FCC RF Test Report

APPLICANT	:	HTC Corporation
EQUIPMENT	:	Smartphone
MODEL NAME	:	PB92110
FCC ID	:	NM8PB92110
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	Digital Transmission System (DTS)

The product was received on Feb. 01, 2010 and completely tested on Mar. 08, 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

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
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APPENDIX A. PHOTOGRAPHS OF EUT

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR020105B	Rev. 01	Initial issue of report	Apr. 12, 2010

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	≥ 0.5MHz	Pass	-
3.2	15.247(b)	A8.4	Power Output	≤ 30dBm	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	≤ 8dBm	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 11.2 dB at 0.182 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 4.34 dB at 2483.50 MHz
3.8	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	
Equipment	Smartphone
Model Name	PB92110
FCC ID	NM8PB92110
Sample 1	EUT with Camera 1
Sample 2	EUT with Camera 2
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 21.28 dBm (134.28 mW) 802.11g : 23.33 dBm (215.28 mW)
Antenna Type	PIFA Antenna with gain 0.5 dBi
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
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 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

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	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.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
5.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

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	20.75	20.62	20.74	20.63
CH 06	2437 MHz	**21.28**	21.21	21.21	21.20
CH 11	2462 MHz	20.35	20.49	20.52	20.48

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	22.71	22.66	22.69	22.10	22.38	22.37	22.40	22.58
CH 06	2437 MHz	**23.33**	23.24	22.98	23.08	22.88	23.02	23.01	23.00
CH 11	2462 MHz	22.05	22.28	22.00	22.40	21.95	21.85	22.01	22.06

Remark:

1. The data rates of WLAN 802.11b/g were set in 1Mbps 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.

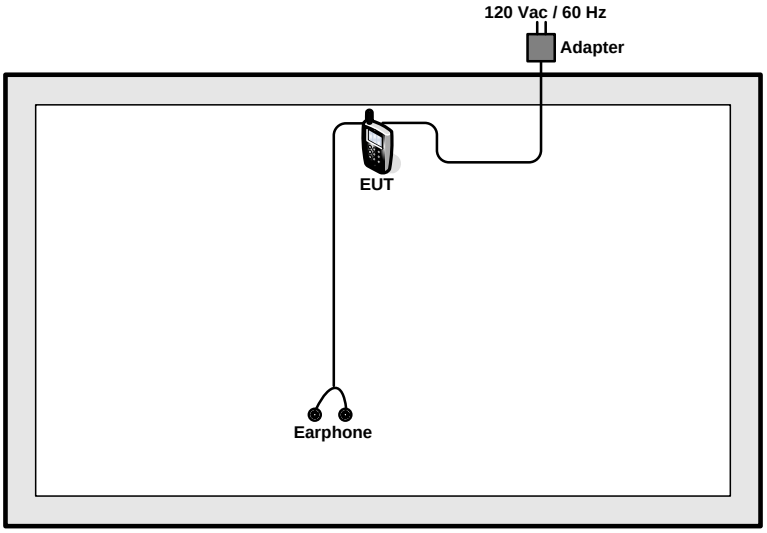
2.2 Test Mode

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 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.

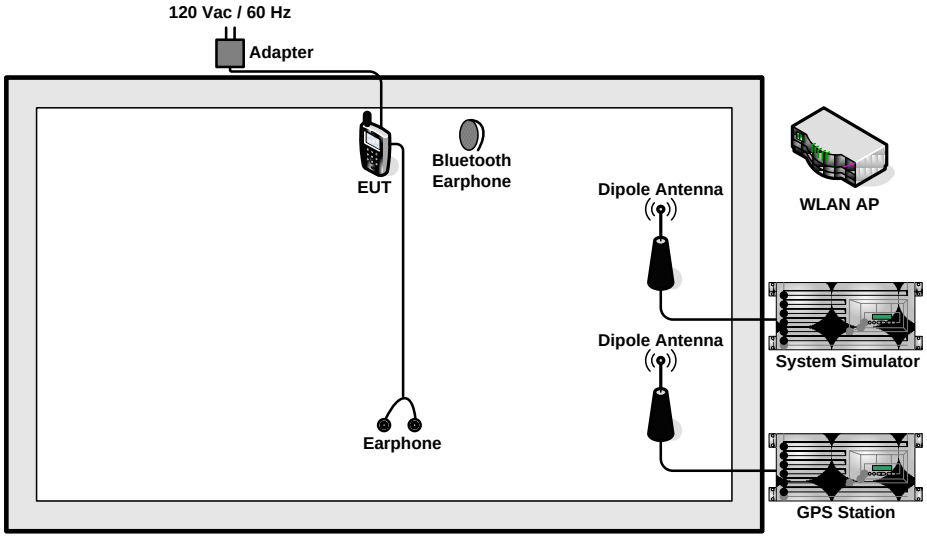
Test Cases		
Test Item	**802.11b**	**802.11g**
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4 : 802.11g CH01_2412 MHz Mode 5 : 802.11g CH06_2437 MHz Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz for Sample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

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<EUT with Adapter Mode>



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.

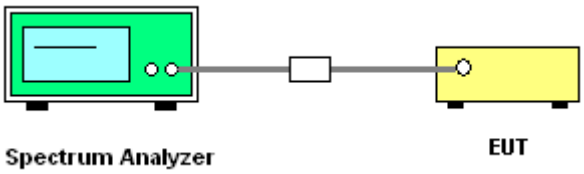
3.1.2 Measuring Instruments

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

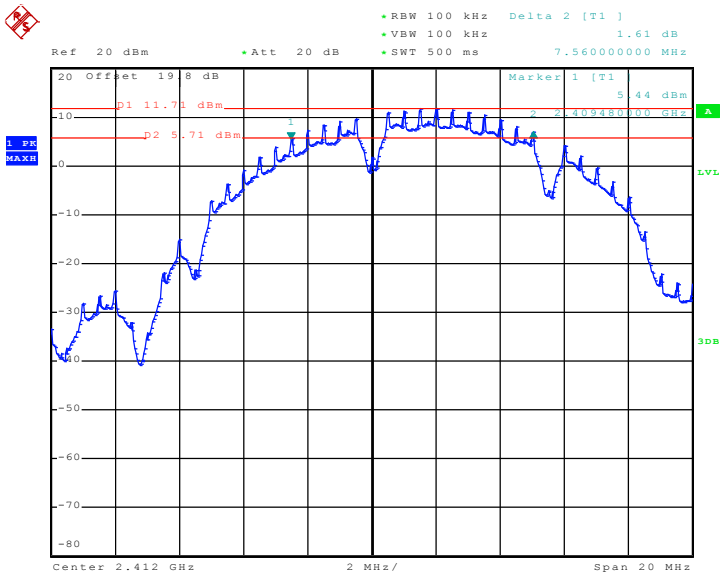


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	**Temperature :**	25~27℃
Test Engineer :	Ken Hsu	**Relative Humidity :**	51~53%

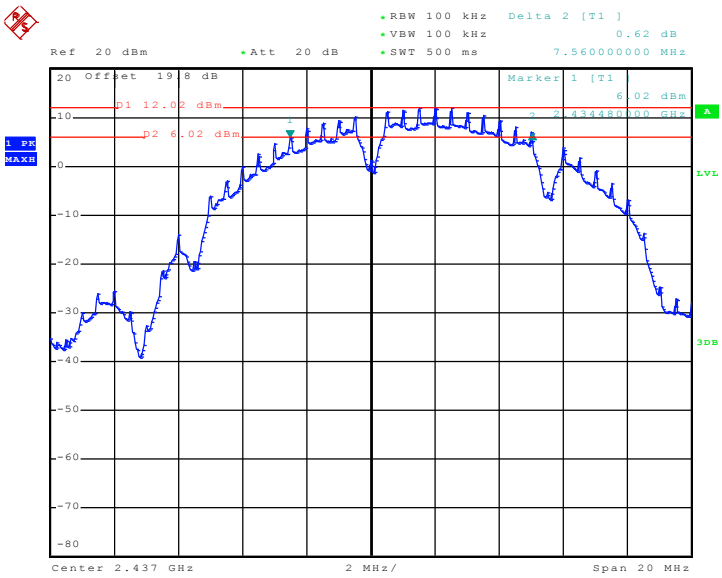
Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	7.56	0.5	Pass
06	2437	7.56	0.5	Pass
11	2462	7.52	0.5	Pass

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



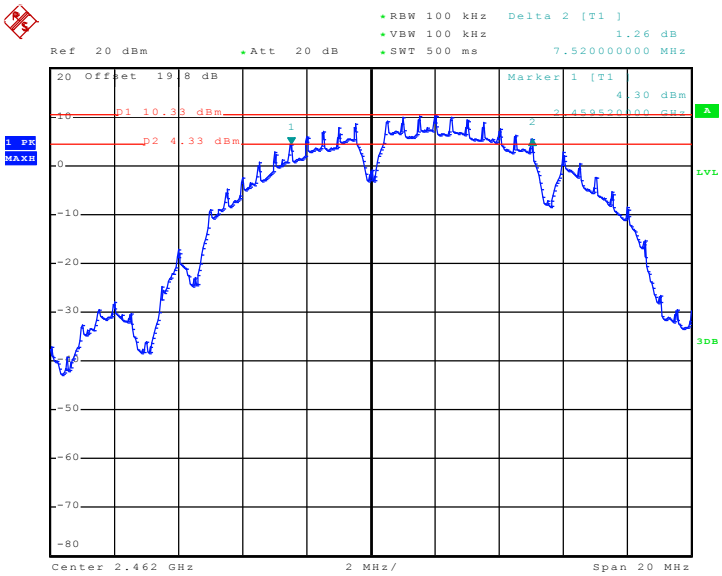
Date: 9.FEB.2010 15:40:07

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



Date: 9.FEB.2010 15:43:12

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

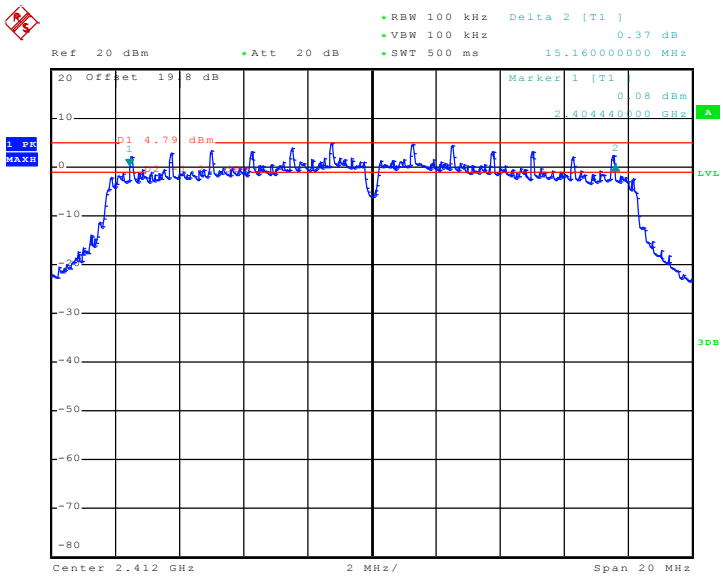


Date: 9.FEB.2010 17:10:55

Test Mode :	Mode 4, 5, 6	**Temperature :**	25~27℃
Test Engineer :	Ken Hsu	**Relative Humidity :**	51~53%

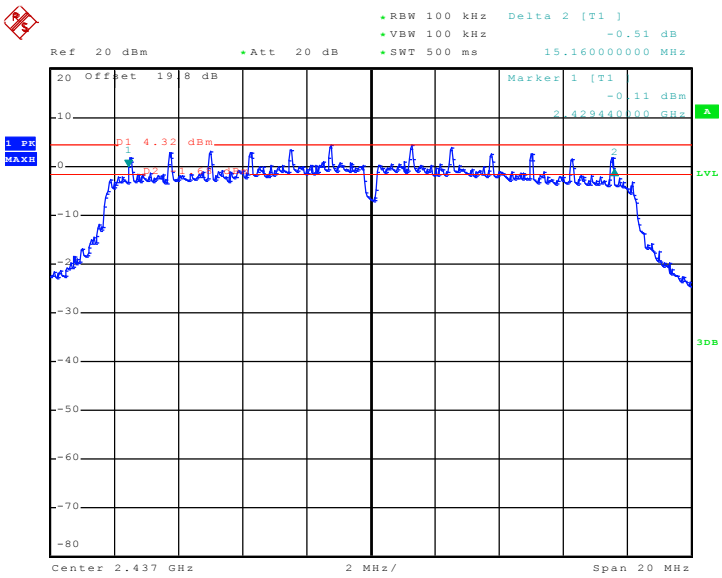
Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.16	0.5	Pass
06	2437	15.16	0.5	Pass
11	2462	15.16	0.5	Pass

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



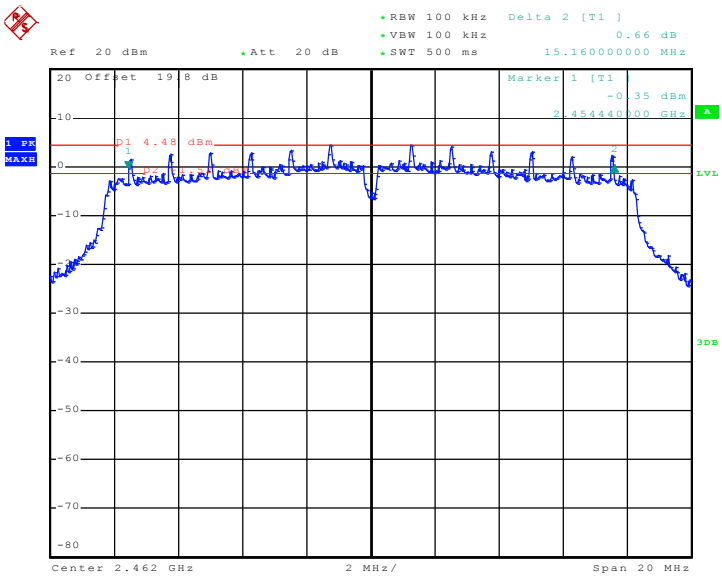
Date: 9.FEB.2010 15:55:47

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



Date: 9.FEB.2010 17:20:59

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



Date: 9.FEB.2010 15:49:36

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.

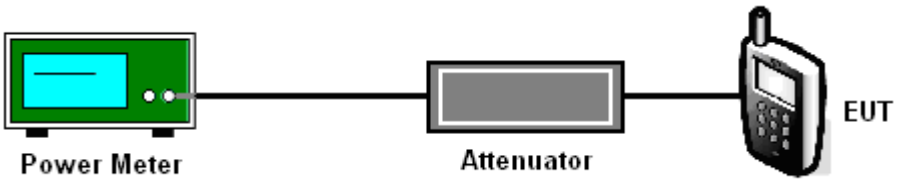
3.2.2 Measuring Instruments

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℃
Test Engineer :	Ken Hsu	**Relative Humidity :**	51~53%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	20.75	30	Pass
06	2437	21.28	30	Pass
11	2462	20.35	30	Pass

Test Mode :	Mode 4, 5, 6	**Temperature :**	25~27℃
Test Engineer :	Ken Hsu	**Relative Humidity :**	51~53%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.71	30	Pass
06	2437	23.33	30	Pass
11	2462	22.05	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

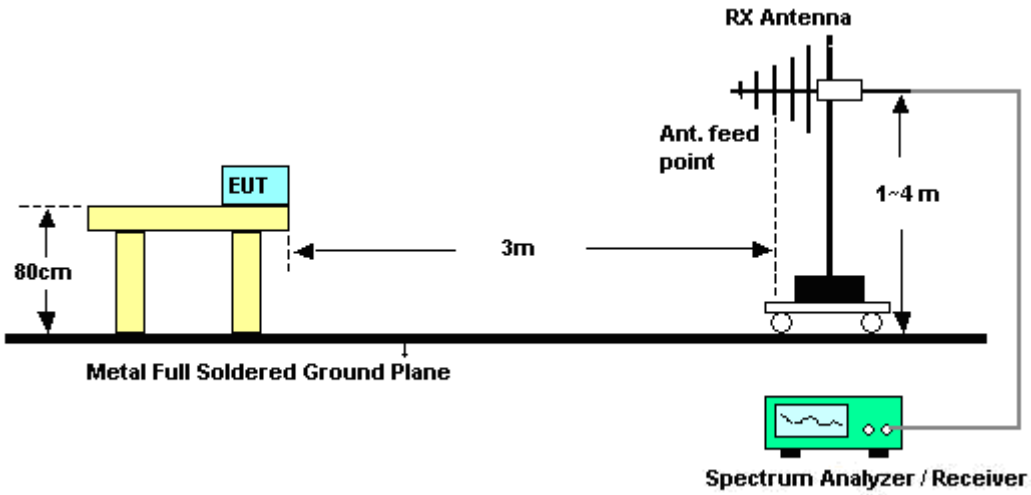
See list of measuring instruments of this test report.

3.3.3 Test Procedures

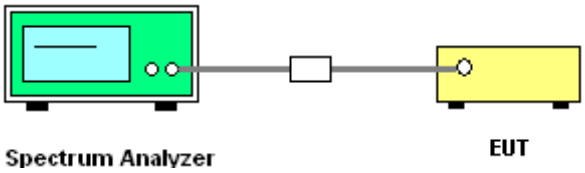
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) ≥ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :**	23~24℃
Test Band :	802.11b	**Relative Humidity :**	43~48%
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
2389.61	59.45	-14.55	74	56.01	32.13	5.46	34.15	193	0	Peak
2389.61	45.04	-8.96	54	41.6	32.13	5.46	34.15	193	0	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	50.87	-23.13	74	47.43	32.13	5.46	34.15	102	251	Peak
2389.61	38.76	-15.24	54	35.32	32.13	5.46	34.15	102	251	Average

Test Mode :	Mode 3	**Temperature :**	23~24℃
Test Band :	802.11b	**Relative Humidity :**	43~48%
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
2485.37	55.85	-18.15	74	52.39	32.27	5.38	34.19	189	3	Peak
2485.37	42.07	-11.93	54	38.61	32.27	5.38	34.19	189	3	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
2485.18	50.65	-23.35	74	47.19	32.27	5.38	34.19	100	168	Peak
2485.18	36.99	-17.01	54	33.53	32.27	5.38	34.19	100	168	Average

Test Mode :	Mode 4	**Temperature :**	23~24℃
Test Band :	802.11g	**Relative Humidity :**	43~48%
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
2389.61	67.38	-6.62	74	63.94	32.13	5.46	34.15	104	330	Peak
2389.61	46.85	-7.15	54	43.41	32.13	5.46	34.15	104	330	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
2389.99	66.18	-7.82	74	62.75	32.13	5.46	34.16	108	54	Peak
2389.99	47.14	-6.86	54	43.71	32.13	5.46	34.16	108	54	Average

Test Mode :	Mode 6	**Temperature :**	23~24℃
Test Band :	802.11g	**Relative Humidity :**	43~48%
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	67.29	-6.71	74	63.83	32.27	5.38	34.19	126	341	Peak
2483.5	45.41	-8.59	54	41.95	32.27	5.38	34.19	126	341	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	62.56	-11.44	74	59.1	32.27	5.38	34.19	100	322	Peak
2483.5	41.95	-12.05	54	38.49	32.27	5.38	34.19	100	322	Average

Test Mode :	Mode 7	**Temperature :**	23~24℃
Test Band :	802.11g	**Relative Humidity :**	43~48%
Test Channel :	11	**Test Engineer :**	Kay Wu

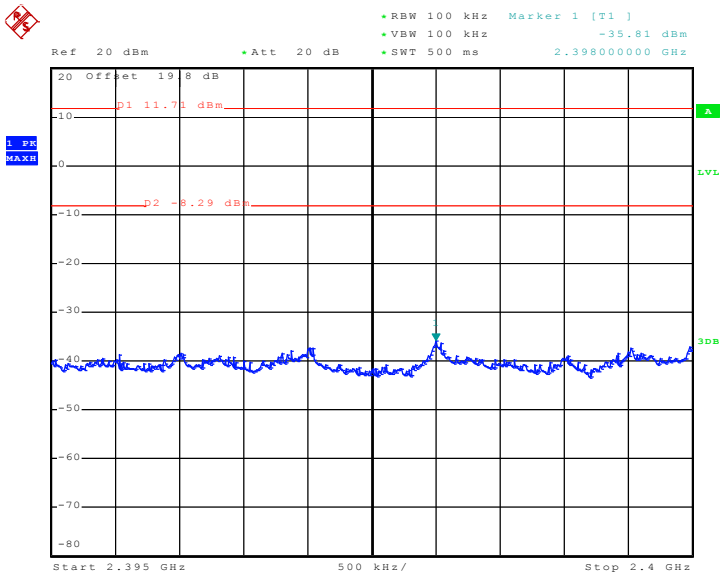
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	68.31	-5.69	74	64.85	32.27	5.38	34.19	100	329	Peak
2483.5	49.66	-4.34	54	46.2	32.27	5.38	34.19	100	329	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
2483.85	61.5	-12.5	74	58.04	32.27	5.38	34.19	100	64	Peak
2483.85	43.26	-10.74	54	39.8	32.27	5.38	34.19	100	64	Average

3.3.6 Test Plots of Conducted Band Edges

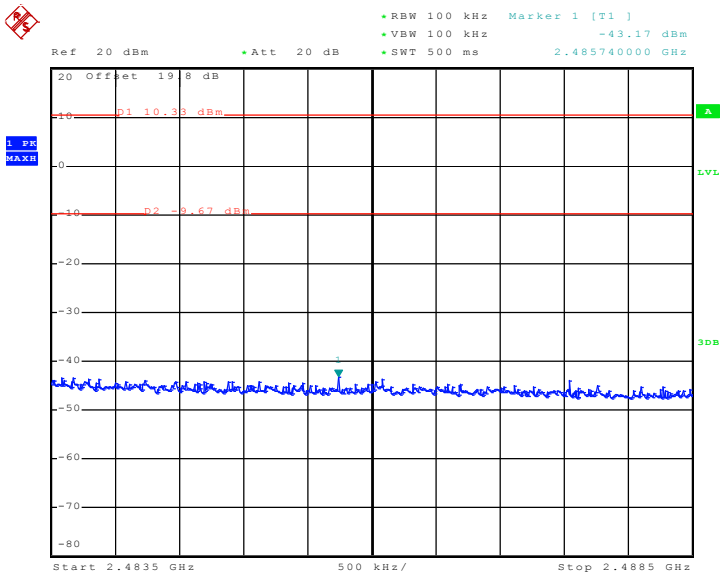
Test Mode :	Mode 1 and 3	**Temperature :**	25~27℃
Test Band :	802.11b	**Relative Humidity :**	51~53%
Test Channel :	01 and 11	**Test Engineer :**	Ken Hsu

Low Band Edge Plot on 802.11b Channel 01



Date: 9.FEB.2010 17:15:10

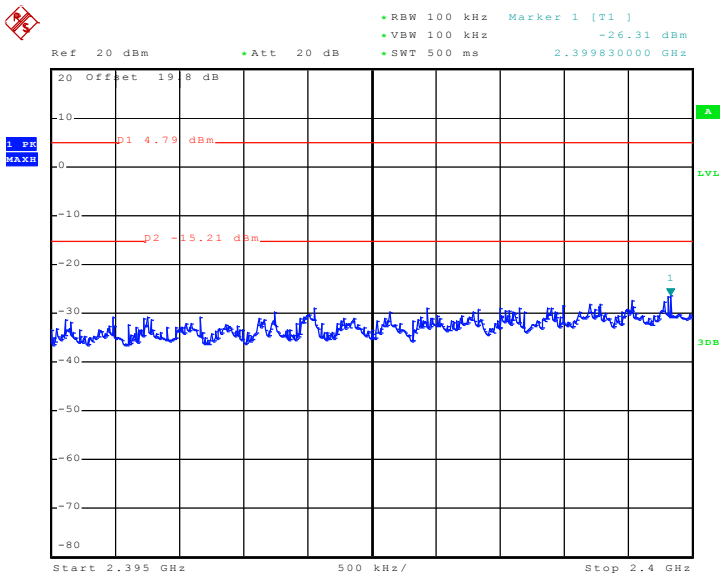
High Band Edge Plot on 802.11b Channel 11



Date: 9.FEB.2010 17:16:19

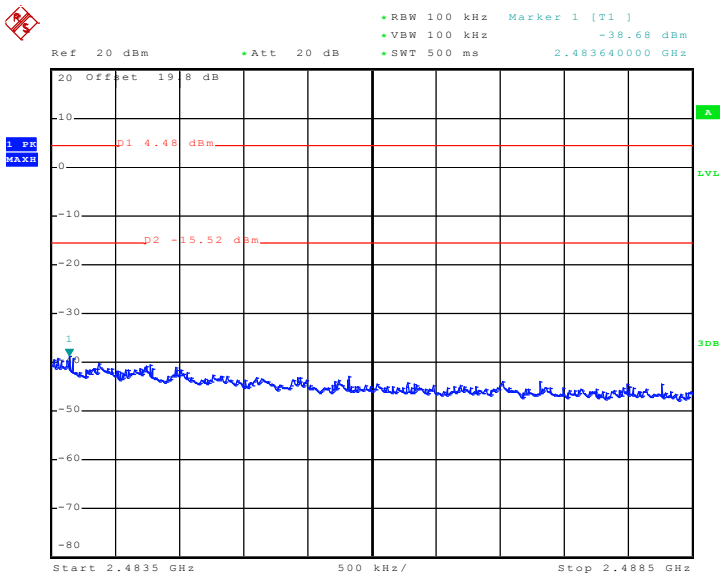
Test Mode :	Mode 4 and 6	**Temperature :**	25~27℃
Test Band :	802.11g	**Relative Humidity :**	51~53%
Test Channel :	01 and 11	**Test Engineer :**	Ken Hsu

Low Band Edge Plot on 802.11g Channel 01



Date: 9.FEB.2010 17:19:38

High Band Edge Plot on 802.11g Channel 11



Date: 9.FEB.2010 17:18:25

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

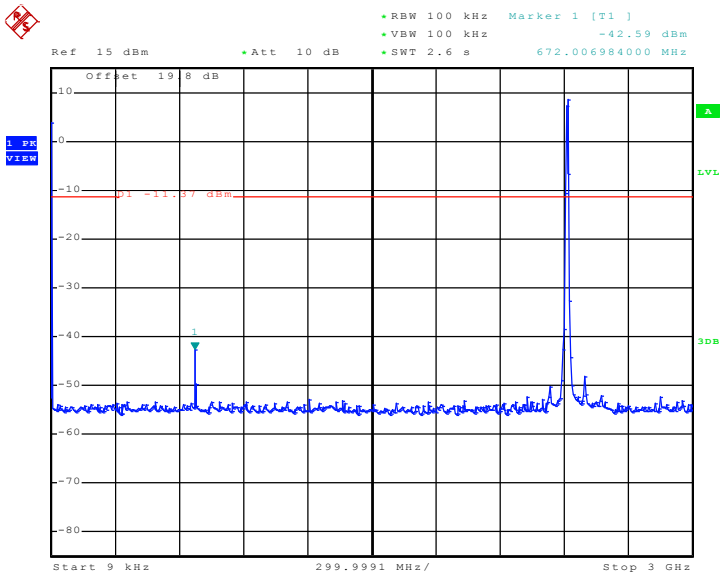
1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) ≥ RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz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

3.4.4 Test Setup

3.4.5 Test Plots of Spurious Emission

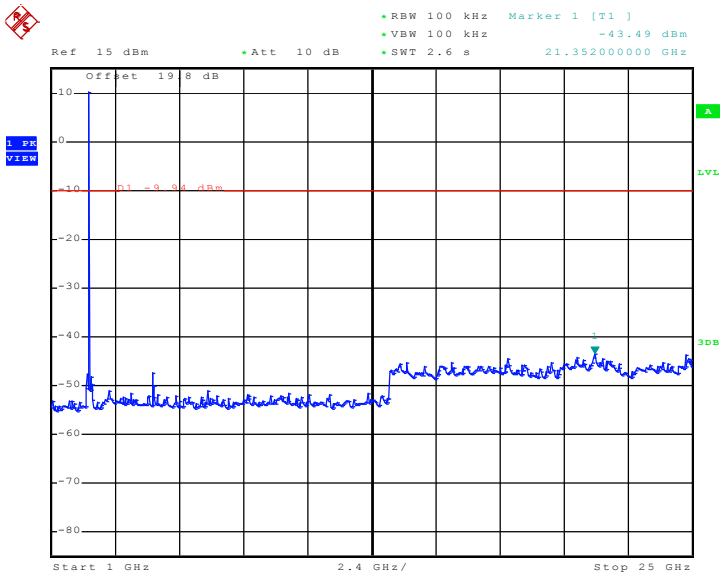
Test Mode :	Mode 1	**Temperature :**	25~27℃
Test Band :	802.11b	**Relative Humidity :**	51~53%
Test Channel :	01	**Test Engineer :**	Ken Hsu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.FEB.2010 17:03:26

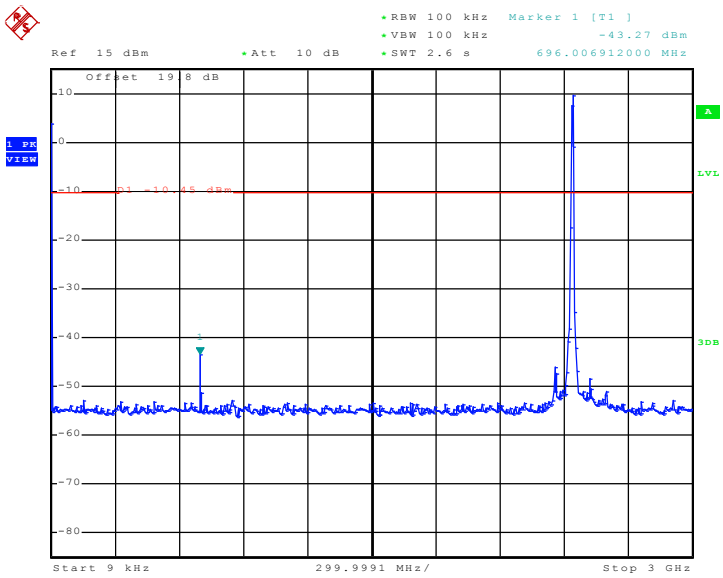
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.FEB.2010 16:17:02

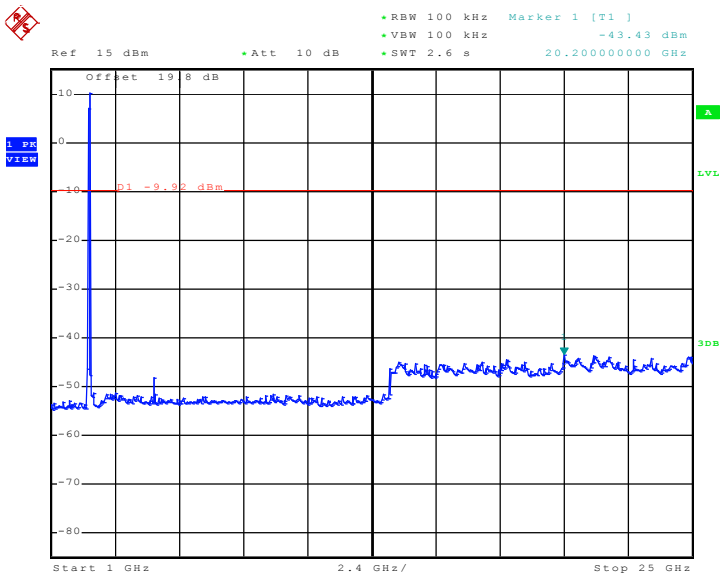
Test Mode :	Mode 2	**Temperature :**	25~27℃
Test Band :	802.11b	**Relative Humidity :**	51~53%
Test Channel :	06	**Test Engineer :**	Ken Hsu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.FEB.2010 17:04:05

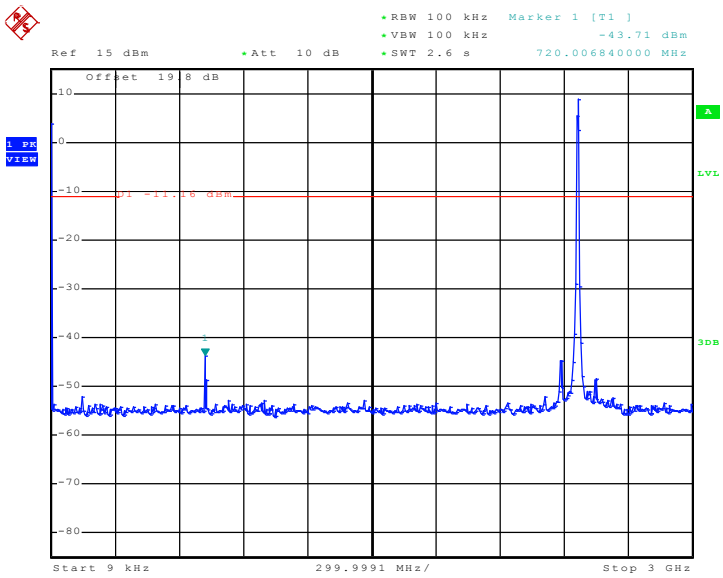
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.FEB.2010 16:19:39

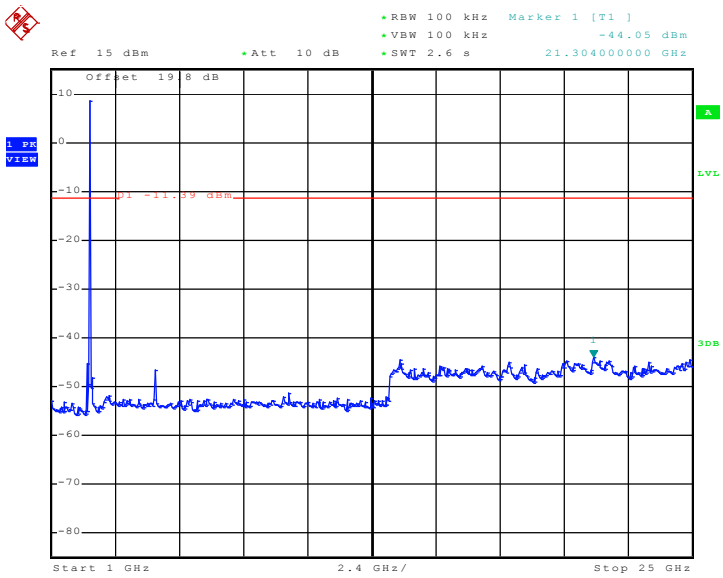
Test Mode :	Mode 3	**Temperature :**	25~27℃
Test Band :	802.11b	**Relative Humidity :**	51~53%
Test Channel :	11	**Test Engineer :**	Ken Hsu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.FEB.2010 16:20:32

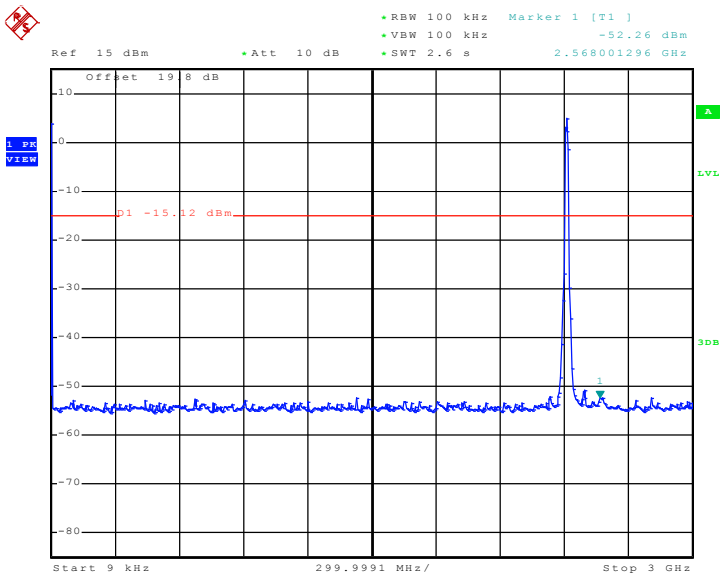
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.FEB.2010 16:20:53

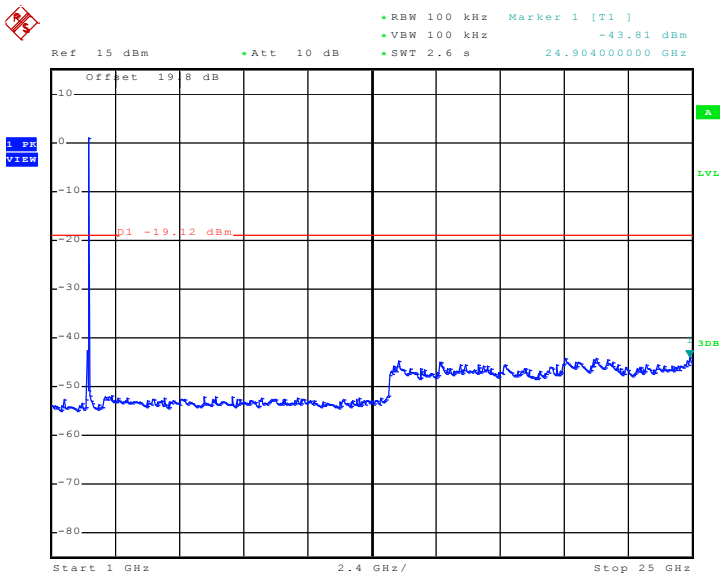
Test Mode :	Mode 4	**Temperature :**	25~27℃
Test Band :	802.11g	**Relative Humidity :**	51~53%
Test Channel :	01	**Test Engineer :**	Ken Hsu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.FEB.2010 16:21:51

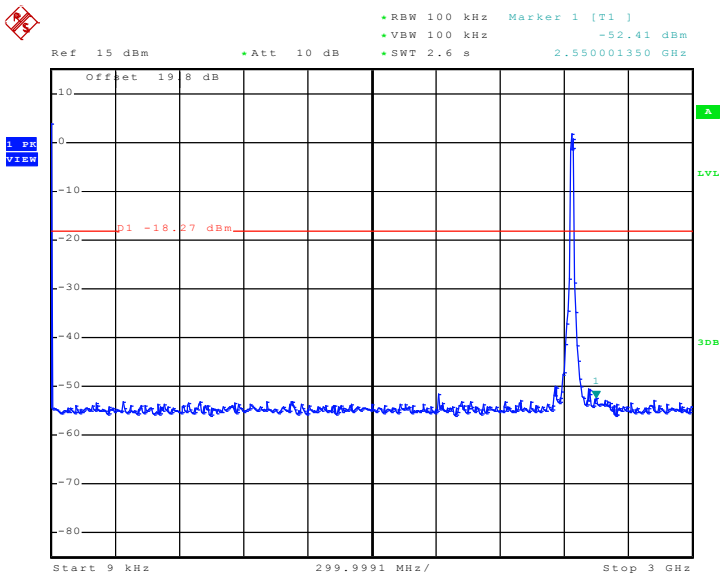
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.FEB.2010 16:22:27

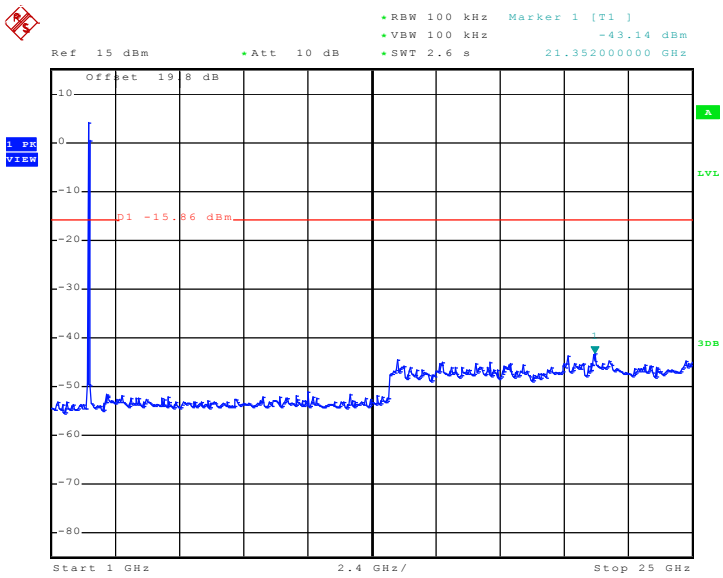
Test Mode :	Mode 5	**Temperature :**	25~27℃
Test Band :	802.11g	**Relative Humidity :**	51~53%
Test Channel :	06	**Test Engineer :**	Ken Hsu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.FEB.2010 16:23:56

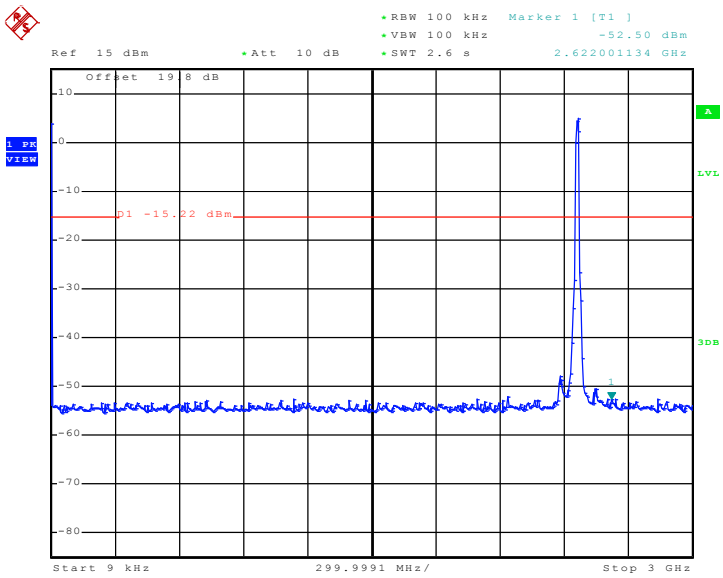
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.FEB.2010 16:24:21

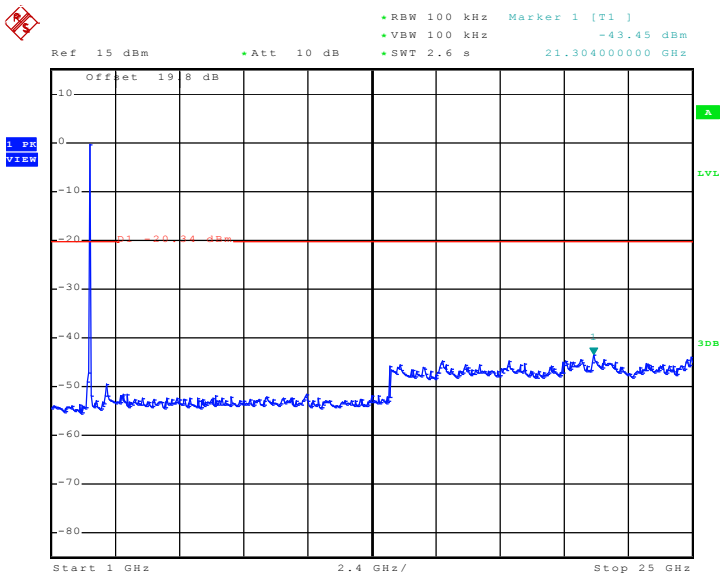
Test Mode :	Mode 6	**Temperature :**	25~27℃
Test Band :	802.11g	**Relative Humidity :**	51~53%
Test Channel :	11	**Test Engineer :**	Ken Hsu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 9.FEB.2010 16:25:15

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 9.FEB.2010 17:07:12

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.

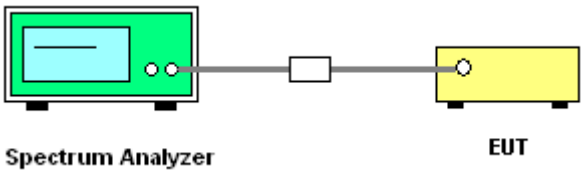
3.5.2 Measuring Instruments

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

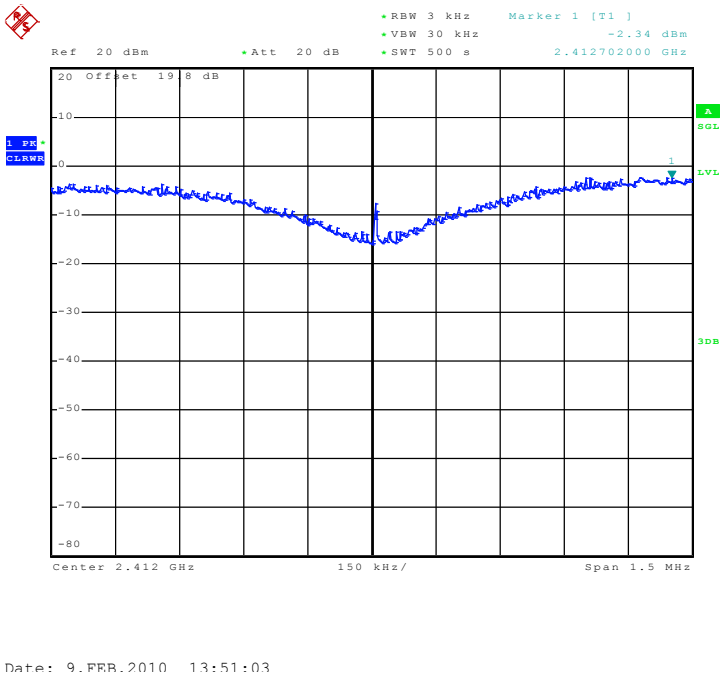


3.5.5 Test Result of Power Spectral Density

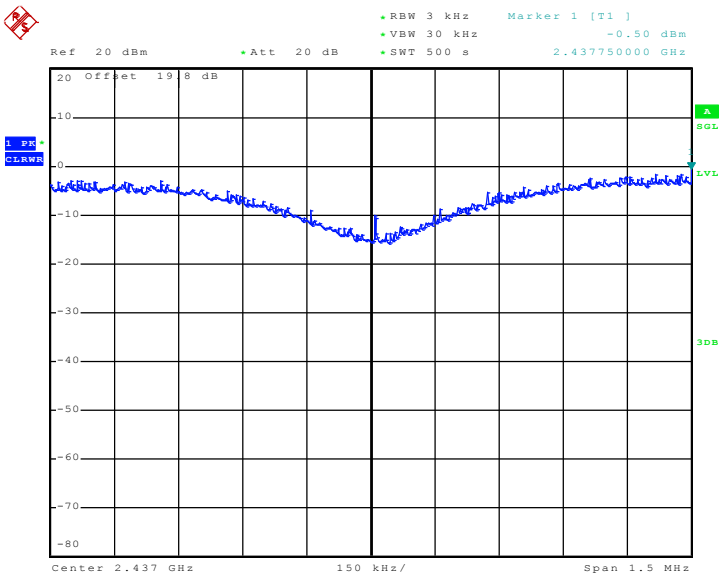
Test Mode :	Mode 1, 2, 3	**Temperature :**	25~27℃
Test Engineer :	Ken Hsu	**Relative Humidity :**	51~53%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-2.34	8	Pass
06	2437	-0.50	8	Pass
11	2462	-2.07	8	Pass

Mode 1 : PSD Plot on 802.11b Channel 01

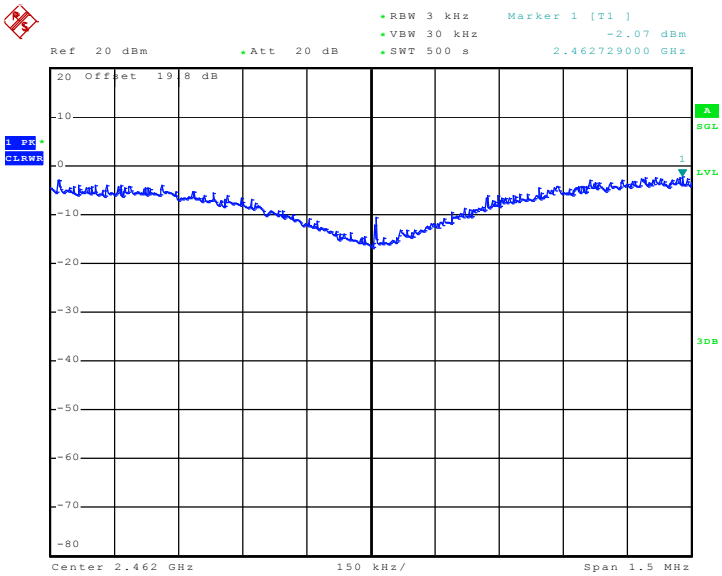


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 9.FEB.2010 15:15:36

Mode 3 : PSD Plot on 802.11b Channel 11

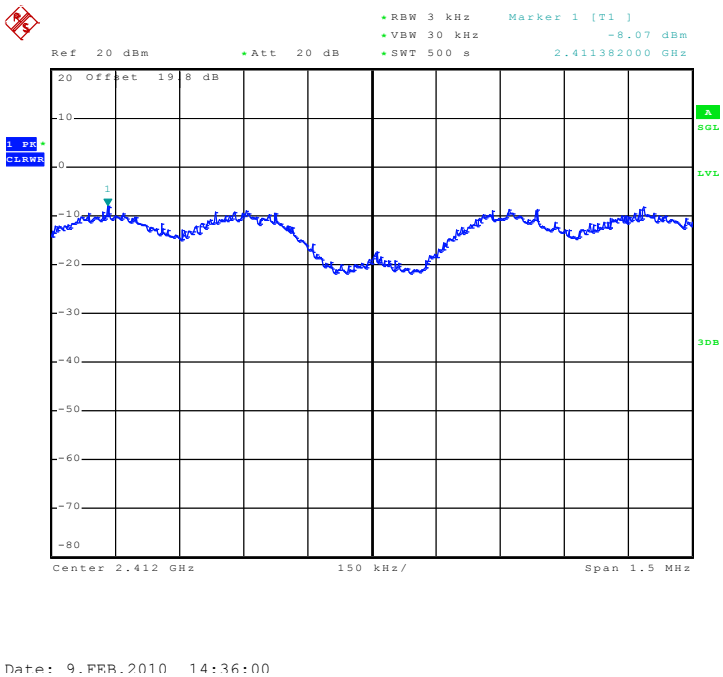


Date: 9.FEB.2010 14:26:23

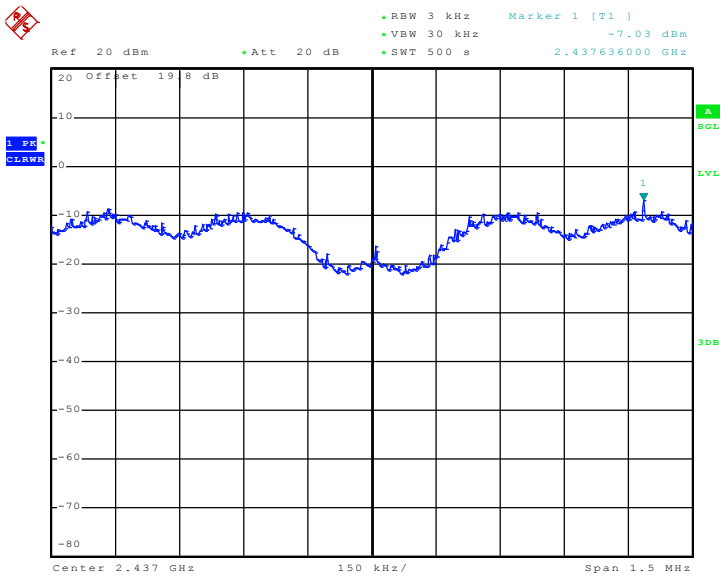
Test Mode :	Mode 4, 5, 6	**Temperature :**	25~27℃
Test Engineer :	Ken Hsu	**Relative Humidity :**	51~53%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-8.07	8	Pass
06	2437	-7.03	8	Pass
11	2462	-8.87	8	Pass

Mode 4 : PSD Plot on 802.11g Channel 01

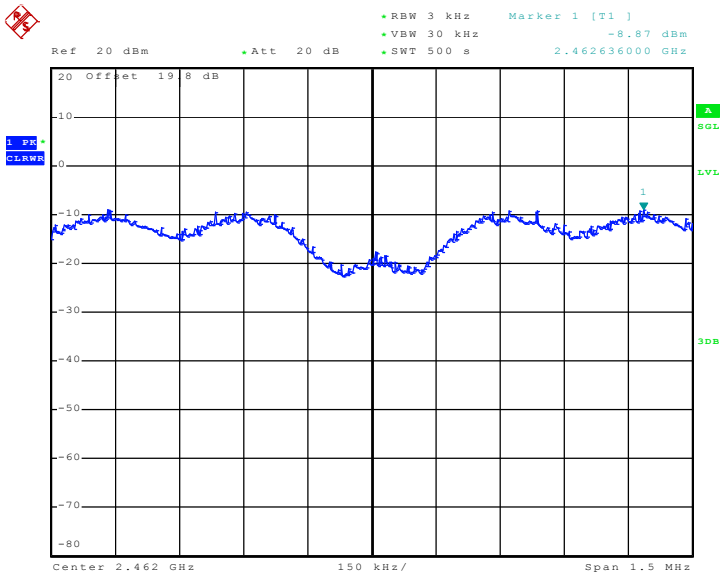


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 9.FEB.2010 17:32:35

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 9.FEB.2010 14:54:59

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.

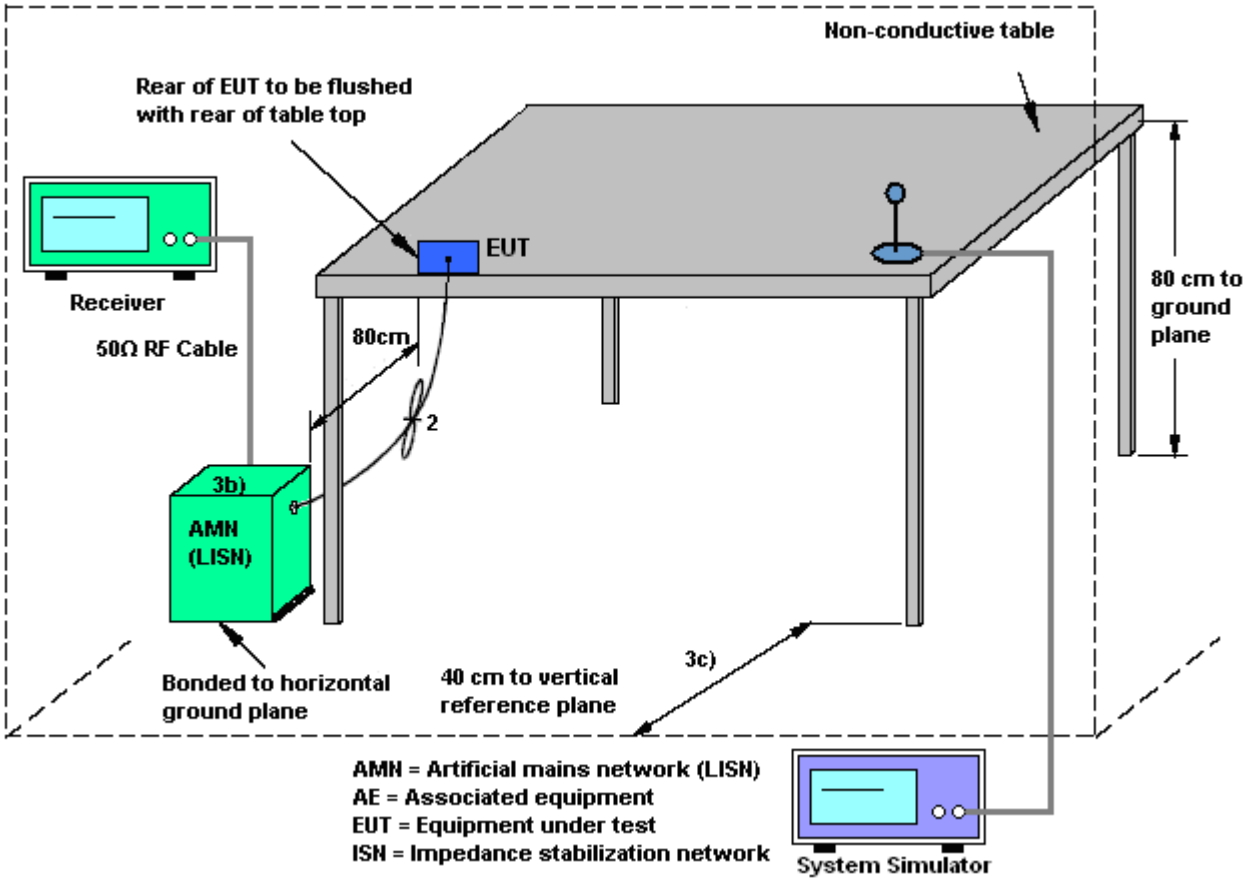
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

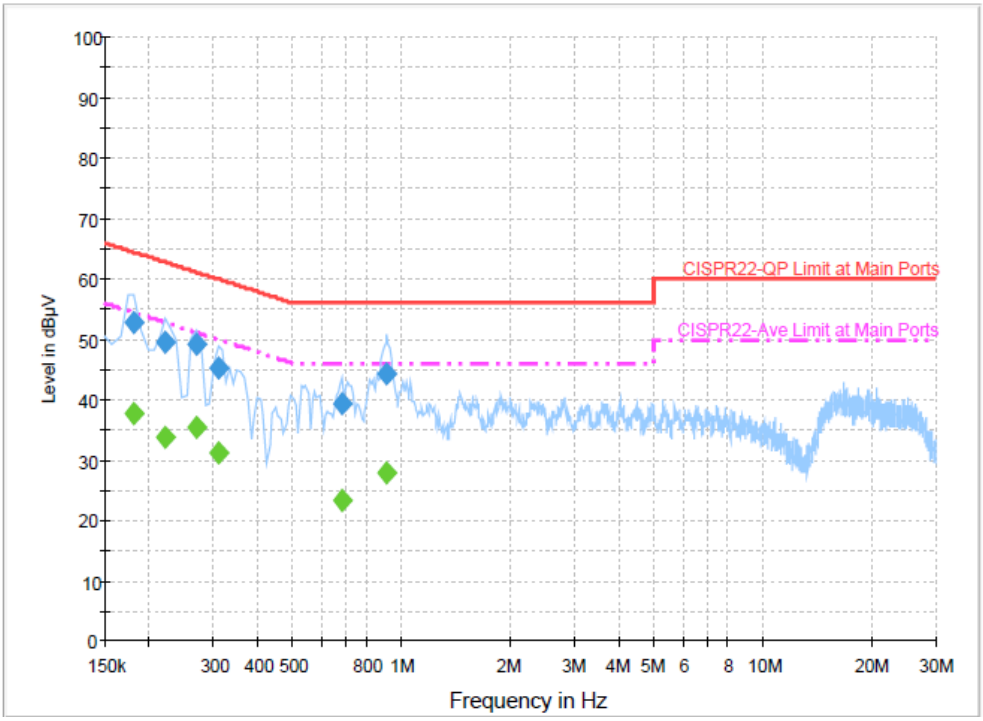
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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℃
Test Engineer :	Novic Jiang	**Relative Humidity :**	43~46%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Sample 2 + GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone 2 + USB Cable 2 (Charging from Adapter 2)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



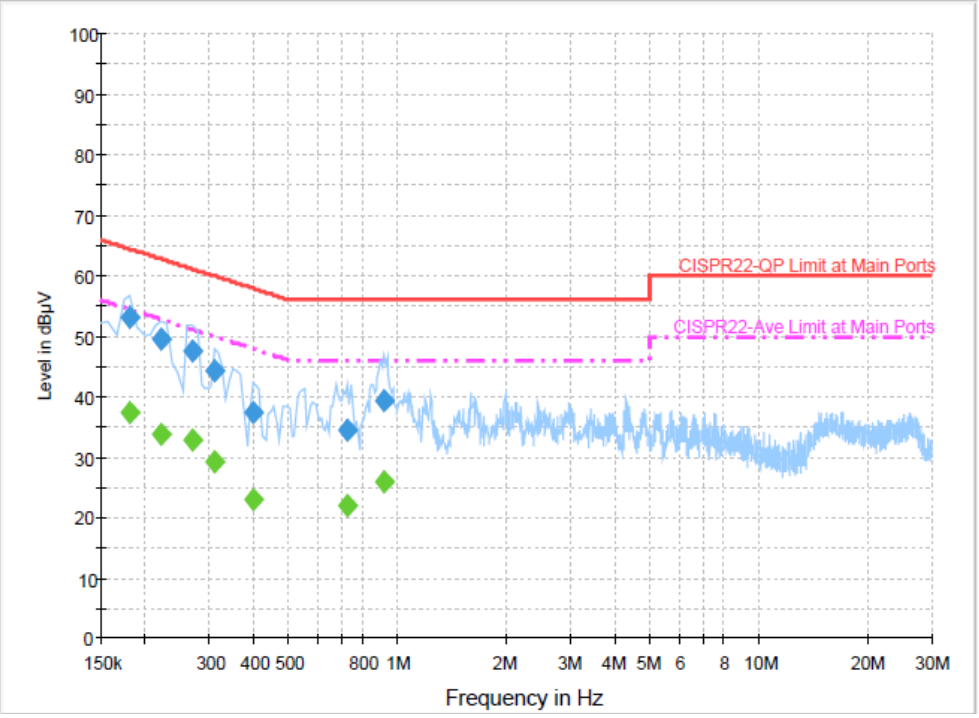
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	52.9	Off	L1	19.5	11.5	64.4
0.222000	49.6	Off	L1	19.6	13.1	62.7
0.270000	49.3	Off	L1	19.4	11.8	61.1
0.310000	45.1	Off	L1	19.5	14.9	60.0
0.686000	39.3	Off	L1	19.5	16.7	56.0
0.910000	44.2	Off	L1	19.4	11.8	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	37.6	Off	L1	19.5	16.8	54.4
0.222000	33.9	Off	L1	19.6	18.8	52.7
0.270000	35.5	Off	L1	19.4	15.6	51.1
0.310000	31.0	Off	L1	19.5	19.0	50.0
0.686000	23.3	Off	L1	19.5	22.7	46.0
0.910000	27.9	Off	L1	19.4	18.1	46.0

Test Mode :	Mode 2	**Temperature :**	20~22℃
Test Engineer :	Novic Jiang	**Relative Humidity :**	43~46%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	Sample 2 + GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone 2 + USB Cable 2 (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)
0.182000	53.2	Off	N	19.5	11.2	64.4
0.222000	49.5	Off	N	19.5	13.2	62.7
0.270000	47.5	Off	N	19.4	13.6	61.1
0.310000	44.3	Off	N	19.5	15.7	60.0
0.398000	37.4	Off	N	19.4	20.5	57.9
0.726000	34.5	Off	N	19.5	21.5	56.0
0.918000	39.4	Off	N	19.4	16.6	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	37.4	Off	N	19.5	17.0	54.4
0.222000	33.9	Off	N	19.5	18.8	52.7
0.270000	32.9	Off	N	19.4	18.2	51.1
0.310000	29.3	Off	N	19.5	20.7	50.0
0.398000	22.9	Off	N	19.4	25.0	47.9
0.726000	22.0	Off	N	19.5	24.0	46.0
0.918000	25.8	Off	N	19.4	20.2	46.0

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

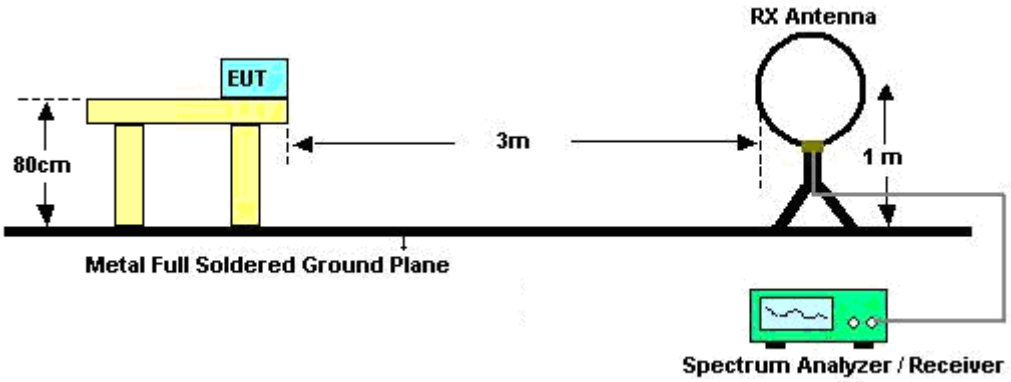
See list of measuring instruments of this test report.

3.7.3 Test Procedures

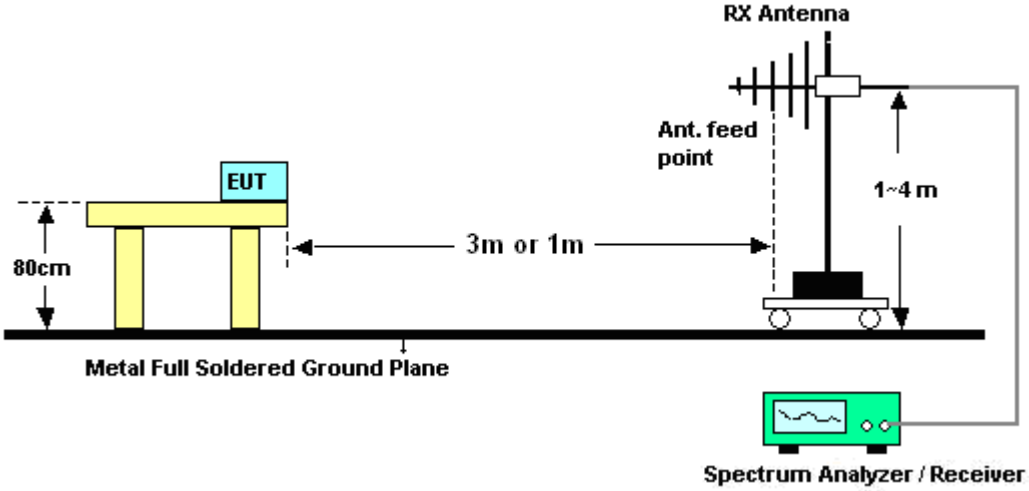
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
   (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
   (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
   Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

3.7.4 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 :	23~24℃
		Relative Humidity :	43~48%

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 (specific distance / test distance) (dB);

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

3.7.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~48%
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	24.33	-15.67	40	35.88	19.51	0.64	31.7	-	-	Peak
94.26	29.36	-14.14	43.5	50.47	9.46	1.13	31.7	100	117	Peak
206.85	23.96	-19.54	43.5	44.9	8.92	1.73	31.59	-	-	Peak
363.7	25.62	-20.38	46	39.32	15.16	2.41	31.27	-	-	Peak
441.4	26.45	-19.55	46	37.87	16.97	2.77	31.16	-	-	Peak
917.4	27.12	-18.88	46	30.16	23.44	4.2	30.68	-	-	Peak
2389.61	59.45	-14.55	74	56.01	32.13	5.46	34.15	193	0	Peak
2389.61	45.04	-8.96	54	41.6	32.13	5.46	34.15	193	0	Average
2412	107.66	-	-	104.22	32.16	5.44	34.16	193	0	Peak
2412	103.48	-	-	100.04	32.16	5.44	34.16	193	0	Average
2494	39.08	-14.92	54	35.61	32.3	5.37	34.2	193	0	Average
2494	49.32	-24.68	74	45.85	32.3	5.37	34.2	193	0	Peak
8445	54.25	-19.75	74	43.21	36	10.14	35.1	100	124	Peak
8445	41.49	-12.51	54	30.45	36	10.14	35.1	100	124	Average

Test Mode :	Mode 1	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~48%
Test Engineer :	Kay Wu	**Polarization :**	Vertical
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	30.54	-9.46	40	42.09	19.51	0.64	31.7	100	167	Peak
92.37	25.82	-17.68	43.5	47.23	9.17	1.12	31.7	-	-	Peak
163.65	25.01	-18.49	43.5	45.02	10.1	1.53	31.64	-	-	Peak
441.4	23.72	-22.28	46	35.14	16.97	2.77	31.16	-	-	Peak
764.1	24.56	-21.44	46	29.87	21.72	3.74	30.77	-	-	Peak
951.7	26.74	-19.26	46	29.17	23.96	4.26	30.65	-	-	Peak
2389.61	50.87	-23.13	74	47.43	32.13	5.46	34.15	102	251	Peak
2389.61	38.76	-15.24	54	35.32	32.13	5.46	34.15	102	251	Average
2412	104.64	-	-	101.2	32.16	5.44	34.16	102	251	Peak
2412	96.6	-	-	93.16	32.16	5.44	34.16	102	251	Average
2494	33.77	-20.23	54	30.3	32.3	5.37	34.2	102	251	Average
2494	47.85	-26.15	74	44.38	32.3	5.37	34.2	102	251	Peak
8274	54.03	-19.97	74	43.1	36	10.03	35.1	110	29	Peak
8274	40.81	-13.19	54	29.88	36	10.03	35.1	110	29	Average

Test Mode :	Mode 2	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~48%
Test Engineer :	Kay Wu	**Polarization :**	Horizontal
Remark :	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
93.18	30.81	-12.69	43.5	52.07	9.32	1.12	31.7	100	246	Peak
201.45	25.39	-18.11	43.5	46.45	8.83	1.71	31.6	-	-	Peak
249.78	25.98	-20.02	46	42.79	12.77	1.92	31.5	-	-	Peak
363.7	27.22	-18.78	46	40.92	15.16	2.41	31.27	-	-	Peak
441.4	28.28	-17.72	46	39.7	16.97	2.77	31.16	-	-	Peak
945.4	27.1	-18.9	46	29.63	23.87	4.25	30.65	-	-	Peak
2358	55.42	-18.58	74	51.99	32.08	5.49	34.14	138	353	Peak
2358	47.02	-6.98	54	43.59	32.08	5.49	34.14	138	353	Average
2437	107.57	-	-	104.11	32.22	5.41	34.17	138	352	Peak
2437	105.57	-	-	102.11	32.22	5.41	34.17	138	353	Average
2484	36.79	-17.21	54	33.33	32.27	5.38	34.19	138	353	Average
2484	49.82	-24.18	74	46.36	32.27	5.38	34.19	138	352	Peak
8370	54.15	-19.85	74	43.15	36	10.1	35.1	100	127	Peak
8370	40.55	-13.45	54	29.55	36	10.1	35.1	100	127	Average

Test Mode :	Mode 2	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~48%
Test Engineer :	Kay Wu	**Polarization :**	Vertical
Remark :	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
93.18	27.01	-16.49	43.5	48.27	9.32	1.12	31.7	100	132	Peak
128.01	26.64	-16.86	43.5	45.16	11.79	1.36	31.67	-	-	Peak
209.01	26.07	-17.43	43.5	46.93	8.97	1.75	31.58	-	-	Peak
441.4	24	-22	46	35.42	16.97	2.77	31.16	-	-	Peak
556.2	22.59	-23.41	46	31.29	19.23	3.11	31.04	-	-	Peak
934.9	26.71	-19.29	46	29.44	23.71	4.23	30.67	-	-	Peak
2358	52.47	-21.53	74	49.04	32.08	5.49	34.14	102	104	Peak
2358	40.03	-13.97	54	36.6	32.08	5.49	34.14	102	104	Average
2437	99.78	-	-	96.32	32.22	5.41	34.17	102	104	Average
2437	103.64	-	-	100.18	32.22	5.41	34.17	102	104	Peak
2484	34.47	-19.53	54	31.01	32.27	5.38	34.19	102	104	Average
2484	46.7	-27.3	74	43.24	32.27	5.38	34.19	102	104	Peak
8397	54.5	-19.5	74	43.49	36	10.11	35.1	100	175	Peak
8397	40.67	-13.33	54	29.66	36	10.11	35.1	100	175	Average

Test Mode :	Mode 3	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~48%
Test Engineer :	Kay Wu	**Polarization :**	Horizontal
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
94.26	30.56	-12.94	43.5	51.67	9.46	1.13	31.7	100	121	Peak
203.61	27.22	-16.28	43.5	48.22	8.87	1.72	31.59	-	-	Peak
249.78	28.2	-17.8	46	45.01	12.77	1.92	31.5	-	-	Peak
363.7	26.67	-19.33	46	40.37	15.16	2.41	31.27	-	-	Peak
441.4	27.04	-18.96	46	38.46	16.97	2.77	31.16	-	-	Peak
939.8	27.17	-18.83	46	29.81	23.78	4.24	30.66	-	-	Peak
2382	56.65	-17.35	74	53.22	32.11	5.47	34.15	189	3	Peak
2382	42.05	-11.95	54	38.62	32.11	5.47	34.15	189	3	Average
2462	107.95	-	-	104.49	32.24	5.4	34.18	189	3	Peak
2462	104.87	-	-	101.41	32.24	5.4	34.18	189	3	Average
2485.37	55.85	-18.15	74	52.39	32.27	5.38	34.19	189	3	Peak
2485.37	42.07	-11.93	54	38.61	32.27	5.38	34.19	189	3	Average
8421	54.56	-19.44	74	43.53	36	10.13	35.1	110	221	Peak
8421	41.81	-12.19	54	30.78	36	10.13	35.1	110	221	Average

Test Mode :	Mode 3	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~48%
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
30.54	32.84	-7.16	40	44.94	18.95	0.65	31.7	100	67	Peak
92.37	26.7	-16.8	43.5	48.11	9.17	1.12	31.7	-	-	Peak
127.74	26.37	-17.13	43.5	44.89	11.79	1.36	31.67	-	-	Peak
441.4	23.58	-22.42	46	35	16.97	2.77	31.16	-	-	Peak
615	22.56	-23.44	46	30.07	20.18	3.3	30.99	-	-	Peak
931.4	26.49	-19.51	46	29.29	23.65	4.22	30.67	-	-	Peak
2382	51.67	-22.33	74	48.24	32.11	5.47	34.15	100	168	Peak
2382	39.58	-14.42	54	36.15	32.11	5.47	34.15	100	168	Average
2462	104.34	-	-	100.88	32.24	5.4	34.18	100	168	Peak
2462	97.16	-	-	93.7	32.24	5.4	34.18	100	168	Average
2485.18	50.65	-23.35	74	47.19	32.27	5.38	34.19	100	168	Peak
2485.18	36.99	-17.01	54	33.53	32.27	5.38	34.19	100	168	Average
8466	54.68	-19.32	74	43.62	36	10.16	35.1	137	64	Peak
8466	42.16	-11.84	54	31.1	36	10.16	35.1	137	64	Average

Test Mode :	Mode 4	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~48%
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
94.26	31.05	-12.45	43.5	52.16	9.46	1.13	31.7	100	69	Peak
121.26	24.47	-19.03	43.5	42.71	12.15	1.29	31.68	-	-	Peak
203.61	26.99	-16.51	43.5	47.99	8.87	1.72	31.59	-	-	Peak
363.7	27.72	-18.28	46	41.42	15.16	2.41	31.27	-	-	Peak
441.4	27.83	-18.17	46	39.25	16.97	2.77	31.16	-	-	Peak
895	26.72	-19.28	46	30.15	23.13	4.14	30.7	-	-	Peak
2389.61	67.38	-6.62	74	63.94	32.13	5.46	34.15	104	330	Peak
2389.61	46.85	-7.15	54	43.41	32.13	5.46	34.15	104	330	Average
2412	103.1	-	-	99.66	32.16	5.44	34.16	104	330	Peak
2412	92.55	-	-	89.11	32.16	5.44	34.16	104	330	Average
2492	34.81	-19.19	54	31.34	32.3	5.37	34.2	104	330	Average
2492	49.28	-24.72	74	45.81	32.3	5.37	34.2	104	330	Peak
8454	54.48	-19.52	74	43.44	36	10.14	35.1	100	104	Peak
8454	42.13	-11.87	54	31.09	36	10.14	35.1	100	104	Average

Test Mode :	Mode 4	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~48%
Test Engineer :	Kay Wu	**Polarization :**	Vertical
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
30.54	31.22	-8.78	40	43.32	18.95	0.65	31.7	100	111	Peak
127.74	26.62	-16.88	43.5	45.14	11.79	1.36	31.67	-	-	Peak
204.42	26.6	-16.9	43.5	47.59	8.88	1.72	31.59	-	-	Peak
363.7	23.83	-22.17	46	37.53	15.16	2.41	31.27	-	-	Peak
441.4	23.77	-22.23	46	35.19	16.97	2.77	31.16	-	-	Peak
948.2	27.49	-18.51	46	29.97	23.91	4.26	30.65	-	-	Peak
2389.99	66.18	-7.82	74	62.75	32.13	5.46	34.16	108	54	Peak
2389.99	47.14	-6.86	54	43.71	32.13	5.46	34.16	108	54	Average
2412	100.14	-	-	96.7	32.16	5.44	34.16	108	54	Peak
2412	88.71	-	-	85.27	32.16	5.44	34.16	108	54	Average
2486	33.89	-20.11	54	30.43	32.27	5.38	34.19	108	54	Average
2486	46.13	-27.87	74	42.67	32.27	5.38	34.19	108	54	Peak
8337	54.5	-19.5	74	43.53	36	10.07	35.1	100	205	Peak
8337	42.86	-11.14	54	31.89	36	10.07	35.1	100	205	Average

Test Mode :	Mode 5	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~48%
Test Engineer :	Kay Wu	**Polarization :**	Horizontal
Remark :	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	24.08	-15.92	40	36.18	18.95	0.65	31.7	-	-	Peak
94.26	30	-13.5	43.5	51.11	9.46	1.13	31.7	100	333	Peak
203.34	27.45	-16.05	43.5	48.45	8.87	1.72	31.59	-	-	Peak
363.7	28.77	-17.23	46	42.47	15.16	2.41	31.27	-	-	Peak
441.4	26.74	-19.26	46	38.16	16.97	2.77	31.16	-	-	Peak
939.8	26.53	-19.47	46	29.17	23.78	4.24	30.66	-	-	Peak
2356	53.42	-20.58	74	49.99	32.08	5.49	34.14	136	360	Peak
2356	41.16	-12.84	54	37.73	32.08	5.49	34.14	136	360	Average
2437	102.6	-	-	99.14	32.22	5.41	34.17	136	360	Peak
2437	90.6	-	-	87.14	32.22	5.41	34.17	136	360	Average
2484	34.49	-19.51	54	31.03	32.27	5.38	34.19	136	360	Average
2484	51.78	-22.22	74	48.32	32.27	5.38	34.19	136	360	Peak
8394	54.81	-19.19	74	43.8	36	10.11	35.1	100	224	Peak
8394	39.2	-34.8	74	28.19	36	10.11	35.1	100	224	Peak

Test Mode :	Mode 5	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~48%
Test Engineer :	Kay Wu	**Polarization :**	Vertical
Remark :	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	32.91	-7.09	40	45.01	18.95	0.65	31.7	100	137	Peak
91.02	26.59	-16.91	43.5	48.14	9.03	1.12	31.7	-	-	Peak
127.74	26.98	-16.52	43.5	45.5	11.79	1.36	31.67	-	-	Peak
441.4	23.5	-22.5	46	34.92	16.97	2.77	31.16	-	-	Peak
738.9	24.39	-21.61	46	30.16	21.38	3.67	30.82	-	-	Peak
918.1	26.37	-19.63	46	29.39	23.46	4.2	30.68	-	-	Peak
2358	50.96	-23.04	74	47.53	32.08	5.49	34.14	100	34	Peak
2358	39.24	-14.76	54	35.81	32.08	5.49	34.14	100	34	Average
2437	100.3	-	-	96.84	32.22	5.41	34.17	100	34	Peak
2437	85.99	-	-	82.53	32.22	5.41	34.17	100	34	Average
2486	33.04	-20.96	54	29.58	32.27	5.38	34.19	100	34	Average
2486	46.99	-27.01	74	43.53	32.27	5.38	34.19	100	34	Peak
8301	54.74	-19.26	74	43.8	36	10.04	35.1	100	323	Peak
8301	40.27	-13.73	54	29.33	36	10.04	35.1	100	323	Average

Test Mode :	Mode 6	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~48%
Test Engineer :	Kay Wu	**Polarization :**	Horizontal
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
96.69	29.11	-14.39	43.5	49.77	9.9	1.14	31.7	100	174	Peak
204.42	27.24	-16.26	43.5	48.23	8.88	1.72	31.59	-	-	Peak
249.78	29.33	-16.67	46	46.14	12.77	1.92	31.5	-	-	Peak
363.7	27.75	-18.25	46	41.45	15.16	2.41	31.27	-	-	Peak
441.4	27.12	-18.88	46	38.54	16.97	2.77	31.16	-	-	Peak
937	27.9	-18.1	46	30.59	23.74	4.23	30.66	-	-	Peak
2380	55.97	-18.03	74	52.54	32.11	5.47	34.15	126	341	Peak
2380	43.4	-10.6	54	39.97	32.11	5.47	34.15	126	341	Average
2462	102.66	-	-	99.2	32.24	5.4	34.18	126	341	Peak
2462	92.26	-	-	88.8	32.24	5.4	34.18	126	341	Average
2483.5	67.29	-6.71	74	63.83	32.27	5.38	34.19	126	341	Peak
2483.5	45.41	-8.59	54	41.95	32.27	5.38	34.19	126	341	Average
8445	54.59	-19.41	74	43.55	36	10.14	35.1	100	44	Peak
8445	41.65	-12.35	54	30.61	36	10.14	35.1	100	44	Average

Test Mode :	Mode 6	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~48%
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
30.81	32.75	-7.25	40	44.85	18.95	0.65	31.7	100	337	Peak
129.9	26.56	-16.94	43.5	45.09	11.77	1.37	31.67	-	-	Peak
205.77	26.63	-16.87	43.5	47.59	8.9	1.73	31.59	-	-	Peak
441.4	23.62	-22.38	46	35.04	16.97	2.77	31.16	-	-	Peak
654.2	23.01	-22.99	46	30.05	20.49	3.42	30.95	-	-	Peak
946.1	26.84	-19.16	46	29.37	23.87	4.25	30.65	-	-	Peak
2382	52.66	-21.34	74	49.23	32.11	5.47	34.15	100	322	Peak
2382	38.36	-15.64	54	34.93	32.11	5.47	34.15	100	322	Average
2462	98.46	-	-	95	32.24	5.4	34.18	100	322	Peak
2462	87.86	-	-	84.4	32.24	5.4	34.18	100	322	Average
2483.5	62.56	-11.44	74	59.1	32.27	5.38	34.19	100	322	Peak
2483.5	41.95	-12.05	54	38.49	32.27	5.38	34.19	100	322	Average
8241	54.27	-19.73	74	43.37	36	10	35.1	131	52	Peak
8241	41.23	-12.77	54	30.33	36	10	35.1	131	52	Average

Test Mode :	Mode 7	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~48%
Test Engineer :	Kay Wu	**Polarization :**	Horizontal
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
95.34	27.72	-15.78	43.5	48.68	9.61	1.13	31.7	100	354	Peak
203.34	23.19	-20.31	43.5	44.19	8.87	1.72	31.59	-	-	Peak
249.78	24.91	-21.09	46	41.72	12.77	1.92	31.5	-	-	Peak
363.7	27.25	-18.75	46	40.95	15.16	2.41	31.27	-	-	Peak
441.4	26.71	-19.29	46	38.13	16.97	2.77	31.16	-	-	Peak
948.2	26.93	-19.07	46	29.41	23.91	4.26	30.65	-	-	Peak
2382	52.06	-21.94	74	48.63	32.11	5.47	34.15	100	329	Peak
2382	41.72	-12.28	54	38.29	32.11	5.47	34.15	100	329	Average
2462	105.8	-	-	102.34	32.24	5.4	34.18	100	329	Peak
2462	93.59	-	-	90.13	32.24	5.4	34.18	100	329	Average
2483.5	49.66	-4.34	54	46.2	32.27	5.38	34.19	100	329	Average
2483.5	68.31	-5.69	74	64.85	32.27	5.38	34.19	100	329	Peak
8301	54.71	-19.29	74	43.77	36	10.04	35.1	100	210	Peak
8301	40.26	-13.74	54	29.32	36	10.04	35.1	100	210	Average

Test Mode :	Mode 7	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~48%
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	27.54	-12.46	40	39.09	19.51	0.64	31.7	100	167	Peak
92.1	23.64	-19.86	43.5	45.05	9.17	1.12	31.7	-	-	Peak
129.09	21.52	-21.98	43.5	40.05	11.78	1.36	31.67	-	-	Peak
441.4	23.52	-22.48	46	34.94	16.97	2.77	31.16	-	-	Peak
657.7	22.99	-23.01	46	29.99	20.51	3.43	30.94	-	-	Peak
917.4	26.64	-19.36	46	29.68	23.44	4.2	30.68	-	-	Peak
2382	49.71	-24.29	74	46.28	32.11	5.47	34.15	100	64	Peak
2382	39.34	-14.66	54	35.91	32.11	5.47	34.15	100	64	Average
2462	102.06	-	-	98.6	32.24	5.4	34.18	100	64	Peak
2462	90.39	-	-	86.93	32.24	5.4	34.18	100	64	Average
2483.85	43.26	-10.74	54	39.8	32.27	5.38	34.19	100	64	Average
2483.85	61.5	-12.5	74	58.04	32.27	5.38	34.19	100	64	Peak
8385	54.45	-19.55	74	43.45	36	10.1	35.1	100	314	Peak
8385	40.46	-13.54	54	29.46	36	10.1	35.1	100	314	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)
System Simulator	R&S	CMU200	105934	N/A	Nov. 11, 2008	Nov. 10, 2010	Conduction (CO05-HY)
GPS Station	T&E	GS-50	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)

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
Combined Standard Uncertainty Uc(y)	**1.13**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**		

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
Combined Standard Uncertainty Uc(y)	**1.27**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**		

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 Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				

Appendix A. Photographs of EUT

Please refer to Sporton report number EP020105 as below.