

# FCC RF Test Report

APPLICANT : Motorola Solutions, Inc.  
EQUIPMENT : Enterprise Digital Assistant (EDA)  
BRAND NAME : Motorola  
MODEL NAME : MC55N0  
FCC ID : UZ7MC55N0  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Apr. 14, 2011 and completely tested on Jul. 19, 2011. 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:



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Jones Tsai / Manager



## SPORTON INTERNATIONAL INC.

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SPORTON INTERNATIONAL INC.

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FCC ID : UZ7MC55N0

Page Number : 1 of 61

Report Issued Date : Aug. 02, 2011

Report Version : Rev. 01



## TABLE OF CONTENTS

<b>REVISION HISTORY .....</b>	<b>3</b>
<b>SUMMARY OF TEST RESULT .....</b>	<b>4</b>
<b>1 GENERAL DESCRIPTION .....</b>	<b>5</b>
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 .....	7
<b>2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST .....</b>	<b>8</b>
2.1 RF Output Power .....	8
2.2 Test Mode .....	9
2.3 Connection Diagram of Test System .....	11
2.4 RF Utility .....	12
<b>3 TEST RESULT .....</b>	<b>13</b>
3.1 Number of Channel Measurement .....	13
3.2 20dB Bandwidth Measurement .....	15
3.3 Hopping Channel Separation Measurement .....	22
3.4 Dwell Time Measurement .....	25
3.5 Peak Output Power Measurement .....	27
3.6 Band Edges Measurement .....	30
3.7 Spurious Emission Measurement .....	35
3.8 AC Conducted Emission Measurement .....	39
3.9 Radiated Emission Measurement .....	47
3.10 Antenna Requirements .....	58
<b>4 LIST OF MEASURING EQUIPMENT .....</b>	<b>59</b>
<b>5 UNCERTAINTY OF EVALUATION .....</b>	<b>60</b>
<b>APPENDIX A. PHOTOGRAPHS OF EUT</b>	
<b>APPENDIX B. SETUP PHOTOGRAPHS</b>	



## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR141402A	Rev. 01	Initial issue of report	Aug. 02, 2011

## 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	$\geq 15\text{Chs}$	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	$\geq 2/3$ of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	$\leq 0.4\text{sec}$ in 31.6sec period	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	$\leq 125\text{ mW}$	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.7	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.8	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 13.3 dB at 0.18 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.28 dB at 2483.5 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**Motorola Solutions, Inc.**

One Motorola Plaza, Holtsville, NY 11742-1300 USA

## 1.2 Manufacturer

**Motorola Solutions, Inc.**

One Motorola Plaza, Holtsville, NY 11742-1300 USA

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Enterprise Digital Assistant (EDA)
Brand Name	Motorola
Model Name	MC55N0
FCC ID	UZ7MC55N0
Sample 1	EUT with Camera
Sample 2	EUT without Camera
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) : 1.73 dBm (0.0015 W) Bluetooth EDR (2Mbps) : 3.67 dBm (0.0020 W) Bluetooth EDR (3Mbps) : 4.05 dBm (0.0030 W)
Antenna Type	PCB Antenna with gain 0.43 dBi
HW Version	DV
SW Version	BSP36
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	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	03CH06-HY	722060/4086B-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 8

### 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.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
6.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	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	1.73 dBm	3.67 dBm	4.05 dBm
Ch39	2441MHz	1.03 dBm	3.02 dBm	3.45 dBm
Ch78	2480MHz	0.54 dBm	2.45 dBm	2.88 dBm

**Remark:**

1. The data rate was set in 3Mbps 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).

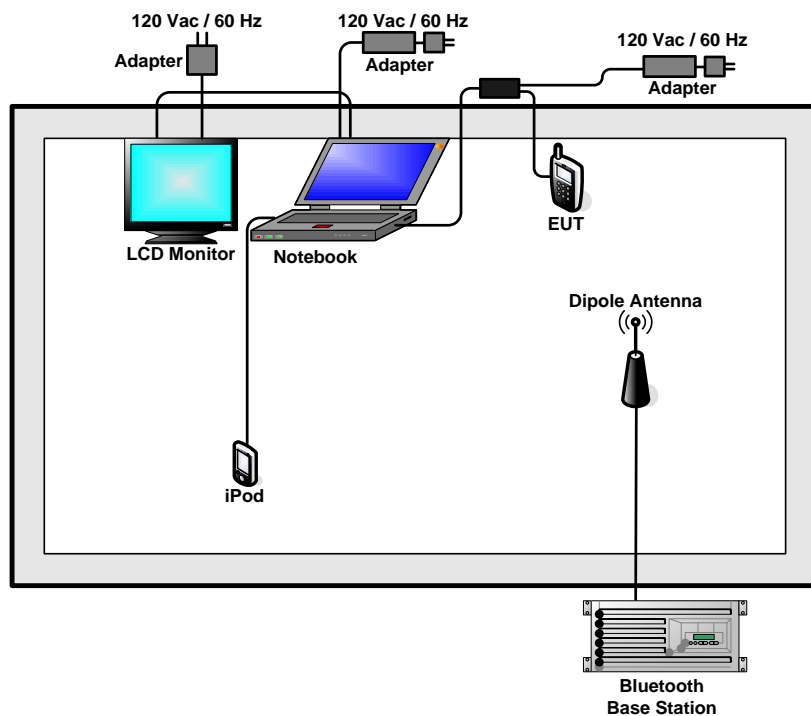
The following tables are showing the test modes as the worst cases and recorded in this report.

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>	N/A	N/A	Mode 1: CH00_2402 MHz + Qwerty Keypad + Battery (3600mAh) + 2D Scanner for Sample 1 Mode 2: CH39_2441 MHz + Qwerty Keypad + Battery (3600mAh) + 2D Scanner for Sample 1 Mode 3: CH78_2480 MHz + Qwerty Keypad + Battery (3600mAh) + 2D Scanner for Sample 1 Mode 4: CH78_2480 MHz + Numeric Keypad + Battery (2400mAh) + 1D Scanner for Sample 2

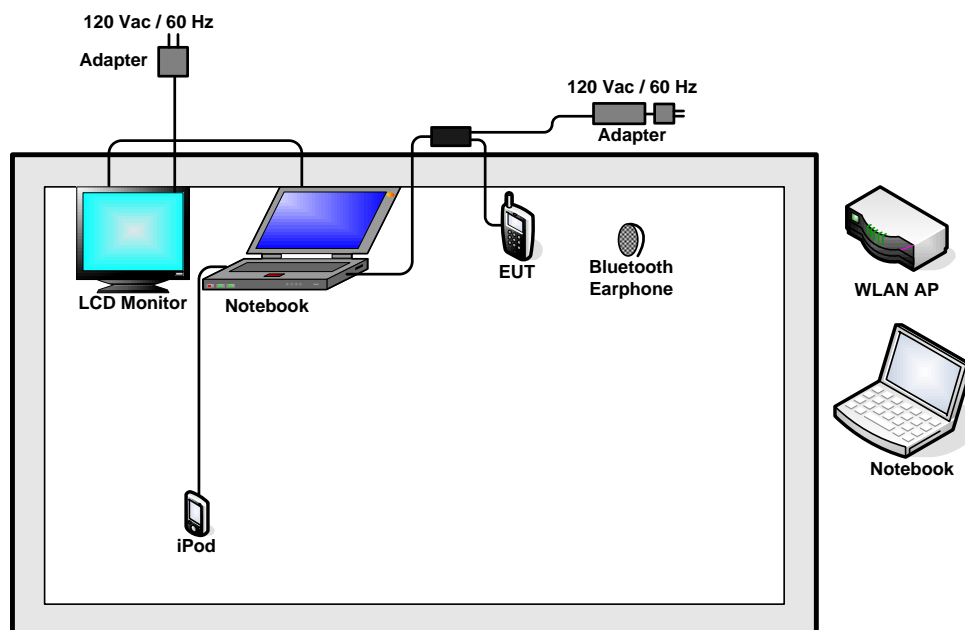
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
AC Conducted Emission	Mode 1 :WLAN Link(2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Qwerty Keypad + Battery (3600mAh) + 2D Scanner for Sample 1		
	Mode 2 :WLAN Link(2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Numeric Keypad + Battery (3600mAh) + 2D Scanner for Sample 1		
	Mode 3 ;WLAN Link(2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + PIM Keypad + Battery (2400mAh) + 1D Scanner for Sample 1		
Remark:			
1. For radiated TCs test was performed together with USB charging cable with AC power.			
2. “BT Link” stands for terminal linked to headset by BT function.			
3. “WLAN Link” stands for terminal associated with AP at 2.4GHz band.			
4. “USB Link” stands for Activesync RNDIS file transfer.			

## 2.3 Connection Diagram of Test System

### <Radiation Test>



### <AC Conducted Emission Mode>





## **2.4 RF Utility**

For Bluetooth function, the RF utility, "BTRegTestVer3.0" was installed in EUT 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.

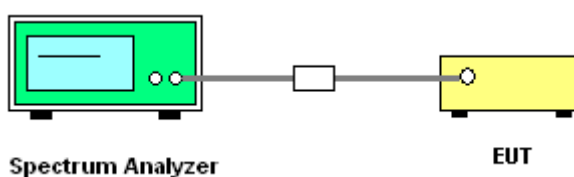
##### 3.1.2 Measuring Instruments

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.

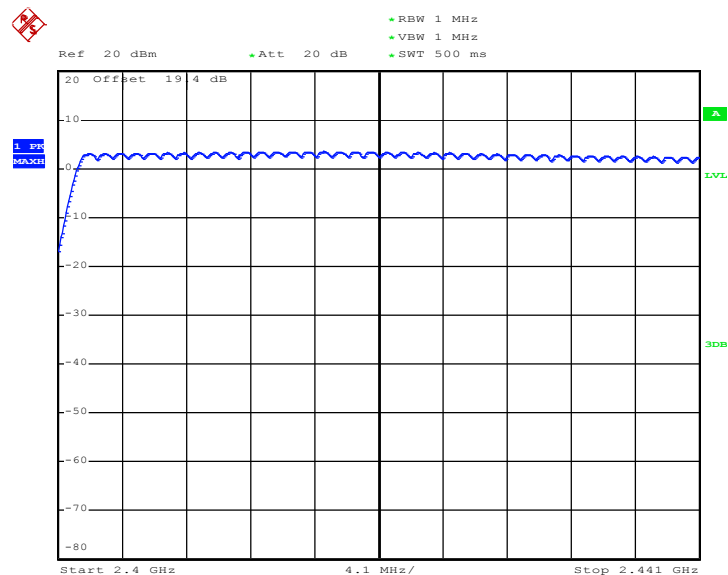
##### 3.1.4 Test Setup



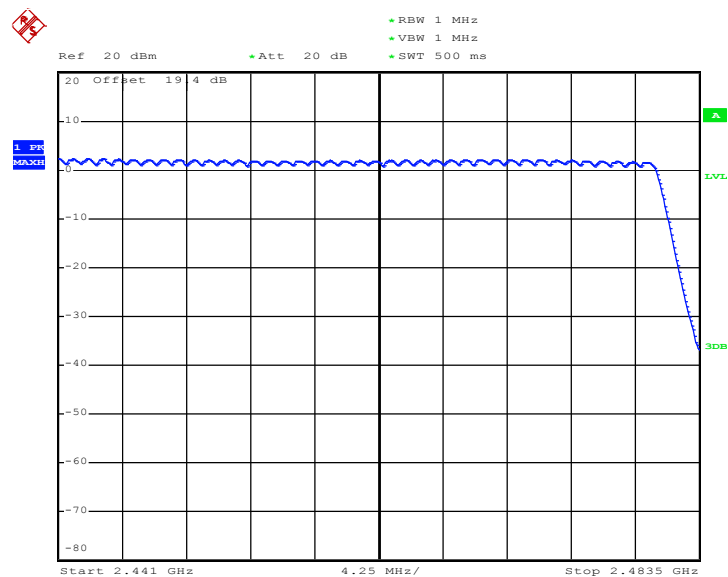
##### 3.1.5 Test Result of Number of Hopping Frequency

<b>Test Mode :</b>	Mode 7~9	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	50~53%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

## Number of Hopping Channel Plot on Channel 00 - 78



Date: 24.JUN.2011 10:12:57



Date: 24.JUN.2011 10:18:20

## 3.2 20dB Bandwidth Measurement

### 3.2.1 Limit of 20dB Bandwidth

N/A

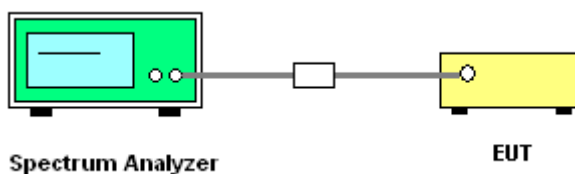
### 3.2.2 Measuring Instruments

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

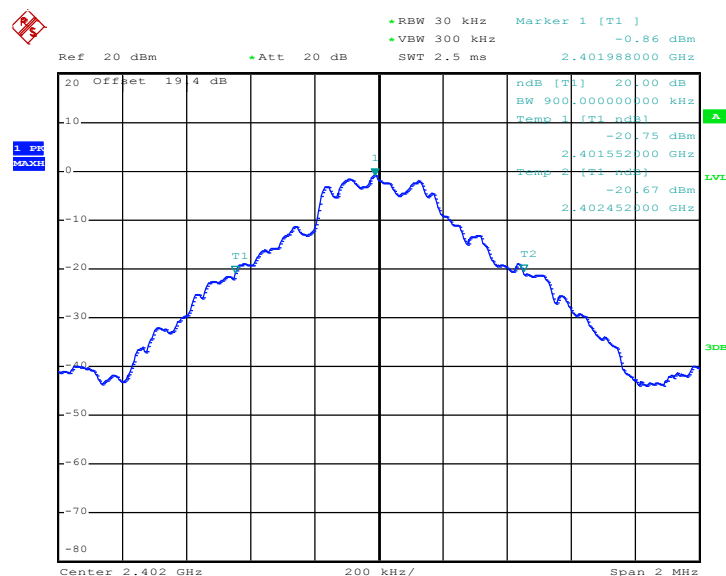


### 3.2.5 Test Result of 20dB Bandwidth

<b>Test Mode :</b>	Mode 1, 2, 3	<b>Temperature :</b>	24~26℃
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.900
39	2441	0.896
78	2480	0.864

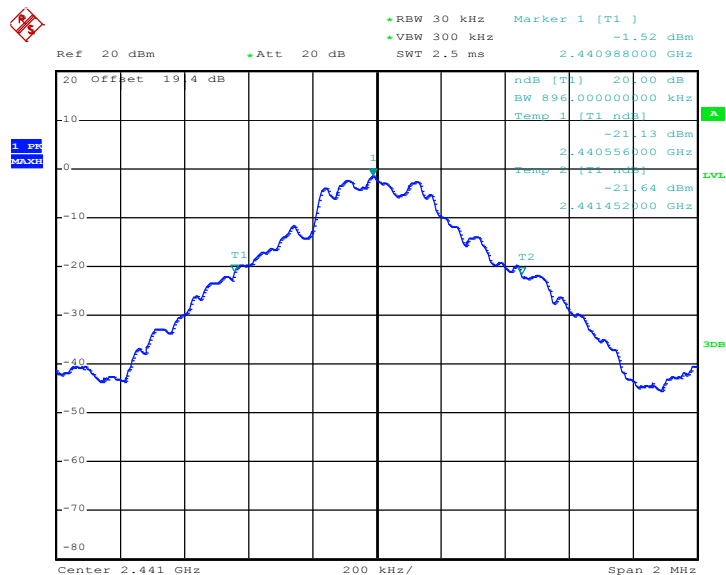
**20 dB Bandwidth Plot on Channel 00**



Date: 24.JUN.2011 09:38:17

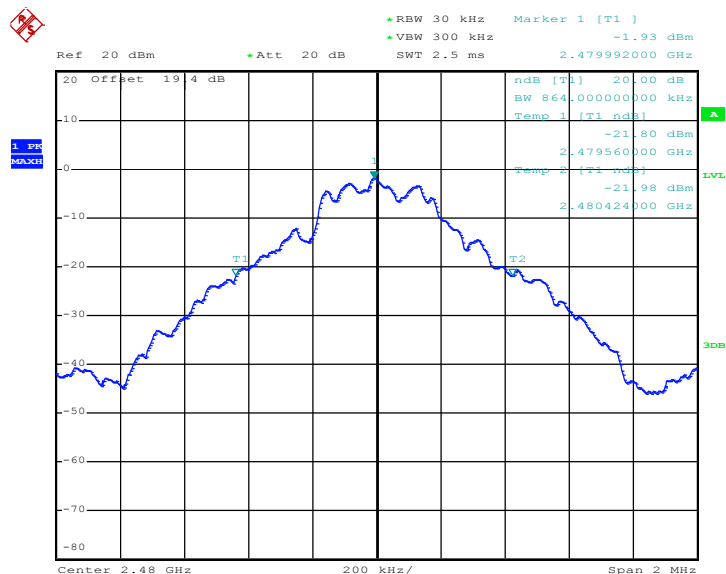


### 20 dB Bandwidth Plot on Channel 39



Date: 24.JUN.2011 09:39:47

### 20 dB Bandwidth Plot on Channel 78



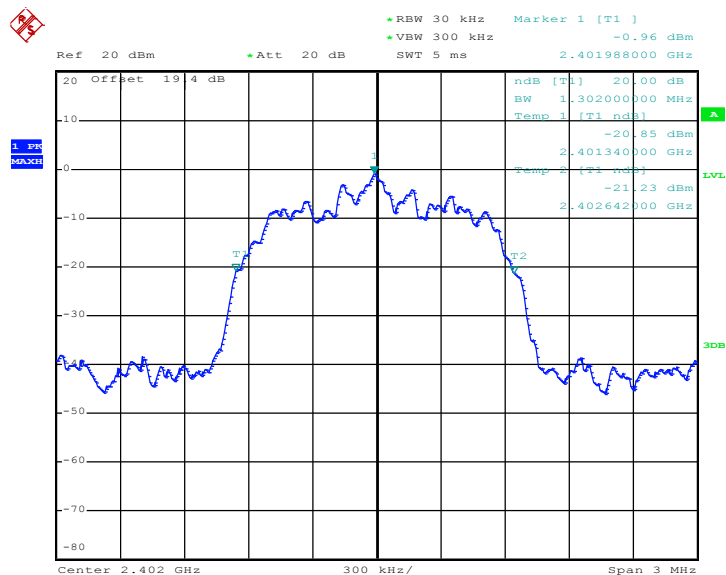
Date: 24.JUN.2011 09:41:25



<b>Test Mode :</b>	Mode 4, 5, 6	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.302
39	2441	1.278
78	2480	1.296

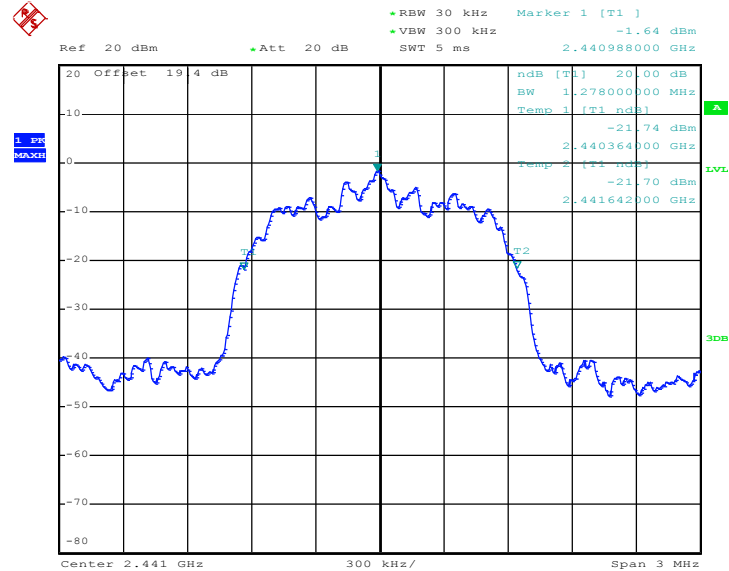
**20 dB Bandwidth Plot on Channel 00**



Date: 24.JUN.2011 09:42:58

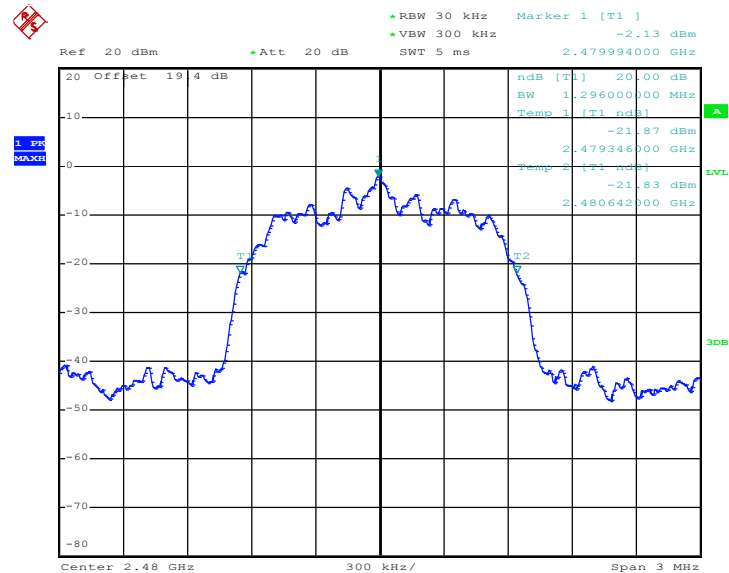


20 dB Bandwidth Plot on Channel 39



Date: 24.JUN.2011 09:45:00

20 dB Bandwidth Plot on Channel 78



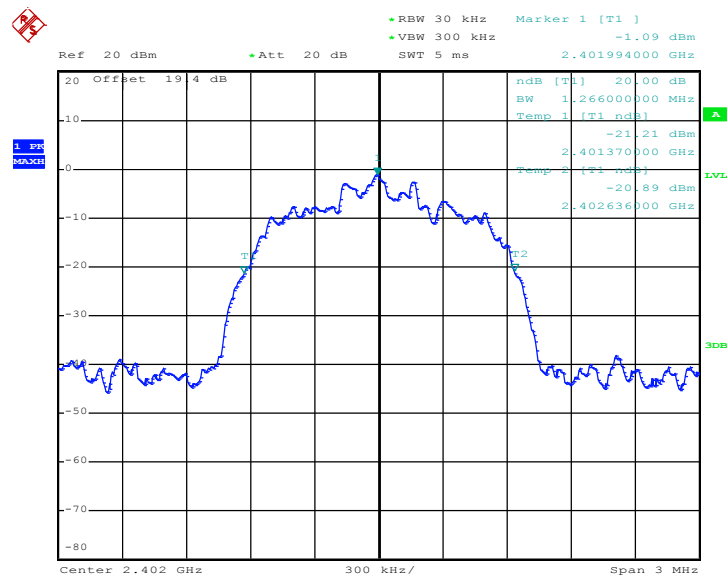
Date: 24.JUN.2011 09:46:21



<b>Test Mode :</b>	Mode 7, 8, 9	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.266
39	2441	1.272
78	2480	1.260

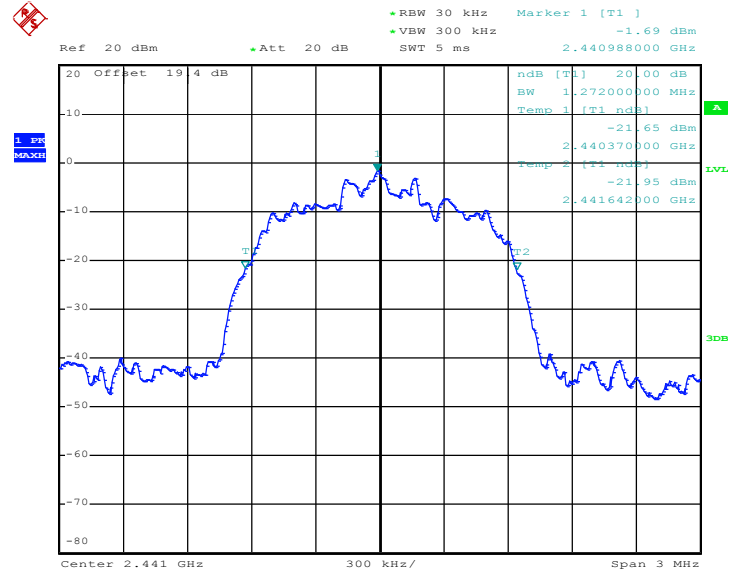
**20 dB Bandwidth Plot on Channel 00**



Date: 24.JUN.2011 09:46:54

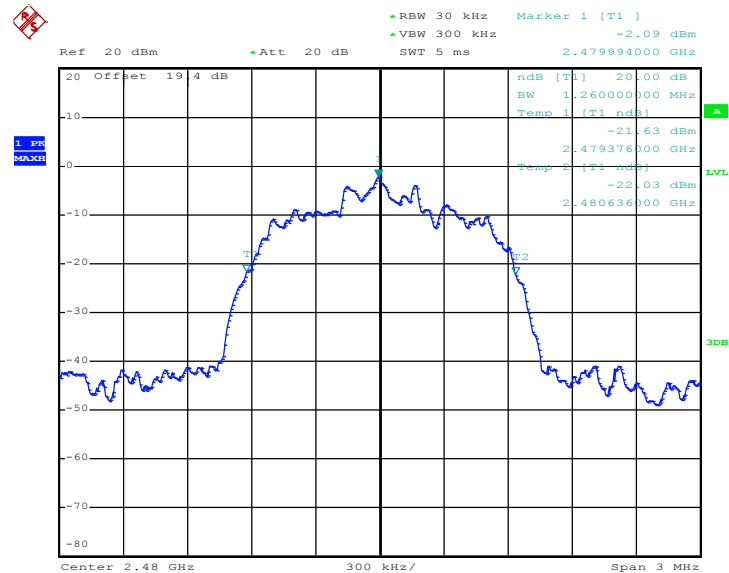


### 20 dB Bandwidth Plot on Channel 39



Date: 24.JUN.2011 09:47:27

### 20 dB Bandwidth Plot on Channel 78



Date: 24.JUN.2011 09:48:05

### 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.

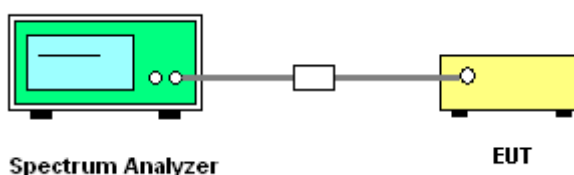
#### 3.3.2 Measuring Instruments

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

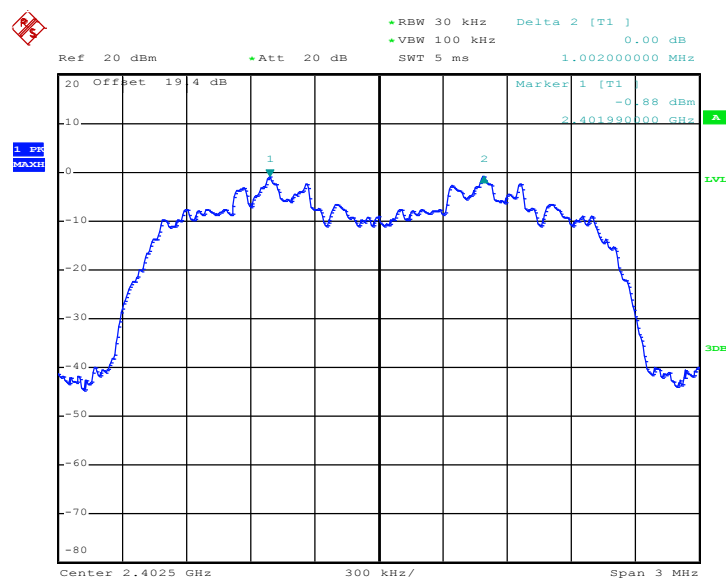


### 3.3.5 Test Result of Hopping Channel Separation

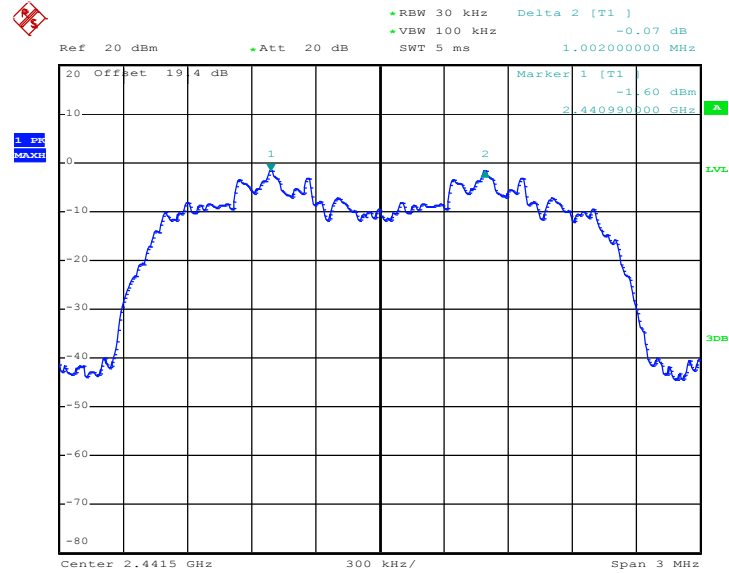
<b>Test Mode :</b>	Mode 7, 8, 9	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.844	Pass
39	2441	1.002	0.848	Pass
78	2480	1.002	0.840	Pass

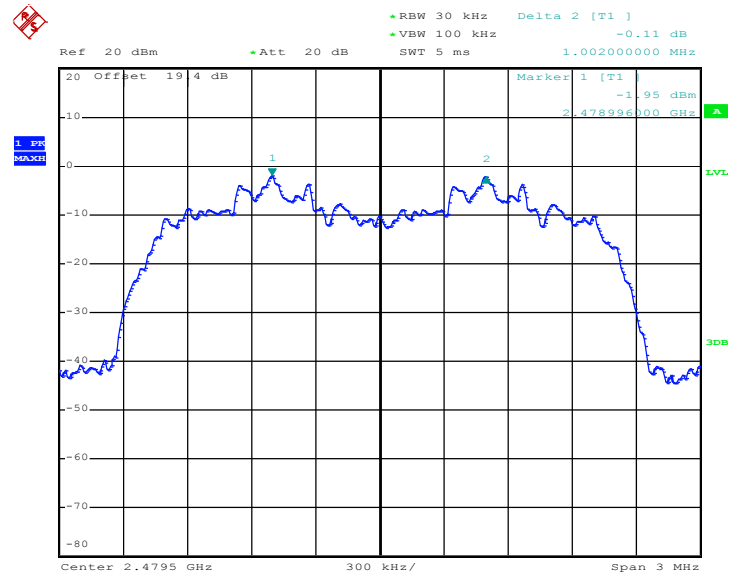
**Channel Separation Plot on Channel 00 - 01**



Date: 24.JUN.2011 09:25:53

**Channel Separation Plot on Channel 39 - 40**


Date: 24.JUN.2011 09:28:46

**Channel Separation Plot on Channel 77 - 78**


Date: 24.JUN.2011 09:32:25



### 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.

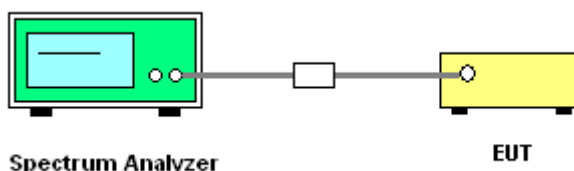
#### 3.4.2 Measuring Instruments

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  $\geq$  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

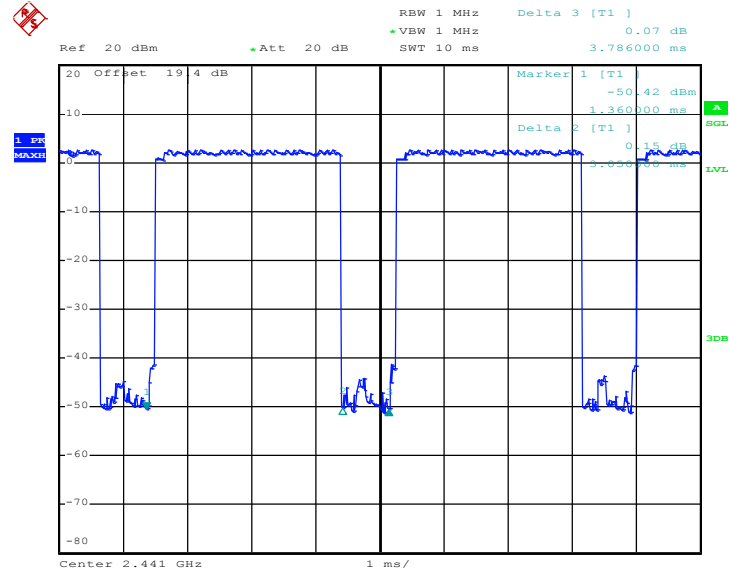
<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	50~53%

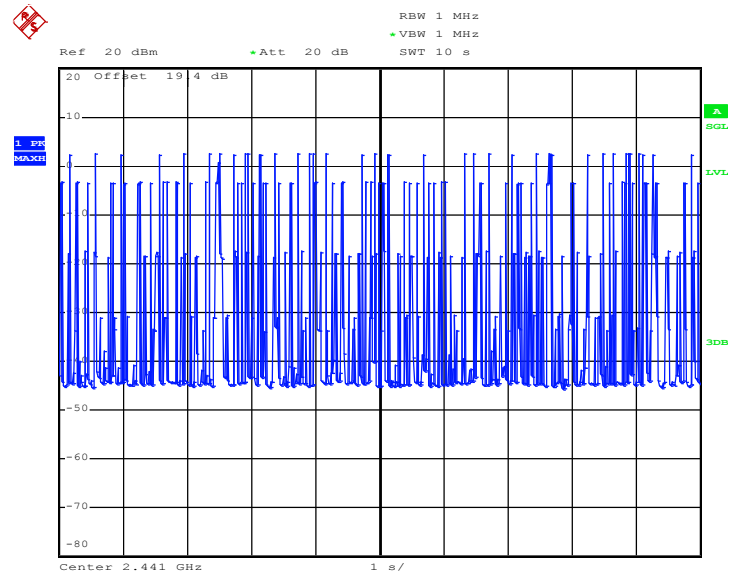
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH5	3.50	3050.00	0.34	0.4	Pass

**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)

**3DH5 Dwell Time (One Pulse) Plot on Channel 39**


Date: 24.JUN.2011 09:18:10

**3DH5 Dwell Time (Count Pulses) Plot on Channel 39**


Date: 24.JUN.2011 09:34:42

### 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 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, provided the systems operate with an output power no greater than 125 mW (20.97dBm).

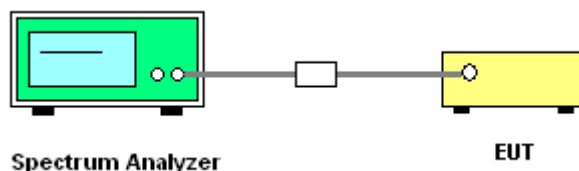
#### 3.5.2 Measuring Instruments

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 7, 8, 9	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	4.05	20.97	Pass
39	2441	3.45	20.97	Pass
78	2480	2.88	20.97	Pass

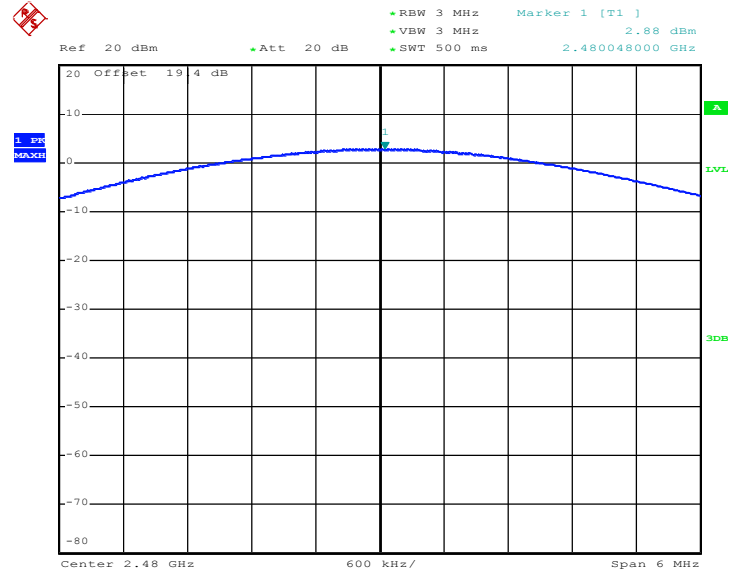


### Peak Output Power Plot on Channel 39





Peak Output Power Plot on Channel 78



Date: 24.JUN.2011 09:09:10

## **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**

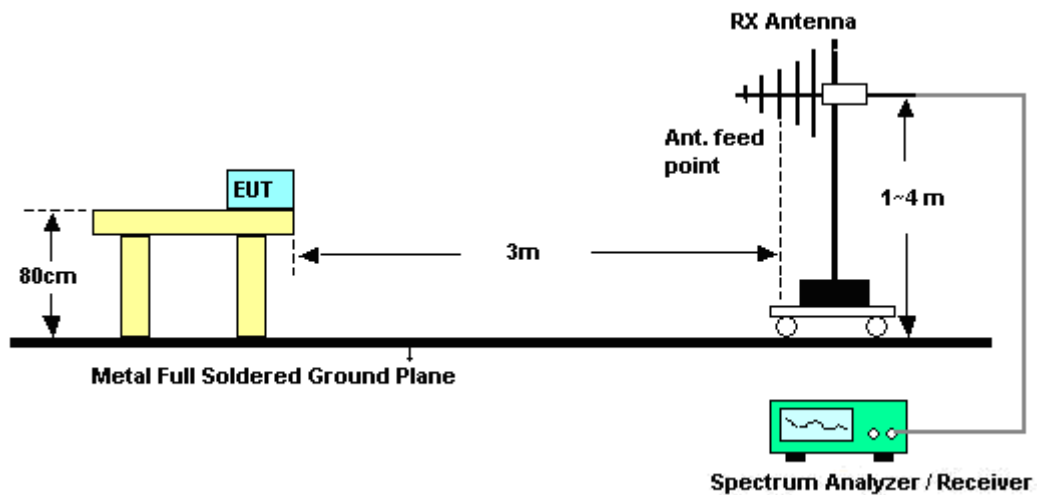
See list of measuring instruments of this test report.

### **3.6.3 Test Procedures**

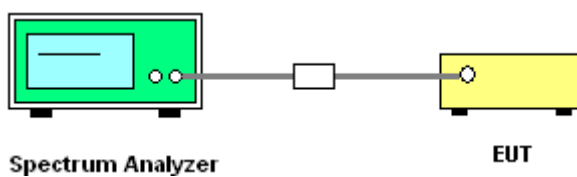
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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**

<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	51~55%
		<b>Test Engineer :</b>	Wii Chang

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
2388.85	46	-28	74	43.09	31.9	5.4	34.39	125	348	Peak
2388.85	33.64	-20.36	54	30.73	31.9	5.4	34.39	125	348	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
2378.97	46.35	-27.65	74	43.5	31.88	5.37	34.4	103	265	Peak
2378.97	33.97	-20.03	54	31.12	31.88	5.37	34.4	103	265	Average

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	51~55%
		<b>Test Engineer :</b>	Wii Chang

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
2483.5	58.06	-15.94	74	54.93	31.98	5.52	34.37	100	348	Peak
2483.5	46.76	-7.24	54	43.63	31.98	5.52	34.37	100	348	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
2483.5	63.22	-10.78	74	60.09	31.98	5.52	34.37	111	352	Peak
2483.5	50.72	-3.28	54	47.59	31.98	5.52	34.37	111	352	Average





<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	51~55%
		<b>Test Engineer :</b>	Wii Chang

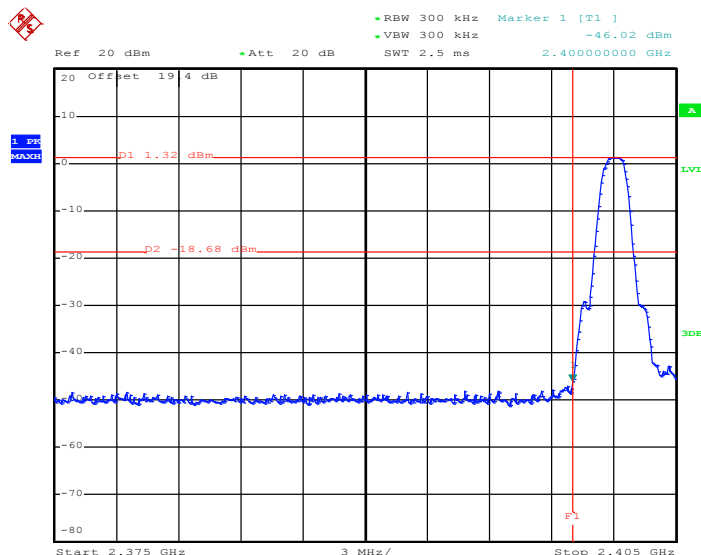
ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	57.4	-16.6	74	54.27	31.98	5.52	34.37	100	156	Peak
2483.5	46.07	-7.93	54	42.94	31.98	5.52	34.37	100	156	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
2483.5	59.37	-14.63	74	56.24	31.98	5.52	34.37	100	272	Peak
2483.5	48.32	-5.68	54	45.19	31.98	5.52	34.37	100	272	Average

### 3.6.6 Test Result of Conducted Band Edges

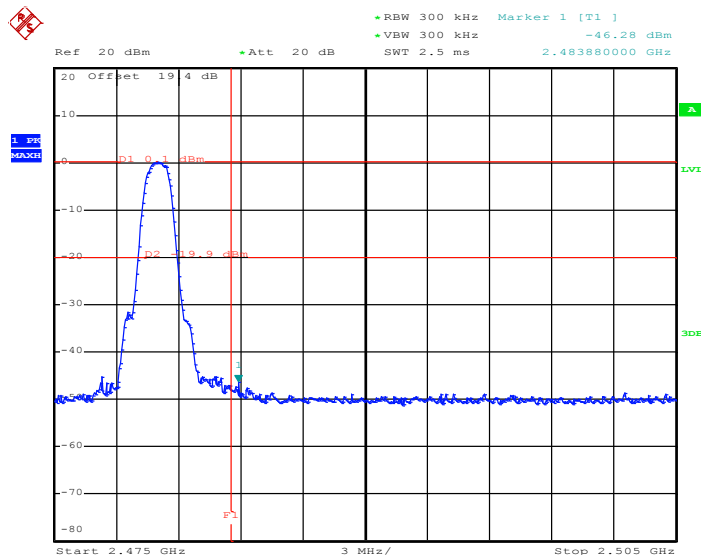
<b>Test Mode :</b>	Mode 7 and 9	<b>Temperature :</b>	24~26℃
<b>Test Channel :</b>	00 and 78	<b>Relative Humidity :</b>	50~53%
		<b>Test Engineer :</b>	Pinkston Tu

**Low Band Edge Plot on Channel 00**



Date: 24.JUN.2011 09:52:49

**High Band Edge Plot on Channel 78**



Date: 24.JUN.2011 09:53:52

## 3.7 Spurious Emission Measurement

### 3.7.1 Limit of Spurious Emission Measurement

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

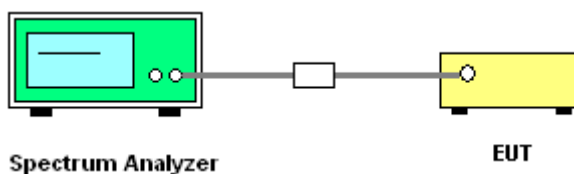
### 3.7.2 Measuring Instruments

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.

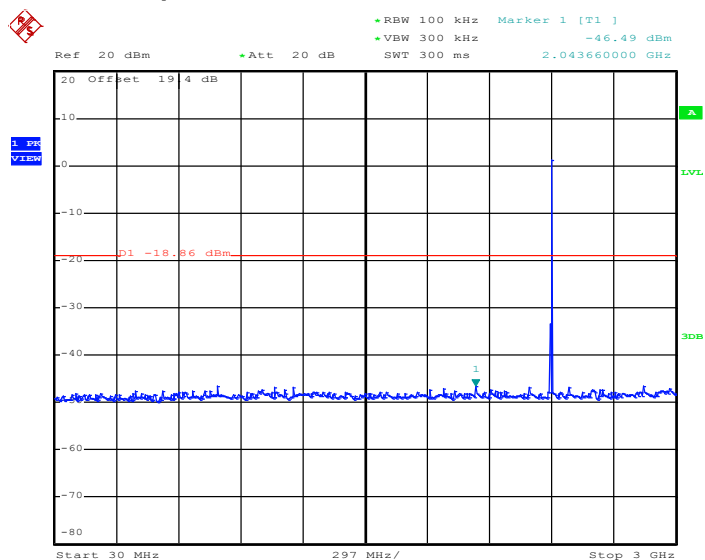
### 3.7.4 Test Setup



### 3.7.5 Test Result

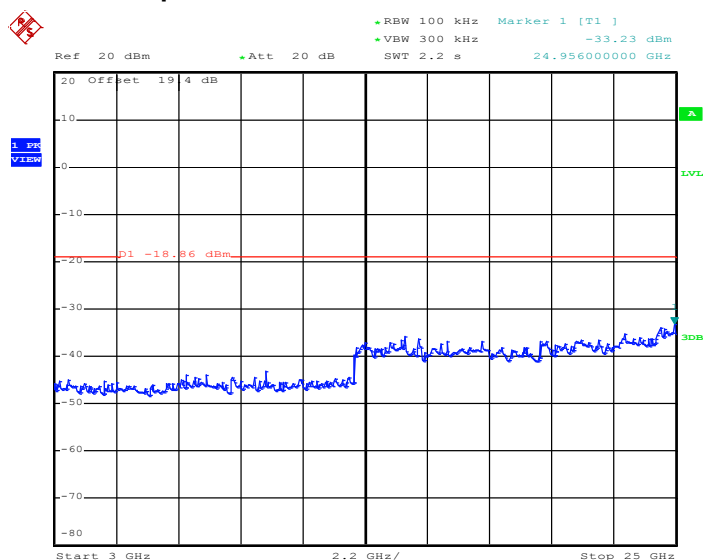
Test Mode :	Mode 7	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

#### Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



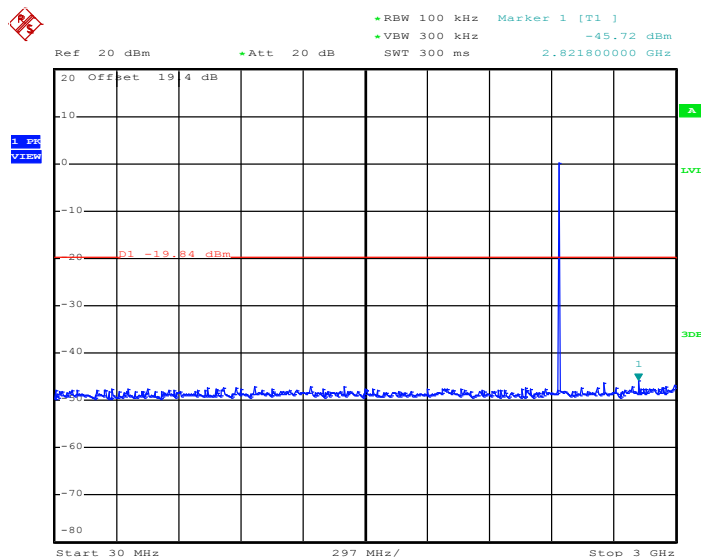
Date: 24.JUN.2011 10:00:14

#### Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

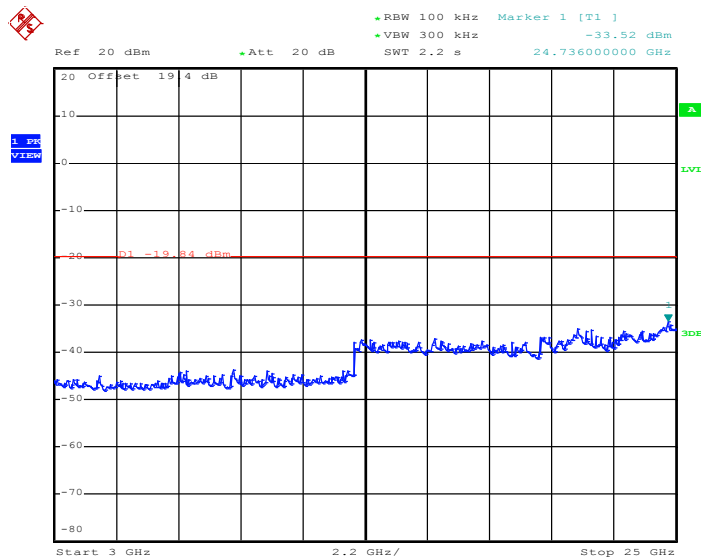


Date: 24.JUN.2011 10:00:27

<b>Test Mode :</b>	Mode 8	<b>Temperature :</b>	24~26°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	50~53%
		<b>Test Engineer :</b>	Pinkston Tu

**Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**


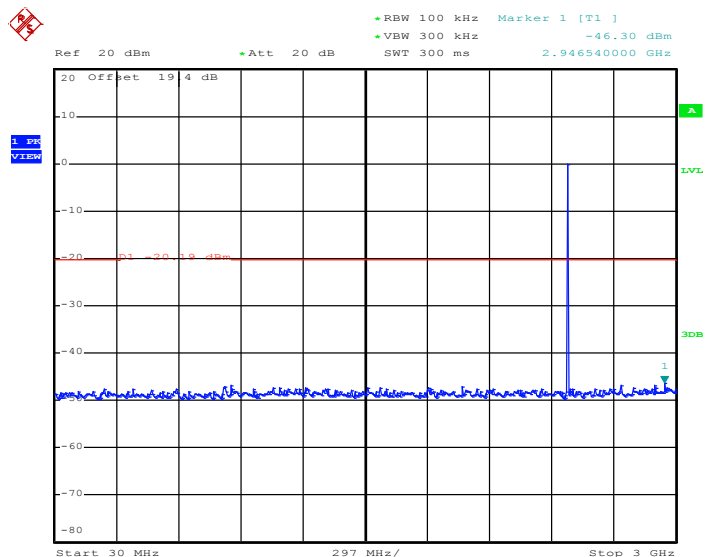
Date: 24.JUN.2011 10:01:19

**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**


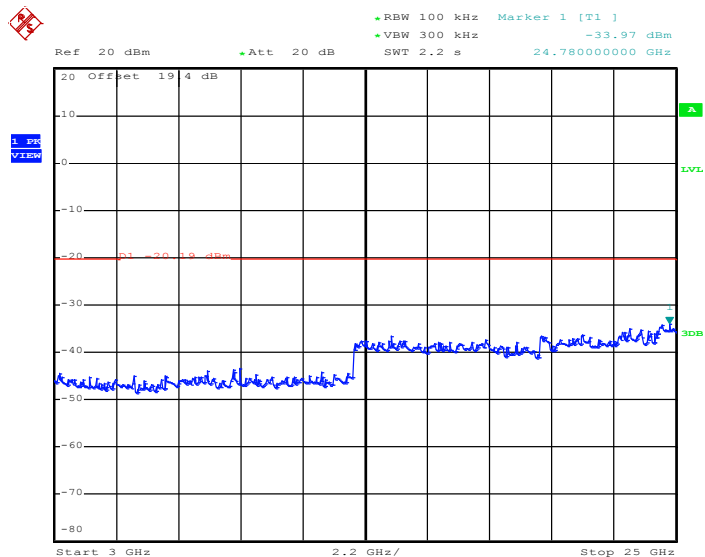
Date: 24.JUN.2011 10:01:32



Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

**Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**

Date: 24.JUN.2011 10:02:24

**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**

Date: 24.JUN.2011 10:02:37

### 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.

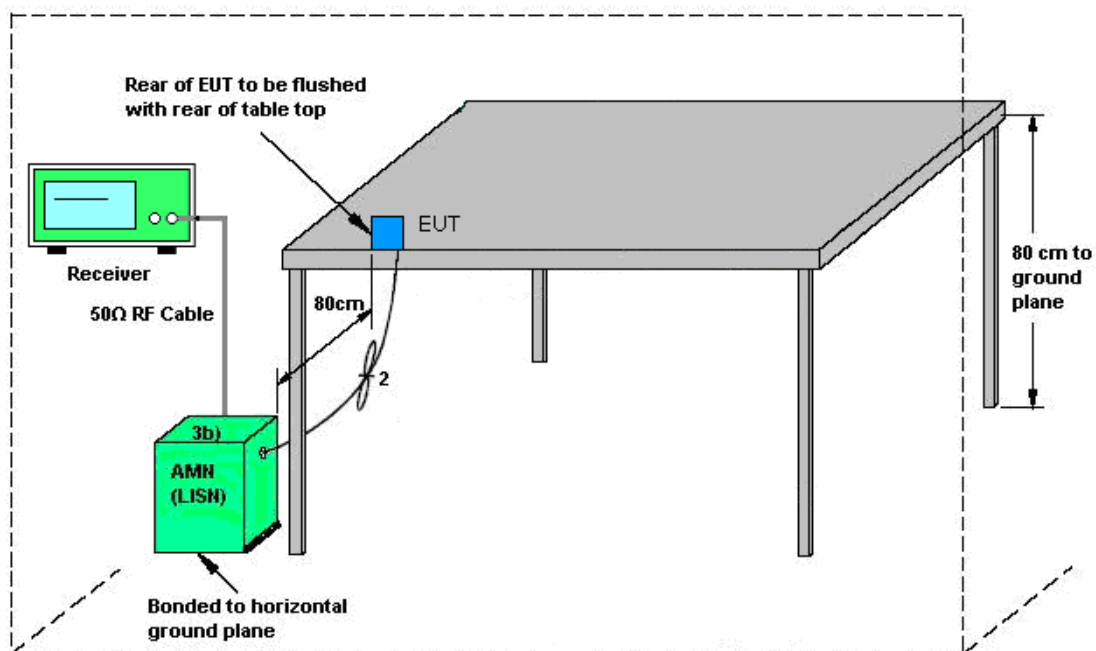
#### 3.8.2 Measuring Instruments

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

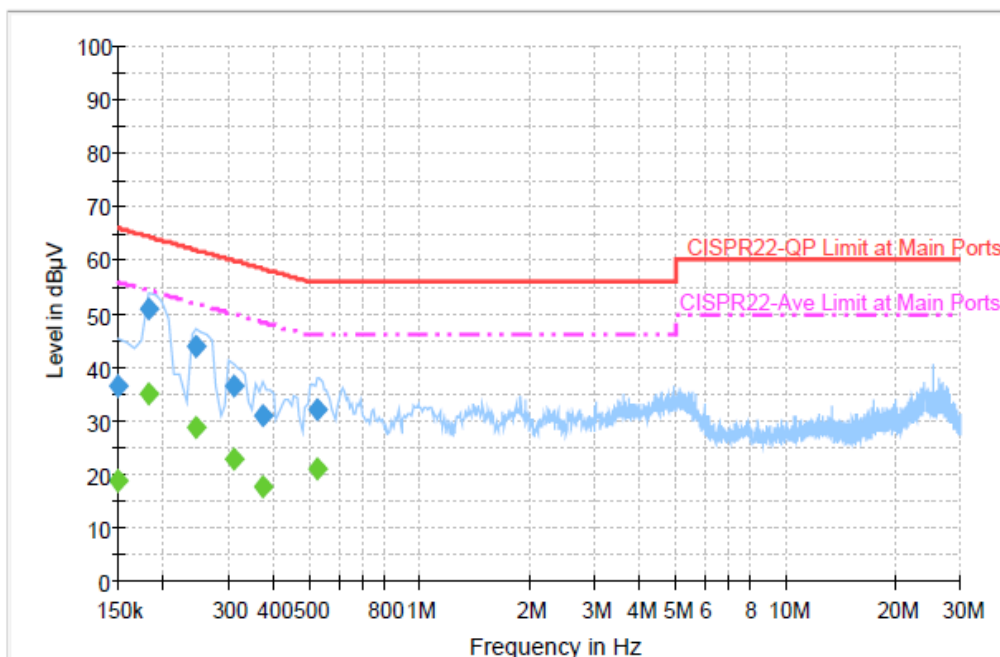


AMN = Artificial mains network (LISN)  
 AE = Associated equipment  
 EUT = Equipment under test  
 ISN = Impedance stabilization network



### 3.8.5 Test Result of AC Conducted Emission

<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	22~24°C
<b>Test Engineer :</b>	Novic Chiang	<b>Relative Humidity :</b>	42~44%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	WLAN Link(2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Qwerty Keypad + Battery (3600mAh) + 2D Scanner for Sample 1		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		



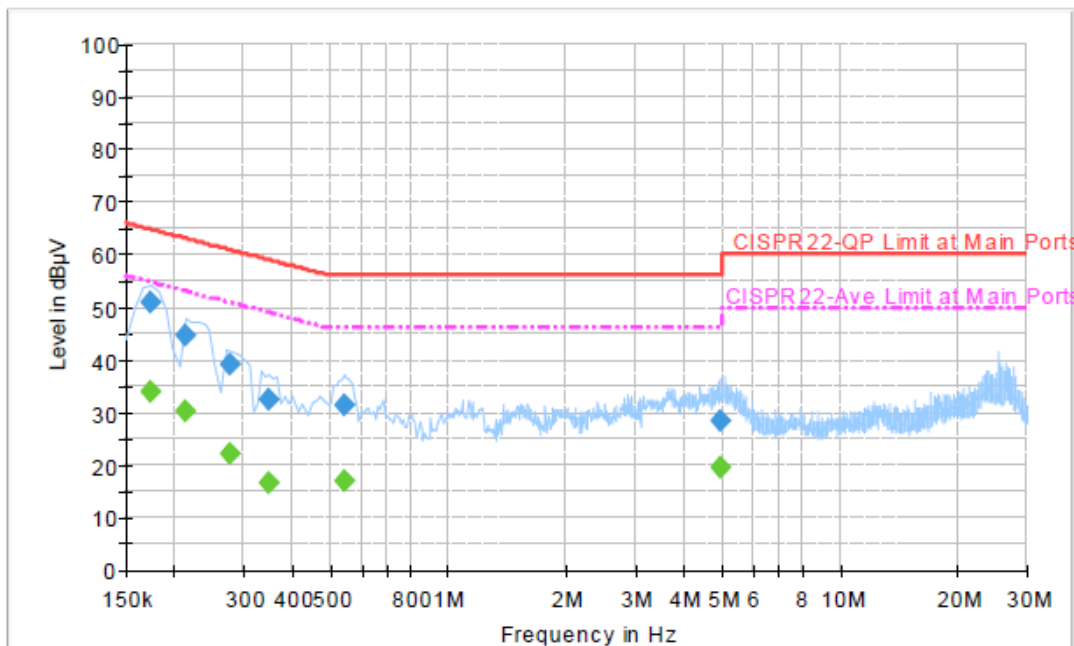
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	36.6	Off	L1	19.4	29.4	66.0
0.182000	51.1	Off	L1	19.4	13.3	64.4
0.246000	43.8	Off	L1	19.4	18.1	61.9
0.310000	36.6	Off	L1	19.4	23.4	60.0
0.374000	31.2	Off	L1	19.4	27.2	58.4
0.526000	32.0	Off	L1	19.4	24.0	56.0

#### Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	18.7	Off	L1	19.4	37.3	56.0
0.182000	34.9	Off	L1	19.4	19.5	54.4
0.246000	28.7	Off	L1	19.4	23.2	51.9
0.310000	22.7	Off	L1	19.4	27.3	50.0
0.374000	17.6	Off	L1	19.4	30.8	48.4
0.526000	20.9	Off	L1	19.4	25.1	46.0

<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	22~24°C
<b>Test Engineer :</b>	Novic Chiang	<b>Relative Humidity :</b>	42~44%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	WLAN Link(2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Qwerty Keypad + Battery (3600mAh) + 2D Scanner for Sample 1		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

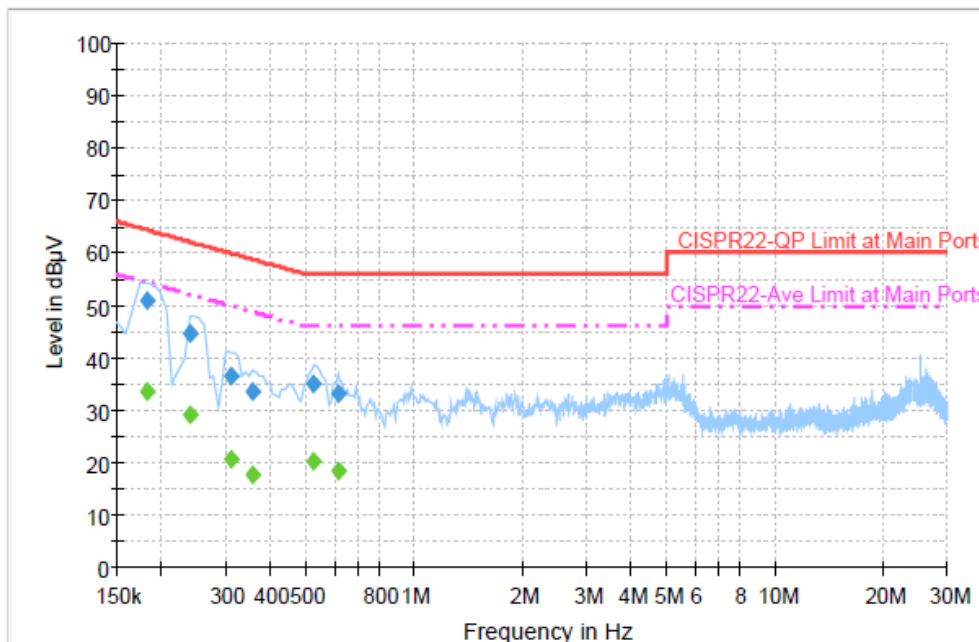

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	50.8	Off	N	19.4	14.0	64.8
0.214000	44.7	Off	N	19.4	18.3	63.0
0.278000	39.0	Off	N	19.4	21.9	60.9
0.350000	32.3	Off	N	19.4	26.7	59.0
0.542000	31.2	Off	N	19.4	24.8	56.0
4.966000	28.3	Off	N	19.6	27.7	56.0

**Final Result 2**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	33.8	Off	N	19.4	21.0	54.8
0.214000	30.1	Off	N	19.4	22.9	53.0
0.278000	22.0	Off	N	19.4	28.9	50.9
0.350000	16.5	Off	N	19.4	32.5	49.0
0.542000	17.0	Off	N	19.4	29.0	46.0
4.966000	19.4	Off	N	19.6	26.6	46.0

<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	22~24°C
<b>Test Engineer :</b>	Novic Chiang	<b>Relative Humidity :</b>	42~44%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	WLAN Link(2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Numeric Keypad + Battery (3600mAh) + 2D Scanner for Sample 1		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

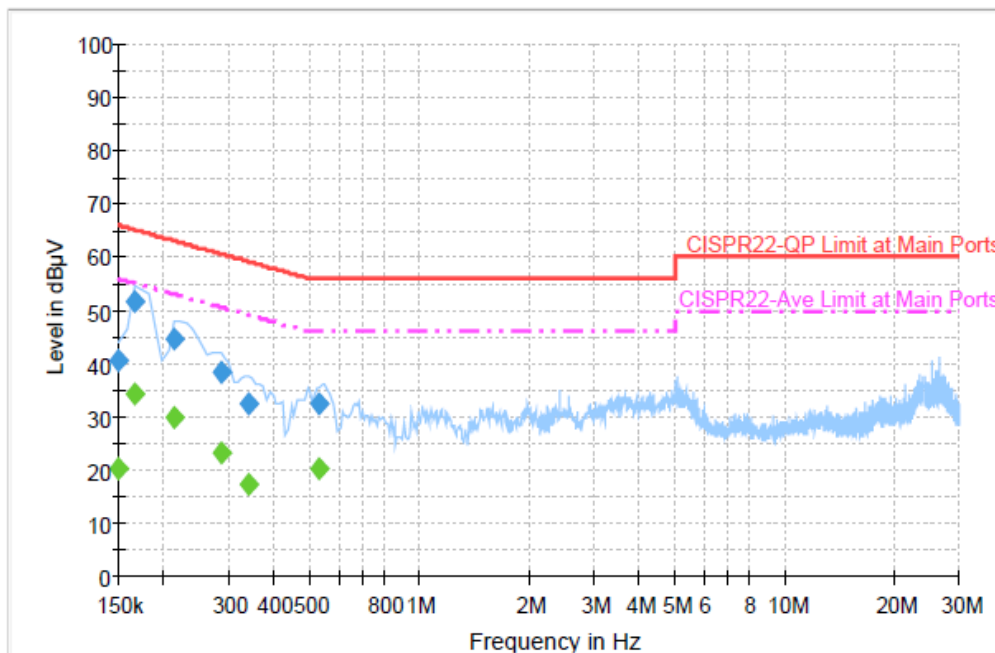

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	50.9	Off	L1	19.4	13.5	64.4
0.238000	44.5	Off	L1	19.4	17.7	62.2
0.310000	36.4	Off	L1	19.4	23.6	60.0
0.358000	33.5	Off	L1	19.4	25.3	58.8
0.526000	35.0	Off	L1	19.4	21.0	56.0
0.614000	33.1	Off	L1	19.4	22.9	56.0

**Final Result 2**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	33.6	Off	L1	19.4	20.8	54.4
0.238000	29.2	Off	L1	19.4	23.0	52.2
0.310000	20.7	Off	L1	19.4	29.3	50.0
0.358000	17.9	Off	L1	19.4	30.9	48.8
0.526000	20.2	Off	L1	19.4	25.8	46.0
0.614000	18.4	Off	L1	19.4	27.6	46.0

<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	22~24°C
<b>Test Engineer :</b>	Novic Chiang	<b>Relative Humidity :</b>	42~44%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	WLAN Link(2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Numeric Keypad + Battery (3600mAh) + 2D Scanner for Sample 1		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

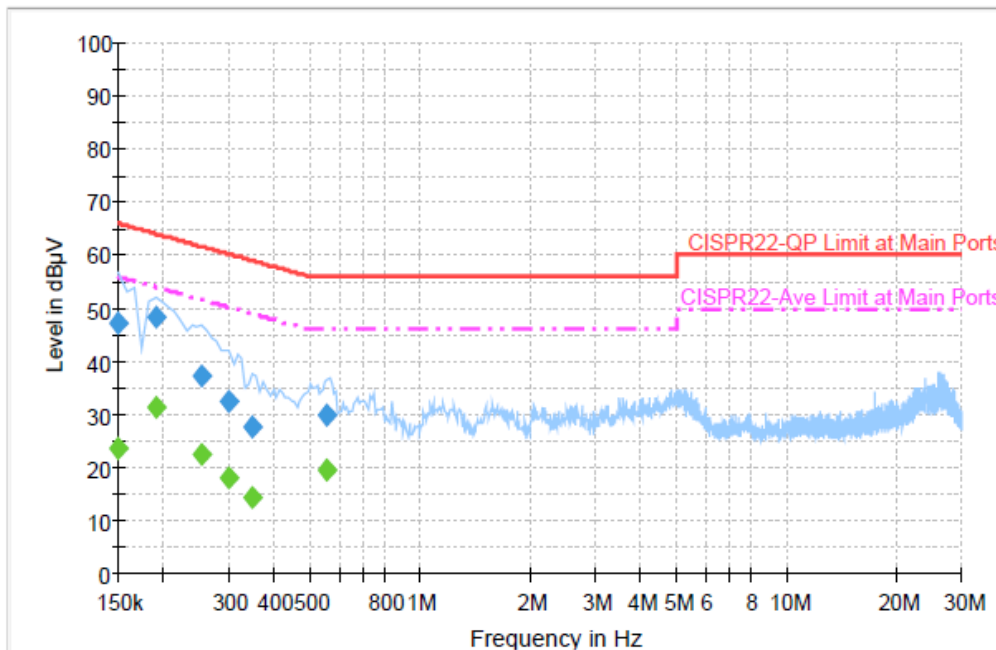

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	40.5	Off	N	19.4	25.5	66.0
0.166000	51.6	Off	N	19.4	13.6	65.2
0.214000	44.7	Off	N	19.4	18.3	63.0
0.286000	38.4	Off	N	19.4	22.2	60.6
0.342000	32.4	Off	N	19.4	26.8	59.2
0.534000	32.3	Off	N	19.4	23.7	56.0

**Final Result 2**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	20.3	Off	N	19.4	35.7	56.0
0.166000	34.4	Off	N	19.4	20.8	55.2
0.214000	29.8	Off	N	19.4	23.2	53.0
0.286000	23.4	Off	N	19.4	27.2	50.6
0.342000	17.4	Off	N	19.4	31.8	49.2
0.534000	20.4	Off	N	19.4	25.6	46.0

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	22~24°C
<b>Test Engineer :</b>	Novic Chiang	<b>Relative Humidity :</b>	42~44%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	WLAN Link(2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + PIM Keypad + Battery (2400mAh) + 1D Scanner for Sample 1		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

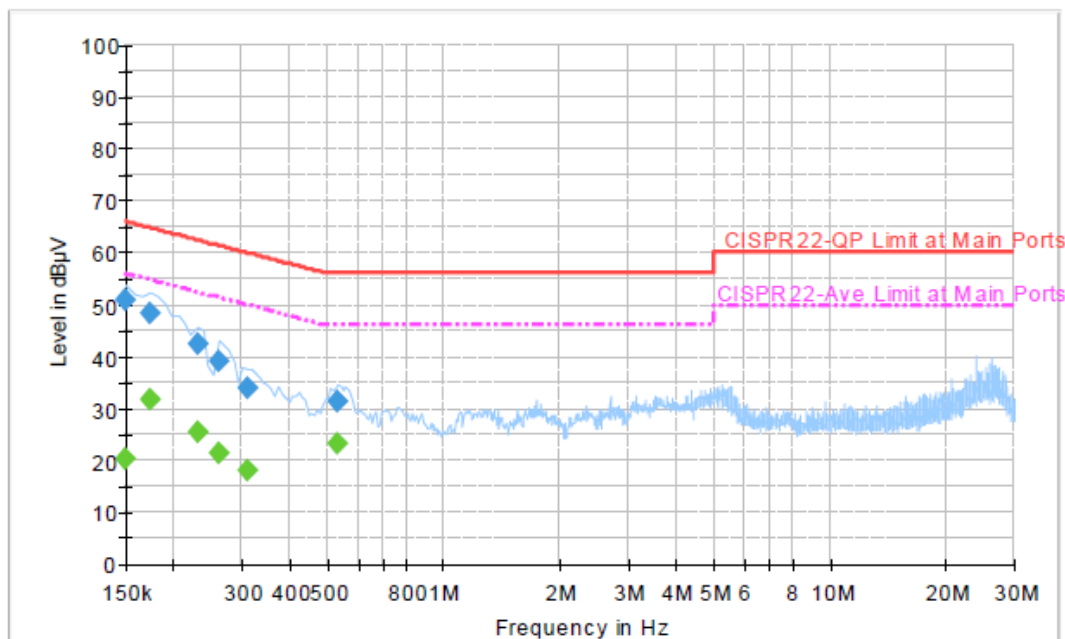

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	47.2	Off	L1	19.4	18.8	66.0
0.190000	48.5	Off	L1	19.4	15.5	64.0
0.254000	37.3	Off	L1	19.4	24.3	61.6
0.302000	32.3	Off	L1	19.4	27.9	60.2
0.350000	27.8	Off	L1	19.4	31.2	59.0
0.558000	29.8	Off	L1	19.4	26.2	56.0

**Final Result 2**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	23.5	Off	L1	19.4	32.5	56.0
0.190000	31.5	Off	L1	19.4	22.5	54.0
0.254000	22.5	Off	L1	19.4	29.1	51.6
0.302000	18.0	Off	L1	19.4	32.2	50.2
0.350000	14.5	Off	L1	19.4	34.5	49.0
0.558000	19.6	Off	L1	19.4	26.4	46.0

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	22~24°C
<b>Test Engineer :</b>	Novic Chiang	<b>Relative Humidity :</b>	42~44%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	WLAN Link(2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + PIM Keypad + Battery (2400mAh) + 1D Scanner for Sample 1		
<b>Remark :</b>	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)
0.150000	50.9	Off	N	19.4	15.1	66.0
0.174000	48.5	Off	N	19.4	16.3	64.8
0.230000	42.4	Off	N	19.5	20.0	62.4
0.262000	39.3	Off	N	19.4	22.1	61.4
0.310000	33.9	Off	N	19.4	26.1	60.0
0.534000	31.5	Off	N	19.4	24.5	56.0

**Final Result 2**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	20.2	Off	N	19.4	35.8	56.0
0.174000	31.8	Off	N	19.4	23.0	54.8
0.230000	25.4	Off	N	19.5	27.0	52.4
0.262000	21.4	Off	N	19.4	30.0	51.4
0.310000	18.2	Off	N	19.4	31.8	50.0
0.534000	23.2	Off	N	19.4	22.8	46.0

### 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

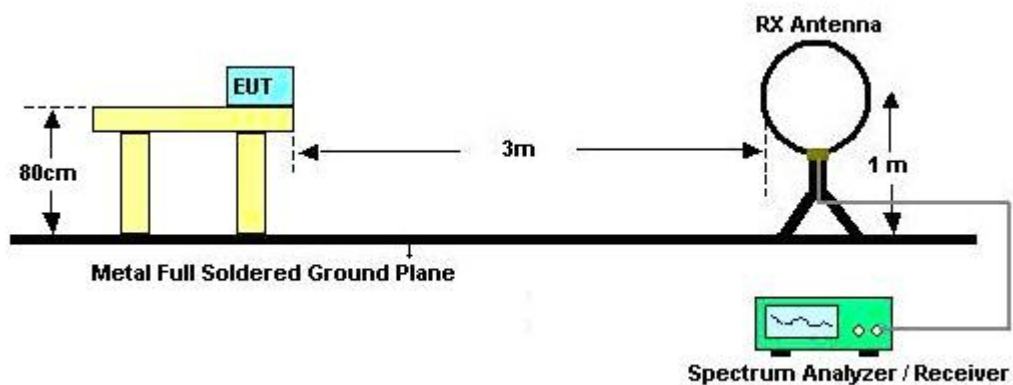
See list of measuring instruments of this test report.

#### 3.9.3 Test Procedures

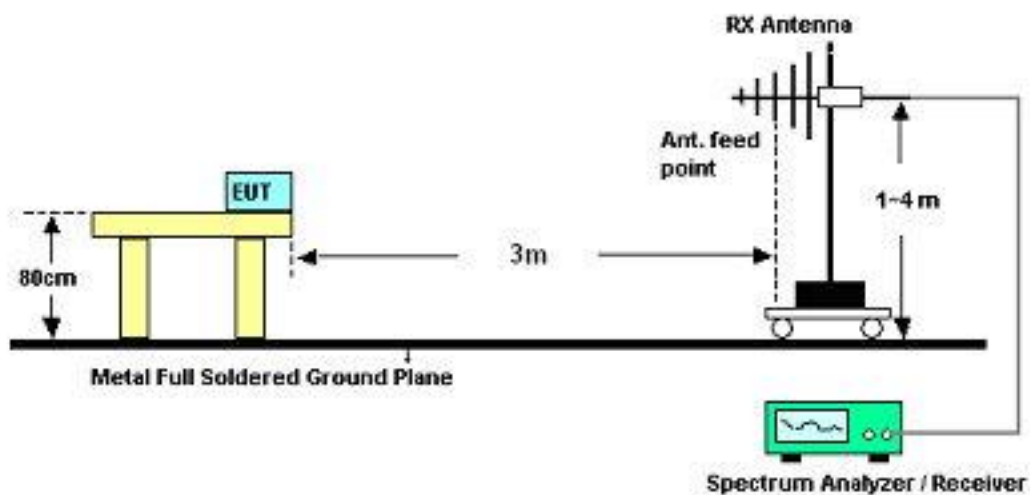
- The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
- Use the following spectrum analyzer settings:
  - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold.
  - 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)
- 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.
- Measured average value for the peak value is greater than 54 dBuV/m

### 3.9.4 Test Setup

For radiated emissions below 30MHz

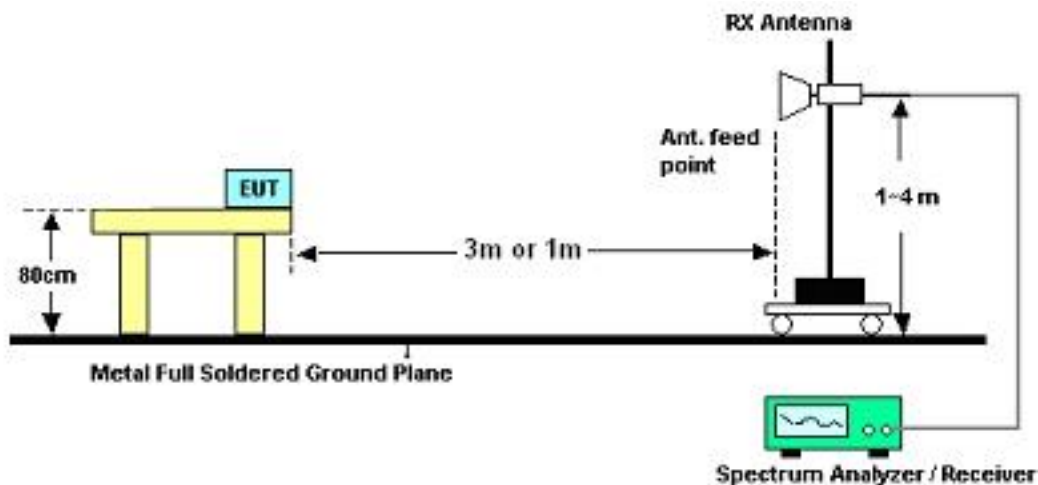


For radiated emissions from 30MHz to 1GHz





For radiated emissions above 1GHz



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

Test Engineer :	Wii Chang	Temperature :	22~26°C	
		Relative Humidity :	51~55%	

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)**

<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	51~55%
<b>Test Engineer :</b>	Wii Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2402 MHz is Fundamental Signals which can be ignored. 2. 1884 MHz is not within a restricted band.		

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
41.34	25.28	-14.72	40	44.39	11.78	0.81	31.7	-	-	Peak
217.38	30.16	-15.84	46	49.59	10.5	1.73	31.66	-	-	Peak
299.19	33.07	-12.93	46	49.22	13.46	2.06	31.67	100	44	Peak
355.3	31.02	-14.98	46	45.6	14.73	2.25	31.56	-	-	Peak
665.4	28.68	-17.32	46	38.23	19.31	3.12	31.98	-	-	Peak
892.9	31.16	-14.84	46	37.5	21.57	3.73	31.64	-	-	Peak
1884	53.05	-20.39	73.44	52.27	30.64	4.74	34.6	125	348	Peak
2388.85	46	-28	74	43.09	31.9	5.4	34.39	125	348	Peak
2388.85	33.64	-20.36	54	30.73	31.9	5.4	34.39	125	348	Average
2402	93.44	-	-	90.52	31.91	5.4	34.39	125	348	Peak
2402	78.29	-	-	75.38	31.9	5.4	34.39	125	348	Average
2500	32.9	-21.1	54	29.75	32	5.52	34.37	125	348	Average
2500	45.2	-28.8	74	42.05	32	5.52	34.37	125	348	Peak

<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	51~55%
<b>Test Engineer :</b>	Wii Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2402 MHz is Fundamental Signals which can be ignored. 2. 1884 MHz is not within a restricted band.		

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
34.59	32.44	-7.56	40	48.47	14.93	0.74	31.7	111	55	Peak
106.68	30.28	-13.22	43.5	49.52	11.2	1.26	31.7	-	-	Peak
151.23	29.85	-13.65	43.5	49.44	10.64	1.46	31.69	-	-	Peak
330.8	29.92	-16.08	46	45.18	14.17	2.16	31.59	-	-	Peak
665.4	34.04	-11.96	46	43.59	19.31	3.12	31.98	-	-	Peak
866.3	32.54	-13.46	46	39.4	21.34	3.61	31.81	-	-	Peak
1884	52.29	-25.67	77.96	51.51	30.64	4.74	34.6	103	265	Peak
2378.97	46.35	-27.65	74	43.5	31.88	5.37	34.4	103	265	Peak
2378.97	33.97	-20.03	54	31.12	31.88	5.37	34.4	103	265	Average
2402	97.96	-	-	95.05	31.9	5.4	34.39	103	265	Peak
2402	81.44	-	-	78.53	31.9	5.4	34.39	103	265	Average
2486	32.97	-21.03	54	29.84	31.98	5.52	34.37	103	265	Average
2486	46.1	-27.9	74	42.97	31.98	5.52	34.37	103	265	Peak

<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	51~55%
<b>Test Engineer :</b>	Wii Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2441 MHz is Fundamental Signals which can be ignored. 2. 1884 MHz is not within a restricted band.		

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
41.34	25.61	-14.39	40	44.72	11.78	0.81	31.7	-	-	Peak
103.98	29.43	-14.07	43.5	48.9	10.98	1.24	31.69	-	-	Peak
199.29	33.02	-10.48	43.5	53.66	9.35	1.66	31.65	100	22	Peak
301.4	30.71	-15.29	46	46.81	13.5	2.07	31.67	-	-	Peak
663.3	29.48	-16.52	46	39.04	19.31	3.11	31.98	-	-	Peak
924.4	29.95	-16.05	46	35.81	21.74	3.77	31.37	-	-	Peak
1884	50.46	-22.36	72.82	49.68	30.64	4.74	34.6	123	349	Peak
2388	33.23	-20.77	54	30.32	31.9	5.4	34.39	123	349	Average
2388	44.51	-29.49	74	41.6	31.9	5.4	34.39	123	349	Peak
2441	92.82	-	-	89.79	31.95	5.46	34.38	123	349	Peak
2441	77.38	-	-	74.35	31.95	5.46	34.38	123	349	Average
2484	44.57	-29.43	74	41.44	31.98	5.52	34.37	123	349	Peak
2484	32.97	-21.03	54	29.84	31.98	5.52	34.37	123	349	Average

<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	51~55%
<b>Test Engineer :</b>	Wii Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2441 MHz is Fundamental Signals which can be ignored. 2. 1884 MHz is not within a restricted band.		

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
31.08	33.07	-6.93	40	46.76	17.31	0.72	31.72	100	155	Peak
110.19	30.34	-13.16	43.5	49.27	11.5	1.28	31.71	-	-	Peak
157.98	30.3	-13.2	43.5	50.28	10.2	1.48	31.66	-	-	Peak
330.8	30.09	-15.91	46	45.35	14.17	2.16	31.59	-	-	Peak
663.3	34.76	-11.24	46	44.32	19.31	3.11	31.98	-	-	Peak
1000	34.03	-19.97	54	38.94	22.09	3.82	30.82	-	-	Peak
1884	52.49	-24.26	76.75	51.71	30.64	4.74	34.6	100	265	Peak
2310	33.36	-20.64	54	30.65	31.81	5.31	34.41	100	265	Average
2310	44.76	-29.24	74	42.05	31.81	5.31	34.41	100	265	Peak
2441	96.75	-	-	93.72	31.95	5.46	34.38	100	265	Peak
2441	80.48	-	-	77.45	31.95	5.46	34.38	100	265	Average
2500	45.01	-28.99	74	41.86	32	5.52	34.37	100	265	Peak
2500	33.2	-20.8	54	30.05	32	5.52	34.37	100	265	Average

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	51~55%
<b>Test Engineer :</b>	Wii Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2480 MHz is Fundamental Signals which can be ignored. 2. 1884 MHz is not within a restricted band.		

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
41.34	25.72	-14.28	40	44.83	11.78	0.81	31.7	-	-	Peak
104.79	29.13	-14.37	43.5	48.51	11.06	1.25	31.69	-	-	Peak
265.98	34.61	-11.39	46	51.47	12.92	1.92	31.7	100	55	Peak
300	32.16	-13.84	46	48.31	13.46	2.06	31.67	-	-	Peak
663.3	30.81	-15.19	46	40.37	19.31	3.11	31.98	-	-	Peak
1000	32.03	-21.97	54	36.94	22.09	3.82	30.82	-	-	Peak
1884	51.28	-21.33	72.61	50.5	30.64	4.74	34.6	100	348	Peak
2348	44.85	-29.15	74	42.08	31.84	5.34	34.41	100	348	Peak
2348	33.31	-20.69	54	30.54	31.84	5.34	34.41	100	348	Average
2480	77.05	-	-	73.92	31.98	5.52	34.37	100	348	Average
2480	92.61	-	-	89.48	31.98	5.52	34.37	100	348	Peak
2483.5	46.76	-7.24	54	43.63	31.98	5.52	34.37	100	348	Average
2483.5	58.06	-15.94	74	54.93	31.98	5.52	34.37	100	348	Peak

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	51~55%
<b>Test Engineer :</b>	Wii Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2480 MHz is Fundamental Signals which can be ignored. 2. 1884 MHz is not within a restricted band.		

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
31.89	34.32	-5.68	40	48.58	16.72	0.73	31.71	100	111	Peak
103.44	28.94	-14.56	43.5	48.41	10.98	1.24	31.69	-	-	Peak
165.54	28.66	-14.84	43.5	48.91	9.88	1.53	31.66	-	-	Peak
330.8	30.23	-15.77	46	45.49	14.17	2.16	31.59	-	-	Peak
663.3	33.36	-12.64	46	42.92	19.31	3.11	31.98	-	-	Peak
745.9	30.87	-15.13	46	39.61	20.02	3.34	32.1	-	-	Peak
1884	51.24	-26.74	77.98	50.46	30.64	4.74	34.6	111	352	Peak
2318	33.14	-20.86	54	30.41	31.83	5.31	34.41	111	352	Average
2318	46.21	-27.79	74	43.48	31.83	5.31	34.41	111	352	Peak
2480	97.98	-	-	94.85	31.98	5.52	34.37	111	352	Peak
2480	81.79	-	-	78.66	31.98	5.52	34.37	111	352	Average
2483.5	63.22	-10.78	74	60.09	31.98	5.52	34.37	111	352	Peak
2483.5	50.72	-3.28	54	47.59	31.98	5.52	34.37	111	352	Average

<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	51~55%
<b>Test Engineer :</b>	Wii Chang	<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
30	15.73	-24.27	40	28.82	17.91	0.72	31.72	-	-	Peak
195.24	30.74	-12.76	43.5	51.39	9.37	1.63	31.65	100	55	Peak
247.08	28.32	-17.68	46	45.65	12.48	1.84	31.65	-	-	Peak
304.9	20.82	-25.18	46	36.83	13.57	2.08	31.66	-	-	Peak
514.9	20.36	-25.64	46	31.42	18.03	2.72	31.81	-	-	Peak
656.3	22.11	-23.89	46	31.71	19.29	3.08	31.97	-	-	Peak
2350	32.62	-21.38	54	29.85	31.84	5.34	34.41	100	156	Average
2350	44.87	-29.13	74	42.1	31.84	5.34	34.41	100	156	Peak
2480	77.17	-	-	74.04	31.98	5.52	34.37	100	156	Average
2480	92.88	-	-	89.75	31.98	5.52	34.37	100	156	Peak
2483.5	46.07	-7.93	54	42.94	31.98	5.52	34.37	100	156	Average
2483.5	57.4	-16.6	74	54.27	31.98	5.52	34.37	100	156	Peak





<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	22~26°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	51~55%
<b>Test Engineer :</b>	Wii Chang	<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
35.94	27.09	-12.91	40	43.52	14.52	0.75	31.7	-	-	Peak
135.84	29.64	-13.86	43.5	48.37	11.55	1.42	31.7	-	-	Peak
195.24	31.82	-11.68	43.5	52.47	9.37	1.63	31.65	100	78	Peak
343.4	18.46	-27.54	46	33.36	14.46	2.21	31.57	-	-	Peak
500.9	20.81	-25.19	46	32.09	17.83	2.67	31.78	-	-	Peak
654.9	23.08	-22.92	46	32.69	19.29	3.07	31.97	-	-	Peak
2326	32.53	-21.47	54	29.8	31.83	5.31	34.41	100	272	Average
2326	44.89	-29.11	74	42.16	31.83	5.31	34.41	100	272	Peak
2480	80.39	-	-	77.26	31.98	5.52	34.37	100	272	Average
2480	95.26	-	-	92.13	31.98	5.52	34.37	100	272	Peak
2483.5	48.32	-5.68	54	45.19	31.98	5.52	34.37	100	272	Average
2483.5	59.37	-14.63	74	56.24	31.98	5.52	34.37	100	272	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 PCB 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. 13, 2011	Jun. 12, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30, 2010	Jul. 29, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 25, 2010	Oct. 24, 2011	Radiation (03CH06-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug.19, 2010	Aug.19, 2011	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2010	Oct. 31, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 02, 2010	Aug. 01, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Oct. 20, 2010	Oct. 19, 2011	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Bluetooth Base Station	R&S	CBT32	100519	N/A	May 18, 2010	May 17, 2011	Radiation (03CH06-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	$\pm 0.10$	Normal ( $k=2$ )	0.10	1	0.10
Antenna Factor Calibration	$\pm 1.70$	Normal ( $k=2$ )	0.85	1	0.85
Cable Loss Calibration	$\pm 0.50$	Normal ( $k=2$ )	0.25	1	0.25
Receiver Correction	$\pm 2.00$	Rectangular	1.15	1	1.15
Antenna Factor Directional	$\pm 1.50$	Rectangular	0.87	1	0.87
Site Imperfection	$\pm 2.80$	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 EP141402 as below.