Frequency	Power Spectral Density(dBm)	Limit (dBm)	Result
2412 MHz	-11.18	8	PASS
2437 MHz	-9.72	8	PASS
2462 MHz	-8.53	8	PASS

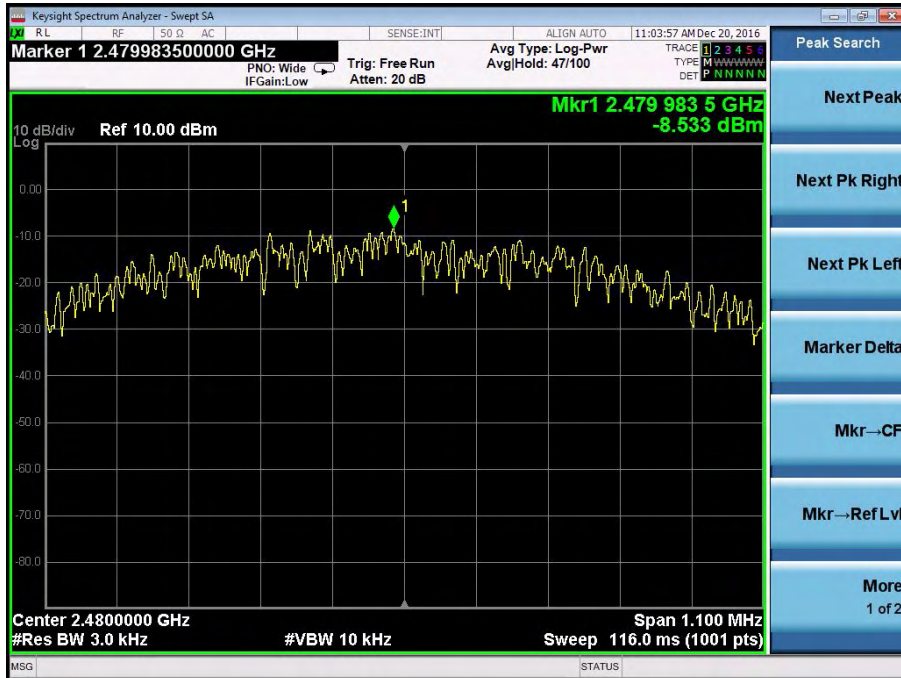




### TX CH06



### TX CH11





## 5. BANDWIDTH TEST

### 5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.249) , Subpart C		
Section	Test Item	Limit
15.247	Bandwidth	>= 500KHz (6dB bandwidth)

#### 5.1.1 TEST PROCEDURE

1. Set RBW = 30 kHz. 2. Set the video bandwidth (VBW)  $\geq 3 \times$  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 6 dB relative to the maximum level measured in the fundamental emission.

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

#### 5.1.5 TEST RESULTS

Temperature :	25°C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V from battery
Test Mode :	TX Mode /CH01, CH20, CH40		

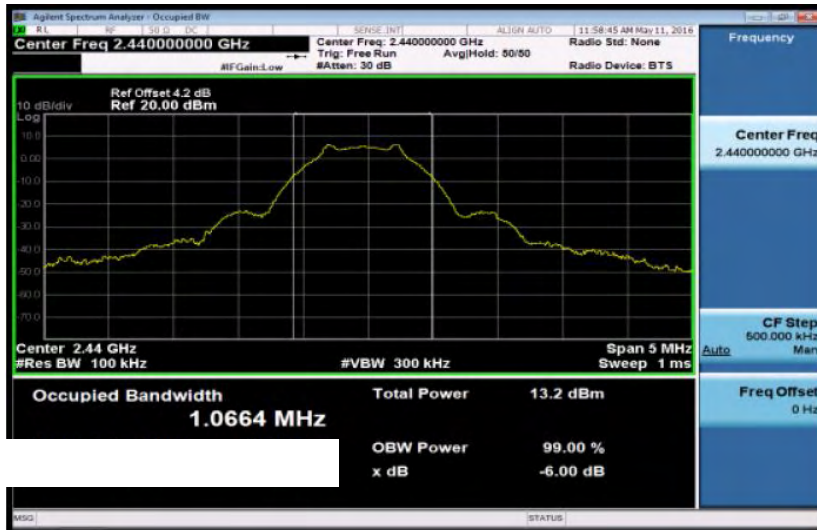
Frequency (MHz)	6dB bandwidth(KHz)	Limit(KHz)	Result
2402	686.9	>= 500KHz	Pass
2440	700.5	>= 500KHz	Pass
2480	720.4	>= 500KHz	Pass



### TX CH 01



### TX CH 20



### TX CH 40





## 6. OUTPUT POWER TEST

### 6.1 APPLIED PROCEDURES / LIMIT

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

#### 6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

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

**6.1.5 TEST RESULTS**

Temperature :	25°C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V from battery

	Frequency	Maximum Conducted Output Power(AV)	LIMIT
	(MHz)	(dBm)	dBm
BT	2402	-4.00	30
	2440	-4.00	30
	2480	-4.00	30





## **7. ANTENNA REQUIREMENT**

### **7.1 STANDARD REQUIREMENT**

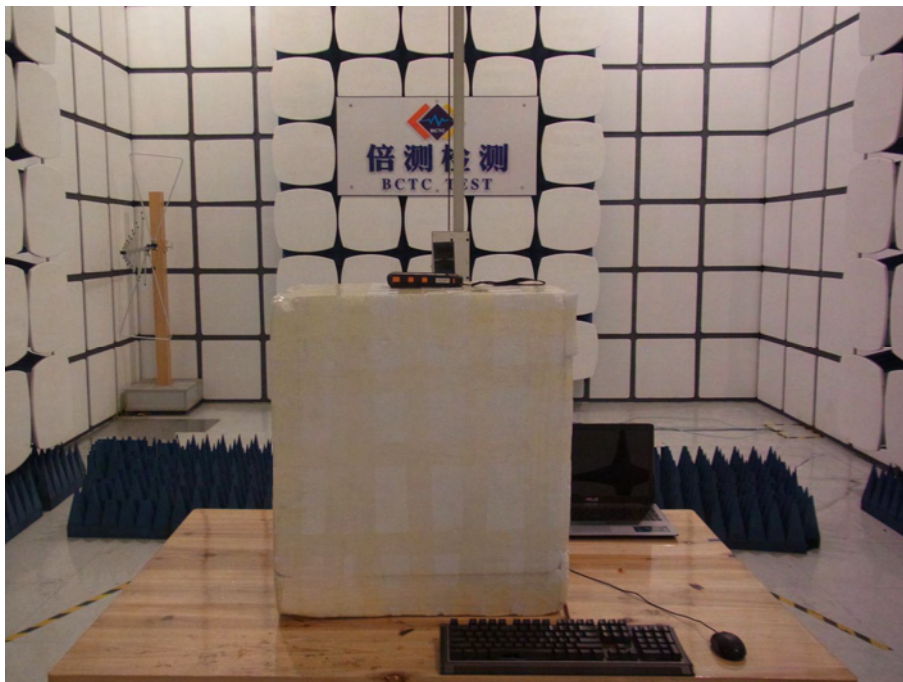
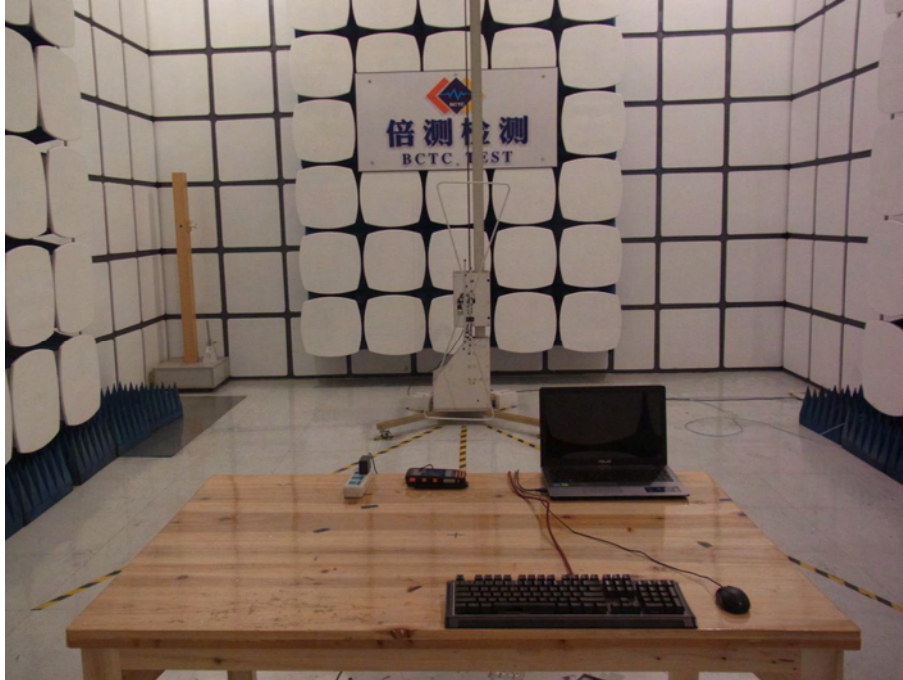
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

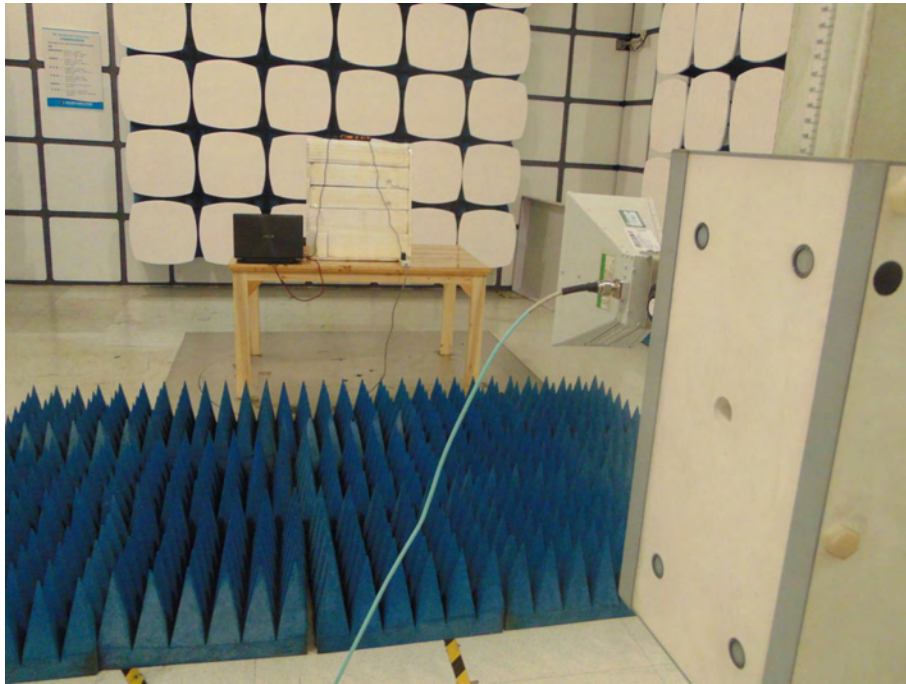
### **7.2 EUT ANTENNA**

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

## 8. TEST SEUUP PHOTO

### Radiated Measurement Photos





### Conducted Measurement Photos



### 9. EUT PHOTO







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