

# FCC RF Test Report

**APPLICANT** : ZTE CORPORATION  
**EQUIPMENT** : WCDMA Digital mobile phone  
**BRAND NAME** : ZTE / Movistar  
**MODEL NAME** : ZTE-U X991 / Movistar Chat  
**FCC ID** : Q78-UX991  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : Digital Spread Spectrum (DSS)

The product was received on Aug. 02, 2010 and completely tested on Aug. 20, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:



Anderson Chiu / Deputy Manager



**SPORTON INTERNATIONAL (KUNSHAN) INC.**  
**No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.**



TABLE OF CONTENTS

REVISION HISTORY ..... 3
SUMMARY OF TEST RESULT ..... 4
1 GENERAL DESCRIPTION ..... 5
1.1 Applicant ..... 5
1.2 Manufacturer ..... 5
1.3 Feature of Equipment Under Test ..... 5
1.4 Testing Site ..... 6
1.5 Applied Standards ..... 6
1.6 Ancillary Equipment List ..... 6
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST ..... 7
2.1 RF Output Power ..... 7
2.2 Test Mode ..... 8
2.3 Connection Diagram of Test System ..... 9
2.4 RF Utility ..... 9
3 TEST RESULT ..... 10
3.1 Number of Channel Measurement ..... 10
3.2 20dB Bandwidth Measurement ..... 12
3.3 Hopping Channel Separation Measurement ..... 19
3.4 Dwell Time Measurement ..... 22
3.5 Peak Output Power Measurement ..... 24
3.6 Band Edges Measurement ..... 27
3.7 Spurious Emission Measurement ..... 33
3.8 AC Conducted Emission Measurement ..... 37
3.9 Radiated Emission Measurement ..... 41
3.10 Antenna Requirements ..... 50
4 LIST OF MEASURING EQUIPMENT ..... 51
5 UNCERTAINTY OF EVALUATION ..... 52
APPENDIX A. PHOTOGRAPHS OF EUT
APPENDIX B. SETUP PHOTOGRAPHS





### SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	A8.4(2)	Number of Channels	≥ 15Chs	Pass	-
3.2	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.3	15.247(a)(1)	A8.1(b)	Channel Separation	≥ 2/3 of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	≤ 1W	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.7	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
3.8	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 7.28 dB at 2.04 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.49 dB at 2483.51 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

## 1.2 Manufacturer

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	WCDMA Digital mobile phone
Brand Name	ZTE / Movistar
Model Name	ZTE-U X991 / Movistar Chat
FCC ID	Q78-UX991
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Channel Spacing	1 MHz
Maximum Output Power to Antenna	Bluetooth (1Mbps) : 8.09 dBm (0.006 W) Bluetooth EDR (2Mbps) : 6.73 dBm (0.005 W) Bluetooth EDR (3Mbps) : 6.99 dBm (0.005 W)
Antenna Type	Fixed Internal Antenna with gain -3 dBi
Type of Antenna Connector	N/A
HW Version	ZTEMT68_09B_HW
SW Version	MB6802_V1_Z1_CN_F1BPa100
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Production Unit

**Remark:**

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

### 1.4 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.	
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	
	CO01-KS	03CH01-KS

### 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC Public Notice DA 00-705
- ANSI C63.4-2003
- IC RSS-210 Issue 7

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

### 1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Nokia	HS-12W	PYAHS-12W	N/A	N/A
3.	Signal Generator	R&S	SMR 40	N/A	N/A	Unshielded, 1.8 m

## 2 Test Configuration of Equipment Under Test

### 2.1 RF Output Power

Preliminary tests were performed in different data rate and recorded the RF output power in the following table:

Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	$\pi$ /4-DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	6.73 dBm	5.32 dBm	5.75 dBm
Ch39	2441MHz	<b>8.09 dBm</b>	6.73 dBm	6.99 dBm
Ch78	2480MHz	6.02 dBm	4.45 dBm	4.62 dBm

**Remark:**

1. The data rate was set in 1Mbps for all the test items due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

## 2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

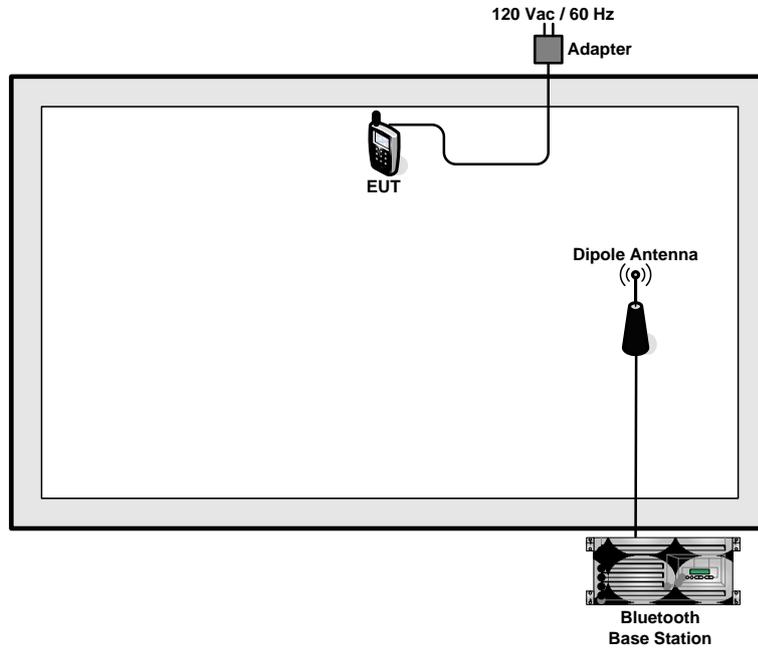
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

The following tables are showing the test modes as the worst cases and recorded in this report.

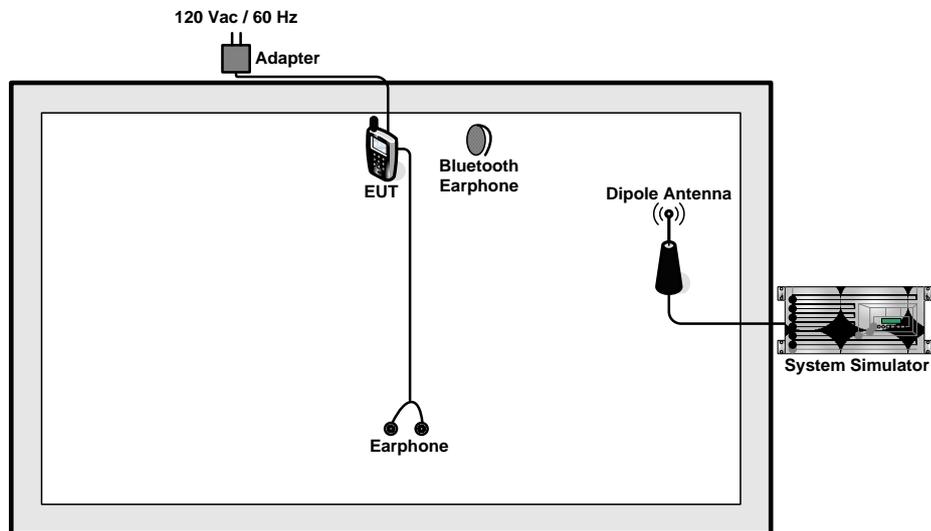
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi$ /4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK
<b>Conducted TCs</b>	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
<b>Radiated TCs</b>	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH78_2480 MHz	Mode 6: CH00_2402 MHz Mode 7: CH78_2480 MHz
<b>AC Conducted Emission</b>	Mode 1 :GSM850 Idle + Bluetooth Link + Adapter + Earphone		
<b>Remark:</b> 1. For radiated TCs, the data rate was set in 1Mbps due to the highest RF output power; only the data of these modes was reported. 2. The mode 4~6 of radiated TCs were verify band edges only.			

## 2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<EUT with Adapter Mode>



## 2.4 RF Utility

For Bluetooth function, input “\* # 8603 #” in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

### 3 Test Result

#### 3.1 Number of Channel Measurement

##### 3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

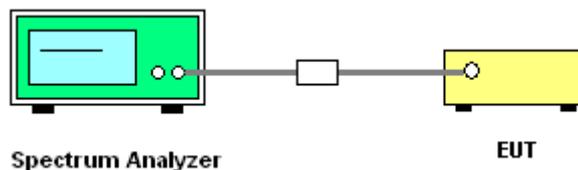
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:  
Span = the frequency band of operation;  $RBW \geq 1\%$  of the span;  $VBW \geq RBW$ ; Sweep = auto;  
Detector function = peak; Trace = max hold.
5. The number of hopping frequency used is defined as the device has the numbers of total channel.

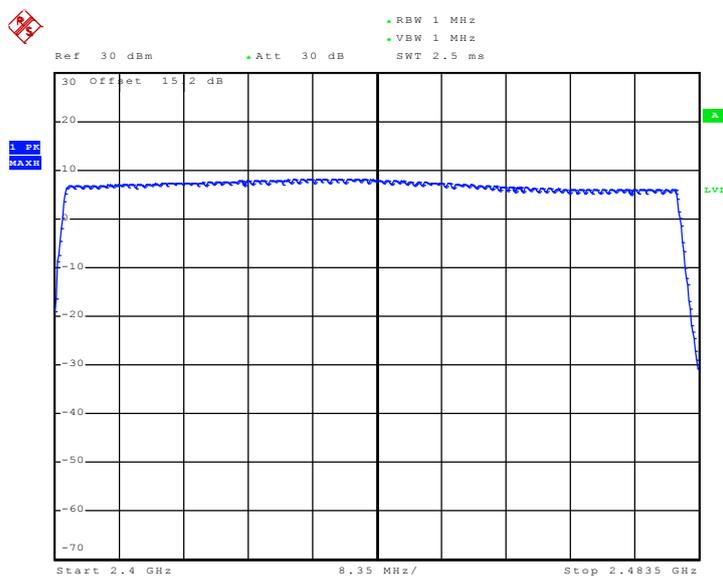
##### 3.1.4 Test Setup



### 3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 1~3	Temperature :	21~22°C
Test Engineer :	Sky Liu	Relative Humidity :	40~41%
Number of Hopping Channels (Channel)		Limits (Channel)	
79		> 15	
		Pass/Fail	
		Pass	

Number of Hopping Channel Plot on Channel 00 - 78



Date: 2.AUG.2010 13:38:46

## 3.2 20dB Bandwidth Measurement

### 3.2.1 Limit of 20dB Bandwidth

N/A

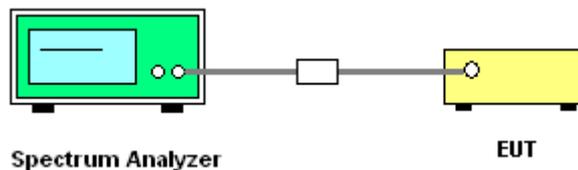
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:  
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;  
RBW  $\geq$  1% of the 20 dB bandwidth; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak;  
Trace = max hold.
5. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

### 3.2.4 Test Setup

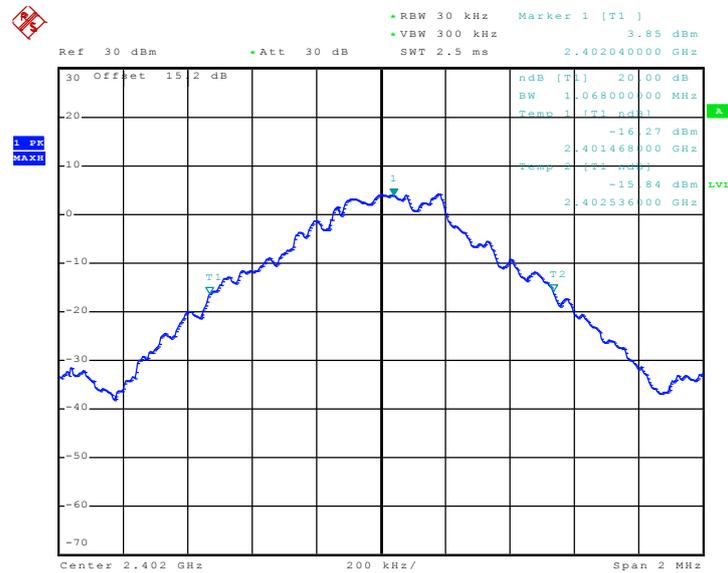


### 3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	21~22°C
Test Engineer :	Sky Liu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.068
39	2441	1.052
78	2480	0.976

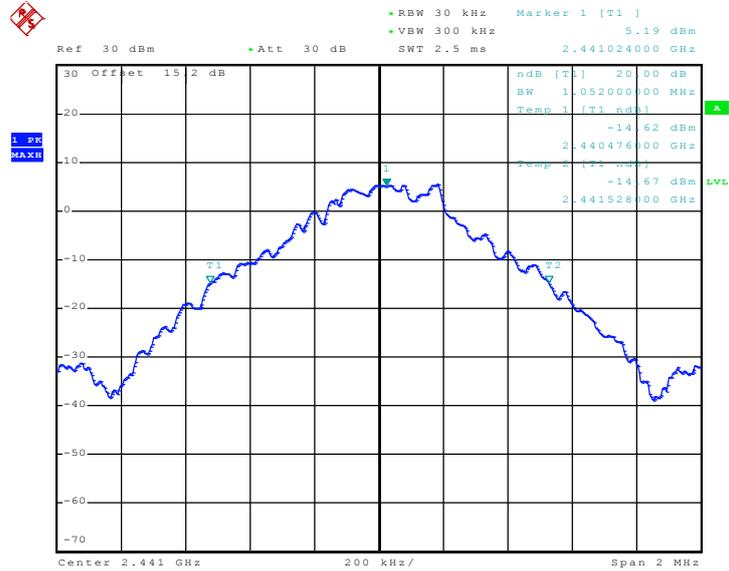
20 dB Bandwidth Plot on Channel 00



Date: 2.AUG.2010 14:53:03

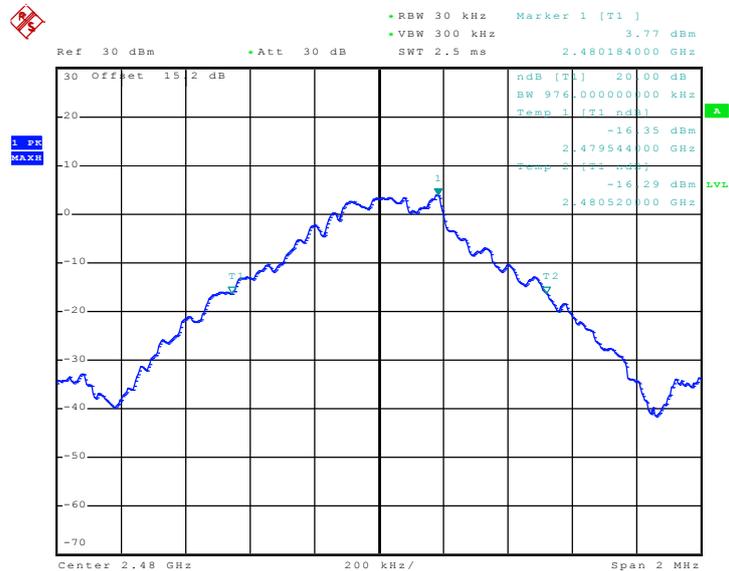


20 dB Bandwidth Plot on Channel 39



Date: 2.AUG.2010 14:53:39

20 dB Bandwidth Plot on Channel 78



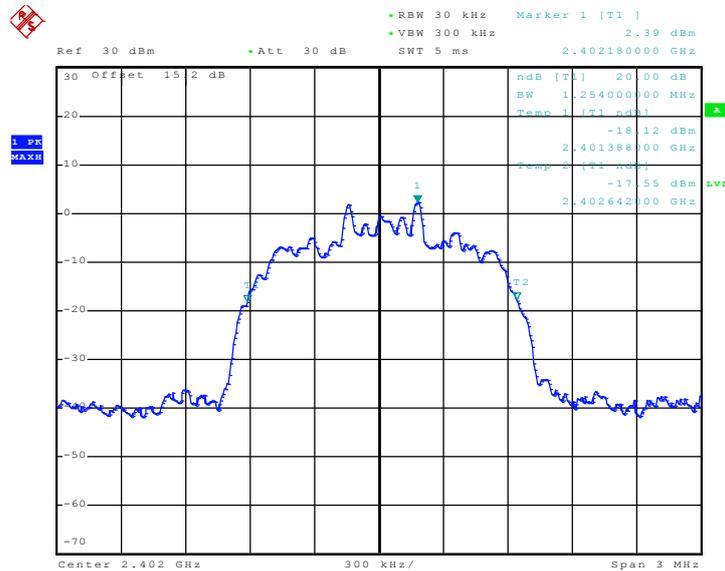
Date: 2.AUG.2010 14:54:17



Test Mode :	Mode 4, 5, 6	Temperature :	21~22°C
Test Engineer :	Sky Liu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.254
39	2441	1.260
78	2480	1.260

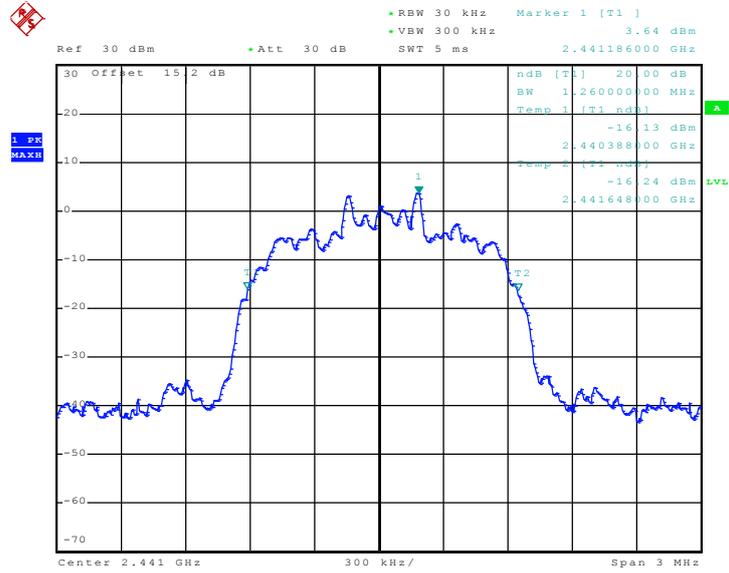
20 dB Bandwidth Plot on Channel 00



Date: 2.AUG.2010 15:34:26

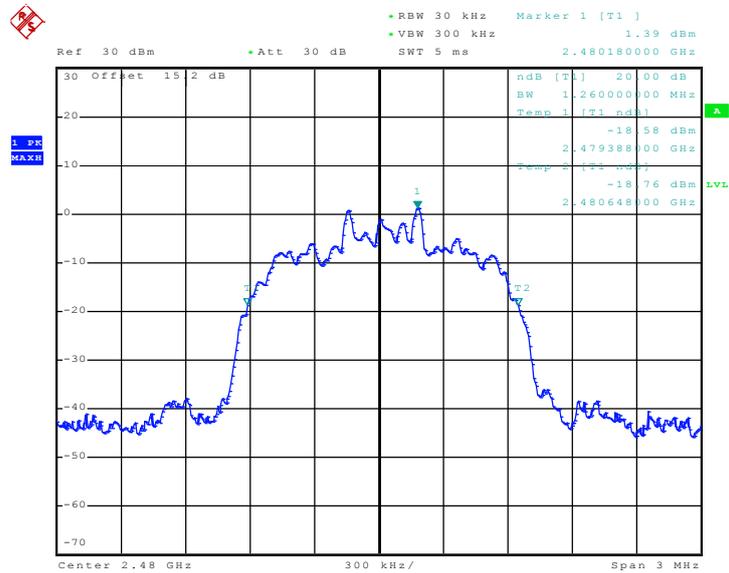


20 dB Bandwidth Plot on Channel 39



Date: 2.AUG.2010 15:42:21

20 dB Bandwidth Plot on Channel 78



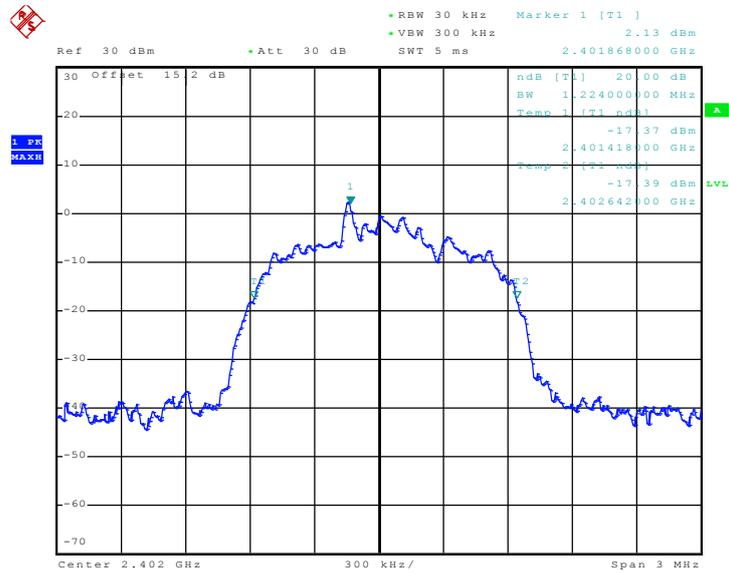
Date: 2.AUG.2010 15:42:46



Test Mode :	Mode 7, 8, 9	Temperature :	21~22°C
Test Engineer :	Sky Liu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.224
39	2441	1.230
78	2480	1.224

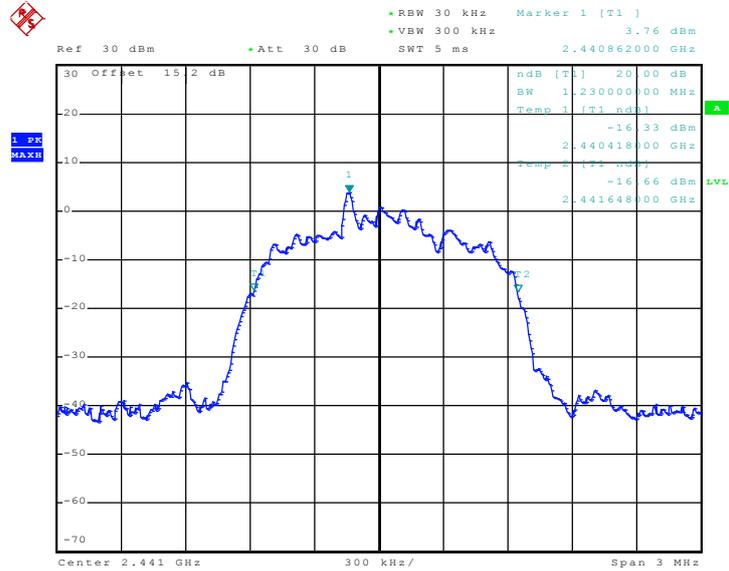
20 dB Bandwidth Plot on Channel 00



Date: 2.AUG.2010 15:43:23

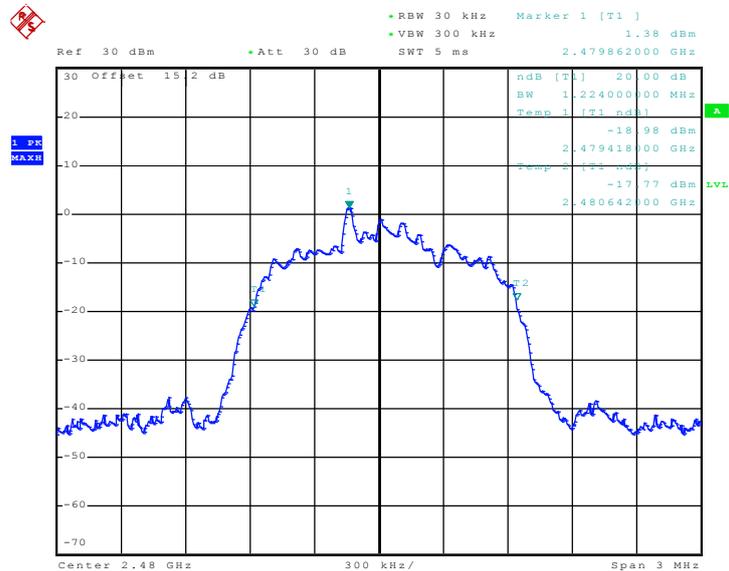


20 dB Bandwidth Plot on Channel 39



Date: 2.AUG.2010 15:43:58

20 dB Bandwidth Plot on Channel 78



Date: 2.AUG.2010 15:44:24

### 3.3 Hopping Channel Separation Measurement

#### 3.3.1 Limit of Hopping Channel Separation

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.

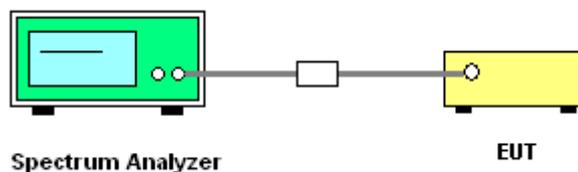
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peaks of two adjacent channels;  $RBW \geq 1\%$  of the span;  
VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

#### 3.3.4 Test Setup



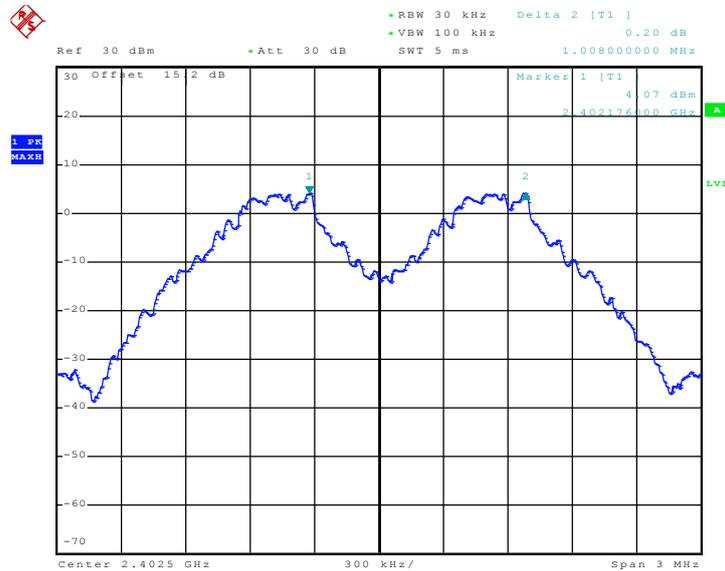


3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 1, 2, 3	Temperature :	21~22°C
Test Engineer :	Sky Liu	Relative Humidity :	40~41%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.008	0.712	Pass
39	2441	1.008	0.701	Pass
78	2480	1.008	0.651	Pass

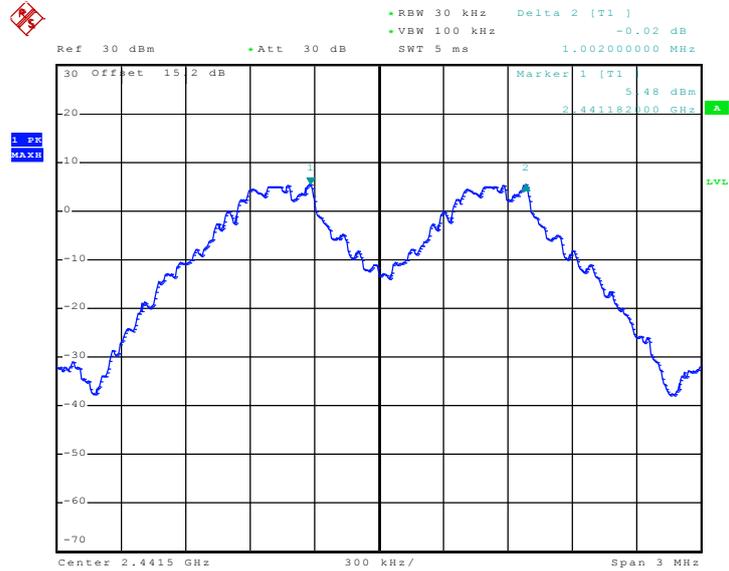
Channel Separation Plot on Channel 00 - 01



Date: 2.AUG.2010 14:37:44

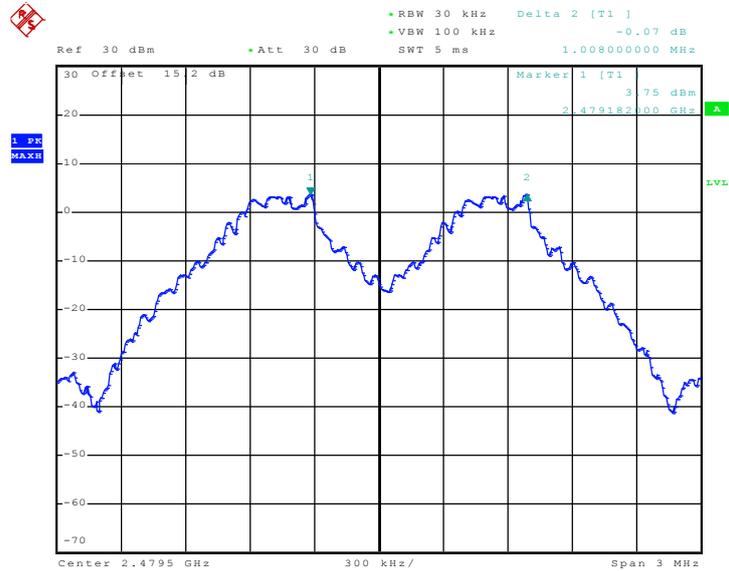


Channel Separation Plot on Channel 39 - 40



Date: 2.AUG.2010 14:39:43

Channel Separation Plot on Channel 77 - 78



Date: 2.AUG.2010 14:40:59

### 3.4 Dwell Time Measurement

#### 3.4.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

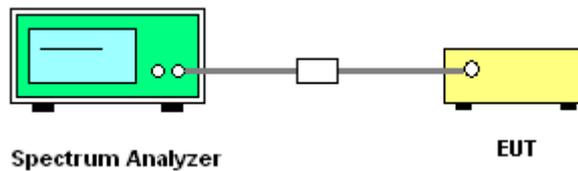
#### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.4.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:  
Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to calculate the dwell time.

#### 3.4.4 Test Setup



#### 3.4.5 Test Result of Dwell Time

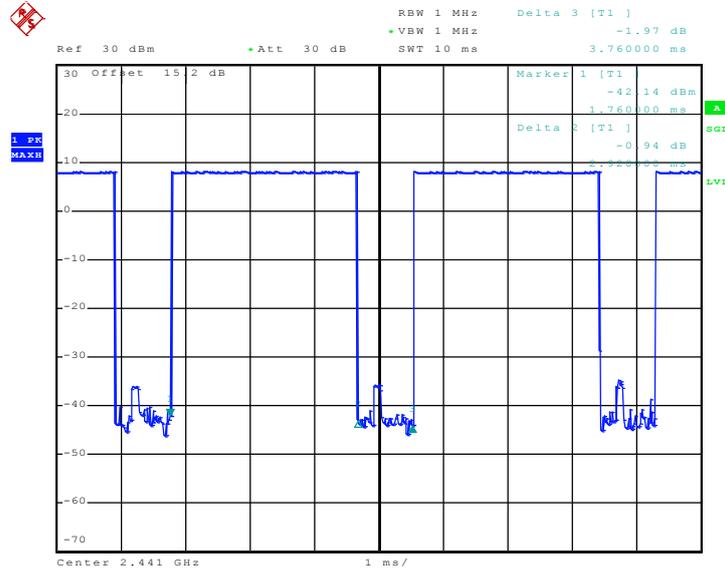
<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	21~22°C		
<b>Test Engineer :</b>	Sky Liu	<b>Relative Humidity :</b>	40~41%		
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	3.20	2920.00	0.30	0.4	Pass

**Remark:**

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

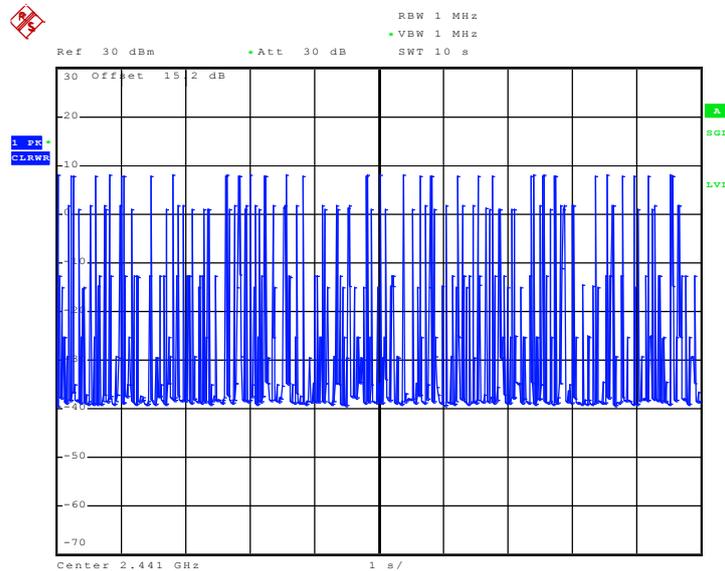


### DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 2.AUG.2010 14:46:24

### DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 2.AUG.2010 14:49:42

### 3.5 Peak Output Power Measurement

#### 3.5.1 Limit of Peak Output Power

Frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1W (30 dBm).

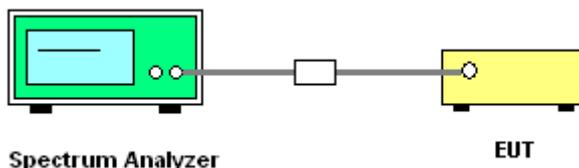
#### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.5.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

#### 3.5.4 Test Setup



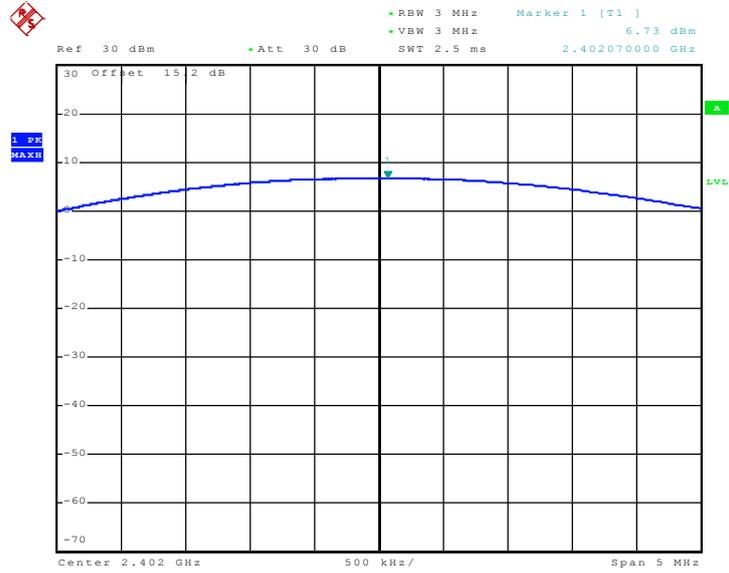
#### 3.5.5 Test Result of Peak Output Power

<b>Test Mode :</b>	Mode 1, 2, 3	<b>Temperature :</b>	21~22°C
<b>Test Engineer :</b>	Sky Liu	<b>Relative Humidity :</b>	40~41%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	6.73	30	Pass
39	2441	8.09	30	Pass
78	2480	6.02	30	Pass

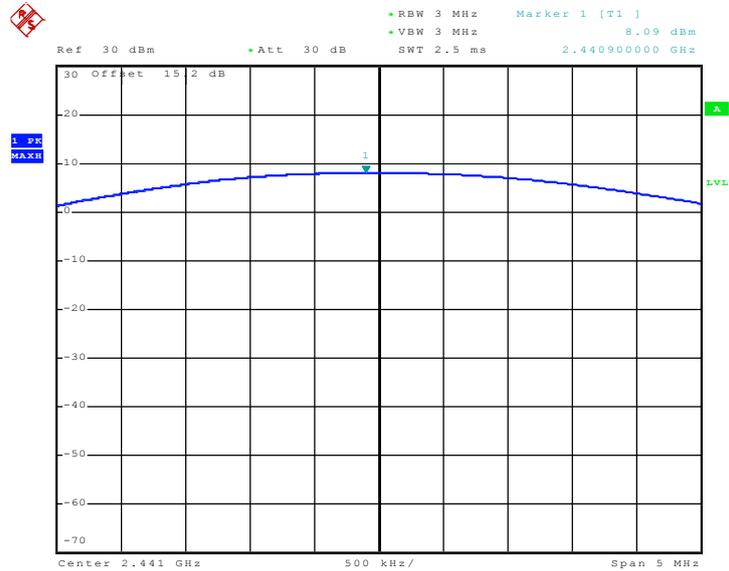


Peak Output Power Plot on Channel 00



Date: 2.AUG.2010 13:12:59

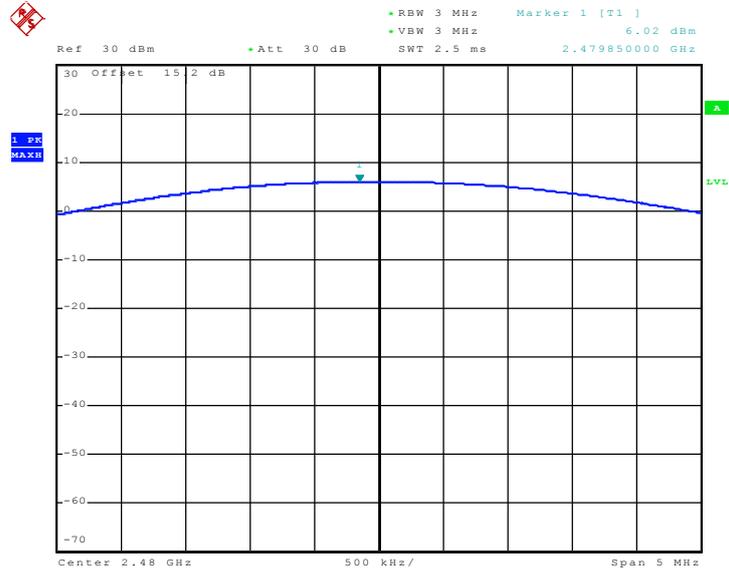
Peak Output Power Plot on Channel 39



Date: 2.AUG.2010 13:13:22



Peak Output Power Plot on Channel 78



Date: 2.AUG.2010 13:13:45



## **3.6 Band Edges Measurement**

### **3.6.1 Limit of Band Edges**

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

### **3.6.2 Measuring Instruments**

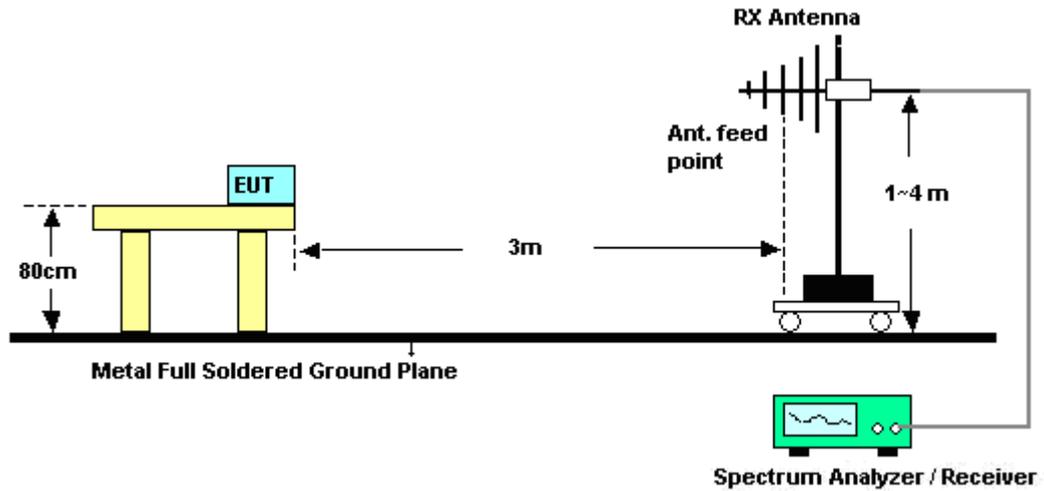
See list of measuring instruments of this test report.

### **3.6.3 Test Procedures**

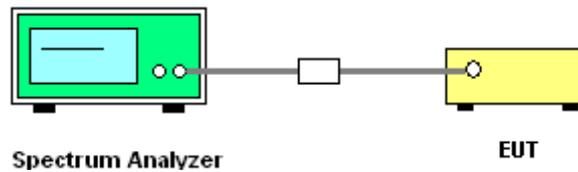
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

### 3.6.4 Test Setup

#### <Radiated Band Edges>



#### <Conducted Band Edges>





3.6.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	42~43%
		Test Engineer :	Lewis Lu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2324.82	45.72	-28.28	74	44.79	32.76	3.10	34.93	103	250	Peak
2324.82	35.93	-18.07	54	35.00	32.76	3.10	34.93	103	250	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.23	45.50	-28.50	74	44.48	32.86	3.13	34.97	108	250	Peak
2389.23	37.03	-16.97	54	36.01	32.86	3.13	34.97	108	250	Average

Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	42~43%
		Test Engineer :	Lewis Lu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.51	63.82	-10.18	74	62.55	33.01	3.20	34.94	102	65	Peak
2483.51	53.51	-0.49	54	52.24	33.01	3.20	34.94	102	65	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.51	61.49	-12.51	74	60.22	33.01	3.20	34.94	129	315	Peak
2483.51	52.45	-1.55	54	51.18	33.01	3.20	34.94	129	315	Average



Test Mode :	Mode 4	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	42~43%
		Test Engineer :	Lewis Lu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2313.42	45.92	-28.08	74	45.02	32.73	3.1	34.93	108	231	Peak
2313.42	37.3	-16.7	54	36.4	32.73	3.1	34.93	108	231	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2385.62	46.46	-27.54	74	45.44	32.86	3.13	34.97	125	200	Peak
2385.62	40.03	-13.97	54	39.01	32.86	3.13	34.97	125	200	Average

Test Mode :	Mode 5	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	42~43%
		Test Engineer :	Lewis Lu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.51	60.47	-13.53	74	59.2	33.01	3.2	34.94	100	128	Peak
2483.51	49.28	-4.72	54	48.01	33.01	3.2	34.94	100	128	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.51	62.77	-11.23	74	61.5	33.01	3.2	34.94	121	331	Peak
2483.51	53.08	-0.92	54	51.81	33.01	3.2	34.94	121	331	Average



Test Mode :	Mode 6	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	42~43%
		Test Engineer :	Lewis Lu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2362.06	45.89	-28.11	74	44.92	32.81	3.12	34.96	105	260	Peak
2362.06	39.07	-14.93	54	38.1	32.81	3.12	34.96	105	260	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2349.71	45.56	-28.44	74	44.62	32.78	3.12	34.96	150	200	Peak
2349.71	36.74	-17.26	54	35.8	32.78	3.12	34.96	150	200	Average

Test Mode :	Mode 7	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	42~43%
		Test Engineer :	Lewis Lu

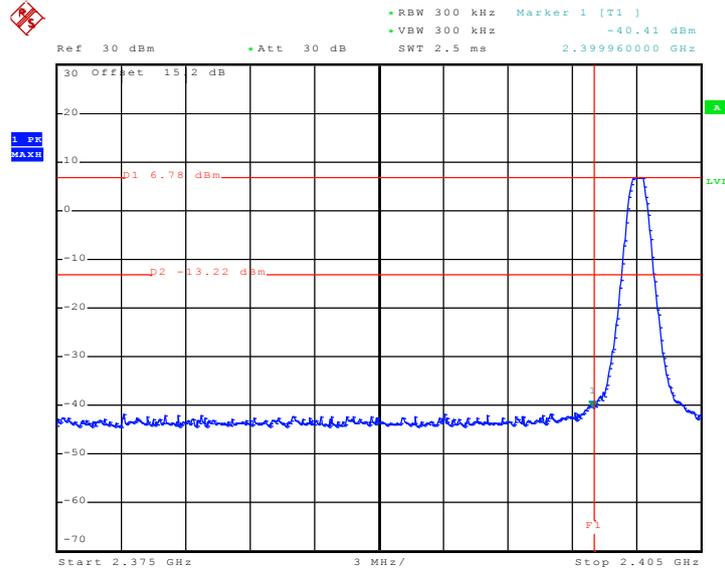
ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.51	60.87	-13.13	74	59.6	33.01	3.2	34.94	116	20	Peak
2483.51	50.28	-3.72	54	49.01	33.01	3.2	34.94	116	20	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.51	63.04	-10.96	74	61.77	33.01	3.2	34.94	124	51	Peak
2483.51	53.18	-0.82	54	51.91	33.01	3.2	34.94	124	51	Average

### 3.6.6 Test Result of Conducted Band Edges

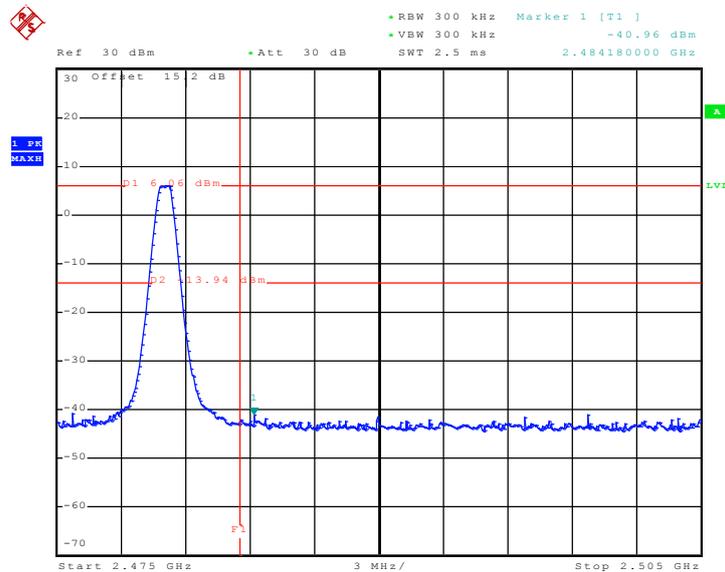
Test Mode :	Mode 1 and 3	Temperature :	21~22°C
Test Channel :	00 and 78	Relative Humidity :	40~41%
		Test Engineer :	Sky Liu

Low Band Edge Plot on Channel 00



Date: 2.AUG.2010 14:59:02

High Band Edge Plot on Channel 78



Date: 2.AUG.2010 15:02:42

## 3.7 Spurious Emission Measurement

### 3.7.1 Limit of Spurious Emission Measurement

All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band.

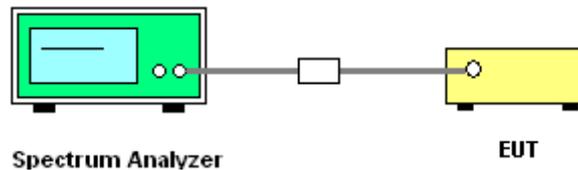
### 3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.7.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW)  $\geq$  RBW, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

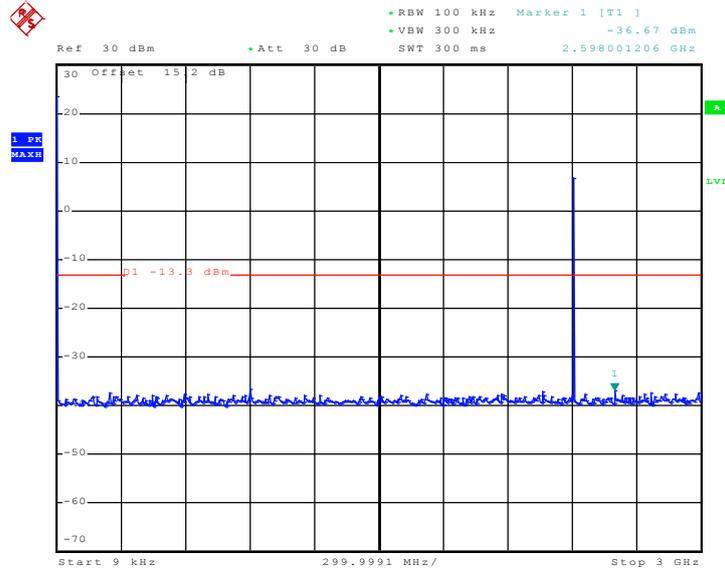
### 3.7.4 Test Setup



3.7.5 Test Result

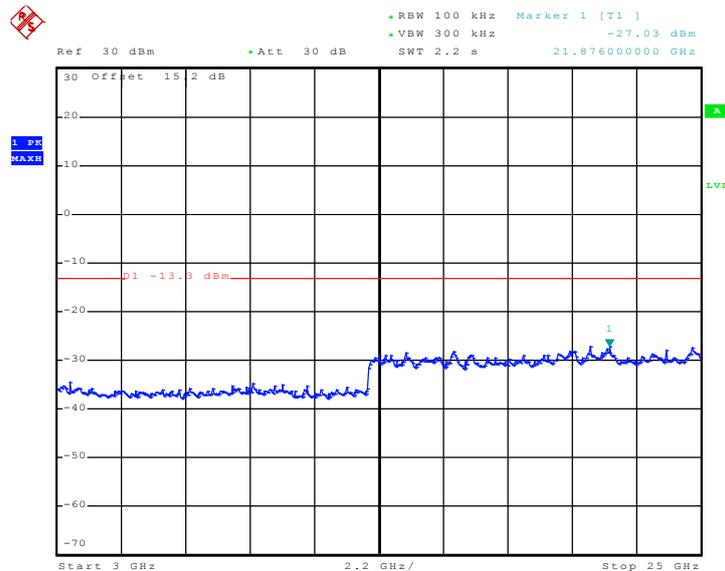
Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	40~41%
		Test Engineer :	Sky Liu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 2.AUG.2010 15:11:45

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

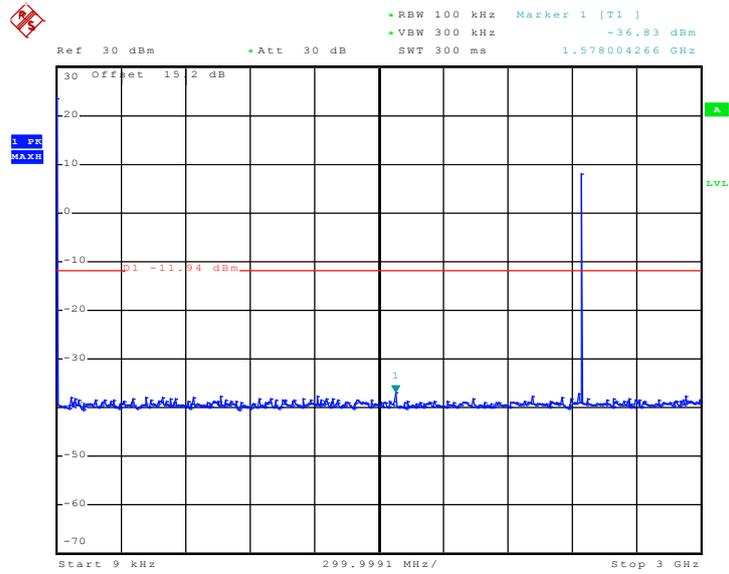


Date: 2.AUG.2010 15:23:10



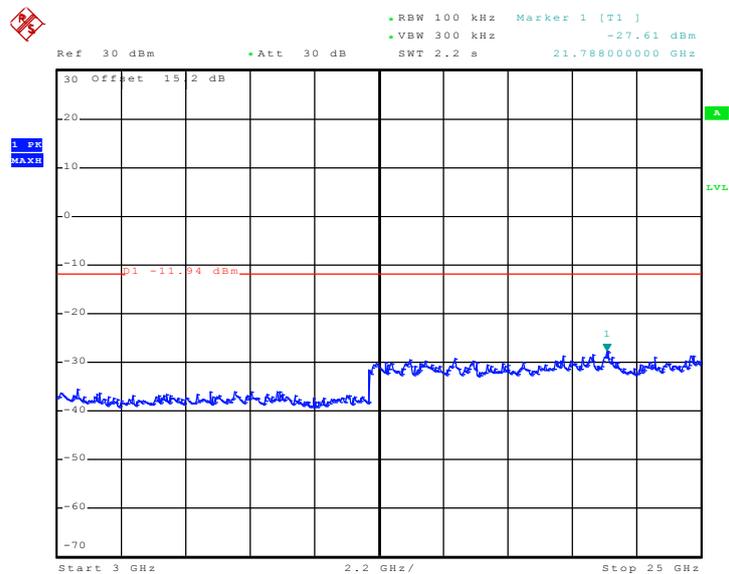
Test Mode :	Mode 2	Temperature :	21~22°C
Test Channel :	39	Relative Humidity :	40~41%
		Test Engineer :	Sky Liu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 2.AUG.2010 15:12:40

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

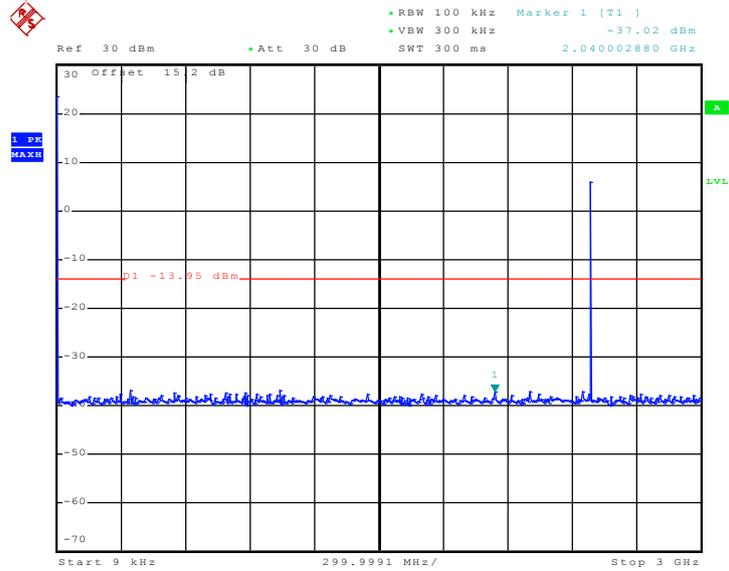


Date: 2.AUG.2010 15:23:49



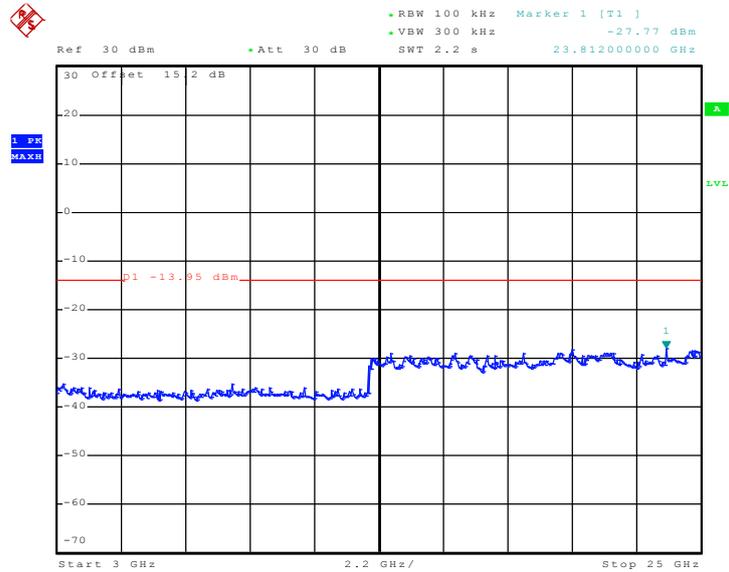
Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	40~41%
		Test Engineer :	Sky Liu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 2.AUG.2010 15:14:17

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 2.AUG.2010 15:18:28

## 3.8 AC Conducted Emission Measurement

### 3.8.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

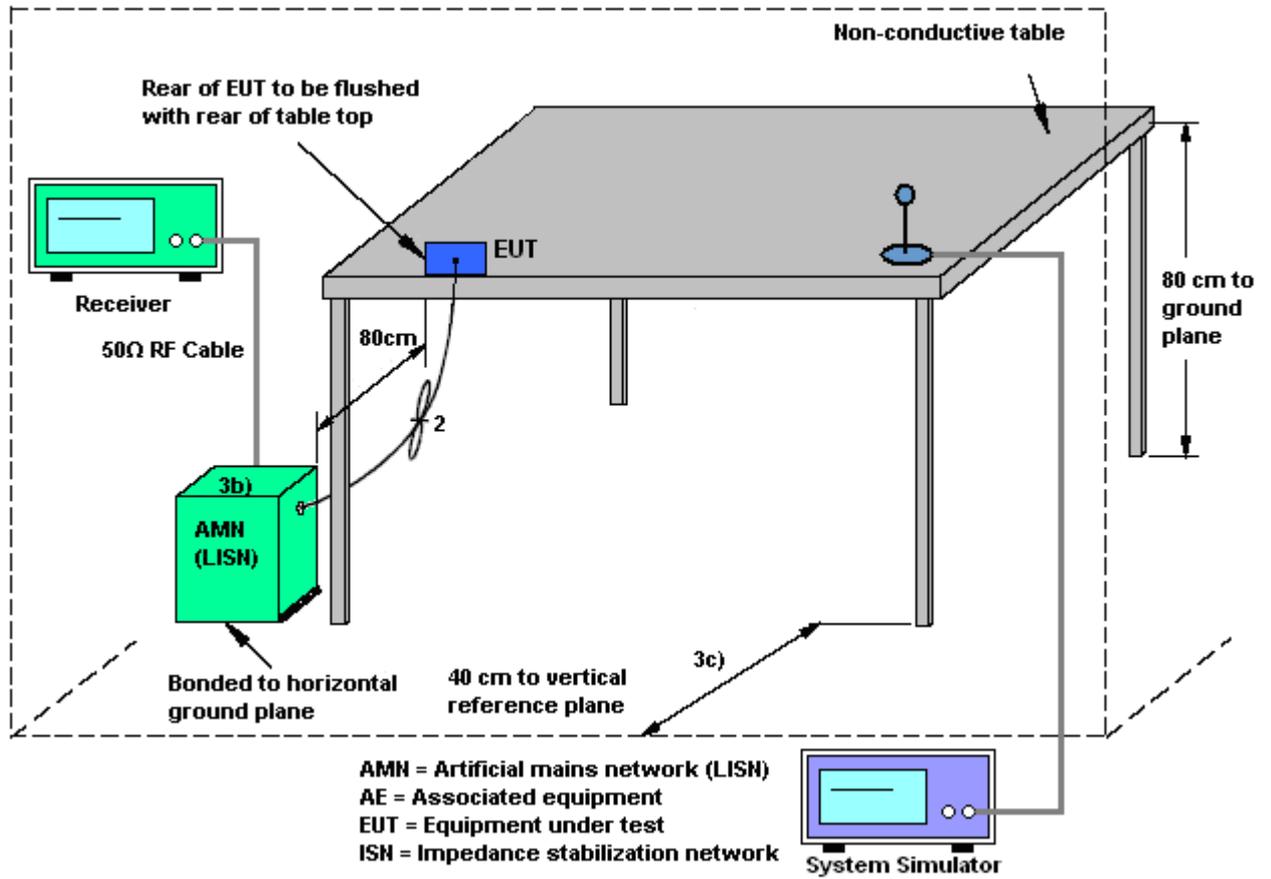
### 3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.8.3 Test Procedures

1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

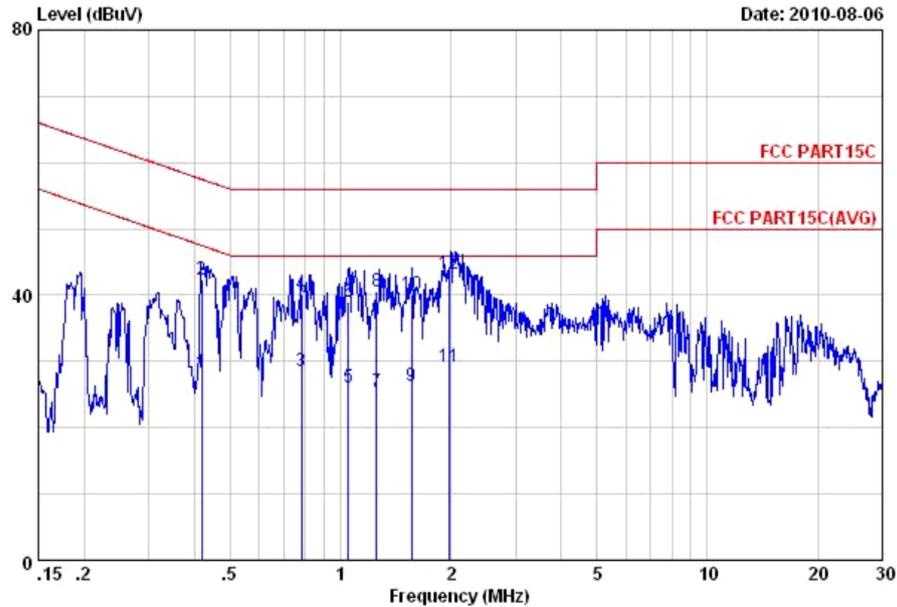
### 3.8.4 Test Setup





3.8.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~23°C
Test Engineer :	Louis Lu	Relative Humidity :	42~43%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + Adapter + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

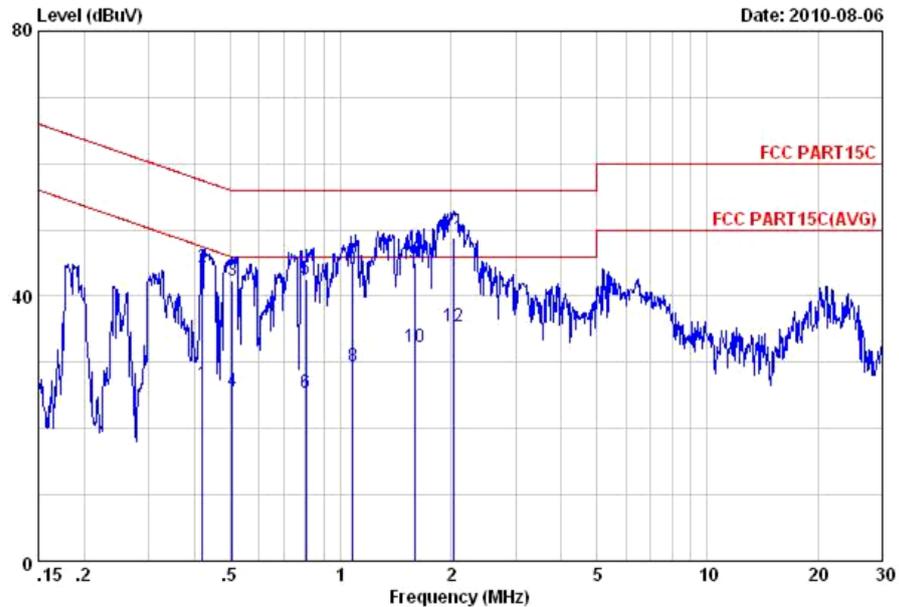


Site : C001-KS  
 Condition: FCC PART15C LISN-071001 LINE  
 Project : (FR) 072703  
 mode : mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
		dBuV	dB	dBuV	dBuV	dB	dB	
1	0.42	28.32	-19.15	47.47	18.21	-0.08	10.19	Average
2	0.42	42.42	-15.05	57.47	32.31	-0.08	10.19	QP
3	0.78	28.45	-17.55	46.00	18.30	-0.09	10.24	Average
4	0.78	40.05	-15.95	56.00	29.90	-0.09	10.24	QP
5	1.05	25.97	-20.03	46.00	15.80	-0.10	10.27	Average
6	1.05	38.97	-17.03	56.00	28.80	-0.10	10.27	QP
7	1.26	25.38	-20.62	46.00	15.20	-0.10	10.28	Average
8	1.26	40.58	-15.42	56.00	30.40	-0.10	10.28	QP
9	1.56	26.40	-19.60	46.00	16.21	-0.11	10.30	Average
10	1.56	40.20	-15.80	56.00	30.01	-0.11	10.30	QP
11	1.98	29.22	-16.78	46.00	19.00	-0.11	10.33	Average
12	1.98	43.22	-12.78	56.00	33.00	-0.11	10.33	QP



Test Mode :	Mode 1	Temperature :	22~23°C
Test Engineer :	Louis Lu	Relative Humidity :	42~43%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + Adapter + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS  
 Condition: FCC PART15C LISN-071001 NEUTRAL  
 Project : (FR) 072703  
 mode : mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.42	26.72	-20.73	47.45	16.61	-0.08	10.19	Average
2	0.42	44.42	-13.03	57.45	34.31	-0.08	10.19	QP
3	0.51	42.33	-13.67	56.00	32.20	-0.08	10.21	QP
4	0.51	25.73	-20.27	46.00	15.60	-0.08	10.21	Average
5	0.81	42.56	-13.44	56.00	32.39	-0.08	10.25	QP
6	0.81	25.36	-20.64	46.00	15.19	-0.08	10.25	Average
7	1.08	45.18	-10.82	56.00	35.00	-0.09	10.27	QP
8	1.08	29.38	-16.62	46.00	19.20	-0.09	10.27	Average
9	1.59	45.00	-11.00	56.00	34.79	-0.10	10.31	QP
10	1.59	32.20	-13.80	46.00	21.99	-0.10	10.31	Average
11	2.04	48.72	-7.28	56.00	38.50	-0.11	10.33	QP
12	2.04	35.32	-10.68	46.00	25.10	-0.11	10.33	Average

### 3.9 Radiated Emission Measurement

#### 3.9.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/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

#### 3.9.2 Measuring Instruments

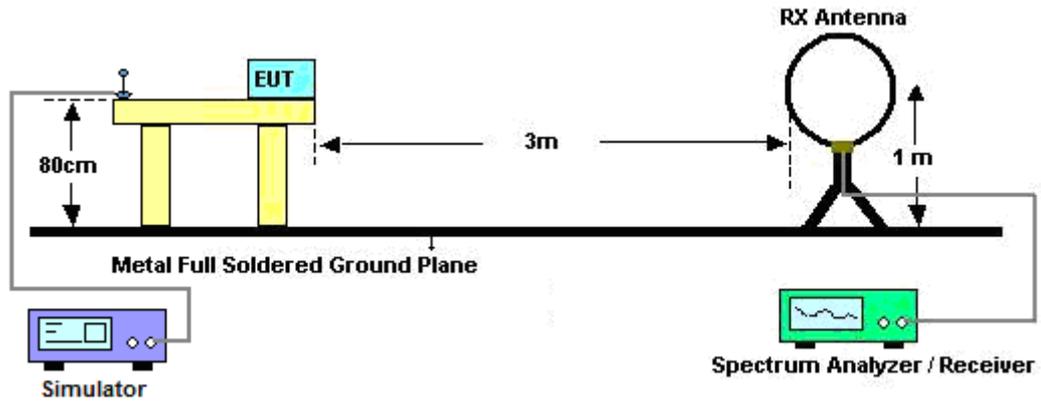
See list of measuring instruments of this test report.

#### 3.9.3 Test Procedures

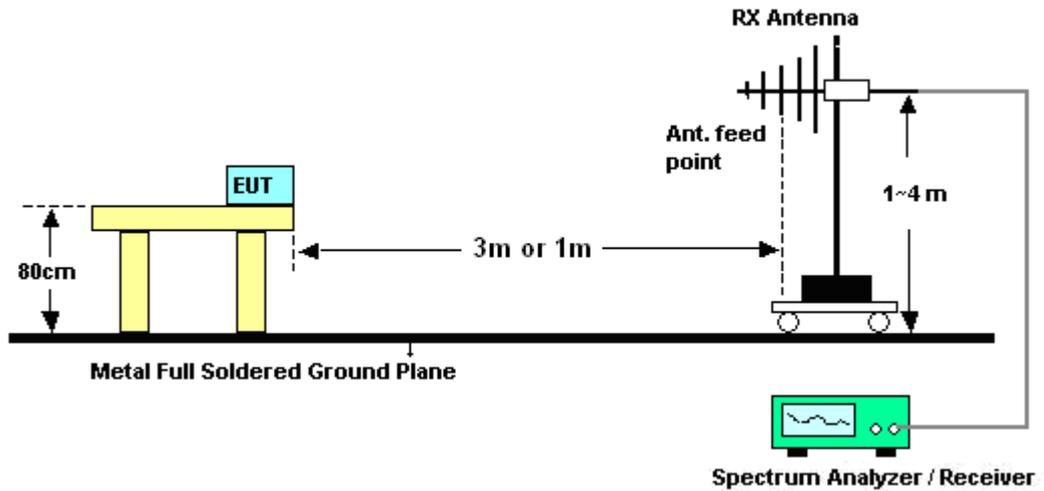
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
  - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold.
  - (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.  
 Distance extrapolation factor =  $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$  (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

### 3.9.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz





3.9.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

Test Engineer :	Lewis Lu	Temperature :	21~22°C	
		Relative Humidity :	42~43%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that 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.



3.9.6 Test Result of Radiated Emission (30 MHz ~ 10<sup>th</sup> Harmonic)

Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	42~43%
Test Engineer :	Lewis Lu	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
44.85	18.71	-21.29	40	38.11	9.6	0.3	29.3	-	-	Peak
92.1	21.98	-21.52	43.5	41.48	9.35	0.42	29.27	123	256	Peak
189.03	12.98	-30.52	43.5	33.27	8.49	0.64	29.42	-	-	Peak
327.3	18.08	-27.92	46	33.14	13.84	0.8	29.7	-	-	Peak
368.6	23.91	-22.09	46	37.85	14.98	0.86	29.78	-	-	Peak
666.8	17.66	-28.34	46	27.03	19.01	1.12	29.5	-	-	Peak
2324.82	45.72	-28.28	74	44.79	32.76	3.1	34.93	103	250	Peak
2324.82	35.93	-18.07	54	35	32.76	3.1	34.93	103	250	Average
2402	86.02	-	-	84.99	32.86	3.15	34.98	102	62	Peak
2402	101.06	-	-	100.03	32.86	3.15	34.98	102	62	Average
2492.97	45.31	-28.69	74	43.98	33.05	3.21	34.93	106	62	Peak
2492.97	36.34	-17.66	54	35.01	33.05	3.21	34.93	106	62	Average



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Lewis Lu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2402 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
46.47	35.68	-4.32	40	55.78	8.88	0.3	29.28	135	236	Peak
89.67	28.9	-14.6	43.5	48.87	8.9	0.4	29.27	-	-	Peak
135.03	22.02	-21.48	43.5	39.46	11.3	0.55	29.29	-	-	Peak
307	15.9	-30.1	46	31.59	13.17	0.78	29.64	-	-	Peak
340.6	18.29	-27.71	46	32.94	14.28	0.81	29.74	-	-	Peak
363.7	16.43	-29.57	46	30.52	14.83	0.85	29.77	-	-	Peak
2389.23	45.5	-28.5	74	44.48	32.86	3.13	34.97	108	250	Peak
2389.23	37.03	-16.97	54	36.01	32.86	3.13	34.97	108	250	Average
2402	99.74	-	-	98.71	32.86	3.15	34.98	151	349	Peak
2402	83.33	-	-	82.3	32.86	3.15	34.98	151	349	Average
2486.51	45.26	-28.74	74	43.99	33.01	3.2	34.94	150	350	Peak
2486.51	38.28	-15.72	54	37.01	33.01	3.2	34.94	150	350	Average



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Lewis Lu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2441 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
42.96	20.14	-19.86	40	38.66	10.48	0.3	29.3	-	-	Peak
92.1	23.08	-20.42	43.5	42.58	9.35	0.42	29.27	-	-	Peak
266.52	19.56	-26.44	46	36.14	12.29	0.75	29.62	-	-	Peak
327.3	21.9	-24.1	46	36.96	13.84	0.8	29.7	-	-	Peak
368.6	22.83	-23.17	46	36.77	14.98	0.86	29.78	-	-	Peak
902	32.32	-13.68	46	38.65	20.46	1.29	28.08	135	255	Peak
2376.69	38	-16	54	37.01	32.83	3.13	34.97	120	250	Average
2376.69	45.25	-28.75	74	44.26	32.83	3.13	34.97	120	250	Peak
2441	99.24	-	-	98.06	32.95	3.18	34.95	197	245	Peak
2441	83.68	-	-	82.5	32.95	3.18	34.95	197	245	Average
2493.16	45.44	-28.56	74	44.11	33.05	3.21	34.93	135	234	Peak
2493.16	37.34	-16.66	54	36.01	33.05	3.21	34.93	135	234	Average



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Lewis Lu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2441 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
47.82	36.76	-3.24	40	57.21	8.5	0.31	29.26	123	236	Peak
88.86	31.02	-12.48	43.5	51.28	8.61	0.4	29.27	-	-	Peak
135.03	22.62	-20.88	43.5	40.06	11.3	0.55	29.29	-	-	Peak
307	17.23	-28.77	46	32.92	13.17	0.78	29.64	-	-	Peak
368.6	14.92	-31.08	46	28.86	14.98	0.86	29.78	-	-	Peak
456.1	16.27	-29.73	46	28.87	16.38	0.94	29.92	-	-	Peak
2357.12	45.27	-28.73	74	44.3	32.81	3.12	34.96	129	235	Peak
2357.12	38.97	-15.03	54	38	32.81	3.12	34.96	129	235	Average
2441	100.04	-	-	98.86	32.95	3.18	34.95	132	29	Peak
2441	84.91	-	-	83.73	32.95	3.18	34.95	132	29	Average
2489.17	46.11	-27.89	74	44.8	33.05	3.2	34.94	145	205	Peak
2489.17	39.31	-14.69	54	38	33.05	3.2	34.94	145	205	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Lewis Lu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2480 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
45.12	20.94	-19.06	40	40.68	9.25	0.3	29.29	120	236	Peak
70.23	15.1	-24.9	40	38.66	5.3	0.37	29.23	-	-	Peak
92.1	23.1	-20.4	43.5	42.6	9.35	0.42	29.27	-	-	Peak
307	16.01	-29.99	46	31.7	13.17	0.78	29.64	-	-	Peak
327.3	16.9	-29.1	46	31.96	13.84	0.8	29.7	-	-	Peak
368.6	22.49	-23.51	46	36.43	14.98	0.86	29.78	-	-	Peak
2320.83	46.45	-27.55	74	45.52	32.76	3.1	34.93	102	200	Peak
2320.83	38.43	-35.57	74	37.5	32.76	3.1	34.93	102	200	QP
2480	102.42	-	-	101.15	33.01	3.2	34.94	102	47	Peak
2480	85.96	-	-	84.69	33.01	3.2	34.94	102	47	Average
2483.51	63.82	-10.18	74	62.55	33.01	3.2	34.94	102	65	Peak
2483.51	53.51	-0.49	54	52.24	33.01	3.2	34.94	102	65	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	21~22°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Lewis Lu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2480 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
45.12	34.05	-5.95	40	53.79	9.25	0.3	29.29	145	102	Peak
88.32	28.68	-14.82	43.5	49.25	8.3	0.4	29.27	-	-	Peak
200.64	21.59	-21.91	43.5	41.35	9.04	0.66	29.46	-	-	Peak
307	17.31	-28.69	46	33	13.17	0.78	29.64	-	-	Peak
363	16.34	-29.66	46	30.46	14.8	0.85	29.77	-	-	Peak
946.1	21.38	-32.62	54	26.9	20.71	1.32	27.55	-	-	Peak
2320.83	45.71	-28.29	74	44.78	32.76	3.1	34.93	102	260	Peak
2320.83	38.93	-15.07	54	38	32.76	3.1	34.93	102	260	Average
2480	100.2	-	-	98.93	33.01	3.2	34.94	104	309	Peak
2480	84.67	-	-	83.4	33.01	3.2	34.94	104	309	Average
2483.51	52.45	-1.55	54	51.18	33.01	3.2	34.94	129	315	Average
2483.51	61.49	-12.51	74	60.22	33.01	3.2	34.94	129	315	Peak



## **3.10 Antenna Requirements**

### **3.10.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

### **3.10.2 Antenna Connected Construction**

The antennas type used in this product is Fixed Internal Antenna without connector and it is considered to meet antenna requirement.

### **3.10.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 27, 2009	Aug. 26, 2010	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 28, 2009	Aug. 27, 2010	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (05CH01-KS)
Bilog Antenna	SCHAFFNER	CBL611D	23183	25MHz~2GHz	Dec. 07, 2009	Dec. 06, 2010	Radiation (05CH01-KS)
DRG	ETS-Lindgren	3117	00075957	1GHz~18GHz	Dec. 07, 2009	Dec. 06, 2010	Radiation (05CH01-KS)
Amplifier	Wireless	FPA6592G	060007	30MHz~2GHz	Dec. 07, 2009	Dec. 06, 2010	Radiation (05CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 07, 2009	Dec. 06, 2010	Radiation (05CH01-KS)
EMI Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 17, 2009	Nov. 16, 2010	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Jan. 18, 2010	Jan. 17, 2011	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Jan. 18, 2010	Jan. 17, 2011	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	N/A	Nov. 26, 2009	Nov. 25, 2010	Conduction (CO01-KS)
System Simulator	R&S	CMU200	837587/066	Full-Band	Jan. 08, 2009	Jan. 07, 2011	-
Bluetooth Base Station	ANRITSU	MT8852B	6K00004935	BT EDR	Sep. 17, 2009	Sep. 16, 2010	-

## 5 Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.13</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.26</b>		

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.27</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.54</b>		

**Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)**

Contribution	Uncertainty of $X_i$		$u(X_i)$	$C_i$	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>2.36</b>				
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>4.72</b>				



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP080210 as below.