

# Partial FCC RF Test Report

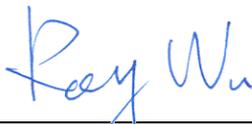
APPLICANT : ASUSTek COMPUTER INC.  
EQUIPMENT : Eee PC  
BRAND NAME : ASUS  
MODEL NAME : EeePC 1005PEG  
FCC ID : MSQE05F3307  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : Digital Transmission System (DTS)

The product was integrated the WLAN Module (Brand Name: AZWAVE / Model Name: AW-NE785H) during the test.

The product was received on Jan. 28, 2010 and completely tested on Feb. 26, 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 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.2	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 8.1 dB at 0.150 MHz
3.3	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.47 dB at 2483.66 MHz
3.4	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**ASUSTek COMPUTER INC.**

4F., No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan

## 1.2 Manufacturer

**1. PEGATRON CORPORATION Taoyuan Mfg.**

No. 5, Shing Yeh St., Kwei Shan Hsiang, Taoyuan 333, Taiwan

**2. Protek (Shanghai) Limited.**

No. 3768, Xiu Yan Rd., Nanhui District, Shanghai China

**3. NorthTec Asis (Shanghai) Limited.**

No. 3768, Xiuyan Rd., Kangqiao Town, Nanhui District, Shanghai, 201319 China

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
<b>Equipment</b>	Eee PC
<b>Brand Name</b>	ASUS
<b>Model Name</b>	EeePC 1005PEG
<b>FCC ID</b>	MSQE05F3307
<b>Tx/Rx Frequency Range</b>	2400 MHz ~ 2483.5 MHz
<b>Number of Channels</b>	11
<b>Carrier Frequency of Each Channel</b>	2412+(n-1)*5 MHz; n=1~11
<b>Channel Spacing</b>	5 MHz
<b>Antenna Type</b>	PIFA Antenna with gain -0.81 dBi
<b>HW Version</b>	Mainboard : Mb R1.2G
<b>SW Version</b>	Mainboard : Bios 0202
<b>Type of Modulation</b>	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
<b>EUT Stage</b>	Production Unit

**Remark:**

- For other wireless features of this EUT, test report will be issued separately.
- This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
- 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

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC/IC Registration No.</b>
	CO05-HY	03CH07-HY	TW1022/4086B-1

## 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 7

### Remark:

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

## 1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	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	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
6.	Earphone	Ergotech	ET-E200	FCC DoC	Unshielded, 1.8 m	N/A
7.	Earphone	Kolin	Kit-7460E	FCC DoC	Unshielded, 1.6 m	N/A
8.	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	
CH 01	2412 MHz	19.98	
CH 06	2437 MHz	20.34	
CH 11	2462 MHz	<b>20.87</b>	

Channel	Frequency	2.4GHz 802.11g	2.4GHz 802.11n (BW 20MHz)
		RF Power (dBm)	RF Power (dBm)
		At OFDM Data Rate	At OFDM Data Rate
		6 Mbps	6.5 Mbps
CH 01	2412 MHz	21.84	20.84
CH 06	2437 MHz	25.04	<b>25.11</b>
CH 11	2462 MHz	22.75	21.70

Channel	Frequency	2.4GHz 802.11n (BW 40MHz) RF Power (dBm)	
		At OFDM Data Rate	
		13.5 Mbps	
CH 03	2422 MHz	17.32	
CH 06	2437 MHz	21.56	
CH 09	2452 MHz	17.05	

**Remark:**

1. The data rates were set in 1Mbps for 802.11b modes and 6.5Mbps for 802.11n (BW 20MHz) modes; only these modes were chosen for the completely radiated spurious emission tests due to the maximum RF output power. For 802.11g and 802.11n (BW 40MHz) modes, only the frequency band edges tests were verified.
2. The EUT is programmed to transmit signals continuously for all testing.

## 2.2 Test Mode

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

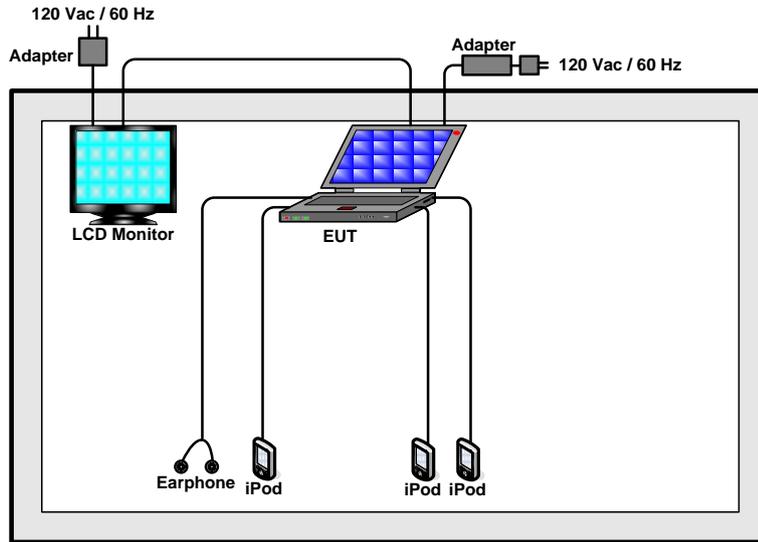
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

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

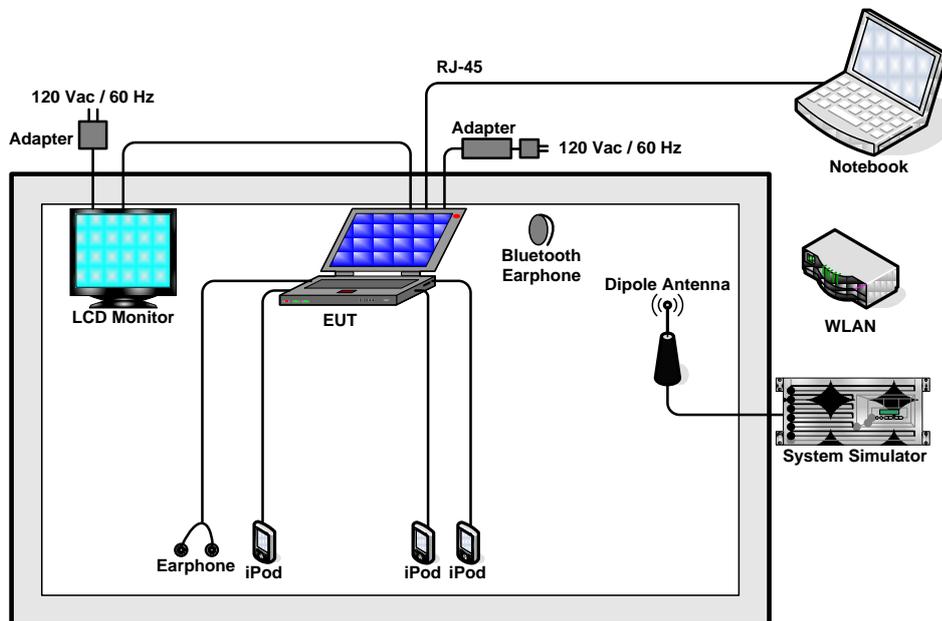
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 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 Link + WLAN Link + Bluetooth Link + TC + Adapter 2	
<b>Remark:</b> 1. TC stands for Test Configuration, and consists of iPod, monitor, earphone, and RJ-45. 2. Only the radiated emission and AC conducted emission tests of the EUT were performed in the report, the conducted test cases can be referred to the WLAN module Report (FCC ID: PPD-AR5B95 / CCS Report Number: 81029005). 3. Only band edges test was performed for mode 4~6 and mode 10~12.		

## 2.3 Connection Diagram of Test System

### <Radiated Emission Test>



### <Conducted Emission Test>





## **2.4 RF Utility**

The programmed RF utility 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

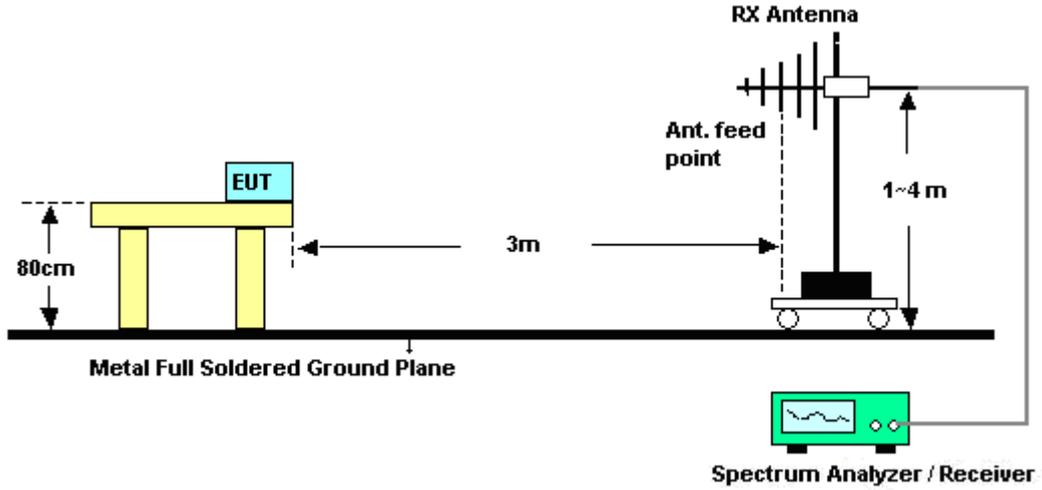
See list of measuring instruments of this test report.

##### 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°C
Test Band :	802.11b	Relative Humidity :	41~42%
Test Channel :	01	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.61	55.54	-18.46	74	52.1	32.13	5.46	34.15	100	355	Peak
2389.61	45.63	-8.37	54	42.19	32.13	5.46	34.15	100	355	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
2388.66	51.91	-22.09	74	48.47	32.13	5.46	34.15	120	65	Peak
2388.66	39.97	-14.03	54	36.53	32.13	5.46	34.15	120	65	Average

Test Mode :	Mode 3	Temperature :	23~24°C
Test Band :	802.11b	Relative Humidity :	41~42%
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	55.12	-18.88	74	51.66	32.27	5.38	34.19	100	322	Peak
2483.5	44.79	-9.21	54	41.33	32.27	5.38	34.19	100	322	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	50.66	-23.34	74	47.2	32.27	5.38	34.19	130	346	Peak
2483.5	40.88	-13.12	54	37.42	32.27	5.38	34.19	130	346	Average



Test Mode :	Mode 4	Temperature :	23~24°C
Test Band :	802.11g	Relative Humidity :	41~42%
Test Channel :	01	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.61	69.79	-4.21	74	66.35	32.13	5.46	34.15	100	355	Peak
2389.61	50.81	-3.19	54	47.37	32.13	5.46	34.15	100	355	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.61	64.6	-9.4	74	61.16	32.13	5.46	34.15	114	70	Peak
2389.61	46.62	-7.38	54	43.18	32.13	5.46	34.15	114	70	Average

Test Mode :	Mode 6	Temperature :	23~24°C
Test Band :	802.11g	Relative Humidity :	41~42%
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
2483.66	68.25	-5.75	74	64.79	32.27	5.38	34.19	100	322	Peak
2483.66	53.53	-0.47	54	50.07	32.27	5.38	34.19	100	322	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	65.01	-8.99	74	61.55	32.27	5.38	34.19	128	342	Peak
2483.85	49.04	-4.96	54	45.58	32.27	5.38	34.19	128	342	Average



Test Mode :	Mode 7	Temperature :	23~24°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	41~42%
Test Channel :	01	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.99	68.37	-5.63	74	64.94	32.13	5.46	34.16	101	349	Peak
2389.99	49.01	-4.99	54	45.58	32.13	5.46	34.16	101	349	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	64.84	-9.16	74	61.41	32.13	5.46	34.16	117	68	Peak
2389.99	45.73	-8.27	54	42.3	32.13	5.46	34.16	117	68	Average

Test Mode :	Mode 9	Temperature :	23~24°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	41~42%
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
2483.66	66.22	-7.78	74	62.76	32.27	5.38	34.19	100	322	Peak
2483.66	49.71	-4.29	54	46.25	32.27	5.38	34.19	100	322	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	62.88	-11.12	74	59.42	32.27	5.38	34.19	129	338	Peak
2483.66	46.47	-7.53	54	43.01	32.27	5.38	34.19	129	338	Average



Test Mode :	Mode 10	Temperature :	23~24°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	41~42%
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
2389.61	62.81	-11.19	74	59.37	32.13	5.46	34.15	100	319	Peak
2389.61	47.22	-6.78	54	43.78	32.13	5.46	34.15	100	319	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	60.9	-13.1	74	57.46	32.13	5.46	34.15	101	338	Peak
2389.42	44.9	-9.1	54	41.46	32.13	5.46	34.15	101	338	Average

Test Mode :	Mode 12	Temperature :	23~24°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	41~42%
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
2483.5	62.4	-11.6	74	58.94	32.27	5.38	34.19	100	320	Peak
2483.5	45.08	-8.92	54	41.62	32.27	5.38	34.19	100	320	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.85	60.61	-13.39	74	57.15	32.27	5.38	34.19	100	339	Peak
2483.85	43.03	-10.97	54	39.57	32.27	5.38	34.19	100	339	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.

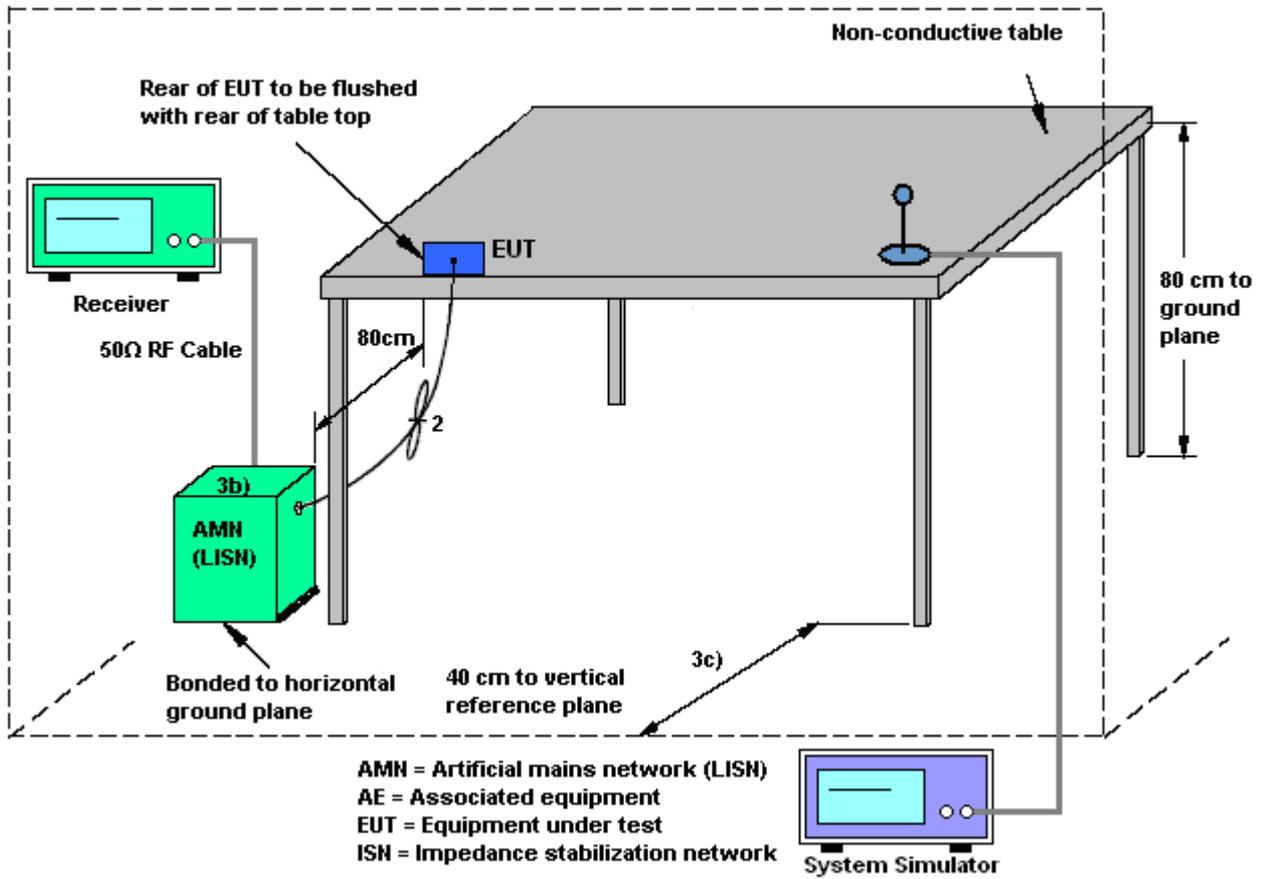
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

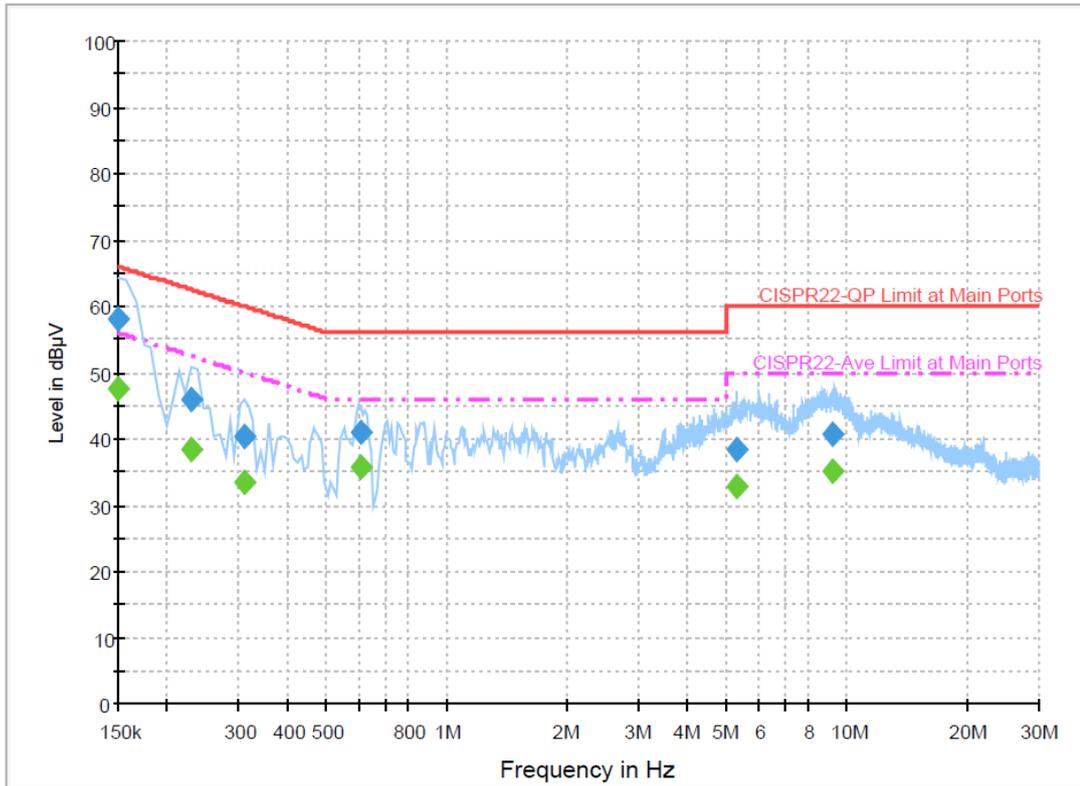
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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 :	21~23°C
Test Engineer :	Hayden Wu	Relative Humidity :	54~57%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GPRS850 Link + 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

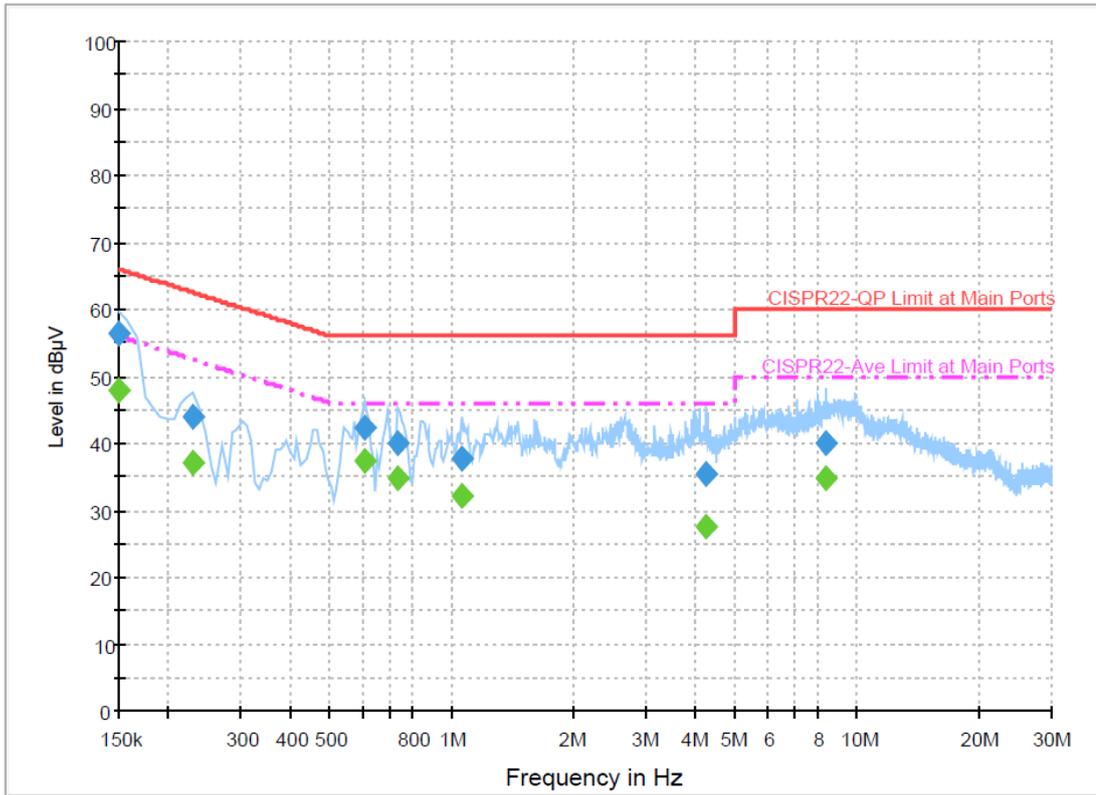
Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	57.9	Off	L1	19.5	8.1	66.0
0.230000	46.0	Off	L1	19.5	16.4	62.4
0.310000	40.3	Off	L1	19.5	19.8	60.0
0.606000	40.9	Off	L1	19.5	15.1	56.0
5.294000	38.3	Off	L1	19.5	21.7	60.0
9.134000	40.6	Off	L1	19.6	19.4	60.0

#### Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	47.6	Off	L1	19.5	8.4	56.0
0.230000	38.5	Off	L1	19.5	13.9	52.4
0.310000	33.5	Off	L1	19.5	16.5	50.0
0.606000	35.7	Off	L1	19.5	10.4	46.0
5.294000	32.7	Off	L1	19.5	17.3	50.0
9.134000	35.0	Off	L1	19.6	15.0	50.0



Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Hayden Wu	Relative Humidity :	54~57%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GPRS850 Link + 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)
0.150000	56.4	Off	N	19.5	9.6	66.0
0.230000	43.8	Off	N	19.5	18.6	62.4
0.606000	42.2	Off	N	19.5	13.8	56.0
0.734000	40.0	Off	N	19.5	16.0	56.0
1.054000	37.6	Off	N	19.4	18.4	56.0
4.230000	35.3	Off	N	19.6	20.7	56.0
8.342000	40.0	Off	N	19.6	20.0	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	47.8	Off	N	19.5	8.2	56.0
0.230000	36.9	Off	N	19.5	15.5	52.4
0.606000	37.4	Off	N	19.5	8.6	46.0
0.734000	34.9	Off	N	19.5	11.1	46.0
1.054000	32.2	Off	N	19.4	13.8	46.0
4.230000	27.6	Off	N	19.6	18.4	46.0
8.342000	34.6	Off	N	19.6	15.4	50.0

### 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

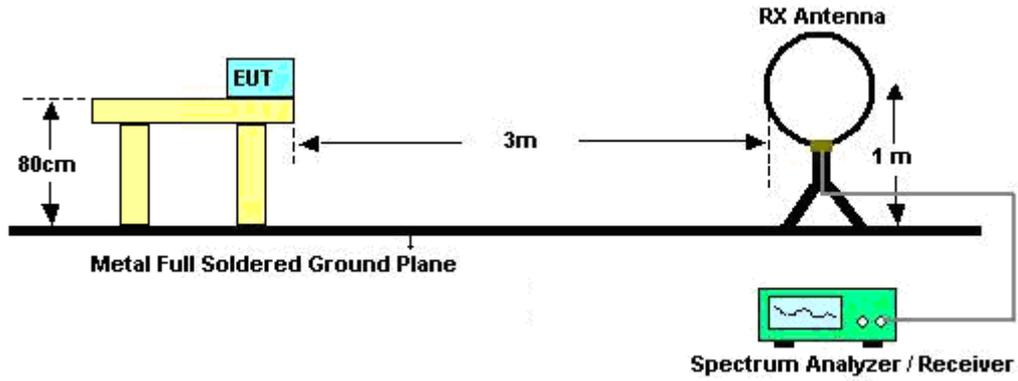
See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

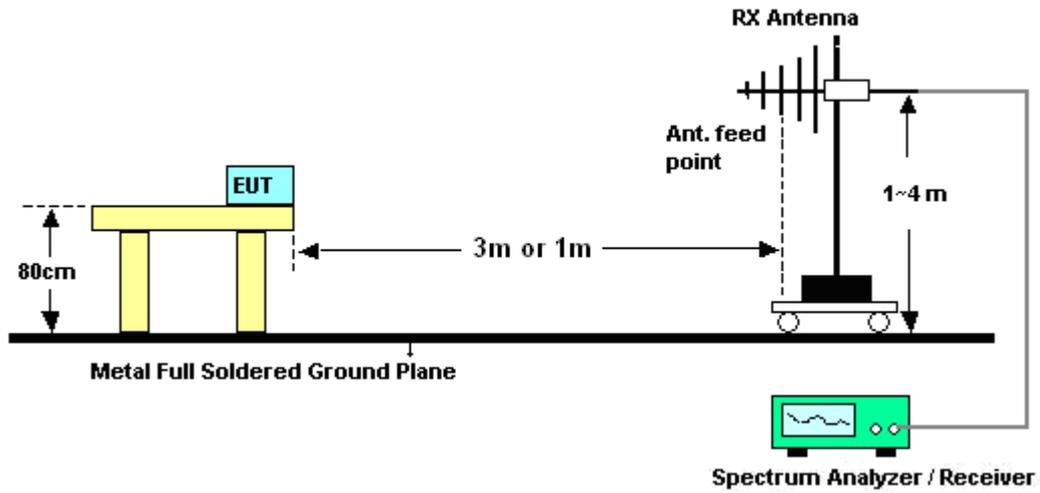
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
  - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  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 above 30MHz





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

Test Engineer :	Kay Wu	Temperature :	23~24°C	
		Relative Humidity :	41~42%	
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.



3.3.6 Test Result of Radiated Emission (30 MHz ~ 10<sup>th</sup> Harmonic)

Test Mode :	Mode 1	Temperature :	23~24°C
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	26.02	-13.98	40	37.57	19.51	0.64	31.7	-	-	Peak
230.61	29.71	-16.29	46	48.98	10.43	1.84	31.54	-	-	Peak
240.06	31.58	-14.42	46	49.62	11.6	1.88	31.52	-	-	Peak
335	32.9	-13.1	46	47.56	14.39	2.28	31.33	100	195	Peak
598.9	30.09	-15.91	46	37.82	20.03	3.24	31	-	-	Peak
758.5	28.09	-17.91	46	33.5	21.64	3.73	30.78	-	-	Peak
2389.61	45.63	-8.37	54	42.19	32.13	5.46	34.15	100	355	Average
2389.61	55.54	-18.46	74	52.1	32.13	5.46	34.15	100	355	Peak
2412	104.47	-	-	101.03	32.16	5.44	34.16	100	355	Average
2412	108.18	-	-	104.74	32.16	5.44	34.16	100	355	Peak
2500	49.04	-24.96	74	45.57	32.3	5.37	34.2	100	355	Peak
2500	37.07	-16.93	54	33.6	32.3	5.37	34.2	100	355	Average
8361	53.17	-20.83	74	42.18	36	10.09	35.1	100	112	Peak
8361	40.54	-13.46	54	29.55	36	10.09	35.1	100	112	Average



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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	31.2	-8.8	40	42.75	19.51	0.64	31.7	100	285	Peak
98.58	32.01	-11.49	43.5	52.37	10.19	1.15	31.7	-	-	Peak
143.94	28.58	-14.92	43.5	47.29	11.52	1.43	31.66	-	-	Peak
509.3	30.98	-15.02	46	40.75	18.35	2.97	31.09	-	-	Peak
598.9	33.63	-12.37	46	41.36	20.03	3.24	31	-	-	Peak
900.6	26.58	-19.42	46	29.93	23.19	4.16	30.7	-	-	Peak
2388.66	39.97	-14.03	54	36.53	32.13	5.46	34.15	120	65	Average
2388.66	51.91	-22.09	74	48.47	32.13	5.46	34.15	120	65	Peak
2412	98.08	-	-	94.64	32.16	5.44	34.16	120	65	Average
2412	103.7	-	-	100.26	32.16	5.44	34.16	120	65	Peak
2494	47.85	-26.15	74	44.38	32.3	5.37	34.2	120	65	Peak
2494	36.12	-17.88	54	32.65	32.3	5.37	34.2	120	65	Average
8370	53.34	-20.66	74	42.34	36	10.1	35.1	100	332	Peak
8370	40.75	-13.25	54	29.75	36	10.1	35.1	100	332	Average



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
89.94	28.44	-15.06	43.5	50.15	8.88	1.11	31.7	-	-	Peak
142.86	29.51	-13.99	43.5	48.19	11.56	1.42	31.66	-	-	Peak
240.06	31.8	-14.2	46	49.84	11.6	1.88	31.52	-	-	Peak
335	32.56	-13.44	46	47.22	14.39	2.28	31.33	100	55	Peak
598.9	30.57	-15.43	46	38.3	20.03	3.24	31	-	-	Peak
890.1	29.76	-16.24	46	33.25	23.09	4.12	30.7	-	-	Peak
2350	47.78	-26.22	74	44.37	32.05	5.5	34.14	123	21	Peak
2350	37.17	-16.83	54	33.76	32.05	5.5	34.14	123	21	Average
2437	107.84	-	-	104.38	32.22	5.41	34.17	123	21	Peak
2437	104.18	-	-	100.72	32.22	5.41	34.17	123	21	Average
2494	49.89	-24.11	74	46.42	32.3	5.37	34.2	123	21	Peak
2494	37.27	-16.73	54	33.8	32.3	5.37	34.2	123	21	Average
8334	53.85	-20.15	74	42.89	36	10.06	35.1	100	277	Peak
8334	40.29	-13.71	54	29.33	36	10.06	35.1	100	277	Average



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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
30.27	30.24	-9.76	40	41.79	19.51	0.64	31.7	100	174	Peak
97.77	32.32	-11.18	43.5	52.82	10.05	1.15	31.7	-	-	Peak
287.85	29.45	-16.55	46	45.5	13.3	2.07	31.42	-	-	Peak
335	28.08	-17.92	46	42.74	14.39	2.28	31.33	-	-	Peak
511.4	30.29	-15.71	46	40.03	18.38	2.97	31.09	-	-	Peak
598.9	32.76	-13.24	46	40.49	20.03	3.24	31	-	-	Peak
2356	48.65	-25.35	74	45.22	32.08	5.49	34.14	117	70	Peak
2356	37.3	-16.7	54	33.87	32.08	5.49	34.14	117	70	Average
2437	101.59	-	-	98.13	32.22	5.41	34.17	117	70	Average
2437	105.27	-	-	101.81	32.22	5.41	34.17	117	70	Peak
2484	48.02	-25.98	74	44.56	32.27	5.38	34.19	117	70	Peak
2484	35.57	-18.43	54	32.11	32.27	5.38	34.19	117	70	Average
8229	53.09	-20.91	74	42.2	36	9.99	35.1	100	252	Peak
8229	40	-14	54	29.11	36	9.99	35.1	100	252	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.78	-15.22	40	36.33	19.51	0.64	31.7	-	-	Peak
95.61	24.29	-19.21	43.5	45.09	9.76	1.14	31.7	-	-	Peak
240.06	31.99	-14.01	46	50.03	11.6	1.88	31.52	-	-	Peak
335	32.52	-13.48	46	47.18	14.39	2.28	31.33	100	67	Peak
598.9	30.27	-15.73	46	38	20.03	3.24	31	-	-	Peak
937.7	28.12	-17.88	46	30.79	23.75	4.24	30.66	-	-	Peak
2372	49.32	-24.68	74	45.89	32.11	5.47	34.15	100	322	Peak
2372	37.32	-16.68	54	33.89	32.11	5.47	34.15	100	322	Average
2462	107.55	-	-	104.09	32.24	5.4	34.18	100	322	Peak
2462	103.99	-	-	100.53	32.24	5.4	34.18	100	322	Average
2483.5	55.12	-18.88	74	51.66	32.27	5.38	34.19	100	322	Peak
2483.5	44.79	-9.21	54	41.33	32.27	5.38	34.19	100	322	Average
8325	53.16	-20.84	74	42.2	36	10.06	35.1	100	86	Peak
8325	39.65	-14.35	54	28.69	36	10.06	35.1	100	86	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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	30.98	-9.02	40	43.08	18.95	0.65	31.7	100	87	Peak
98.58	32.46	-11.04	43.5	52.82	10.19	1.15	31.7	-	-	Peak
143.94	28.53	-14.97	43.5	47.24	11.52	1.43	31.66	-	-	Peak
506.5	30.77	-15.23	46	40.61	18.29	2.96	31.09	-	-	Peak
598.9	33.83	-12.17	46	41.56	20.03	3.24	31	-	-	Peak
909.7	26.39	-19.61	46	29.57	23.33	4.18	30.69	-	-	Peak
2374	47.44	-26.56	74	44.01	32.11	5.47	34.15	130	346	Peak
2374	36.26	-17.74	54	32.83	32.11	5.47	34.15	130	346	Average
2462	105.96	-	-	102.5	32.24	5.4	34.18	130	346	Peak
2462	101.17	-	-	97.71	32.24	5.4	34.18	130	346	Average
2483.5	50.66	-23.34	74	47.2	32.27	5.38	34.19	130	346	Peak
2483.5	40.88	-13.12	54	37.42	32.27	5.38	34.19	130	346	Average
8442	53.09	-20.91	74	42.05	36	10.14	35.1	100	131	Peak
8442	39.52	-14.48	54	28.48	36	10.14	35.1	100	131	Average



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
2389.61	50.81	-3.19	54	47.37	32.13	5.46	34.15	100	355	Average
2389.61	69.79	-4.21	74	66.35	32.13	5.46	34.15	100	355	Peak
2412	105.83	-	-	102.39	32.16	5.44	34.16	100	355	Peak
2412	95.95	-	-	92.51	32.16	5.44	34.16	100	355	Average
2494	33.4	-20.6	54	29.93	32.3	5.37	34.2	100	355	Average
2494	45.46	-28.54	74	41.99	32.3	5.37	34.2	100	355	Peak



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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
2389.61	46.62	-7.38	54	43.18	32.13	5.46	34.15	114	70	Average
2389.61	64.6	-9.4	74	61.16	32.13	5.46	34.15	114	70	Peak
2412	102.27	-	-	98.83	32.16	5.44	34.16	114	70	Peak
2412	92.48	-	-	89.04	32.16	5.44	34.16	114	70	Average
2484	33.43	-20.57	54	29.97	32.27	5.38	34.19	114	70	Average
2484	45.17	-28.83	74	41.71	32.27	5.38	34.19	114	70	Peak



Test Mode :	Mode 5	Temperature :	23~24°C
Test Channel :	06	Relative Humidity :	41~42%
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	54.27	-19.73	74	50.84	32.13	5.46	34.16	100	322	Peak
2390	39.92	-14.08	54	36.49	32.13	5.46	34.16	100	322	Average
2437	108.12	-	-	104.67	32.22	5.41	34.18	100	322	Peak
2437	97.82	-	-	94.36	32.22	5.41	34.17	100	322	Average
2484	41.05	-12.95	54	37.59	32.27	5.38	34.19	100	322	Average
2484	51.69	-22.31	74	48.23	32.27	5.38	34.19	100	322	Peak



Test Mode :	Mode 5	Temperature :	23~24°C
Test Channel :	06	Relative Humidity :	41~42%
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
2388	50.14	-23.86	74	46.7	32.13	5.46	34.15	119	69	Peak
2388	36.24	-17.76	54	32.8	32.13	5.46	34.15	119	69	Average
2437	105.7	-	-	102.24	32.22	5.41	34.17	119	69	Peak
2437	96.15	-	-	92.69	32.22	5.41	34.17	119	69	Average
2486	36.02	-17.98	54	32.56	32.27	5.38	34.19	119	69	Average
2486	47.35	-26.65	74	43.89	32.27	5.38	34.19	119	69	Peak



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
2374	46.68	-27.32	74	43.25	32.11	5.47	34.15	100	322	Peak
2374	34.52	-19.48	54	31.09	32.11	5.47	34.15	100	322	Average
2462	105.43	-	-	101.97	32.24	5.4	34.18	100	322	Peak
2462	95.62	-	-	92.16	32.24	5.4	34.18	100	322	Average
2483.66	53.53	-0.47	54	50.07	32.27	5.38	34.19	100	322	Average
2483.66	68.25	-5.75	74	64.79	32.27	5.38	34.19	100	322	Peak



Test Mode :	Mode 6	Temperature :	23~24°C
Test Channel :	11	Relative Humidity :	41~42%
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
2374	43.6	-30.4	74	40.17	32.11	5.47	34.15	128	342	Peak
2374	32.68	-21.32	54	29.25	32.11	5.47	34.15	128	342	Average
2462	104.15	-	-	100.69	32.24	5.4	34.18	128	342	Peak
2462	94.39	-	-	90.93	32.24	5.4	34.18	128	342	Average
2483.85	49.04	-4.96	54	45.58	32.27	5.38	34.19	128	342	Average
2483.85	65.01	-8.99	74	61.55	32.27	5.38	34.19	128	342	Peak



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
97.5	24.56	-18.94	43.5	45.06	10.05	1.15	31.7	-	-	Peak
230.61	29.37	-16.63	46	48.64	10.43	1.84	31.54	-	-	Peak
240.06	31.85	-14.15	46	49.89	11.6	1.88	31.52	-	-	Peak
335	32.28	-13.72	46	46.94	14.39	2.28	31.33	100	76	Peak
598.9	30.86	-15.14	46	38.59	20.03	3.24	31	-	-	Peak
895.7	26.67	-19.33	46	30.1	23.13	4.14	30.7	-	-	Peak
2389.99	49.01	-4.99	54	45.58	32.13	5.46	34.16	101	349	Average
2389.99	68.37	-5.63	74	64.94	32.13	5.46	34.16	101	349	Peak
2412	94.25	-	-	90.81	32.16	5.44	34.16	101	349	Average
2412	103.8	-	-	100.35	32.19	5.43	34.17	101	349	Peak
2500	44.65	-29.35	74	41.18	32.3	5.37	34.2	101	349	Peak
2500	33.07	-20.93	54	29.6	32.3	5.37	34.2	101	349	Average
8361	53.31	-20.69	74	42.32	36	10.09	35.1	100	117	Peak
8361	40.43	-13.57	54	29.44	36	10.09	35.1	100	117	Average



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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
31.62	31.14	-8.86	40	43.78	18.4	0.66	31.7	100	161	Peak
98.58	32.32	-11.18	43.5	52.68	10.19	1.15	31.7	-	-	Peak
143.94	28.67	-14.83	43.5	47.38	11.52	1.43	31.66	-	-	Peak
344.1	29.88	-16.12	46	44.23	14.64	2.32	31.31	-	-	Peak
598.9	33.26	-12.74	46	40.99	20.03	3.24	31	-	-	Peak
929.3	26.14	-19.86	46	28.97	23.62	4.22	30.67	-	-	Peak
2389.99	45.73	-8.27	54	42.3	32.13	5.46	34.16	117	68	Average
2389.99	64.84	-9.16	74	61.41	32.13	5.46	34.16	117	68	Peak
2412	92.14	-	-	88.7	32.16	5.44	34.16	117	68	Average
2412	101.45	-	-	98.01	32.16	5.44	34.16	117	68	Peak
2494	45.56	-28.44	74	42.09	32.3	5.37	34.2	117	68	Peak
2494	33.63	-20.37	54	30.16	32.3	5.37	34.2	117	68	Average
8442	53.67	-20.33	74	42.63	36	10.14	35.1	100	258	Peak
8442	41	-13	54	29.96	36	10.14	35.1	100	258	Average



<b>Test Mode :</b>	Mode 8	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
143.94	26.45	-17.05	43.5	45.16	11.52	1.43	31.66	-	-	Peak
230.61	30.2	-15.8	46	49.47	10.43	1.84	31.54	-	-	Peak
240.06	32.01	-13.99	46	50.05	11.6	1.88	31.52	-	-	Peak
335	32.43	-13.57	46	47.09	14.39	2.28	31.33	100	110	Peak
598.9	30.01	-15.99	46	37.74	20.03	3.24	31	-	-	Peak
912.5	26.54	-19.46	46	29.67	23.37	4.19	30.69	-	-	Peak
2382	54.62	-19.38	74	51.19	32.11	5.47	34.15	100	327	Peak
2382	36.78	-17.22	54	33.35	32.11	5.47	34.15	100	327	Average
2437	108.48	-	-	105.03	32.22	5.41	34.18	100	327	Peak
2437	98.65	-	-	95.19	32.22	5.41	34.17	100	327	Average
2484	53.24	-20.76	74	49.78	32.27	5.38	34.19	100	327	Peak
2484	39.3	-14.7	54	35.84	32.27	5.38	34.19	100	327	Average
8337	53.55	-20.45	74	42.58	36	10.07	35.1	100	87	Peak
8337	39.56	-14.44	54	28.59	36	10.07	35.1	100	87	Average



<b>Test Mode :</b>	Mode 8	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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	30.53	-9.47	40	43.17	18.4	0.66	31.7	100	197	Peak
97.77	32.28	-11.22	43.5	52.78	10.05	1.15	31.7	-	-	Peak
116.94	30.64	-12.86	43.5	49.1	11.96	1.26	31.68	-	-	Peak
511.4	30.2	-15.8	46	39.94	18.38	2.97	31.09	-	-	Peak
598.9	33.29	-12.71	46	41.02	20.03	3.24	31	-	-	Peak
912.5	25.63	-20.37	46	28.76	23.37	4.19	30.69	-	-	Peak
2390	52.18	-21.82	74	48.75	32.13	5.46	34.16	117	68	Peak
2390	35.51	-18.49	54	32.08	32.13	5.46	34.16	117	68	Average
2437	105.61	-	-	102.15	32.22	5.41	34.17	117	68	Peak
2437	96.3	-	-	92.84	32.22	5.41	34.17	117	68	Average
2484	50.91	-23.09	74	47.45	32.27	5.38	34.19	117	68	Peak
2484	36.54	-17.46	54	33.08	32.27	5.38	34.19	117	68	Average
8385	53.4	-20.6	74	42.4	36	10.1	35.1	100	199	Peak
8385	39.36	-14.64	54	28.36	36	10.1	35.1	100	199	Average



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
96.69	24.58	-18.92	43.5	45.24	9.9	1.14	31.7	-	-	Peak
143.94	26.46	-17.04	43.5	45.17	11.52	1.43	31.66	-	-	Peak
240.06	32.02	-13.98	46	50.06	11.6	1.88	31.52	-	-	Peak
335	32.72	-13.28	46	47.38	14.39	2.28	31.33	100	231	Peak
598.9	30.92	-15.08	46	38.65	20.03	3.24	31	-	-	Peak
937.7	26.36	-19.64	46	29.03	23.75	4.24	30.66	-	-	Peak
2372	45.75	-28.25	74	42.32	32.11	5.47	34.15	100	322	Peak
2372	33.87	-20.13	54	30.44	32.11	5.47	34.15	100	322	Average
2462	103.12	-	-	99.66	32.24	5.4	34.18	100	322	Peak
2462	94.06	-	-	90.6	32.24	5.4	34.18	100	322	Average
2483.66	49.71	-4.29	54	46.25	32.27	5.38	34.19	100	322	Average
2483.66	66.22	-7.78	74	62.76	32.27	5.38	34.19	100	322	Peak
8445	53.87	-20.13	74	42.83	36	10.14	35.1	100	178	Peak
8445	40.51	-13.49	54	29.47	36	10.14	35.1	100	178	Average



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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	32.36	-7.64	40	43.91	19.51	0.64	31.7	100	53	Peak
97.77	32.12	-11.38	43.5	52.62	10.05	1.15	31.7	-	-	Peak
143.94	28.47	-15.03	43.5	47.18	11.52	1.43	31.66	-	-	Peak
346.9	29.79	-16.21	46	44.04	14.72	2.33	31.3	-	-	Peak
598.9	33.46	-12.54	46	41.19	20.03	3.24	31	-	-	Peak
878.2	27.28	-18.72	46	30.94	22.97	4.07	30.7	-	-	Peak
2350	44.37	-29.63	74	40.96	32.05	5.5	34.14	129	338	Peak
2350	32.01	-21.99	54	28.6	32.05	5.5	34.14	129	338	Average
2462	101.34	-	-	97.88	32.24	5.4	34.18	129	338	Peak
2462	92.12	-	-	88.66	32.24	5.4	34.18	129	338	Average
2483.66	46.47	-7.53	54	43.01	32.27	5.38	34.19	129	338	Average
2483.66	62.88	-11.12	74	59.42	32.27	5.38	34.19	129	338	Peak
8385	52.99	-21.01	74	41.99	36	10.1	35.1	100	222	Peak
8385	39.66	-14.34	54	28.66	36	10.1	35.1	100	222	Average



<b>Test Mode :</b>	Mode 10	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	03	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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	47.22	-6.78	54	43.78	32.13	5.46	34.15	100	319	Average
2389.61	62.81	-11.19	74	59.37	32.13	5.46	34.15	100	319	Peak
2422	95.12	-	-	91.67	32.19	5.43	34.17	100	319	Peak
2422	85.76	-	-	82.31	32.19	5.43	34.17	100	319	Average
2484	33.75	-20.25	54	30.29	32.27	5.38	34.19	100	319	Average
2484	45.97	-28.03	74	42.51	32.27	5.38	34.19	100	319	Peak



<b>Test Mode :</b>	Mode 10	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	03	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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
2389.42	60.9	-13.1	74	57.46	32.13	5.46	34.15	101	338	Peak
2389.42	44.9	-9.1	54	41.46	32.13	5.46	34.15	101	338	Average
2422	93.55	-	-	90.1	32.19	5.43	34.17	101	338	Peak
2422	84.92	-	-	81.47	32.19	5.43	34.17	101	338	Average
2500	32.9	-21.1	54	29.43	32.3	5.37	34.2	101	338	Average
2500	46.19	-27.81	74	42.72	32.3	5.37	34.2	101	338	Peak



<b>Test Mode :</b>	Mode 11	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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	55.34	-18.66	74	51.91	32.13	5.46	34.16	100	318	Peak
2390	38.96	-15.04	54	35.53	32.13	5.46	34.16	100	318	Average
2437	99.48	-	-	96.03	32.19	5.43	34.17	100	318	Peak
2437	90.33	-	-	86.87	32.22	5.41	34.17	100	318	Average
2484	56.64	-17.36	74	53.18	32.27	5.38	34.19	100	318	Peak
2484	40.72	-13.28	54	37.26	32.27	5.38	34.19	100	318	Average



Test Mode :	Mode 11	Temperature :	23~24°C
Test Channel :	06	Relative Humidity :	41~42%
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	53.76	-20.24	74	50.33	32.13	5.46	34.16	102	337	Peak
2390	37.02	-16.98	54	33.59	32.13	5.46	34.16	102	337	Average
2437	99.75	-	-	96.3	32.22	5.41	34.18	102	337	Peak
2437	90.23	-	-	86.77	32.22	5.41	34.17	102	337	Average
2484	57.9	-16.1	74	54.44	32.27	5.38	34.19	102	337	Peak
2484	40.22	-13.78	54	36.76	32.27	5.38	34.19	102	337	Average



Test Mode :	Mode 12	Temperature :	23~24°C
Test Channel :	09	Relative Humidity :	41~42%
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
2356	45.45	-28.55	74	42.02	32.08	5.49	34.14	100	320	Peak
2356	33.98	-20.02	54	30.55	32.08	5.49	34.14	100	320	Average
2452	95.47	-	-	92.02	32.22	5.41	34.18	100	320	Peak
2452	86.66	-	-	83.21	32.22	5.41	34.18	100	320	Average
2483.5	62.4	-11.6	74	58.94	32.27	5.38	34.19	100	320	Peak
2483.5	45.08	-8.92	54	41.62	32.27	5.38	34.19	100	320	Average



Test Mode :	Mode 12	Temperature :	23~24°C
Test Channel :	09	Relative Humidity :	41~42%
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
2342	44.97	-29.03	74	41.56	32.05	5.5	34.14	100	339	Peak
2342	31.32	-22.68	54	27.91	32.05	5.5	34.14	100	339	Average
2452	94.41	-	-	90.96	32.22	5.41	34.18	100	339	Peak
2452	85.64	-	-	82.19	32.22	5.41	34.18	100	339	Average
2483.85	60.61	-13.39	74	57.15	32.27	5.38	34.19	100	339	Peak
2483.85	43.03	-10.97	54	39.57	32.27	5.38	34.19	100	339	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-1000 W	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
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.13</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.26</b>		

### 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
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.27</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.54</b>		



**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
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>2.36</b>				
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>4.72</b>				



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP9N2427-02 as below.