

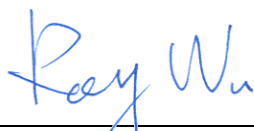
FCC RF Test Report

APPLICANT : Getac Technology Corporation
EQUIPMENT : PDA
BRAND NAME : (1) Getac
(2) Topcon
(3) Sokkia
MODEL NAME : (1) PS535F, PS535F-Lite
(2) FC-25A, FC-25
(3) SHC25A, SHC25
FCC ID : QYLPS535F
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Apr. 01, 2010 and completely tested on Apr. 19, 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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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR832813-03A	Rev. 01	Initial issue of report	Apr. 23, 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	$\geq 0.5\text{MHz}$	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 14.5 dB at 0.198 MHz
3.6	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.09 dB at 2483.50 MHz
3.7	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

Getac Technology Corporation

5F., Building A, No. 209, Sec.1, Nangang Rd., Nangang Dist., Taipei City 11568, Taiwan, R.O.C.

1.2 Manufacturer

GeTAC Technology(Kunshan)Co., LTD.

No. 269, 2nd Road, Export Processing Zone, Changjiang South Road, Kunshan, Jiangsu, P.R.C.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	PDA
Brand Name	(1) Getac (2) Topcon (3) Sokkia
Model Name	(1) PS535F, PS535F-Lite (2) FC-25A, FC-25 (3) SHC25A, SHC25
FCC ID	QYLPS535F
Sample A	PDA with Camera (Brand and Model Names are as follows: Getac PS535F / Topcon FC-25A / Sokkia SHC25A)
Sample B	PDA without Camera (Brand and Model Names are as follows: Getac PS535F-Lite / Topcon FC-25 / Sokkia SHC25)
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 : 17.90 dBm (61.66 mW) 802.11g : 21.21 dBm (132.13 mW)
Antenna Type	PIFA Antenna with gain 2.109 dBi
HW Version	R01
SW Version	G1.33.022
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

Remark:

1. Sample A and Sample B are almost the same. The difference between them is camera function only. Sample A has camera function, but Sample B doesn't.
2. For other wireless features of this EUT, test report will be issued separately.
3. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
4. 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.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	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	17.90	17.81	15.99	17.25
CH 06	2437 MHz	16.96	17.62	16.08	16.82
CH 11	2462 MHz	17.50	17.80	15.65	16.25

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	20.92	20.68	20.82	20.48	20.81	20.78	20.83	20.64
CH 06	2437 MHz	20.90	20.94	20.57	20.14	20.65	20.79	20.17	20.22
CH 11	2462 MHz	21.21	20.92	20.75	20.27	21.19	20.96	20.50	20.55

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.

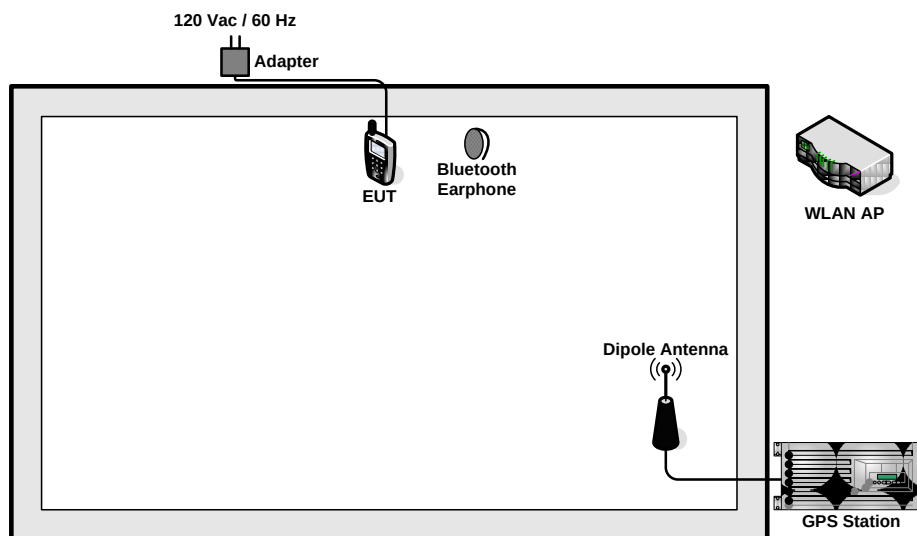
2.2 Test Mode

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.

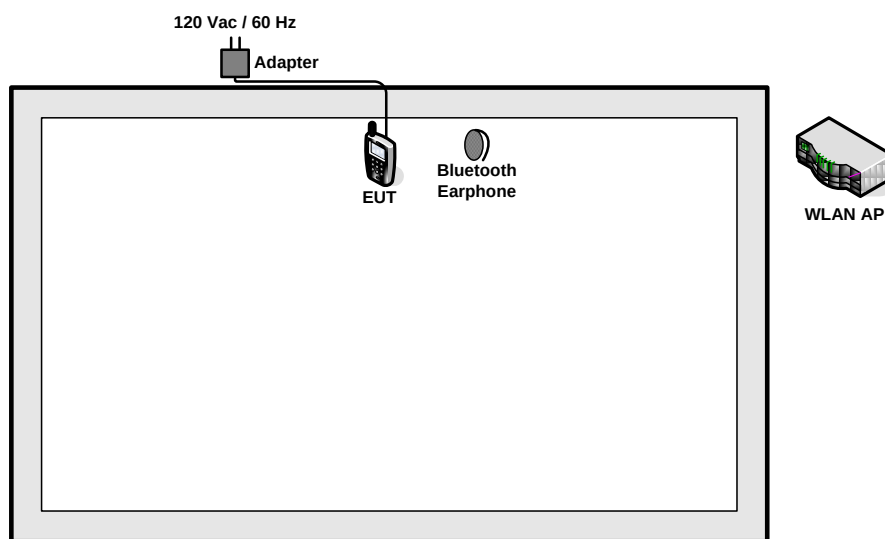
Test Cases		
Test Item	802.11b	802.11g
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz for Sample A	Mode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

2.3 Connection Diagram of Test System

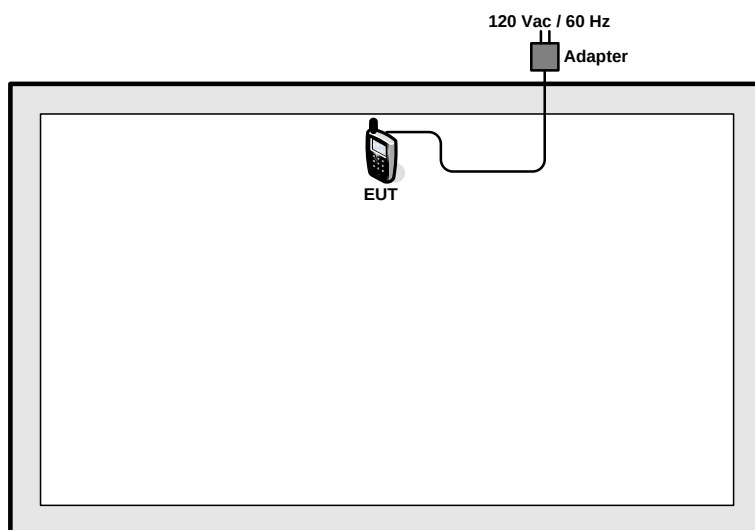
<EUT with WLAN Link, Bluetooth Link, GPS Rx, and Adapter Mode>



<EUT with WLAN Link, Bluetooth Link, and Adapter Mode>



<WLAN Tx Mode>



2.4 RF Utility

The programmed RF utility, "MyLabTool(wm61)" 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.

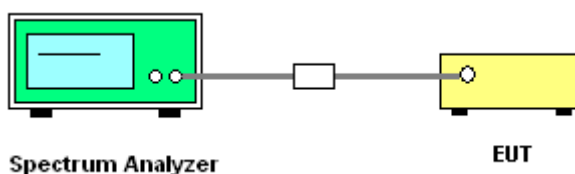
3.1.2 Measuring Instruments

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

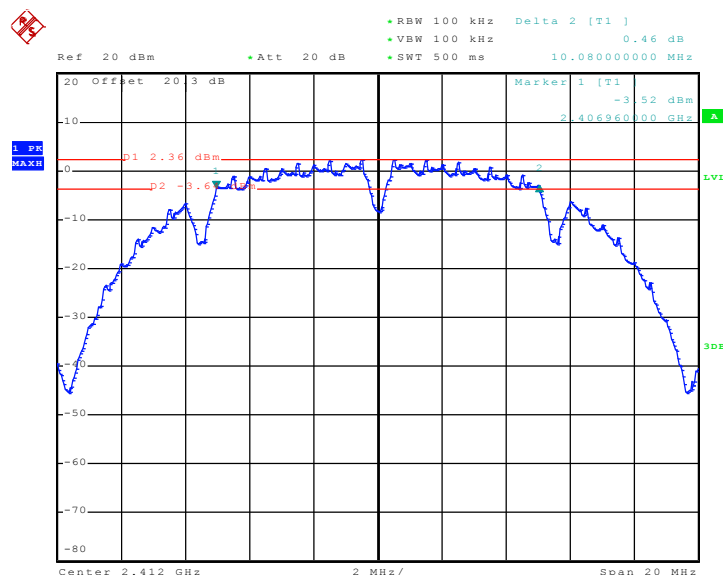


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	23~25℃
Test Engineer :	Andy Yeh	Relative Humidity :	39~42%

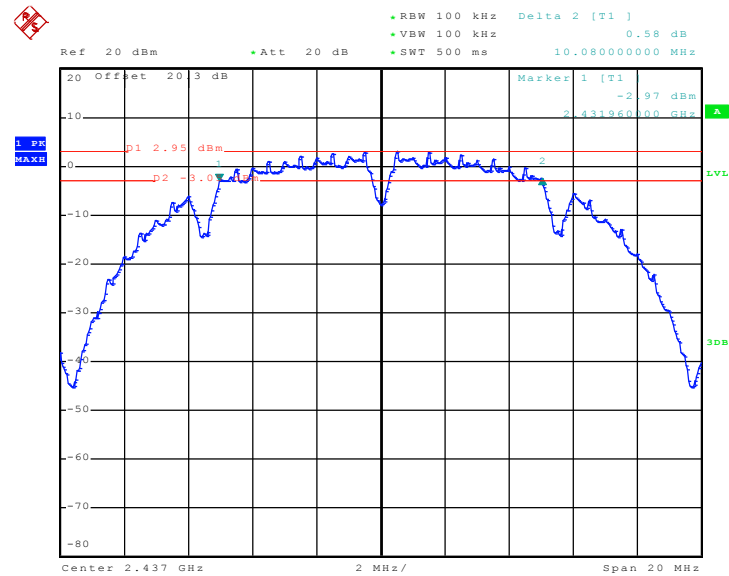
Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	10.08	0.5	Pass
06	2437	10.08	0.5	Pass
11	2462	10.08	0.5	Pass

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



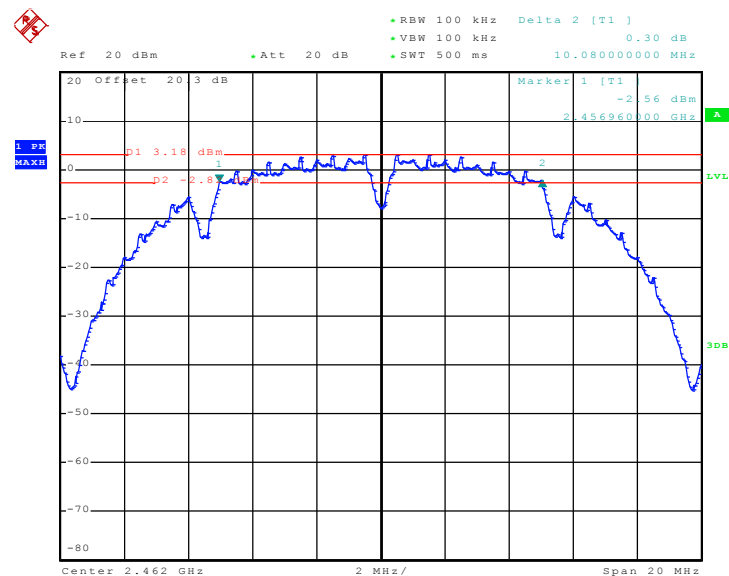
Date: 14.APR.2010 00:10:00

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



Date: 14.APR.2010 00:11:07

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



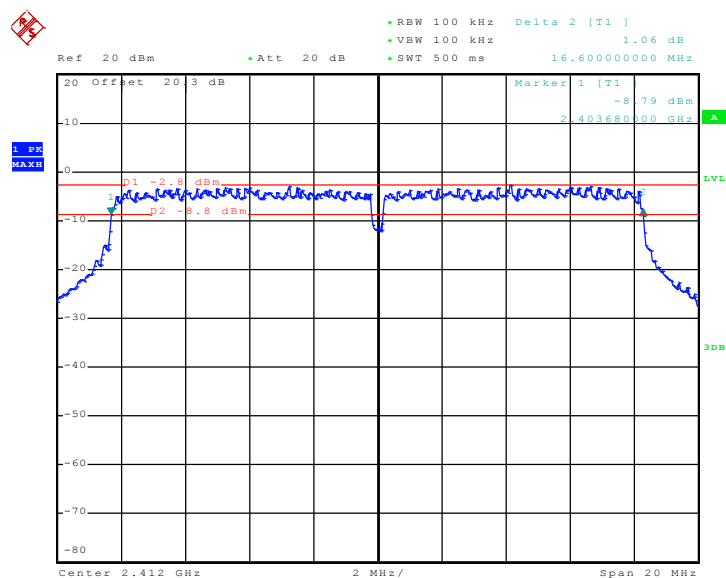
Date: 14.APR.2010 00:12:17



Test Mode :	Mode 4, 5, 6	Temperature :	23~25°C
Test Engineer :	Andy Yeh	Relative Humidity :	39~42%

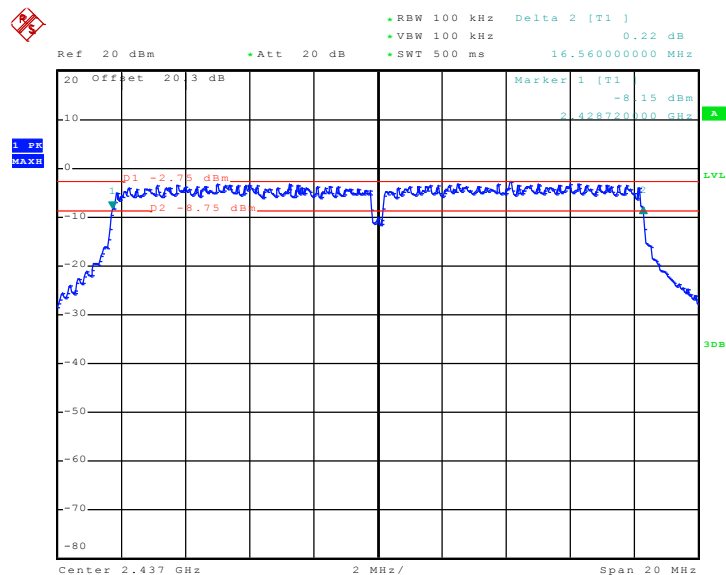
Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.60	0.5	Pass
06	2437	16.56	0.5	Pass
11	2462	16.56	0.5	Pass

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



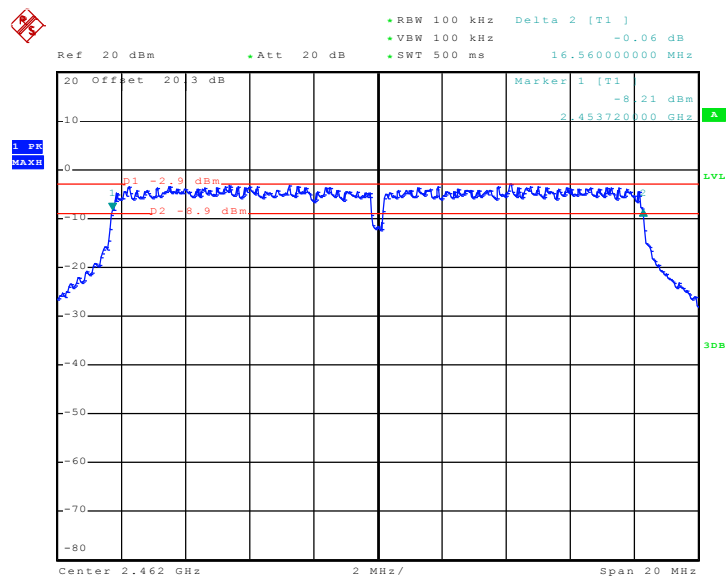
Date: 14.APR.2010 00:20:11

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



Date: 14.APR.2010 00:23:26

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



Date: 14.APR.2010 00:24:34

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.

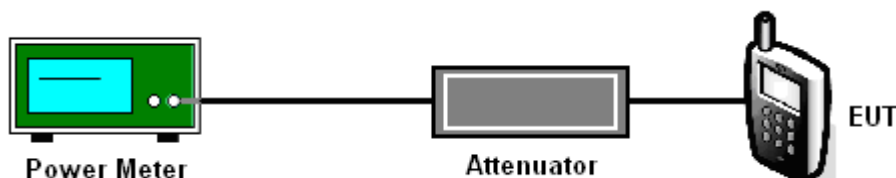
3.2.2 Measuring Instruments

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 :	23~25℃
Test Engineer :	Andy Yeh	Relative Humidity :	39~42%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	17.90	30	Pass
06	2437	16.96	30	Pass
11	2462	17.50	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	23~25℃
Test Engineer :	Andy Yeh	Relative Humidity :	39~42%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	20.92	30	Pass
06	2437	20.90	30	Pass
11	2462	21.21	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

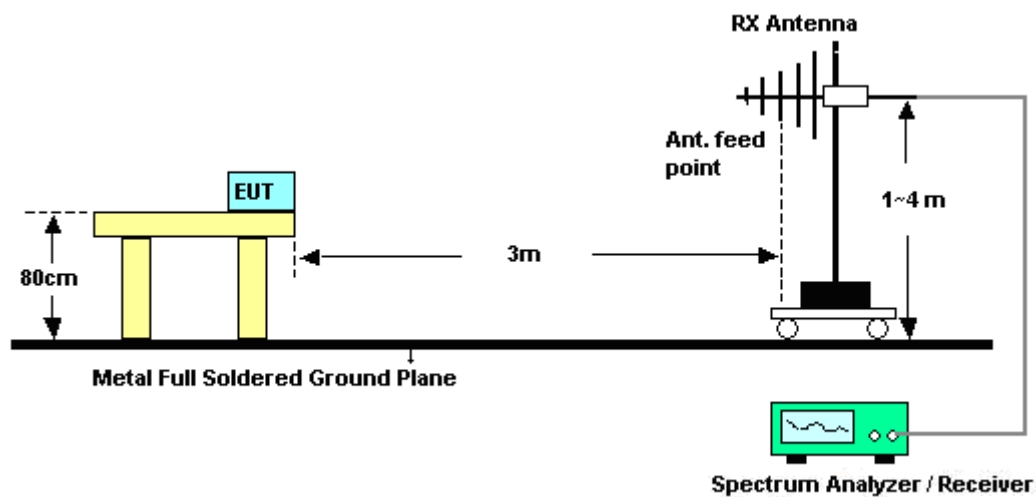
See list of measuring instruments of this test report.

3.3.3 Test Procedures

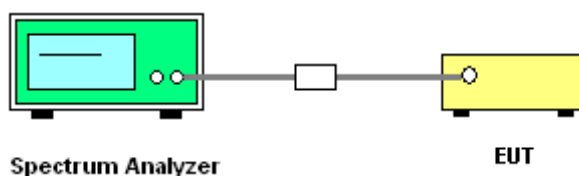
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	23~24℃
Test Band :	802.11b	Relative Humidity :	48~51%
Test Channel :	01	Test Engineer :	Cona Huang

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
2381.82	51.84	-22.16	74.00	48.41	32.11	5.47	34.15	100	351	Peak
2381.82	39.03	-14.97	54.00	35.60	32.11	5.47	34.15	100	351	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
2386.57	51.95	-22.05	74.00	48.51	32.13	5.46	34.15	100	63	Peak
2386.57	40.22	-13.78	54.00	36.78	32.13	5.46	34.15	100	63	Average

Test Mode :	Mode 3	Temperature :	23~24℃
Test Band :	802.11b	Relative Humidity :	48~51%
Test Channel :	11	Test Engineer :	Cona Huang

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
2485.18	53.35	-20.65	74.00	49.89	32.27	5.38	34.19	100	338	Peak
2485.18	40.83	-13.17	54.00	37.37	32.27	5.38	34.19	100	338	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
2485.94	52.26	-21.74	74.00	48.80	32.27	5.38	34.19	100	55	Peak
2485.94	39.39	-14.61	54.00	35.93	32.27	5.38	34.19	100	55	Average



Test Mode :	Mode 4	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	48~51%
Test Channel :	01	Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.85	61.00	-13.00	74.00	57.56	32.13	5.46	34.15	100	350	Peak
2388.85	42.19	-11.81	54.00	38.75	32.13	5.46	34.15	100	350	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
2388.85	61.74	-12.26	74.00	58.30	32.13	5.46	34.15	100	63	Peak
2388.85	43.46	-10.54	54.00	40.02	32.13	5.46	34.15	100	63	Average

Test Mode :	Mode 6	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	48~51%
Test Channel :	11	Test Engineer :	Cona Huang

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	63.93	-10.07	74.00	60.47	32.27	5.38	34.19	100	338	Peak
2483.50	45.36	-8.64	54.00	41.90	32.27	5.38	34.19	100	338	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	63.05	-10.95	74.00	59.59	32.27	5.38	34.19	100	57	Peak
2483.50	43.25	-10.75	54.00	39.79	32.27	5.38	34.19	100	57	Average



Test Mode :	Mode 7	Temperature :	23~24°C
Test Band :	802.11g	Relative Humidity :	48~51%
Test Channel :	11	Test Engineer :	Cona Huang

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	64.13	-9.87	74.00	60.67	32.27	5.38	34.19	110	320	Peak
2483.50	46.91	-7.09	54.00	43.45	32.27	5.38	34.19	110	320	Average

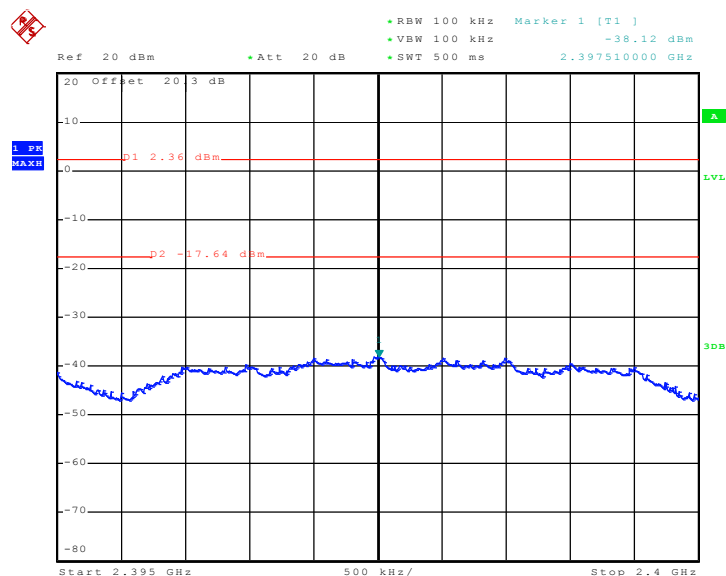
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	57.30	-16.70	74.00	53.84	32.27	5.38	34.19	100	69	Peak
2483.50	40.13	-13.87	54.00	36.67	32.27	5.38	34.19	100	69	Average



3.3.6 Test Plots of Conducted Band Edges

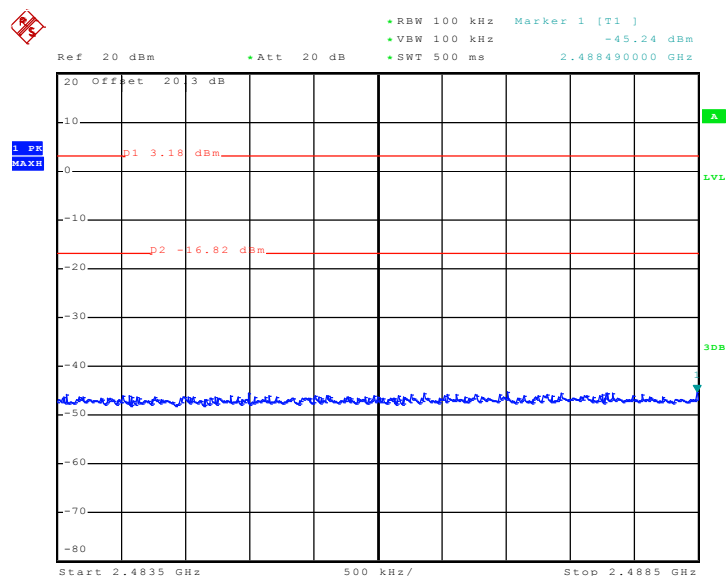
Test Mode :	Mode 1 and 3	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	39~42%
Test Channel :	01 and 11	Test Engineer :	Andy Yeh

Low Band Edge Plot on 802.11b Channel 01



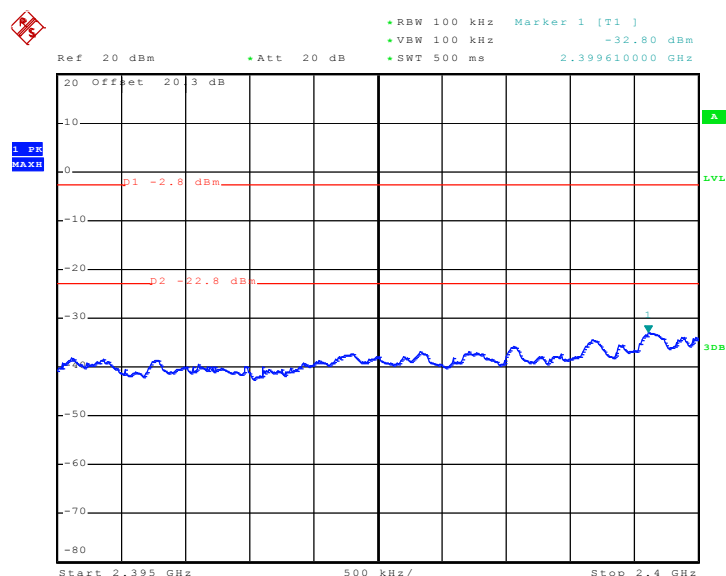
Date: 14.APR.2010 00:17:06

High Band Edge Plot on 802.11b Channel 11

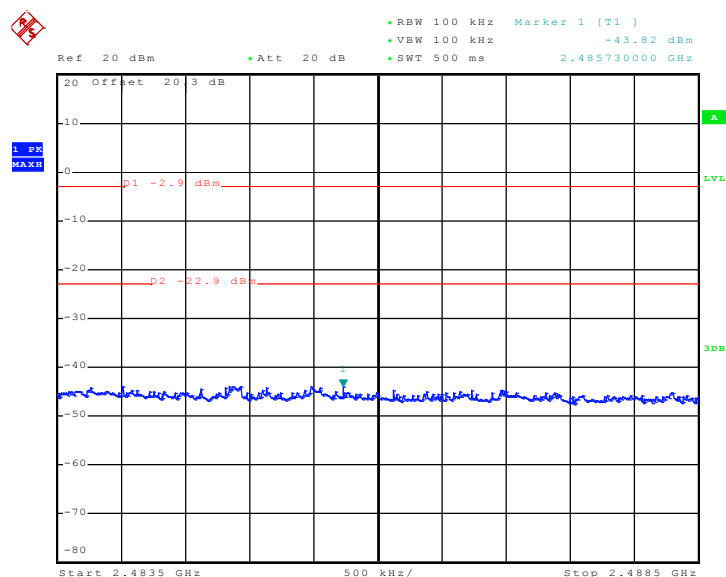


Date: 14.APR.2010 00:13:47

Test Mode :	Mode 4 and 6	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	39~42%
Test Channel :	01 and 11	Test Engineer :	Andy Yeh

Low Band Edge Plot on 802.11g Channel 01


Date: 14.APR.2010 00:21:02

High Band Edge Plot on 802.11g Channel 11


Date: 14.APR.2010 00:26:05

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.

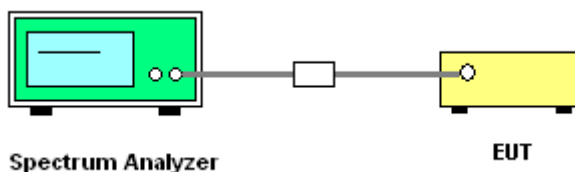
3.4.2 Measuring Instruments

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

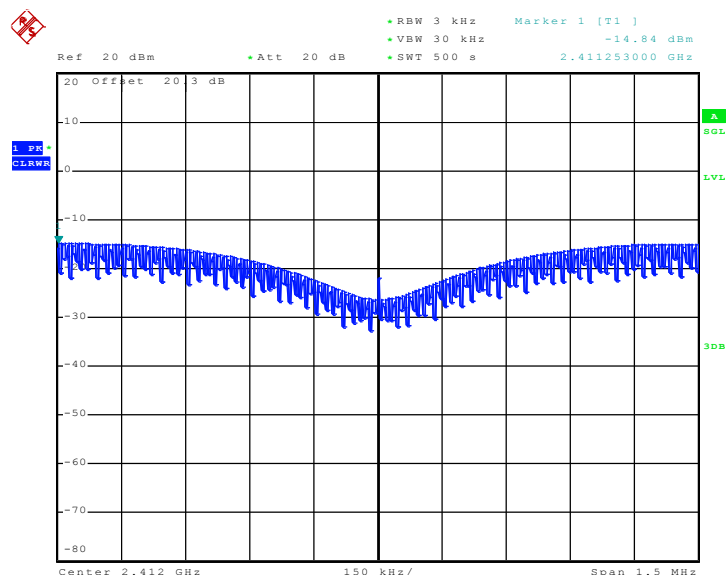


3.4.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	23~25℃
Test Engineer :	Andy Yeh	Relative Humidity :	39~42%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-14.84	8	Pass
06	2437	-15.03	8	Pass
11	2462	-15.18	8	Pass

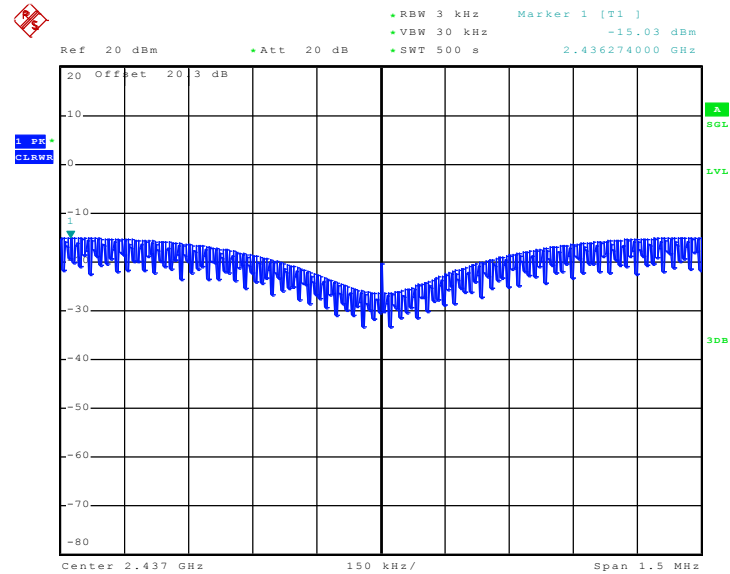
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 14.APR.2010 01:11:11

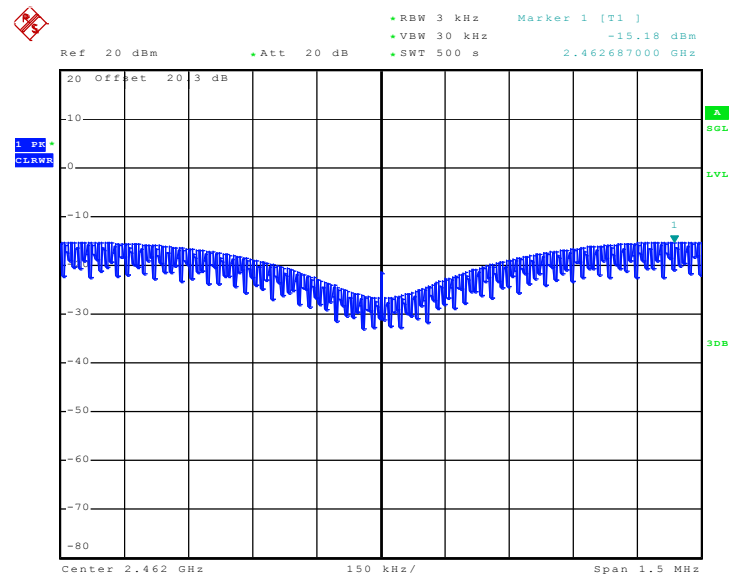


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 14.APR.2010 01:21:56

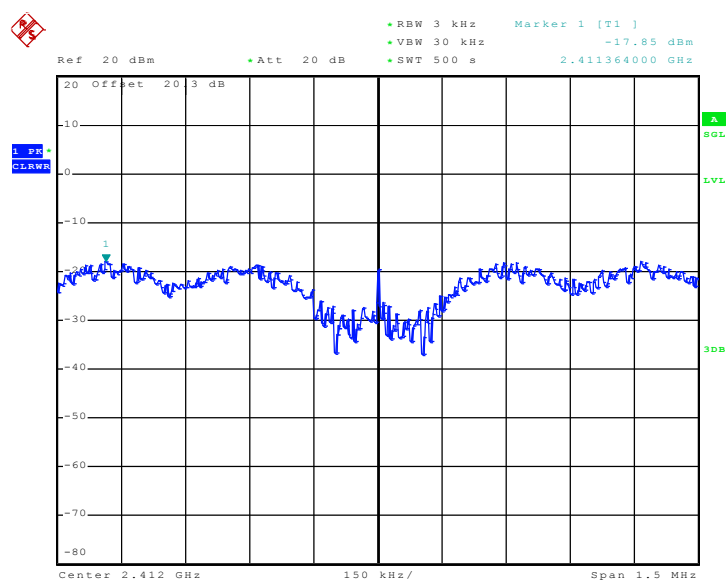
Mode 3 : PSD Plot on 802.11b Channel 11



Date: 14.APR.2010 01:30:57

Test Mode :	Mode 4, 5, 6	Temperature :	23~25℃
Test Engineer :	Andy Yeh	Relative Humidity :	39~42%

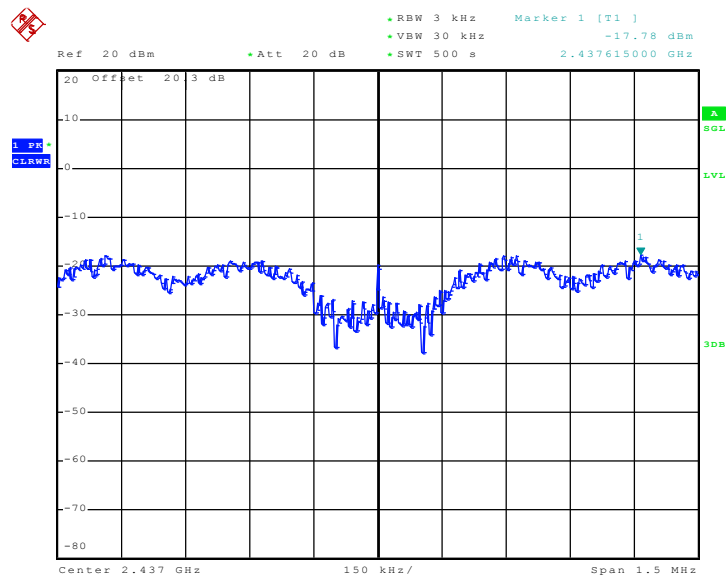
Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-17.85	8	Pass
06	2437	-17.78	8	Pass
11	2462	-17.96	8	Pass

Mode 4 : PSD Plot on 802.11g Channel 01


Date: 14.APR.2010 01:59:04

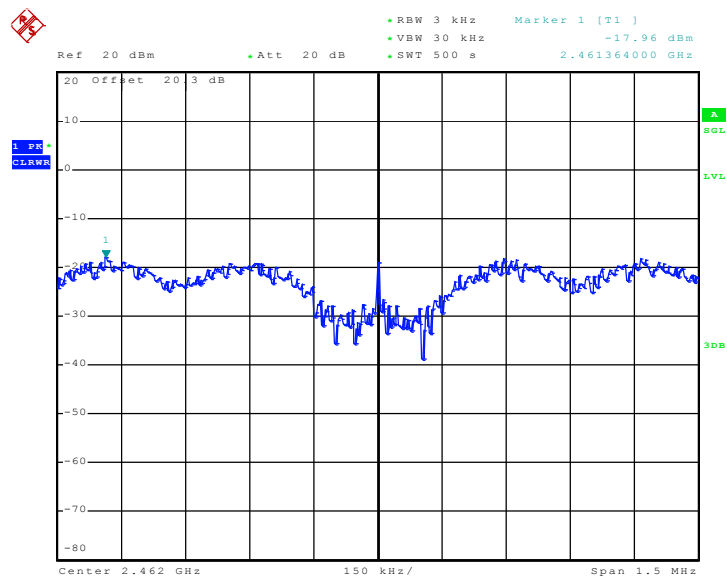


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 14.APR.2010 01:50:07

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 14.APR.2010 01:40:10

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.

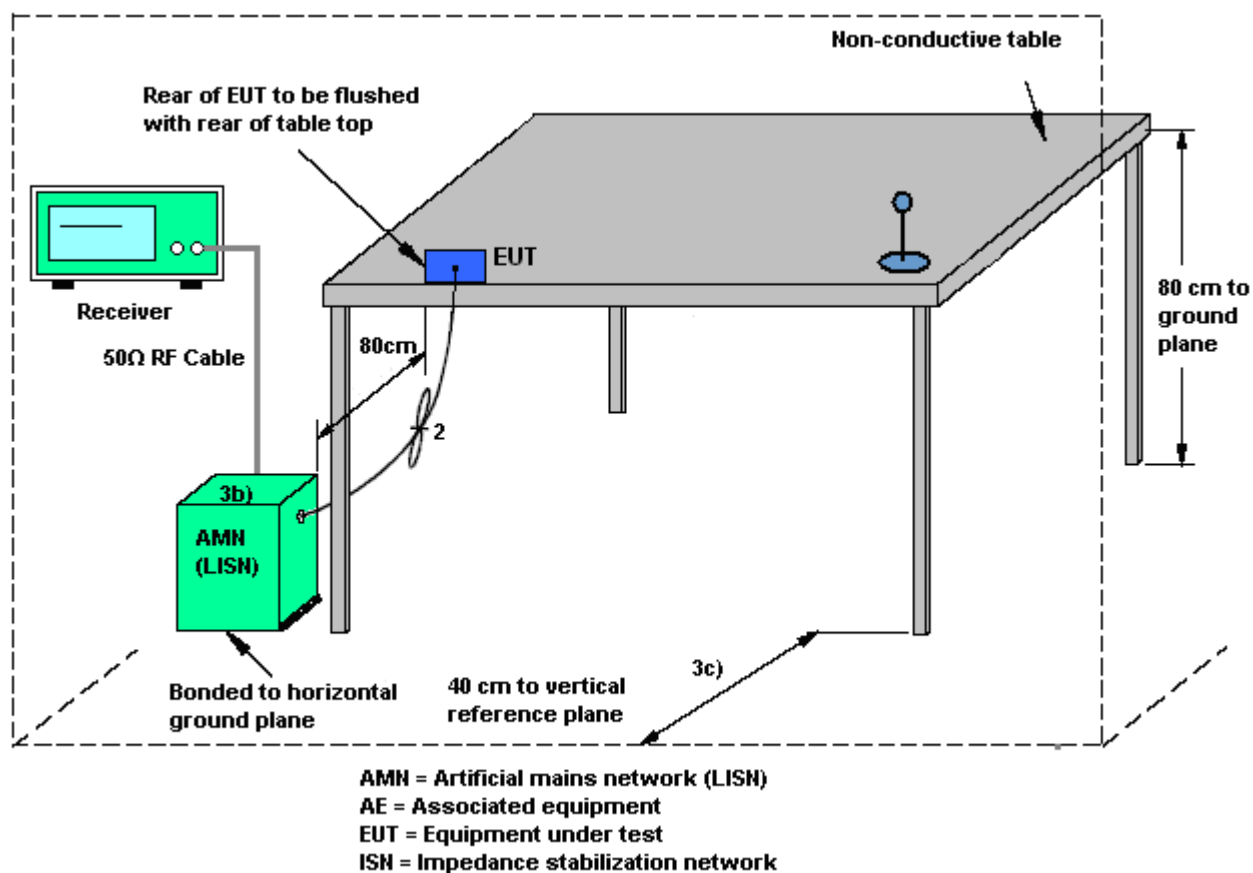
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

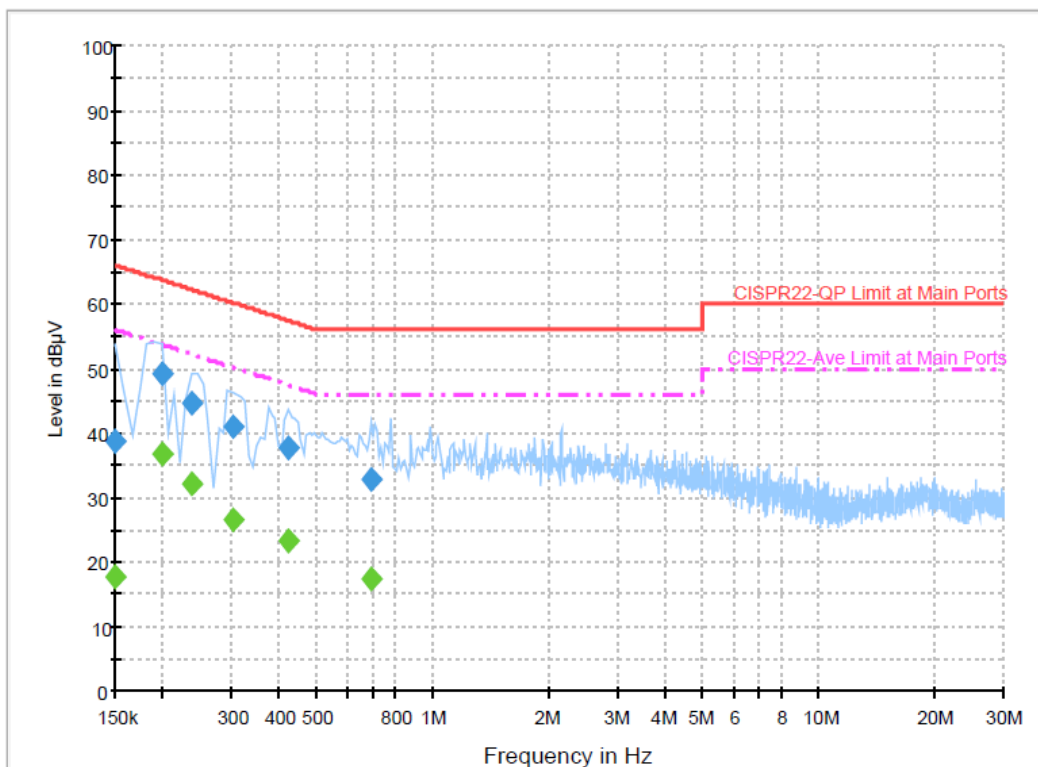
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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 :	50~53%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Bluetooth Link + Camera + Adapter for Sample A		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



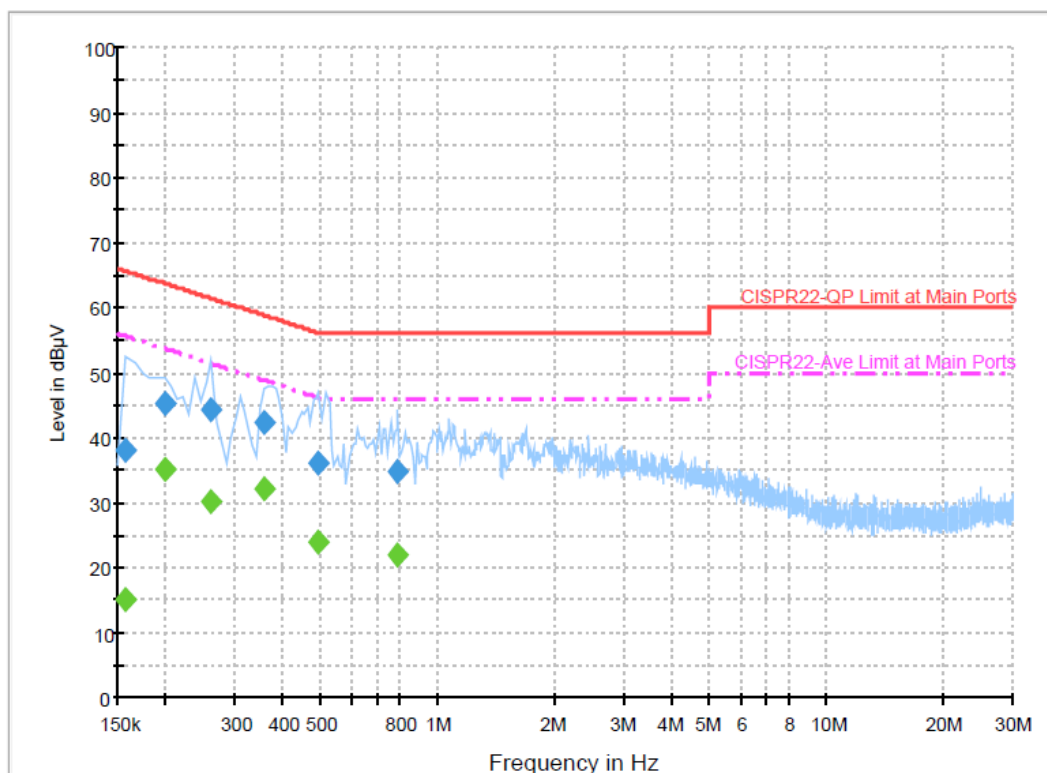
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	38.8	Off	L1	19.5	27.2	66.0
0.198000	49.2	Off	L1	19.6	14.5	63.7
0.238000	44.7	Off	L1	19.5	17.5	62.2
0.302000	41.1	Off	L1	19.5	19.1	60.2
0.422000	37.8	Off	L1	19.4	19.6	57.4
0.694000	32.8	Off	L1	19.5	23.2	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	17.6	Off	L1	19.5	38.4	56.0
0.198000	36.6	Off	L1	19.6	17.1	53.7
0.238000	32.0	Off	L1	19.5	20.2	52.2
0.302000	26.6	Off	L1	19.5	23.6	50.2
0.422000	23.2	Off	L1	19.4	24.2	47.4
0.694000	17.4	Off	L1	19.5	28.6	46.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	50~53%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Bluetooth Link + Camera + Adapter for Sample A		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	38.0	Off	N	19.5	27.6	65.6
0.198000	45.2	Off	N	19.5	18.5	63.7
0.262000	44.3	Off	N	19.4	17.1	61.4
0.358000	42.2	Off	N	19.4	16.6	58.8
0.494000	36.2	Off	N	19.4	19.9	56.1
0.790000	34.7	Off	N	19.4	21.3	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	15.1	Off	N	19.5	40.5	55.6
0.198000	35.1	Off	N	19.5	18.6	53.7
0.262000	30.3	Off	N	19.4	21.1	51.4
0.358000	32.0	Off	N	19.4	16.8	48.8
0.494000	23.8	Off	N	19.4	22.3	46.1
0.790000	21.9	Off	N	19.4	24.1	46.0

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

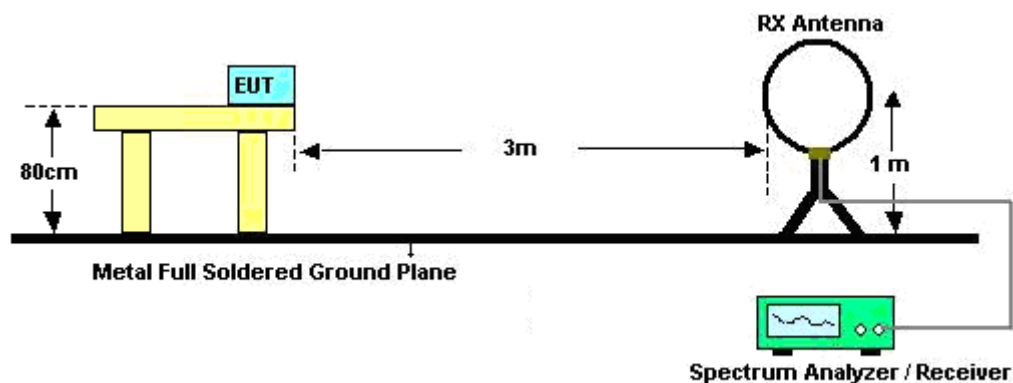
See list of measuring instruments of this test report.

3.6.3 Test Procedures

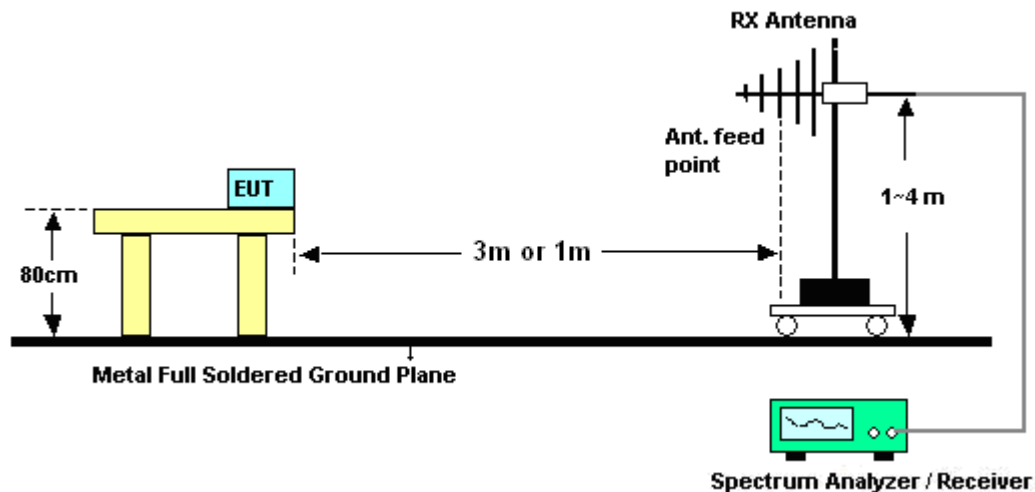
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep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

3.6.4 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 :	Cona Huang	Temperature :	23~24℃	
		Relative Humidity :	48~51%	

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 :	23~24℃
Test Channel :	802.11b CH01 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	1. 2412 MHz is Fundamental Signals which can be ignored. 2. 9648 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.00	21.93	-18.07	40.00	33.20	19.51	0.68	31.46	125	333	Peak
120.45	20.59	-22.91	43.50	38.50	12.23	1.42	31.56	-	-	Peak
206.58	23.70	-19.80	43.50	44.31	8.92	1.94	31.47	-	-	Peak
416.90	24.85	-21.15	46.00	36.67	16.47	2.86	31.15	-	-	Peak
456.10	23.83	-22.17	46.00	34.65	17.26	3.01	31.09	-	-	Peak
833.40	25.67	-20.33	46.00	29.65	22.54	4.19	30.71	-	-	Peak
2381.82	51.84	-22.16	74.00	48.41	32.11	5.47	34.15	100	351	Peak
2381.82	39.03	-14.97	54.00	35.60	32.11	5.47	34.15	100	351	Average
2412.00	105.15	-	-	101.71	32.16	5.44	34.16	100	351	Peak
2412.00	101.38	-	-	97.94	32.16	5.44	34.16	100	351	Average
2484.00	48.66	-25.34	74.00	45.20	32.27	5.38	34.19	100	351	Peak
2484.00	37.71	-16.29	54.00	34.25	32.27	5.38	34.19	100	351	Average
8346.00	52.23	-21.77	74.00	41.26	36.00	10.07	35.10	122	123	Peak
8346.00	40.08	-13.92	54.00	29.11	36.00	10.07	35.10	122	123	Average
9648.00	35.42	-49.73	85.15	70.30	-10.32	10.74	35.30	100	0	Peak

Test Mode :	Mode 1	Temperature :	23~24°C
Test Channel :	802.11b CH01 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
32.97	26.60	-13.40	40.00	39.52	17.84	0.71	31.47	100	56	Peak
48.09	25.01	-14.99	40.00	46.71	8.96	0.87	31.53	-	-	Peak
196.05	25.01	-18.49	43.50	45.75	8.85	1.90	31.49	-	-	Peak
416.90	20.54	-25.46	46.00	32.36	16.47	2.86	31.15	-	-	Peak
542.90	21.56	-24.44	46.00	30.21	18.99	3.35	30.99	-	-	Peak
746.60	24.03	-21.97	46.00	29.31	21.48	3.95	30.71	-	-	Peak
2386.57	40.22	-13.78	54.00	36.78	32.13	5.46	34.15	100	63	Average
2386.57	51.95	-22.05	74.00	48.51	32.13	5.46	34.15	100	63	Peak
2412.00	101.18	-	-	97.74	32.16	5.44	34.16	100	63	Average
2412.00	104.78	-	-	101.34	32.16	5.44	34.16	100	63	Peak
2492.00	50.27	-23.73	74.00	46.80	32.30	5.37	34.20	100	63	Peak
2492.00	38.79	-15.21	54.00	35.32	32.30	5.37	34.20	100	63	Average
8277.00	52.76	-21.24	74.00	41.83	36.00	10.03	35.10	118	251	Peak
8277.00	39.09	-14.91	54.00	28.16	36.00	10.03	35.10	118	251	Average
9648.00	37.66	-47.12	84.78	72.54	-10.32	10.74	35.30	100	0	Peak



Test Mode :	Mode 2	Temperature :	23~24°C
Test Channel :	802.11b CH06 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
44.85	22.45	-17.55	40.00	42.20	10.92	0.83	31.50	100	25	Peak
120.45	21.78	-21.72	43.50	39.69	12.23	1.42	31.56	-	-	Peak
194.97	23.61	-19.89	43.50	44.35	8.86	1.89	31.49	-	-	Peak
416.90	25.35	-20.65	46.00	37.17	16.47	2.86	31.15	-	-	Peak
512.10	23.96	-22.04	46.00	33.45	18.40	3.16	31.05	-	-	Peak
774.60	25.53	-20.47	46.00	30.34	21.87	4.01	30.69	-	-	Peak
2358.00	51.20	-22.80	74.00	47.77	32.08	5.49	34.14	100	340	Peak
2358.00	39.68	-14.32	54.00	36.25	32.08	5.49	34.14	100	340	Average
2437.00	105.51	-	-	102.05	32.22	5.41	34.17	100	340	Peak
2437.00	101.86	-	-	98.40	32.22	5.41	34.17	100	340	Average
2484.00	52.51	-21.49	74.00	49.05	32.27	5.38	34.19	100	340	Peak
2484.00	40.52	-13.48	54.00	37.06	32.27	5.38	34.19	100	340	Average
8277.00	52.71	-21.29	74.00	41.78	36.00	10.03	35.10	100	19	Peak
8277.00	39.28	-14.72	54.00	28.35	36.00	10.03	35.10	100	19	Average



Test Mode :	Mode 2	Temperature :	23~24°C
Test Channel :	802.11b CH06 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
32.97	27.13	-12.87	40.00	40.05	17.84	0.71	31.47	164	251	Peak
48.09	25.35	-14.65	40.00	47.05	8.96	0.87	31.53	-	-	Peak
196.05	25.14	-18.36	43.50	45.88	8.85	1.90	31.49	-	-	Peak
416.90	20.30	-25.70	46.00	32.12	16.47	2.86	31.15	-	-	Peak
634.60	22.76	-23.24	46.00	29.73	20.33	3.59	30.89	-	-	Peak
766.20	25.12	-20.88	46.00	30.06	21.75	4.00	30.69	-	-	Peak
2390.00	50.22	-23.78	74.00	46.79	32.13	5.46	34.16	100	49	Peak
2390.00	37.94	-16.06	54.00	34.51	32.13	5.46	34.16	100	49	Average
2437.00	103.54	-	-	100.08	32.22	5.41	34.17	100	49	Peak
2437.00	99.84	-	-	96.38	32.22	5.41	34.17	100	49	Average
2494.00	50.76	-23.24	74.00	47.29	32.30	5.37	34.20	100	49	Peak
2494.00	38.42	-15.58	54.00	34.95	32.30	5.37	34.20	100	49	Average
8199.00	52.71	-21.29	74.00	41.84	36.00	9.97	35.10	106	204	Peak
8199.00	39.57	-14.43	54.00	28.70	36.00	9.97	35.10	106	204	Average



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	802.11b CH11 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
30.00	22.90	-17.10	40.00	34.17	19.51	0.68	31.46	-	-	Peak
120.45	20.06	-23.44	43.50	37.97	12.23	1.42	31.56	-	-	Peak
190.38	28.88	-14.62	43.50	49.61	8.92	1.86	31.51	145	136	Peak
416.90	24.57	-21.43	46.00	36.39	16.47	2.86	31.15	-	-	Peak
456.10	24.06	-21.94	46.00	34.88	17.26	3.01	31.09	-	-	Peak
688.50	22.97	-23.03	46.00	29.26	20.75	3.79	30.83	-	-	Peak
2366.00	51.01	-22.99	74.00	47.59	32.08	5.49	34.15	100	338	Peak
2366.00	39.66	-14.34	54.00	36.24	32.08	5.49	34.15	100	338	Average
2462.00	105.20	-	-	101.74	32.24	5.40	34.18	100	338	Peak
2462.00	101.65	-	-	98.19	32.24	5.40	34.18	100	338	Average
2485.18	40.83	-13.17	54.00	37.37	32.27	5.38	34.19	100	338	Average
2485.18	53.35	-20.65	74.00	49.89	32.27	5.38	34.19	100	338	Peak
8346.00	53.34	-20.66	74.00	42.37	36.00	10.07	35.10	120	210	Peak
8346.00	39.25	-14.75	54.00	28.28	36.00	10.07	35.10	120	210	Average



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	802.11b CH11 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
33.78	27.63	-12.37	40.00	41.09	17.29	0.72	31.47	100	88	Peak
48.09	24.38	-15.62	40.00	46.08	8.96	0.87	31.53	-	-	Peak
202.26	23.16	-20.34	43.50	43.86	8.85	1.93	31.48	-	-	Peak
372.10	21.85	-24.15	46.00	35.05	15.39	2.66	31.25	-	-	Peak
587.00	21.74	-24.26	46.00	29.42	19.81	3.45	30.94	-	-	Peak
749.40	23.69	-22.31	46.00	28.91	21.52	3.96	30.70	-	-	Peak
2372.00	51.44	-22.56	74.00	48.01	32.11	5.47	34.15	100	55	Peak
2372.00	38.63	-15.37	54.00	35.20	32.11	5.47	34.15	100	55	Average
2462.00	102.84	-	-	99.38	32.24	5.40	34.18	100	55	Peak
2462.00	99.31	-	-	95.85	32.24	5.40	34.18	100	55	Average
2485.94	39.39	-14.61	54.00	35.93	32.27	5.38	34.19	100	55	Average
2485.94	52.26	-21.74	74.00	48.80	32.27	5.38	34.19	100	55	Peak
8364.00	52.68	-21.32	74.00	41.69	36.00	10.09	35.10	136	214	Peak
8364.00	39.10	-14.90	54.00	28.11	36.00	10.09	35.10	136	214	Average

Test Mode :	Mode 4	Temperature :	23~24℃
Test Channel :	802.11g CH01 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	1. 2412 MHz is Fundamental Signals which can be ignored. 2. 9648 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.00	22.17	-17.83	40.00	33.44	19.51	0.68	31.46	126	246	Peak
119.10	20.28	-23.22	43.50	38.29	12.14	1.41	31.56	-	-	Peak
194.97	23.47	-20.03	43.50	44.21	8.86	1.89	31.49	-	-	Peak
416.90	23.51	-22.49	46.00	35.33	16.47	2.86	31.15	-	-	Peak
456.10	23.63	-22.37	46.00	34.45	17.26	3.01	31.09	-	-	Peak
512.10	22.67	-23.33	46.00	32.16	18.40	3.16	31.05	-	-	Peak
2388.85	42.19	-11.81	54.00	38.75	32.13	5.46	34.15	100	350	Average
2388.85	61.00	-13.00	74.00	57.56	32.13	5.46	34.15	100	350	Peak
2412.00	95.89	-	-	92.45	32.16	5.44	34.16	100	350	Average
2412.00	104.98	-	-	101.54	32.16	5.44	34.16	100	350	Peak
2484.00	51.70	-22.30	74.00	48.24	32.27	5.38	34.19	100	350	Peak
2484.00	40.10	-13.90	54.00	36.64	32.27	5.38	34.19	100	350	Average
8046.00	54.68	-19.32	74.00	43.92	36.00	9.86	35.10	100	21	Peak
8046.00	39.42	-14.58	54.00	28.66	36.00	9.86	35.10	100	21	Average
9648.00	33.74	-51.24	84.98	68.62	-10.32	10.74	35.30	100	0	Peak



Test Mode :	Mode 4	Temperature :	23~24℃
Test Channel :	802.11g CH01 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	1. 2412 MHz is Fundamental Signals which can be ignored. 2. 9648 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
35.94	27.34	-12.66	40.00	41.88	16.20	0.74	31.48	-	-	Peak
48.09	25.17	-14.83	40.00	46.87	8.96	0.87	31.53	-	-	Peak
81.30	28.34	-11.66	40.00	51.01	7.70	1.16	31.53	100	125	Peak
416.90	20.26	-25.74	46.00	32.08	16.47	2.86	31.15	-	-	Peak
604.50	22.53	-23.47	46.00	29.84	20.10	3.51	30.92	-	-	Peak
778.10	24.80	-21.20	46.00	29.56	21.91	4.02	30.69	-	-	Peak
2388.85	43.46	-10.54	54.00	40.02	32.13	5.46	34.15	100	63	Average
2388.85	61.74	-12.26	74.00	58.30	32.13	5.46	34.15	100	63	Peak
2412.00	95.48	-	-	92.04	32.16	5.44	34.16	100	63	Average
2412.00	104.37	-	-	100.93	32.16	5.44	34.16	100	63	Peak
2486.00	53.07	-20.93	74.00	49.61	32.27	5.38	34.19	100	63	Peak
2486.00	40.78	-13.22	54.00	37.32	32.27	5.38	34.19	100	63	Average
8181.00	52.13	-21.87	74.00	41.27	36.00	9.96	35.10	100	248	Peak
8181.00	38.97	-15.03	54.00	28.11	36.00	9.96	35.10	100	248	Average
9648.00	35.69	-48.68	84.37	70.57	-10.32	10.74	35.30	100	0	Peak

Test Mode :	Mode 5	Temperature :	23~24℃
Test Channel :	802.11g CH06 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
32.97	21.16	-18.84	40.00	34.08	17.84	0.71	31.47	103	226	Peak
122.34	19.92	-23.58	43.50	37.98	12.06	1.44	31.56	-	-	Peak
196.05	24.50	-19.00	43.50	45.24	8.85	1.90	31.49	-	-	Peak
416.90	23.93	-22.07	46.00	35.75	16.47	2.86	31.15	-	-	Peak
456.10	23.27	-22.73	46.00	34.09	17.26	3.01	31.09	-	-	Peak
834.10	26.97	-19.03	46.00	30.94	22.55	4.19	30.71	-	-	Peak
2364.00	53.77	-20.23	74.00	50.34	32.08	5.49	34.14	100	339	Peak
2364.00	41.46	-12.54	54.00	38.03	32.08	5.49	34.14	100	339	Average
2437.00	104.53	-	-	101.07	32.22	5.41	34.17	100	339	Peak
2437.00	95.72	-	-	92.26	32.22	5.41	34.17	100	339	Average
2484.00	54.48	-19.52	74.00	51.02	32.27	5.38	34.19	100	339	Peak
2484.00	42.65	-11.35	54.00	39.19	32.27	5.38	34.19	100	339	Average
8166.00	53.41	-20.59	74.00	42.55	36.00	9.96	35.10	105	165	Peak
8166.00	39.22	-14.78	54.00	28.36	36.00	9.96	35.10	105	165	Average

Test Mode :	Mode 5	Temperature :	23~24°C
Test Channel :	802.11g CH06 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
36.21	26.91	-13.09	40.00	41.45	16.20	0.74	31.48	100	109	Peak
48.09	24.76	-15.24	40.00	46.46	8.96	0.87	31.53	-	-	Peak
197.13	24.86	-18.64	43.50	45.61	8.84	1.90	31.49	-	-	Peak
456.10	20.90	-25.10	46.00	31.72	17.26	3.01	31.09	-	-	Peak
690.60	22.97	-23.03	46.00	29.24	20.77	3.79	30.83	-	-	Peak
825.00	25.36	-20.64	46.00	29.45	22.46	4.16	30.71	-	-	Peak
2382.00	51.68	-22.32	74.00	48.25	32.11	5.47	34.15	100	49	Peak
2382.00	39.53	-14.47	54.00	36.10	32.11	5.47	34.15	100	49	Average
2437.00	103.23	-	-	99.78	32.19	5.43	34.17	100	49	Peak
2437.00	94.31	-	-	90.85	32.22	5.41	34.17	100	49	Average
2500.00	52.48	-21.52	74.00	49.01	32.30	5.37	34.20	100	49	Peak
2500.00	40.67	-13.33	54.00	37.20	32.30	5.37	34.20	100	49	Average
8214.00	52.64	-21.36	74.00	41.76	36.00	9.98	35.10	114	128	Peak
8214.00	39.88	-14.12	54.00	29.00	36.00	9.98	35.10	114	128	Average

Test Mode :	Mode 6	Temperature :	23~24°C
Test Channel :	802.11g CH11 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
34.05	20.81	-19.19	40.00	34.27	17.29	0.72	31.47	138	261	Peak
121.26	21.96	-21.54	43.50	39.94	12.15	1.43	31.56	-	-	Peak
194.97	23.22	-20.28	43.50	43.96	8.86	1.89	31.49	-	-	Peak
416.90	24.13	-21.87	46.00	35.95	16.47	2.86	31.15	-	-	Peak
456.10	23.74	-22.26	46.00	34.56	17.26	3.01	31.09	-	-	Peak
777.40	24.63	-21.37	46.00	29.39	21.91	4.02	30.69	-	-	Peak
2366.00	52.74	-21.26	74.00	49.32	32.08	5.49	34.15	100	338	Peak
2366.00	41.48	-12.52	54.00	38.06	32.08	5.49	34.15	100	338	Average
2462.00	95.82	-	-	92.36	32.24	5.40	34.18	100	338	Average
2462.00	104.89	-	-	101.43	32.24	5.40	34.18	100	338	Peak
2483.50	63.93	-10.07	74.00	60.47	32.27	5.38	34.19	100	338	Peak
2483.50	45.36	-8.64	54.00	41.90	32.27	5.38	34.19	100	338	Average
8331.00	53.02	-20.98	74.00	42.06	36.00	10.06	35.10	100	168	Peak
8331.00	40.19	-13.81	54.00	29.23	36.00	10.06	35.10	100	168	Average

Test Mode :	Mode 6	Temperature :	23~24°C
Test Channel :	802.11g CH11 for Sample A	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
36.21	27.17	-12.83	40.00	41.71	16.20	0.74	31.48	100	334	Peak
48.09	24.48	-15.52	40.00	46.18	8.96	0.87	31.53	-	-	Peak
197.13	24.29	-19.21	43.50	45.04	8.84	1.90	31.49	-	-	Peak
416.90	20.34	-25.66	46.00	32.16	16.47	2.86	31.15	-	-	Peak
598.20	22.03	-23.97	46.00	29.43	20.03	3.49	30.92	-	-	Peak
738.20	24.01	-21.99	46.00	29.46	21.36	3.92	30.73	-	-	Peak
2374.00	51.85	-22.15	74.00	48.42	32.11	5.47	34.15	100	57	Peak
2374.00	39.83	-14.17	54.00	36.40	32.11	5.47	34.15	100	57	Average
2462.00	94.43	-	-	90.97	32.24	5.40	34.18	100	57	Average
2462.00	103.53	-	-	100.08	32.24	5.40	34.19	100	57	Peak
2483.50	63.05	-10.95	74.00	59.59	32.27	5.38	34.19	100	57	Peak
2483.50	43.25	-10.75	54.00	39.79	32.27	5.38	34.19	100	57	Average
8280.00	53.00	-21.00	74.00	42.07	36.00	10.03	35.10	100	269	Peak
8280.00	39.57	-14.43	54.00	28.64	36.00	10.03	35.10	100	269	Average

Test Mode :	Mode 7	Temperature :	23~24°C
Test Channel :	802.11g CH11 for Sample B	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
31.89	21.46	-18.54	40.00	33.82	18.40	0.70	31.46	100	221	Peak
119.10	21.64	-21.86	43.50	39.65	12.14	1.41	31.56	-	-	Peak
194.97	23.37	-20.13	43.50	44.11	8.86	1.89	31.49	-	-	Peak
416.90	23.64	-22.36	46.00	35.46	16.47	2.86	31.15	-	-	Peak
660.50	22.66	-23.34	46.00	29.33	20.53	3.66	30.86	-	-	Peak
855.80	25.88	-20.12	46.00	29.61	22.75	4.25	30.73	-	-	Peak
2374.00	53.47	-20.53	74.00	50.04	32.11	5.47	34.15	110	320	Peak
2374.00	40.21	-13.79	54.00	36.78	32.11	5.47	34.15	110	320	Average
2462.00	105.76	-	-	102.30	32.24	5.40	34.18	110	320	Peak
2462.00	96.71	-	-	93.25	32.24	5.40	34.18	110	320	Average
2483.50	46.91	-7.09	54.00	43.45	32.27	5.38	34.19	110	320	Average
2483.50	64.13	-9.87	74.00	60.67	32.27	5.38	34.19	110	320	Peak
8445.00	52.83	-21.17	74.00	41.79	36.00	10.14	35.10	100	255	Peak
8445.00	39.97	-14.03	54.00	28.93	36.00	10.14	35.10	100	255	Average

Test Mode :	Mode 7	Temperature :	23~24°C
Test Channel :	802.11g CH11 for Sample B	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	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
33.78	27.38	-12.62	40.00	40.84	17.29	0.72	31.47	100	164	Peak
48.09	25.11	-14.89	40.00	46.81	8.96	0.87	31.53	-	-	Peak
196.86	23.90	-19.60	43.50	44.65	8.84	1.90	31.49	-	-	Peak
416.90	20.06	-25.94	46.00	31.88	16.47	2.86	31.15	-	-	Peak
645.80	22.51	-23.49	46.00	29.34	20.42	3.62	30.87	-	-	Peak
839.70	25.55	-20.45	46.00	29.46	22.60	4.21	30.72	-	-	Peak
2372.00	47.70	-26.30	74.00	44.27	32.11	5.47	34.15	100	69	Peak
2372.00	36.62	-17.38	54.00	33.19	32.11	5.47	34.15	100	69	Average
2462.00	100.15	-	-	96.69	32.24	5.40	34.18	100	69	Peak
2462.00	90.96	-	-	87.50	32.24	5.40	34.18	100	69	Average
2483.50	57.30	-16.70	74.00	53.84	32.27	5.38	34.19	100	69	Peak
2483.50	40.13	-13.87	54.00	36.67	32.27	5.38	34.19	100	69	Average
8397.00	53.71	-20.29	74.00	42.70	36.00	10.11	35.10	127	283	Peak
8397.00	40.34	-13.66	54.00	29.33	36.00	10.11	35.10	127	283	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)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 25, 2010	Feb. 24, 2011	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 25, 2010	Feb. 24, 2011	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)
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.32dB.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 EP832813-03 as below.