

FCC RF Test Report

APPLICANT : Samsung Electronics
EQUIPMENT : GTM671W
BRAND NAME : Option
MODEL NAME : MO6712
IC : NCMOMO6712
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Jul. 11, 2011 and completely tested on Aug. 11, 2011. 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:



Jones Tsai / 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
FR171128	Rev. 01	Initial issue of report	Aug. 05, 2011
FR171128	Rev. 02	verify RSE and update data	Aug. 11, 2011
FR171128	Rev. 03	Revise antenna type and SW version	Aug. 24, 2011



SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.1	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 5.3 dB at 3.718 MHz
3.1	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 2.29 dB at 2389.61 MHz
3.4	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Samsung Electronics

416, Maetan-3dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, 443-742, Korea

1.2 Manufacturer

Samsung Electronics

416, Maetan-3dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, 443-742, Korea

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GTM671W
Brand Name	Option
Model Name	MO6712
FCC	NCMOMO6712
Host Notebook Computer	Brand Name : Samsung Model Name : XE700T1A Marketing Name : Series 7 HW Version : MP1.0 SW Version : Windows
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 : 17.07 dBm (0.0509 W) 802.11g : 21.62 dBm (0.1452 W) 802.11n (BW 20MHz) : 18.64 dBm (0.0731 W) 802.11n (BW 40MHz) : 18.59 dBm (0.0723 W)
Antenna Type	PIFA Antenna with gain 2.7 dBi
HW Version	3.1
SW Version	1.8.1.0
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH07-HY	722060/4086B-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 8

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	LCD Monitor	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
6.	iPod Earphone	Apple	A1285	FCC DoC	Unshielded, 1.0 m	N/A
7.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	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)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	16.49	-	-	-
CH 06	2437 MHz	16.50	-	-	-
CH 11	2462 MHz	17.07	17.05	17.04	17.06

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	20.71	21.06	21.30	21.60	21.60	21.32	20.80	21.62
CH 06	2437 MHz	20.31	-	-	-	-	-	-	21.08
CH 11	2462 MHz	20.51	-	-	-	-	-	-	20.97

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		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	18.50	18.47	18.58	18.33	18.59	18.52	18.60	18.64
CH 06	2437 MHz	18.32	-	-	-	-	-	-	18.48
CH 11	2462 MHz	18.08	-	-	-	-	-	-	18.23



Channel	Frequency	2.4GHz 802.11n (BW 40MHz) RF Power (dBm)							
		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	18.59	18.2	18.56	18.55	18.52	18.02	18.43	18.32
CH 06	2437 MHz	18.45	-	-	-	-	-	-	-
CH 09	2452 MHz	18.44	-	-	-	-	-	-	-

Remark:

1. The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 54Mbps for 802.11g, MCS7 for 802.11n (BW 20MHz), and MCS0 for 802.11n (BW 40MHz) for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.
3. Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.

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).

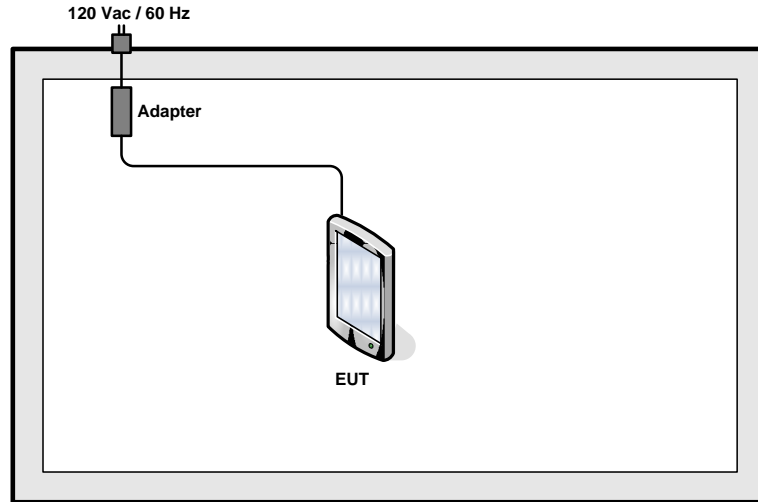
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

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

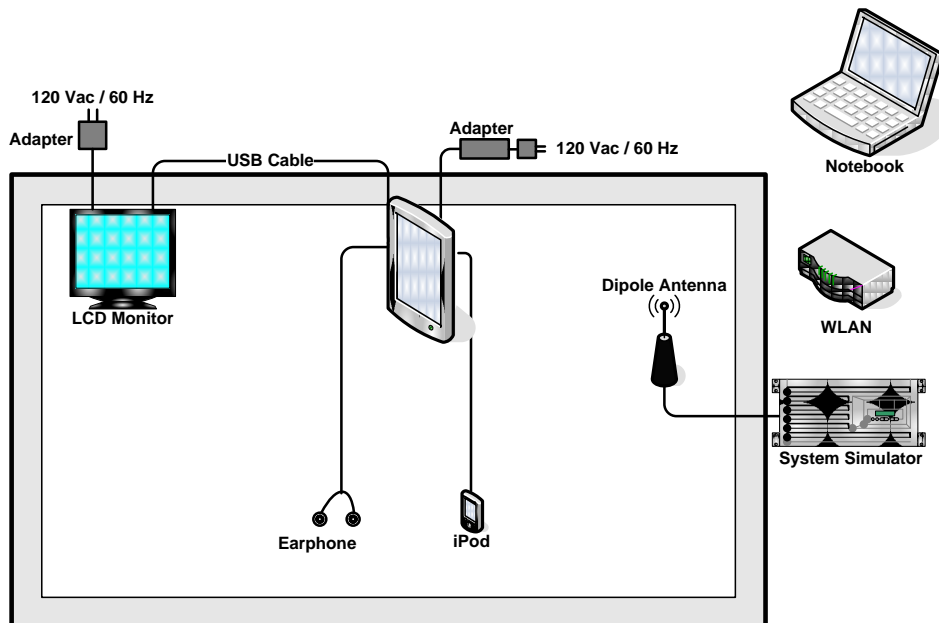
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 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 : GSM850 (GPRS850) Idle + WLAN Link + Bluetooth Link + TC + Adapter 1 Mode 2 : GSM850 (GPRS850) Idle + WLAN Link + Bluetooth Link + TC + Adapter 2	
Remark: 1. TC stands for Test Configuration, and consists of earphone, NFC Turn On, USB Cable and Notebook. 2. The worst case of conducted emission is mode 2; only the test data of it was reported.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

The programmed RF utility "WIN XP" 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

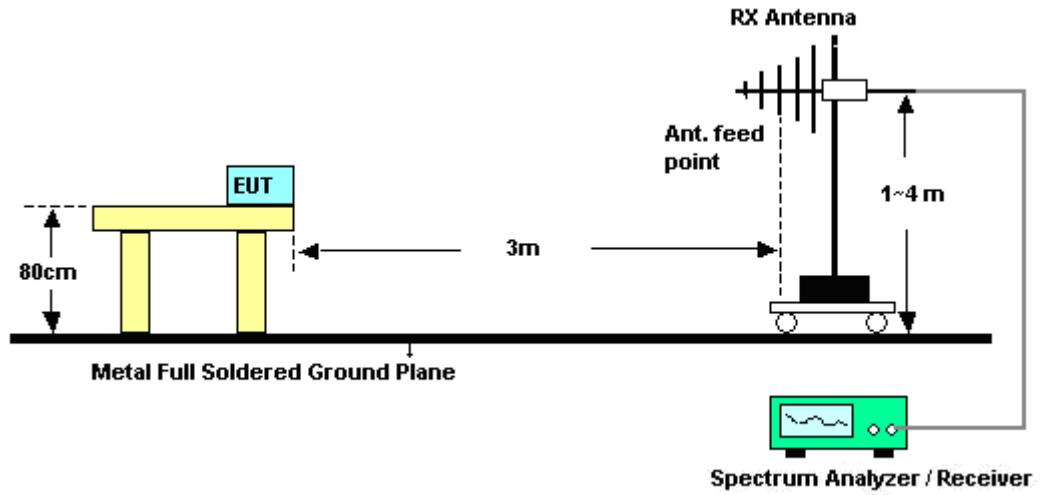
See list of measuring instruments of this test report.

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 :	23~25°C
Test Band :	802.11b	Relative Humidity :	49~51%
Test Channel :	01	Test Engineer :	Ivan Hsieh

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
2385.81	51.75	-22.25	74	47.39	32.18	6.03	33.85	166	318	Peak
2385.81	41.58	-12.42	54	37.22	32.18	6.03	33.85	166	318	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
2386.38	47.49	-26.51	74	43.13	32.18	6.03	33.85	100	88	Peak
2386.38	36.41	-17.59	54	32.05	32.18	6.03	33.85	100	88	Average

Test Mode :	Mode 3	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Ivan Hsieh

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
2488.22	53.81	-20.19	74	49.23	32.3	6.18	33.9	161	336	Peak
2488.22	46.24	-7.76	54	41.66	32.3	6.18	33.9	161	336	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	50.64	-23.36	74	46.06	32.3	6.18	33.9	102	98	Peak
2488.22	41.21	-12.79	54	36.63	32.3	6.18	33.9	102	98	Average



Test Mode :	Mode 4	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	49~51%
Test Channel :	01	Test Engineer :	Ivan Hsieh

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	70.29	-3.71	74	65.93	32.18	6.03	33.85	200	337	Peak
2389.99	50.11	-3.89	54	45.75	32.18	6.03	33.85	200	337	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	68.59	-5.41	74	64.23	32.18	6.03	33.85	100	88	Peak
2389.99	47.83	-6.17	54	43.47	32.18	6.03	33.85	100	88	Average

Test Mode :	Mode 6	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Ivan Hsieh

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.66	70.02	-3.98	74	65.46	32.28	6.18	33.9	134	338	Peak
2483.66	47.7	-6.3	54	43.14	32.28	6.18	33.9	134	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
2483.66	65.09	-8.91	74	60.53	32.28	6.18	33.9	154	98	Peak
2483.66	44.1	-9.9	54	39.54	32.28	6.18	33.9	154	98	Average



Test Mode :	Mode 7	Temperature :	23~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	49~51%
Test Channel :	01	Test Engineer :	Ivan Hsieh

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	70.71	-3.29	74	66.31	32.22	6.03	33.85	100	252	Peak
2388.85	49.91	-4.09	54	45.51	32.22	6.03	33.85	100	252	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.42	69.78	-4.22	74	65.38	32.22	6.03	33.85	189	281	Peak
2389.42	48.75	-5.25	54	44.35	32.22	6.03	33.85	189	281	Average

Test Mode :	Mode 9	Temperature :	23~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Ivan Hsieh

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.66	63.59	-10.41	74	59.03	32.28	6.18	33.9	100	132	Peak
2483.66	42.01	-11.99	54	37.45	32.28	6.18	33.9	100	132	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	58.78	-15.22	74	54.22	32.28	6.18	33.9	184	69	Peak
2483.5	39.05	-14.95	54	34.49	32.28	6.18	33.9	184	69	Average



Test Mode :	Mode 10	Temperature :	23~25°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	49~51%
Test Channel :	03	Test Engineer :	Ivan Hsieh

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	62.2	-11.8	74	57.84	32.18	6.03	33.85	100	110	Peak
2389.61	44.36	-9.64	54	40	32.18	6.03	33.85	100	110	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	58.65	-15.35	74	54.29	32.18	6.03	33.85	186	77	Peak
2388.85	39.02	-14.98	54	34.66	32.18	6.03	33.85	186	77	Average

Test Mode :	Mode 12	Temperature :	23~25°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	49~51%
Test Channel :	09	Test Engineer :	Ivan Hsieh

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
2483.85	63.62	-10.38	74	59.06	32.28	6.18	33.9	100	110	Peak
2483.85	47.09	-6.91	54	42.53	32.28	6.18	33.9	100	110	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.85	59.95	-14.05	74	55.39	32.28	6.18	33.9	184	80	Peak
2483.85	45.41	-8.59	54	40.85	32.28	6.18	33.9	184	80	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.

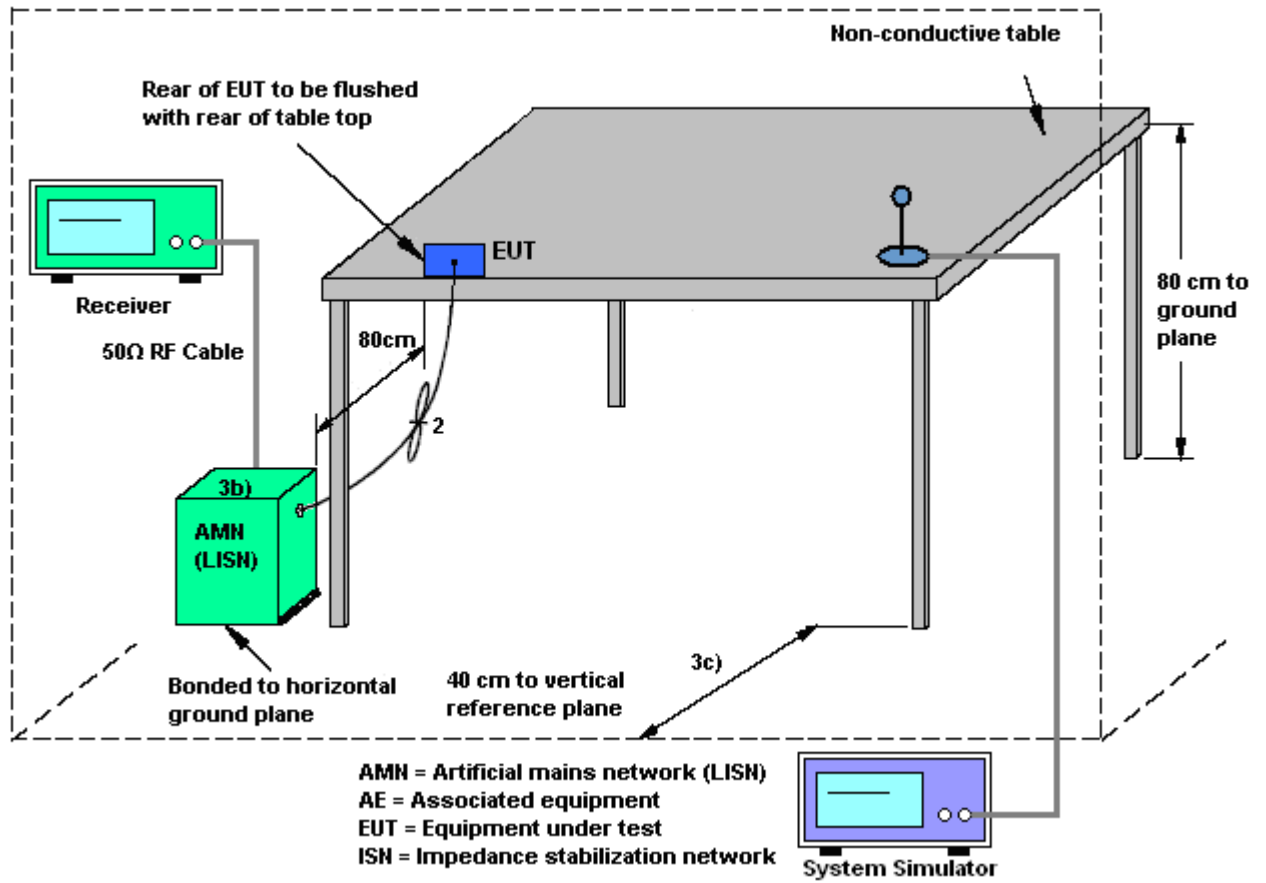
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

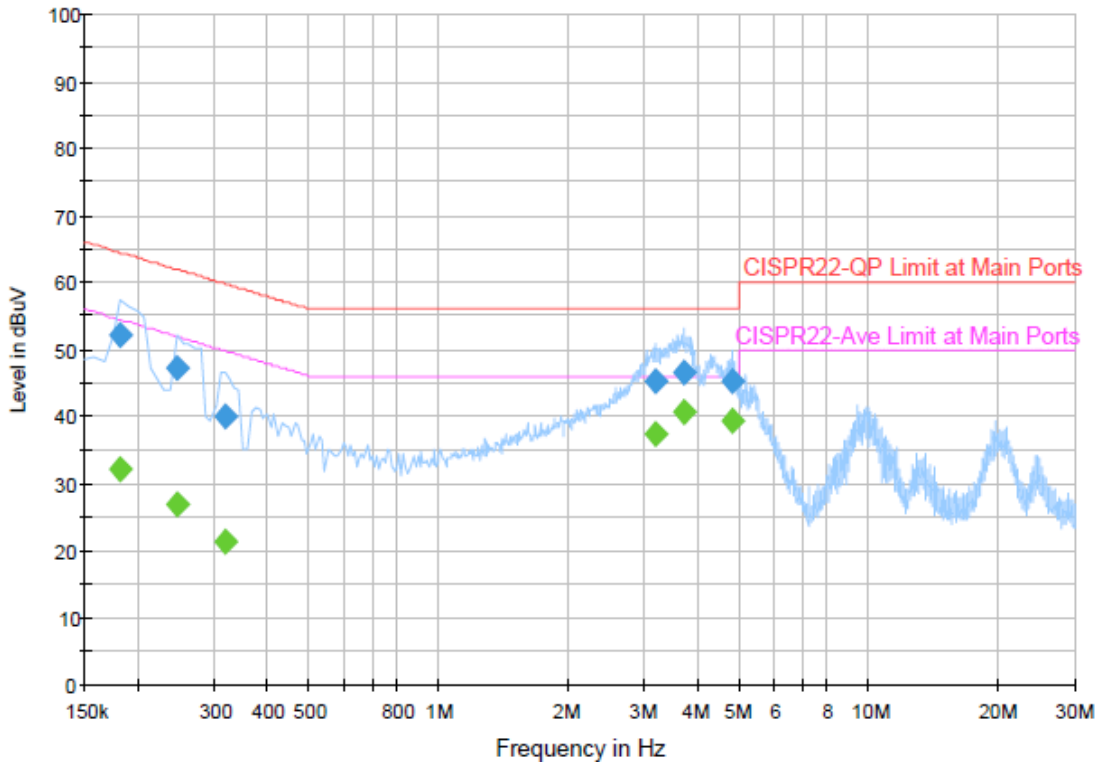
4. The testing follows the guidelines in ANSI C63.4-2003.
5. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
6. Connect EUT to the power mains through a line impedance stabilization network (LISN).
7. All the support units are connecting to the other LISN.
8. The LISN provides 50 ohm coupling impedance for the measuring instrument.
9. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
10. Both sides of AC line were checked for maximum conducted interference.
11. The frequency range from 150 kHz to 30 MHz was searched.
12. 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 2	Temperature :	21~23°C
Test Engineer :	Novic Chiang	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 (GPRS850) Idle + WLAN Link + Bluetooth Link + TC + Adapter 2		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

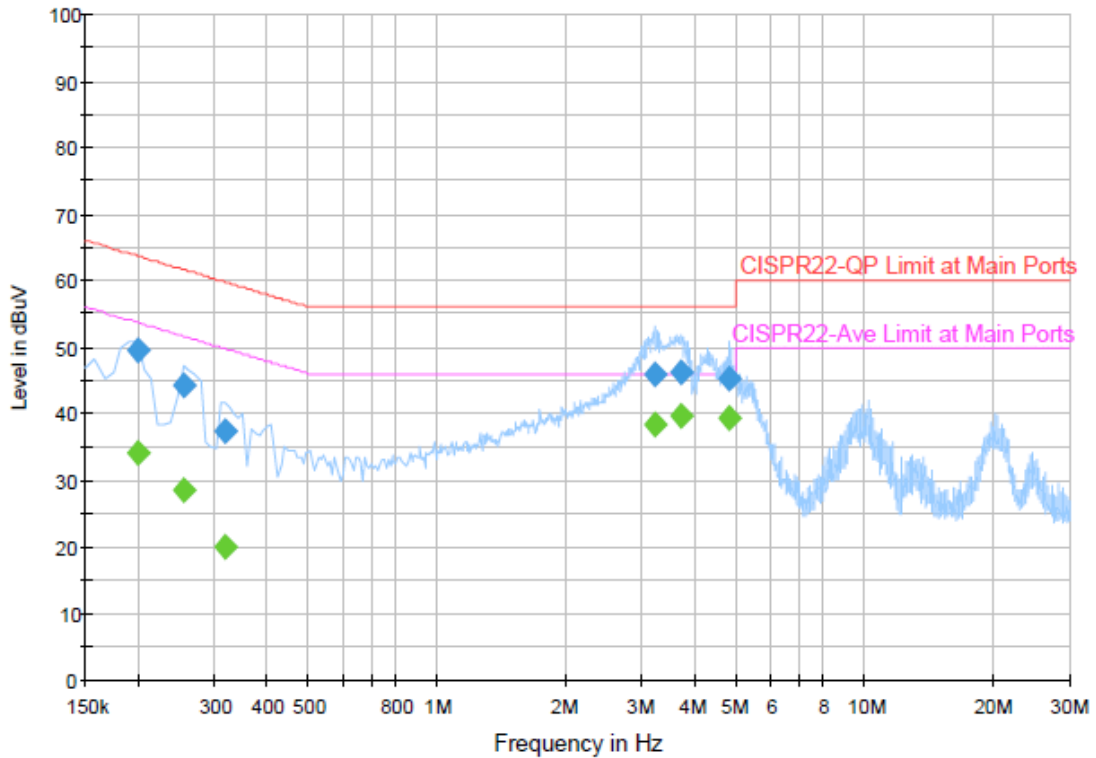
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	52.0	Off	L1	19.4	12.4	64.4
0.246000	47.3	Off	L1	19.4	14.6	61.9
0.318000	40.0	Off	L1	19.4	19.8	59.8
3.190000	45.1	Off	L1	19.5	10.9	56.0
3.718000	46.6	Off	L1	19.5	9.4	56.0
4.790000	45.1	Off	L1	19.5	10.9	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	32.0	Off	L1	19.4	22.4	54.4
0.246000	27.0	Off	L1	19.4	24.9	51.9
0.318000	21.5	Off	L1	19.4	28.3	49.8
3.190000	37.4	Off	L1	19.5	8.6	46.0
3.718000	40.7	Off	L1	19.5	5.3	46.0
4.790000	39.4	Off	L1	19.5	6.6	46.0



Test Mode :	Mode 2	Temperature :	21~23°C
Test Engineer :	Novic Chiang	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 (GPRS850) Idle + WLAN Link + Bluetooth Link + TC + Adapter 2		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.198000	49.4	Off	N	19.4	14.3	63.7
0.254000	44.1	Off	N	19.4	17.5	61.6
0.318000	37.5	Off	N	19.4	22.3	59.8
3.214000	45.9	Off	N	19.5	10.1	56.0
3.702000	46.2	Off	N	19.5	9.8	56.0
4.790000	45.2	Off	N	19.5	10.8	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.198000	34.1	Off	N	19.4	19.6	53.7
0.254000	28.6	Off	N	19.4	23.0	51.6
0.318000	19.9	Off	N	19.4	29.9	49.8
3.214000	38.4	Off	N	19.5	7.6	46.0
3.702000	39.8	Off	N	19.5	6.2	46.0
4.790000	39.4	Off	N	19.5	6.6	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.

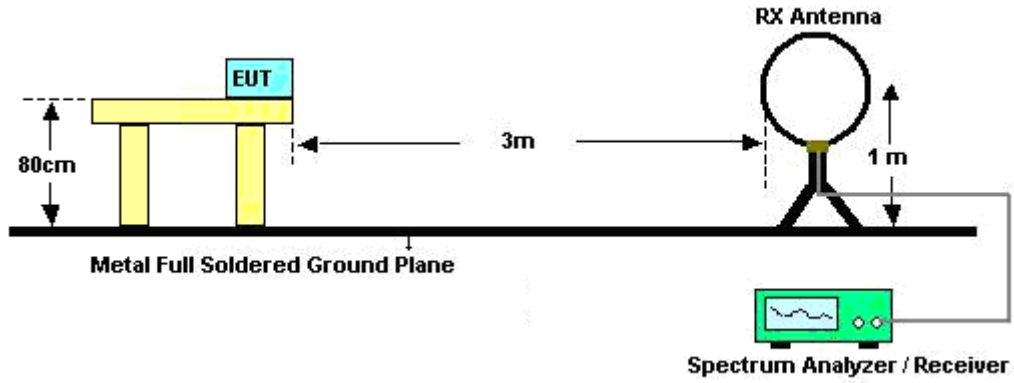


3.3.3 Test Procedures

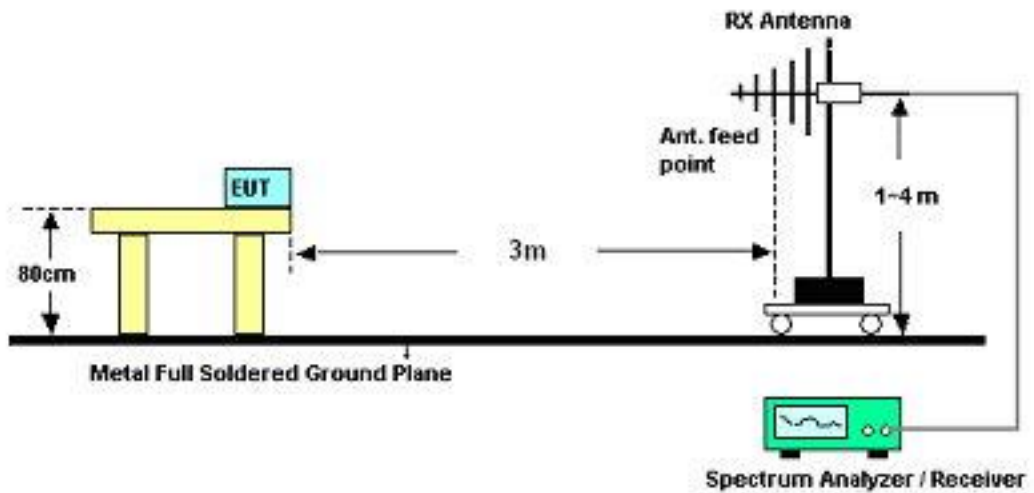
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep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

3.3.4 Test Setup

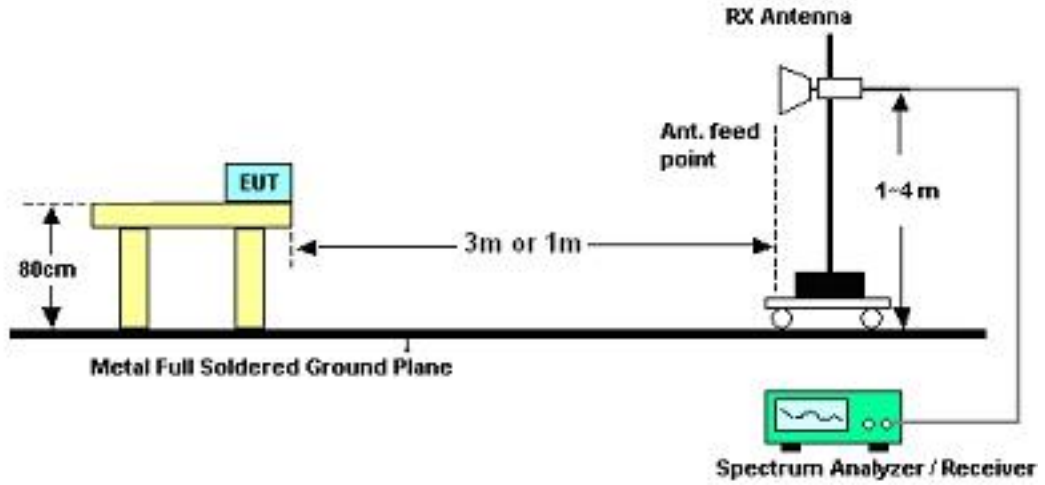
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	Ivan Hsieh	Temperature :	23~25°C	
		Relative Humidity :	49~51%	
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 (specific distance / test distance) (dB);

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



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

Test Mode :	Mode 1	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
49.98	26.81	-13.19	40	49.37	8.28	0.7	31.54	-	-	Peak
237.09	29.07	-16.93	46	47.28	11.71	1.51	31.43	-	-	Peak
299.46	36.68	-9.32	46	52.78	13.46	1.77	31.33	100	92	Peak
307	32.58	-13.42	46	48.42	13.7	1.79	31.33	-	-	Peak
397.3	26.61	-19.39	46	39.16	16.5	2.14	31.19	-	-	Peak
985.3	27.37	-26.63	54	29.74	24.71	3.5	30.58	-	-	Peak
2385.81	51.75	-22.25	74	47.39	32.18	6.03	33.85	166	318	Peak
2385.81	41.58	-12.42	54	37.22	32.18	6.03	33.85	166	318	Average
2412	103.25	-	-	98.85	32.2	6.07	33.87	166	318	Peak
2412	99.74	-	-	95.34	32.2	6.07	33.87	166	318	Average
2500	36.66	-17.34	54	32.08	32.3	6.18	33.9	166	318	Average
2500	50.88	-23.12	74	46.3	32.3	6.18	33.9	166	318	Peak



Test Mode :	Mode 1	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
40.26	26.68	-13.32	40	45.06	12.5	0.63	31.51	-	-	Peak
106.41	32.1	-11.4	43.5	52.25	10.37	1.03	31.55	100	327	Peak
272.46	27.37	-18.63	46	44.06	13.03	1.64	31.36	-	-	Peak
540.1	22.03	-23.97	46	31.66	18.84	2.53	31	-	-	Peak
696.9	23.59	-22.41	46	30.62	20.86	2.93	30.82	-	-	Peak
960.1	26.74	-27.26	54	29.45	24.39	3.47	30.57	-	-	Peak
2386.38	47.49	-26.51	74	43.13	32.18	6.03	33.85	100	88	Peak
2386.38	36.41	-17.59	54	32.05	32.18	6.03	33.85	100	88	Average
2412	97.39	-	-	92.99	32.2	6.07	33.87	100	88	Peak
2412	93.73	-	-	89.33	32.2	6.07	33.87	100	88	Average
2492	33.21	-20.79	54	28.63	32.3	6.18	33.9	100	88	Average
2492	45.63	-28.37	74	41.05	32.3	6.18	33.9	100	88	Peak



Test Mode :	Mode 2	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
40.26	26.54	-13.46	40	44.92	12.5	0.63	31.51	-	-	Peak
49.98	26.69	-13.31	40	49.25	8.28	0.7	31.54	-	-	Peak
298.65	34.28	-11.72	46	50.41	13.44	1.76	31.33	120	212	Peak
330.1	30.51	-15.49	46	45.58	14.39	1.85	31.31	-	-	Peak
399.4	27.12	-18.88	46	39.6	16.56	2.14	31.18	-	-	Peak
800.5	24.13	-21.87	46	29.2	22.47	3.14	30.68	-	-	Peak
2364	45.36	-28.64	74	41.08	32.13	5.99	33.84	164	338	Peak
2364	33.76	-20.24	54	29.48	32.13	5.99	33.84	164	338	Average
2437	100.81	-	-	96.36	32.22	6.11	33.88	164	338	Peak
2437	96.58	-	-	92.11	32.24	6.11	33.88	164	338	Average
2484	46.08	-27.92	74	41.52	32.28	6.18	33.9	164	338	Peak
2484	34.99	-19.01	54	30.43	32.28	6.18	33.9	164	338	Average



Test Mode :	Mode 2	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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	27.13	-12.87	40	42	16.04	0.55	31.46	-	-	Peak
106.41	31.56	-11.94	43.5	51.71	10.37	1.03	31.55	100	281	Peak
276.78	29.24	-16.76	46	45.87	13.09	1.64	31.36	-	-	Peak
497.4	21.89	-24.11	46	32.34	18.18	2.44	31.07	-	-	Peak
755	24.17	-21.83	46	30.05	21.75	3.07	30.7	-	-	Peak
998.6	27.52	-26.48	54	29.71	24.88	3.51	30.58	-	-	Peak
2366	45.15	-28.85	74	40.87	32.13	5.99	33.84	126	95	Peak
2366	33.39	-20.61	54	29.11	32.13	5.99	33.84	126	95	Average
2437	90.9	-	-	86.43	32.24	6.11	33.88	126	95	Average
2437	94.07	-	-	89.6	32.24	6.11	33.88	126	95	Peak
2500	46.17	-27.83	74	41.59	32.3	6.18	33.9	126	95	Peak
2500	33.77	-20.23	54	29.19	32.3	6.18	33.9	126	95	Average
7311	47.06	-26.94	74	59.68	35.45	10.06	58.13	100	0	Peak



Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
49.98	26.58	-13.42	40	49.14	8.28	0.7	31.54	-	-	Peak
272.73	33.5	-12.5	46	50.19	13.03	1.64	31.36	-	-	Peak
299.73	34.44	-11.56	46	50.54	13.46	1.77	31.33	100	193	Peak
304.9	30.59	-15.41	46	46.53	13.61	1.78	31.33	-	-	Peak
352.5	29.15	-16.85	46	43.35	15.09	1.99	31.28	-	-	Peak
758.5	24.38	-21.62	46	30.2	21.81	3.07	30.7	-	-	Peak
2366	45.92	-28.08	74	41.64	32.13	5.99	33.84	161	336	Peak
2366	33.61	-20.39	54	29.33	32.13	5.99	33.84	161	336	Average
2462	98.35	-	-	93.84	32.26	6.14	33.89	161	336	Average
2462	101.94	-	-	97.43	32.26	6.14	33.89	161	336	Peak
2488.22	53.81	-20.19	74	49.23	32.3	6.18	33.9	161	336	Peak
2488.22	46.24	-7.76	54	41.66	32.3	6.18	33.9	161	336	Average



Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.81	30.12	-9.88	40	44.77	16.27	0.54	31.46	100	226	Peak
106.41	28.9	-14.6	43.5	49.05	10.37	1.03	31.55	-	-	Peak
275.7	27.42	-18.58	46	44.07	13.07	1.64	31.36	-	-	Peak
312.6	22.05	-23.95	46	37.73	13.85	1.79	31.32	-	-	Peak
668.2	23.15	-22.85	46	30.59	20.53	2.88	30.85	-	-	Peak
982.5	27.35	-26.65	54	29.77	24.67	3.49	30.58	-	-	Peak
2324	45.76	-28.24	74	41.57	32.09	5.92	33.82	102	98	Peak
2324	33.18	-20.82	54	28.99	32.09	5.92	33.82	102	98	Average
2462	92.04	-	-	87.53	32.26	6.14	33.89	102	98	Average
2462	95.9	-	-	91.39	32.26	6.14	33.89	102	98	Peak
2488.22	50.64	-23.36	74	46.06	32.3	6.18	33.9	102	98	Peak
2488.22	41.21	-12.79	54	36.63	32.3	6.18	33.9	102	98	Average



Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
49.98	26.48	-13.52	40	49.04	8.28	0.7	31.54	-	-	Peak
267.06	34.14	-11.86	46	50.98	12.93	1.62	31.39	-	-	Peak
277.86	34.92	-11.08	46	51.52	13.12	1.64	31.36	114	251	Peak
307	31.48	-14.52	46	47.32	13.7	1.79	31.33	-	-	Peak
351.8	27.16	-18.84	46	41.36	15.09	1.99	31.28	-	-	Peak
898.5	26.74	-19.26	46	30.49	23.61	3.34	30.7	-	-	Peak
2389.99	70.29	-3.71	74	65.93	32.18	6.03	33.85	200	337	Peak
2389.99	50.11	-3.89	54	45.75	32.18	6.03	33.85	200	337	Average
2412	103.39	-	-	98.97	32.22	6.07	33.87	200	337	Peak
2412	89.66	-	-	85.26	32.2	6.07	33.87	200	337	Average
2500	33.94	-20.06	54	29.36	32.3	6.18	33.9	200	337	Average
2500	45.76	-28.24	74	41.18	32.3	6.18	33.9	200	337	Peak



Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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	26.8	-13.2	40	41.22	16.51	0.53	31.46	100	168	Peak
106.41	28.7	-14.8	43.5	48.85	10.37	1.03	31.55	-	-	Peak
270.57	28.15	-17.85	46	44.88	13	1.64	31.37	-	-	Peak
335.7	23.98	-22.02	46	38.84	14.57	1.87	31.3	-	-	Peak
596.8	22.96	-23.04	46	31.49	19.71	2.68	30.92	-	-	Peak
993.7	26.95	-27.05	54	29.21	24.82	3.5	30.58	-	-	Peak
2389.99	68.59	-5.41	74	64.23	32.18	6.03	33.85	100	88	Peak
2389.99	47.83	-6.17	54	43.47	32.18	6.03	33.85	100	88	Average
2412	100.51	-	-	96.09	32.22	6.07	33.87	100	88	Peak
2412	86.19	-	-	81.79	32.2	6.07	33.87	100	88	Average
2484	33.03	-20.97	54	28.47	32.28	6.18	33.9	100	88	Average
2484	45.04	-28.96	74	40.48	32.28	6.18	33.9	100	88	Peak



Test Mode :	Mode 5	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
49.17	26.65	-13.35	40	48.81	8.68	0.69	31.53	-	-	Peak
192.81	29.86	-13.64	43.5	50.99	9.08	1.29	31.5	-	-	Peak
299.46	33.83	-12.17	46	49.93	13.46	1.77	31.33	-	-	Peak
301.4	34.6	-11.4	46	50.64	13.52	1.77	31.33	105	47	Peak
399.4	25.9	-20.1	46	38.38	16.56	2.14	31.18	-	-	Peak
988.1	27.44	-26.56	54	29.78	24.74	3.5	30.58	-	-	Peak
2388	45.09	-28.91	74	40.73	32.18	6.03	33.85	108	329	Peak
2388	33.61	-20.39	54	29.25	32.18	6.03	33.85	108	329	Average
2437	101.6	-	-	97.15	32.22	6.11	33.88	108	329	Peak
2437	87.31	-	-	82.84	32.24	6.11	33.88	108	329	Average
2486	49.9	-24.1	74	45.34	32.28	6.18	33.9	108	329	Peak
2486	34.18	-19.82	54	29.62	32.28	6.18	33.9	108	329	Average



Test Mode :	Mode 5	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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	25.52	-14.48	40	40.39	16.04	0.55	31.46	-	-	Peak
48.9	26.73	-13.27	40	48.5	9.08	0.68	31.53	100	332	Peak
106.41	28.12	-15.38	43.5	48.27	10.37	1.03	31.55	-	-	Peak
341.3	21.69	-24.31	46	36.34	14.75	1.9	31.3	-	-	Peak
643.7	22.83	-23.17	46	30.63	20.26	2.82	30.88	-	-	Peak
987.4	28.6	-25.4	54	30.95	24.73	3.5	30.58	-	-	Peak
2316	45.3	-28.7	74	41.13	32.07	5.92	33.82	154	86	Peak
2316	33.13	-20.87	54	28.96	32.07	5.92	33.82	154	86	Average
2437	96.22	-	-	91.77	32.22	6.11	33.88	154	86	Peak
2437	82.92	-	-	78.45	32.24	6.11	33.88	154	86	Average
2484	45.25	-28.75	74	40.69	32.28	6.18	33.9	154	86	Peak
2484	32.96	-21.04	54	28.4	32.28	6.18	33.9	154	86	Average



Test Mode :	Mode 6	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
49.17	26.34	-13.66	40	48.5	8.68	0.69	31.53	-	-	Peak
274.89	33.24	-12.76	46	49.9	13.06	1.64	31.36	-	-	Peak
298.65	34.18	-11.82	46	50.31	13.44	1.76	31.33	100	244	Peak
302.1	32.27	-13.73	46	48.27	13.55	1.78	31.33	-	-	Peak
352.5	27.03	-18.97	46	41.23	15.09	1.99	31.28	-	-	Peak
974.1	26.49	-27.51	54	29.02	24.56	3.48	30.57	-	-	Peak
2382	46	-28	74	41.66	32.16	6.03	33.85	134	338	Peak
2382	33.67	-20.33	54	29.33	32.16	6.03	33.85	134	338	Average
2462	88.77	-	-	84.26	32.26	6.14	33.89	134	338	Average
2462	101.06	-	-	96.55	32.26	6.14	33.89	134	338	Peak
2483.66	70.02	-3.98	74	65.46	32.28	6.18	33.9	134	338	Peak
2483.66	47.7	-6.3	54	43.14	32.28	6.18	33.9	134	338	Average



Test Mode :	Mode 6	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	27.09	-12.91	40	41.74	16.27	0.54	31.46	100	109	Peak
106.41	30.27	-13.23	43.5	50.42	10.37	1.03	31.55	-	-	Peak
278.94	28.3	-17.7	46	44.88	13.13	1.64	31.35	-	-	Peak
300	22.02	-23.98	46	38.12	13.46	1.77	31.33	-	-	Peak
497.4	21.8	-24.2	46	32.25	18.18	2.44	31.07	-	-	Peak
665.4	23.58	-22.42	46	31.06	20.5	2.87	30.85	-	-	Peak
2350	45.39	-28.61	74	41.16	32.11	5.95	33.83	154	98	Peak
2350	33.27	-20.73	54	29.04	32.11	5.95	33.83	154	98	Average
2462	83.78	-	-	79.27	32.26	6.14	33.89	154	98	Average
2462	98.12	-	-	93.61	32.26	6.14	33.89	154	98	Peak
2483.66	65.09	-8.91	74	60.53	32.28	6.18	33.9	154	98	Peak
2483.66	44.1	-9.9	54	39.54	32.28	6.18	33.9	154	98	Average



Test Mode :	Mode 7	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
2388.85	70.71	-3.29	74	66.31	32.22	6.03	33.85	100	252	Peak
2388.85	49.91	-4.09	54	45.51	32.22	6.03	33.85	100	252	Average
2412	103.54	-	-	99.11	32.23	6.07	33.87	100	252	Peak
2412	89.49	-	-	85.06	32.23	6.07	33.87	100	252	Average
2494	35.4	-18.6	54	30.82	32.3	6.18	33.9	100	252	Average
2494	47.1	-26.9	74	42.52	32.3	6.18	33.9	100	252	Peak

Test Mode :	Mode 7	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
2389.42	69.78	-4.22	74	65.38	32.22	6.03	33.85	189	281	Peak
2389.42	48.75	-5.25	54	44.35	32.22	6.03	33.85	189	281	Average
2412	100.38	-	-	95.95	32.23	6.07	33.87	189	281	Peak
2412	87.06	-	-	82.63	32.23	6.07	33.87	189	281	Average
2486	34.4	-19.6	54	29.83	32.29	6.18	33.9	189	281	Average
2486	47.85	-26.15	74	43.28	32.29	6.18	33.9	189	281	Peak



Test Mode :	Mode 8	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
2356	45.24	-28.76	74	40.99	32.13	5.95	33.83	125	113	Peak
2356	33.04	-20.96	54	28.79	32.13	5.95	33.83	125	113	Average
2437	98.52	-	-	94.05	32.24	6.11	33.88	125	113	Peak
2437	88.23	-	-	83.76	32.24	6.11	33.88	125	113	Average
2492	49.53	-24.47	74	44.95	32.3	6.18	33.9	125	113	Peak
2492	34.94	-19.06	54	30.36	32.3	6.18	33.9	125	113	Average

Test Mode :	Mode 8	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
2358	45.67	-28.33	74	41.39	32.13	5.99	33.84	187	71	Peak
2358	32.91	-21.09	54	28.63	32.13	5.99	33.84	187	71	Average
2437	93.78	-	-	89.31	32.24	6.11	33.88	187	71	Peak
2437	83.73	-	-	79.26	32.24	6.11	33.88	187	71	Average
2500	33.93	-20.07	54	29.35	32.3	6.18	33.9	187	71	Average
2500	48.6	-25.4	74	44.02	32.3	6.18	33.9	187	71	Peak



Test Mode :	Mode 9	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
2390	45.75	-28.25	74	41.39	32.18	6.03	33.85	100	132	Peak
2390	33.61	-20.39	54	29.25	32.18	6.03	33.85	100	132	Average
2462	96.94	-	-	92.43	32.26	6.14	33.89	100	132	Peak
2462	86.84	-	-	82.33	32.26	6.14	33.89	100	132	Average
2483.66	63.59	-10.41	74	59.03	32.28	6.18	33.9	100	132	Peak
2483.66	42.01	-11.99	54	37.45	32.28	6.18	33.9	100	132	Average

Test Mode :	Mode 9	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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	45.91	-28.09	74	41.55	32.18	6.03	33.85	184	69	Peak
2388	33.51	-20.49	54	29.15	32.18	6.03	33.85	184	69	Average
2462	94.14	-	-	89.63	32.26	6.14	33.89	184	69	Peak
2462	84.64	-	-	80.13	32.26	6.14	33.89	184	69	Average
2483.5	58.78	-15.22	74	54.22	32.28	6.18	33.9	184	69	Peak
2483.5	39.05	-14.95	54	34.49	32.28	6.18	33.9	184	69	Average



Test Mode :	Mode 10	Temperature :	23~25°C
Test Channel :	03	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
2389.61	62.2	-11.8	74	57.84	32.18	6.03	33.85	100	110	Peak
2389.61	44.36	-9.64	54	40	32.18	6.03	33.85	100	110	Average
2422	96.26	-	-	91.84	32.22	6.07	33.87	100	110	Peak
2422	85.71	-	-	81.29	32.22	6.07	33.87	100	110	Average
2494	35.12	-18.88	54	30.54	32.3	6.18	33.9	100	110	Average
2494	48.93	-25.07	74	44.35	32.3	6.18	33.9	100	110	Peak

Test Mode :	Mode 10	Temperature :	23~25°C
Test Channel :	03	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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	58.65	-15.35	74	54.29	32.18	6.03	33.85	186	77	Peak
2388.85	39.02	-14.98	54	34.66	32.18	6.03	33.85	186	77	Average
2422	93.01	-	-	88.59	32.22	6.07	33.87	186	77	Peak
2422	82.57	-	-	78.15	32.22	6.07	33.87	186	77	Average
2500	34.05	-19.95	54	29.47	32.3	6.18	33.9	186	77	Average
2500	47.85	-26.15	74	43.27	32.3	6.18	33.9	186	77	Peak



Test Mode :	Mode 11	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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	57.55	-16.45	74	53.19	32.18	6.03	33.85	100	146	Peak
2390	39.39	-14.61	54	35.03	32.18	6.03	33.85	100	146	Average
2437	95.53	-	-	91.06	32.24	6.11	33.88	100	146	Peak
2437	84.25	-	-	79.78	32.24	6.11	33.88	100	146	Average
2484	65.05	-8.95	74	60.49	32.28	6.18	33.9	100	146	Peak
2484	42.35	-11.65	54	37.79	32.28	6.18	33.9	100	146	Average

Test Mode :	Mode 11	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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	54.62	-19.38	74	50.26	32.18	6.03	33.85	186	74	Peak
2390	37.29	-16.71	54	32.93	32.18	6.03	33.85	186	74	Average
2437	92.02	-	-	87.55	32.24	6.11	33.88	186	74	Peak
2437	81.32	-	-	76.85	32.24	6.11	33.88	186	74	Average
2484	55.72	-18.28	74	51.16	32.28	6.18	33.9	186	74	Peak
2484	38.2	-15.8	54	33.64	32.28	6.18	33.9	186	74	Average



Test Mode :	Mode 12	Temperature :	23~25°C
Test Channel :	09	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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
2390	46.27	-27.73	74	41.91	32.18	6.03	33.85	100	110	Peak
2390	33.94	-20.06	54	29.58	32.18	6.03	33.85	100	110	Average
2452	95.47	-	-	91	32.24	6.11	33.88	100	110	Peak
2452	84.82	-	-	80.35	32.24	6.11	33.88	100	110	Average
2483.85	63.62	-10.38	74	59.06	32.28	6.18	33.9	100	110	Peak
2483.85	47.09	-6.91	54	42.53	32.28	6.18	33.9	100	110	Average

Test Mode :	Mode 12	Temperature :	23~25°C
Test Channel :	09	Relative Humidity :	49~51%
Test Engineer :	Ivan Hsieh	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	45.7	-28.3	74	41.34	32.18	6.03	33.85	184	80	Peak
2388	33.52	-20.48	54	29.16	32.18	6.03	33.85	184	80	Average
2452	92.72	-	-	88.25	32.24	6.11	33.88	184	80	Peak
2452	82.59	-	-	78.12	32.24	6.11	33.88	184	80	Average
2483.85	59.95	-14.05	74	55.39	32.28	6.18	33.9	184	80	Peak
2483.85	45.41	-8.59	54	40.85	32.28	6.18	33.9	184	80	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
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Jun. 12, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
ISN	Teseq GmbH	ISN T400A	25696	N/A	Jun. 16, 2011	Jun. 15, 2012	Conduction (CO05-HY)
ISN	Teseq GmbH	ISN T800	27134	N/A	Jun. 16, 2011	Jun. 15, 2012	Conduction (CO05-HY)
DC- LISN	R&S	ESH3-26	1000485	0.1MHz~200MHz	Jun. 08, 2011	Jun. 07, 2012	Conduction (CO05-HY)
DC- LISN	R&S	ESH3-26	1000484	0.1MHz~200MHz	Jun. 08, 2011	Jun. 07, 2012	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2010	Aug. 18, 2011	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32dB.GAIN	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH07-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	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 EP171128 as below.