

FCC RF Test Report

APPLICANT : ASUSTek COMPUTER INC.
EQUIPMENT : PDA Phone
BRAND NAME : Garmin-Asus
MODEL NAME : M10
FCC ID : MSQ-M10
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Nov. 26, 2009 and completely tested on Apr. 28, 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 1st 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(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.5	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 16.7 dB at 0.366 MHz
3.6	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.14 dB at 2389.99 MHz
3.7	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

ASUSTek COMPUTER INC.

4F., No. 150, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C.

1.2 Manufacturer

ProTek (Shanghai) Ltd.

No. 3768, Xiu Yan Road, Nanhui District, 201315 Shanghai, P.R.C.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	PDA Phone
Brand Name	Garmin-Asus
Model Name	M10
FCC ID	MSQ-M10
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 : 16.54 dBm (45.08 mW) 802.11g : 20.31 dBm (107.40 mW)
Antenna Type	PIFA Antenna with gain -3 dBi
HW Version	V1.1(SR1-2)
SW Version	OS : Ver. M10_V2.6.0.p2 Modem : Ver.G2.4.2-Q2_SR1_M10
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 1 st 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.	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	16.46	16.45	16.46	16.54
CH 06	2437 MHz	15.90	15.81	15.89	15.69
CH 11	2462 MHz	15.05	15.24	15.29	15.34

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	20.23	18.26	19.51	19.12	19.55	19.35	19.20	20.27
CH 06	2437 MHz	20.29	17.64	19.13	18.89	20.30	19.55	18.86	20.31
CH 11	2462 MHz	19.47	17.18	18.34	17.94	18.39	18.25	18.39	19.50

Remark:

1. The data rates of WLAN 802.11b/g were set in 11Mbps for 802.11b and 54Mbps 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.

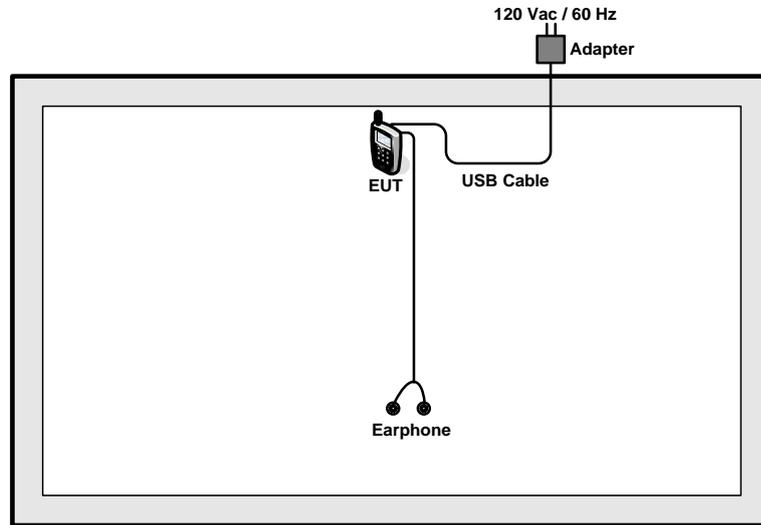
2.2 Test Mode

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.

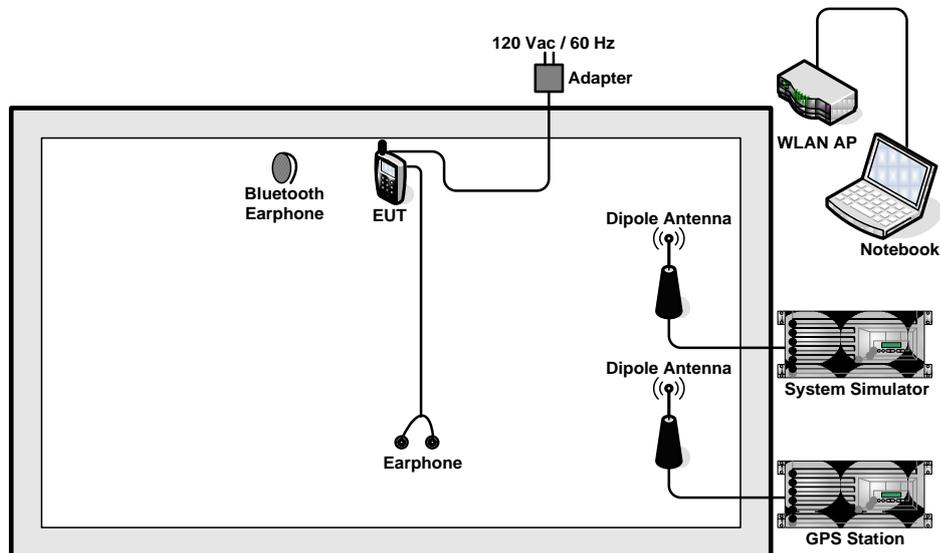
Test Cases		
Test Item	802.11b	802.11g
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
AC Conducted Emission	Mode 1 : GSM850 Idle + WLAN Link + Bluetooth Link + GPS Rx + USB Cable 1 (Charging from Adapter) + Earphone + Battery 1	
Remark: For radiated TCs, the test was performed together with USB Cable (Charging with Adapter) and Earphone.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>





2.4 RF Utility

The programmed RF utility, "WLAN TestMode" 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.

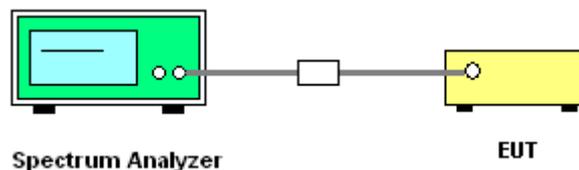
3.1.2 Measuring Instruments

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

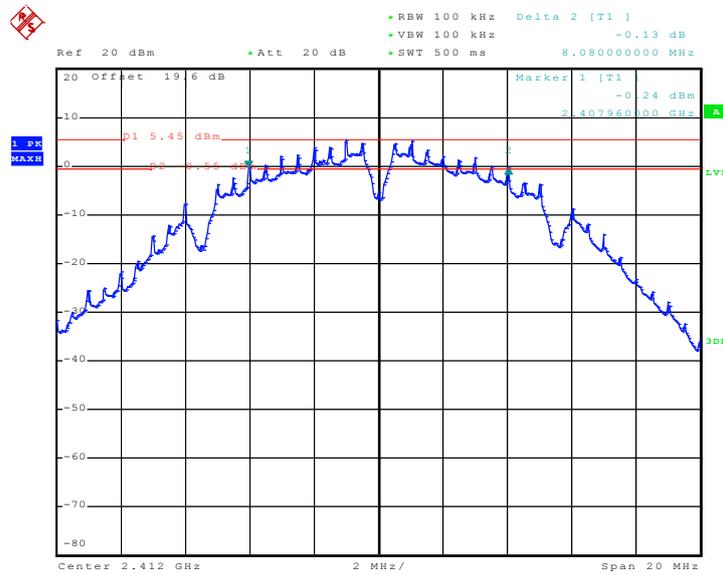


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	27~29°C
Test Engineer :	Tang Liu	Relative Humidity :	40~43%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	8.08	0.5	Pass
06	2437	7.56	0.5	Pass
11	2462	7.52	0.5	Pass

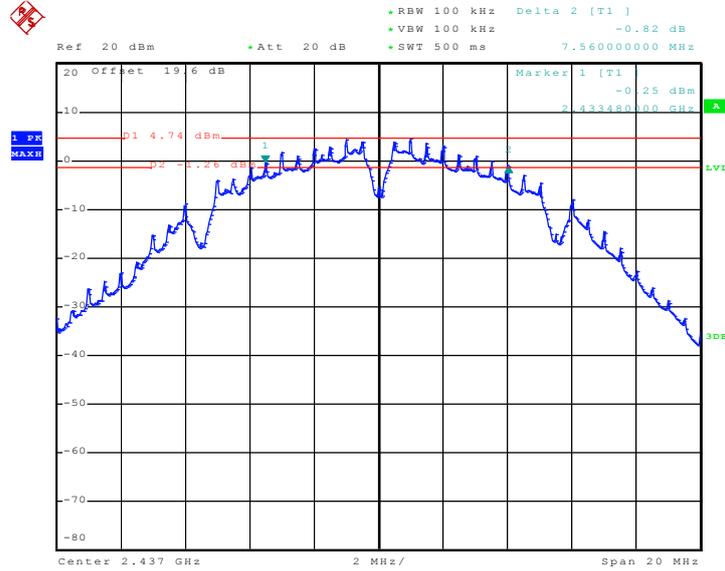
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



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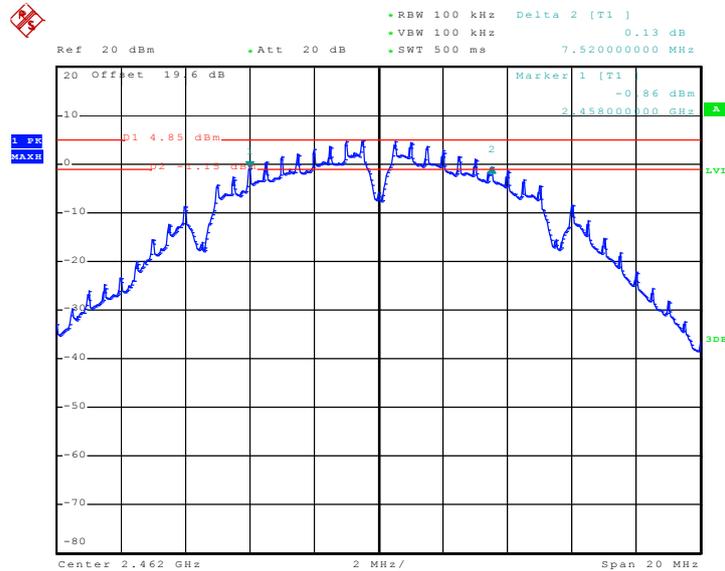


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



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



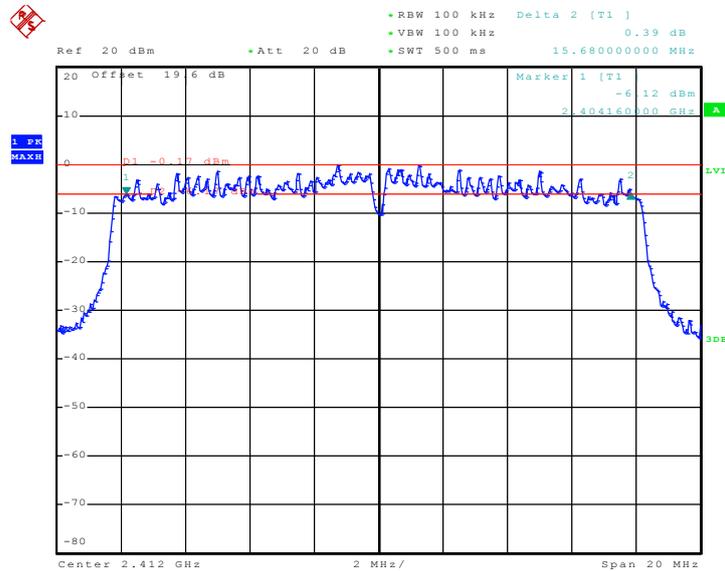
Date: 30.NOV.2009 23:25:37



Test Mode :	Mode 4, 5, 6	Temperature :	27~29°C
Test Engineer :	Tang Liu	Relative Humidity :	40~43%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.68	0.5	Pass
06	2437	15.96	0.5	Pass
11	2462	15.40	0.5	Pass

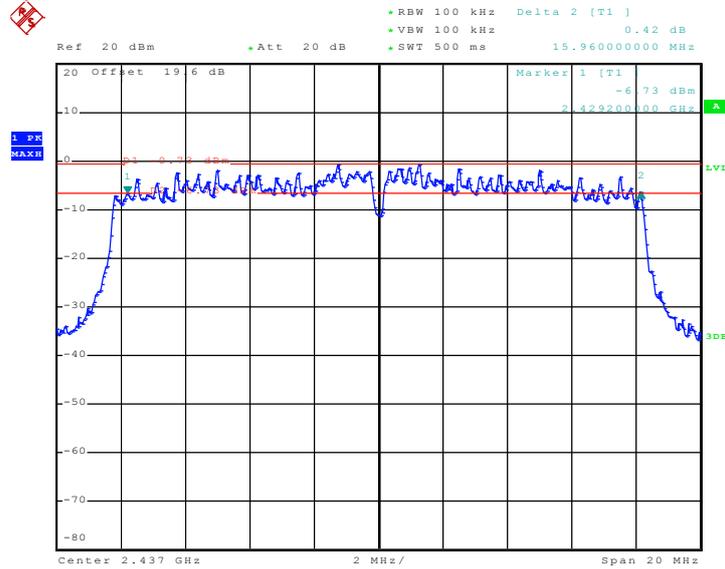
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



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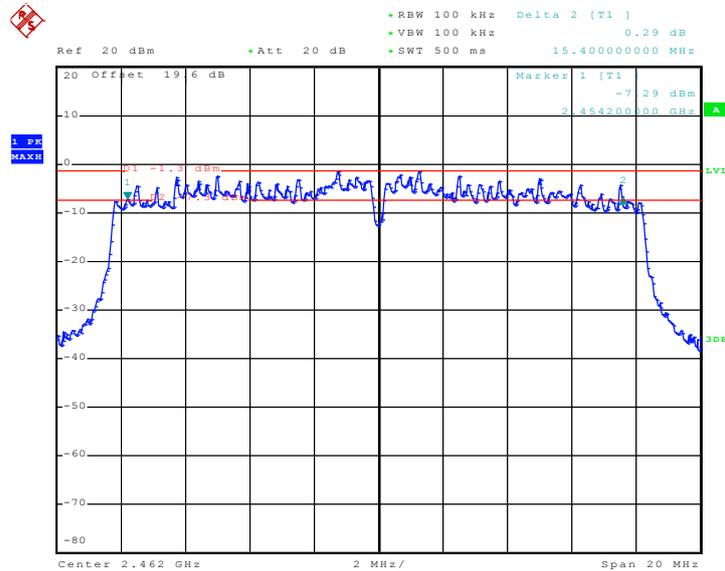


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Date: 10.DEC.2009 19:29:41

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



Date: 10.DEC.2009 19:30:30

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.

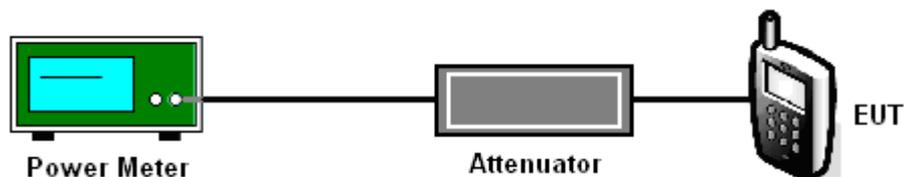
3.2.2 Measuring Instruments

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 :	27~29°C
Test Engineer :	Tang Liu	Relative Humidity :	40~43%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	16.54	30	Pass
06	2437	15.69	30	Pass
11	2462	15.34	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	27~29°C
Test Engineer :	Tang Liu	Relative Humidity :	40~43%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	20.27	30	Pass
06	2437	20.31	30	Pass
11	2462	19.50	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

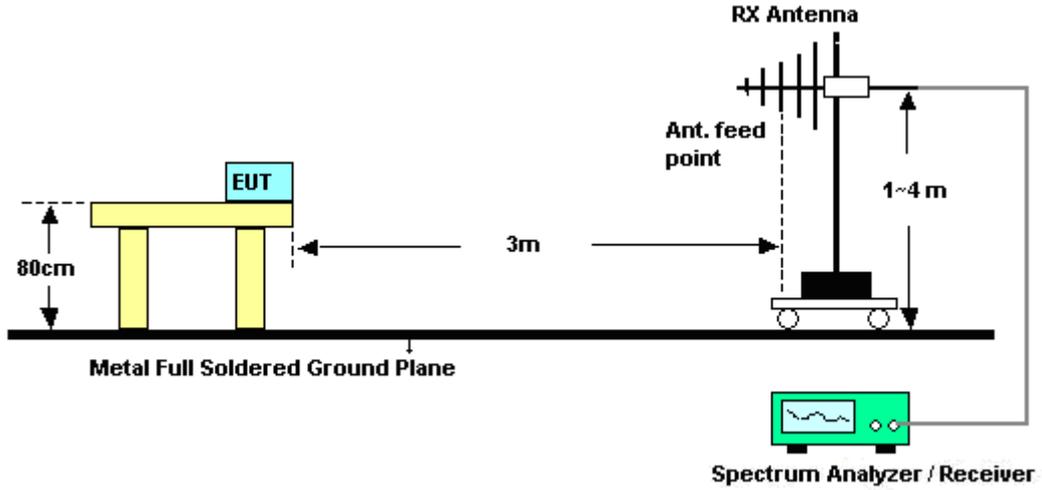
See list of measuring instruments of this test report.

3.3.3 Test Procedures

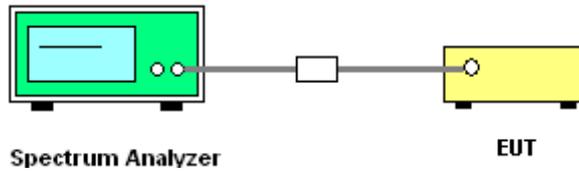
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) \geq RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	23~25°C
Test Band :	802.11b	Relative Humidity :	42~45%
Test Channel :	01	Test Engineer :	Kai Wang and Mac Lin

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
2387.14	60.33	-13.67	74.00	57.12	32.13	5.46	34.38	163	16	Peak
2387.14	49.19	-4.81	54.00	45.98	32.13	5.46	34.38	163	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
2385.81	57.00	-17.00	74.00	53.79	32.13	5.46	34.38	200	351	Peak
2385.81	45.93	-8.07	54.00	42.72	32.13	5.46	34.38	200	351	Average

Test Mode :	Mode 3	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	42~45%
Test Channel :	11	Test Engineer :	Kai Wang and Mac Lin

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
2483.66	59.16	-14.84	74.00	55.90	32.27	5.38	34.40	190	7	Peak
2483.66	45.07	-8.93	54.00	41.81	32.27	5.38	34.40	190	7	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
2489.17	57.47	-16.53	74.00	54.21	32.27	5.38	34.40	167	359	Peak
2489.17	44.71	-9.29	54.00	41.44	32.30	5.37	34.40	167	359	Average



Test Mode :	Mode 4	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	42~45%
Test Channel :	01	Test Engineer :	Kai Wang and Mac Lin

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	70.57	-3.43	74.00	67.36	32.13	5.46	34.38	165	359	Peak
2389.99	53.86	-0.14	54.00	50.65	32.13	5.46	34.38	165	359	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	66.90	-7.10	74.00	63.69	32.13	5.46	34.38	200	351	Peak
2389.99	50.79	-3.21	54.00	47.58	32.13	5.46	34.38	200	351	Average

Test Mode :	Mode 6	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	42~45%
Test Channel :	11	Test Engineer :	Kai Wang and Mac Lin

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
2483.50	69.60	-4.40	74.00	66.34	32.27	5.38	34.40	107	5	Peak
2483.50	53.68	-0.32	54.00	50.42	32.27	5.38	34.40	107	5	Average

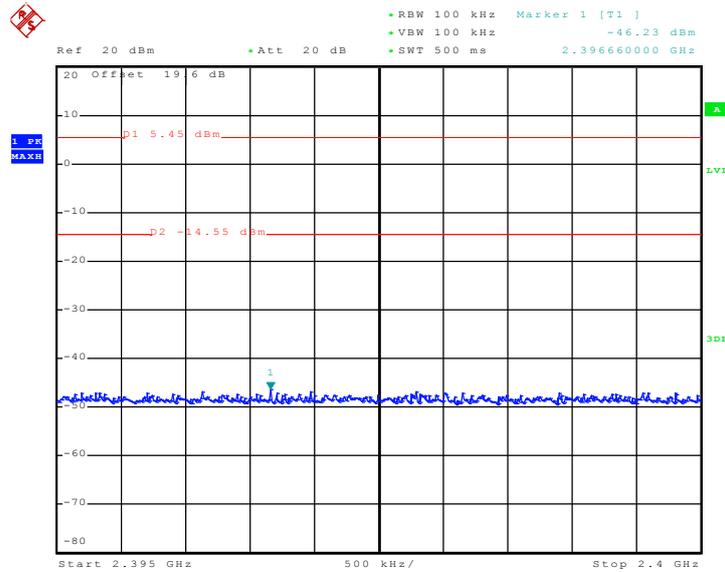
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	66.32	-7.68	74.00	63.06	32.27	5.38	34.40	179	360	Peak
2483.50	50.88	-3.12	54.00	47.62	32.27	5.38	34.40	179	360	Average



3.3.6 Test Plots of Conducted Band Edges

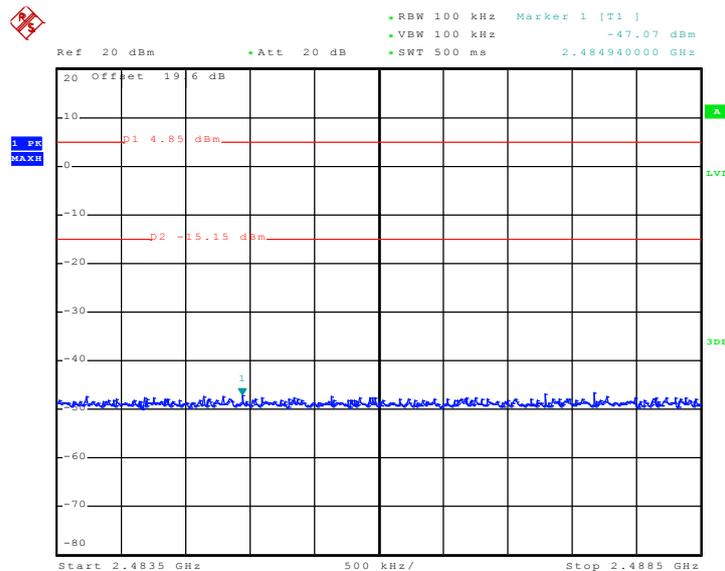
Test Mode :	Mode 1 and 3	Temperature :	27~29°C
Test Band :	802.11b	Relative Humidity :	40~43%
Test Channel :	01 and 11	Test Engineer :	Tang Liu

Low Band Edge Plot on 802.11b Channel 01



Date: 30.NOV.2009 23:22:05

High Band Edge Plot on 802.11b Channel 11

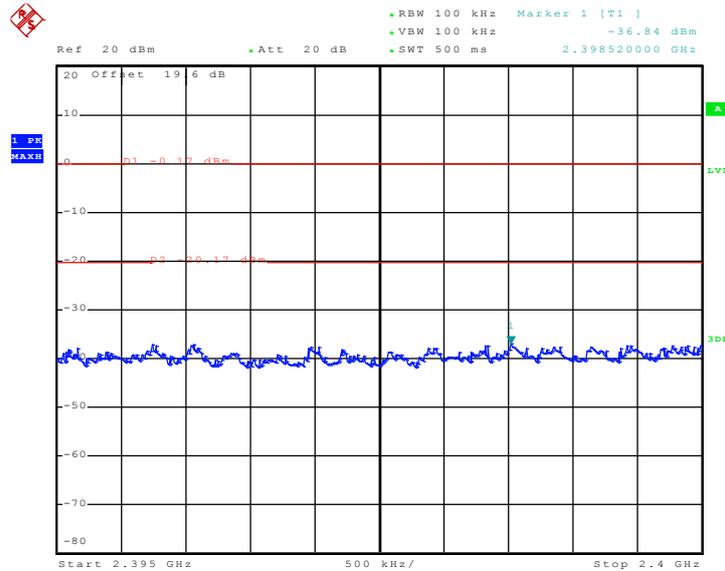


Date: 30.NOV.2009 23:26:06



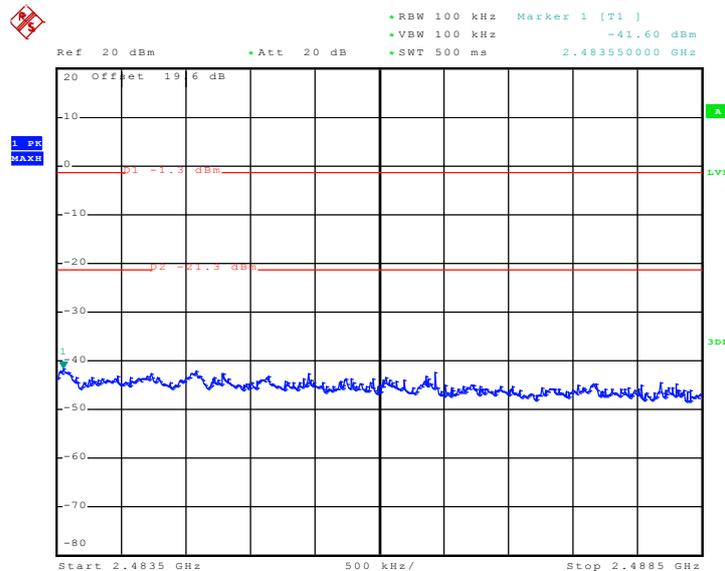
Test Mode :	Mode 4 and 6	Temperature :	27~29°C
Test Band :	802.11g	Relative Humidity :	40~43%
Test Channel :	01 and 11	Test Engineer :	Tang Liu

Low Band Edge Plot on 802.11g Channel 01



Date: 10.DEC.2009 19:28:42

High Band Edge Plot on 802.11g Channel 11



Date: 10.DEC.2009 19:31:10

3.4 Power Spectral Density Measurement

3.4.1 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.

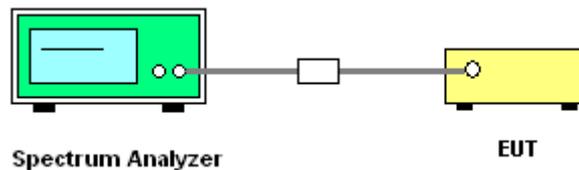
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 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.

3.4.4 Test Setup



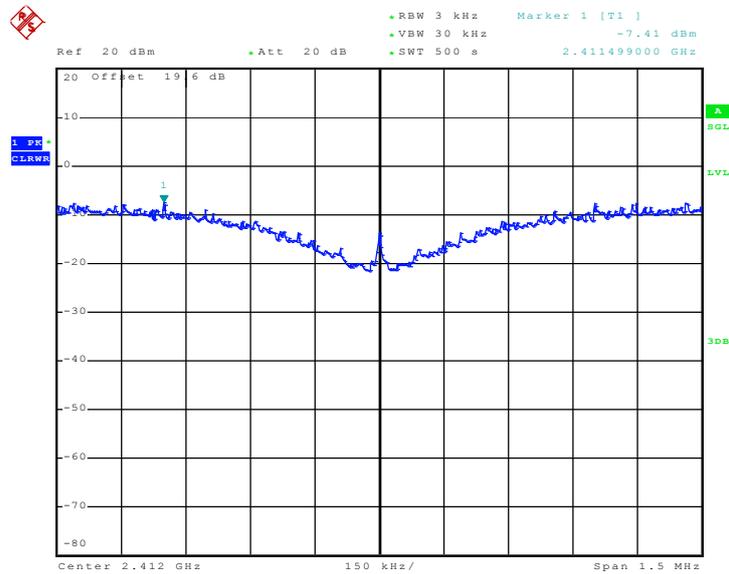


3.4.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	27~29°C
Test Engineer :	Tang Liu	Relative Humidity :	40~43%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-7.41	8	Pass
06	2437	-5.94	8	Pass
11	2462	-6.29	8	Pass

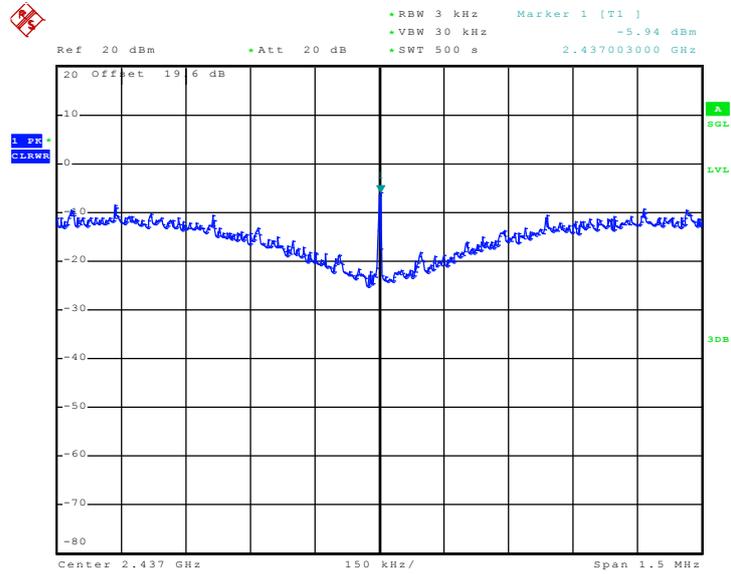
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 1.DEC.2009 00:21:10

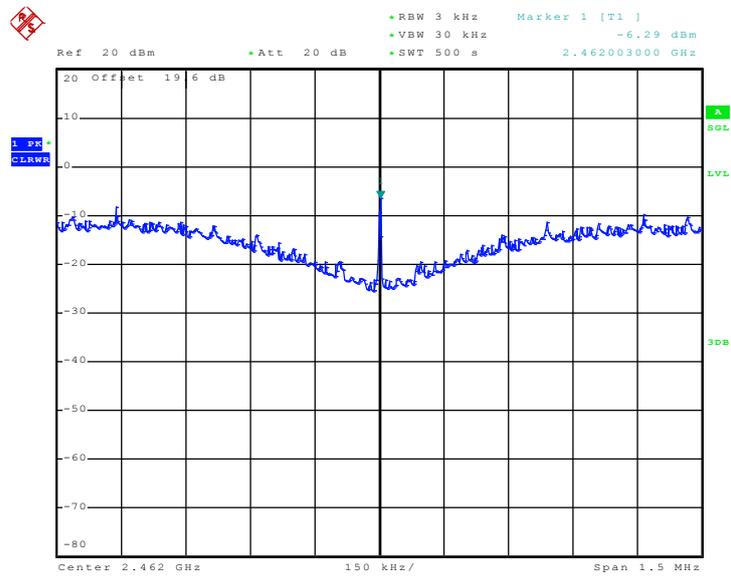


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 30.NOV.2009 23:54:19

Mode 3 : PSD Plot on 802.11b Channel 11



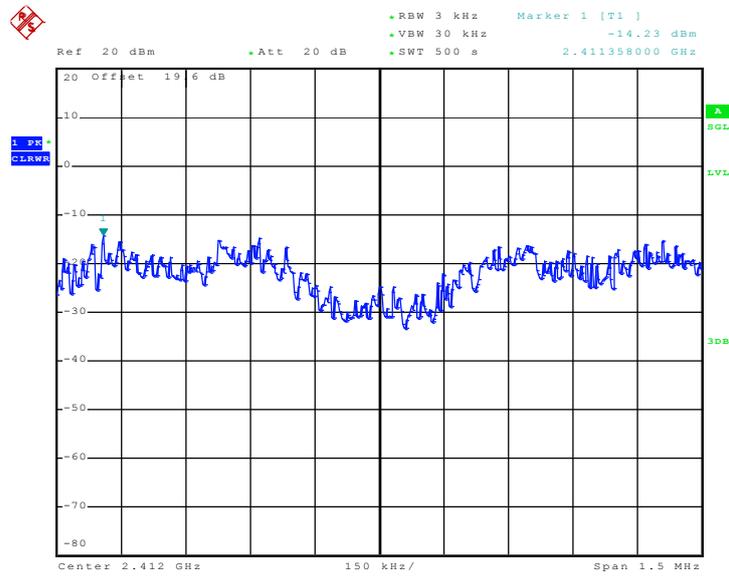
Date: 30.NOV.2009 23:45:12



Test Mode :	Mode 4, 5, 6	Temperature :	27~29°C
Test Engineer :	Tang Liu	Relative Humidity :	40~43%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-14.23	8	Pass
06	2437	-15.05	8	Pass
11	2462	-16.00	8	Pass

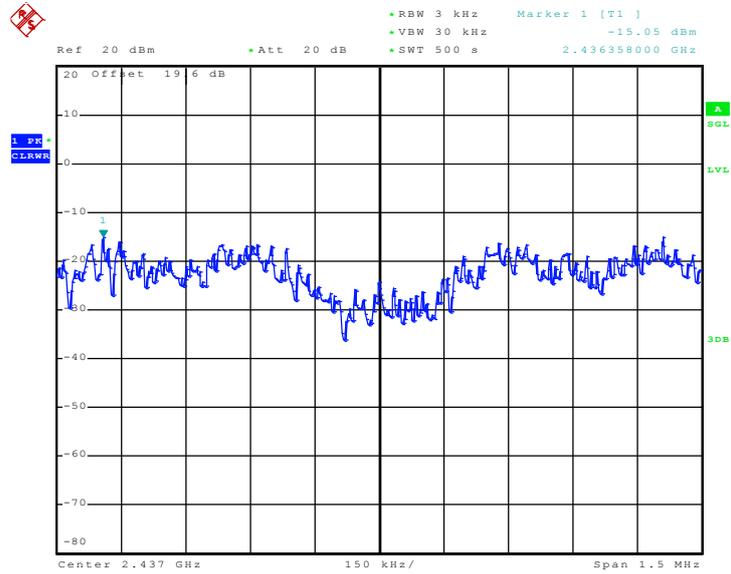
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 10.DEC.2009 19:40:19

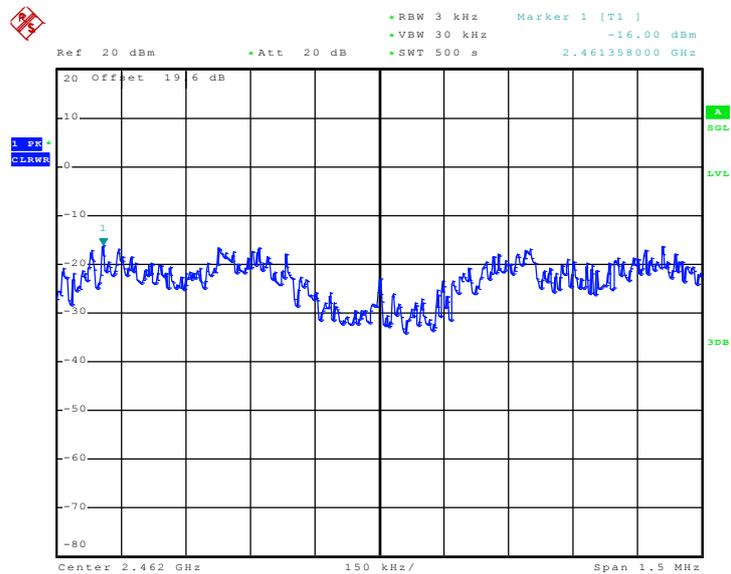


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 10.DEC.2009 19:49:00

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 10.DEC.2009 19:58:49

3.5 AC Conducted Emission Measurement

3.5.1 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.

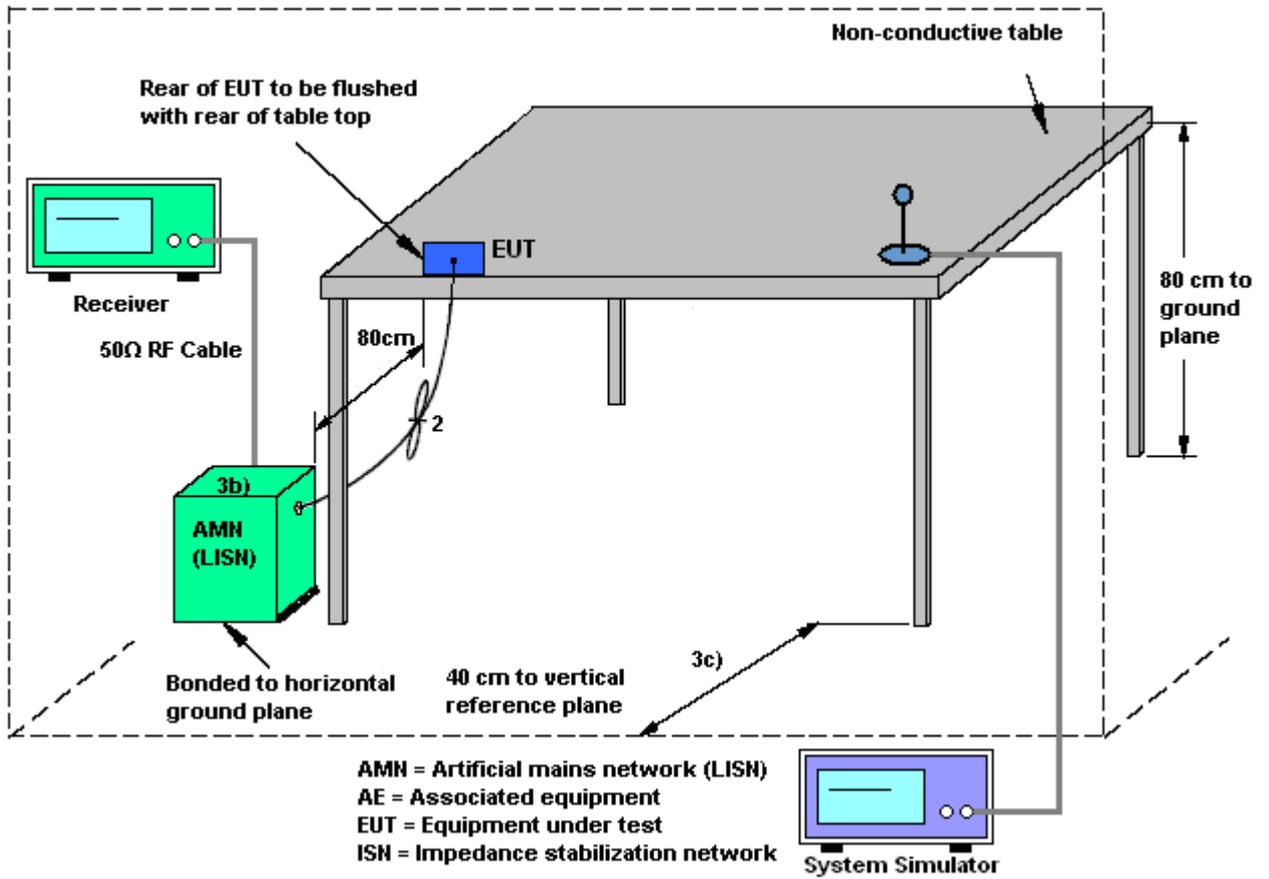
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

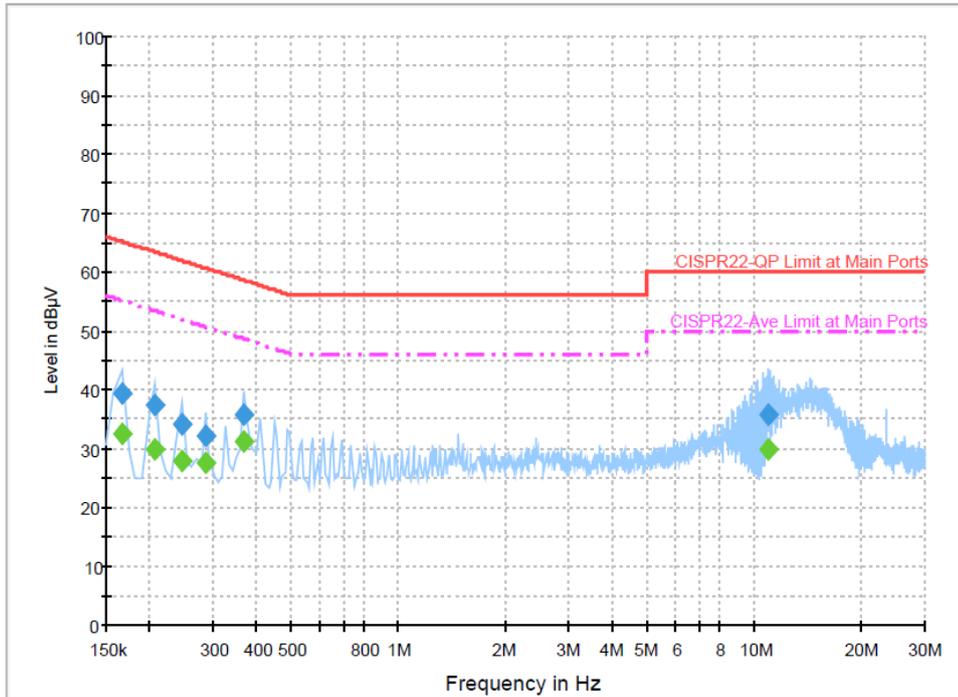
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

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



Final Result 1

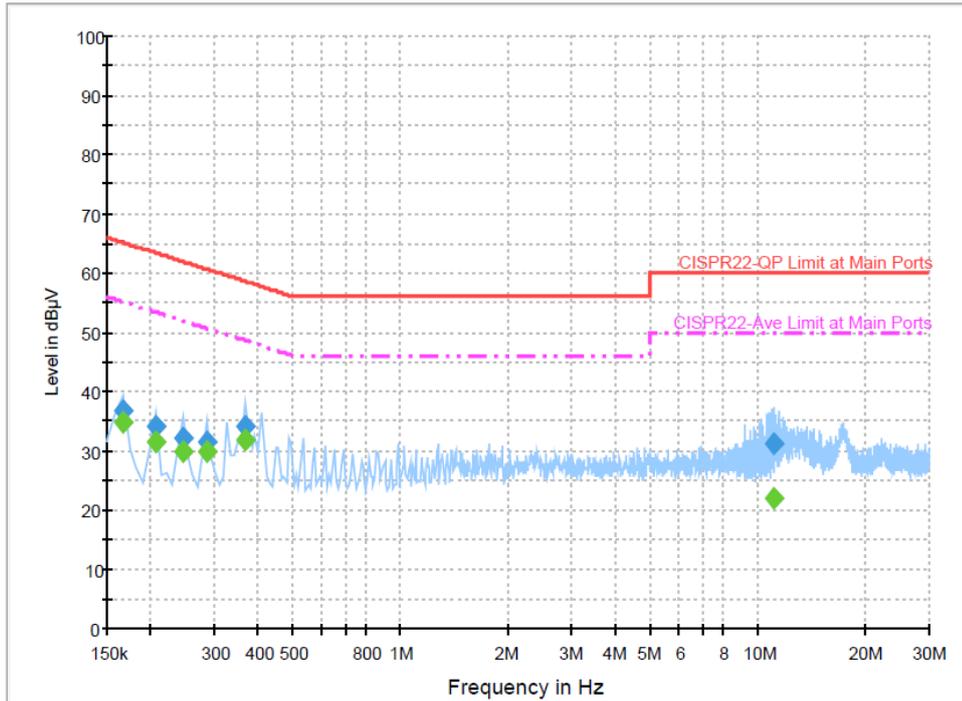
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	39.5	Off	L1	19.5	25.7	65.2
0.206000	37.5	Off	L1	19.6	25.9	63.4
0.246000	34.0	Off	L1	19.5	27.9	61.9
0.286000	32.3	Off	L1	19.4	28.3	60.6
0.366000	35.6	Off	L1	19.5	23.0	58.6
10.894000	35.8	Off	L1	19.6	24.2	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	32.5	Off	L1	19.5	22.7	55.2
0.206000	29.9	Off	L1	19.6	23.5	53.4
0.246000	27.7	Off	L1	19.5	24.2	51.9
0.286000	27.6	Off	L1	19.4	23.0	50.6
0.366000	31.1	Off	L1	19.5	17.5	48.6
10.894000	29.8	Off	L1	19.6	20.2	50.0



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + WLAN Link + Bluetooth Link + GPS Rx + USB Cable 1 (Charging from Adapter) + Earphone + Battery 1		
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)
0.166000	36.8	Off	N	19.5	28.4	65.2
0.206000	34.1	Off	N	19.5	29.3	63.4
0.246000	32.2	Off	N	19.5	29.7	61.9
0.286000	31.6	Off	N	19.4	29.0	60.6
0.366000	34.1	Off	N	19.4	24.5	58.6
11.014000	31.1	Off	N	19.6	28.9	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	34.7	Off	N	19.5	20.5	55.2
0.206000	31.4	Off	N	19.5	22.0	53.4
0.246000	29.8	Off	N	19.5	22.1	51.9
0.286000	29.8	Off	N	19.4	20.8	50.6
0.366000	31.9	Off	N	19.4	16.7	48.6
11.014000	22.0	Off	N	19.6	28.0	50.0

3.6 Radiated Emission Measurement

3.6.1 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

3.6.2 Measuring Instruments

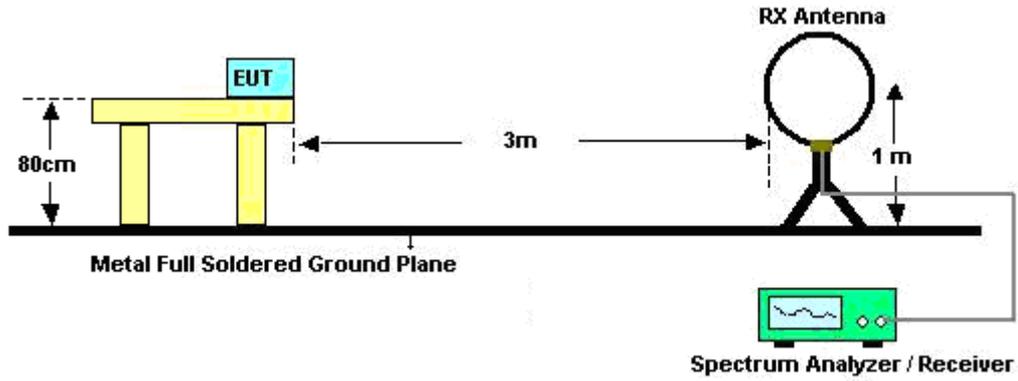
See list of measuring instruments of this test report.

3.6.3 Test Procedures

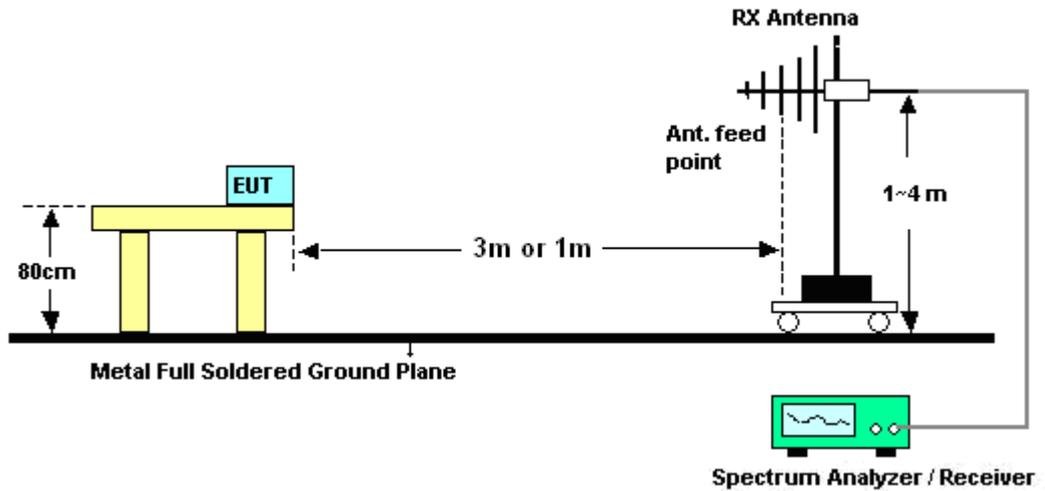
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto;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

3.6.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz





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

Test Engineer :	Kai Wang and Mac Lin	Temperature :	23~25°C	
		Relative Humidity :	42~45%	
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.



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

Test Mode :	Mode 1	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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
94.53	24.77	-18.73	43.5	45.73	9.61	1.13	31.7	-	-	Peak
147.45	24.57	-18.93	43.5	43.43	11.34	1.45	31.65	-	-	Peak
242.49	33.28	-12.72	46	51.06	11.84	1.89	31.51	100	107	Peak
687.8	23.41	-22.59	46	30.07	20.74	3.51	30.91	-	-	Peak
864.2	25.62	-20.38	46	29.46	22.84	4.02	30.7	-	-	Peak
996.5	28.27	-25.73	54	29.87	24.63	4.37	30.6	-	-	Peak
2387.14	60.33	-13.67	74	57.12	32.13	5.46	34.38	163	16	Peak
2387.14	49.19	-4.81	54	45.98	32.13	5.46	34.38	163	16	Average
2412	110.02	-	-	106.8	32.16	5.44	34.38	163	16	Peak
2412	101.54	-	-	98.32	32.16	5.44	34.38	163	16	Average
2494	53.4	-20.6	74	50.13	32.3	5.37	34.4	163	16	Peak
2494	39.88	-14.12	54	36.61	32.3	5.37	34.4	163	16	Average
7236	57.33	-16.67	74	46.65	35.9	9.88	35.1	141	348	Peak
7236	48.63	-5.37	54	37.95	35.9	9.88	35.1	141	348	Average
9648	42.02	-31.98	74	76.94	-10.09	10.74	35.57	100	0	Peak
12060	34.35	-39.65	74	67.01	-9.77	12.07	34.96	100	0	Peak



Test Mode :	Mode 1	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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	24.62	-15.38	40	36.72	18.95	0.65	31.7	100	189	Peak
70.77	24.26	-15.74	40	48.32	6.68	0.96	31.7	-	-	Peak
238.98	27.45	-18.55	46	45.73	11.37	1.87	31.52	-	-	Peak
517	20.31	-25.69	46	29.91	18.49	2.99	31.08	-	-	Peak
736.1	24.26	-21.74	46	30.09	21.34	3.66	30.83	-	-	Peak
926.5	26.35	-19.65	46	29.23	23.58	4.21	30.67	-	-	Peak
2385.81	57	-17	74	53.79	32.13	5.46	34.38	200	351	Peak
2385.81	45.93	-8.07	54	42.72	32.13	5.46	34.38	200	351	Average
2412	108.15	-	-	104.93	32.16	5.44	34.38	200	351	Peak
2412	99.2	-	-	95.98	32.16	5.44	34.38	200	351	Average
2500	51.35	-22.65	74	48.08	32.3	5.37	34.4	200	351	Peak
2500	38.19	-15.81	54	34.92	32.3	5.37	34.4	200	351	Average
7236	56.21	-17.79	74	45.53	35.9	9.88	35.1	100	269	Peak
7236	47.8	-6.2	54	37.12	35.9	9.88	35.1	100	269	Average
9648	39.99	-34.01	74	74.91	-10.09	10.74	35.57	100	0	Peak
12060	33.69	-40.31	74	66.35	-9.77	12.07	34.96	100	0	Peak



Test Mode :	Mode 2	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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
69.69	21.58	-18.42	40	45.73	6.59	0.96	31.7	-	-	Peak
95.61	24.68	-18.82	43.5	45.48	9.76	1.14	31.7	-	-	Peak
237.9	30.97	-15.03	46	49.37	11.25	1.87	31.52	100	109	Peak
449.8	19.1	-26.9	46	30.29	17.15	2.81	31.15	-	-	Peak
685.7	22.75	-23.25	46	29.42	20.73	3.51	30.91	-	-	Peak
904.1	26.27	-19.73	46	29.56	23.24	4.17	30.7	-	-	Peak
2358	56.56	-17.44	74	53.36	32.08	5.49	34.37	162	16	Peak
2358	46.32	-7.68	54	43.12	32.08	5.49	34.37	162	16	Average
2437	110.36	-	-	107.13	32.19	5.43	34.39	162	16	Peak
2437	101.89	-	-	98.65	32.22	5.41	34.39	162	16	Average
2484	55.49	-18.51	74	52.24	32.27	5.38	34.4	162	16	Peak
2484	42.89	-11.11	54	39.64	32.27	5.38	34.4	162	16	Average
7311	56.5	-17.5	74	45.91	35.9	9.81	35.12	120	349	Peak
7311	47.52	-6.48	54	36.93	35.9	9.81	35.12	120	349	Average
9748	40.47	-33.53	74	75.05	-9.85	10.82	35.55	100	0	Peak
12185	31.81	-42.19	74	64.72	-10.25	12.19	34.85	100	0	Peak



Test Mode :	Mode 2	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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	24.62	-15.38	40	36.72	18.95	0.65	31.7	100	193	Peak
70.77	24.44	-15.56	40	48.5	6.68	0.96	31.7	-	-	Peak
85.62	22.31	-17.69	40	44.72	8.23	1.06	31.7	-	-	Peak
567.4	21.12	-24.88	46	29.55	19.45	3.15	31.03	-	-	Peak
769	25.12	-20.88	46	30.33	21.79	3.76	30.76	-	-	Peak
940.5	26.63	-19.37	46	29.25	23.8	4.24	30.66	-	-	Peak
2358	55.01	-18.99	74	51.81	32.08	5.49	34.37	200	345	Peak
2358	39.54	-14.46	54	36.34	32.08	5.49	34.37	200	345	Average
2437	107.74	-	-	104.5	32.22	5.41	34.39	200	345	Peak
2437	98.8	-	-	95.56	32.22	5.41	34.39	200	345	Average
2500	52.91	-21.09	74	49.64	32.3	5.37	34.4	200	345	Peak
2500	38.71	-15.29	54	35.44	32.3	5.37	34.4	200	345	Average
7311	55.57	-18.43	74	44.98	35.9	9.81	35.12	100	270	Peak
7311	46.81	-7.19	54	36.22	35.9	9.81	35.12	100	270	Average
9748	38.03	-35.97	74	72.64	-9.87	10.81	35.55	100	0	Peak
12185	31.72	-42.28	74	64.63	-10.25	12.19	34.85	100	0	Peak



Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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
70.77	21.69	-18.31	40	45.75	6.68	0.96	31.7	-	-	Peak
149.61	29.63	-13.87	43.5	48.57	11.25	1.46	31.65	100	218	Peak
241.14	30.16	-15.84	46	48.07	11.72	1.89	31.52	-	-	Peak
621.3	22.82	-23.18	46	30.25	20.23	3.32	30.98	-	-	Peak
800.5	25.46	-20.54	46	30.09	22.22	3.85	30.7	-	-	Peak
926.5	26.07	-19.93	46	28.95	23.58	4.21	30.67	-	-	Peak
2366	56.12	-17.88	74	52.92	32.08	5.49	34.37	190	7	Peak
2366	43.82	-10.18	54	40.62	32.08	5.49	34.37	190	7	Average
2462	109.69	-	-	106.44	32.24	5.4	34.39	190	7	Peak
2462	100.6	-	-	97.35	32.24	5.4	34.39	190	7	Average
2483.66	59.16	-14.84	74	55.91	32.27	5.38	34.4	190	7	Peak
2483.66	45.07	-8.93	54	41.82	32.27	5.38	34.4	190	7	Average
7386	58.21	-15.79	74	47.74	35.9	9.73	35.16	139	348	Peak
7386	49.47	-4.53	54	39	35.9	9.73	35.16	139	348	Average
9848	38.88	-35.12	74	73.15	-9.63	10.89	35.53	100	0	Peak
12310	31.87	-42.13	74	64.96	-10.65	12.31	34.75	100	0	Peak



Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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	24.35	-15.65	40	36.45	18.95	0.65	31.7	-	-	Peak
71.58	24.63	-15.37	40	48.59	6.77	0.97	31.7	100	206	Peak
84.81	22.46	-17.54	40	44.87	8.23	1.06	31.7	-	-	Peak
531	21.06	-24.94	46	30.35	18.75	3.03	31.07	-	-	Peak
746.6	24.09	-21.91	46	29.73	21.48	3.69	30.81	-	-	Peak
948.9	26.81	-19.19	46	29.29	23.91	4.26	30.65	-	-	Peak
2380	53.99	-20.01	74	50.79	32.11	5.47	34.38	167	359	Peak
2380	41	-13	54	37.8	32.11	5.47	34.38	167	359	Average
2462	107	-	-	103.75	32.24	5.4	34.39	167	359	Peak
2462	98.34	-	-	95.09	32.24	5.4	34.39	167	359	Average
2489.17	57.47	-16.53	74	54.22	32.27	5.38	34.4	167	359	Peak
2489.17	44.71	-9.29	54	41.44	32.3	5.37	34.4	167	359	Average
7386	55.81	-18.19	74	45.34	35.9	9.73	35.16	100	268	Peak
7386	46.52	-7.48	54	36.05	35.9	9.73	35.16	100	268	Average
9848	37.21	-36.79	74	71.48	-9.63	10.89	35.53	100	0	Peak
12310	30.78	-43.22	74	63.87	-10.65	12.31	34.75	100	0	Peak



Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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	23	-17	40	34.55	19.51	0.64	31.7	-	-	Peak
70.77	21.6	-18.4	40	45.66	6.68	0.96	31.7			Peak
238.98	30.58	-15.42	46	48.86	11.37	1.87	31.52	100	139	Peak
424.6	23.99	-22.01	46	35.84	16.63	2.7	31.18	-	-	Peak
777.4	24.62	-21.38	46	29.67	21.91	3.78	30.74	-	-	Peak
937	27.12	-18.88	46	29.81	23.74	4.23	30.66	-	-	Peak
2389.99	70.57	-3.43	74	67.36	32.13	5.46	34.38	165	359	Peak
2389.99	53.86	-0.14	54	50.65	32.13	5.46	34.38	165	359	Average
2412	107.73	-	-	104.51	32.16	5.44	34.38	165	359	Peak
2412	94.12	-	-	90.9	32.16	5.44	34.38	165	359	Average
2492	52.9	-21.1	74	49.63	32.3	5.37	34.4	165	359	Peak
2492	39.5	-14.5	54	36.23	32.3	5.37	34.4	165	359	Average
7209	55.71	-18.29	74	44.98	35.9	9.91	35.08	100	129	Peak
7209	43.29	-10.71	54	32.56	35.9	9.91	35.08	100	129	Average



Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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	24.44	-15.56	40	35.99	19.51	0.64	31.7	100	218	Peak
70.77	24.32	-15.68	40	48.38	6.68	0.96	31.7	-	-	Peak
85.89	22.31	-17.69	40	44.58	8.36	1.07	31.7	-	-	Peak
495.3	20.48	-25.52	46	30.58	18.08	2.92	31.1	-	-	Peak
736.1	26.84	-19.16	46	32.67	21.34	3.66	30.83	-	-	Peak
925.8	26.27	-19.73	46	29.15	23.58	4.21	30.67	-	-	Peak
2389.99	66.9	-7.1	74	63.69	32.13	5.46	34.38	200	351	Peak
2389.99	50.79	-3.21	54	47.58	32.13	5.46	34.38	200	351	Average
2412	105.62	-	-	102.4	32.16	5.44	34.38	200	351	Peak
2412	91.81	-	-	88.59	32.16	5.44	34.38	200	351	Average
2484	52.15	-21.85	74	48.9	32.27	5.38	34.4	200	351	Peak
2484	37.8	-16.2	54	34.55	32.27	5.38	34.4	200	351	Average
8913	55.6	-18.4	74	44.43	36.24	10.31	35.38	100	306	Peak
8913	43.35	-10.65	54	32.18	36.24	10.31	35.38	100	306	Average



Test Mode :	Mode 5	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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
70.77	21.51	-18.49	40	45.57	6.68	0.96	31.7	-	-	Peak
147.45	25.17	-18.33	43.5	44.03	11.34	1.45	31.65	-	-	Peak
242.49	28.99	-17.01	46	46.77	11.84	1.89	31.51	100	169	Peak
665.4	22.75	-23.25	46	29.66	20.57	3.45	30.93	-	-	Peak
813.8	25.35	-20.65	46	29.82	22.35	3.88	30.7	-	-	Peak
943.3	26.97	-19.03	46	29.54	23.84	4.25	30.66	-	-	Peak
2356	56.58	-17.42	74	53.38	32.08	5.49	34.37	192	357	Peak
2356	41.95	-12.05	54	38.75	32.08	5.49	34.37	192	357	Average
2437	107.06	-	-	103.82	32.22	5.41	34.39	192	357	Peak
2437	94.05	-	-	90.81	32.22	5.41	34.39	192	357	Average
2484	53.48	-20.52	74	50.23	32.27	5.38	34.4	192	357	Peak
2484	39.15	-14.85	54	35.9	32.27	5.38	34.4	192	357	Average
7533	55.31	-18.69	74	44.97	35.91	9.64	35.21	100	137	Peak
7533	43.1	-10.9	54	32.76	35.91	9.64	35.21	100	137	Average



Test Mode :	Mode 5	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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
30.54	24.48	-15.52	40	36.58	18.95	0.65	31.7	100	281	Peak
70.77	24.45	-15.55	40	48.51	6.68	0.96	31.7	-	-	Peak
85.62	22.61	-17.39	40	45.02	8.23	1.06	31.7	-	-	Peak
584.2	22.38	-23.62	46	30.44	19.76	3.2	31.02	-	-	Peak
769.7	24.53	-21.47	46	29.73	21.8	3.76	30.76	-	-	Peak
917.4	26.28	-19.72	46	29.32	23.44	4.2	30.68	-	-	Peak
2356	53.62	-20.38	74	50.42	32.08	5.49	34.37	180	357	Peak
2356	40.2	-13.8	54	37	32.08	5.49	34.37	180	357	Average
2437	106.51	-	-	103.27	32.22	5.41	34.39	180	357	Peak
2437	93.19	-	-	89.95	32.22	5.41	34.39	180	357	Average
2486	53.84	-20.16	74	50.59	32.27	5.38	34.4	180	357	Peak
2486	38.1	-15.9	54	34.85	32.27	5.38	34.4	180	357	Average
7878	55.45	-18.55	74	44.96	35.98	9.79	35.28	100	293	Peak
7878	43.06	-10.94	54	32.57	35.98	9.79	35.28	100	293	Average



Test Mode :	Mode 6	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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
30	22.55	-17.45	40	34.1	19.51	0.64	31.7	100	125	Peak
70.77	21.37	-18.63	40	45.43	6.68	0.96	31.7	-	-	Peak
238.17	28.07	-17.93	46	46.35	11.37	1.87	31.52	-	-	Peak
528.9	21.97	-24.03	46	31.3	18.71	3.03	31.07	-	-	Peak
758.5	24.77	-21.23	46	30.18	21.64	3.73	30.78	-	-	Peak
934.9	26.97	-19.03	46	29.7	23.71	4.23	30.67	-	-	Peak
2382	56.61	-17.39	74	53.41	32.11	5.47	34.38	107	5	Peak
2382	42.3	-11.7	54	39.1	32.11	5.47	34.38	107	5	Average
2462	106.53	-	-	103.28	32.24	5.4	34.39	107	5	Peak
2462	92.61	-	-	89.36	32.24	5.4	34.39	107	5	Average
2483.5	69.6	-4.4	74	66.35	32.27	5.38	34.4	107	5	Peak
2483.5	53.68	-0.32	54	50.43	32.27	5.38	34.4	107	5	Average
8877	55.55	-18.45	74	44.4	36.22	10.3	35.37	100	173	Peak
8877	43.28	-10.72	54	32.13	36.22	10.3	35.37	100	173	Average



Test Mode :	Mode 6	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	42~45%
Test Engineer :	Kai Wang and Mac Lin	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	24.32	-15.68	40	35.87	19.51	0.64	31.7	130	100	Peak
70.77	24.26	-15.74	40	48.32	6.68	0.96	31.7	-	-	Peak
240.33	25.55	-20.45	46	43.59	11.6	1.88	31.52	-	-	Peak
377	17.83	-28.17	46	31.07	15.52	2.48	31.24	-	-	Peak
564.6	21.54	-24.46	46	30.05	19.39	3.14	31.04	-	-	Peak
864.9	25.65	-20.35	46	29.49	22.84	4.02	30.7	-	-	Peak
2382	53.55	-20.45	74	50.35	32.11	5.47	34.38	179	360	Peak
2382	41.05	-12.95	54	37.85	32.11	5.47	34.38	179	360	Average
2462	105.96	-	-	102.71	32.24	5.4	34.39	179	360	Peak
2462	92.04	-	-	88.79	32.24	5.4	34.39	179	360	Average
2483.5	66.32	-7.68	74	63.07	32.27	5.38	34.4	179	360	Peak
2483.5	50.88	-3.12	54	47.63	32.27	5.38	34.4	179	360	Average
7449	55.52	-18.48	74	45.12	35.9	9.68	35.18	100	106	Peak
7449	43.41	-10.59	54	33.01	35.9	9.68	35.18	100	106	Average



3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Connected Construction

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

3.7.3 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, 2010	Mar. 26, 2011	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 $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	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 $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	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 $\Gamma_1 = 0.197$ 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
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP041539 as below.