

Partial FCC RF Test Report

APPLICANT : LG Electronics INC
EQUIPMENT : NoteBook Computer
BRAND NAME : LG
MODEL NAME : LGX14, LGX14A, X140, XB140, XD140
FCC ID : BEJNT-LGX14B
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

This is a partial report which is only valid combined with the WLAN Module report (Brand Name: Realtek / Model Name: RTL8191SE, FCC ID: TX2-RTL8191SE).

The product was received on Mar. 05, 2010 and completely tested on Mar. 13, 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
FR030509-02A	Rev. 01	Initial issue of report	May 18, 2010
FR030509-02A	Rev. 02	Add Conducted Power	Jun. 10, 2010

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.2	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 11.4 dB at 0.190 MHz
3.3	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.81 dB at 2487.65 MHz
3.4	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

LG Electronics INC

19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea

1.2 Manufacturer

LG Electronics INC

19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	NoteBook Computer
Brand Name	LG
Model Name	LGX14, LGX14A, X140, XB140, XD140
FCC ID	BEJNT-LGX14B
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 : 18.23 dBm 802.11g : 16.54 dBm 802.11n (BW 20MHz) : 16.26 dBm 802.11n (BW 40MHz) : 16.53 dBm
Antenna Type	PIFA Antenna
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

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.
4. The EUT parts listed with * were all in the test configuration which were used for the test.

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.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
5.	Earphone	Ergotech	ET-E200	FCC DoC	Unshielded, 1.8 m	N/A
6.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Power

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	16.63	16.64	17.1	17.55
CH 06	2437 MHz	17.49	17.62	17.71	18.21
CH 11	2462 MHz	17.53	17.65	17.75	18.23

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	15.65	15.56	15.29	15.17	15.48	15.54	16.03	15.15
CH 06	2437 MHz	15.84	16.48	16.23	16.28	16.22	16.49	16.39	16.24
CH 11	2462 MHz	16.46	16.46	16.45	16.35	16.43	16.29	16.51	16.54

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		At OFDM Data Rate							
		MCS=0	MCS=1	MCS=2	MCS=3	MCS=4	MCS=5	MCS=6	MCS=7
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 01	2412 MHz	15.00	15.35	15.11	15.02	14.84	14.98	15.15	15.31
CH 06	2437 MHz	15.77	16.16	16.00	15.84	16.19	16.19	16.03	16.26
CH 11	2462 MHz	15.93	15.79	16.11	16.05	16.22	15.92	16.08	16.14

Channel	Frequency	2.4GHz 802.11n (BW 40MHz) RF Power (dBm)							
		At OFDM Data Rate							
		MCS=0	MCS=1	MCS=2	MCS=3	MCS=4	MCS=5	MCS=6	MCS=7
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 03	2422 MHz	14.34	14.13	15.09	14.68	13.68	14.03	14.05	15.89
CH 06	2437 MHz	15.06	15.00	15.64	14.81	14.71	14.75	14.33	16.17
CH 09	2452 MHz	15.25	15.12	15.40	15.11	15.06	14.83	14.81	16.53

2.2 Test Mode

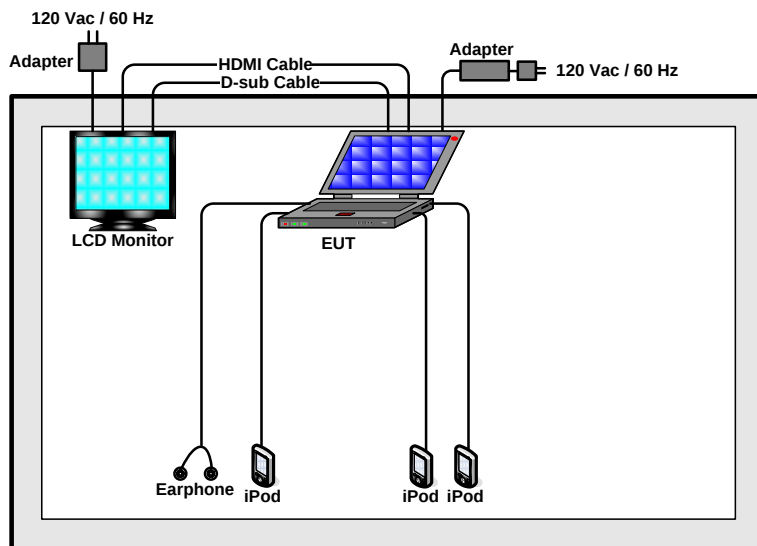
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

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

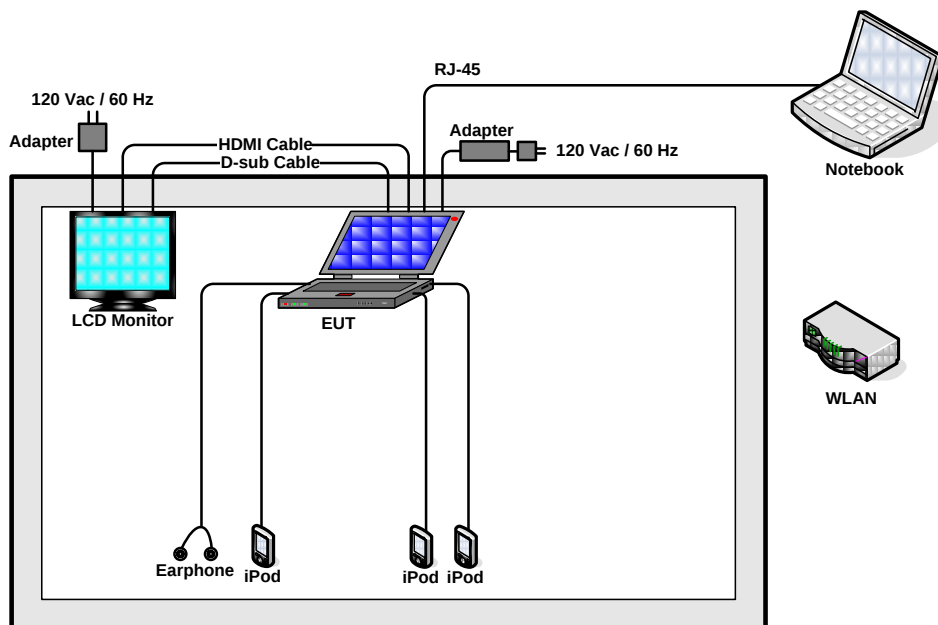
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz Mode 10: 802.11n (BW 40M)_CH03_2422 MHz Mode 11: 802.11n (BW 40M)_CH06_2437 MHz Mode 12: 802.11n (BW 40M)_CH09_2452 MHz
AC Conducted Emission	Mode 1 : GPRS850 Idle + WLAN Link + TC + Adapter	
Remark: 1. TC stands for Test Configuration, and consists of iPod, monitor, earphone, and RJ-45. 2. Only the radiated emission and conducted emission of the laptop computer was performed in this report, and the conducted test cases can be referred to Realtek module report (FCC ID: TX2-RTL8191SE). 3. The mode 7~12 of Radiated TCs were verify band edge only.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<EUT with TC Mode>





2.4 RF Utility

The programmed RF utility “Realtek 11n single chip PCIE WLAN MP Diagnostic Program” 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 Band Edges Measurement

3.1.1 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.

3.1.2 Measuring Instruments

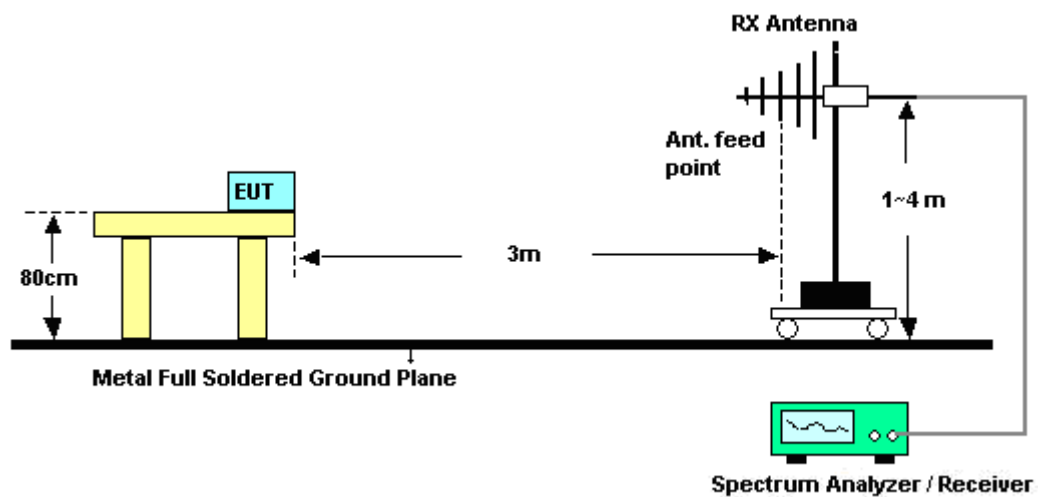
See list of measuring instruments of this test report.

3.1.3 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).

3.1.4 Test Setup

<Radiated Band Edges>



3.1.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	23~24℃
Test Band :	802.11b	Relative Humidity :	42~43%
Test Channel :	01	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.38	50.93	-23.07	74	47.49	32.13	5.46	34.15	108	12	Peak
2386.38	42.42	-11.58	54	38.98	32.13	5.46	34.15	108	12	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	47.84	-26.16	74	44.4	32.13	5.46	34.15	100	139	Peak
2385.81	38.1	-15.9	54	34.66	32.13	5.46	34.15	100	139	Average

Test Mode :	Mode 3	Temperature :	23~24℃
Test Band :	802.11b	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	56.15	-17.85	74	52.69	32.27	5.38	34.19	103	17	Peak
2483.5	49.65	-4.35	54	46.19	32.27	5.38	34.19	103	17	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	51.56	-22.44	74	48.1	32.27	5.38	34.19	100	134	Peak
2483.5	42.76	-11.24	54	39.3	32.27	5.38	34.19	100	134	Average



Test Mode :	Mode 4	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	42~43%
Test Channel :	01	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	61.04	-12.96	74	57.61	32.13	5.46	34.16	103	8	Peak
2390	45.44	-8.56	54	42.01	32.13	5.46	34.16	103	8	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
2390	54.89	-19.11	74	51.46	32.13	5.46	34.16	102	139	Peak
2390	39.18	-14.82	54	35.75	32.13	5.46	34.16	102	139	Average

Test Mode :	Mode 6	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	70.69	-3.31	74	67.23	32.27	5.38	34.19	105	18	Peak
2483.5	52.36	-1.64	54	48.9	32.27	5.38	34.19	105	18	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	64.99	-9.01	74	61.53	32.27	5.38	34.19	100	133	Peak
2483.5	46.3	-7.7	54	42.84	32.27	5.38	34.19	100	133	Average



Test Mode :	Mode 7	Temperature :	23~24℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	42~43%
Test Channel :	01	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	62.28	-11.72	74	58.85	32.13	5.46	34.16	131	342	Peak
2390	41.77	-12.23	54	38.34	32.13	5.46	34.16	131	342	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
2390	53.4	-20.6	74	49.97	32.13	5.46	34.16	103	138	Peak
2390	37.62	-16.38	54	34.19	32.13	5.46	34.16	103	138	Average

Test Mode :	Mode 9	Temperature :	23~24℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	72.38	-1.62	74	68.92	32.27	5.38	34.19	102	14	Peak
2483.5	52.77	-1.23	54	49.31	32.27	5.38	34.19	102	14	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	68.4	-5.6	74	64.94	32.27	5.38	34.19	100	133	Peak
2483.5	48.18	-5.82	54	44.72	32.27	5.38	34.19	100	133	Average



Test Mode :	Mode 10	Temperature :	23~24℃
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	42~43%
Test Channel :	03	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.9	56.19	-17.81	74	52.75	32.13	5.46	34.15	105	14	Peak
2387.9	42.97	-11.03	54	39.53	32.13	5.46	34.15	105	14	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	51.42	-22.58	74	47.98	32.13	5.46	34.15	101	114	Peak
2388.85	39.34	-14.66	54	35.9	32.13	5.46	34.15	101	114	Average

Test Mode :	Mode 12	Temperature :	23~24℃
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	42~43%
Test Channel :	09	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2487.65	70.24	-3.76	74	66.76	32.3	5.37	34.19	103	13	Peak
2487.65	53.19	-0.81	54	49.71	32.3	5.37	34.19	103	13	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
2488.22	64.06	-9.94	74	60.58	32.3	5.37	34.19	100	133	Peak
2488.22	46.58	-7.42	54	43.1	32.3	5.37	34.19	100	133	Average

3.2 AC Conducted Emission Measurement

3.2.1 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.

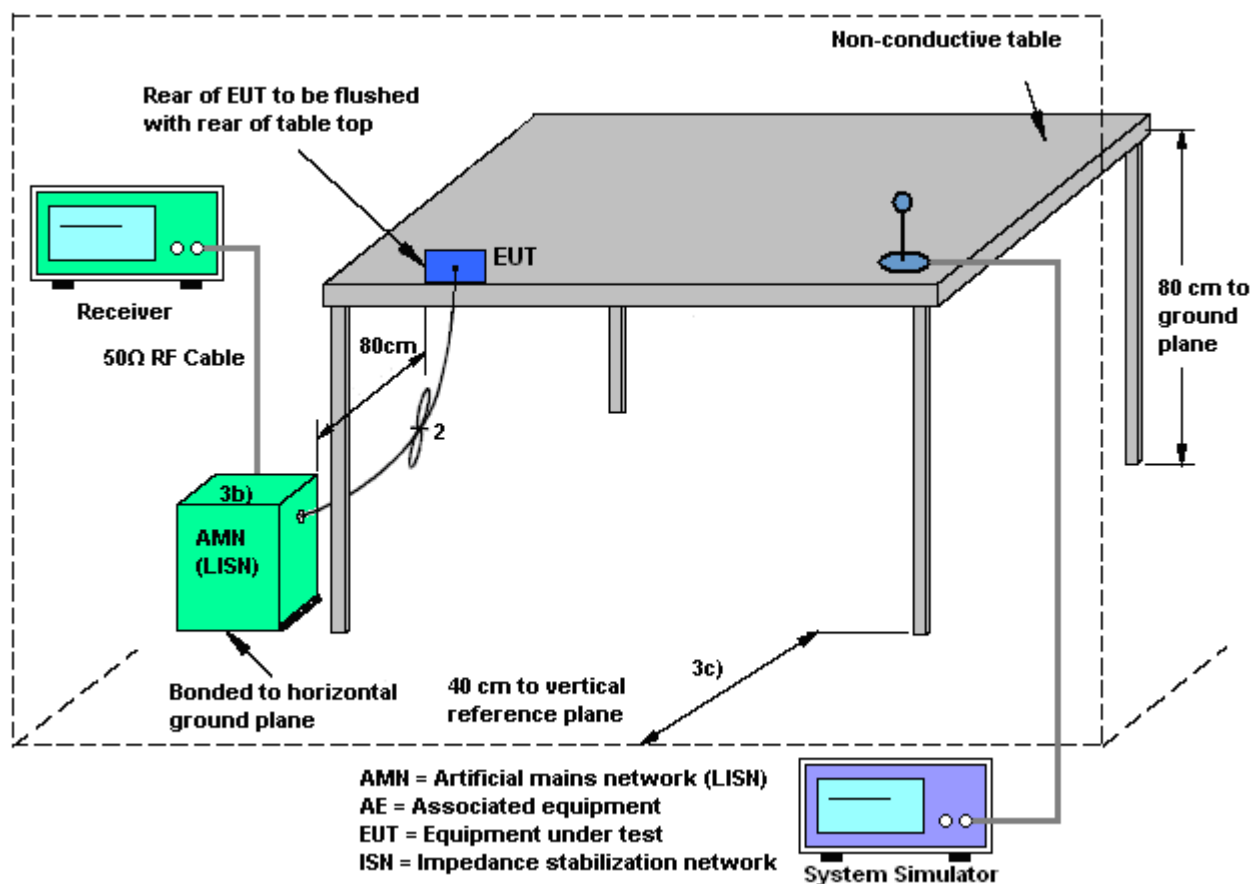
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

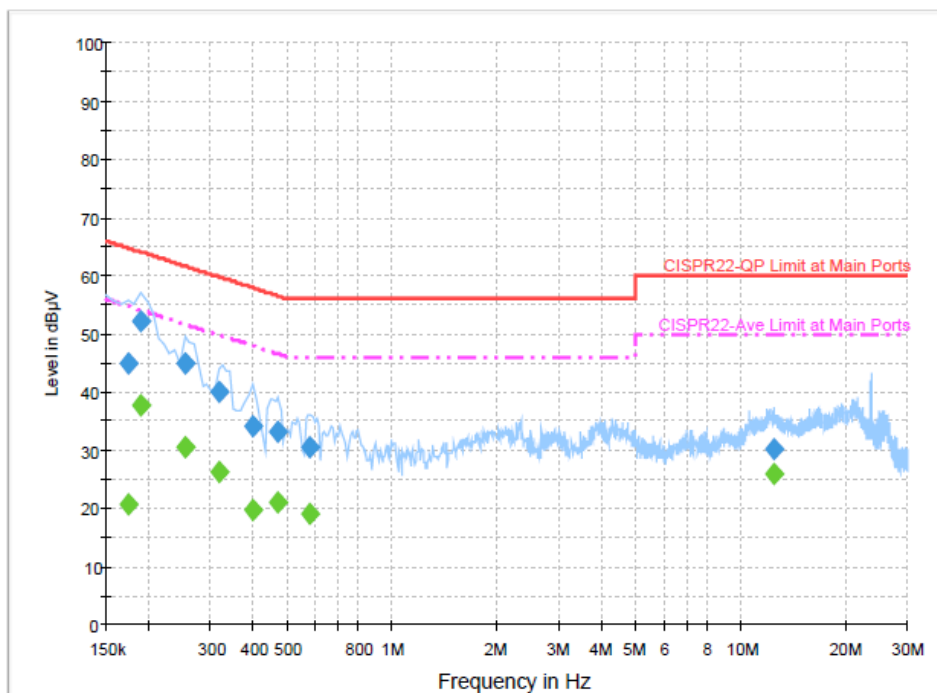
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

3.2.4 Test Setup



3.2.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	39~41%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GPRS850 Idle + WLAN Link + TC + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



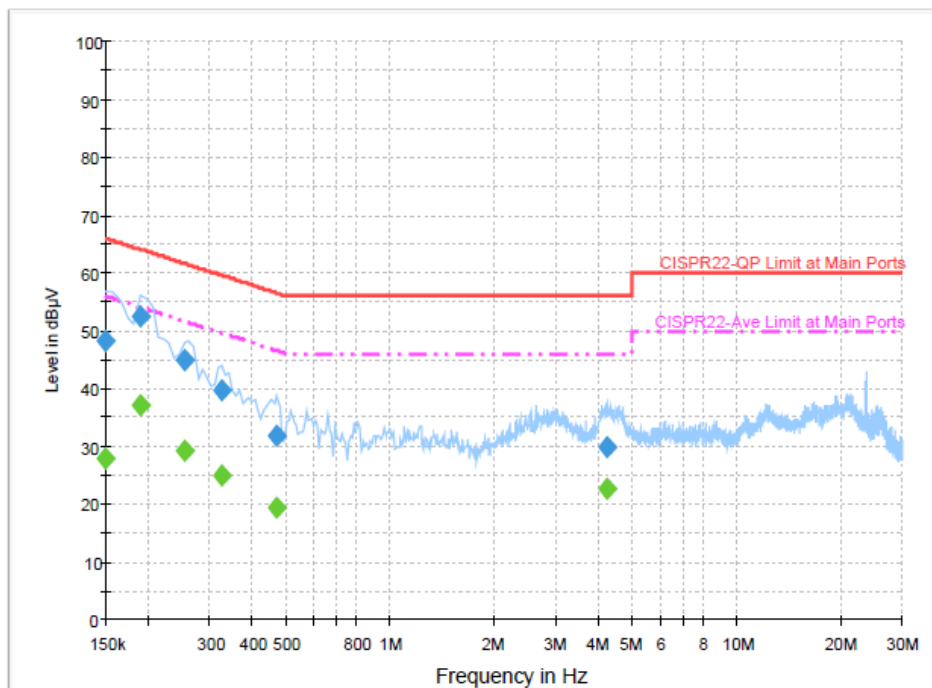
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	45.0	Off	L1	19.5	19.8	64.8
0.190000	52.3	Off	L1	19.6	11.7	64.0
0.254000	45.0	Off	L1	19.4	16.6	61.6
0.318000	40.1	Off	L1	19.5	19.7	59.8
0.398000	34.0	Off	L1	19.5	23.9	57.9
0.470000	33.0	Off	L1	19.4	23.5	56.5
0.582000	30.4	Off	L1	19.5	25.6	56.0
12.414000	30.2	Off	L1	19.6	29.8	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	20.8	Off	L1	19.5	34.0	54.8
0.190000	37.8	Off	L1	19.6	16.2	54.0
0.254000	30.3	Off	L1	19.4	21.3	51.6
0.318000	26.3	Off	L1	19.5	23.5	49.8
0.398000	19.5	Off	L1	19.5	28.4	47.9
0.470000	20.9	Off	L1	19.4	25.6	46.5
0.582000	18.9	Off	L1	19.5	27.1	46.0
12.414000	25.9	Off	L1	19.6	24.1	50.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	39~41%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GPRS850 Idle + WLAN Link + TC + Adapter		
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	48.2	Off	N	19.5	17.8	66.0
0.190000	52.6	Off	N	19.5	11.4	64.0
0.254000	44.8	Off	N	19.4	16.8	61.6
0.326000	39.6	Off	N	19.5	20.0	59.6
0.470000	31.9	Off	N	19.4	24.6	56.5
4.198000	29.9	Off	N	19.5	26.1	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	28.0	Off	N	19.5	28.0	56.0
0.190000	37.0	Off	N	19.5	17.0	54.0
0.254000	29.1	Off	N	19.4	22.5	51.6
0.326000	24.9	Off	N	19.5	24.7	49.6
0.470000	19.3	Off	N	19.4	27.2	46.5
4.198000	22.5	Off	N	19.5	23.5	46.0

3.3 Radiated Emission Measurement

3.3.1 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

3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

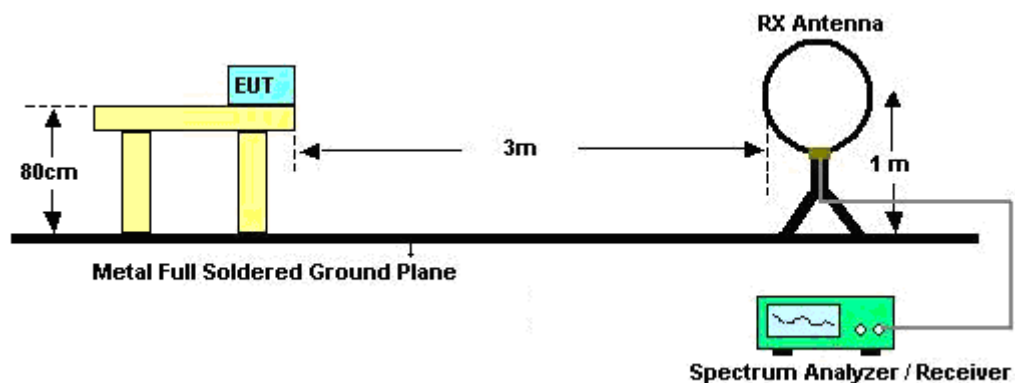
3.3.3

3.3.4 Test Procedures

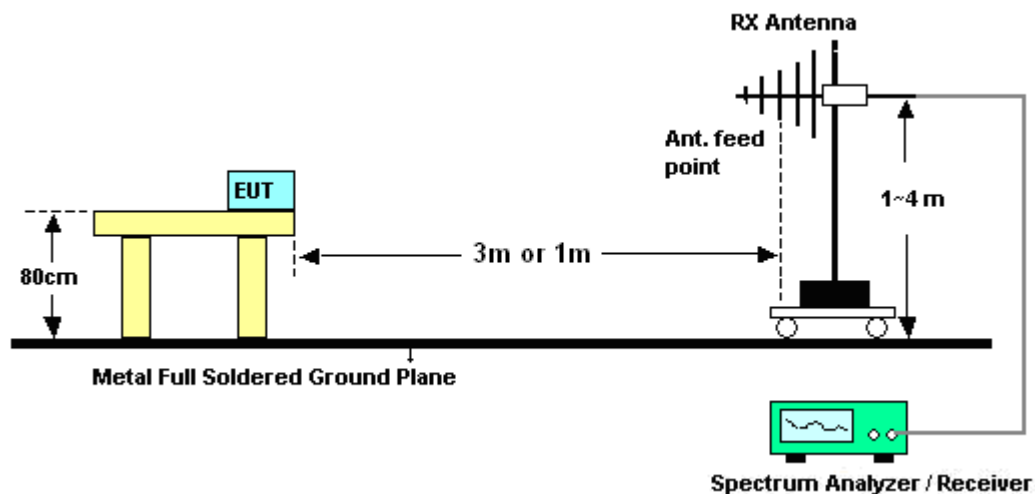
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep =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

3.3.5 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



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

Test Engineer :	Kay Wu	Temperature :	23~24℃	
		Relative Humidity :	42~43%	

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

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

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

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

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

Test Mode :	Mode 1	Temperature :	23~24℃
Test Channel :	01	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
80.22	20.06	-19.94	40	43.19	7.57	1	31.7	-	-	Peak
193.89	23.4	-20.1	43.5	44.46	8.87	1.68	31.61	-	-	Peak
295.14	39.99	-6.01	46	55.91	13.39	2.1	31.41	-	-	Peak
300	36.75	-9.25	46	52.56	13.46	2.13	31.4	-	-	Peak
370.7	42.77	-3.23	46	56.25	15.34	2.44	31.26	100	66	Peak
635.3	29.04	-16.96	46	36.31	20.34	3.36	30.97	-	-	Peak
2386.38	42.42	-11.58	54	38.98	32.13	5.46	34.15	108	12	Average
2386.38	50.93	-23.07	74	47.49	32.13	5.46	34.15	108	12	Peak
2412	101.82	-	-	98.38	32.16	5.44	34.16	108	12	Average
2412	105.42	-	-	101.98	32.16	5.44	34.16	108	12	Peak
2492	48.6	-25.4	74	45.13	32.3	5.37	34.2	108	12	Peak
2492	39.84	-14.16	54	36.37	32.3	5.37	34.2	108	12	Average
8316	53.21	-20.79	74	42.26	36	10.05	35.1	100	21	Peak
8316	39.58	-14.42	54	28.63	36	10.05	35.1	100	21	Average



Test Mode :	Mode 1	Temperature :	23~24℃
Test Channel :	01	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.81	26.6	-13.4	40	38.7	18.95	0.65	31.7	-	-	Peak
92.37	24.02	-19.48	43.5	45.43	9.17	1.12	31.7	-	-	Peak
166.62	22.63	-20.87	43.5	42.83	9.89	1.54	31.63	-	-	Peak
371.4	42.59	-3.41	46	56.04	15.36	2.45	31.26	100	55	Peak
634.6	33.55	-12.45	46	40.83	20.33	3.36	30.97	-	-	Peak
808.2	35.34	-10.66	46	39.88	22.29	3.87	30.7	-	-	Peak
2385.81	38.1	-15.9	54	34.66	32.13	5.46	34.15	100	139	Average
2385.81	47.84	-26.16	74	44.4	32.13	5.46	34.15	100	139	Peak
2412	98.73	-	-	95.29	32.16	5.44	34.16	100	139	Average
2412	102.3	-	-	98.86	32.16	5.44	34.16	100	139	Peak
2494	45.96	-28.04	74	42.49	32.3	5.37	34.2	100	139	Peak
2494	36.55	-17.45	54	33.08	32.3	5.37	34.2	100	139	Average
8262	53.26	-20.74	74	42.34	36	10.02	35.1	100	248	Peak
8262	39.45	-14.55	54	28.53	36	10.02	35.1	100	248	Average

Test Mode :	Mode 2	Temperature :	23~24℃
Test Channel :	06	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
79.41	20.01	-19.99	40	43.23	7.48	1	31.7	-	-	Peak
193.89	23.18	-20.32	43.5	44.24	8.87	1.68	31.61	-	-	Peak
291.9	36.2	-9.8	46	52.18	13.35	2.09	31.42	-	-	Peak
300	37.12	-8.88	46	52.93	13.46	2.13	31.4	-	-	Peak
369.3	42.85	-3.15	46	56.36	15.31	2.44	31.26	100	117	Peak
872.6	31.36	-14.64	46	35.09	22.92	4.05	30.7	-	-	Peak
2390	44.28	-29.72	74	40.85	32.13	5.46	34.16	100	340	Peak
2390	33.35	-20.65	54	29.92	32.13	5.46	34.16	100	340	Average
2437	105.1	-	-	101.64	32.22	5.41	34.17	100	340	Peak
2437	101.4	-	-	97.94	32.22	5.41	34.17	100	340	Average
2484	47.43	-26.57	74	43.97	32.27	5.38	34.19	100	340	Peak
2484	36.03	-17.97	54	32.57	32.27	5.38	34.19	100	340	Average
8313	53.34	-20.66	74	42.39	36	10.05	35.1	100	142	Peak
8313	39.39	-14.61	54	28.44	36	10.05	35.1	100	142	Average



Test Mode :	Mode 2	Temperature :	23~24℃
Test Channel :	06	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
82.65	23.3	-16.7	40	46.15	7.83	1.02	31.7	-	-	Peak
92.37	25.07	-18.43	43.5	46.48	9.17	1.12	31.7	-	-	Peak
295.14	31.02	-14.98	46	46.94	13.39	2.1	31.41	-	-	Peak
371.4	42.72	-3.28	46	56.17	15.36	2.45	31.26	100	221	Peak
477.8	31.25	-14.75	46	41.79	17.72	2.86	31.12	-	-	Peak
637.4	33.55	-12.45	46	40.79	20.35	3.37	30.96	-	-	Peak
2390	44.15	-29.85	74	40.72	32.13	5.46	34.16	100	141	Peak
2390	33.02	-20.98	54	29.59	32.13	5.46	34.16	100	141	Average
2437	102.68	-	-	99.22	32.22	5.41	34.17	100	141	Peak
2437	98.87	-	-	95.41	32.22	5.41	34.17	100	141	Average
2484	44.33	-29.67	74	40.87	32.27	5.38	34.19	100	141	Peak
2484	32.87	-21.13	54	29.41	32.27	5.38	34.19	100	141	Average
4874	55.27	-18.73	74	47.57	34.35	7.85	34.5	102	0	Peak
4874	51.41	-2.59	54	43.71	34.35	7.85	34.5	102	0	Average
8358	52.71	-21.29	74	41.72	36	10.09	35.1	100	119	Peak
8358	40.43	-13.57	54	29.44	36	10.09	35.1	100	119	Average

Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
79.41	20.2	-19.8	40	43.42	7.48	1	31.7	-	-	Peak
230.61	29.72	-16.28	46	48.99	10.43	1.84	31.54	-	-	Peak
294.06	39.27	-6.73	46	55.2	13.38	2.1	31.41	-	-	Peak
369.3	42.34	-3.66	46	55.85	15.31	2.44	31.26	100	337	Peak
637.4	27.85	-18.15	46	35.09	20.35	3.37	30.96	-	-	Peak
872.6	31.48	-14.52	46	35.21	22.92	4.05	30.7	-	-	Peak
2374	46.36	-27.64	74	42.93	32.11	5.47	34.15	103	17	Peak
2374	35.72	-18.28	54	32.29	32.11	5.47	34.15	103	17	Average
2462	109.2	-	-	105.74	32.24	5.4	34.18	103	17	Peak
2462	105.25	-	-	101.79	32.24	5.4	34.18	103	17	Average
2483.5	49.65	-4.35	54	46.19	32.27	5.38	34.19	103	17	Average
2483.5	56.15	-17.85	74	52.69	32.27	5.38	34.19	103	17	Peak
4924	51.41	-22.59	74	43.65	34.37	7.89	34.5	100	221	Peak
4924	47.65	-6.35	54	39.89	34.37	7.89	34.5	100	221	Average
8316	52.94	-21.06	74	41.99	36	10.05	35.1	133	44	Peak
8316	39.72	-14.28	54	28.77	36	10.05	35.1	133	44	Average



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.62	25.99	-14.01	40	38.63	18.4	0.66	31.7	-	-	Peak
92.37	24.16	-19.34	43.5	45.57	9.17	1.12	31.7	-	-	Peak
166.62	22.97	-20.53	43.5	43.17	9.89	1.54	31.63	-	-	Peak
371.4	42.09	-3.91	46	55.54	15.36	2.45	31.26	100	66	Peak
634.6	33.6	-12.4	46	40.88	20.33	3.36	30.97	-	-	Peak
808.2	35.82	-10.18	46	40.36	22.29	3.87	30.7	-	-	Peak
2374	44.59	-29.41	74	41.16	32.11	5.47	34.15	100	134	Peak
2374	34.46	-19.54	54	31.03	32.11	5.47	34.15	100	134	Average
2462	105.88	-	-	102.42	32.24	5.4	34.18	100	134	Peak
2462	102.45	-	-	98.99	32.24	5.4	34.18	100	134	Average
2483.5	42.76	-11.24	54	39.3	32.27	5.38	34.19	100	134	Average
2483.5	51.56	-22.44	74	48.1	32.27	5.38	34.19	100	134	Peak
4924	54.91	-19.09	74	47.15	34.37	7.89	34.5	100	0	Peak
4924	51.08	-2.92	54	43.32	34.37	7.89	34.5	100	0	Average
8397	52.98	-21.02	74	41.97	36	10.11	35.1	114	136	Peak
8397	39	-15	54	27.99	36	10.11	35.1	114	136	Average



Test Mode :	Mode 4	Temperature :	23~24℃
Test Channel :	01	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
79.41	19.98	-20.02	40	43.2	7.48	1	31.7	-	-	Peak
193.89	23.98	-19.52	43.5	45.04	8.87	1.68	31.61	-	-	Peak
292.98	39.17	-6.83	46	55.12	13.37	2.09	31.41	-	-	Peak
301.4	37.34	-8.66	46	53.09	13.51	2.14	31.4	-	-	Peak
371.4	42.62	-3.38	46	56.07	15.36	2.45	31.26	100	221	Peak
872.6	33.82	-12.18	46	37.55	22.92	4.05	30.7	-	-	Peak
2390	45.44	-8.56	54	42.01	32.13	5.46	34.16	103	8	Average
2390	61.04	-12.96	74	57.61	32.13	5.46	34.16	103	8	Peak
2412	96.4	-	-	92.96	32.16	5.44	34.16	103	8	Average
2412	105.22	-	-	101.77	32.19	5.43	34.17	103	8	Peak
2484	47.55	-26.45	74	44.09	32.27	5.38	34.19	103	8	Peak
2484	37.26	-16.74	54	33.8	32.27	5.38	34.19	103	8	Average
8457	54.33	-19.67	74	43.27	36	10.16	35.1	100	216	Peak
8457	39.58	-14.42	54	28.52	36	10.16	35.1	100	216	Average



Test Mode :	Mode 4	Temperature :	23~24℃
Test Channel :	01	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.81	26.32	-13.68	40	38.42	18.95	0.65	31.7	-	-	Peak
92.37	24.74	-18.76	43.5	46.15	9.17	1.12	31.7	-	-	Peak
294.06	31.59	-14.41	46	47.52	13.38	2.1	31.41	-	-	Peak
369.3	42.08	-3.92	46	55.59	15.31	2.44	31.26	100	64	Peak
637.4	32.84	-13.16	46	40.08	20.35	3.37	30.96	-	-	Peak
808.2	35.67	-10.33	46	40.21	22.29	3.87	30.7	-	-	Peak
2390	39.18	-14.82	54	35.75	32.13	5.46	34.16	102	139	Average
2390	54.89	-19.11	74	51.46	32.13	5.46	34.16	102	139	Peak
2412	92.74	-	-	89.3	32.16	5.44	34.16	102	139	Average
2412	101.49	-	-	98.05	32.16	5.44	34.16	102	139	Peak
2494	46.35	-27.65	74	42.88	32.3	5.37	34.2	102	139	Peak
2494	33.36	-20.64	54	29.89	32.3	5.37	34.2	102	139	Average
8319	52.71	-21.29	74	41.75	36	10.06	35.1	124	211	Peak
8319	39.24	-14.76	54	28.28	36	10.06	35.1	124	211	Average



Test Mode :	Mode 5	Temperature :	23~24℃
Test Channel :	06	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	21.41	-18.59	40	32.96	19.51	0.64	31.7	-	-	Peak
79.41	19.83	-20.17	40	43.05	7.48	1	31.7	-	-	Peak
294.33	39.44	-6.56	46	55.36	13.39	2.1	31.41	-	-	Peak
369.3	42.55	-3.45	46	56.06	15.31	2.44	31.26	100	28	Peak
528.2	27.82	-18.18	46	37.15	18.71	3.03	31.07	-	-	Peak
872.6	31.77	-14.23	46	35.5	22.92	4.05	30.7	-	-	Peak
2390	44.27	-29.73	74	40.84	32.13	5.46	34.16	101	339	Peak
2390	33.63	-20.37	54	30.2	32.13	5.46	34.16	101	339	Average
2437	106.21	-	-	102.76	32.22	5.41	34.18	101	339	Peak
2437	97.37	-	-	93.91	32.22	5.41	34.17	101	339	Average
2484	50.71	-23.29	74	47.25	32.27	5.38	34.19	101	339	Peak
2484	38.34	-15.66	54	34.88	32.27	5.38	34.19	101	339	Average
8139	51.83	-22.17	74	41	36	9.93	35.1	100	76	Peak
8139	39.55	-14.45	54	28.72	36	9.93	35.1	100	76	Average



Test Mode :	Mode 5	Temperature :	23~24℃
Test Channel :	06	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.62	26.09	-13.91	40	38.73	18.4	0.66	31.7	-	-	Peak
92.37	24.73	-18.77	43.5	46.14	9.17	1.12	31.7	-	-	Peak
298.65	30.33	-15.67	46	46.16	13.45	2.12	31.4	-	-	Peak
371.4	42.83	-3.17	46	56.28	15.36	2.45	31.26	100	31	Peak
637.4	36.26	-9.74	46	43.5	20.35	3.37	30.96	-	-	Peak
808.2	35.38	-10.62	46	39.92	22.29	3.87	30.7	-	-	Peak
2366	44.46	-29.54	74	41.04	32.08	5.49	34.15	100	141	Peak
2366	32.31	-21.69	54	28.89	32.08	5.49	34.15	100	141	Average
2437	102.34	-	-	98.88	32.22	5.41	34.17	100	141	Peak
2437	93.58	-	-	90.12	32.22	5.41	34.17	100	141	Average
2484	45.12	-28.88	74	41.66	32.27	5.38	34.19	100	141	Peak
2484	33.55	-20.45	54	30.09	32.27	5.38	34.19	100	141	Average
8316	53.27	-20.73	74	42.32	36	10.05	35.1	134	310	Peak
8316	40.06	-13.94	54	29.11	36	10.05	35.1	134	310	Average



Test Mode :	Mode 6	Temperature :	23~24℃
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
79.41	19.86	-20.14	40	43.08	7.48	1	31.7	-	-	Peak
193.62	23.82	-19.68	43.5	44.88	8.87	1.68	31.61	-	-	Peak
291.09	39.42	-6.58	46	55.42	13.34	2.08	31.42	-	-	Peak
300	37.24	-8.76	46	53.05	13.46	2.13	31.4	-	-	Peak
369.3	42.14	-3.86	46	55.65	15.31	2.44	31.26	100	221	Peak
872.6	32.49	-13.51	46	36.22	22.92	4.05	30.7	-	-	Peak
2382	44.83	-29.17	74	41.4	32.11	5.47	34.15	105	18	Peak
2382	34.12	-19.88	54	30.69	32.11	5.47	34.15	105	18	Average
2462	107.18	-	-	103.72	32.24	5.4	34.18	105	18	Peak
2462	98.45	-	-	94.99	32.24	5.4	34.18	105	18	Average
2483.5	52.36	-1.64	54	48.9	32.27	5.38	34.19	105	18	Average
2483.5	70.69	-3.31	74	67.23	32.27	5.38	34.19	105	18	Peak
8307	53.46	-20.54	74	42.51	36	10.05	35.1	100	265	Peak
8307	39.83	-14.17	54	28.88	36	10.05	35.1	100	265	Average



Test Mode :	Mode 6	Temperature :	23~24°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.62	26.71	-13.29	40	39.35	18.4	0.66	31.7	-	-	Peak
83.46	23.34	-16.66	40	46.05	7.96	1.03	31.7	-	-	Peak
299.46	32.09	-13.91	46	47.9	13.46	2.13	31.4	-	-	Peak
369.3	42.4	-3.6	46	55.91	15.31	2.44	31.26	100	111	Peak
637.4	33.62	-12.38	46	40.86	20.35	3.37	30.96	-	-	Peak
808.2	36.15	-9.85	46	40.69	22.29	3.87	30.7	-	-	Peak
2380	43.76	-30.24	74	40.33	32.11	5.47	34.15	100	133	Peak
2380	32.84	-21.16	54	29.41	32.11	5.47	34.15	100	133	Average
2462	103.55	-	-	100.09	32.24	5.4	34.18	100	133	Peak
2462	94.75	-	-	91.29	32.24	5.4	34.18	100	133	Average
2483.5	46.3	-7.7	54	42.84	32.27	5.38	34.19	100	133	Average
2483.5	64.99	-9.01	74	61.53	32.27	5.38	34.19	100	133	Peak
8412	53.58	-20.42	74	42.56	36	10.12	35.1	124	321	Peak
8412	40.22	-13.78	54	29.2	36	10.12	35.1	124	321	Average



Test Mode :	Mode 7	Temperature :	23~24°C
Test Channel :	01	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	41.77	-12.23	54	38.34	32.13	5.46	34.16	131	342	Average
2390	62.28	-11.72	74	58.85	32.13	5.46	34.16	131	342	Peak
2412	94.32	-	-	90.88	32.16	5.44	34.16	131	342	Average
2412	103.55	-	-	100.11	32.16	5.44	34.16	131	342	Peak
2486	46.79	-27.21	74	43.33	32.27	5.38	34.19	131	342	Peak
2486	36.4	-17.6	54	32.94	32.27	5.38	34.19	131	342	Average



Test Mode :	Mode 7	Temperature :	23~24°C
Test Channel :	01	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	37.62	-16.38	54	34.19	32.13	5.46	34.16	103	138	Average
2390	53.4	-20.6	74	49.97	32.13	5.46	34.16	103	138	Peak
2412	91.44	-	-	88	32.16	5.44	34.16	103	138	Average
2412	101.09	-	-	97.65	32.16	5.44	34.16	103	138	Peak
2486	44.56	-29.44	74	41.1	32.27	5.38	34.19	103	138	Peak
2486	32.57	-21.43	54	29.11	32.27	5.38	34.19	103	138	Average



Test Mode :	Mode 8	Temperature :	23~24°C
Test Channel :	06	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2324	44.61	-29.39	74	41.21	32.02	5.51	34.13	102	339	Peak
2324	32.29	-21.71	54	28.89	32.02	5.51	34.13	102	339	Average
2437	105.33	-	-	101.88	32.22	5.41	34.18	102	339	Peak
2437	96.19	-	-	92.73	32.22	5.41	34.17	102	339	Average
2484	49.73	-24.27	74	46.27	32.27	5.38	34.19	102	339	Peak
2484	37.69	-16.31	54	34.23	32.27	5.38	34.19	102	339	Average



Test Mode :	Mode 8	Temperature :	23~24°C
Test Channel :	06	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	44.38	-29.62	74	40.95	32.13	5.46	34.16	102	115	Peak
2390	33.58	-20.42	54	30.15	32.13	5.46	34.16	102	115	Average
2437	101.04	-	-	97.59	32.19	5.43	34.17	102	115	Peak
2437	91.88	-	-	88.42	32.22	5.41	34.17	102	115	Average
2484	47.37	-26.63	74	43.91	32.27	5.38	34.19	102	115	Peak
2484	34.86	-19.14	54	31.4	32.27	5.38	34.19	102	115	Average



Test Mode :	Mode 9	Temperature :	23~24℃
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2348	45.56	-28.44	74	42.15	32.05	5.5	34.14	102	14	Peak
2348	33.1	-20.9	54	29.69	32.05	5.5	34.14	102	14	Average
2462	106.55	-	-	103.09	32.24	5.4	34.18	102	14	Peak
2462	96.98	-	-	93.52	32.24	5.4	34.18	102	14	Average
2483.5	52.77	-1.23	54	49.31	32.27	5.38	34.19	102	14	Average
2483.5	72.38	-1.62	74	68.92	32.27	5.38	34.19	102	14	Peak



Test Mode :	Mode 9	Temperature :	23~24°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388	44.52	-29.48	74	41.08	32.13	5.46	34.15	100	133	Peak
2388	32.94	-21.06	54	29.5	32.13	5.46	34.15	100	133	Average
2462	104.13	-	-	100.67	32.24	5.4	34.18	100	133	Peak
2462	94.9	-	-	91.44	32.24	5.4	34.18	100	133	Average
2483.5	48.18	-5.82	54	44.72	32.27	5.38	34.19	100	133	Average
2483.5	68.4	-5.6	74	64.94	32.27	5.38	34.19	100	133	Peak



Test Mode :	Mode 10	Temperature :	23~24°C
Test Channel :	03	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2422 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
2387.9	42.97	-11.03	54	39.53	32.13	5.46	34.15	105	14	Average
2387.9	56.19	-17.81	74	52.75	32.13	5.46	34.15	105	14	Peak
2422	91	-	-	87.55	32.19	5.43	34.17	105	14	Average
2422	99.87	-	-	96.42	32.19	5.43	34.17	105	14	Peak
2484	49.36	-24.64	74	45.9	32.27	5.38	34.19	105	14	Peak
2484	37.27	-16.73	54	33.81	32.27	5.38	34.19	105	14	Average



Test Mode :	Mode 10	Temperature :	23~24℃
Test Channel :	03	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2422 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
2388.85	39.34	-14.66	54	35.9	32.13	5.46	34.15	101	114	Average
2388.85	51.42	-22.58	74	47.98	32.13	5.46	34.15	101	114	Peak
2422	86.15	-	-	82.7	32.19	5.43	34.17	101	114	Average
2422	96.03	-	-	92.58	32.19	5.43	34.17	101	114	Peak
2494	44.79	-29.21	74	41.32	32.3	5.37	34.2	101	114	Peak
2494	33.58	-20.42	54	30.11	32.3	5.37	34.2	101	114	Average



Test Mode :	Mode 11	Temperature :	23~24°C
Test Channel :	06	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	50.86	-23.14	74	47.43	32.13	5.46	34.16	101	352	Peak
2390	37.85	-16.15	54	34.42	32.13	5.46	34.16	101	352	Average
2437	100.17	-	-	96.71	32.24	5.4	34.18	101	352	Peak
2437	91.05	-	-	87.59	32.22	5.41	34.17	101	352	Average
2484	60.43	-13.57	74	56.97	32.27	5.38	34.19	101	352	Peak
2484	43.82	-10.18	54	40.36	32.27	5.38	34.19	101	352	Average



Test Mode :	Mode 11	Temperature :	23~24°C
Test Channel :	06	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	52.05	-21.95	74	48.62	32.13	5.46	34.16	104	116	Peak
2390	38.68	-15.32	54	35.25	32.13	5.46	34.16	104	116	Average
2437	97	-	-	93.55	32.22	5.41	34.18	104	116	Peak
2437	88.2	-	-	84.74	32.22	5.41	34.17	104	116	Average
2484	56.59	-17.41	74	53.13	32.27	5.38	34.19	104	116	Peak
2484	41.74	-12.26	54	38.28	32.27	5.38	34.19	104	116	Average



Test Mode :	Mode 12	Temperature :	23~24°C
Test Channel :	09	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2452 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
2388	47.21	-26.79	74	43.77	32.13	5.46	34.15	103	13	Peak
2388	35.41	-18.59	54	31.97	32.13	5.46	34.15	103	13	Average
2452	102.34	-	-	98.88	32.24	5.4	34.18	103	13	Peak
2452	92.84	-	-	89.39	32.22	5.41	34.18	103	13	Average
2487.65	70.24	-3.76	74	66.76	32.3	5.37	34.19	103	13	Peak
2487.65	53.19	-0.81	54	49.71	32.3	5.37	34.19	103	13	Average



Test Mode :	Mode 12	Temperature :	23~24°C
Test Channel :	09	Relative Humidity :	42~43%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2452 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
2388	45.38	-28.62	74	41.94	32.13	5.46	34.15	100	133	Peak
2388	33.75	-20.25	54	30.31	32.13	5.46	34.15	100	133	Average
2452	99.15	-	-	95.69	32.24	5.4	34.18	100	133	Peak
2452	90.25	-	-	86.8	32.22	5.41	34.18	100	133	Average
2488.22	64.06	-9.94	74	60.58	32.3	5.37	34.19	100	133	Peak
2488.22	46.58	-7.42	54	43.1	32.3	5.37	34.19	100	133	Average

3.4 Antenna Requirements

3.4.1 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.

3.4.2 Antenna Connected Construction

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

3.4.3 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
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Aug. 05, 2009	Aug. 04, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 30, 2009	Nov. 29, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 23, 2009	Nov. 22, 2010	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 04, 2009	Dec. 03, 2010	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec.09,2009	Dec. 08, 2010	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 27, 2009	Mar. 26, 2010	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 KHz~30 MHz	May 22, 2008	May 21, 2010	Radiation (03CH07-HY)

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 EP030509-02 as below.