

Partial FCC RF Test Report

APPLICANT : Acer Incorporated
EQUIPMENT : 1X1 802.11b/g/n-BT Combo PCIe minicard
BRAND NAME : Acer
MODEL NAME : BCM94313HMGB
FCC ID : HLZ-BRCM1051I
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

This is a partial report, and includes the Radiated Emissions test only. The product was The product was received on Jul. 25, 2011 and completely tested on Sep. 20, 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.



TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION.....	5
1.1 Applicant	5
1.2 Manufacturer.....	5
1.3 Feature of Equipment Under Test	6
1.4 Testing Site.....	7
1.5 Applied Standards	7
1.6 Ancillary Equipment List	8
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST.....	9
2.1 RF Output Power	9
2.2 Test Mode.....	10
2.3 Connection Diagram of Test System.....	11
2.4 RF Utility	12
3 TEST RESULT	13
3.1 Band Edges Measurement	13
3.2 AC Conducted Emission Measurement.....	19
3.3 Radiated Emission Measurement.....	23
3.4 Antenna Requirements	41
4 LIST OF MEASURING EQUIPMENT.....	42
5 UNCERTAINTY OF EVALUATION.....	43
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR172516-01A	Rev. 01	Initial issue of report	Sep. 22, 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	$\leq 20\text{dBc}$	Pass	-
3.2	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 7.4 dB at 0.534 MHz
3.3	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.66 dB at 2483.5 MHz
3.4	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Acer Incorporated

8F., No.88, Sec. 1, Xintai 5th Rd., New Taipei City 22181, Taiwan, R.O.C.

1.2 Manufacturer

1. Acer Information Services (Zhong Shan) Co., Ltd.

2F., C Building, XinYe Rd., Export Processing District In Torch, Zhongshan, Guangdong, P.R.C.

2. Acer Computer (Shanghai) Ltd.

3F., No. 168, Xizang Medium Road, Huangpu District, Shanghai 200001, CHINA

3. Kunshang Botai Electronics Co., Ltd.

988, Tong Feng East Rd., Kunshan Economic & Technical Development Zone, Kunshan, Jiangsu, P.R. China

4. Beijing Acer Information Co., Ltd.

Huade Building, No. 18, ChuangYe Rd., ShangDi Zone, HaiDian District, Beijing, P.R.C.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	1X1 802.11b/g/n-BT Combo PCIe minicard
Brand Name	Acer
Model Name	BCM94313HMGB
Host Notebook Computer	Brand Name : Acer Model Name : MS2346 Marketing Name : Aspire S3, Aspire S3 series
FCC ID	HLZ-BRCM1051I
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Channel Spacing	1 MHz
Maximum Output Power to Antenna	Bluetooth (1Mbps) : -5.15 dBm (0.0003 W) Bluetooth EDR (2Mbps) : -2.20 dBm (0.0006 W) Bluetooth EDR (3Mbps) : -1.67 dBm (0.0007 W) Bluetooth4.0 (1Mbps) : -1.00dBm (0.0008 W)
Antenna Type	PIFA Antenna with gain -2.30 dBi
HW Version	M/B : 55.4QP01.D07G
SW Version	BIOS : 1.02
Type of Modulation	Bluetooth (1Mbps) / Bluetooth 4.0 (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Production Unit

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).
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 Public Notice DA 00-705
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8
- ♦ IC RSS-Gen Issue 3

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.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
2.	LCD Monitor	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
6.	iPod Cable	Apple	N/A	DoC	Shielded, 1.0 m	N/A
7.	iPod Earphone	Apple	N/A	DoC	Shielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Output Power

Preliminary tests were performed in different data rate and recorded the RF output power in the following table:

Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	$\pi/4$ -DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	-5.53 dBm	-2.53 dBm	-1.9 dBm
Ch39	2441MHz	-5.15 dBm	-2.28 dBm	-1.67 dBm
Ch78	2480MHz	-5.16 dBm	-2.2 dBm	-1.69 dBm

Channel	Frequency	Bluetooth RF Output Power	
		1 Mbps / GFSK Data Rate	
Ch00	2402MHz	-1.23 dBm	
Ch19	2440MHz	-1.04 dBm	
Ch39	2480MHz	-1.00 dBm	

Remark: The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

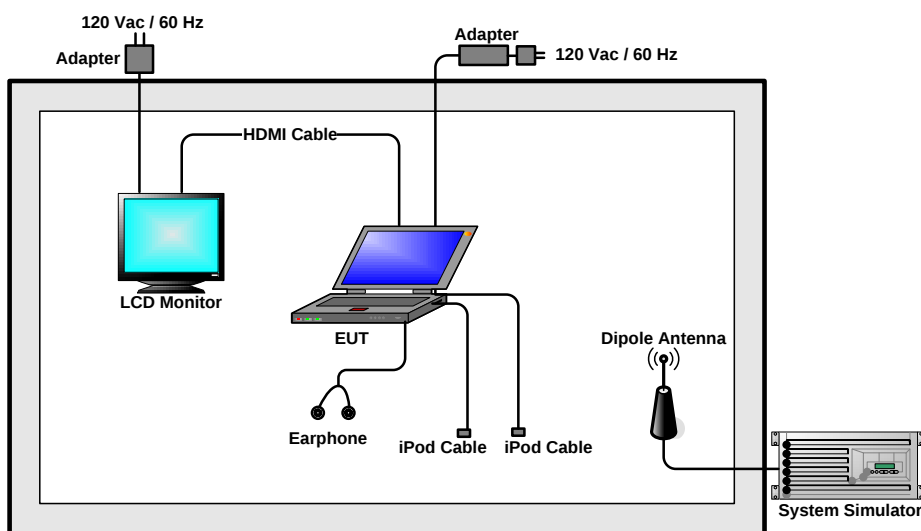
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

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

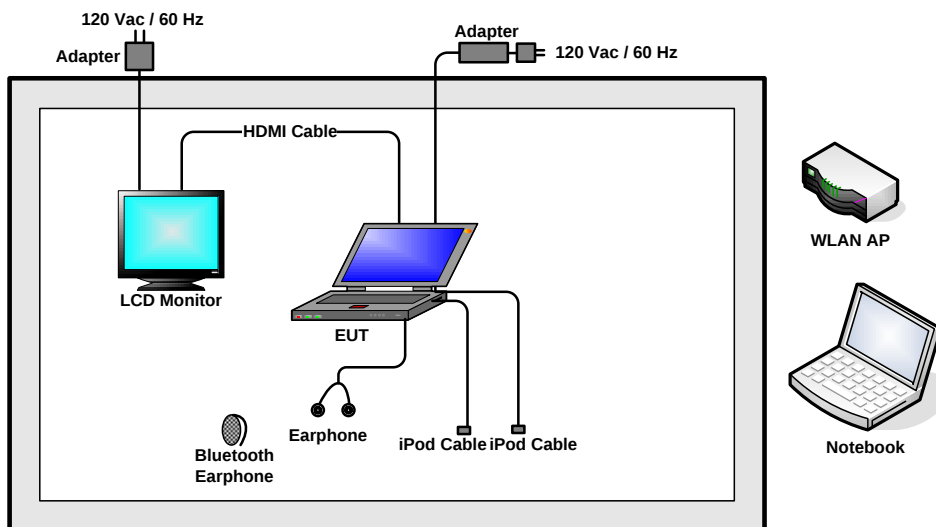
Test Cases				
Test Item	Data Rate / Modulation			
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK	Bluetooth4.0 1Mbps GFSK
Radiated TCs	N/A	N/A	N/A	Mode 1: CH00_2402 MHz Mode 2: CH19_2440 MHz Mode 3: CH39_2480 MHz
AC Conducted Emission	Mode 1 :WLAN Link + Bluetooth Link + TC + Adapter			
Remark:				
1. TC stands for Test Configuration, and consists of iPod Earphone, iPod Cable, monitor, and HDMI Cable.				
2. For radiated TCs, the data rate was set in LE due to the highest RF output power; only the data of these modes was reported.				

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>





2.4 RF Utility

For Bluetooth function, the RF utility, “Broadcom BlueTool” was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

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. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

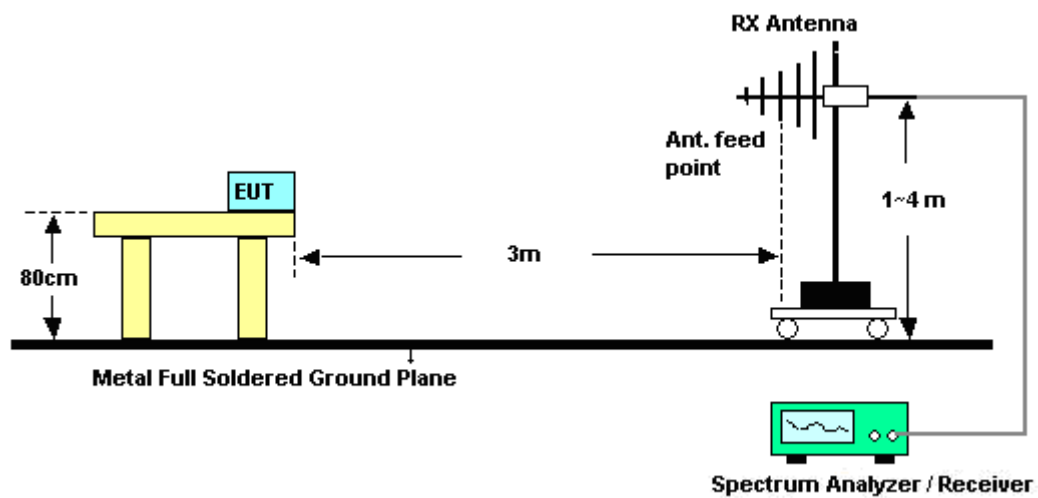
3.1.2 Measuring Instruments

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 Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, 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 300k Hz 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: Applies 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 = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. 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. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

3.1.4 Test Setup



3.1.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
		Test Engineer :	Ivan Chiang

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
2344.77	45.79	-28.21	74	41.69	31.98	5.95	33.83	168	52	Peak
2344.77	33.79	-20.21	54	29.69	31.98	5.95	33.83	168	52	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
2382.01	46.03	-27.97	74	41.82	32.03	6.03	33.85	200	165	Peak
2382.01	33.73	-20.27	54	29.52	32.03	6.03	33.85	200	165	Average

Test Mode :	Mode 3	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~51%
		Test Engineer :	Ivan Chiang

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	51.59	-22.41	74	47.13	32.18	6.18	33.9	154	77	Peak
2483.5	43.13	-10.87	54	38.67	32.18	6.18	33.9	154	77	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	54.07	-19.93	74	49.61	32.18	6.18	33.9	100	33	Peak
2483.5	45.2	-8.8	54	40.74	32.18	6.18	33.9	100	33	Average



Test Mode :	Mode 4	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
		Test Engineer :	Ivan Chiang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.14	46.4	-27.6	74	42.16	32.06	6.03	33.85	103	48	Peak
2387.14	33.51	-20.49	54	29.27	32.06	6.03	33.85	103	48	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
2377.45	46.04	-27.96	74	41.86	32.03	5.99	33.84	199	164	Peak
2377.45	33.79	-20.21	54	29.61	32.03	5.99	33.84	199	164	Average

Test Mode :	Mode 6	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~51%
		Test Engineer :	Ivan Chiang

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	55.68	-18.32	74	51.22	32.18	6.18	33.9	167	125	Peak
2483.5	44.61	-9.39	54	40.15	32.18	6.18	33.9	167	125	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	57	-17	74	52.54	32.18	6.18	33.9	100	34	Peak
2483.5	45.48	-8.52	54	41.02	32.18	6.18	33.9	100	34	Average



Test Mode :	Mode 7	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
		Test Engineer :	Ivan Chiang

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
2382.01	46.45	-27.55	74	42.24	32.03	6.03	33.85	169	51	Peak
2382.01	33.46	-20.54	54	29.25	32.03	6.03	33.85	169	51	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
2357.69	46.4	-27.6	74	42.24	32.01	5.99	33.84	196	167	Peak
2357.69	33.5	-20.5	54	29.34	32.01	5.99	33.84	196	167	Average

Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~51%
		Test Engineer :	Ivan Chiang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	56.06	-17.94	74	51.6	32.18	6.18	33.9	191	322	Peak
2483.5	44.84	-9.16	54	40.38	32.18	6.18	33.9	191	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	56.3	-17.7	74	51.84	32.18	6.18	33.9	100	33	Peak
2483.5	44.88	-9.12	54	40.42	32.18	6.18	33.9	100	33	Average



Test Mode :	Mode 10	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
		Test Engineer :	Ivan Chiang

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
2374.41	45.81	-28.19	74	41.63	32.03	5.99	33.84	102	229	Peak
2374.41	33.27	-20.73	54	29.09	32.03	5.99	33.84	102	229	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
2382.01	45.74	-28.26	74	41.53	32.03	6.03	33.85	158	162	Peak
2382.01	34.54	-19.46	54	30.33	32.03	6.03	33.85	158	162	Average

Test Mode :	Mode 12	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~51%
		Test Engineer :	Ivan Chiang

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	58.77	-15.23	74	54.31	32.18	6.18	33.9	170	318	Peak
2483.5	45.14	-8.86	54	40.68	32.18	6.18	33.9	170	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
2483.5	60.71	-13.29	74	56.25	32.18	6.18	33.9	174	244	Peak
2483.5	46.34	-7.66	54	41.88	32.18	6.18	33.9	174	244	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.

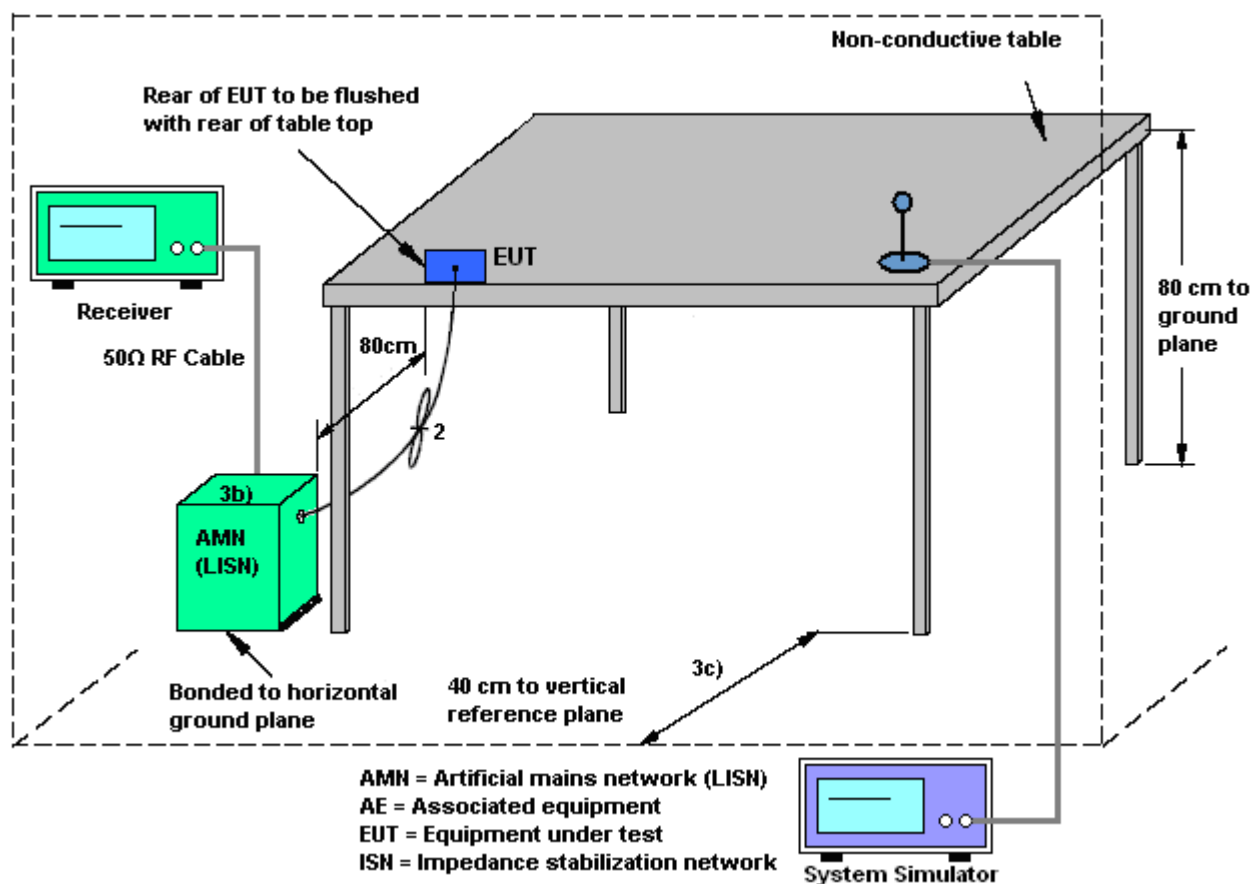
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

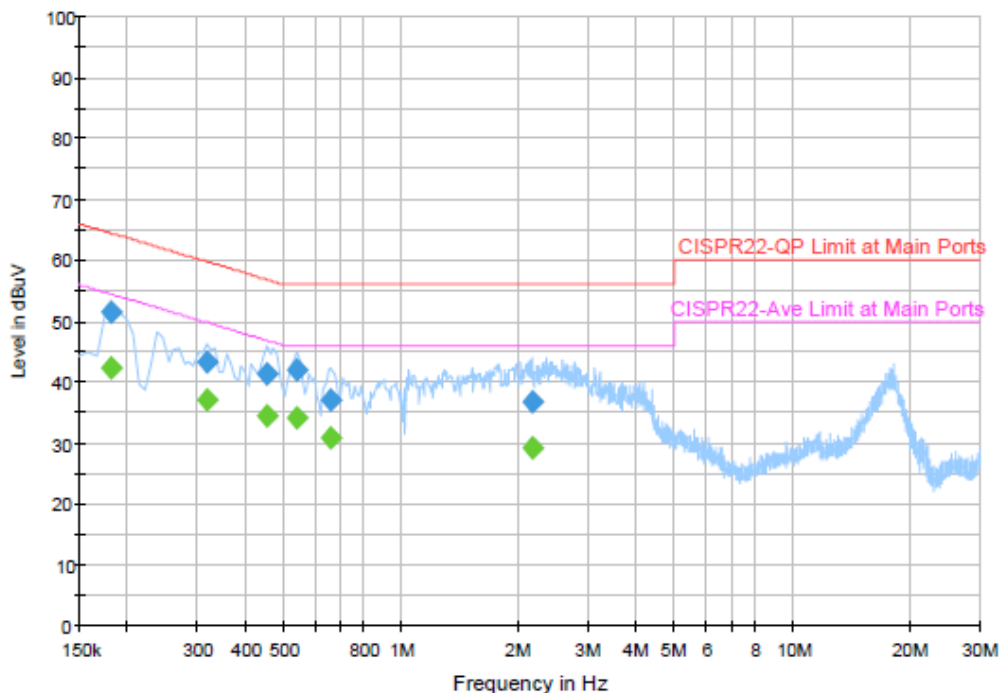
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
1. Connect EUT to the power mains through a line impedance stabilization network (LISN).
2. All the support units are connecting to the other LISN.
3. The LISN provides 50 ohm coupling impedance for the measuring instrument.
4. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.2.4 Test Setup



3.2.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Bluetooth Link + TC + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



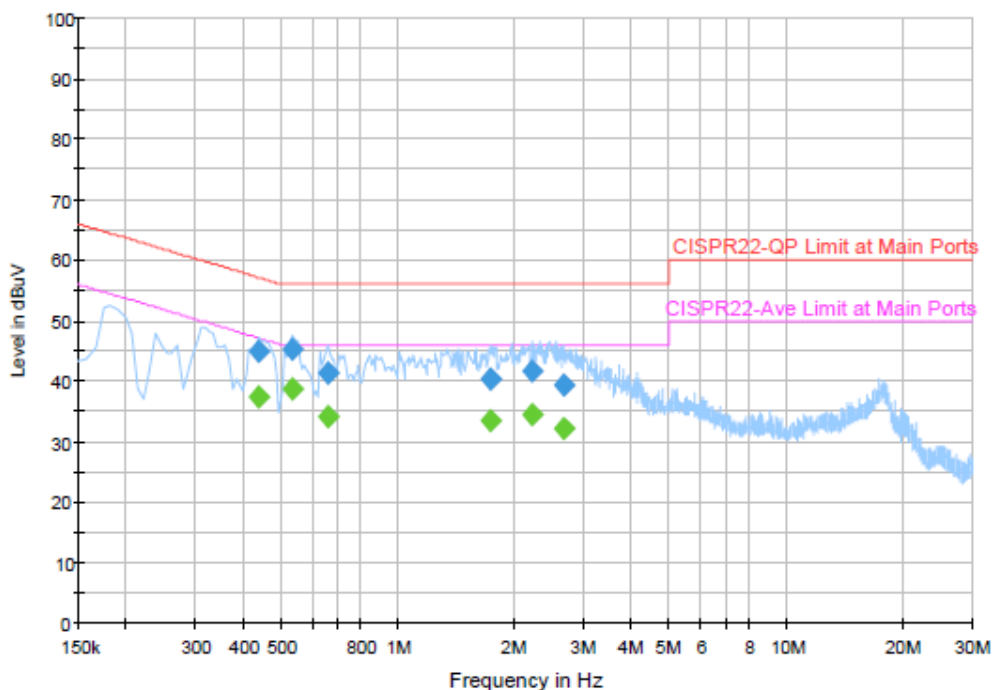
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	51.5	Off	L1	19.4	12.9	64.4
0.318000	43.3	Off	L1	19.4	16.5	59.8
0.454000	41.3	Off	L1	19.4	15.5	56.8
0.542000	41.8	Off	L1	19.4	14.2	56.0
0.662000	36.9	Off	L1	19.4	19.1	56.0
2.158000	36.6	Off	L1	19.4	19.4	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	42.4	Off	L1	19.4	12.0	54.4
0.318000	37.2	Off	L1	19.4	12.6	49.8
0.454000	34.3	Off	L1	19.4	12.5	46.8
0.542000	33.9	Off	L1	19.4	12.1	46.0
0.662000	30.7	Off	L1	19.4	15.3	46.0
2.158000	29.2	Off	L1	19.4	16.8	46.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Bluetooth Link + TC + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.438000	44.9	Off	N	19.5	12.2	57.1
0.534000	45.3	Off	N	19.4	10.7	56.0
0.662000	41.3	Off	N	19.4	14.7	56.0
1.734000	40.2	Off	N	19.5	15.8	56.0
2.222000	41.7	Off	N	19.5	14.3	56.0
2.670000	39.2	Off	N	19.5	16.8	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.438000	37.5	Off	N	19.5	9.6	47.1
0.534000	38.6	Off	N	19.4	7.4	46.0
0.662000	34.2	Off	N	19.4	11.8	46.0
1.734000	33.6	Off	N	19.5	12.4	46.0
2.222000	34.3	Off	N	19.5	11.7	46.0
2.670000	32.0	Off	N	19.5	14.0	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. 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

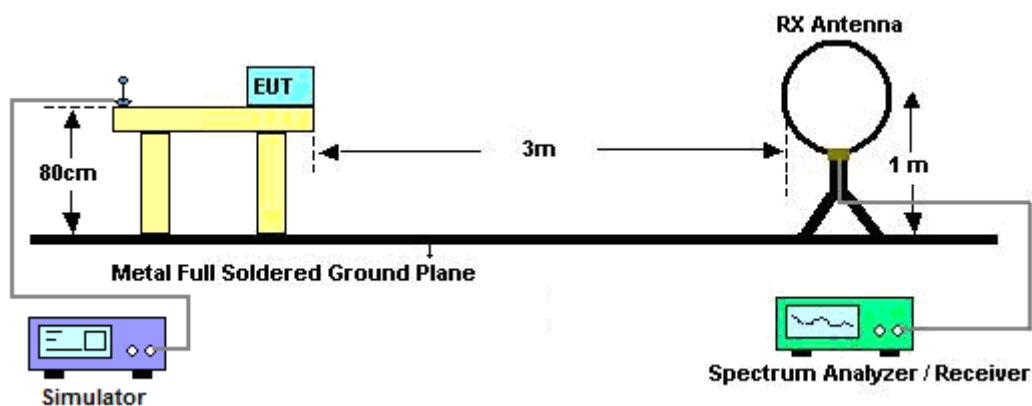
See list of measuring instruments of this test report.

3.3.3 Test Procedures

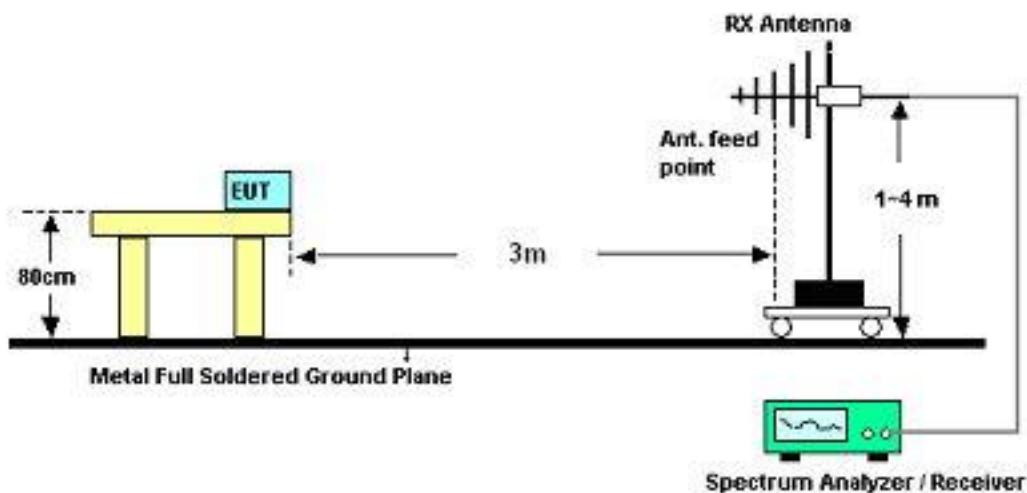
- The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB)
- Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.
- Measured average value for the peak value is greater than 54 dBuV/m

3.3.4 Test Setup

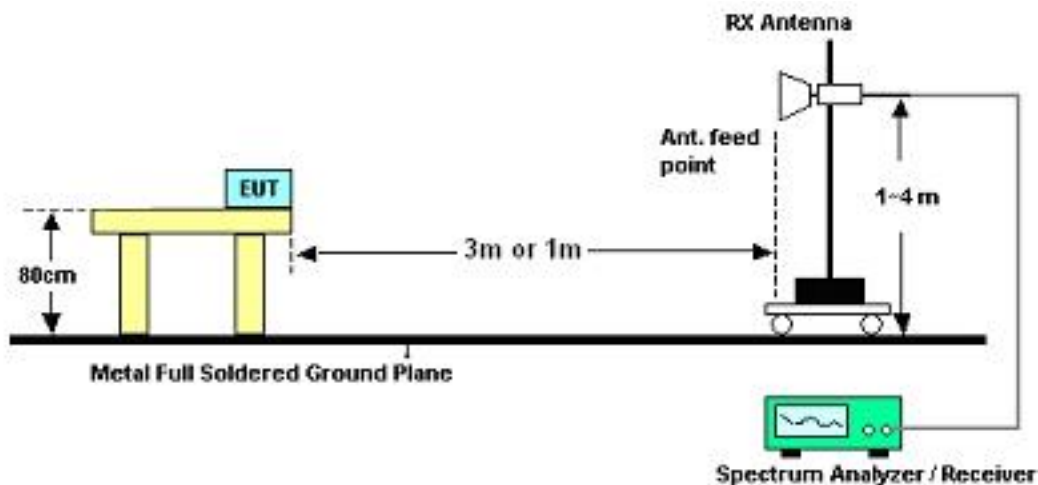
For radiated emissions below 30MHz



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 Chiang	Temperature :	24~26°C	
		Relative Humidity :	50~51%	

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

Note:

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

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

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

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

Test Mode :	Mode 1	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2402 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
2344.77	45.79	-28.21	74	41.69	31.98	5.95	33.83	168	52	Peak
2344.77	33.79	-20.21	54	29.69	31.98	5.95	33.83	168	52	Average
2402	90.51	-	-	86.25	32.08	6.03	33.85	168	52	Peak
2402	77.6	-	-	73.36	32.06	6.03	33.85	168	52	Average
2492	32.99	-21.01	54	28.51	32.2	6.18	33.9	168	52	Average
2492	46.28	-27.72	74	41.8	32.2	6.18	33.9	168	52	Peak

Test Mode :	Mode 1	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2402 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
2382.01	46.03	-27.97	74	41.82	32.03	6.03	33.85	200	165	Peak
2382.01	33.73	-20.27	54	29.52	32.03	6.03	33.85	200	165	Average
2402	91.67	-	-	87.41	32.08	6.03	33.85	200	165	Peak
2402	78.3	-	-	74.06	32.06	6.03	33.85	200	165	Average
2494	32.58	-21.42	54	28.1	32.2	6.18	33.9	200	165	Average
2494	44.24	-29.76	74	39.76	32.2	6.18	33.9	200	165	Peak

Test Mode :	Mode 2	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2441 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
2382	45.59	-28.41	74	41.38	32.03	6.03	33.85	162	58	Peak
2382	33.6	-20.4	54	29.39	32.03	6.03	33.85	162	58	Average
2441	88.87	-	-	84.51	32.13	6.11	33.88	162	58	Peak
2441	76.11	-	-	71.75	32.13	6.11	33.88	162	58	Average
2486	46.03	-27.97	74	41.57	32.18	6.18	33.9	162	58	Peak
2486	32.99	-21.01	54	28.53	32.18	6.18	33.9	162	58	Average

Test Mode :	Mode 2	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2441 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	45.26	-28.74	74	41.02	32.06	6.03	33.85	176	244	Peak
2388	33.65	-20.35	54	29.41	32.06	6.03	33.85	176	244	Average
2441	92.18	-	-	87.82	32.13	6.11	33.88	176	244	Peak
2441	78.67	-	-	74.31	32.13	6.11	33.88	176	244	Average
2486	44.66	-29.34	74	40.2	32.18	6.18	33.9	176	244	Peak
2486	33.14	-20.86	54	28.68	32.18	6.18	33.9	176	244	Average

Test Mode :	Mode 3	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2480 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
2350	46.05	-27.95	74	41.95	31.98	5.95	33.83	154	77	Peak
2350	33.03	-20.97	54	28.93	31.98	5.95	33.83	154	77	Average
2480	74.85	-	-	70.39	32.18	6.18	33.9	154	77	Average
2480	87.18	-	-	82.72	32.18	6.18	33.9	154	77	Peak
2483.5	51.59	-22.41	74	47.13	32.18	6.18	33.9	154	77	Peak
2483.5	43.13	-10.87	54	38.67	32.18	6.18	33.9	154	77	Average

Test Mode :	Mode 3	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2480 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	45.51	-28.49	74	41.27	32.06	6.03	33.85	100	33	Peak
2388	33.66	-20.34	54	29.42	32.06	6.03	33.85	100	33	Average
2480	77.17	-	-	72.71	32.18	6.18	33.9	100	33	Average
2480	89.87	-	-	85.41	32.18	6.18	33.9	100	33	Peak
2483.5	54.07	-19.93	74	49.61	32.18	6.18	33.9	100	33	Peak
2483.5	45.2	-8.8	54	40.74	32.18	6.18	33.9	100	33	Average

Test Mode :	Mode 4	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.14	46.4	-27.6	74	42.16	32.06	6.03	33.85	103	48	Peak
2387.14	33.51	-20.49	54	29.27	32.06	6.03	33.85	103	48	Average
2402	92.06	-	-	87.82	32.06	6.03	33.85	103	48	Peak
2402	76.38	-	-	72.14	32.06	6.03	33.85	103	48	Average
2492	32.94	-21.06	54	28.46	32.2	6.18	33.9	103	48	Average
2492	45.2	-28.8	74	40.72	32.2	6.18	33.9	103	48	Peak

Test Mode :	Mode 4	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2402 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
2377.45	46.04	-27.96	74	41.86	32.03	5.99	33.84	199	164	Peak
2377.45	33.79	-20.21	54	29.61	32.03	5.99	33.84	199	164	Average
2402	94	-	-	89.74	32.08	6.03	33.85	199	164	Peak
2402	77.66	-	-	73.42	32.06	6.03	33.85	199	164	Average
2484	32.72	-21.28	54	28.26	32.18	6.18	33.9	199	164	Average
2484	44.79	-29.21	74	40.33	32.18	6.18	33.9	199	164	Peak

Test Mode :	Mode 5	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2441 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	45.71	-28.29	74	41.47	32.06	6.03	33.85	162	43	Peak
2388	33.4	-20.6	54	29.16	32.06	6.03	33.85	162	43	Average
2441	90.75	-	-	86.39	32.13	6.11	33.88	162	43	Peak
2441	75.15	-	-	70.79	32.13	6.11	33.88	162	43	Average
2492	45.02	-28.98	74	40.54	32.2	6.18	33.9	162	43	Peak
2492	33.02	-20.98	54	28.54	32.2	6.18	33.9	162	43	Average

Test Mode :	Mode 5	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2441 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
2372	46.13	-27.87	74	41.95	32.03	5.99	33.84	175	240	Peak
2372	33.19	-20.81	54	29.01	32.03	5.99	33.84	175	240	Average
2441	94.34	-	-	89.98	32.13	6.11	33.88	175	240	Peak
2441	78.26	-	-	73.9	32.13	6.11	33.88	175	240	Average
2500	45.35	-28.65	74	40.87	32.2	6.18	33.9	175	240	Peak
2500	33.02	-20.98	54	28.54	32.2	6.18	33.9	175	240	Average

Test Mode :	Mode 6	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2480 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	45.85	-28.15	74	41.69	32.01	5.99	33.84	167	125	Peak
2358	33.32	-20.68	54	29.16	32.01	5.99	33.84	167	125	Average
2480	90.77	-	-	86.31	32.18	6.18	33.9	167	125	Peak
2480	75.21	-	-	70.75	32.18	6.18	33.9	167	125	Average
2483.5	55.68	-18.32	74	51.22	32.18	6.18	33.9	167	125	Peak
2483.5	44.61	-9.39	54	40.15	32.18	6.18	33.9	167	125	Average

Test Mode :	Mode 6	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2480 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	45.63	-28.37	74	41.47	32.01	5.99	33.84	100	34	Peak
2358	33.33	-20.67	54	29.17	32.01	5.99	33.84	100	34	Average
2480	91.77	-	-	87.31	32.18	6.18	33.9	100	34	Peak
2480	76.13	-	-	71.67	32.18	6.18	33.9	100	34	Average
2483.5	57	-17	74	52.54	32.18	6.18	33.9	100	34	Peak
2483.5	45.48	-8.52	54	41.02	32.18	6.18	33.9	100	34	Average



Test Mode :	Mode 7	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2402 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
2382.01	46.45	-27.55	74	42.24	32.03	6.03	33.85	169	51	Peak
2382.01	33.46	-20.54	54	29.25	32.03	6.03	33.85	169	51	Average
2402	92.13	-	-	87.87	32.08	6.03	33.85	169	51	Peak
2402	76.26	-	-	72.02	32.06	6.03	33.85	169	51	Average
2484	32.68	-21.32	54	28.22	32.18	6.18	33.9	169	51	Average
2484	44.97	-29.03	74	40.51	32.18	6.18	33.9	169	51	Peak

Test Mode :	Mode 7	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2402 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
2357.69	46.4	-27.6	74	42.24	32.01	5.99	33.84	196	167	Peak
2357.69	33.5	-20.5	54	29.34	32.01	5.99	33.84	196	167	Average
2402	94.31	-	-	90.05	32.08	6.03	33.85	196	167	Peak
2402	77.89	-	-	73.65	32.06	6.03	33.85	196	167	Average
2484	32.55	-21.45	54	28.09	32.18	6.18	33.9	196	167	Average
2484	44.7	-29.3	74	40.24	32.18	6.18	33.9	196	167	Peak

Test Mode :	Mode 8	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2441 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
2372	45.02	-28.98	74	40.84	32.03	5.99	33.84	162	43	Peak
2372	33.25	-20.75	54	29.07	32.03	5.99	33.84	162	43	Average
2441	90.57	-	-	86.21	32.13	6.11	33.88	162	43	Peak
2441	75.06	-	-	70.7	32.13	6.11	33.88	162	43	Average
2486	44.6	-29.4	74	40.14	32.18	6.18	33.9	162	43	Peak
2486	32.62	-21.38	54	28.16	32.18	6.18	33.9	162	43	Average

Test Mode :	Mode 8	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2441 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
2340	44.69	-29.31	74	40.59	31.98	5.95	33.83	177	243	Peak
2340	33.14	-20.86	54	29.04	31.98	5.95	33.83	177	243	Average
2441	77.54	-	-	73.18	32.13	6.11	33.88	177	243	Average
2441	93.9	-	-	89.54	32.13	6.11	33.88	177	243	Peak
2500	44.69	-29.31	74	40.21	32.2	6.18	33.9	177	243	Peak
2500	32.73	-21.27	54	28.25	32.2	6.18	33.9	177	243	Average

Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2480 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
2382	45.1	-28.9	74	40.89	32.03	6.03	33.85	191	322	Peak
2382	33.15	-20.85	54	28.94	32.03	6.03	33.85	191	322	Average
2480	75.48	-	-	71.02	32.18	6.18	33.9	191	322	Average
2480	91.29	-	-	86.83	32.18	6.18	33.9	191	322	Peak
2483.5	56.06	-17.94	74	51.6	32.18	6.18	33.9	191	322	Peak
2483.5	44.84	-9.16	54	40.38	32.18	6.18	33.9	191	322	Average

Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2480 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
2372	45.22	-28.78	74	41.04	32.03	5.99	33.84	100	33	Peak
2372	33.07	-20.93	54	28.89	32.03	5.99	33.84	100	33	Average
2480	75.61	-	-	71.15	32.18	6.18	33.9	100	33	Average
2480	91.45	-	-	86.99	32.18	6.18	33.9	100	33	Peak
2483.5	56.3	-17.7	74	51.84	32.18	6.18	33.9	100	33	Peak
2483.5	44.88	-9.12	54	40.42	32.18	6.18	33.9	100	33	Average



Test Mode :	Mode 10	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2402 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	20.88	-19.12	40	35.3	16.51	0.53	31.46	133	201	Peak
138.54	17.63	-25.87	43.5	36.38	11.6	1.2	31.55	-	-	Peak
234.93	18.93	-27.07	46	37.29	11.57	1.5	31.43	-	-	Peak
330.1	24.41	-21.59	46	39.48	14.39	1.85	31.31	-	-	Peak
562.5	21.61	-24.39	46	30.8	19.19	2.59	30.97	-	-	Peak
735.4	24.25	-21.75	46	30.52	21.44	3.02	30.73	-	-	Peak
2374.41	45.81	-28.19	74	41.63	32.03	5.99	33.84	102	229	Peak
2374.41	33.27	-20.73	54	29.09	32.03	5.99	33.84	102	229	Average
2402	91.56	-	-	87.3	32.08	6.03	33.85	102	229	Peak
2402	71.07	-	-	66.83	32.06	6.03	33.85	102	229	Average
2486	32.68	-21.32	54	28.22	32.18	6.18	33.9	102	229	Average
2486	45.26	-28.74	74	40.8	32.18	6.18	33.9	102	229	Peak

Test Mode :	Mode 10	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2402 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	20.57	-19.43	40	34.99	16.51	0.53	31.46	102	33	Peak
138.81	20.69	-22.81	43.5	39.44	11.6	1.2	31.55	-	-	Peak
246.54	17.07	-28.93	46	34.55	12.4	1.53	31.41	-	-	Peak
405.7	20.67	-25.33	46	33.02	16.66	2.16	31.17	-	-	Peak
498.1	23.08	-22.92	46	33.51	18.2	2.44	31.07	-	-	Peak
747.3	24.35	-21.65	46	30.38	21.63	3.05	30.71	-	-	Peak
2382.01	45.74	-28.26	74	41.53	32.03	6.03	33.85	158	162	Peak
2382.01	34.54	-19.46	54	30.33	32.03	6.03	33.85	158	162	Average
2402	95.77	-	-	91.51	32.08	6.03	33.85	158	162	Peak
2402	74.18	-	-	69.94	32.06	6.03	33.85	158	162	Average
2484	32.67	-21.33	54	28.21	32.18	6.18	33.9	158	162	Average
2484	44.25	-29.75	74	39.79	32.18	6.18	33.9	158	162	Peak

Test Mode :	Mode 11	Temperature :	24~26°C
Test Channel :	19	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2440 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	20.58	-19.42	40	35	16.51	0.53	31.46	142	185	Peak
138.81	14.06	-29.44	43.5	32.81	11.6	1.2	31.55	-	-	Peak
234.93	18.87	-27.13	46	37.23	11.57	1.5	31.43	-	-	Peak
332.2	23.52	-22.48	46	38.49	14.48	1.86	31.31	-	-	Peak
414.1	21.38	-24.62	46	33.55	16.8	2.19	31.16	-	-	Peak
766.9	24.16	-21.84	46	29.81	21.95	3.09	30.69	-	-	Peak
2380	45.4	-28.6	74	41.19	32.03	6.03	33.85	100	258	Peak
2380	32.92	-21.08	54	28.71	32.03	6.03	33.85	100	258	Average
2440	89.98	-	-	85.62	32.13	6.11	33.88	100	258	Peak
2440	69.81	-	-	65.45	32.13	6.11	33.88	100	258	Average
2486	44.01	-29.99	74	39.55	32.18	6.18	33.9	100	258	Peak
2486	32.34	-21.66	54	27.88	32.18	6.18	33.9	100	258	Average

Test Mode :	Mode 11	Temperature :	24~26°C
Test Channel :	19	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2440 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	20.54	-19.46	40	34.96	16.51	0.53	31.46	110	141	Peak
139.62	20.46	-23.04	43.5	39.21	11.6	1.2	31.55	-	-	Peak
233.58	14.45	-31.55	46	32.88	11.5	1.5	31.43	-	-	Peak
332.2	19.96	-26.04	46	34.93	14.48	1.86	31.31	-	-	Peak
497.4	24.45	-21.55	46	34.9	18.18	2.44	31.07	-	-	Peak
755.7	23.62	-22.38	46	29.49	21.76	3.07	30.7	-	-	Peak
2334	44.84	-29.16	74	40.76	31.96	5.95	33.83	175	240	Peak
2334	33.16	-20.84	54	29.08	31.96	5.95	33.83	175	240	Average
2440	95.88	-	-	91.52	32.13	6.11	33.88	175	240	Peak
2440	74.27	-	-	69.91	32.13	6.11	33.88	175	240	Average
2484	44.82	-29.18	74	40.36	32.18	6.18	33.9	175	240	Peak
2484	32.75	-21.25	54	28.29	32.18	6.18	33.9	175	240	Average

Test Mode :	Mode 12	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2480 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	20.58	-19.42	40	35.45	16.04	0.55	31.46	132	185	Peak
138.81	13.69	-29.81	43.5	32.44	11.6	1.2	31.55	-	-	Peak
234.93	18.27	-27.73	46	36.63	11.57	1.5	31.43	-	-	Peak
332.2	24.39	-21.61	46	39.36	14.48	1.86	31.31	-	-	Peak
553.4	20.79	-25.21	46	30.16	19.05	2.56	30.98	-	-	Peak
755	24.05	-21.95	46	29.93	21.75	3.07	30.7	-	-	Peak
2372	45.33	-28.67	74	41.15	32.03	5.99	33.84	170	318	Peak
2372	32.92	-21.08	54	28.74	32.03	5.99	33.84	170	318	Average
2480	72.82	-	-	68.36	32.18	6.18	33.9	170	318	Average
2480	93.97	-	-	89.51	32.18	6.18	33.9	170	318	Peak
2483.5	58.77	-15.23	74	54.31	32.18	6.18	33.9	170	318	Peak
2483.5	45.14	-8.86	54	40.68	32.18	6.18	33.9	170	318	Average

Test Mode :	Mode 12	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2480 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	20.48	-19.52	40	35.35	16.04	0.55	31.46	120	182	Peak
138.81	20.33	-23.17	43.5	39.08	11.6	1.2	31.55	-	-	Peak
234.93	14.26	-31.74	46	32.62	11.57	1.5	31.43	-	-	Peak
400.1	19.72	-26.28	46	32.18	16.58	2.14	31.18	-	-	Peak
634.6	23.21	-22.79	46	31.16	20.15	2.79	30.89	-	-	Peak
772.5	24.61	-21.39	46	30.17	22.03	3.1	30.69	-	-	Peak
2388	45.1	-28.9	74	40.86	32.06	6.03	33.85	174	244	Peak
2388	33.15	-20.85	54	28.91	32.06	6.03	33.85	174	244	Average
2480	74.25	-	-	69.79	32.18	6.18	33.9	174	244	Average
2480	95.97	-	-	91.51	32.18	6.18	33.9	174	244	Peak
2483.5	60.71	-13.29	74	56.25	32.18	6.18	33.9	174	244	Peak
2483.5	46.34	-7.66	54	41.88	32.18	6.18	33.9	174	244	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. 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
System Simulator	R&S	CMU200	117995	N/A	Jul. 28, 2011	Jul. 27, 2012	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Jun. 12, 2012	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 27, 2011	Jul. 26, 2012	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Aug. 21, 2012	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)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 30, 2010	Oct. 29, 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. 10, 2011	Aug. 09, 2012	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)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-00101800-30-10P	159088	1GHz ~ 18GHz	Feb. 21, 2011	Feb. 20, 2012	Radiation (03CH07-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Jan. 13, 2011	Jan. 12, 2012	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 EP172516-01 as below.