



# FCC Part 15C Test Report

## FCC ID: 2ANRXUPAIR1

Product Name:	UPAIR
Trademark:	N/A
Model Name :	UPAIR ONE PLUS
Prepared For :	Shenzhen Jitian Innovation Technology Co., Ltd.
Address :	Room N&L 8th Floor, Tower A, TCL Building NO.6, Gaoxin South 1st Ave, Nanshan District, Shenzhen, China
Prepared By :	Shenzhen BCTC Technology Co., Ltd.
Address :	No.101, Yousong Road, Longhua New District, Shenzhen, China
Test Date:	May 27, 2017 – Jun. 20, 2017
Date of Report :	Jun. 20, 2017
Report No.:	BCTC-LH170803192E



### TEST RESULT CERTIFICATION

**Applicant's name** ..... : Shenzhen Jitian Innovation Technology Co., Ltd.

**Address** ..... : Room N&L 8th Floor, Tower A, TCL Building NO.6, Gaoxin South 1st Ave, Nanshan District, Shenzhen, China

**Manufacture's Name** ..... : Shenzhen Jitian Innovation Technology Co., Ltd.

**Address** ..... : Room N&L 8th Floor, Tower A, TCL Building NO.6, Gaoxin South 1st Ave, Nanshan District, Shenzhen, China

#### Product description

**Product name**..... : UPAIR

**Trademark**..... : N/A

**Model and/or type reference** : UPAIR ONE PLUS

**Standards** ..... : FCC Part15.247  
ANSI C63.10-2013

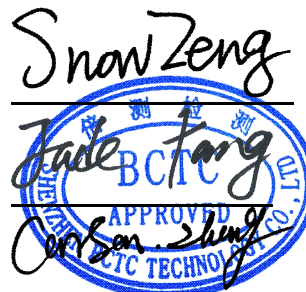
This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Prepared by(Engineer): Snow Zeng

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 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.247(a)(1)	Hopping Channel Separation	PASS	
15.247(b)(1)	Peak Output Power	PASS	
15.247(c)	Radiated Spurious Emission	PASS	
15.247(a)(iii)	Number of Hopping Frequency	PASS	
15.247(a)(iii)	Dwell Time	PASS	
15.247(a)(1)	Bandwidth	PASS	
15.205	Band 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	$\pm 1.38\text{dB}$
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	UPAIR	
Trade Name	N/A	
Model Name	UPAIR ONE PLUS	
Model Difference	N/A	
Product Description	The EUT is a UPAIR	
	Operation Frequency:	2406~2475 MHz
	Modulation Type:	GFSK
	Number Of Channel	70 CH
	Antenna type:	external antenna*2
	Antenna Gain (dBi)	2.0dBi
	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 12.6V from battery	
Adapter	--	
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	2406	27	2432	54	2459
02	2407	28	2433	55	2460
03	2408	29	2434	56	2461
~	~	~	~	~	~
11	2416	35	2440	68	2473
12	2417	36	2441	69	2474
13	2418	37	2442	70	2475
~	~	~	~	~	~
24	2429	51	2456		
25	2430	52	2457		
26	2431	53	2458		

**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.

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH35
Mode 3	CH70
Mode 4	Link Mode

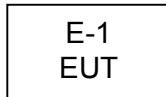
Note:

(1) The measurements are performed at the highest, middle, lowest available channels.



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

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	UPAIR	N/A	UPAIR ONE PLUS	N/A	EUT

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 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	2016.08.29	2017.08.28
8	Amplifier	SCHWARZBECK	BBV9718	9718-270	2016.08.29	2017.08.28
9	Amplifier	SCHWARZBECK	BBV9743	9743-119	2016.08.29	2017.08.28
10	Loop Antenna	ARA	PLM600D MI-BTH0730/ B	1029	2016.07.06	2017.07.05
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 RADIATED EMISSION MEASUREMENT

##### 3.1.1 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

### 3.1.2 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 chamber. 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 to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

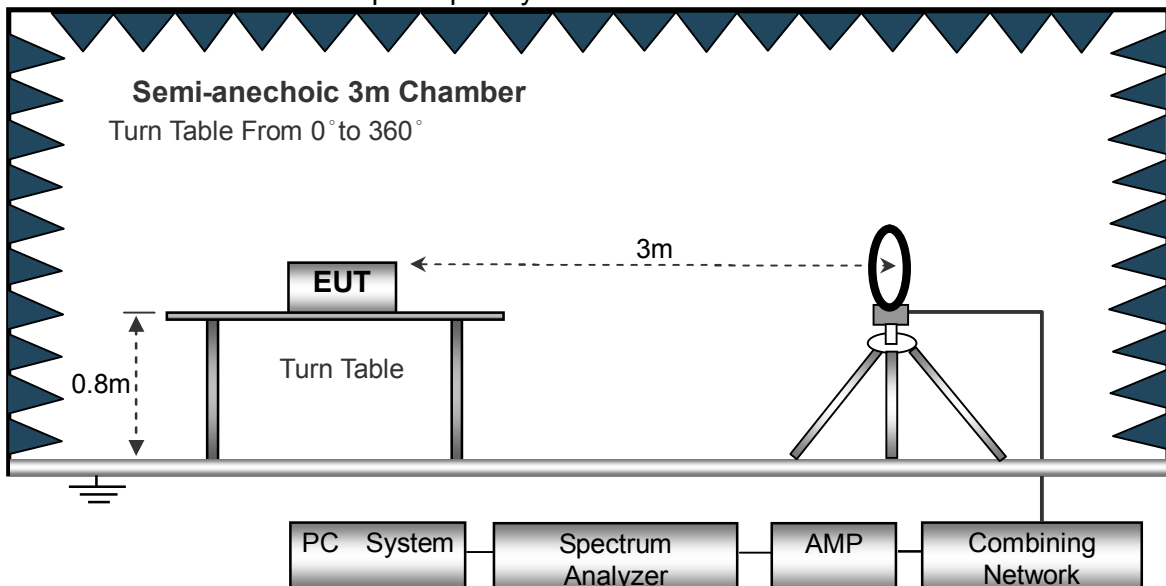
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.1.3 DEVIATION FROM TEST STANDARD

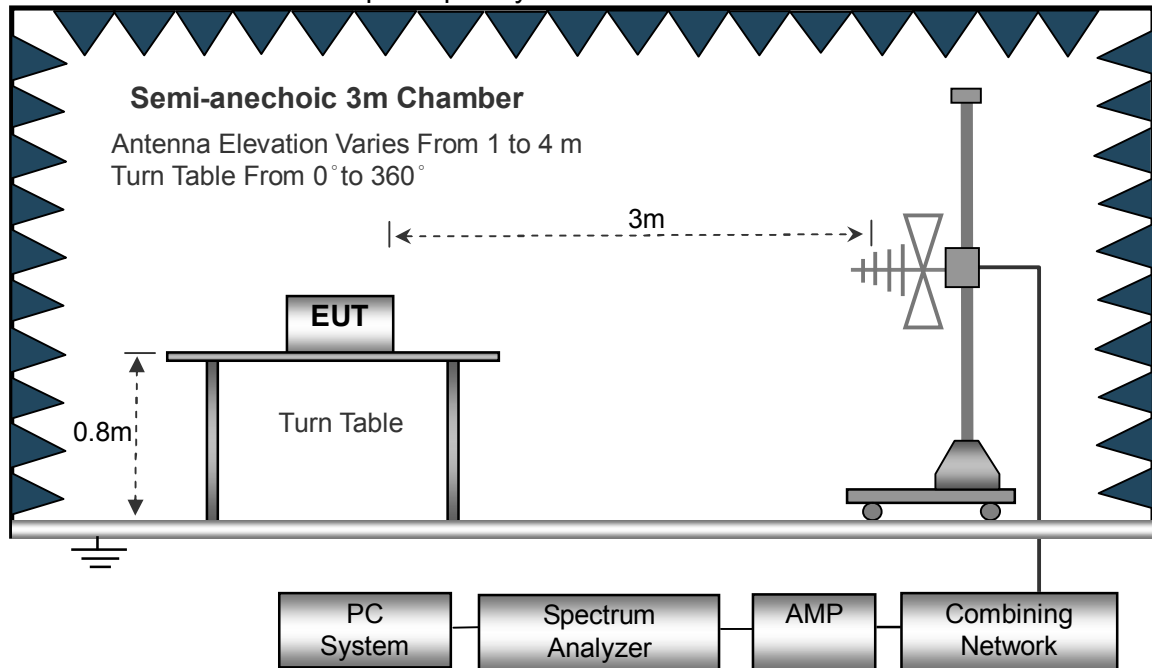
No deviation

### 3.1.4 TEST SETUP

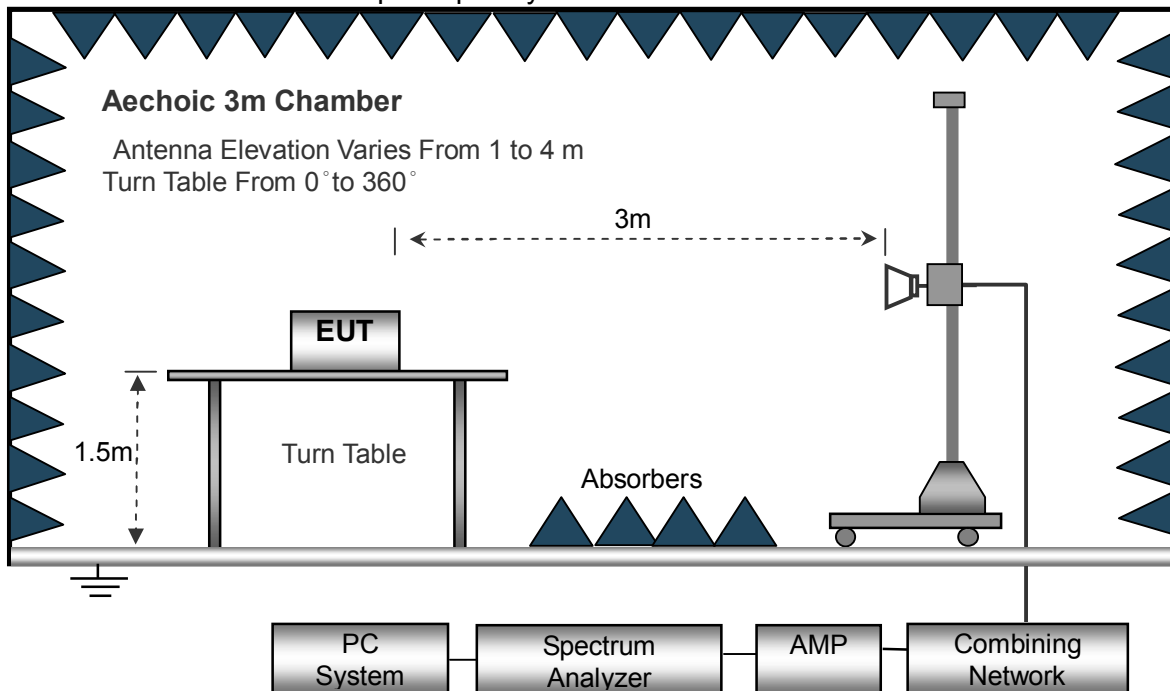
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



**3.1.5 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.

This device only the SISO mode was supported. And basing on the pre-scan, only the data for worst case configuration (ant 1 active) was listed below.

**3.1.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)**

Temperature:	20°C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 12.6V
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.

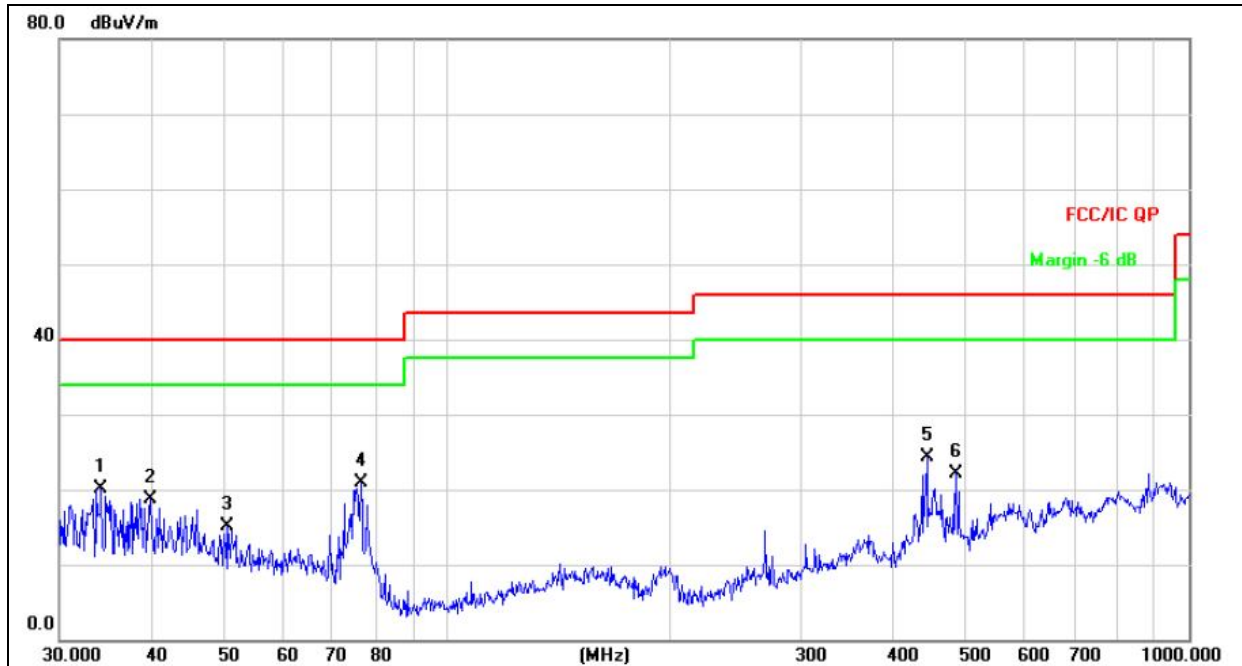
Distance extrapolation factor =  $40 \log (\text{specific distance}/\text{test distance})(\text{dB})$ ;

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



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

Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 12.6V		
Test Mode :	Mode 4		

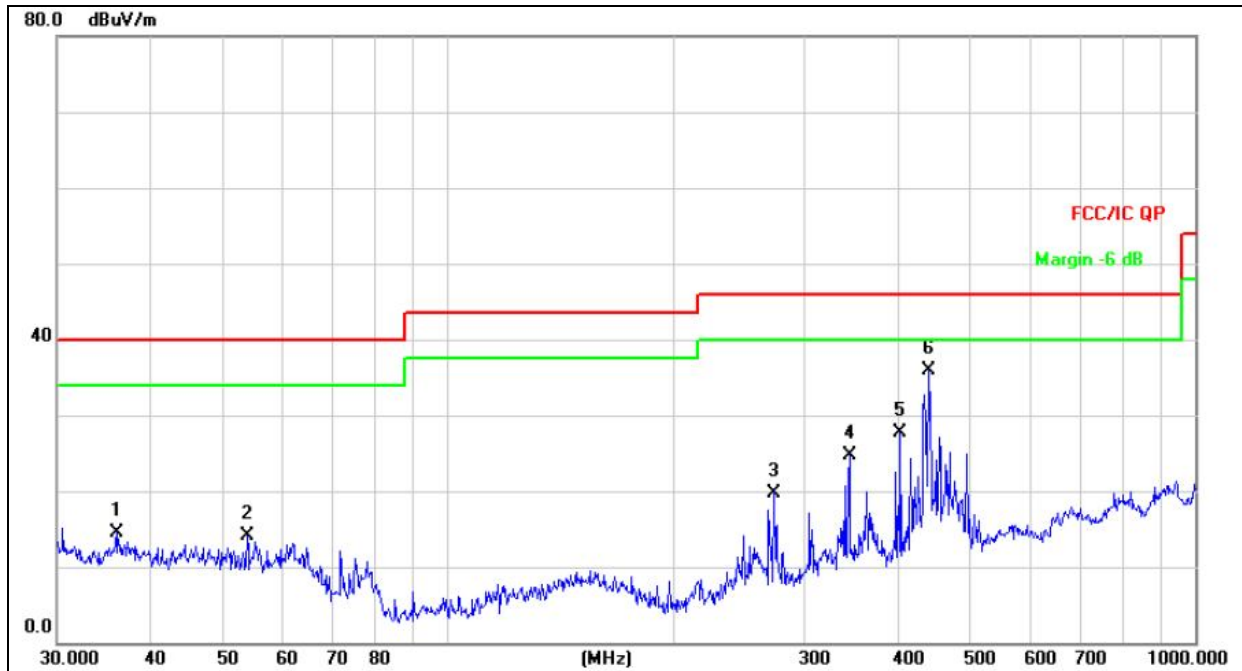


Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		34.1561	28.59	-8.45	20.14	40.00	-19.86	QP
2		39.7146	27.58	-8.83	18.75	40.00	-21.25	QP
3		50.5860	25.57	-10.39	15.18	40.00	-24.82	QP
4	*	76.5121	37.74	-16.85	20.89	40.00	-19.11	QP
5		443.2943	33.49	-9.13	24.36	46.00	-21.64	QP
6		485.6093	30.52	-8.36	22.16	46.00	-23.84	QP



Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 12.6V		
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		36.0007	23.19	-8.59	14.60	40.00	-25.40	QP
2		53.8818	24.99	-10.93	14.06	40.00	-25.94	QP
3		273.2341	33.18	-13.38	19.80	46.00	-26.20	QP
4		344.3855	36.23	-11.49	24.74	46.00	-21.26	QP
5		403.2500	37.76	-10.11	27.65	46.00	-18.35	QP
6	*	440.1963	45.19	-9.19	36.00	46.00	-10.00	QP



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

GFSK

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:2406</b>									
V	4812.00	62.48	38.06	7.78	23.25	55.45	74.00	-18.55	PK
V	4812.00	47.09	38.06	7.78	23.25	40.06	54.00	-13.94	AV
V	7218.00	60.89	38.45	8.13	23.71	54.28	74.00	-19.72	PK
V	7218.00	44.79	38.45	8.13	23.71	38.18	54.00	-15.82	AV
V	16132.00	54.95	38.75	10.36	26.57	53.13	74.00	-20.87	PK
H	4812.00	62.68	38.06	7.78	23.25	55.65	74.00	-18.35	PK
H	4812.00	46.93	38.06	7.78	23.25	39.90	54.00	-14.10	AV
H	7218.00	62.33	38.45	8.13	23.71	55.72	74.00	-18.28	PK
H	7218.00	45.54	38.45	8.13	23.71	38.93	54.00	-15.07	AV
H	16132.00	56.20	38.75	10.36	26.57	54.38	74.00	-19.62	PK
<b>operation frequency:2440</b>									
V	4880.00	62.75	38.11	7.82	23.61	56.07	74.00	-17.93	PK
V	4880.00	46.59	38.11	7.82	23.61	39.91	54.00	-14.09	AV
V	7320.00	60.74	38.51	8.28	23.96	54.47	74.00	-19.53	PK
V	7320.00	44.44	38.51	8.28	23.93	38.14	54.00	-15.86	AV
V	16132.00	54.99	38.75	10.36	26.57	53.17	74.00	-20.83	PK
H	4880.00	62.94	38.11	7.82	23.61	56.26	74.00	-17.74	PK
H	4880.00	46.90	38.11	7.82	23.61	40.22	54.00	-13.78	AV
H	7320.00	62.04	38.51	8.28	23.96	55.77	74.00	-18.23	PK
H	7320.00	45.43	38.51	8.28	23.93	39.13	54.00	-14.87	AV
H	16132.00	56.24	38.75	10.36	26.57	54.42	74.00	-19.58	PK
<b>operation frequency:2475</b>									
V	4950.00	63.52	38.26	7.96	23.83	57.05	74.00	-16.95	PK
V	4950.00	47.22	38.26	7.96	23.83	40.75	54.00	-13.25	AV
V	7425.00	60.52	38.72	8.31	24.03	54.14	74.00	-19.86	PK
V	7425.00	44.32	38.72	8.31	24.03	37.94	54.00	-16.06	AV
V	16132.00	54.98	38.75	10.36	26.57	53.16	74.00	-20.84	PK
H	4950.00	63.71	38.26	7.96	23.83	57.24	74.00	-16.76	PK
H	4950.00	47.13	38.26	7.96	23.83	40.66	54.00	-13.34	AV
H	7425.00	63.42	38.72	8.31	24.03	57.04	74.00	-16.96	PK
H	7425.00	45.92	38.72	8.31	24.03	39.54	54.00	-14.46	AV
H	16132.00	56.13	38.75	10.36	26.57	54.31	74.00	-19.69	PK

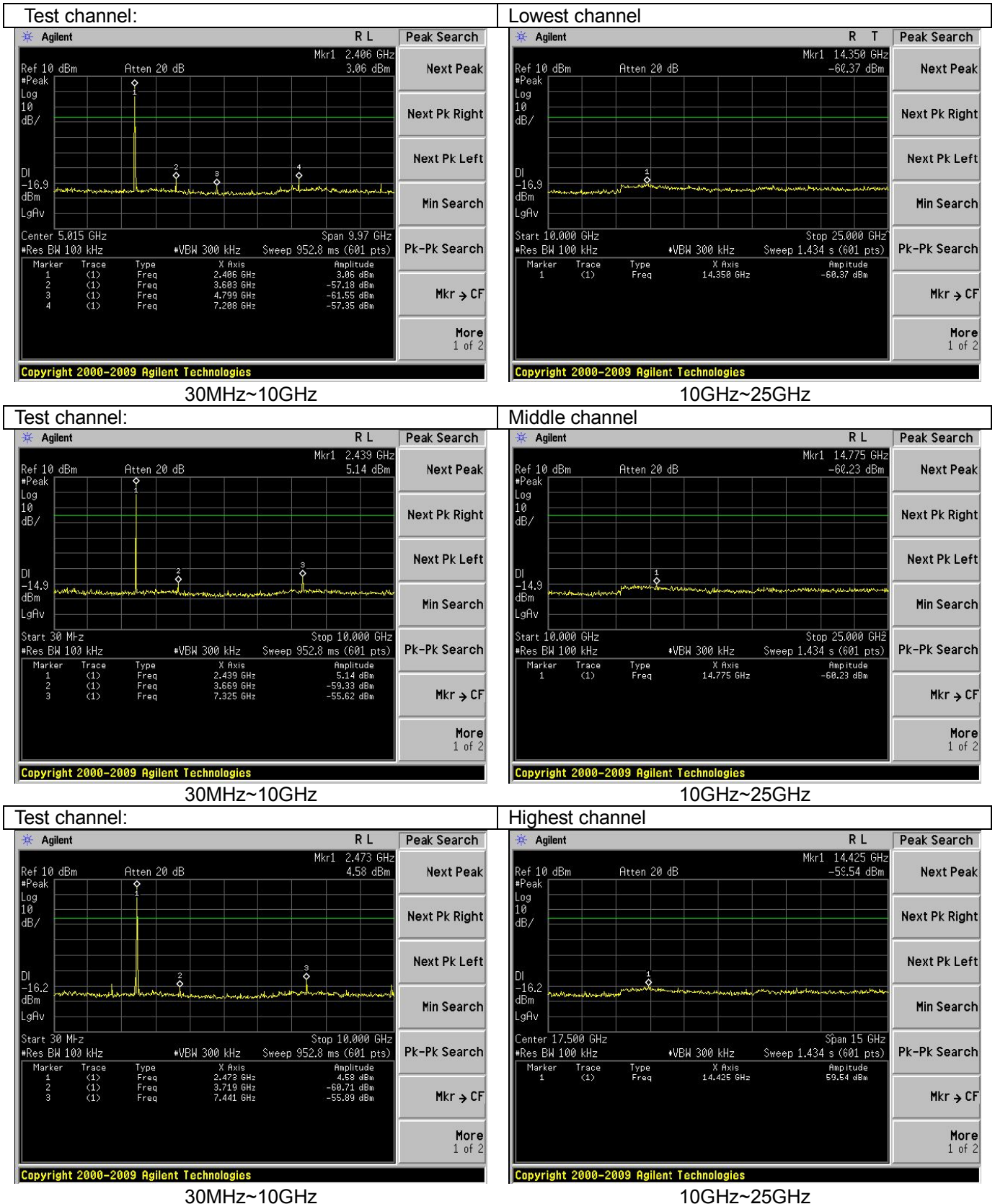
**Remark:**

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.





For Conducted





### 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:

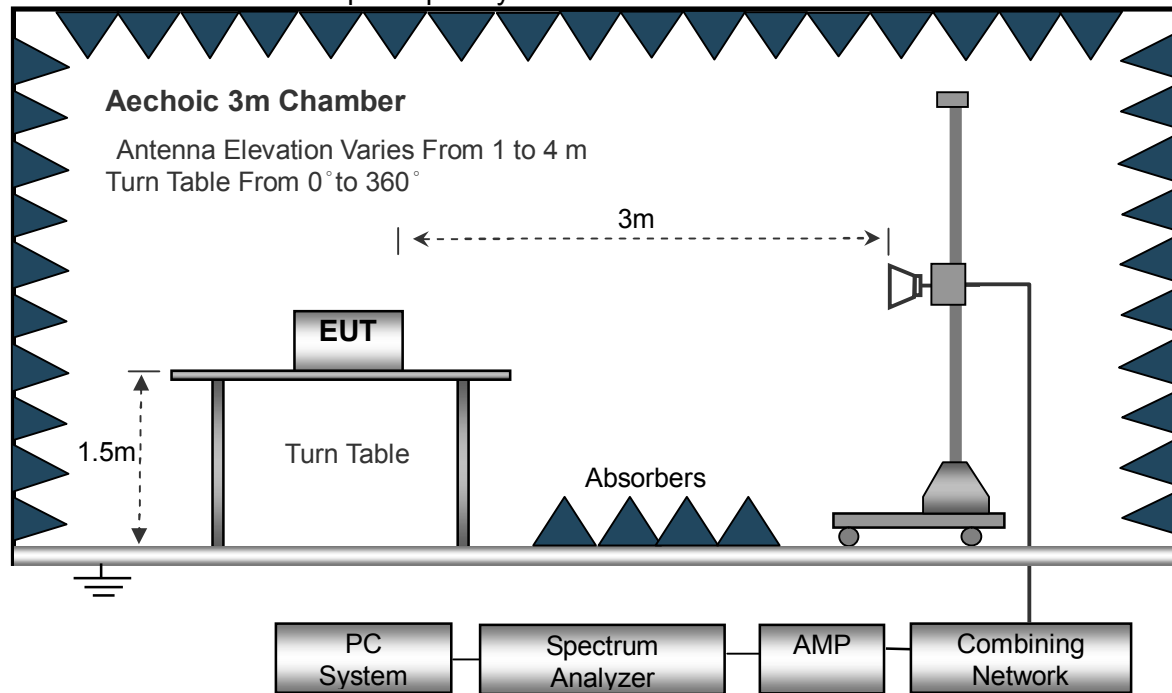
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 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**

GFSK

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:2406</b>									
V	2390.00	66.50	38.06	7.42	20.15	56.01	74.00	-17.99	PK
V	2390.00	55.23	38.06	7.42	20.15	44.74	54.00	-9.26	AV
V	2400.00	66.71	38.06	7.42	20.15	56.22	74.00	-17.78	PK
V	2400.00	54.82	38.06	7.42	20.15	44.33	54.00	-9.67	AV
H	2390.00	66.79	38.06	7.42	20.15	56.30	74.00	-17.70	PK
H	2390.00	55.26	38.06	7.42	20.15	44.77	54.00	-9.23	AV
H	2400.00	66.66	38.06	7.42	20.15	56.17	74.00	-17.83	PK
H	2400.00	56.30	38.06	7.42	20.15	45.81	54.00	-8.19	AV

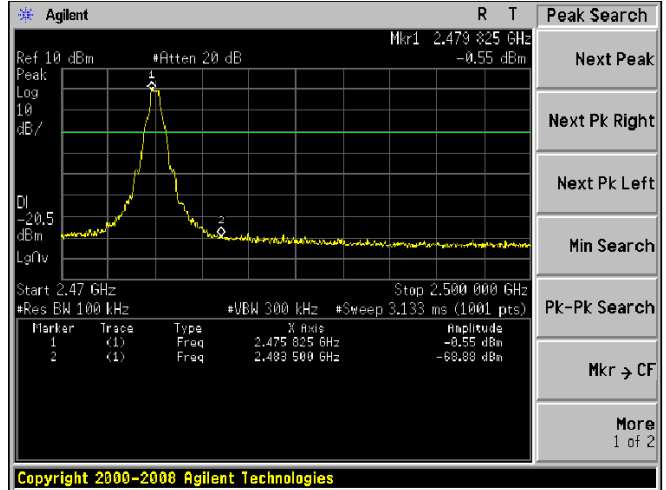
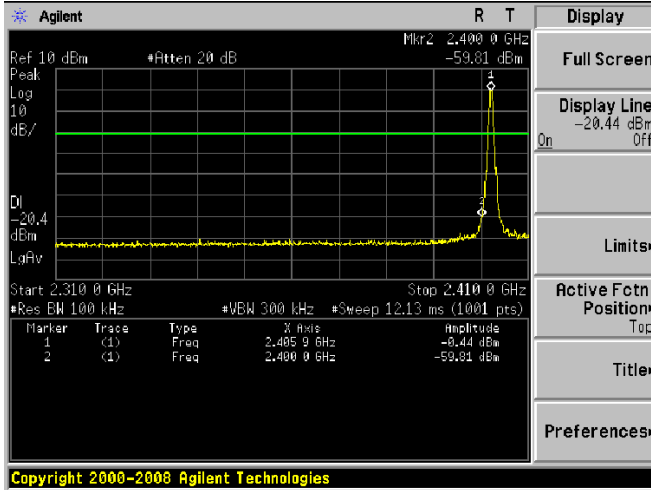
Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
<b>operation frequency:2475</b>									
V	2483.50	66.71	38.17	7.42	20.51	56.47	74.00	-17.53	PK
V	2483.50	55.47	38.17	7.42	20.51	45.23	54.00	-8.77	AV
V	2500.00	66.65	38.20	7.45	20.54	56.44	74.00	-17.56	PK
V	2500.00	54.93	38.20	7.45	20.54	44.72	54.00	-9.28	AV
H	2483.50	66.83	38.17	7.42	20.51	56.59	74.00	-17.41	PK
H	2483.50	55.51	38.17	7.42	20.51	45.27	54.00	-8.73	AV
H	2500.00	66.45	38.20	7.45	20.54	56.24	74.00	-17.76	PK
H	2500.00	56.88	38.20	7.45	20.54	46.67	54.00	-7.33	AV

**Remark:**

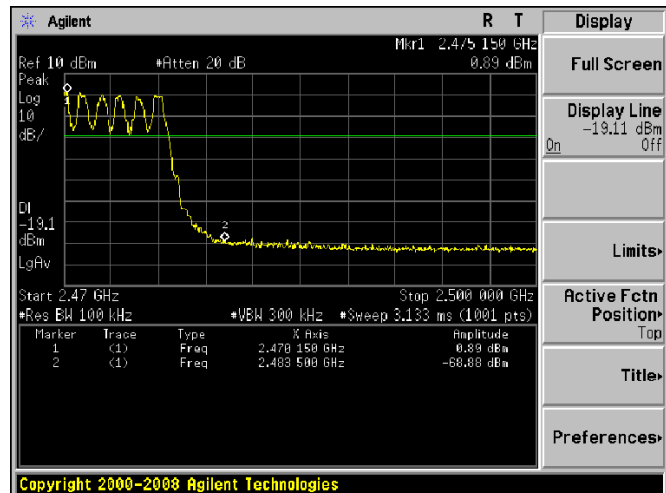
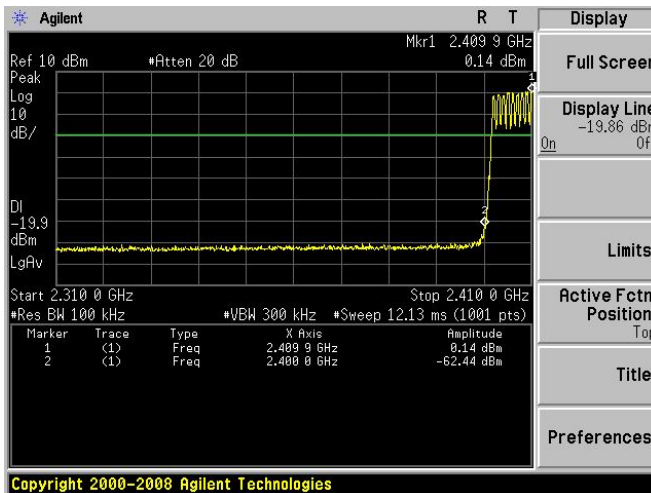
1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



For Conducted  
Unhopping  
GFSK



Hopping Mode





#### 4. BANDWIDTH TEST

##### 4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C	
Section	Test Item
15.247(a)(2)	Bandwidth

##### 4.1.1 TEST PROCEDURE

1. Set RBW = 30 kHz.
2. Set the video bandwidth (VBW)  $\geq$ 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.

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



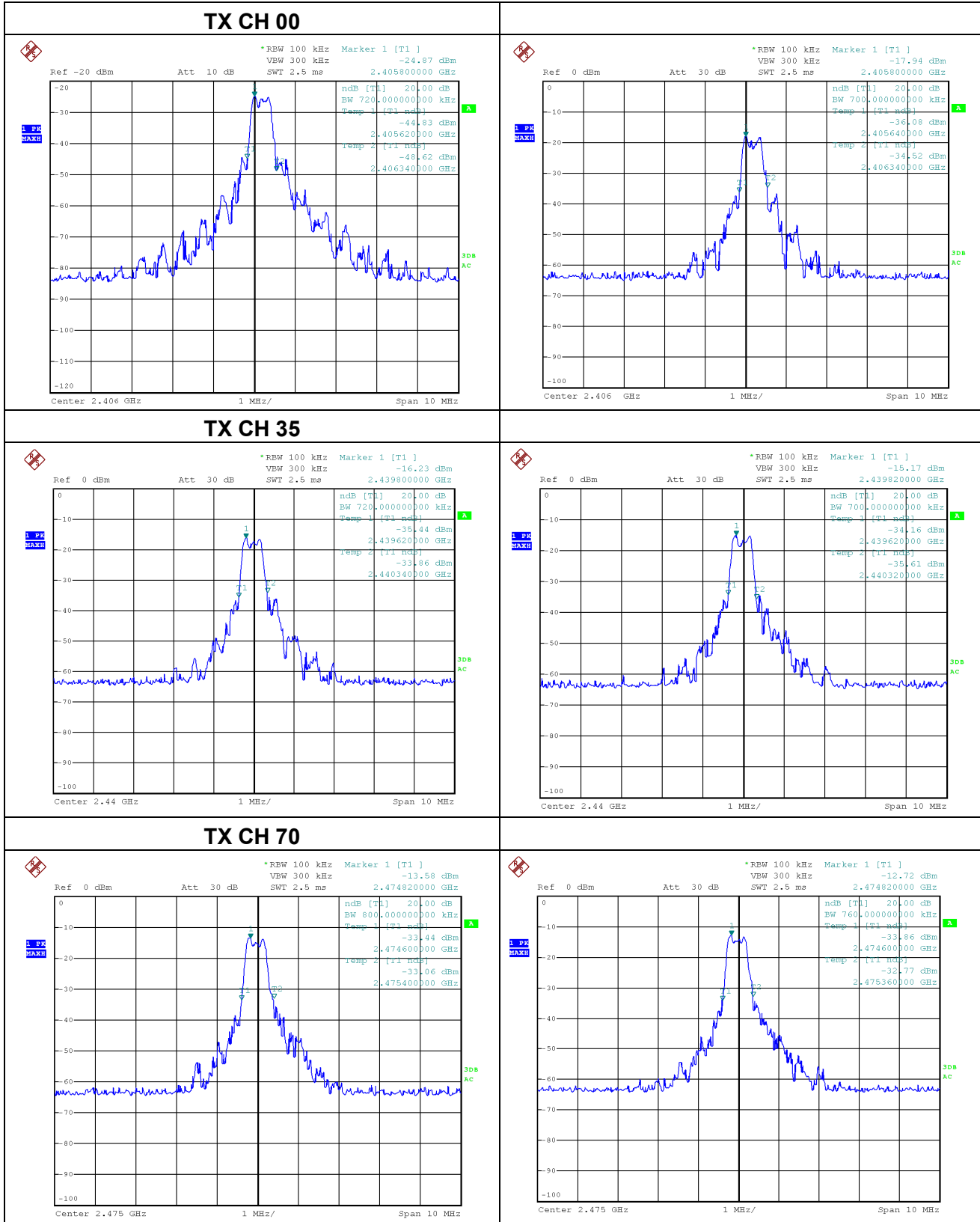
#### 4.1.5 TEST RESULTS

Temperature :	25°C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12.6V
Test Mode :	TX Mode /CH01, CH35, CH70		

	Frequency (MHz)	Bandwidth (kHz)		Result
		ANT1	ANT2	
GFSK	2406	720.0	700.0	Pass
	2440	720.0	700.0	Pass
	2475	800.0	760.0	Pass



GFSK





**5. NUMBER OF HOPPING CHANNEL**

**5.1 APPLIED PROCEDURES / LIMIT**

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	= the frequency band of operation
RB	RBW ≥ 1% of the span
VB	VBW ≥ RBW
Detector	Peak
Trace	Max Hold
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,
- b. Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

**5.1.2 DEVIATION FROM STANDARD**

No deviation.

**5.1.3 TEST SETUP**



**5.1.4 EUT OPERATION CONDITIONS**

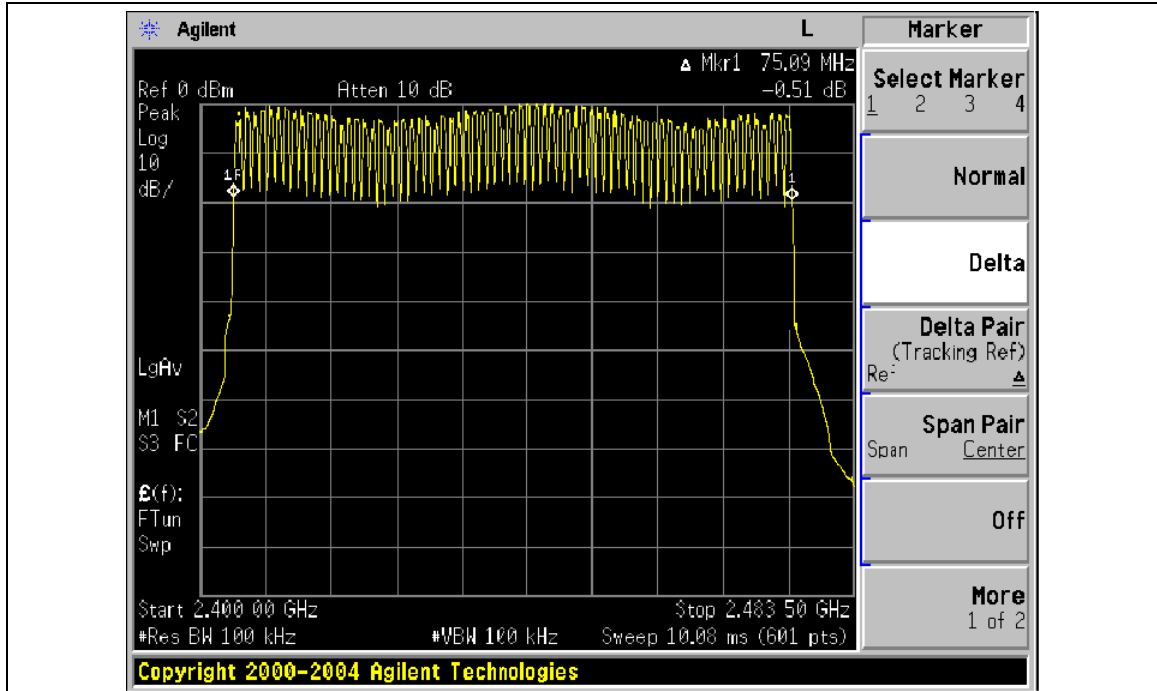
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

**5.1.5 TEST RESULTS**



Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 12.6V
Test Mode :	Hopping Mode		

Number of Hopping Channel	70
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## 6. AVERAGE TIME OF OCCUPANCY

### 6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

#### 6.1.1 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. A Period Time = (channel number)\*0.4

#### 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.



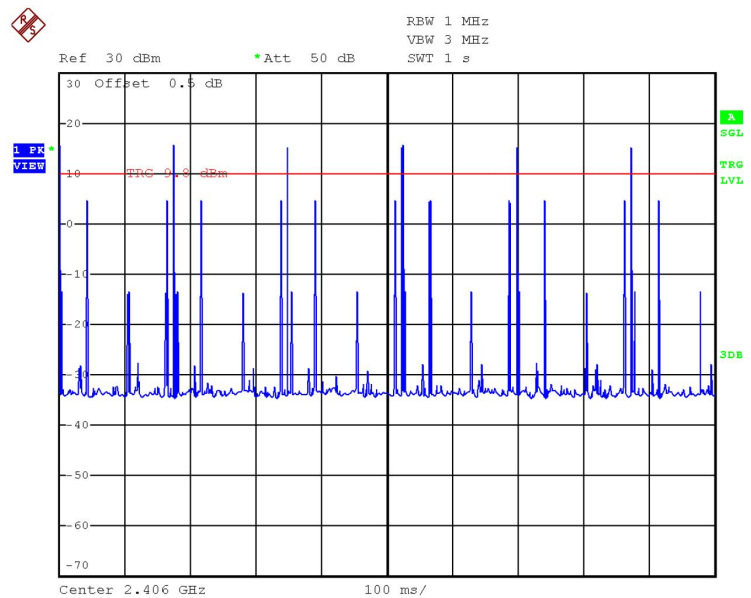
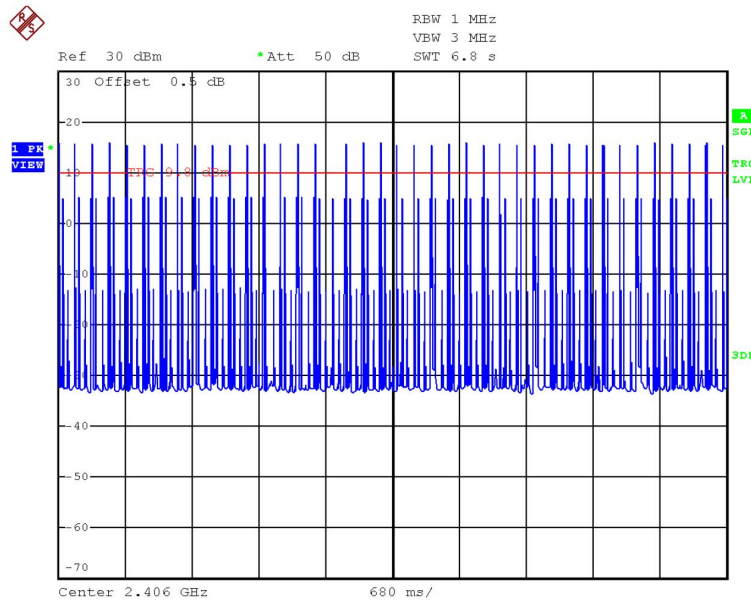
**6.1.5 TEST RESULTS**

EUT :	Smart Band	Model Name :	A2
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12.6V
Test Mode :	CH01		

Frequency	Plus(ms)	Dwell time(ms)	Limit(ms)	Result
2406MHz	0.45	73.44	400	Pass

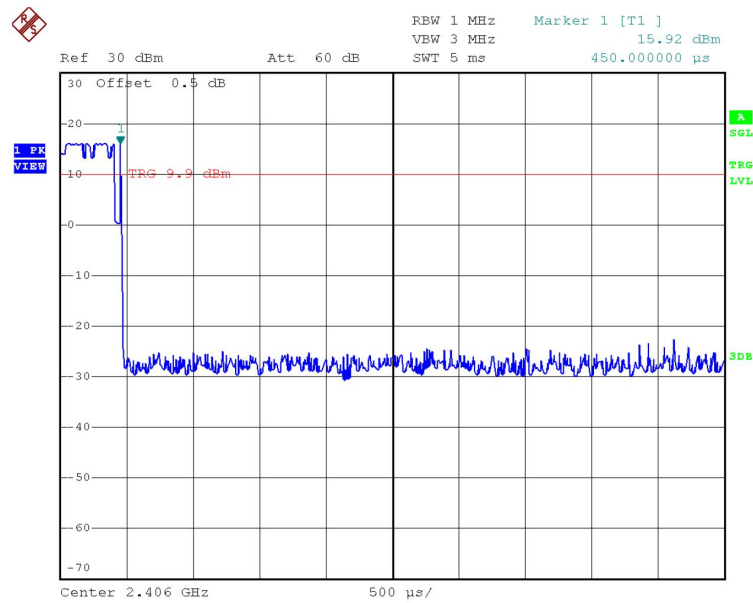
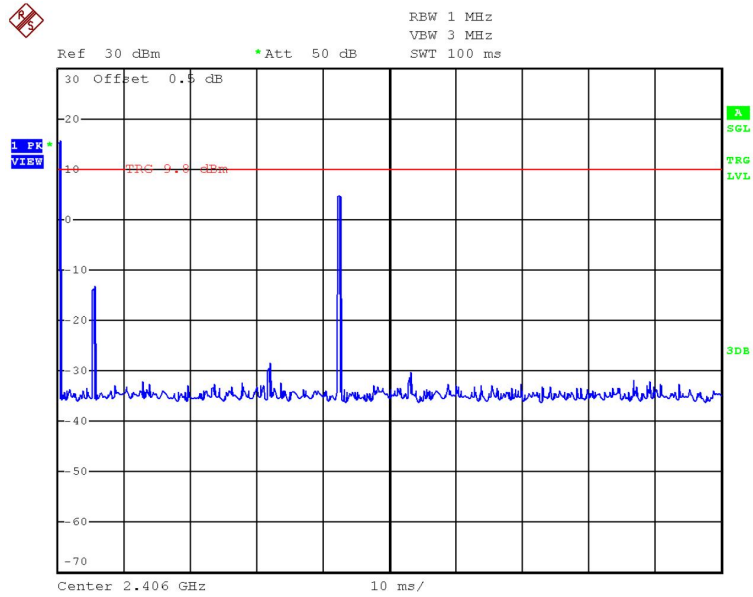
The test period:  $T = 0.45\text{ms} \times 6 \times 4 \times 6.8 = 73.44\text{ms}$

Plots Average Channel Occupancy Time





### Plots Average Channel Occupancy Time



**7. HOPPING CHANNEL SEPARATION MEASUREMENT**

**7.1 APPLIED PROCEDURES / LIMIT**

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	100 kHz (Channel Separation)
VB	300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

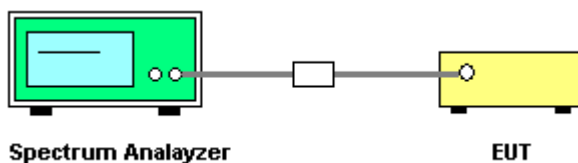
**7.1.1 TEST PROCEDURE**

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

**7.1.2 DEVIATION FROM STANDARD**

No deviation.

**7.1.3 TEST SETUP**



**7.1.4 EUT OPERATION CONDITIONS**

The EUT was programmed to be in continuously transmitting mode.

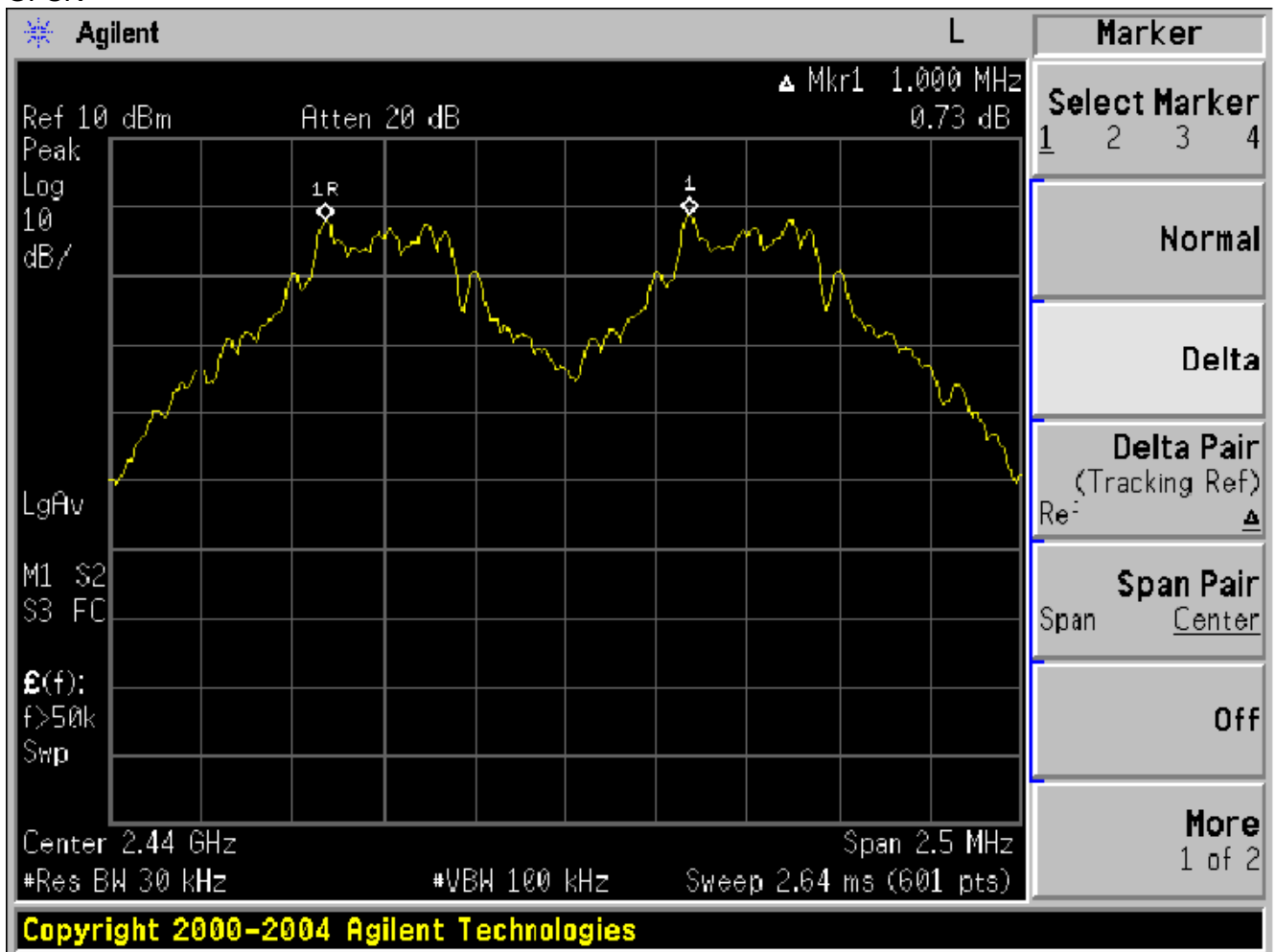


**7.1.5 TEST RESULTS**

Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12.6V
Test Mode :	GFSK		

Test Mode	Ch. Separation (MHz)	Limit (MHz)	Result
GFSK	1.00	0.902	Complies

GFSK



## 8. HOPPING CHANNEL SEPARATION MEASUREMENT

### 8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(i)	Peak Output Power	30Bm or 20.96dBm	2400-2483.5	PASS

#### 8.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW > the 20 dB bandwidth of the emission being measured  
 Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel  
 VBW ≥ RBW  
 Sweep = auto  
 Detector function = peak  
 Trace = max hold

#### 8.1.2 DEVIATION FROM STANDARD

No deviation.

#### 8.1.3 TEST SETUP



#### 8.1.4 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.



**8.1.5 TEST RESULTS**

Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12.6V
Test Mode :	CH01/ CH35 /CH70		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)		LIMIT (dBm)
		ANT1	ANT2	
CH01	2406	15.33	15.23	30.00
CH35	2440	15.34	15.27	30.00
CH70	2475	15.35	15.31	30.00



## **9. ANTENNA REQUIREMENT**

### **9.1 STANDARD REQUIREMENT**

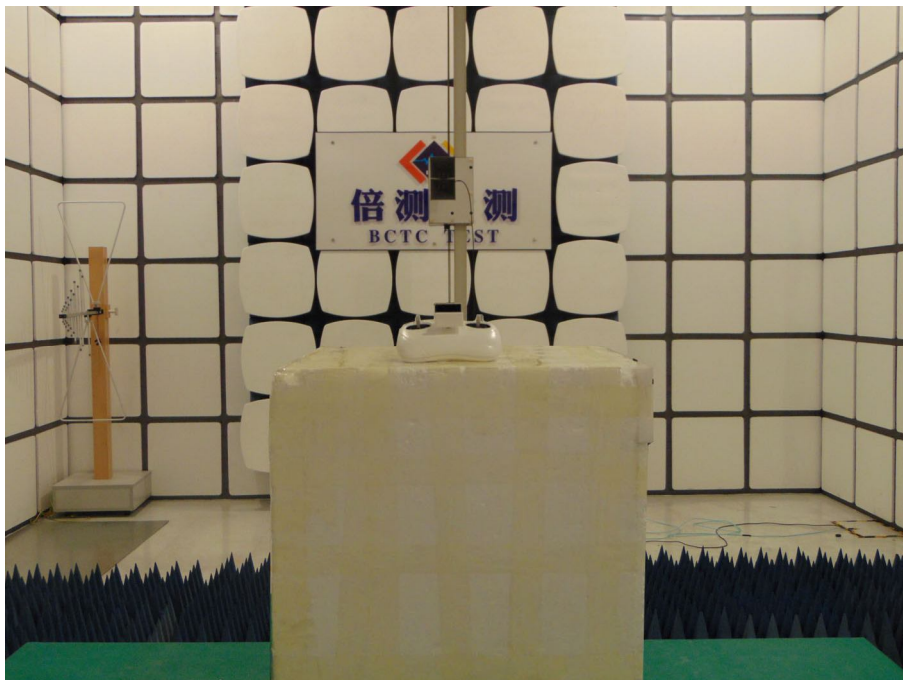
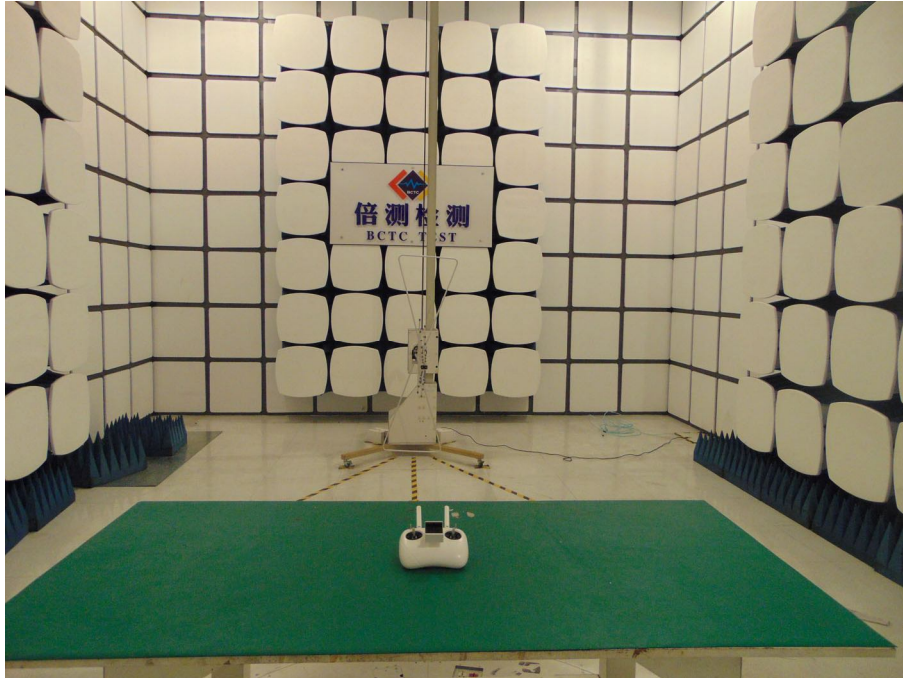
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### **9.2 EUT ANTENNA**

The EUT antenna is external permanent connection antenna,. It comply with the standard requirement.

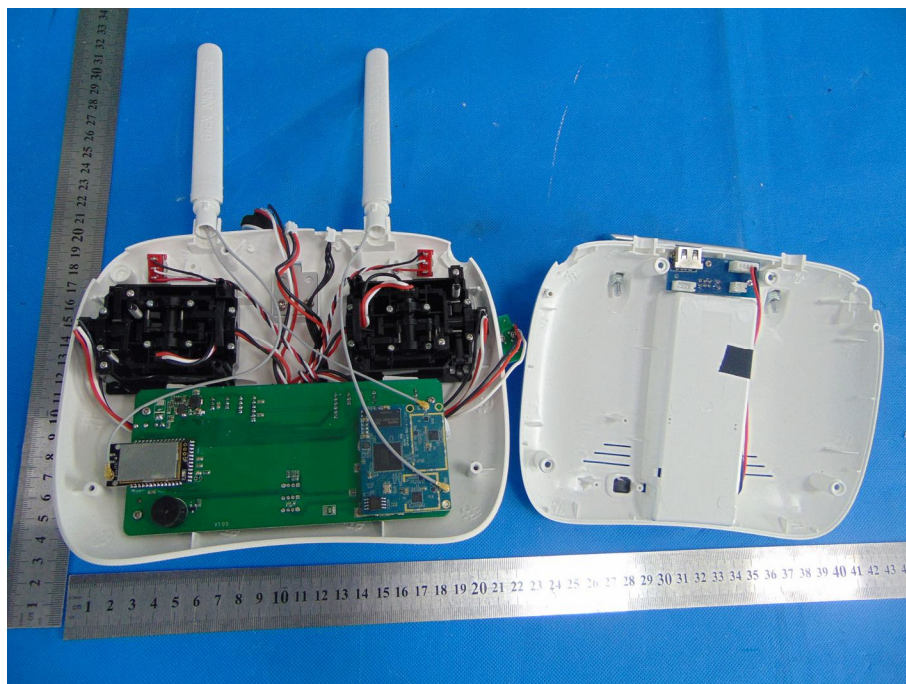
## 10. TEST SETUP PHOTO

### Radiated Measurement Photos



## 11. EUT PHOTO





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