

# FCC RF Test Report

APPLICANT : Acer Incorporated  
EQUIPMENT : Smart HandHeld  
BRAND NAME : Acer  
MODEL NAME : E120  
FCC ID : HLZDME120  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on May 19, 2010 and completely tested on Jun. 15, 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 INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



## **SPORTON INTERNATIONAL INC.**

No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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### REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR051810-01A	Rev. 01	Initial issue of report	Jun. 22, 2010

**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	-
3.2	-	Gen 4.4.1	99% Bandwidth	-	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 16.7 dB at 0.398 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.86 dB at 2483.500 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**Acer Incorporated**

8F., No. 88, Sec. 1, Hsin Tai Wu Rd., Hsichih, Taipei Hsien 221, Taiwan

## 1.2 Manufacturer

**Futaijing Precision Electronics (Beijing) Co., Ltd.**

No. 9, Jinxiu Street, Beijing Economic Technology Development Area

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
<b>Equipment</b>	Smart HandHeld
<b>Brand Name</b>	Acer
<b>Model Name</b>	E120
<b>FCC ID</b>	HLZDME120
<b>Tx/Rx Frequency Range</b>	2400 MHz ~ 2483.5 MHz
<b>Number of Channels</b>	79
<b>Carrier Frequency of Each Channel</b>	2402+n*1 MHz; n=0~78
<b>Channel Spacing</b>	1 MHz
<b>Maximum Output Power to Antenna</b>	Bluetooth (1Mbps) : 1.98 dBm (1.58 mW) Bluetooth EDR (2Mbps) : -0.13 dBm (0.97 mW) Bluetooth EDR (3Mbps) : 0.11 dBm (1.03 mW)
<b>Antenna Type</b>	PIFA Antenna with gain 3.1 dBi
<b>HW Version</b>	1.0 (PR2)
<b>SW Version</b>	Firmware version : 1.6 Baseband version : 40000000E22E1105 Build number : Acer_E120_V0.180.00_AAP_GEN2
<b>Type of Modulation</b>	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi$ /4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
<b>EUT Stage</b>	Identical Prototype

**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 INC.		
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC/IC Registration No.</b>
	CO05-HY	03CH05-HY	TW1022/4086B-1

## 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 Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A

## 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	1.38 dBm	-0.13 dBm	0.11 dBm
Ch39	2441MHz	1.14 dBm	-0.60 dBm	-0.29 dBm
Ch78	2480MHz	<b>1.98 dBm</b>	-0.27 dBm	0.08 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 were conducted to determine the final configuration from all possible combinations.

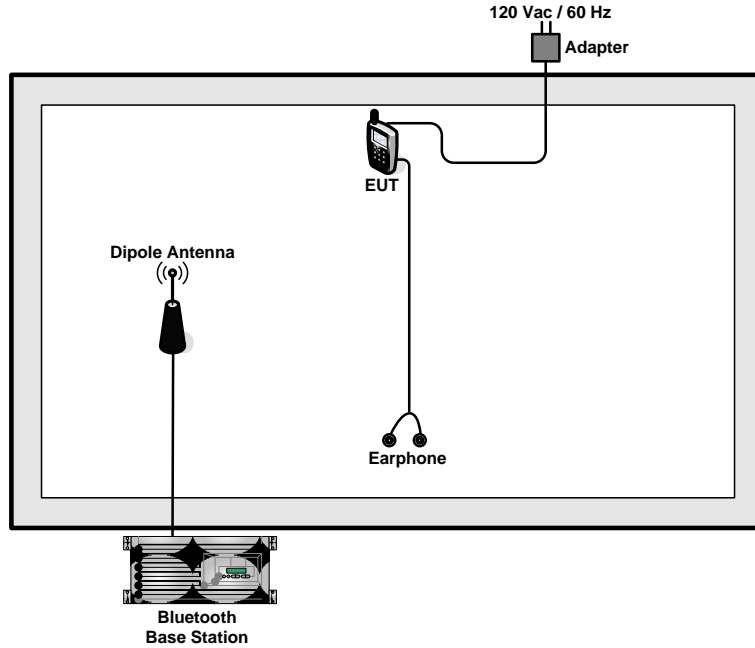
The following tables are showing the test modes as the worst cases and recorded in this report.

<b>Test Cases</b>			
<b>Test Item</b>	<b>Data Rate / Modulation</b>		
	<b>Bluetooth 1Mbps GFSK</b>	<b>Bluetooth EDR 2Mbps <math>\pi</math>/4-DQPSK</b>	<b>Bluetooth EDR 3Mbps 8-DPSK</b>
<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	N/A	N/A
<b>AC Conducted Emission</b>	Mode 1 :GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + Adapter		
<b>Remark:</b> 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.			

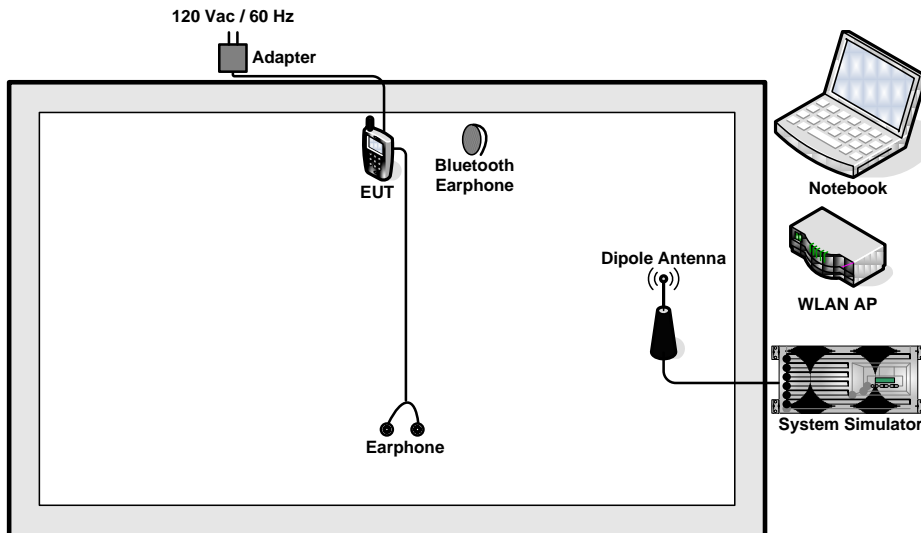


## 2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<EUT with Adapter Mode>



## 2.4 RF Utility

For Bluetooth function, the RF utility, "AT Command" was installed in notebook which was programmed 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.

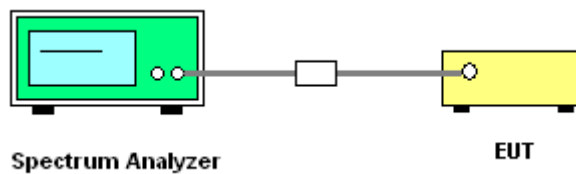
##### 3.1.2 Measuring Instruments

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

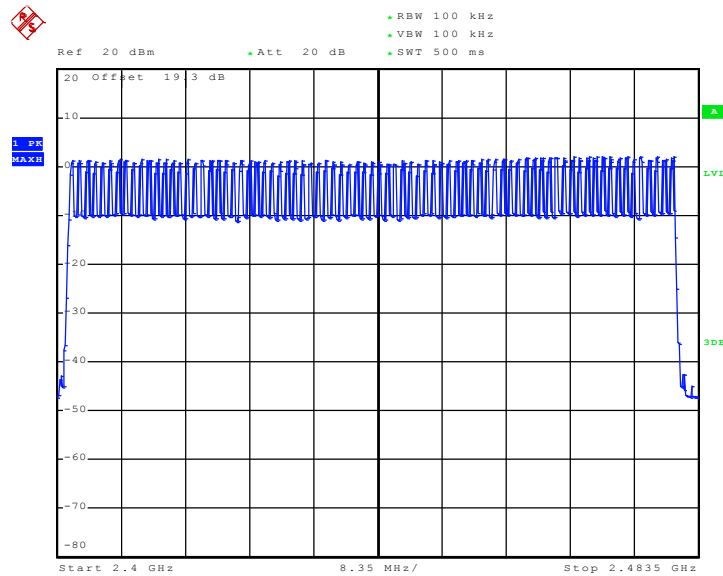




### 3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 1~3	Temperature :	26~28°C
Test Engineer :	Lancelot Chen	Relative Humidity :	43~46%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 25.MAY.2010 18:21:43

## 3.2 20dB and 99% Bandwidth Measurement

### 3.2.1 Limit of 20dB Bandwidth

N/A

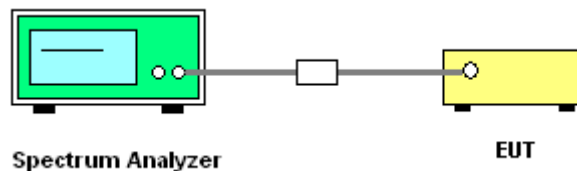
### 3.2.2 Measuring Instruments

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



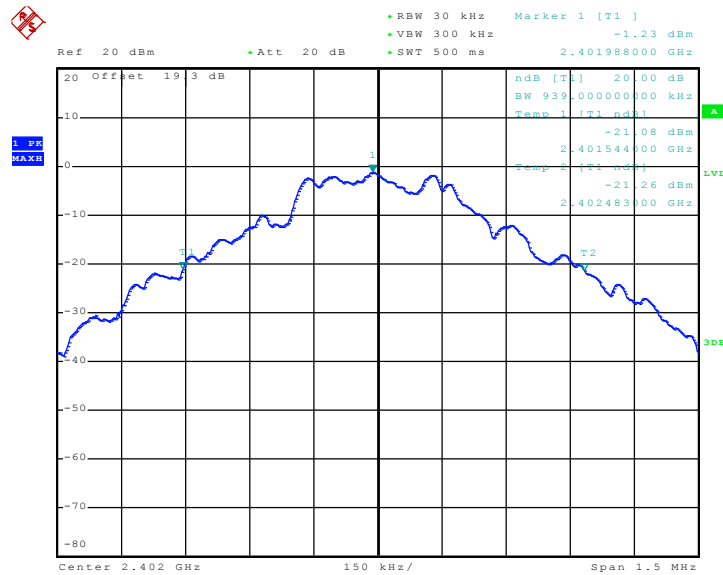


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	26~28°C
Test Engineer :	Lancelot Chen	Relative Humidity :	43~46%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.939
39	2441	0.939
78	2480	0.939

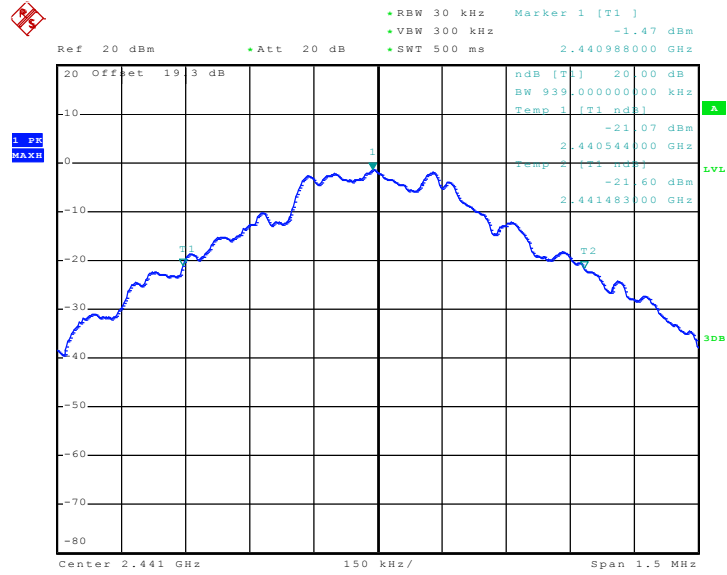
20 dB Bandwidth Plot on Channel 00



Date: 25.MAY.2010 17:39:57

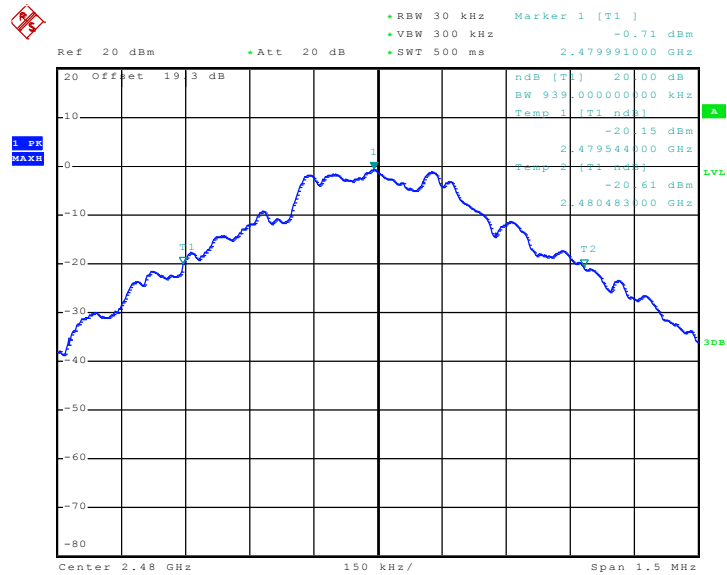


20 dB Bandwidth Plot on Channel 39



Date: 25.MAY.2010 17:40:24

20 dB Bandwidth Plot on Channel 78



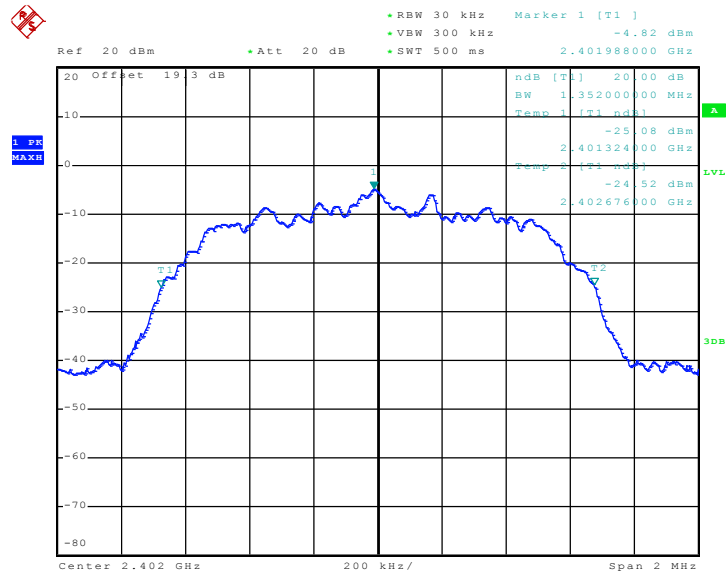
Date: 25.MAY.2010 17:40:45



Test Mode :	Mode 4, 5, 6	Temperature :	26~28°C
Test Engineer :	Lancelot Chen	Relative Humidity :	43~46%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.352
39	2441	1.348
78	2480	1.344

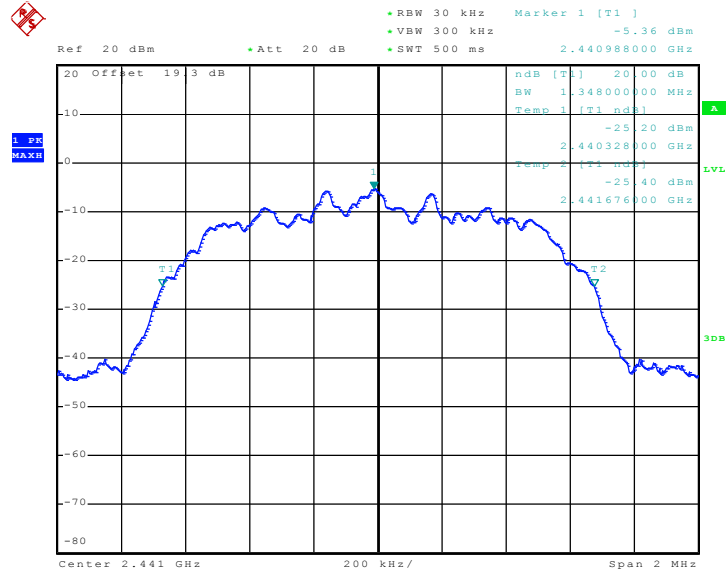
20 dB Bandwidth Plot on Channel 00



Date: 25.MAY.2010 17:43:13

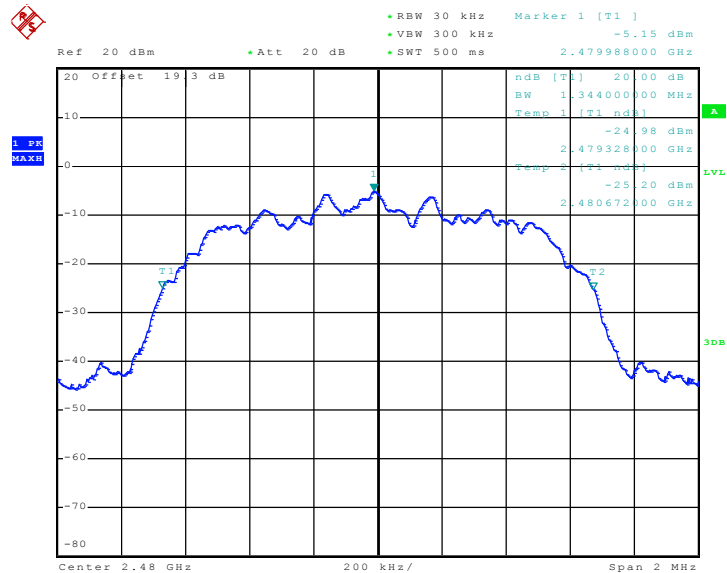


### 20 dB Bandwidth Plot on Channel 39



Date: 25.MAY.2010 17:42:35

### 20 dB Bandwidth Plot on Channel 78



Date: 25.MAY.2010 17:41:44

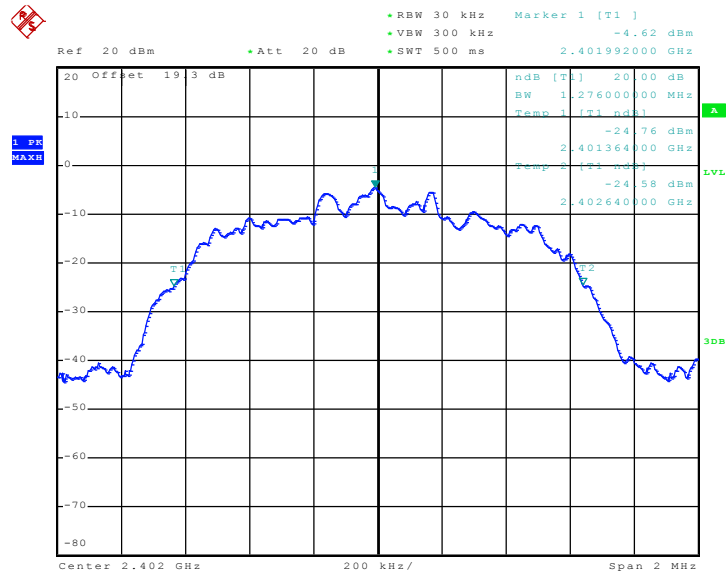




Test Mode :	Mode 7, 8, 9	Temperature :	26~28°C
Test Engineer :	Lancelot Chen	Relative Humidity :	43~46%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.276
39	2441	1.272
78	2480	1.280

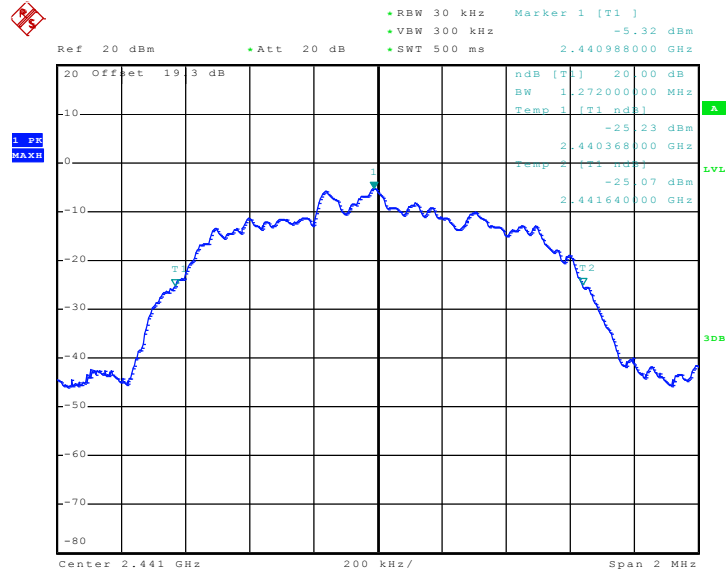
20 dB Bandwidth Plot on Channel 00



Date: 25.MAY.2010 17:46:05

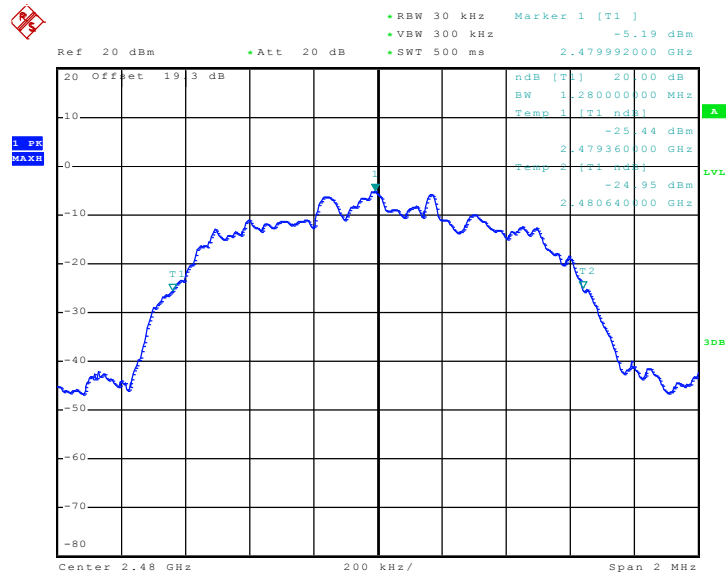


20 dB Bandwidth Plot on Channel 39



Date: 25.MAY.2010 17:46:57

20 dB Bandwidth Plot on Channel 78



Date: 25.MAY.2010 17:47:27

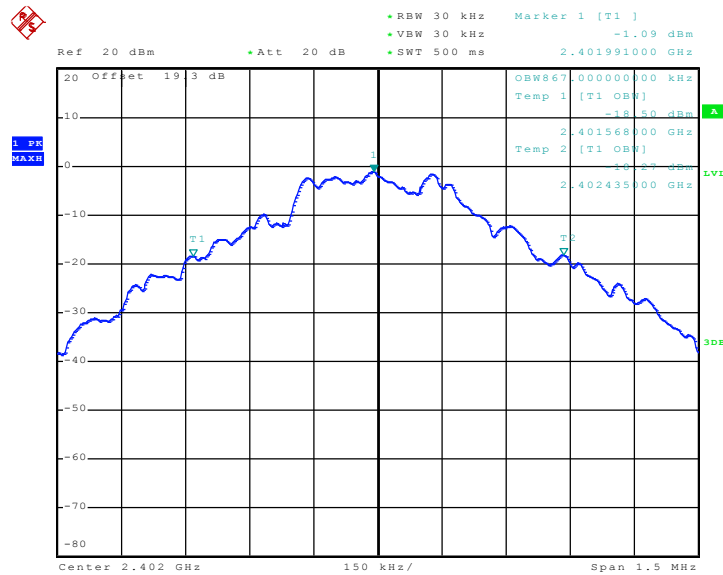


3.2.6 Test Result of 99% Occupied Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	26~28°C
Test Engineer :	Lancelot Chen	Relative Humidity :	43~46%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.867
39	2441	0.867
78	2480	0.867

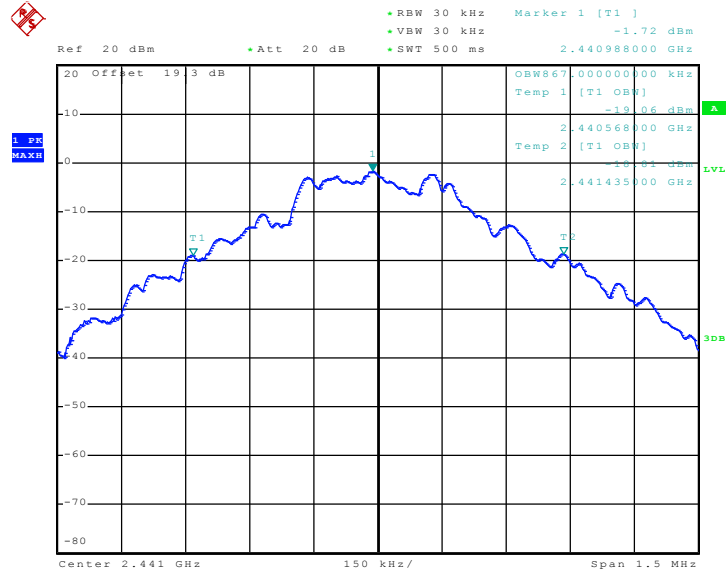
99% Bandwidth Plot on Channel 00



Date: 1.JUN.2010 11:03:08

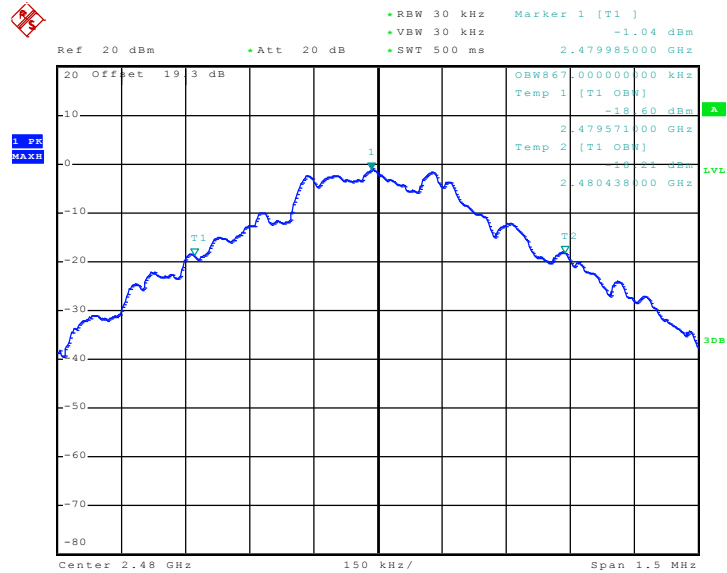


99% Occupied Bandwidth Plot on Channel 39



Date: 1.JUN.2010 11:03:30

99% Occupied Bandwidth Plot on Channel 78



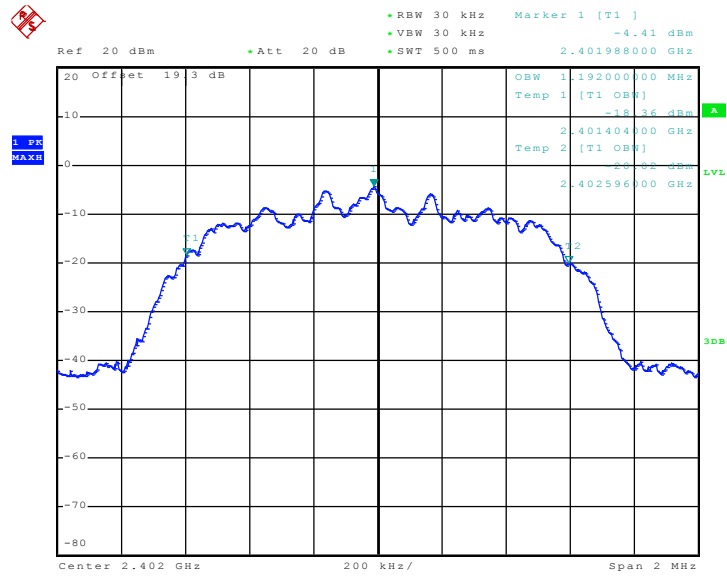
Date: 1.JUN.2010 11:03:53



Test Mode :	Mode 4, 5, 6	Temperature :	26~28°C
Test Engineer :	Lancelot Chen	Relative Humidity :	43~46%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.192
39	2441	1.196
78	2480	1.192

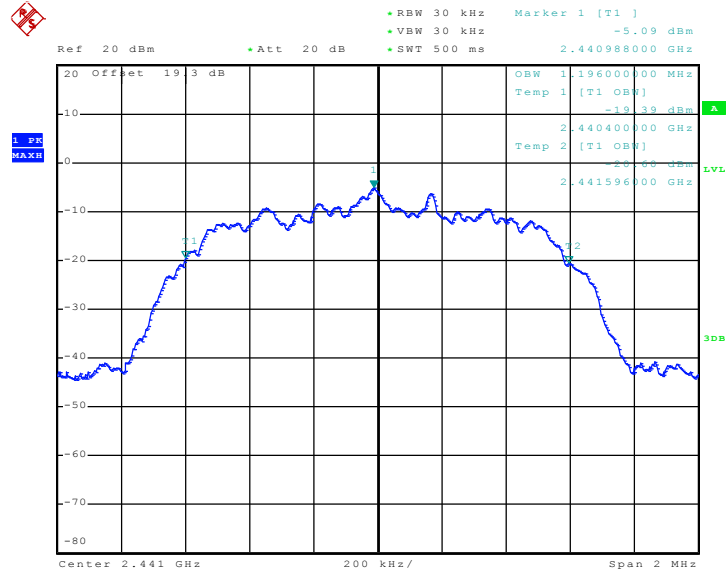
99% Bandwidth Plot on Channel 00



Date: 1.JUN.2010 11:05:58

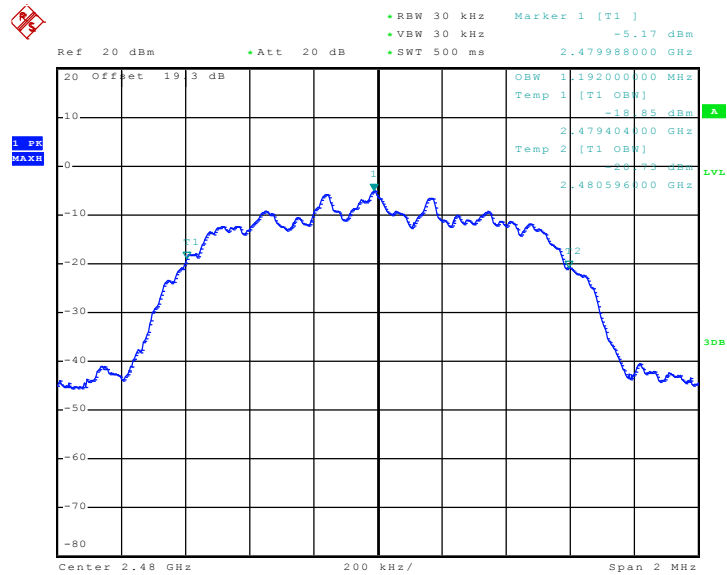


99% Occupied Bandwidth Plot on Channel 39



Date: 1.JUN.2010 11:05:32

99% Occupied Bandwidth Plot on Channel 78



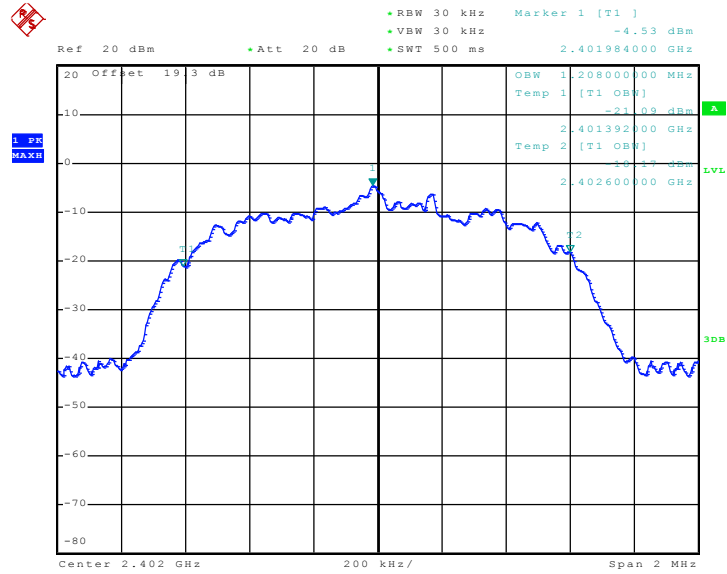
Date: 1.JUN.2010 11:05:02



Test Mode :	Mode 7, 8, 9	Temperature :	26~28°C
Test Engineer :	Lancelot Chen	Relative Humidity :	43~46%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.208
39	2441	1.208
78	2480	1.196

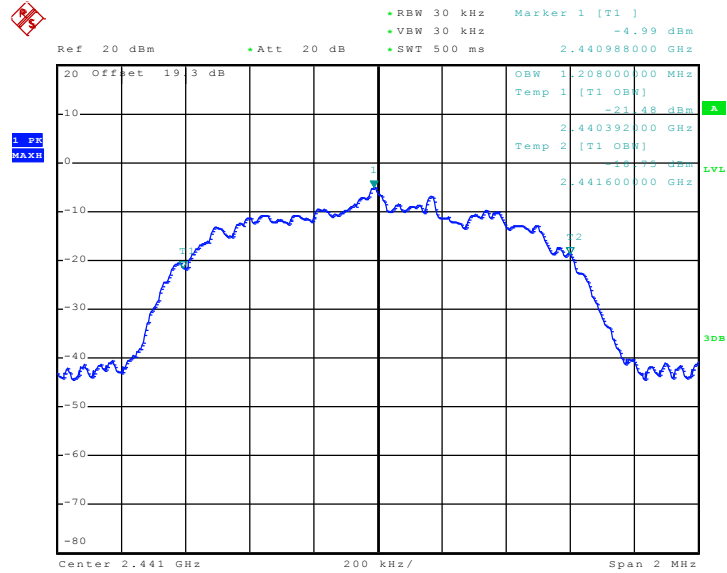
99% Bandwidth Plot on Channel 00



Date: 1.JUN.2010 11:06:51

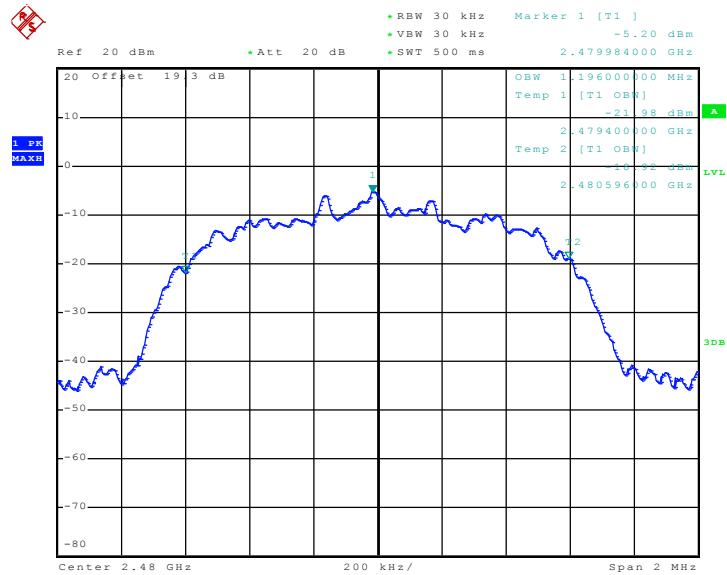


99% Occupied Bandwidth Plot on Channel 39



Date: 1.JUN.2010 11:07:28

99% Occupied Bandwidth Plot on Channel 78



Date: 1.JUN.2010 11:08:28



### 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.

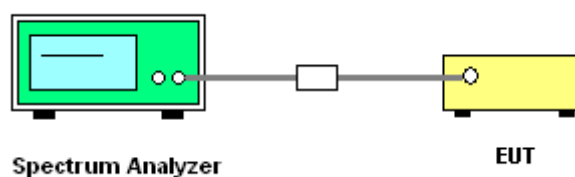
#### 3.3.2 Measuring Instruments

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



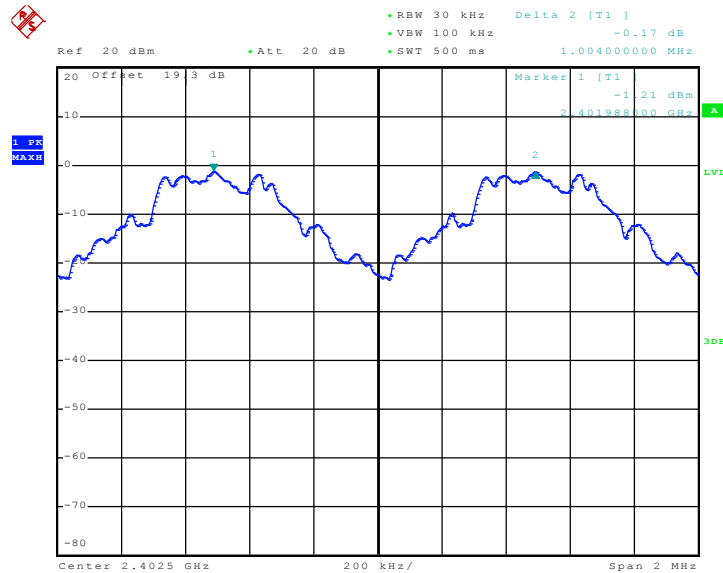


3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 1, 2, 3	Temperature :	26~28°C
Test Engineer :	Lancelot Chen	Relative Humidity :	43~46%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.004	0.626	Pass
39	2441	1.004	0.626	Pass
78	2480	1.000	0.626	Pass

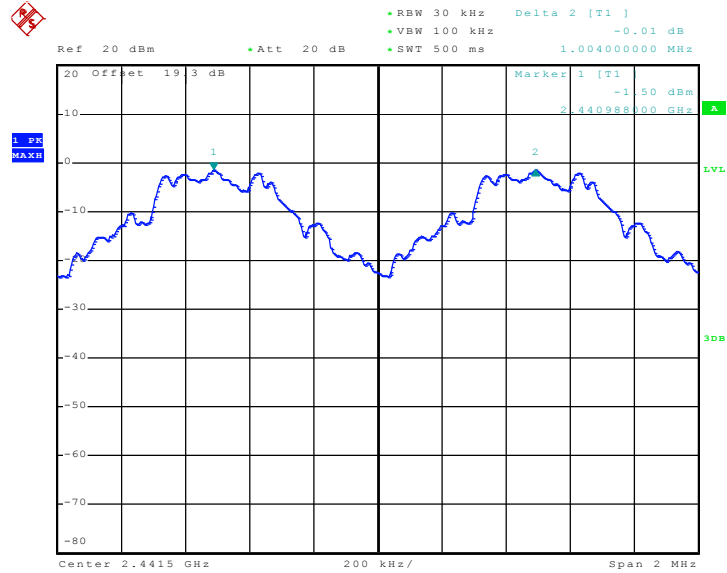
Channel Separation Plot on Channel 00 - 01



Date: 25.MAY.2010 17:52:51

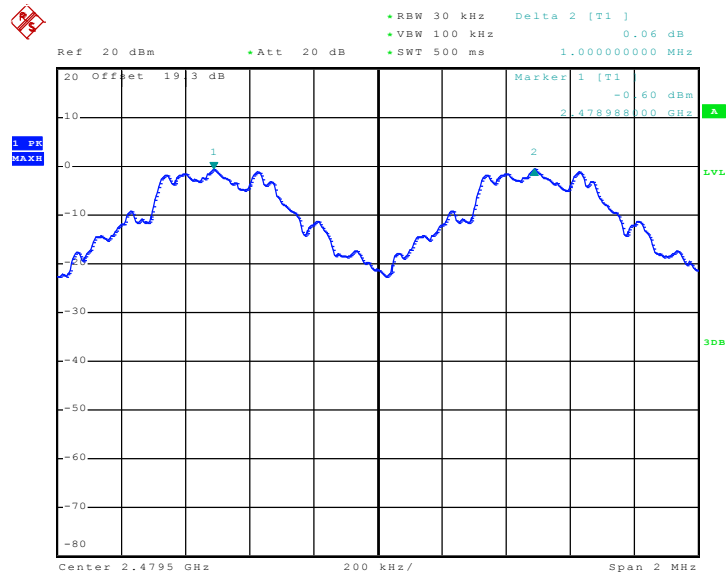


Channel Separation Plot on Channel 39 - 40



Date: 25.MAY.2010 17:54:04

Channel Separation Plot on Channel 77 - 78



Date: 25.MAY.2010 17:55:06

### 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.

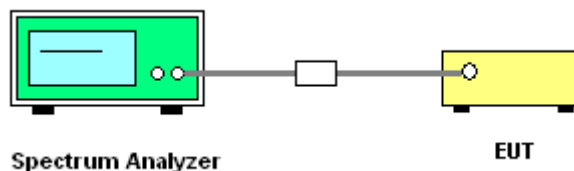
#### 3.4.2 Measuring Instruments

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

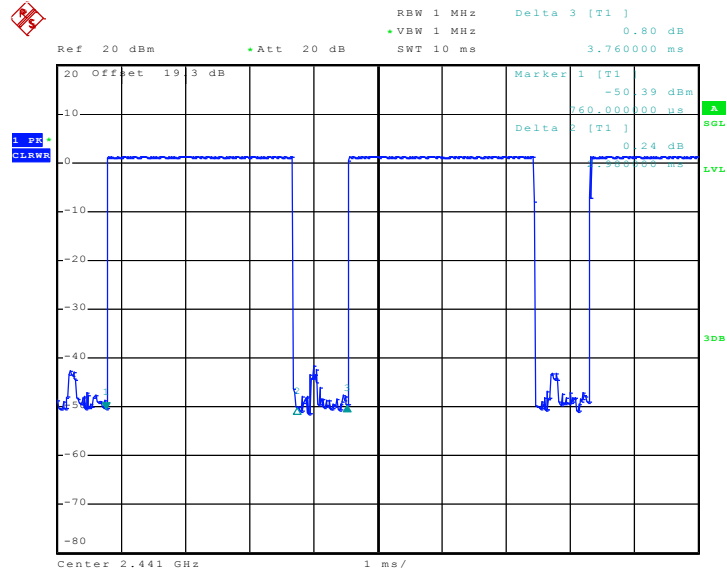
<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	26~28°C		
<b>Test Engineer :</b>	Lancelot Chen	<b>Relative Humidity :</b>	43~46%		
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	3.60	2980.00	0.34	0.4	Pass

**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)

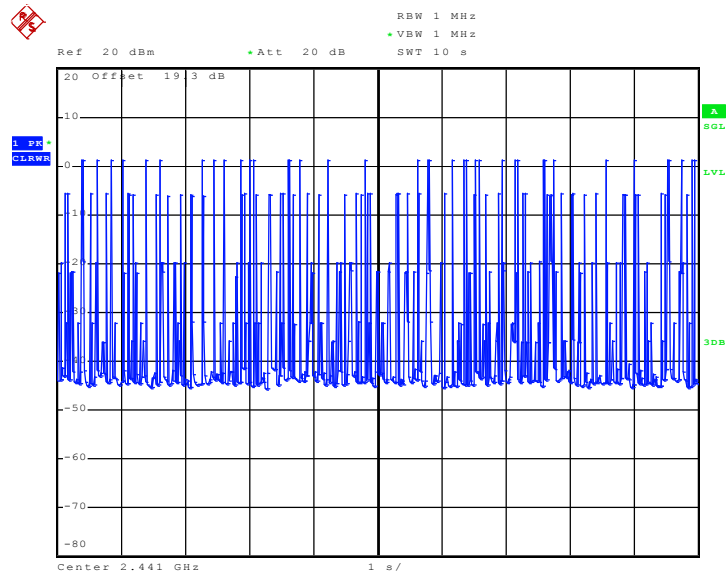


### DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 25.MAY.2010 18:33:36

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



Date: 25.MAY.2010 18:31:06

### 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).

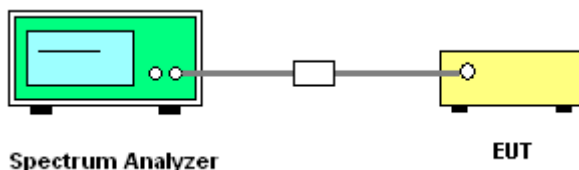
#### 3.5.2 Measuring Instruments

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



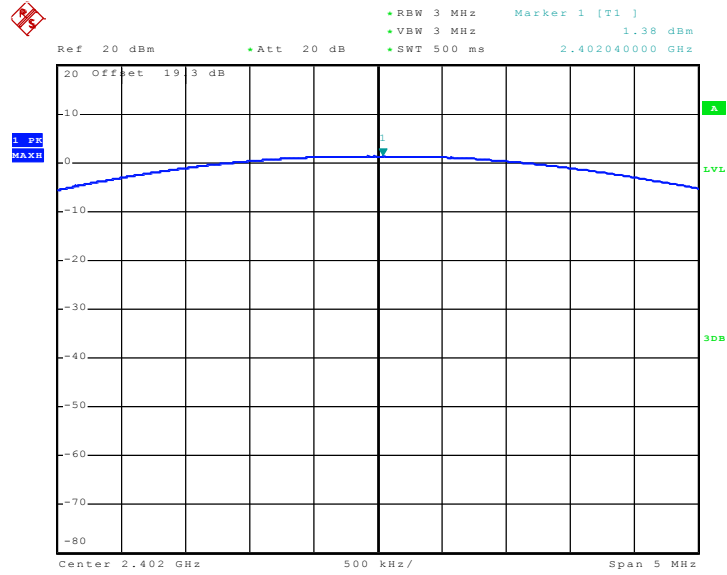
#### 3.5.5 Test Result of Peak Output Power

<b>Test Mode :</b>	Mode 1, 2, 3	<b>Temperature :</b>	26~28°C
<b>Test Engineer :</b>	Lancelot Chen	<b>Relative Humidity :</b>	43~46%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	1.38	30	Pass
39	2441	1.14	30	Pass
78	2480	1.98	30	Pass

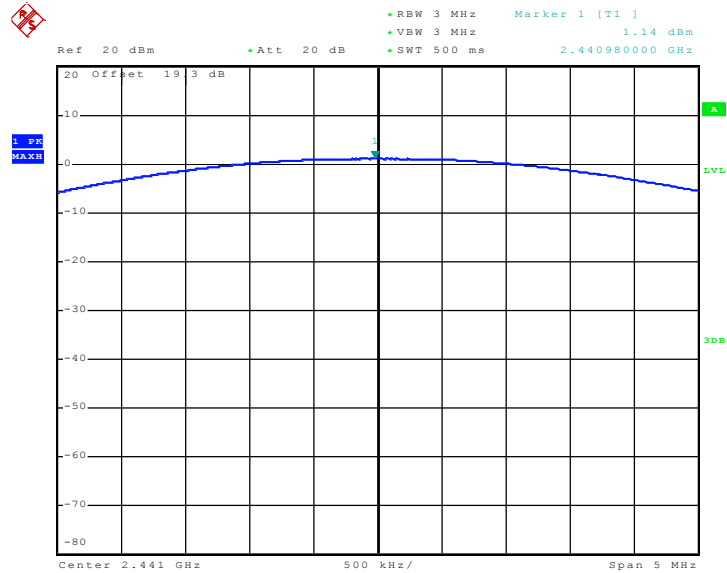


Peak Output Power Plot on Channel 00



Date: 25.MAY.2010 16:44:57

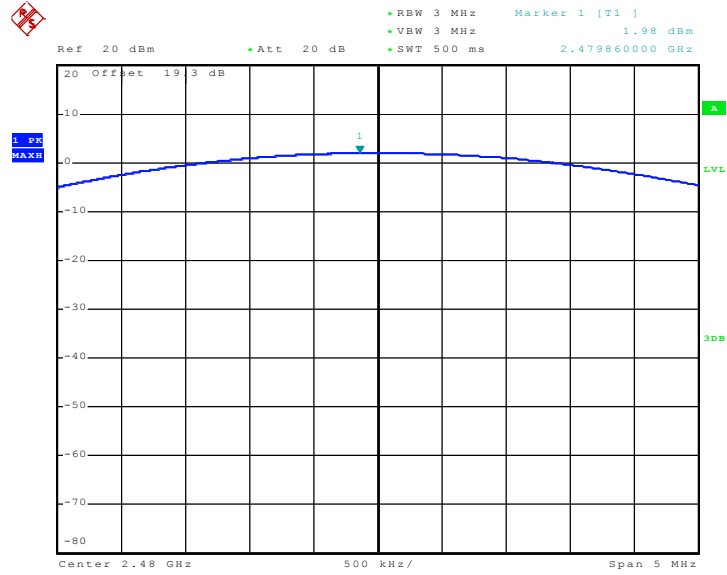
Peak Output Power Plot on Channel 39



Date: 25.MAY.2010 16:45:41



Peak Output Power Plot on Channel 78



Date: 25.MAY.2010 16:46:09





## **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**

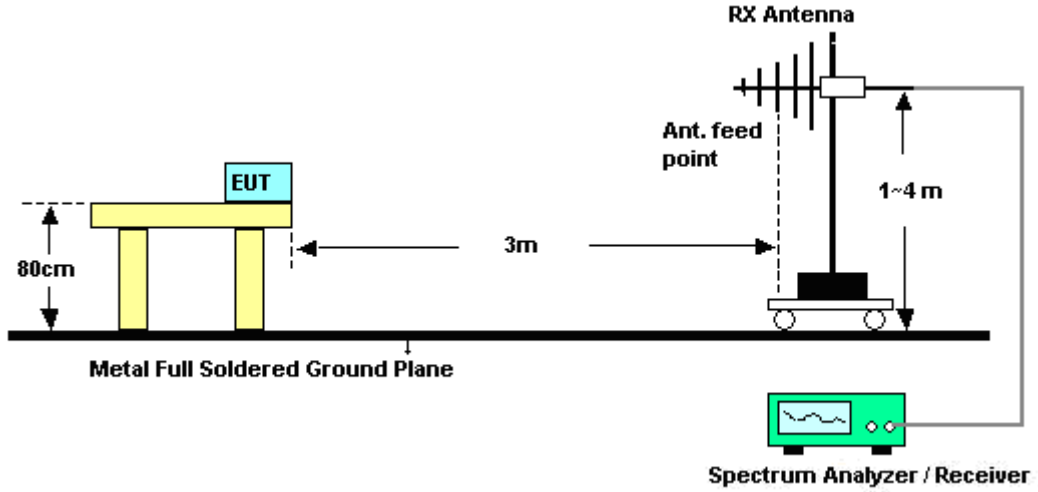
See list of measuring instruments of this test report.

### **3.6.3 Test Procedures**

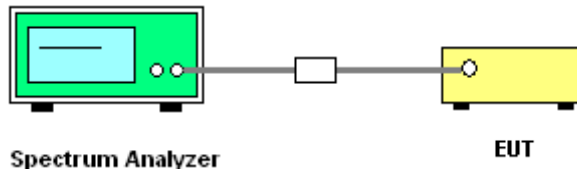
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	23~24°C
Test Channel :	00	Relative Humidity :	45~46%
		Test Engineer :	Kai Wang and Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2385.81	51.39	-22.61	74.00	50.89	31.86	36.08	4.72	114	360	Peak
2385.81	36.26	-17.74	54.00	35.76	31.86	36.08	4.72	114	360	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2384.86	47.59	-26.41	74.00	47.12	31.83	36.08	4.72	100	32	Peak
2384.86	32.44	-21.56	54.00	31.97	31.83	36.08	4.72	100	32	Average

---



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	45~46%
		Test Engineer :	Kai Wang and Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.50	66.14	-7.86	74.00	65.42	31.98	36.10	4.84	168	0	Peak
2483.50	35.18	-18.82	54.00	34.46	31.98	36.10	4.84	168	0	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBµV/m)	Delta Result (dB)	Average Result (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
Single Carrier Mode	86.49	51.31	35.18	54.00	-18.82	Pass
Hopping Mode	86.49	52.44	34.05	54.00	-19.95	Pass

Note : Average result = Maximum field strength – Delta result

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.50	62.37	-11.63	74.00	61.65	31.98	36.10	4.84	100	51	Peak
2483.50	31.27	-22.73	54.00	30.55	31.98	36.10	4.84	100	51	Average

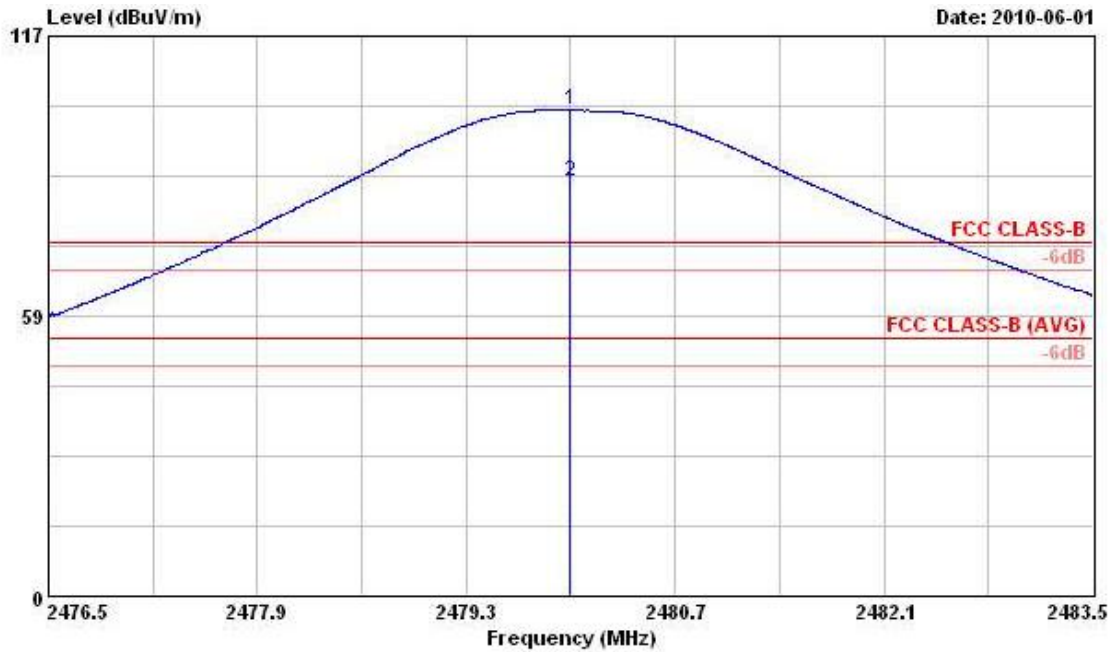
Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBµV/m)	Delta Result (dB)	Average Result (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
Single Carrier Mode	83.70	52.94	30.76	54.00	-23.24	Pass
Hopping Mode	83.70	52.43	31.27	54.00	-22.73	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	45~46%
Test Engineer :	Kai Wang and Cona Huang	Polarization :	Horizontal



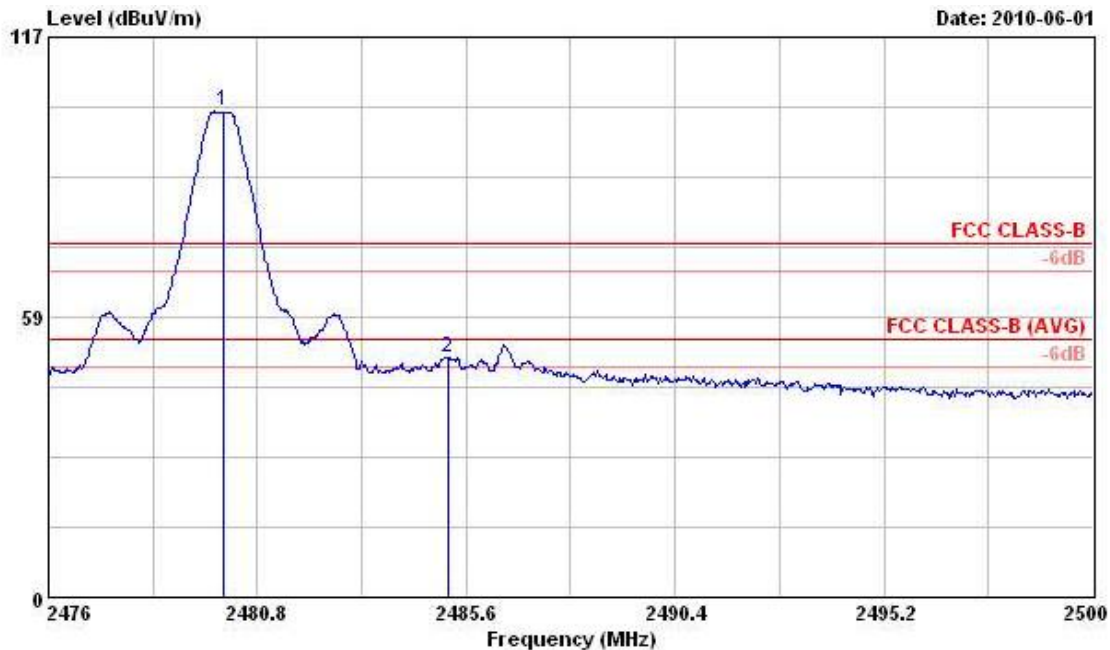
Site : 03CH05-HY  
 Condition : FCC CLASS-B 3m HF\_ANT\_100510 HORIZONTAL  
 Project : FR 051810-01  
 Mode : Mode 3

Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Ant Pos	Table Pos	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB/m	dB	cm	deg	
1 @ 2480.000	101.49	27.49	74.00	100.77	4.84	31.98	36.10	168	0	Peak
2 @ 2480.000	86.49	32.49	54.00	85.77	4.84	31.98	36.10	168	0	Average

\* Maximum field strength of the fundamental emission



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	45~46%
Test Engineer :	Kai Wang and Cona Huang	Polarization :	Horizontal



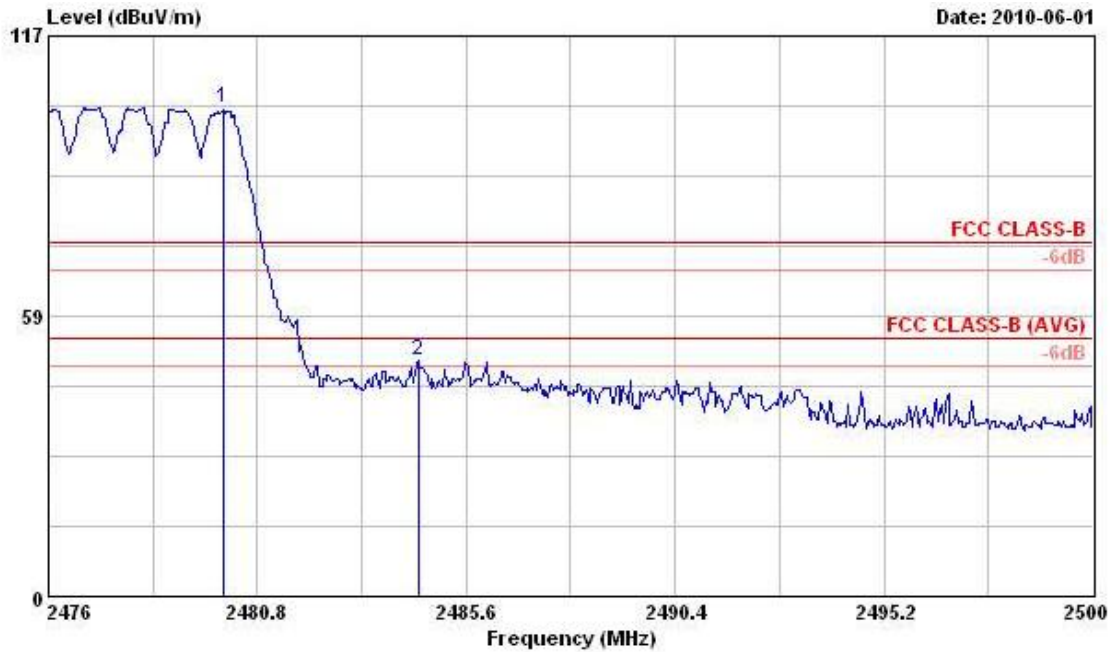
Site : 03CH05-HY  
 Condition : FCC CLASS-B 3m HF\_ANT\_100510 HORIZONTAL  
 Project : FR 051810-01  
 Mode : Mode 3

Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Ant Pos	Table Pos	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB/m	dB	cm	deg	
1 @ 2480.000	101.43	27.43	74.00	100.71	4.84	31.98	36.10	168	0	Peak
2 2485.190	50.12	-23.88	74.00	49.40	4.84	31.98	36.10	168	0	Peak

\* Marker-Delta Method (RBW/VBW=100KHz): 51.31 dB , single carrier Mode



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	45~46%
Test Engineer :	Kai Wang and Cona Huang	Polarization :	Horizontal



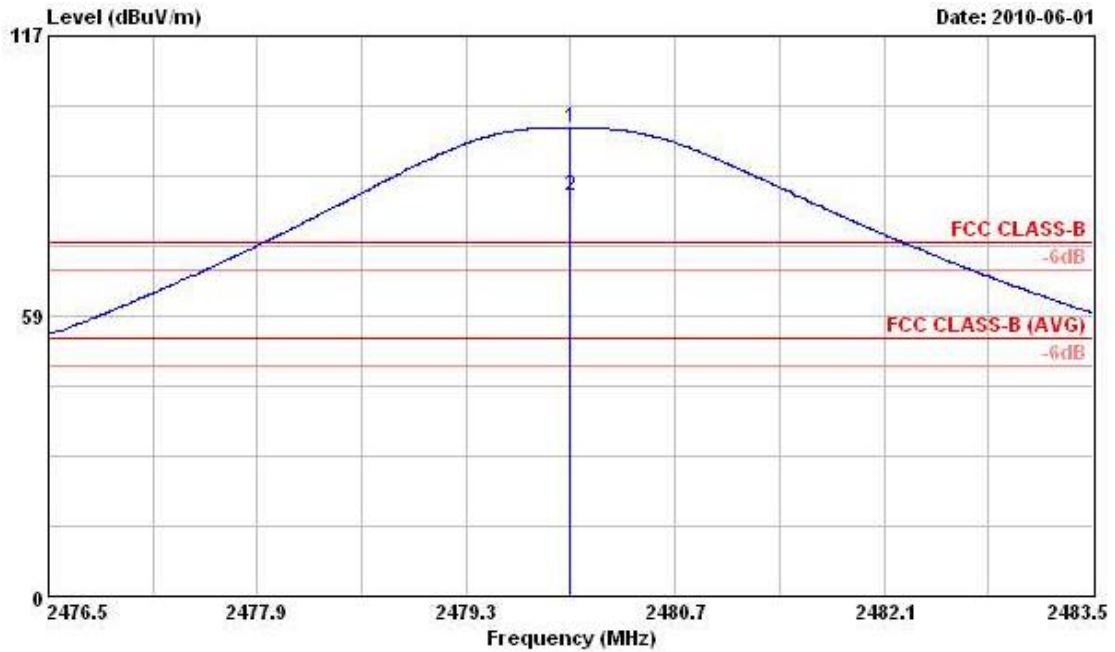
Site : 03CH05-HY  
 Condition : FCC CLASS-B 3m HF\_ANT\_100510 HORIZONTAL  
 Project : FR 051810-01  
 Mode : Mode 3

Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Ant Pos	Table Pos	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB/m	dB	cm	deg	
1 @ 2480.000	101.89	27.89	74.00	101.17	4.84	31.98	36.10	168	0	Peak
2 2484.500	49.45	-24.55	74.00	48.73	4.84	31.98	36.10	168	0	Peak

\* Marker-Delta Method (RBW/VBW=100KHz): 52.44 dB , Hopping Mode



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	45~46%
Test Engineer :	Kai Wang and Cona Huang	Polarization :	Vertical



Site : 03CH05-HY  
 Condition : FCC CLASS-B 3m HF\_ANT\_100510 VERTICAL  
 Project : FR 051810-01  
 Mode : Mode 3

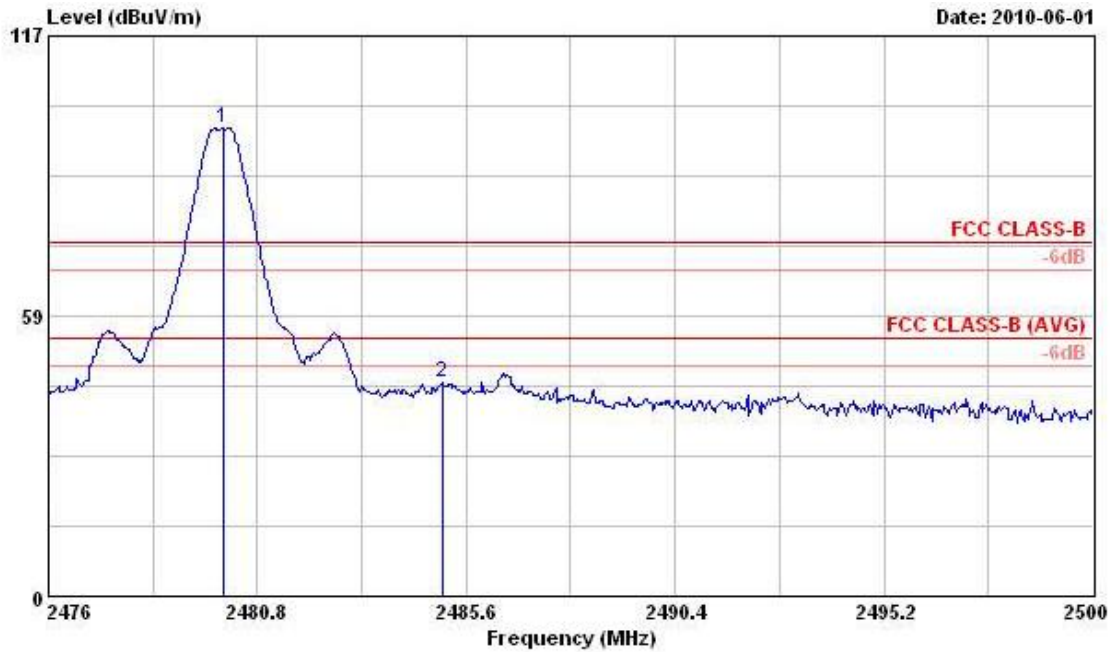
Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X 2480.000	97.75	23.75	74.00	97.03	31.98	4.84	36.10	100	51	Peak
2 @ 2480.000	83.70	29.70	54.00	82.98	31.98	4.84	36.10	100	51	Average

\* Maximum field strength of the fundamental emission





Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	45~46%
Test Engineer :	Kai Wang and Cona Huang	Polarization :	Vertical



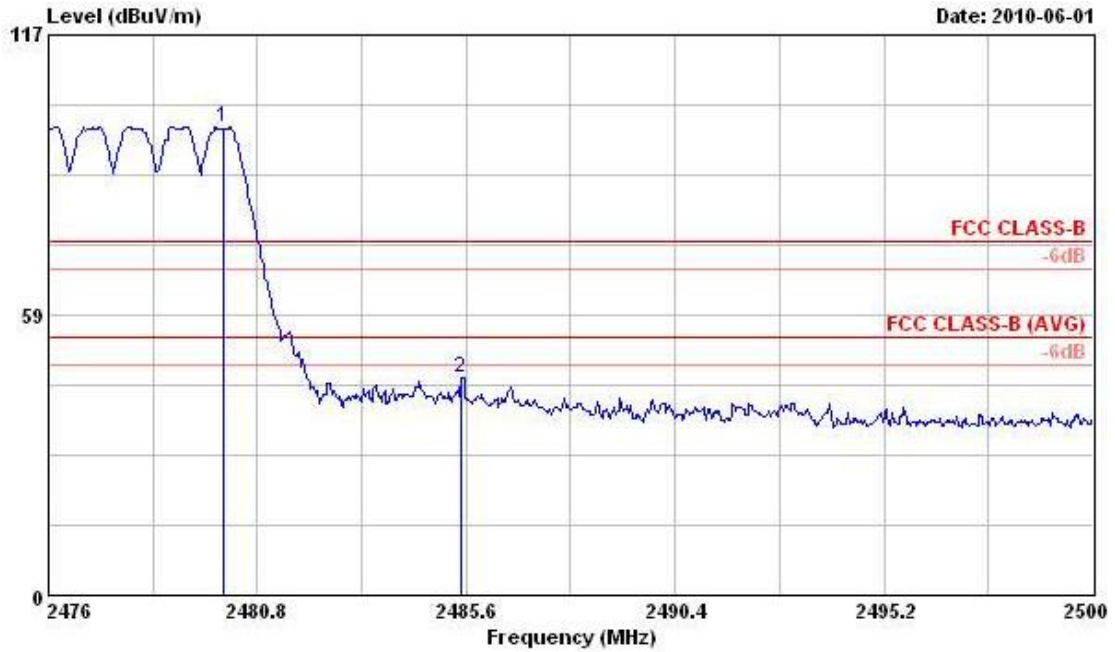
Site : 03CH05-HY  
 Condition : FCC CLASS-B 3m HF\_ANT\_100510 VERTICAL  
 Project : FR 051810-01  
 Mode : Mode 3

Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X 2480.000	97.65	23.65	74.00	96.93	31.98	4.84	36.10	100	51	Peak
2 2485.070	44.71	-29.29	74.00	43.99	31.98	4.84	36.10	100	51	Peak

\* Marker-Delta Method (RBW/VBW=100KHz): 52.94 dB , single carrier Mode



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	45~46%
Test Engineer :	Kai Wang and Cona Huang	Polarization :	Vertical



Site : 03CH05-HY  
 Condition : FCC CLASS-B 3m HF\_ANT\_100510 VERTICAL  
 Project : FR 051810-01  
 Mode : Mode 3

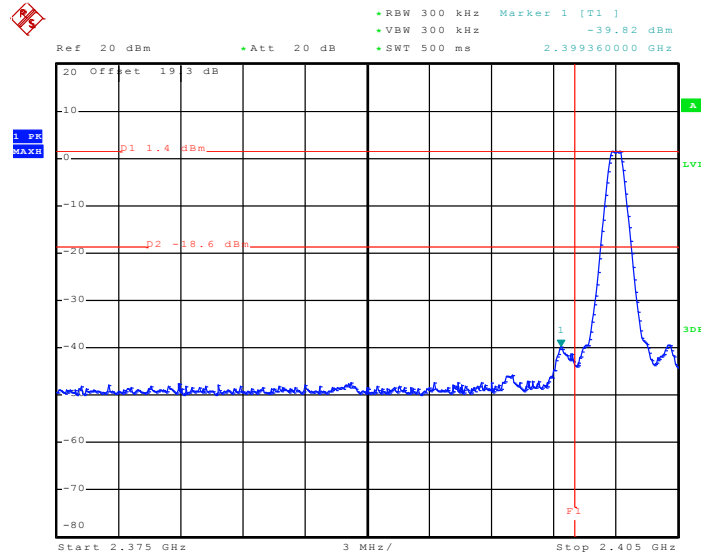
Peak	Freq	Level	Over Limit	Limit Line	Read Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1	2480.000	97.83	23.83	74.00	97.11	31.98	4.84	36.10	100	51 Peak
2	2485.500	45.40	-28.60	74.00	44.68	31.98	4.84	36.10	100	51 Peak

\* Marker-Delta Method (RBW/VBW=100KHz): 52.43 dB , Hopping Mode

### 3.6.6 Test Result of Conducted Band Edges

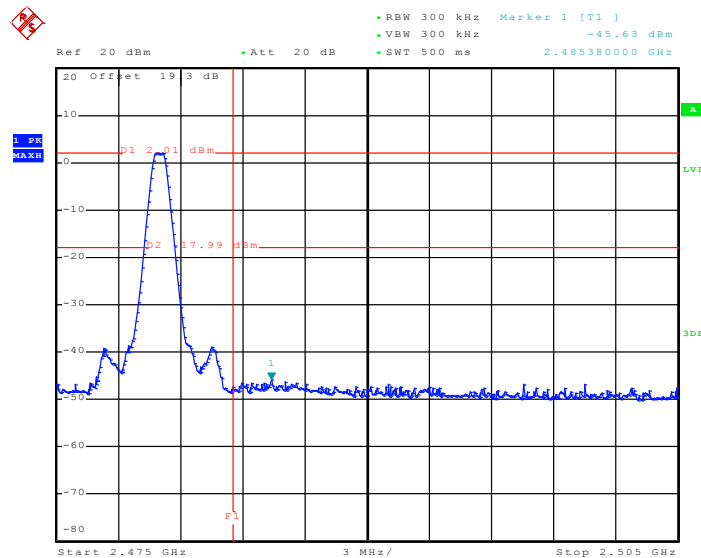
Test Mode :	Mode 1 and 3	Temperature :	26~28°C
Test Channel :	00 and 78	Relative Humidity :	43~46%
		Test Engineer :	Lancelot Chen

Low Band Edge Plot on Channel 00



Date: 25.MAY.2010 18:03:51

High Band Edge Plot on Channel 78



Date: 25.MAY.2010 18:06:33

## 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.

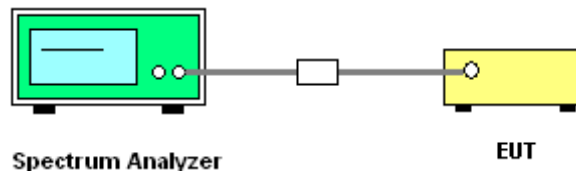
### 3.7.2 Measuring Instruments

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

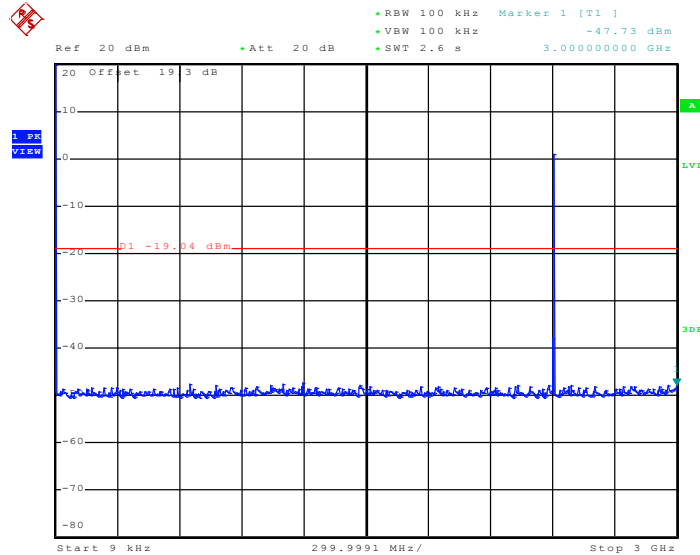




3.7.5 Test Result

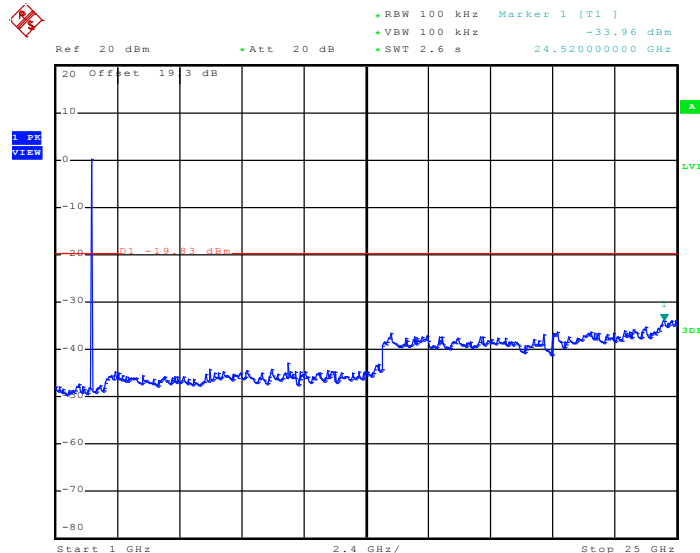
Test Mode :	Mode 1	Temperature :	26~28°C
Test Channel :	00	Relative Humidity :	43~46%
		Test Engineer :	Lancelot Chen

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 1.JUN.2010 14:51:11

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

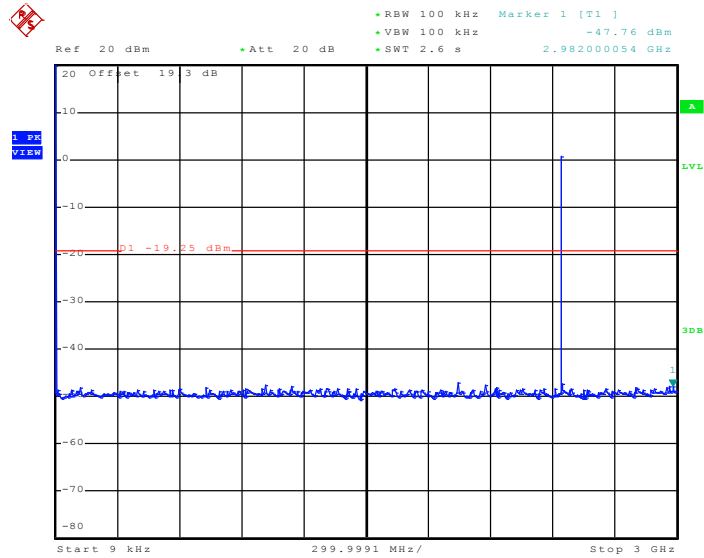


Date: 1.JUN.2010 14:52:02



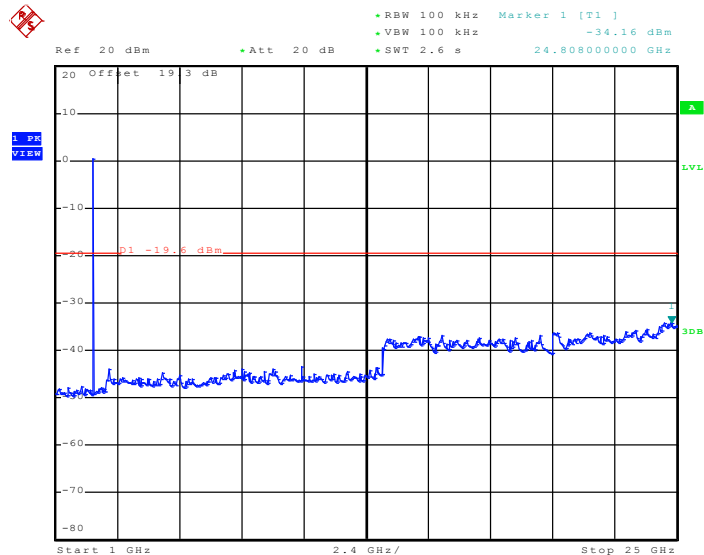
Test Mode :	Mode 2	Temperature :	26~28°C
Test Channel :	39	Relative Humidity :	43~46%
		Test Engineer :	Lancelot Chen

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 1.JUN.2010 14:52:32

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

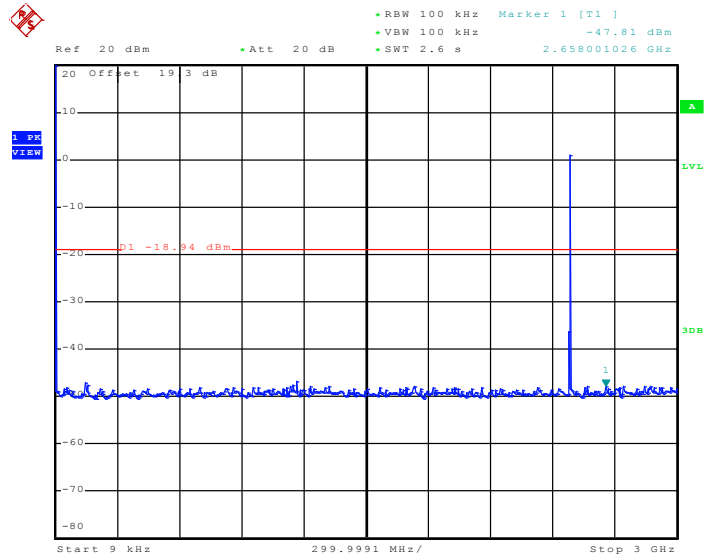


Date: 1.JUN.2010 14:53:15



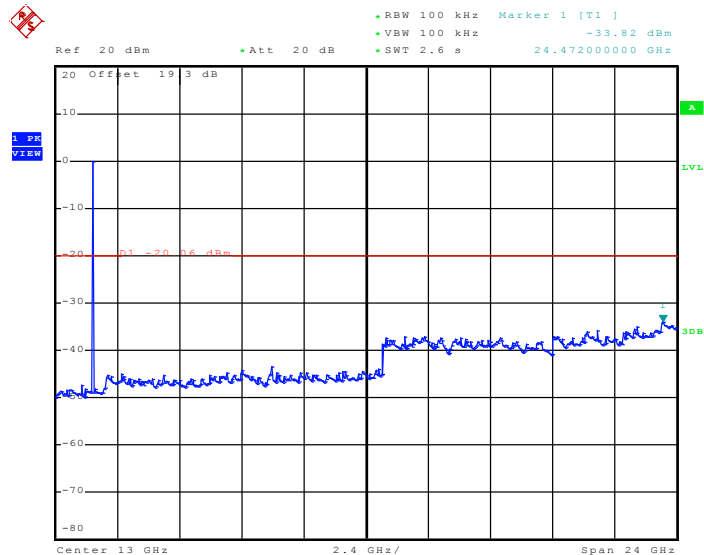
Test Mode :	Mode 3	Temperature :	26~28°C
Test Channel :	78	Relative Humidity :	43~46%
		Test Engineer :	Lancelot Chen

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 1.JUN.2010 14:53:59

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 1.JUN.2010 14:56:08

### 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

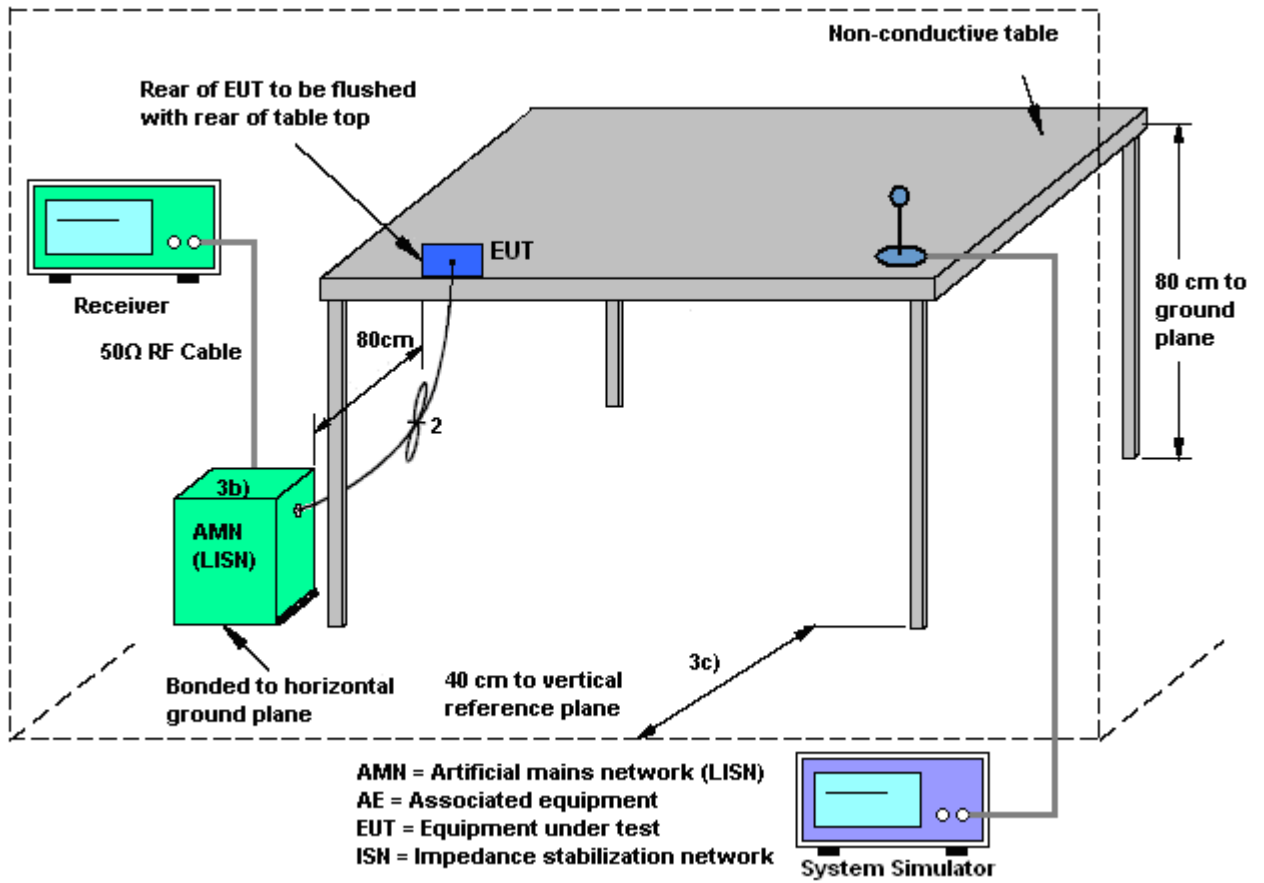
See list of measuring instruments of this test report.

#### 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.

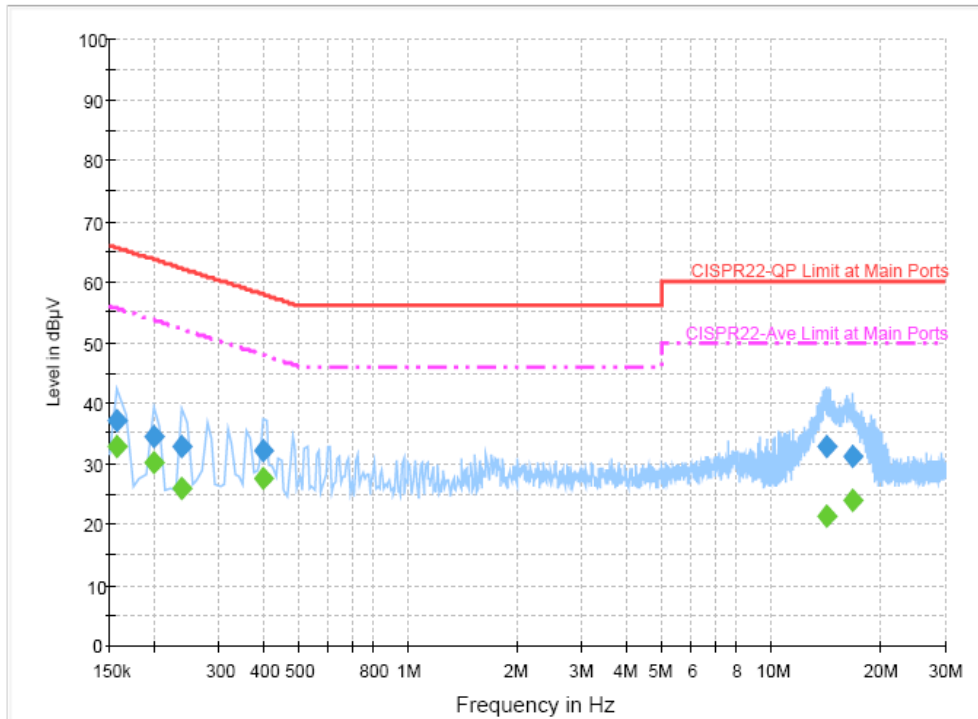


### 3.8.4 Test Setup



### 3.8.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



#### Final Result 1

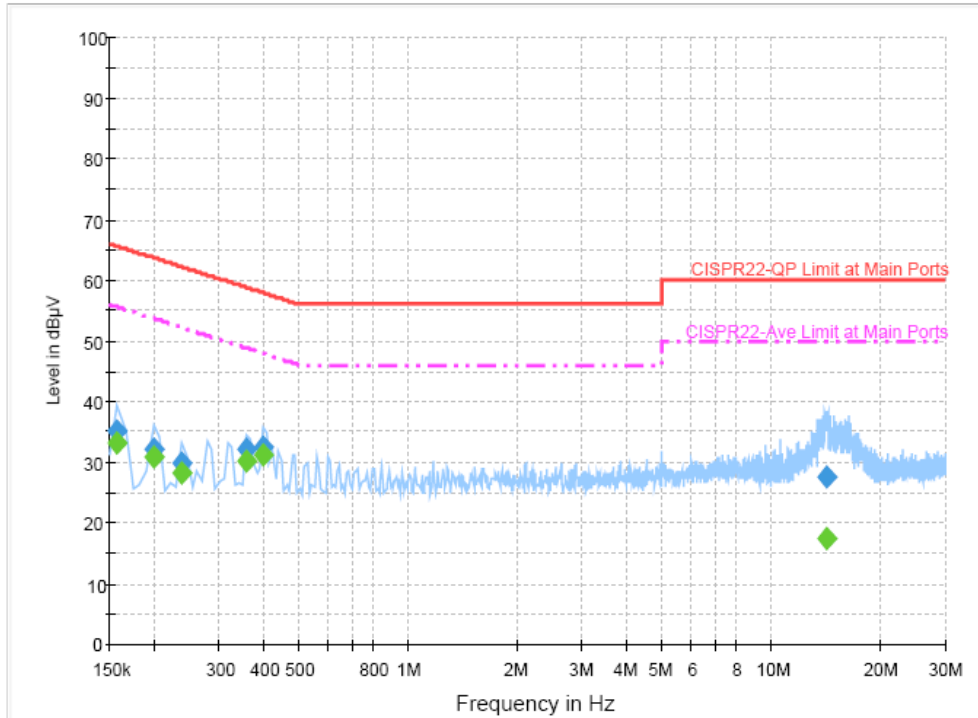
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	37.1	Off	L1	19.5	28.5	65.6
0.198000	34.5	Off	L1	19.6	29.2	63.7
0.238000	32.8	Off	L1	19.5	29.4	62.2
0.398000	32.2	Off	L1	19.5	25.7	57.9
14.150000	32.9	Off	L1	19.7	27.1	60.0
16.590000	31.2	Off	L1	19.7	28.8	60.0

#### Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	32.9	Off	L1	19.5	22.7	55.6
0.198000	30.1	Off	L1	19.6	23.6	53.7
0.238000	26.0	Off	L1	19.5	26.2	52.2
0.398000	27.4	Off	L1	19.5	20.5	47.9
14.150000	21.4	Off	L1	19.7	28.6	50.0
16.590000	24.0	Off	L1	19.7	26.0	50.0



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	35.0	Off	N	19.5	30.6	65.6
0.198000	32.1	Off	N	19.5	31.6	63.7
0.238000	30.0	Off	N	19.5	32.2	62.2
0.358000	32.0	Off	N	19.4	26.8	58.8
0.398000	32.4	Off	N	19.4	25.5	57.9
14.070000	27.7	Off	N	19.7	32.3	60.0

**Final Result 2**

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	33.2	Off	N	19.5	22.4	55.6
0.198000	30.8	Off	N	19.5	22.9	53.7
0.238000	28.1	Off	N	19.5	24.1	52.2
0.358000	30.2	Off	N	19.4	18.6	48.8
0.398000	31.2	Off	N	19.4	16.7	47.9
14.070000	17.4	Off	N	19.7	32.6	50.0

### 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

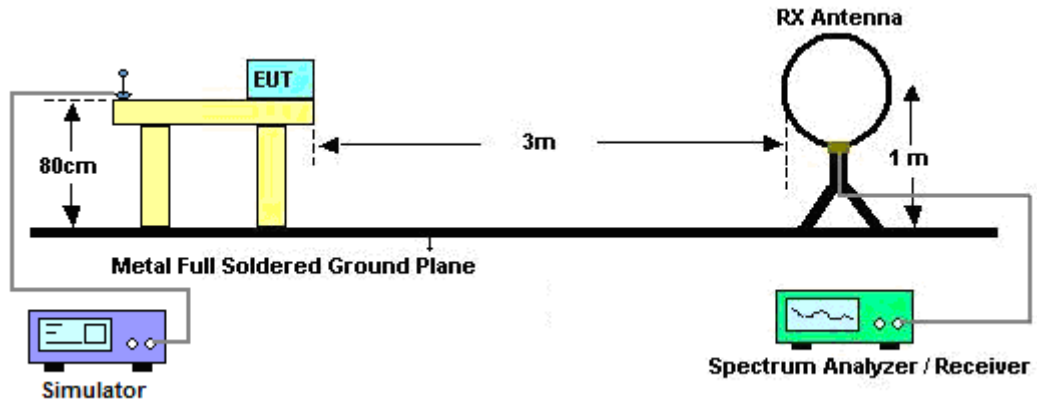
See list of measuring instruments of this test report.

#### 3.9.3 Test Procedures

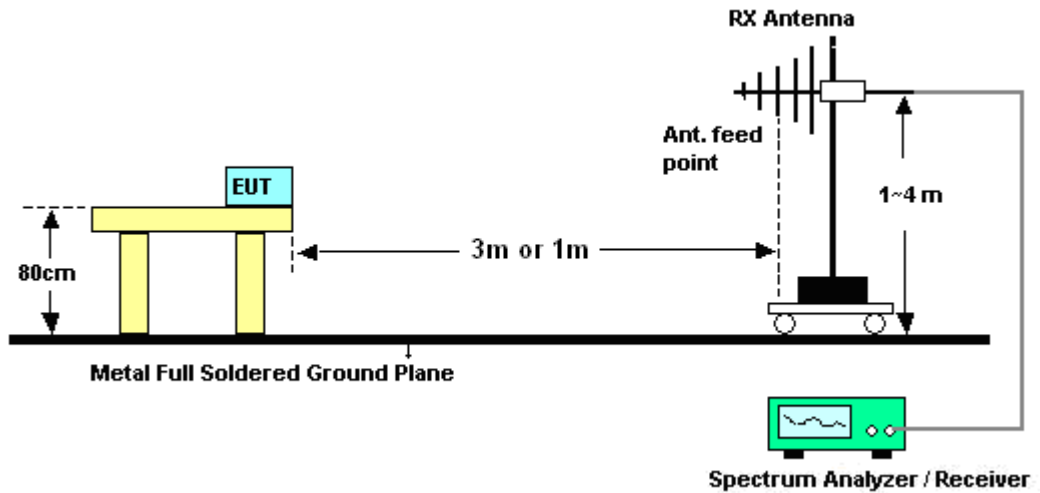
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
  - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = 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 :	Kai Wang and Cona Huang	Temperature :	23~24°C	
		Relative Humidity :	45~46%	
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 :	23~24°C
Test Channel :	00	Relative Humidity :	45~46%
Test Engineer :	Kai Wang and Cona Huang	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 )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
98.58	20.66	-22.84	43.50	40.44	10.86	31.57	0.93	-	-	Peak
126.66	23.05	-20.45	43.50	41.03	12.47	31.52	1.07	-	-	Peak
210.90	25.82	-17.68	43.50	46.58	9.36	31.47	1.35	100	323	Peak
332.20	22.75	-23.25	46.00	37.77	14.59	31.30	1.69	-	-	Peak
519.80	20.18	-25.82	46.00	30.55	18.57	31.03	2.09	-	-	Peak
685.70	23.51	-22.49	46.00	31.94	19.87	30.73	2.43	-	-	Peak
2385.81	51.39	-22.61	74.00	50.89	31.86	36.08	4.72	114	360	Peak
2385.81	36.26	-17.74	54.00	35.76	31.86	36.08	4.72	114	360	Average
2402.00	101.47	-	-	100.95	31.88	36.08	4.72	114	360	Peak
2402.00	86.46	-	-	85.96	31.86	36.08	4.72	114	360	Average
2486.00	45.10	-28.90	74.00	44.38	31.98	36.10	4.84	114	360	Peak
2486.00	30.25	-23.75	54.00	29.53	31.98	36.10	4.84	114	360	Average
8286.00	52.29	-21.71	74.00	44.44	35.74	36.66	8.77	100	164	Peak
8286.00	40.26	-13.74	54.00	32.41	35.74	36.66	8.77	100	164	Average



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang and Cona Huang	<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 )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	24.54	-15.46	40.00	39.93	15.53	31.52	0.60	100	259	Peak
70.50	22.60	-17.40	40.00	47.21	6.10	31.51	0.80	-	-	Peak
200.10	27.60	-15.90	43.50	48.10	9.63	31.45	1.32	-	-	Peak
484.10	20.13	-25.87	46.00	31.22	17.96	31.10	2.05	-	-	Peak
573.00	21.52	-24.48	46.00	30.93	19.30	30.91	2.20	-	-	Peak
727.00	22.63	-23.37	46.00	30.36	20.37	30.62	2.52	-	-	Peak
2384.86	32.44	-21.56	54.00	31.97	31.83	36.08	4.72	100	32	Average
2384.86	47.59	-26.41	74.00	47.12	31.83	36.08	4.72	100	32	Peak
2402.00	82.76	-	-	82.26	31.86	36.08	4.72	100	32	Average
2402.00	96.57	-	-	96.05	31.88	36.08	4.72	100	32	Peak
2500.00	43.61	-30.39	74.00	42.87	32.00	36.10	4.84	100	32	Peak
2500.00	30.41	-23.59	54.00	29.67	32.00	36.10	4.84	100	32	Average
8259.00	52.99	-21.01	74.00	45.15	35.75	36.65	8.74	100	14	Peak
8259.00	41.23	-12.77	54.00	33.39	35.75	36.65	8.74	100	14	Average





<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang and Cona Huang	<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 )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.00	21.37	-18.63	40.00	33.91	18.48	31.56	0.54	-	-	Peak
129.09	22.37	-21.13	43.50	40.41	12.40	31.52	1.08	-	-	Peak
211.98	25.78	-17.72	43.50	46.55	9.34	31.47	1.36	100	56	Peak
329.40	22.85	-23.15	46.00	37.92	14.53	31.29	1.69	-	-	Peak
372.10	20.75	-25.25	46.00	34.65	15.57	31.25	1.78	-	-	Peak
803.30	23.27	-22.73	46.00	30.42	20.76	30.54	2.63	-	-	Peak
2356.00	42.71	-31.29	74.00	42.31	31.81	36.07	4.66	200	360	Peak
2356.00	29.88	-24.12	54.00	29.48	31.81	36.07	4.66	200	360	Average
2441.00	85.62	-	-	85.00	31.93	36.09	4.78	200	360	Average
2441.00	100.69	-	-	100.07	31.93	36.09	4.78	200	360	Peak
2484.00	44.55	-29.45	74.00	43.83	31.98	36.10	4.84	200	360	Peak
2484.00	30.40	-23.6	54.00	29.68	31.98	36.10	4.84	200	360	Average
8445.00	51.93	-22.07	74.00	44.05	35.71	36.69	8.86	100	182	Peak
8445.00	41.03	-12.97	54.00	33.15	35.71	36.69	8.86	100	182	Average



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang and Cona Huang	<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 )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	24.68	-15.32	40.00	40.07	15.53	31.52	0.60	100	89	Peak
70.50	22.58	-17.42	40.00	47.19	6.10	31.51	0.80	-	-	Peak
200.10	28.05	-15.45	43.50	48.55	9.63	31.45	1.32	-	-	Peak
307.00	19.29	-26.71	46.00	35.08	13.84	31.28	1.65	-	-	Peak
472.20	19.36	-26.64	46.00	30.75	17.68	31.12	2.05	-	-	Peak
758.50	22.87	-23.13	46.00	30.10	20.72	30.54	2.59	-	-	Peak
2316.00	42.17	-31.83	74.00	41.87	31.73	36.06	4.63	100	28	Peak
2316.00	30.14	-23.86	54.00	29.84	31.73	36.06	4.63	100	28	Average
2441.00	96.53	-	-	95.91	31.93	36.09	4.78	100	28	Peak
2441.00	82.37	-	-	81.75	31.93	36.09	4.78	100	28	Average
2486.00	41.63	-32.37	74.00	40.91	31.98	36.10	4.84	100	28	Peak
2486.00	30.32	-23.68	54.00	29.60	31.98	36.10	4.84	100	28	Average
8184.00	52.13	-21.87	74.00	44.31	35.76	36.63	8.69	100	271	Peak
8184.00	40.74	-13.26	54.00	32.92	35.76	36.63	8.69	100	271	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang and Cona Huang	<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 )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.00	21.26	-18.74	40.00	33.80	18.48	31.56	0.54	-	-	Peak
126.66	23.07	-20.43	43.50	41.05	12.47	31.52	1.07	-	-	Peak
211.17	26.28	-17.22	43.50	47.04	9.36	31.47	1.35	100	164	Peak
329.40	22.58	-23.42	46.00	37.65	14.53	31.29	1.69	-	-	Peak
368.60	20.80	-25.20	46.00	34.83	15.46	31.26	1.77	-	-	Peak
749.40	22.71	-23.29	46.00	29.96	20.71	30.54	2.58	-	-	Peak
2382.00	43.79	-30.21	74.00	43.32	31.83	36.08	4.72	168	0	Peak
2382.00	29.99	-24.01	54.00	29.52	31.83	36.08	4.72	168	0	Average
2480.00	101.49	-	-	100.77	31.98	36.10	4.84	168	0	Peak
2480.00	86.49	-	-	85.77	31.98	36.10	4.84	168	0	Average
2483.50	66.14	-7.86	74.00	65.42	31.98	36.10	4.84	168	0	Peak
2483.50	35.18	-18.82	54.00	34.46	31.98	36.10	4.84	168	0	Average
8169.00	51.67	-22.33	74.00	43.84	35.77	36.63	8.69	100	266	Peak
8169.00	40.56	-13.44	54.00	32.73	35.77	36.63	8.69	100	266	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	45~46%
<b>Test Engineer :</b>	Kai Wang and Cona Huang	<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 )	Preamp Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
40.53	24.15	-15.85	40.00	42.90	12.17	31.52	0.60	-	-	Peak
179.58	26.65	-16.85	43.50	47.87	9.03	31.51	1.26	-	-	Peak
213.33	28.36	-15.14	43.50	49.15	9.32	31.47	1.36	100	121	Peak
427.40	19.15	-26.85	46.00	31.20	17.15	31.16	1.96	-	-	Peak
551.30	22.03	-23.97	46.00	31.54	19.30	30.95	2.14	-	-	Peak
794.90	23.00	-23.00	46.00	30.17	20.75	30.54	2.62	-	-	Peak
2374.00	30.24	-23.76	54.00	29.79	31.83	36.07	4.69	100	51	Average
2374.00	42.44	-31.56	74.00	41.99	31.83	36.07	4.69	100	51	Peak
2480.00	97.72	-	-	97.00	31.98	36.10	4.84	100	51	Peak
2480.00	83.70	-	-	82.98	31.98	36.10	4.84	100	51	Average
2483.50	62.37	-11.63	74.00	61.65	31.98	36.10	4.84	100	51	Peak
2483.50	31.27	-22.73	54.00	30.55	31.98	36.10	4.84	100	51	Average
8433.00	52.03	-21.97	74.00	44.15	35.71	36.69	8.86	100	177	Peak
8433.00	40.39	-13.61	54.00	32.51	35.71	36.69	8.86	100	177	Average



## **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 PIFA 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	100055	9kHz~40GHz	Jun. 23, 2009	Jun. 22, 2010	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 17, 2009	Sep. 16, 2010	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 10, 2009	Sep. 09, 2010	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 05, 2009	Aug. 04, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 30, 2009	Nov. 29, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 23, 2009	Nov. 22, 2010	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	105934	N/A	Nov. 11, 2008	Nov. 10, 2010	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 20, 2009	Oct. 19, 2010	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161069	1KHz - 1GHz	Mar. 29, 2010	Mar. 28, 2011	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2727C	30 MHz - 1 GHz	Aug. 12, 2009	Aug. 11, 2010	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Nov. 11, 2009	Nov. 10, 2010	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 - 360 degree	N/A	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m - 4 m	N/A	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	00066584	1GHz ~ 18GHz	Aug. 05, 2009	Aug. 04, 2010	Radiation (03CH05-HY)
Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Nov. 02, 2009	Nov. 01, 2010	Radiation (03CH05-HY)
Bluetooth Base Station	R&S	CBT32	100519	N/A	May 12, 2009	May 11, 2011	Radiation (03CH05-HY)

## 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 EP051810-01 as below.