

# FCC RF Test Report

**APPLICANT** : HTC Corporation  
**EQUIPMENT** : Windows Phone  
**MODEL NAME** : PB92100  
**FCC ID** : NM8PB92100  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : Digital Transmission System (DTS)

The product was received on Jan. 12, 2010 and completely tested on Feb. 22, 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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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 7.1 dB at 0.598 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 1.72 dB at 2483.50 MHz
0	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**HTC Corporation**

No. 23, Xinghua Rd., Taoyuan 330, Taiwan

## 1.2 Manufacturer

**HTC Corporation**

No. 23, Xinghua Rd., Taoyuan 330, Taiwan

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
<b>Equipment</b>	Windows Phone
<b>Model Name</b>	PB92100
<b>FCC ID</b>	NM8PB92100
<b>Sample A</b>	EUT with Camera 1 and LCM 1
<b>Sample B</b>	EUT with Camera 2 and LCM 2
<b>Tx/Rx Frequency Range</b>	2400 MHz ~ 2483.5 MHz
<b>Number of Channels</b>	11
<b>Carrier Frequency of Each Channel</b>	2412+(n-1)*5 MHz; n=1~11
<b>Channel Spacing</b>	5 MHz
<b>Maximum Output Power to Antenna</b>	802.11b : 20.90 dBm (123.03 mW) 802.11g : 22.95 dBm (197.24 mW)
<b>Antenna Type</b>	PIFA Antenna with gain 0.5 dBi
<b>Type of Antenna Connector</b>	N/A
<b>Type of Modulation</b>	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
<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 Transmission System (DTS).
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	03CH07-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 KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ 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.	GPS Station	T&E	GS-50	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 Power

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

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		At DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	20.73	20.74	20.87	<b>20.90</b>
CH 06	2437 MHz	20.51	20.66	20.44	20.57
CH 11	2462 MHz	19.45	19.61	19.72	19.69

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		At OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	<b>22.95</b>	22.10	22.15	21.85	22.31	22.05	22.51	22.53
CH 06	2437 MHz	22.49	22.01	22.00	21.90	22.22	22.01	22.48	22.47
CH 11	2462 MHz	21.53	21.18	21.21	20.93	21.38	21.19	21.75	21.63

**Remark:**

1. The data rates of WLAN 802.11b/g were set in 11Mbps for 802.11b and 6Mbps for 802.11g, for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

## 2.2 Test Mode

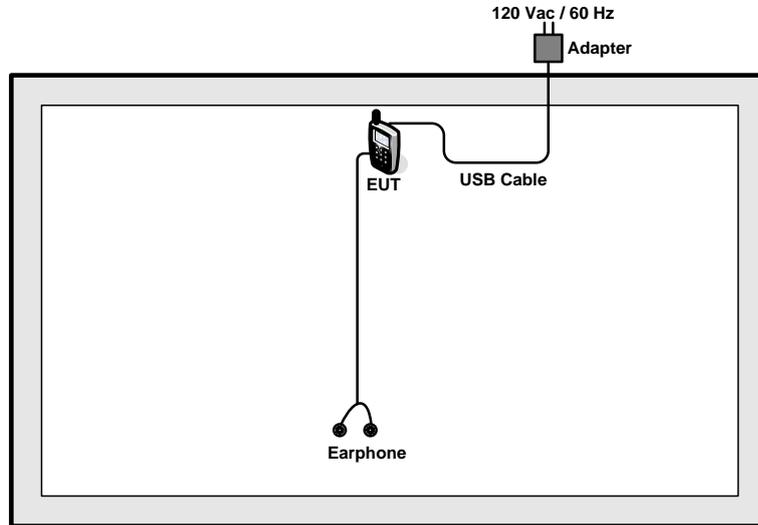
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

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

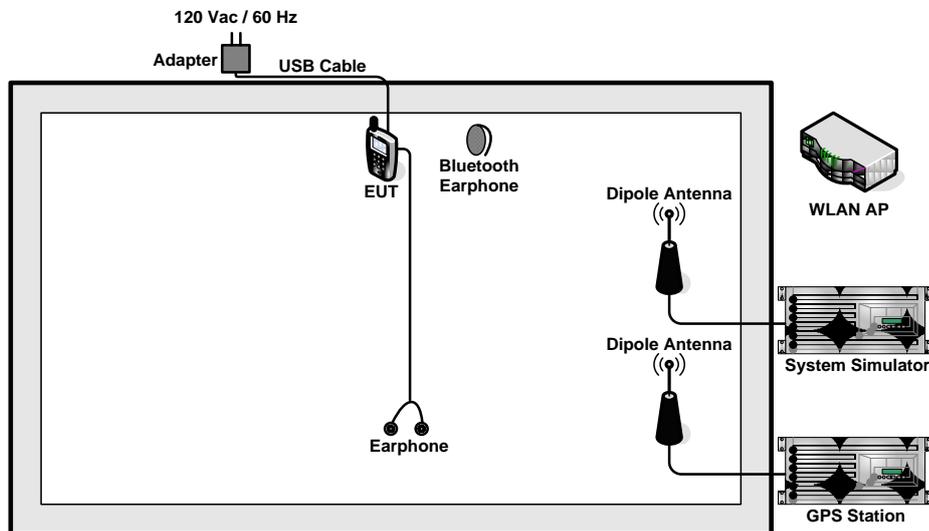
Test Cases		
Test Item	802.11b	802.11g
<b>Conducted TCs</b>	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4 : 802.11g CH01_2412 MHz Mode 5 : 802.11g CH06_2437 MHz Mode 6 : 802.11g CH11_2462 MHz
<b>Radiated TCs</b>	Mode 1 : 802.11b CH01_2412 MHz for Sample A Mode 2 : 802.11b CH06_2437 MHz for Sample A Mode 3 : 802.11b CH11_2462 MHz for Sample A	Mode 4 : 802.11g CH01_2412 MHz for Sample A Mode 5 : 802.11g CH06_2437 MHz for Sample A Mode 6 : 802.11g CH11_2462 MHz for Sample A Mode 7 : 802.11g CH11_2462 MHz for Sample B
<b>AC Conducted Emission</b>	Mode 1 :Sample A + GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + USB Cable (Charging from Adapter 1) Mode 2 :Sample B + GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + USB Cable (Charging from Adapter 2) Mode 3 :Sample B + GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + USB Cable (Charging from Adapter 3)	
<b>Remark:</b> The worst case of conducted emission is mode 2; only the test data of it was reported.		

## 2.3 Connection Diagram of Test System

### <Radiation Test>



### <Conduction Test>



## 2.4 RF Utility

The programmed RF utility, "Remote 432X controller (serial)" is installed in EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

### 3 Test Result

#### 3.1 6dB Bandwidth Measurement

##### 3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

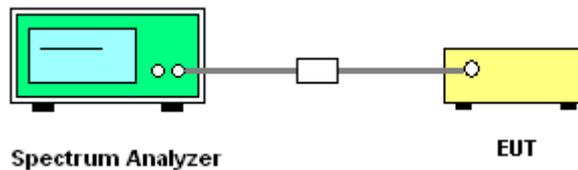
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

##### 3.1.4 Test Setup



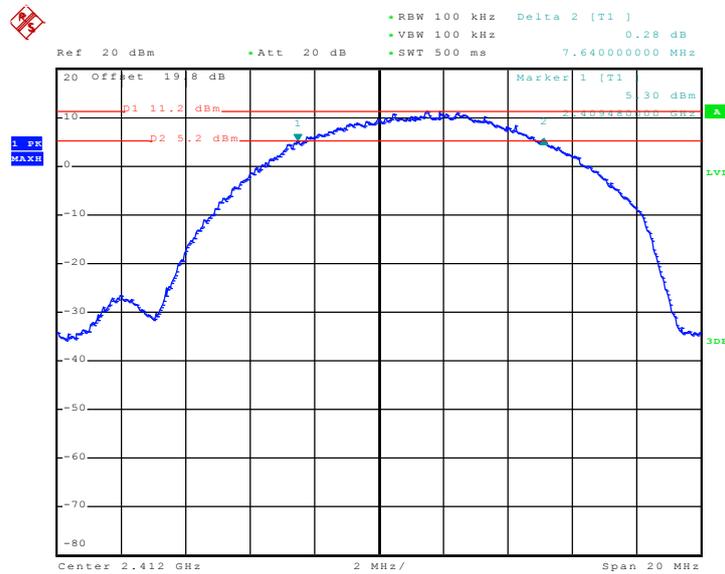


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	25~27°C
Test Engineer :	Andy Yeh	Relative Humidity :	37~40%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	7.64	0.5	Pass
06	2437	7.64	0.5	Pass
11	2462	7.24	0.5	Pass

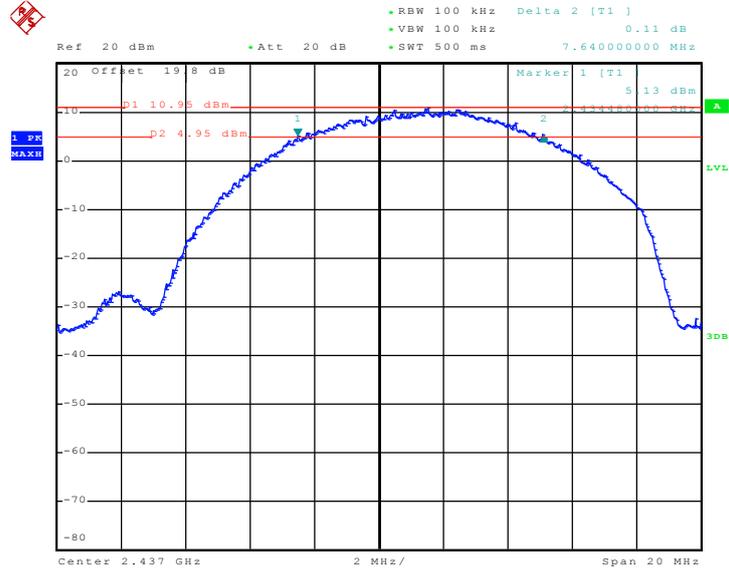
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 1.FEB.2010 00:58:01

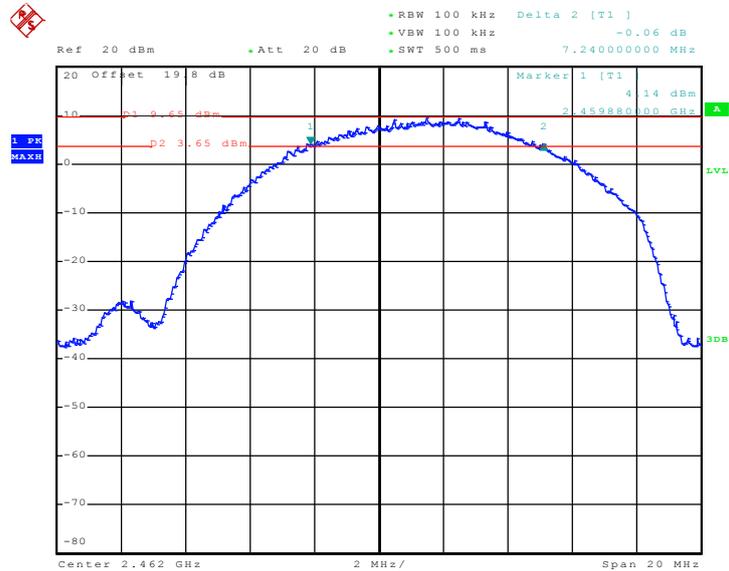


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



Date: 1.FEB.2010 01:06:54

Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 11



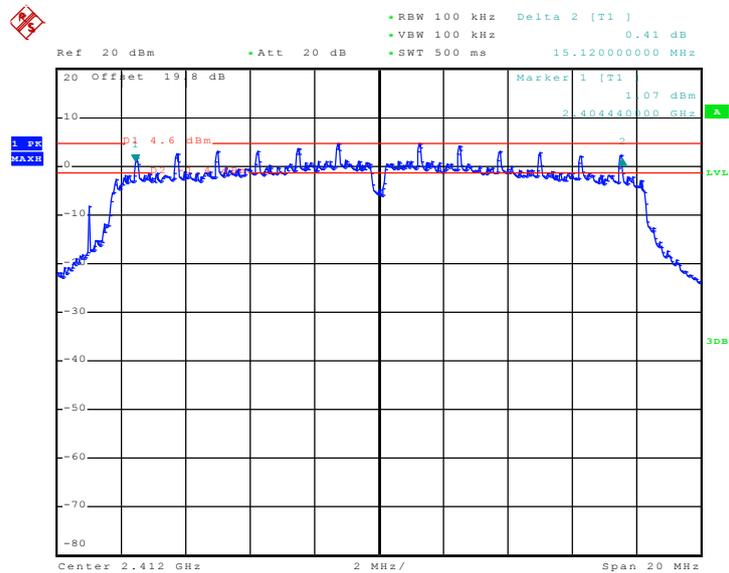
Date: 1.FEB.2010 01:03:57



Test Mode :	Mode 4, 5, 6	Temperature :	25~27°C
Test Engineer :	Andy Yeh	Relative Humidity :	37~40%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.12	0.5	Pass
06	2437	15.20	0.5	Pass
11	2462	15.16	0.5	Pass

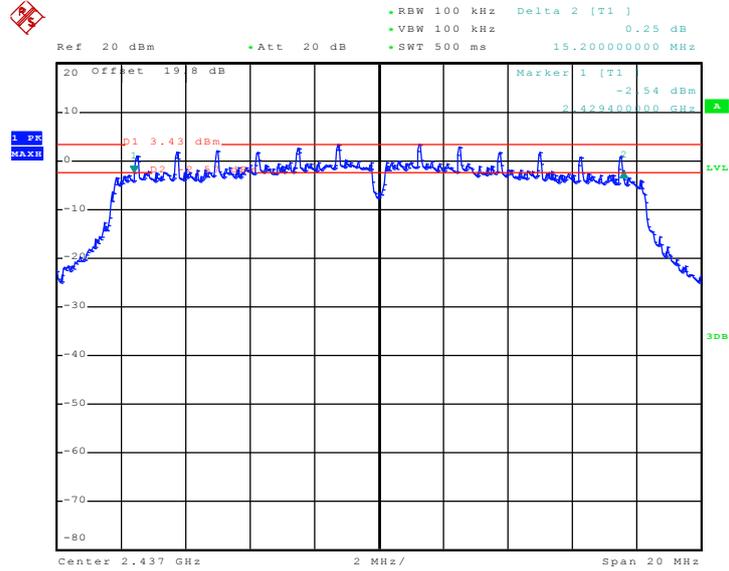
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 9.FEB.2010 15:48:23

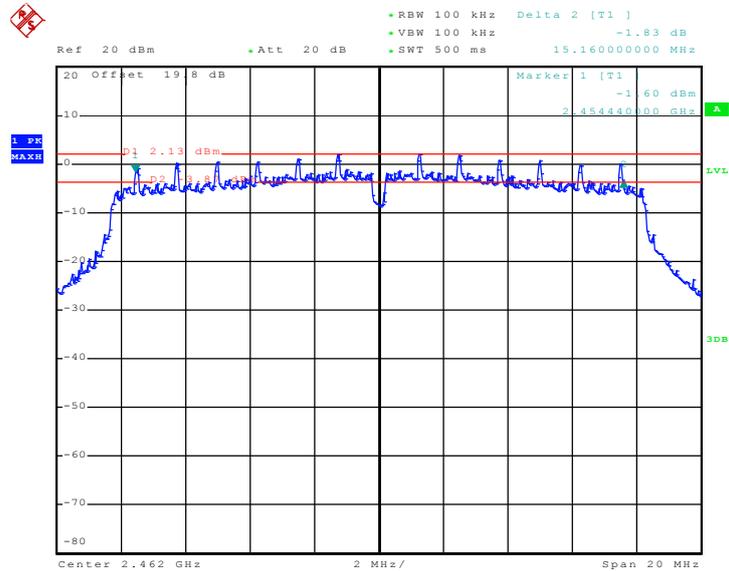


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Date: 1.FEB.2010 01:20:51

Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11



Date: 1.FEB.2010 01:22:13

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

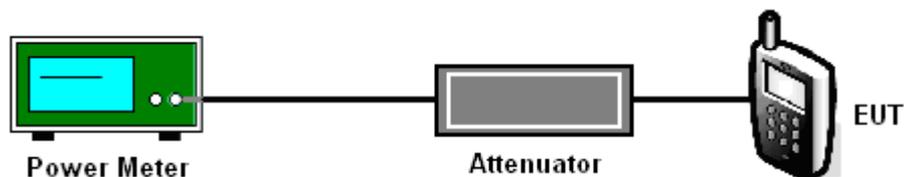
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the power meter by a low loss cable.
3. Measure the power by power meter.

### 3.2.4 Test Setup





3.2.5 Test Result of Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	25~27°C
Test Engineer :	Andy Yeh	Relative Humidity :	37~40%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	20.90	30	Pass
06	2437	20.57	30	Pass
11	2462	19.69	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	25~27°C
Test Engineer :	Andy Yeh	Relative Humidity :	37~40%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.95	30	Pass
06	2437	22.49	30	Pass
11	2462	21.53	30	Pass



### **3.3 Band Edges Measurement**

#### **3.3.1 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. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB.

#### **3.3.2 Measuring Instruments**

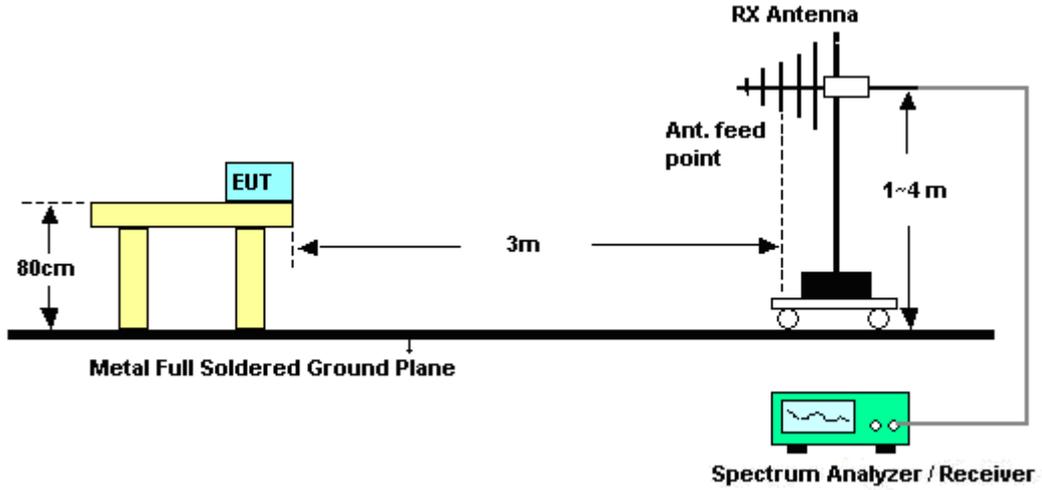
See list of measuring instruments of this test report.

#### **3.3.3 Test Procedures**

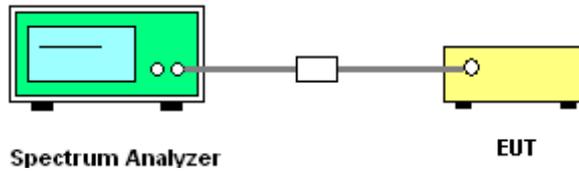
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz 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: Apply 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 = 10 Hz, Sweep=Auto. 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 as in FCC Section 15.35(b) and (c).

### 3.3.4 Test Setup

#### <Radiated Band Edges>



#### <Conducted Band Edges>





3.3.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	22~23°C
Test Band :	802.11b	Relative Humidity :	42~43%
Test Channel :	01	Test Engineer :	Kay Wu

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
2389.99	57.64	-16.36	74.00	54.21	32.13	5.46	34.16	110	17	Peak
2389.99	45.8	-8.20	54.00	42.37	32.13	5.46	34.16	110	17	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.61	59.77	-14.23	74.00	56.33	32.13	5.46	34.15	100	58	Peak
2389.61	46.61	-7.39	54.00	43.17	32.13	5.46	34.15	100	58	Average

Test Mode :	Mode 3	Temperature :	22~23°C
Test Band :	802.11b	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Kay Wu

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	58.58	-15.42	74.00	55.12	32.27	5.38	34.19	192	9	Peak
2483.5	45.79	-8.21	54.00	42.33	32.27	5.38	34.19	192	9	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	59.48	-14.52	74.00	56.02	32.27	5.38	34.19	100	63	Peak
2483.5	46.15	-7.85	54.00	42.69	32.27	5.38	34.19	100	63	Average



Test Mode :	Mode 4	Temperature :	22~23°C
Test Band :	802.11g	Relative Humidity :	42~43%
Test Channel :	01	Test Engineer :	Kay Wu

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
2389.99	67.75	-6.25	74.00	64.32	32.13	5.46	34.16	111	16	Peak
2389.99	49.77	-4.23	54.00	46.34	32.13	5.46	34.16	111	16	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.42	68.19	-5.81	74.00	64.75	32.13	5.46	34.15	130	47	Peak
2389.42	50.38	-3.62	54.00	46.94	32.13	5.46	34.15	130	47	Average

Test Mode :	Mode 6	Temperature :	22~23°C
Test Band :	802.11g	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Kay Wu

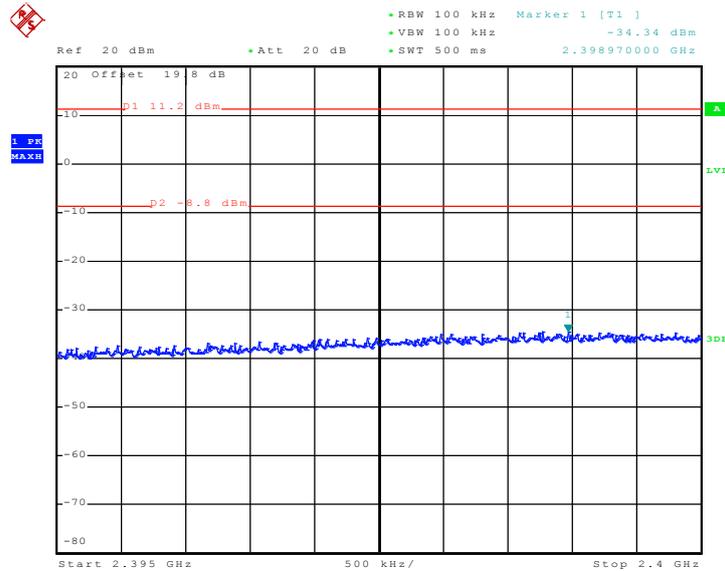
ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2484.42	67.52	-6.48	74.00	64.06	32.27	5.38	34.19	164	32	Peak
2484.42	50.9	-3.1	54.00	47.44	32.27	5.38	34.19	164	32	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	69.31	-4.69	74.00	65.85	32.27	5.38	34.19	100	46	Peak
2483.5	52.28	-1.72	54.00	48.82	32.27	5.38	34.19	100	46	Average

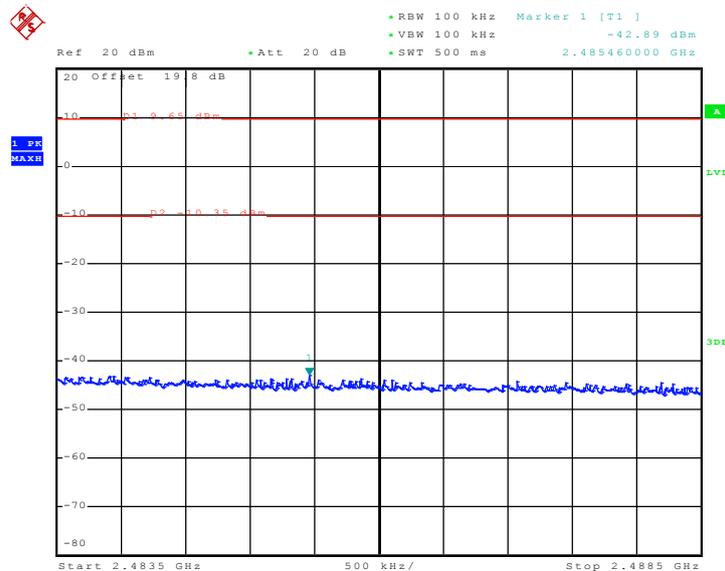
### 3.3.6 Test Plots of Conducted Band Edges

Test Mode :	Mode 1 and 3	Temperature :	25~27°C
Test Band :	802.11b	Relative Humidity :	37~40%
Test Channel :	01 and 11	Test Engineer :	Andy Yeh

Low Band Edge Plot on 802.11b Channel 01



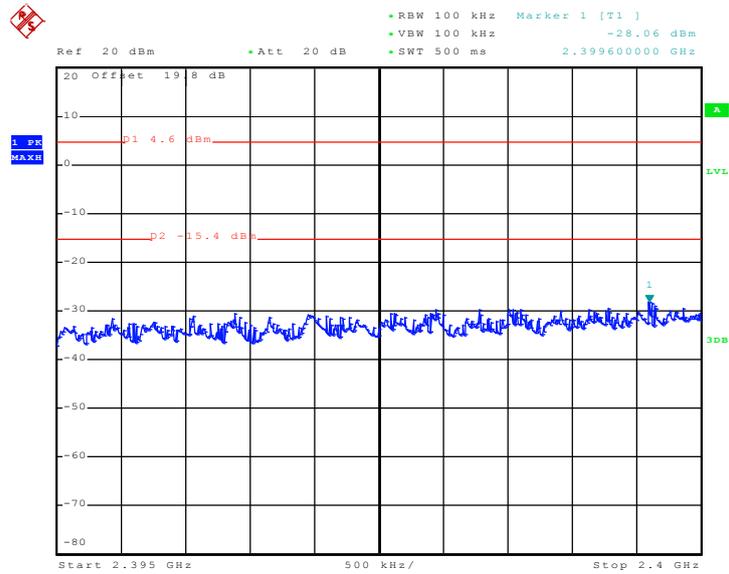
High Band Edge Plot on 802.11b Channel 11



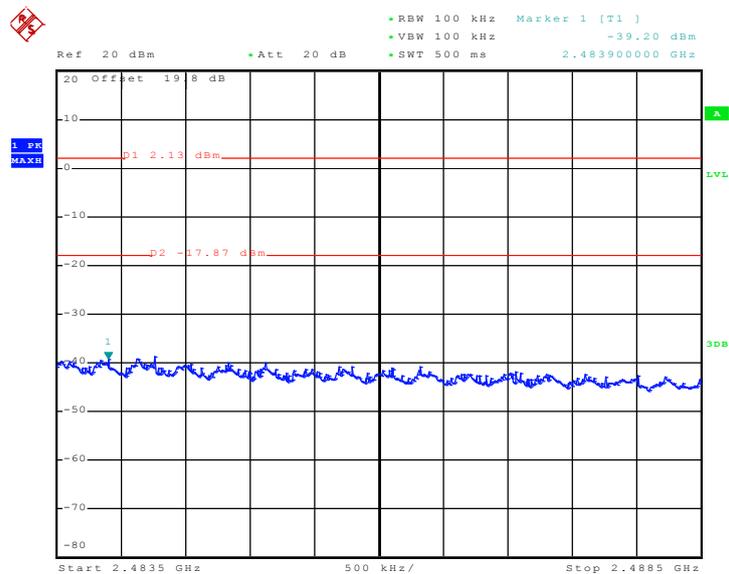


Test Mode :	Mode 4 and 6	Temperature :	25~27°C
Test Band :	802.11g	Relative Humidity :	37~40%
Test Channel :	01 and 11	Test Engineer :	Andy Yeh

Low Band Edge Plot on 802.11g Channel 01



High Band Edge Plot on 802.11g Channel 11



## 3.4 Spurious Emission Measurement

### 3.4.1 Limit of Spurious Emission Measurement

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

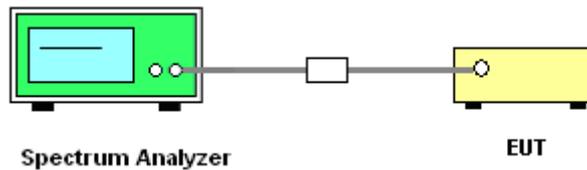
### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 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.

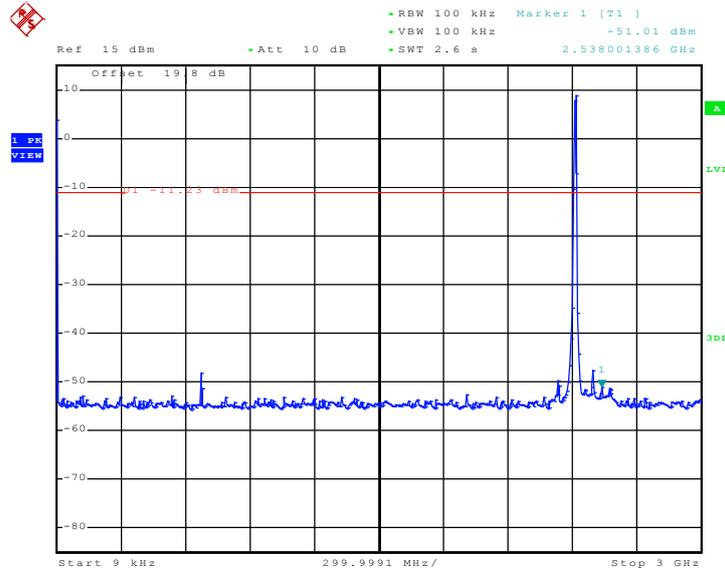
### 3.4.4 Test Setup



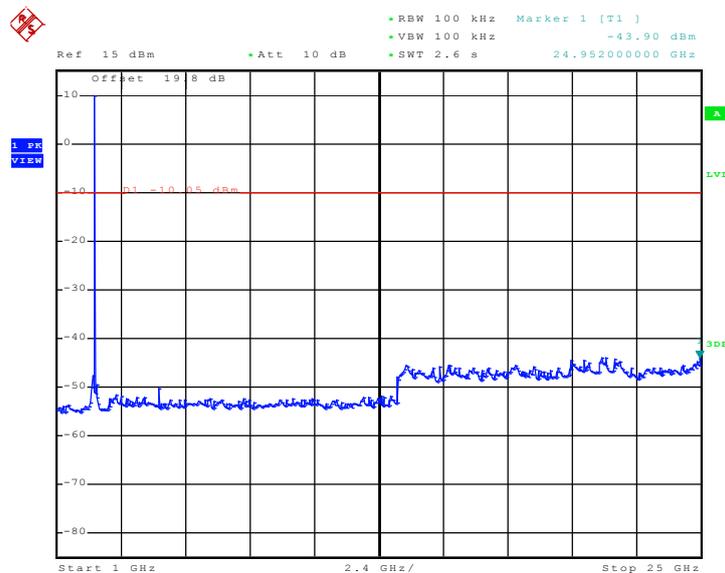
### 3.4.5 Test Plots of Spurious Emission

Test Mode :	Mode 1	Temperature :	25~27°C
Test Band :	802.11b	Relative Humidity :	37~40%
Test Channel :	01	Test Engineer :	Andy Yeh

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



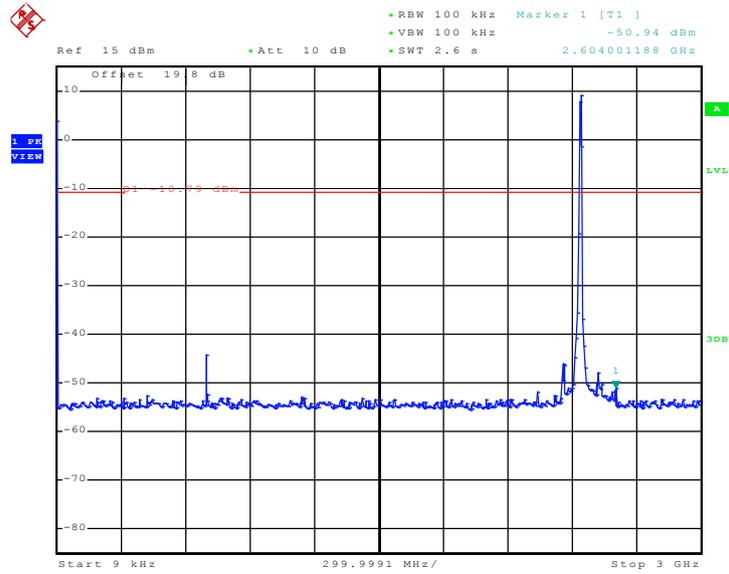
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



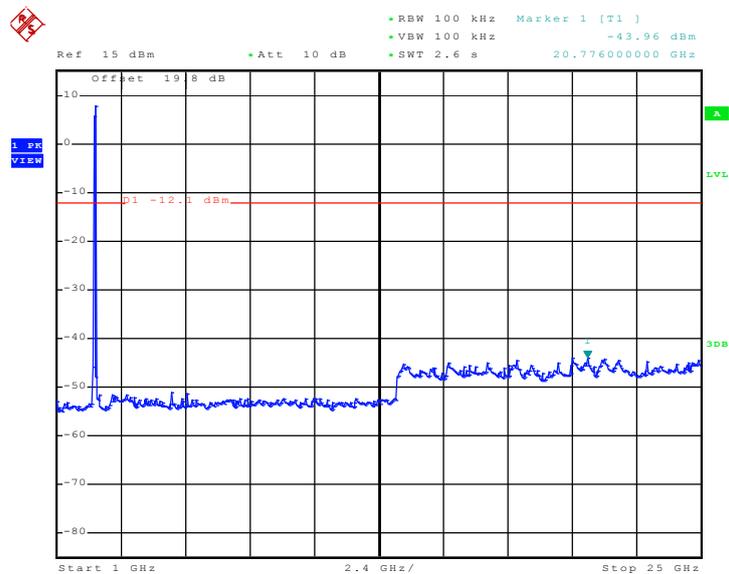


Test Mode :	Mode 2	Temperature :	25~27°C
Test Band :	802.11b	Relative Humidity :	37~40%
Test Channel :	06	Test Engineer :	Andy Yeh

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



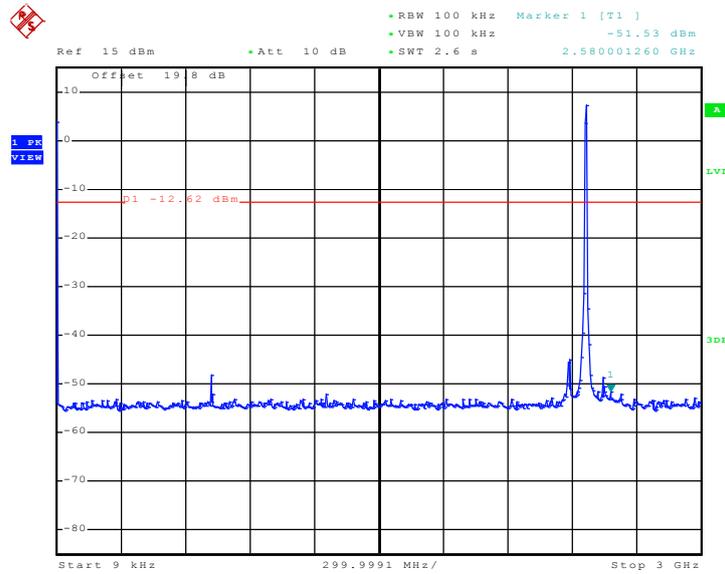
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



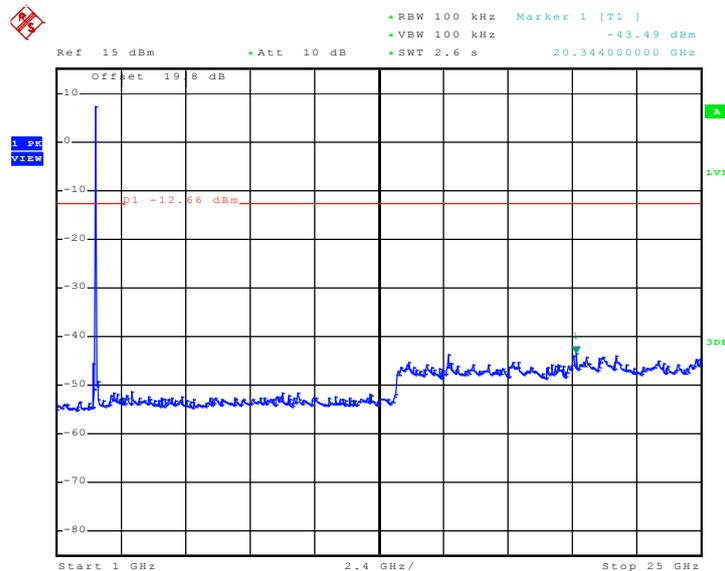


Test Mode :	Mode 3	Temperature :	25~27°C
Test Band :	802.11b	Relative Humidity :	37~40%
Test Channel :	11	Test Engineer :	Andy Yeh

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

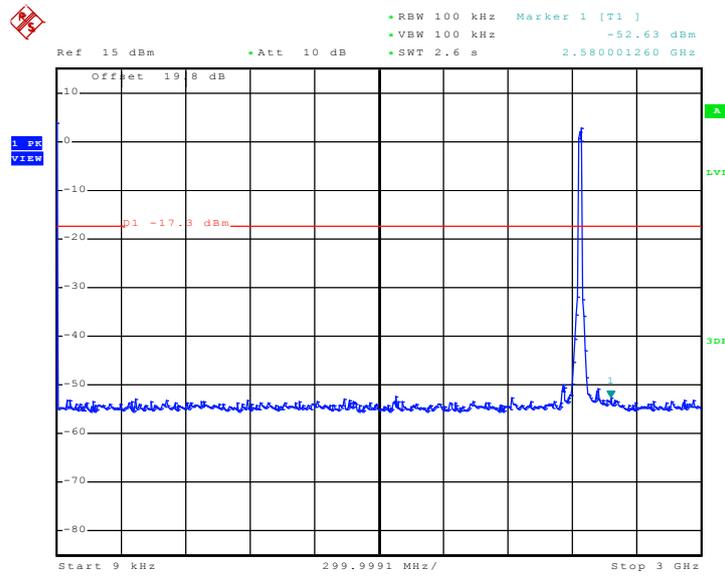




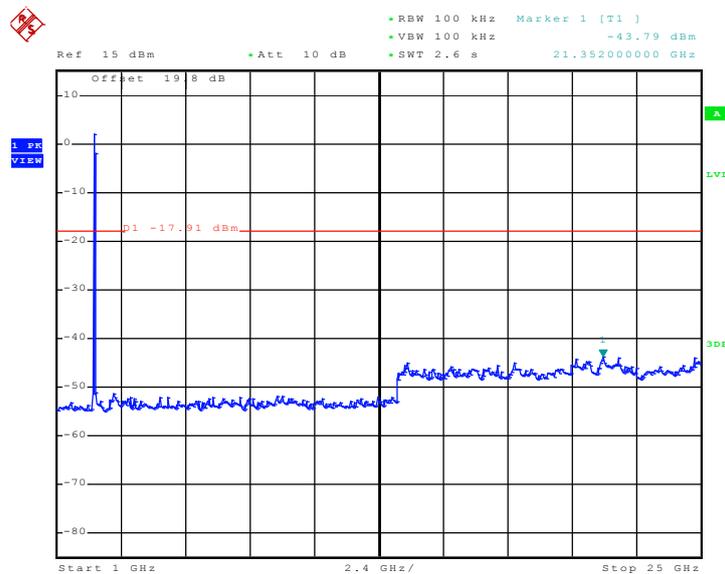


Test Mode :	Mode 5	Temperature :	25~27°C
Test Band :	802.11g	Relative Humidity :	37~40%
Test Channel :	06	Test Engineer :	Andy Yeh

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

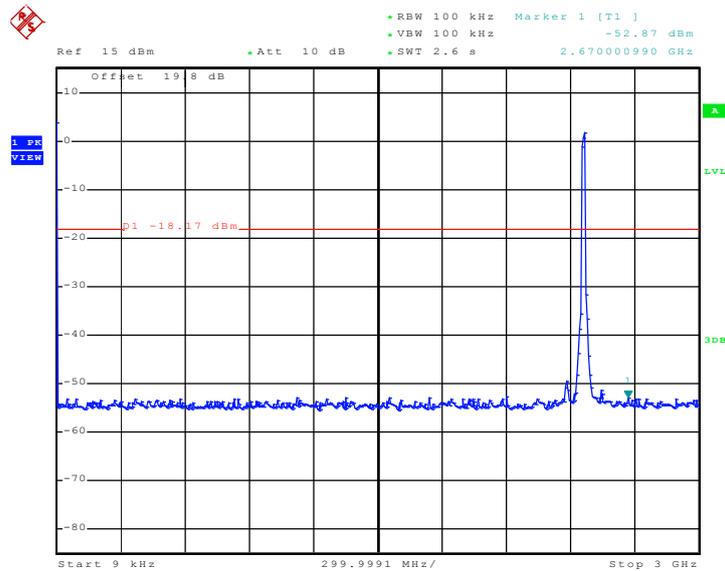


Date: 1. FEB. 2010 03:33:47

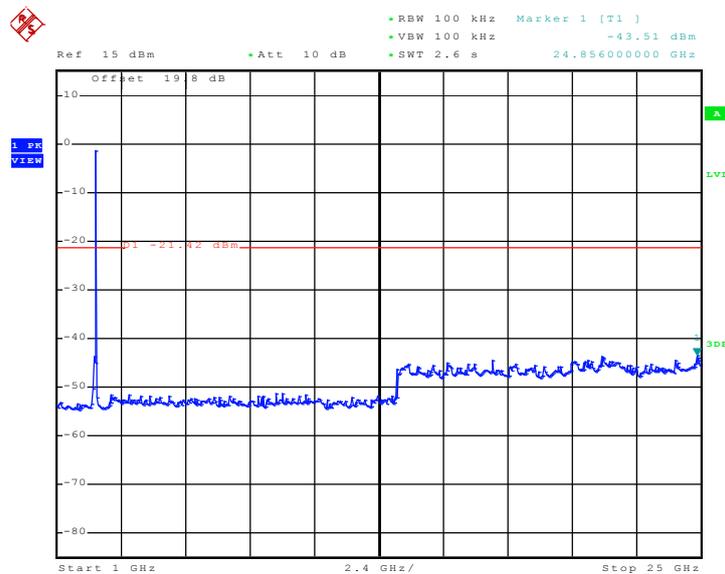


Test Mode :	Mode 6	Temperature :	25~27°C
Test Band :	802.11g	Relative Humidity :	37~40%
Test Channel :	11	Test Engineer :	Andy Yeh

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



## 3.5 Power Spectral Density Measurement

### 3.5.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

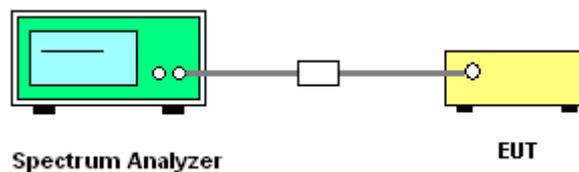
### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Take the measured data from spectrum analyzer.

### 3.5.4 Test Setup



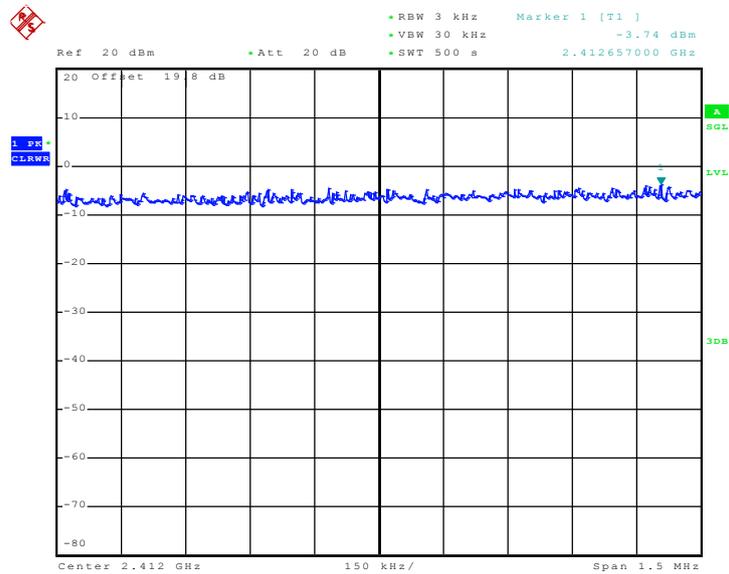


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	25~27°C
Test Engineer :	Andy Yeh	Relative Humidity :	37~40%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-3.74	8	Pass
06	2437	-3.89	8	Pass
11	2462	-4.95	8	Pass

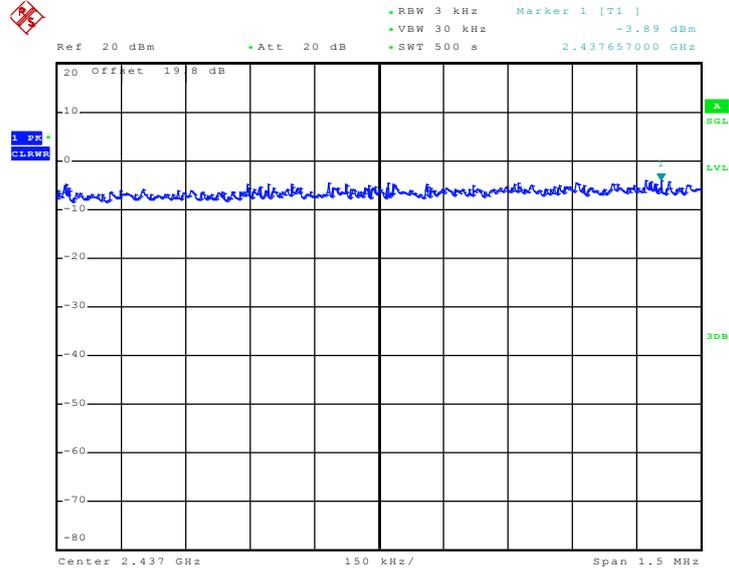
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 1.FRR.2010 02:17:04

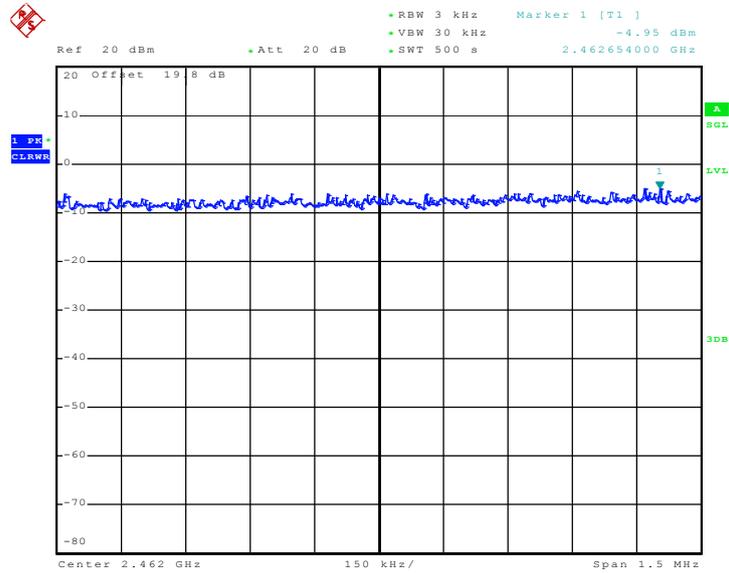


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 1.FEB.2010 01:49:37

Mode 3 : PSD Plot on 802.11b Channel 11



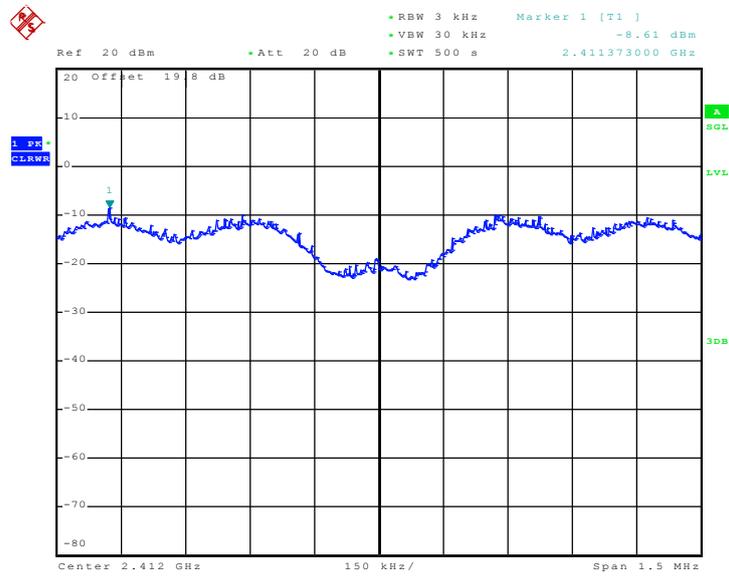
Date: 1.FEB.2010 01:40:40



Test Mode :	Mode 4, 5, 6	Temperature :	25~27°C
Test Engineer :	Andy Yeh	Relative Humidity :	37~40%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-8.61	8	Pass
06	2437	-8.27	8	Pass
11	2462	-9.84	8	Pass

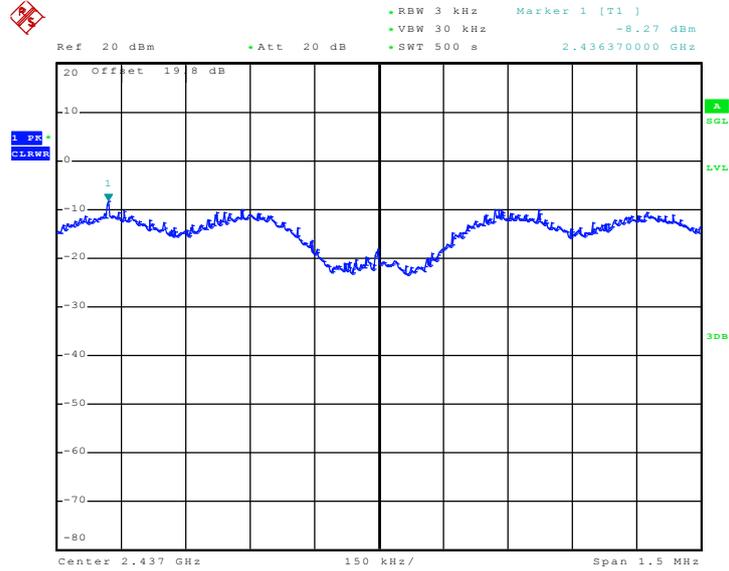
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 1.FEB.2010 03:00:05

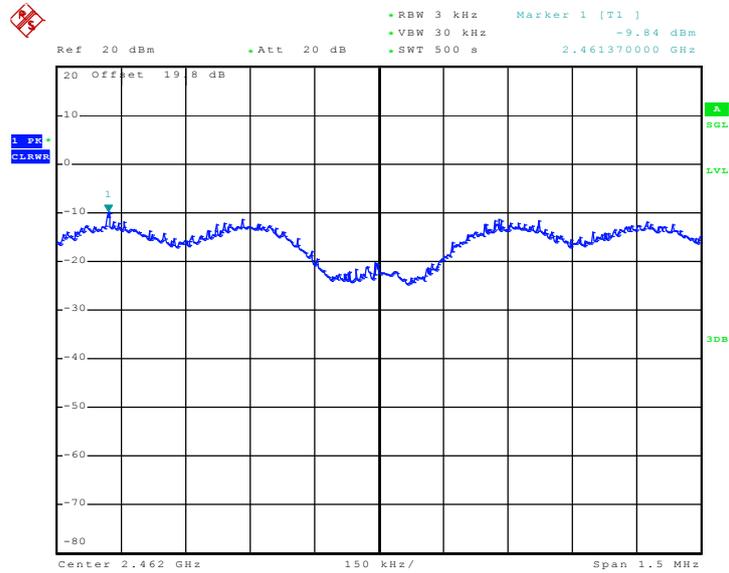


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 1.FEB.2010 03:14:12

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 1.FEB.2010 03:23:14

### 3.6 AC Conducted Emission Measurement

#### 3.6.1 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.

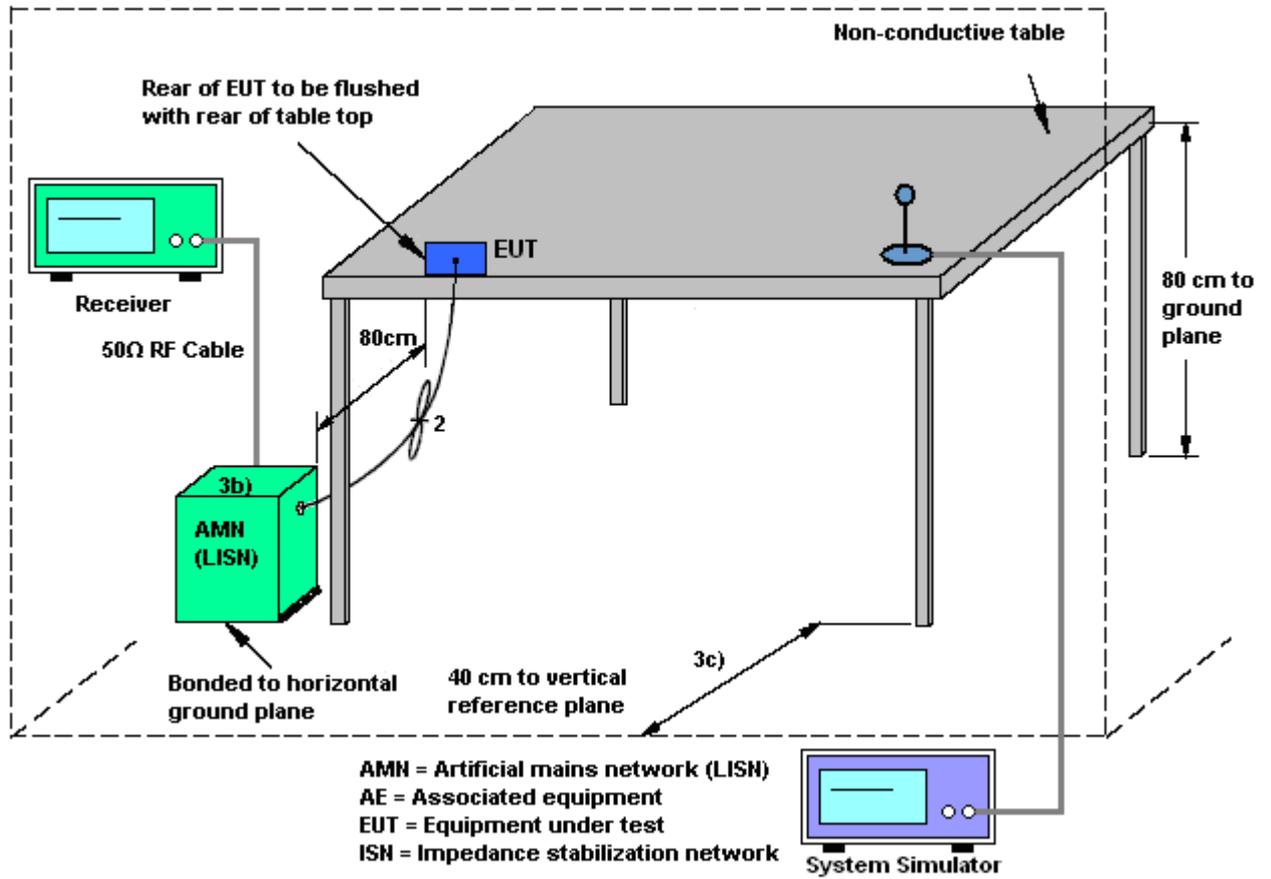
#### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.6.3 Test Procedures

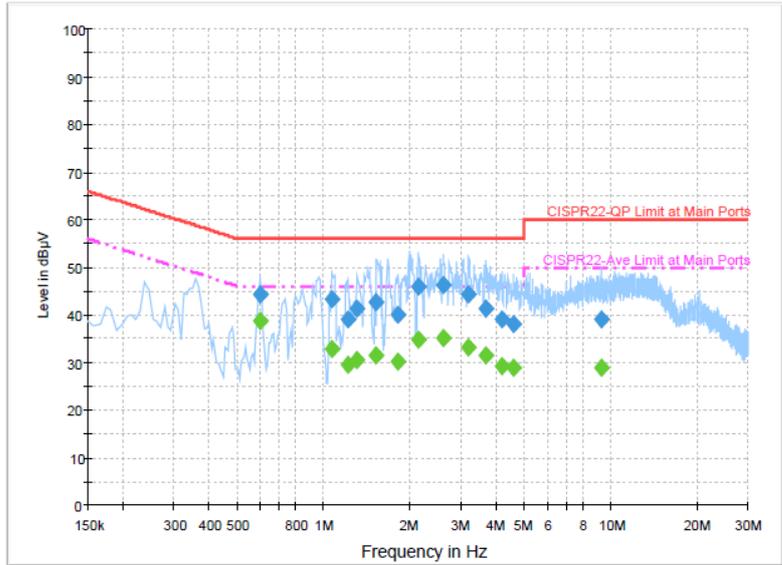
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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.

### 3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Hayden Wu	Relative Humidity :	43~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Sample B + GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + USB Cable (Charging from Adapter 2)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

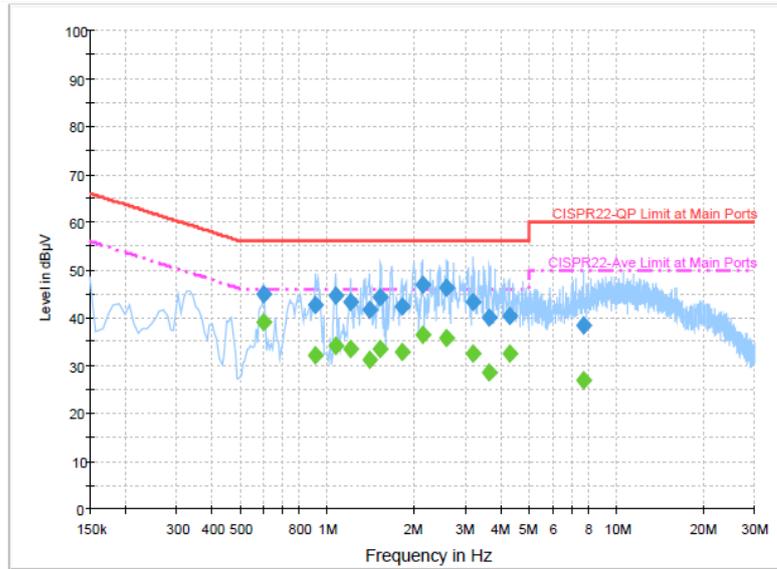
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.598000	44.4	Off	L1	19.5	11.6	56.0
1.070000	43.2	Off	L1	19.4	12.8	56.0
1.214000	39.1	Off	L1	19.5	16.9	56.0
1.310000	41.2	Off	L1	19.5	14.8	56.0
1.518000	42.5	Off	L1	19.5	13.5	56.0
1.814000	39.9	Off	L1	19.5	16.1	56.0
2.134000	45.9	Off	L1	19.5	10.1	56.0
2.606000	46.3	Off	L1	19.5	9.7	56.0
3.198000	44.4	Off	L1	19.5	11.6	56.0
3.654000	41.4	Off	L1	19.5	14.6	56.0
4.166000	39.0	Off	L1	19.5	17.0	56.0
4.574000	38.0	Off	L1	19.6	18.0	56.0
9.222000	39.0	Off	L1	19.6	21.0	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.598000	38.8	Off	L1	19.5	7.2	46.0
1.070000	32.7	Off	L1	19.4	13.3	46.0
1.214000	29.4	Off	L1	19.5	16.6	46.0
1.310000	30.4	Off	L1	19.5	15.6	46.0
1.518000	31.6	Off	L1	19.5	14.4	46.0
1.814000	30.0	Off	L1	19.5	16.0	46.0
2.134000	34.8	Off	L1	19.5	11.2	46.0
2.606000	35.0	Off	L1	19.5	11.0	46.0
3.198000	33.0	Off	L1	19.5	13.0	46.0
3.654000	31.6	Off	L1	19.5	14.4	46.0
4.166000	29.0	Off	L1	19.5	17.0	46.0
4.574000	28.8	Off	L1	19.6	17.2	46.0
9.222000	29.0	Off	L1	19.6	21.0	50.0



Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Hayden Wu	Relative Humidity :	43~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Sample B + GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + USB Cable (Charging from Adapter 2)		
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)
0.598000	45.0	Off	N	19.5	11.0	56.0
0.910000	42.5	Off	N	19.4	13.5	56.0
1.070000	44.7	Off	N	19.4	11.3	56.0
1.206000	43.2	Off	N	19.5	12.8	56.0
1.390000	41.5	Off	N	19.5	14.5	56.0
1.526000	44.2	Off	N	19.5	11.8	56.0
1.806000	42.4	Off	N	19.5	13.6	56.0
2.126000	46.8	Off	N	19.5	9.2	56.0
2.574000	46.2	Off	N	19.5	9.8	56.0
3.182000	43.4	Off	N	19.5	12.6	56.0
3.638000	40.0	Off	N	19.5	16.0	56.0
4.254000	40.4	Off	N	19.5	15.6	56.0
7.710000	38.4	Off	N	19.6	21.6	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.598000	38.9	Off	N	19.5	7.1	46.0
0.910000	32.2	Off	N	19.4	13.8	46.0
1.070000	34.0	Off	N	19.4	12.0	46.0
1.206000	33.4	Off	N	19.5	12.6	46.0
1.390000	31.3	Off	N	19.5	14.7	46.0
1.526000	33.6	Off	N	19.5	12.4	46.0
1.806000	32.7	Off	N	19.5	13.3	46.0
2.126000	36.4	Off	N	19.5	9.6	46.0
2.574000	35.7	Off	N	19.5	10.3	46.0
3.182000	32.5	Off	N	19.5	13.5	46.0
3.638000	28.5	Off	N	19.5	17.5	46.0
4.254000	32.5	Off	N	19.5	13.5	46.0
7.710000	26.8	Off	N	19.6	23.2	50.0

### 3.7 Radiated Emission Measurement

#### 3.7.1 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. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. 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

#### 3.7.2 Measuring Instruments

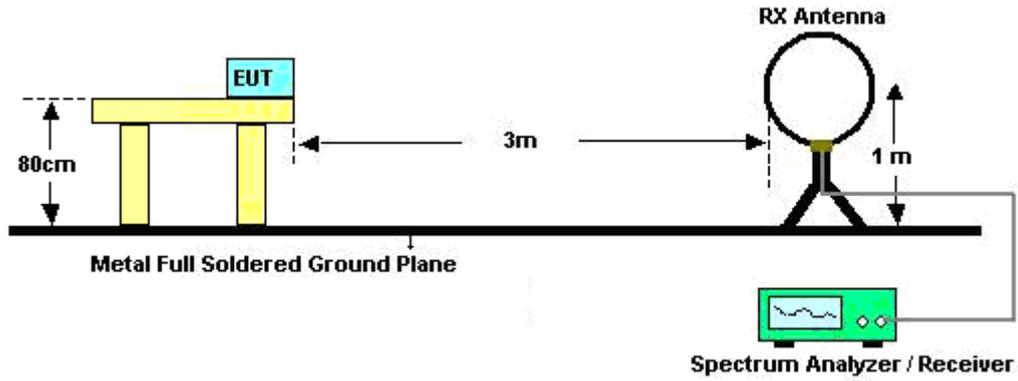
See list of measuring instruments of this test report.

#### 3.7.3 Test Procedures

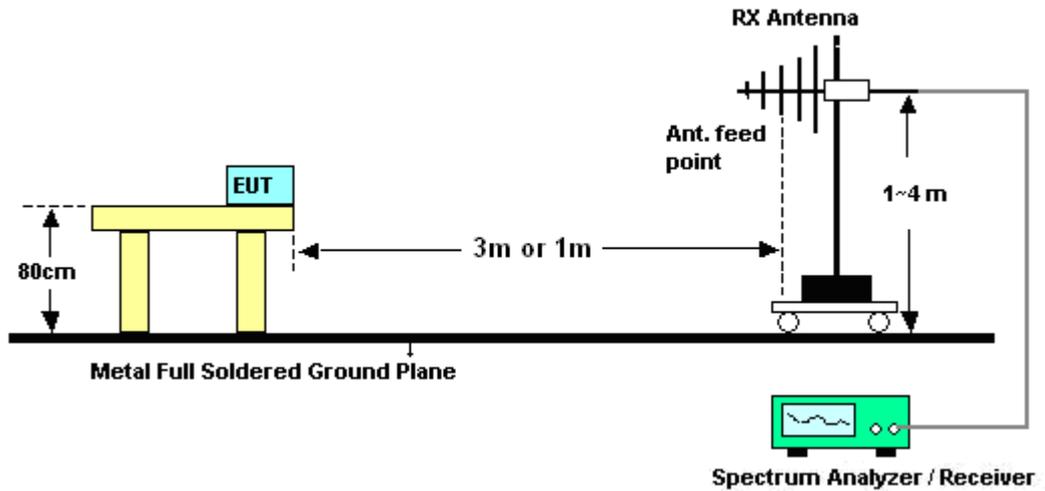
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
  - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = 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.

### 3.7.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz





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

Test Engineer :	Kay Wu	Temperature :	22~23°C	
		Relative Humidity :	42~43%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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



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

Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2412 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	22.16	-17.84	40	33.71	19.51	0.64	31.7	100	87	Peak
91.02	22.53	-20.97	43.5	44.08	9.03	1.12	31.7	-	-	Peak
162.57	23.46	-20.04	43.5	43.41	10.17	1.52	31.64	-	-	Peak
388.2	19.97	-26.03	46	32.88	15.8	2.51	31.22	-	-	Peak
595.4	22.17	-23.83	46	29.96	19.98	3.23	31	-	-	Peak
926.5	26.39	-19.61	46	29.27	23.58	4.21	30.67	-	-	Peak
2389.99	57.64	-16.36	74	54.21	32.13	5.46	34.16	110	17	Peak
2389.99	45.8	-8.2	54	42.37	32.13	5.46	34.16	110	17	Average
2412	97.22	-	-	93.78	32.16	5.44	34.16	110	17	Average
2412	109.06	-	-	105.62	32.16	5.44	34.16	110	17	Peak
2492	48.8	-25.2	74	45.33	32.3	5.37	34.2	110	17	Peak
2492	37.23	-16.77	54	33.76	32.3	5.37	34.2	110	17	Average
8394	54.72	-19.28	74	43.71	36	10.11	35.1	100	117	Peak
8394	40.56	-13.44	54	29.55	36	10.11	35.1	100	117	Average



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2412 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
83.46	25.81	-14.19	40	48.52	7.96	1.03	31.7	100	74	Peak
124.5	26.9	-16.6	43.5	45.35	11.89	1.34	31.68	-	-	Peak
253.29	25.14	-20.86	46	41.89	12.81	1.93	31.49	-	-	Peak
598.9	22.65	-23.35	46	30.38	20.03	3.24	31	-	-	Peak
774.6	24.08	-21.92	46	29.18	21.87	3.78	30.75	-	-	Peak
906.9	26.39	-19.61	46	29.63	23.28	4.17	30.69	-	-	Peak
2389.61	46.61	-7.39	54	43.17	32.13	5.46	34.15	100	58	Average
2389.61	59.77	-14.23	74	56.33	32.13	5.46	34.15	100	58	Peak
2412	96.8	-	-	93.36	32.16	5.44	34.16	100	58	Average
2412	108.81	-	-	105.37	32.16	5.44	34.16	100	58	Peak
2494	49.8	-24.2	74	46.33	32.3	5.37	34.2	100	58	Peak
2494	38.62	-15.38	54	35.15	32.3	5.37	34.2	100	58	Average
8025	54.71	-19.29	74	43.96	36	9.85	35.1	100	197	Peak
8025	40.41	-13.59	54	29.66	36	9.85	35.1	100	197	Average



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2437 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	22.94	-17.06	40	34.49	19.51	0.64	31.7	100	133	Peak
91.02	23.39	-20.11	43.5	44.94	9.03	1.12	31.7	-	-	Peak
256.53	26.37	-19.63	46	43.06	12.86	1.94	31.49	-	-	Peak
338.5	20.6	-25.4	46	35.14	14.49	2.29	31.32	-	-	Peak
598.9	22.56	-23.44	46	30.29	20.03	3.24	31	-	-	Peak
902	26.85	-19.15	46	30.18	23.21	4.16	30.7	-	-	Peak
2358	49.97	-24.03	74	46.54	32.08	5.49	34.14	100	291	Peak
2358	39.87	-14.13	54	36.44	32.08	5.49	34.14	100	291	Average
2437	106.22	-	-	102.76	32.22	5.41	34.17	100	291	Peak
2437	94.81	-	-	91.35	32.22	5.41	34.17	100	291	Average
2484	44.59	-29.41	74	41.13	32.27	5.38	34.19	100	291	Peak
2484	33.46	-20.54	54	30	32.27	5.38	34.19	100	291	Average
8406	55.55	-18.45	74	44.53	36	10.12	35.1	100	245	Peak
8406	40.46	-13.54	54	29.44	36	10.12	35.1	100	245	Average



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2437 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	25.31	-14.69	40	36.86	19.51	0.64	31.7	100	211	Peak
85.89	23.55	-16.45	40	45.82	8.36	1.07	31.7	-	-	Peak
251.13	25.04	-20.96	46	41.84	12.78	1.92	31.5	-	-	Peak
461	19.4	-26.6	46	30.35	17.36	2.83	31.14	-	-	Peak
640.9	22.71	-23.29	46	29.91	20.38	3.38	30.96	-	-	Peak
920.9	26.22	-19.78	46	29.21	23.49	4.2	30.68	-	-	Peak
2356	53.98	-20.02	74	50.55	32.08	5.49	34.14	100	46	Peak
2356	44.6	-9.4	54	41.17	32.08	5.49	34.14	100	46	Average
2437	110	-	-	106.54	32.22	5.41	34.17	100	46	Peak
2437	97.96	-	-	94.5	32.22	5.41	34.17	100	46	Average
2486	49.88	-24.12	74	46.42	32.27	5.38	34.19	100	46	Peak
2486	37.33	-16.67	54	33.87	32.27	5.38	34.19	100	46	Average
8409	54.38	-19.62	74	43.36	36	10.12	35.1	100	276	Peak
8409	40.63	-13.37	54	29.61	36	10.12	35.1	100	276	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 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
30.00	22.28	-17.72	40.0	33.83	19.51	0.64	31.70	100	75	Peak
91.02	23.24	-20.26	43.5	44.79	9.03	1.12	31.7	-	-	Peak
252.21	25.93	-20.07	46	42.7	12.8	1.93	31.5	-	-	Peak
338.5	21.4	-24.6	46	35.94	14.49	2.29	31.32	-	-	Peak
680.1	23.25	-22.75	46	30	20.68	3.49	30.92	-	-	Peak
903.4	28.14	-17.86	46	31.45	23.22	4.17	30.7	-	-	Peak
2382	51.06	-22.94	74	47.63	32.11	5.47	34.15	192	9	Peak
2382	41.37	-12.63	54	37.94	32.11	5.47	34.15	192	9	Average
2462	106.9	-	-	103.44	32.24	5.4	34.18	192	9	Peak
2462	95.45	-	-	91.99	32.24	5.4	34.18	192	9	Average
2483.5	58.58	-15.42	74	55.12	32.27	5.38	34.19	192	9	Peak
2483.5	45.79	-8.21	54	42.33	32.27	5.38	34.19	192	9	Average
8253	54.42	-19.58	74	43.5	36	10.02	35.1	100	284	Peak
8253	40.1	-13.9	54	29.18	36	10.02	35.1	100	284	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 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
30.54	27.17	-12.83	40	39.27	18.95	0.65	31.7	100	112	Peak
83.46	25.44	-14.56	40	48.15	7.96	1.03	31.7	-	-	Peak
256.26	24.92	-21.08	46	41.62	12.85	1.94	31.49	-	-	Peak
399.4	22.98	-23.02	46	35.53	16.11	2.54	31.2	-	-	Peak
752.9	23.53	-22.47	46	29.06	21.56	3.71	30.8	-	-	Peak
902	26.42	-19.58	46	29.75	23.21	4.16	30.7	-	-	Peak
2388	54	-20	74	50.56	32.13	5.46	34.15	100	63	Peak
2388	44.71	-9.29	54	41.27	32.13	5.46	34.15	100	63	Average
2462	109.77	-	-	106.31	32.24	5.4	34.18	100	63	Peak
2462	97.92	-	-	94.46	32.24	5.4	34.18	100	63	Average
2483.5	59.48	-14.52	74	56.02	32.27	5.38	34.19	100	63	Peak
2483.5	46.15	-7.85	54	42.69	32.27	5.38	34.19	100	63	Average
8373	54.27	-19.73	74	43.27	36	10.1	35.1	100	331	Peak
8373	40.78	-13.22	54	29.78	36	10.1	35.1	100	331	Average



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2412 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	22.87	-17.13	40	34.42	19.51	0.64	31.7	100	314	Peak
91.02	24.09	-19.41	43.5	45.64	9.03	1.12	31.7	-	-	Peak
127.74	21.97	-21.53	43.5	40.49	11.79	1.36	31.67	-	-	Peak
374.2	20.85	-25.15	46	34.19	15.44	2.47	31.25	-	-	Peak
724.9	23.56	-22.44	46	29.62	21.17	3.62	30.85	-	-	Peak
906.2	26.39	-19.61	46	29.64	23.27	4.17	30.69	-	-	Peak
2389.99	67.75	-6.25	74	64.32	32.13	5.46	34.16	111	16	Peak
2389.99	49.77	-4.23	54	46.34	32.13	5.46	34.16	111	16	Average
2412	91.76	-	-	88.32	32.16	5.44	34.16	111	16	Average
2412	104.01	-	-	100.57	32.16	5.44	34.16	111	16	Peak
2486	34.87	-19.13	54	31.41	32.27	5.38	34.19	111	16	Average
2486	45.64	-28.36	74	42.18	32.27	5.38	34.19	111	16	Peak
8358	54.64	-19.36	74	43.65	36	10.09	35.1	100	227	Peak
8358	40.13	-13.87	54	29.14	36	10.09	35.1	100	227	Average



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2412 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	24.85	-15.15	40	36.4	19.51	0.64	31.7	100	337	Peak
91.02	23.76	-19.74	43.5	45.31	9.03	1.12	31.7	-	-	Peak
185.25	21.79	-21.71	43.5	42.78	8.98	1.64	31.61	-	-	Peak
399.4	22.35	-23.65	46	34.9	16.11	2.54	31.2	-	-	Peak
668.9	22.49	-23.51	46	29.36	20.6	3.46	30.93	-	-	Peak
889.4	25.5	-20.5	46	29	23.08	4.12	30.7	-	-	Peak
2389.42	50.38	-3.62	54	46.94	32.13	5.46	34.15	130	47	Average
2389.42	68.19	-5.81	74	64.75	32.13	5.46	34.15	130	47	Peak
2412	92.72	-	-	89.28	32.16	5.44	34.16	130	47	Average
2412	104.75	-	-	101.31	32.16	5.44	34.16	130	47	Peak
2486	48.32	-25.68	74	44.86	32.27	5.38	34.19	130	47	Peak
2486	27.05	-26.95	54	23.59	32.27	5.38	34.19	130	47	Average
8286	54.59	-19.41	74	43.65	36	10.04	35.1	100	237	Peak
8286	40.41	-13.59	54	29.47	36	10.04	35.1	100	237	Average



<b>Test Mode :</b>	Mode 5	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2437 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	22.03	-17.97	40	33.58	19.51	0.64	31.7	100	225	Peak
124.77	21.75	-21.75	43.5	40.26	11.81	1.35	31.67	-	-	Peak
214.14	22.7	-20.8	43.5	43.45	9.05	1.77	31.57	-	-	Peak
638.1	22.57	-23.43	46	29.8	20.36	3.37	30.96	-	-	Peak
722.1	23.21	-22.79	46	29.3	21.15	3.62	30.86	-	-	Peak
976.2	26.79	-27.21	54	28.77	24.32	4.32	30.62	-	-	Peak
2390	49.58	-24.42	74	46.15	32.13	5.46	34.16	100	291	Peak
2390	37.78	-16.22	54	34.35	32.13	5.46	34.16	100	291	Average
2437	100.87	-	-	97.41	32.22	5.41	34.17	100	291	Peak
2437	89.31	-	-	85.85	32.22	5.41	34.17	100	291	Average
2484	44.26	-29.74	74	40.8	32.27	5.38	34.19	100	291	Peak
2484	33.33	-20.67	54	29.87	32.27	5.38	34.19	100	291	Average
8310	54.35	-19.65	74	43.4	36	10.05	35.1	100	288	Peak
8310	40.28	-13.72	54	29.33	36	10.05	35.1	100	288	Average



<b>Test Mode :</b>	Mode 5	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2437 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
30.81	25.38	-14.62	40	37.48	18.95	0.65	31.7	-	-	Peak
83.73	26.16	-13.84	40	48.87	7.96	1.03	31.7	100	85	Peak
251.94	25.07	-20.93	46	41.84	12.8	1.93	31.5	-	-	Peak
346.2	19.15	-26.85	46	33.45	14.69	2.32	31.31	-	-	Peak
727	22.65	-23.35	46	28.65	21.22	3.63	30.85	-	-	Peak
951.7	26.15	-19.85	46	28.58	23.96	4.26	30.65	-	-	Peak
2390	52.1	-21.9	74	48.67	32.13	5.46	34.16	100	32	Peak
2390	39.08	-14.92	54	35.65	32.13	5.46	34.16	100	32	Average
2437	104.44	-	-	100.99	32.19	5.43	34.17	100	32	Peak
2437	92.74	-	-	89.28	32.22	5.41	34.17	100	32	Average
2484	48.08	-25.92	74	44.62	32.27	5.38	34.19	100	32	Peak
2484	35.98	-18.02	54	32.52	32.27	5.38	34.19	100	32	Average
8385	54.81	-19.19	74	43.81	36	10.1	35.1	100	284	Peak
8385	40.17	-13.83	54	29.17	36	10.1	35.1	100	284	Average



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 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
30.54	22.21	-17.79	40	34.31	18.95	0.65	31.7	100	29	Peak
125.85	21.98	-21.52	43.5	40.5	11.8	1.35	31.67	-	-	Peak
215.49	22.35	-21.15	43.5	43.08	9.07	1.77	31.57	-	-	Peak
512.1	20.86	-25.14	46	30.57	18.4	2.98	31.09	-	-	Peak
741.7	23.67	-22.33	46	29.39	21.42	3.68	30.82	-	-	Peak
926.5	26.24	-19.76	46	29.12	23.58	4.21	30.67	-	-	Peak
2380	53.03	-20.97	74	49.6	32.11	5.47	34.15	164	32	Peak
2380	41.69	-12.31	54	38.26	32.11	5.47	34.15	164	32	Average
2462	91.33	-	-	87.87	32.24	5.4	34.18	164	32	Average
2462	103.98	-	-	100.52	32.24	5.4	34.18	164	32	Peak
2484.42	50.9	-3.1	54	47.44	32.27	5.38	34.19	164	32	Average
2484.42	67.52	-6.48	74	64.06	32.27	5.38	34.19	164	32	Peak
8013	54.8	-19.2	74	44.05	36	9.85	35.1	100	284	Peak
8013	39.92	-14.08	54	29.17	36	9.85	35.1	100	284	Average



Test Mode :	Mode 6	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2462 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	25.89	-14.11	40	37.44	19.51	0.64	31.7	100	227	Peak
82.65	24.68	-15.32	40	47.53	7.83	1.02	31.7	-	-	Peak
159.33	22.76	-20.74	43.5	42.43	10.46	1.51	31.64	-	-	Peak
413.4	19.23	-26.77	46	31.4	16.39	2.63	31.19	-	-	Peak
729.8	23.23	-22.77	46	29.19	21.24	3.64	30.84	-	-	Peak
962.9	27.17	-26.83	54	29.39	24.13	4.29	30.64	-	-	Peak
2388	54.89	-19.11	74	51.45	32.13	5.46	34.15	100	46	Peak
2388	42.58	-11.42	54	39.14	32.13	5.46	34.15	100	46	Average
2462	105.99	-	-	102.53	32.24	5.4	34.18	100	46	Peak
2462	93.62	-	-	90.16	32.24	5.4	34.18	100	46	Average
2483.5	52.28	-1.72	54	48.82	32.27	5.38	34.19	100	46	Average
2483.5	69.31	-4.69	74	65.85	32.27	5.38	34.19	100	46	Peak
8358	54.79	-19.21	74	43.8	36	10.09	35.1	100	85	Peak
8358	40.73	-13.27	54	29.74	36	10.09	35.1	100	85	Average



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 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
39.18	21.09	-18.91	40	37.48	14.59	0.72	31.7	100	27	Peak
125.85	20.98	-22.52	43.5	39.5	11.8	1.35	31.67	-	-	Peak
276.78	26.42	-19.58	46	42.72	13.14	2.01	31.45	-	-	Peak
338.5	20.63	-25.37	46	35.17	14.49	2.29	31.32	-	-	Peak
691.3	22.34	-23.66	46	28.95	20.77	3.53	30.91	-	-	Peak
926.5	26.24	-19.76	46	29.12	23.58	4.21	30.67	-	-	Peak
2382	53.27	-20.73	74	49.84	32.11	5.47	34.15	101	345	Peak
2382	42.18	-11.82	54	38.75	32.11	5.47	34.15	101	345	Average
2462	105.65	-	-	102.19	32.24	5.4	34.18	101	345	Peak
2462	94.08	-	-	90.62	32.24	5.4	34.18	101	345	Average
2483.5	66.13	-7.87	74	62.67	32.27	5.38	34.19	101	345	Peak
2483.5	50.89	-3.11	54	47.43	32.27	5.38	34.19	101	345	Average
8406	55.06	-18.94	74	44.04	36	10.12	35.1	100	28	Peak
8406	40.02	-13.98	54	29	36	10.12	35.1	100	28	Average



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	22~23°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 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
30.81	23.83	-16.17	40	35.93	18.95	0.65	31.7	100	28	Peak
82.65	23.68	-16.32	40	46.53	7.83	1.02	31.7	-	-	Peak
255.18	25.42	-20.58	46	42.13	12.84	1.94	31.49	-	-	Peak
559	23.51	-22.49	46	32.15	19.28	3.12	31.04	-	-	Peak
637.4	23.2	-22.8	46	30.44	20.35	3.37	30.96	-	-	Peak
962.9	27.17	-26.83	54	29.39	24.13	4.29	30.64	-	-	Peak
2380	48.49	-25.51	74	45.06	32.11	5.47	34.15	100	126	Peak
2380	37.72	-16.28	54	34.29	32.11	5.47	34.15	100	126	Average
2462	99.82	-	-	96.36	32.24	5.4	34.18	100	126	Peak
2462	88.2	-	-	84.74	32.24	5.4	34.18	100	126	Average
2483.66	62.01	-11.99	74	58.55	32.27	5.38	34.19	100	126	Peak
2483.66	46.77	-7.23	54	43.31	32.27	5.38	34.19	100	126	Average
8406	55.03	-18.97	74	44.01	36	10.12	35.1	100	67	Peak
8406	40.16	-13.84	54	29.14	36	10.12	35.1	100	67	Average



## **3.8 Antenna Requirements**

### **3.8.1 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. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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.

### **3.8.2 Antenna Connected Construction**

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

### **3.8.3 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)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 04, 2009	Dec. 03, 2010	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec.09,2009	Dec. 08, 2010	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 27, 2009	Mar. 26, 2010	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 KHz~30 MHz	May 22, 2008	May 21, 2010	Radiation (03CH07-HY)
System Simulator	R&S	CMU200	116456	N/A	Jun. 05, 2008	Jun. 04, 2010	-
GPS Station	T&E	GS-50	N/A	N/A	N/A	N/A	-

## 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 EP011201 as below.