



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 Transmission System (DTS)

This is a partial report, and includes the Radiated Emissions test only. 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.

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FCC ID : HLZ-BRCM1051I

Page Number : 1 of 43

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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 7.2.4	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 1.47 dB at 4924 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	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 17.14 dBm (0.0518 W) 802.11g : 22.37 dBm (0.1726 W) 802.11n (BW 20MHz) : 21.69 dBm (0.1476 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	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

Remark:

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

1.4 Testing Site

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

1.5 Applied Standards

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

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8
- ♦ 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 Power

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

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	17.14	17.11	17.09	17.05
CH 06	2437 MHz	16.95	-	-	-
CH 11	2462 MHz	16.73	-	-	-

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	21.34	-	-	-	-	-	-	-
CH 06	2437 MHz	21.55	-	-	-	-	-	-	-
CH 11	2462 MHz	22.37	22.12	22.04	22.1	21.83	22.02	22.11	21.23

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		MCS=0	MCS=1	MCS=2	MCS=3	MCS=4	MCS=5	MCS=6	MCS=7
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 01	2412 MHz	20.06	-	-	-	-	-	-	-
CH 06	2437 MHz	20.85	-	-	-	-	-	-	-
CH 11	2462 MHz	21.69	21.34	21.31	20.93	21.07	21.09	21.62	21.13

Remark:

1. The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 6Mbps for 802.11g, and MCS0 for 802.11n (BW 20MHz) for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.
3. Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.



2.2 Test Mode

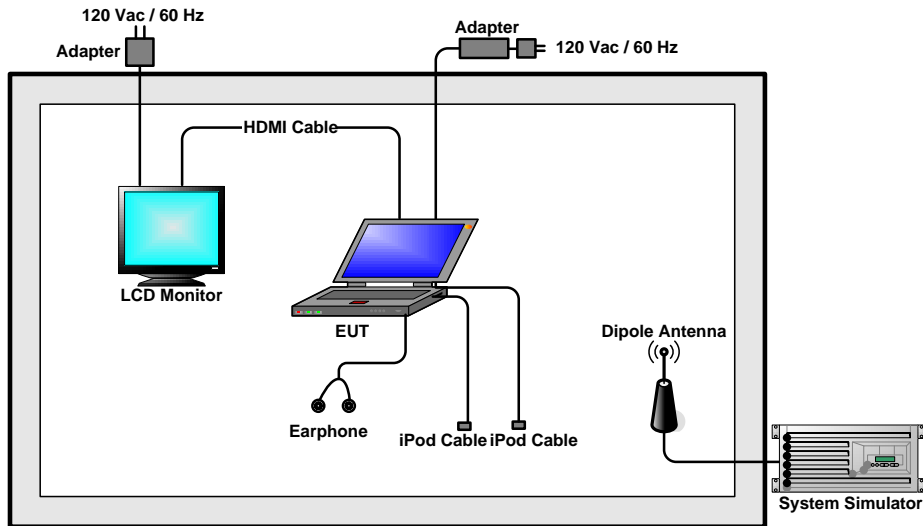
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic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

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

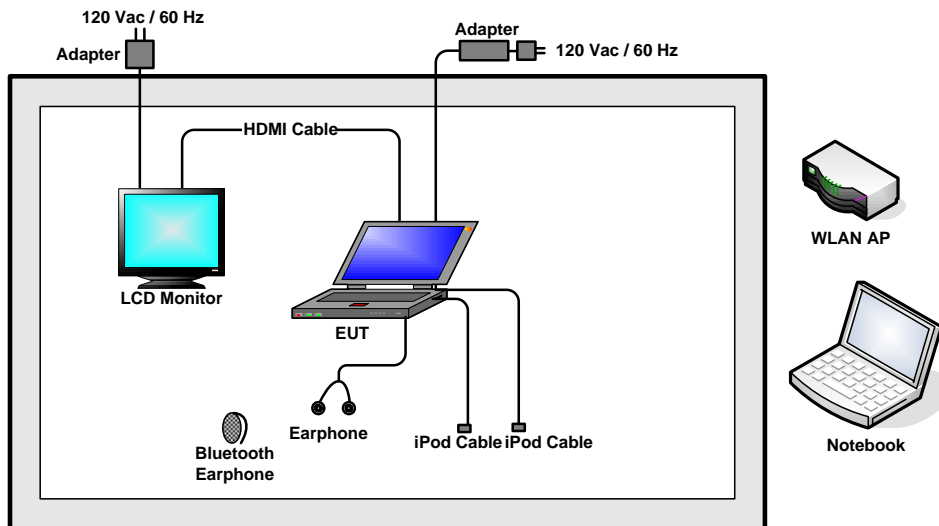
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz
AC Conducted Emission	Mode 1 : WLAN Link + Bluetooth Link + TC + Adapter:	
Remark: TC stands for Test Configuration, and consists of iPod Earphone, iPod Cable, monitor, and HDMI Cable.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>





2.4 RF Utility

For WLAN function, programmed RF utility, installed in the notebook/PC/EUT provides functions like channel selection and power level for continuous transmitting and receiving signals.

1. Execute "Windows Media Player" to play MPEG4 files.
2. AP D-Link was linked with the Notebook and runs the command of Ping and runs ISPSCAN
3. The EUT turned on the BurnIn Test and H Pattern function.



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.

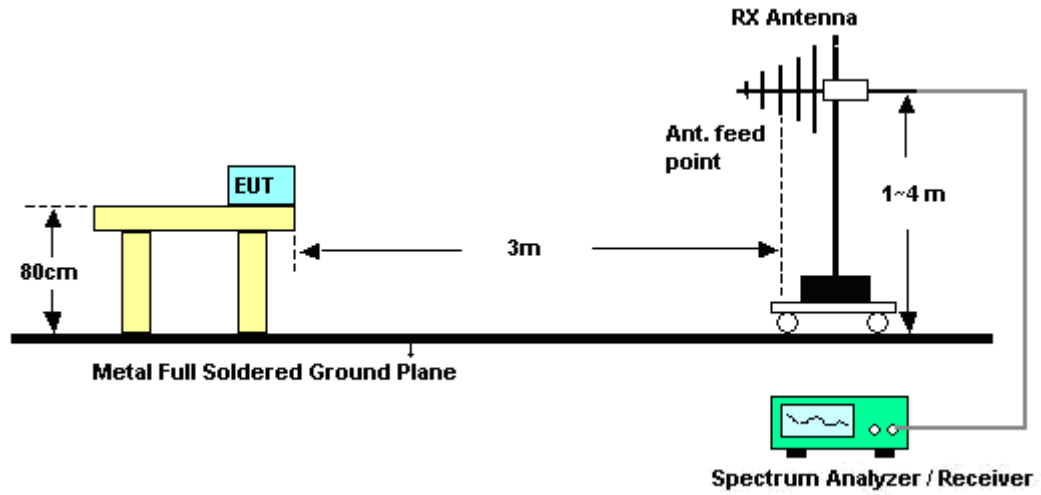
3.1.2 Measuring Instruments

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





3.1.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~51%
Test Channel :	01	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
2383.34	51.91	-22.09	74	47.7	32.03	6.03	33.85	100	243	Peak
2383.34	38.71	-15.29	54	34.5	32.03	6.03	33.85	100	243	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
2387.14	52.64	-21.36	74	48.4	32.06	6.03	33.85	140	124	Peak
2387.14	40.13	-13.87	54	35.89	32.06	6.03	33.85	140	124	Average

Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~51%
Test Channel :	11	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
2483.85	57.22	-16.78	74	52.76	32.18	6.18	33.9	101	238	Peak
2483.85	48.37	-5.63	54	43.91	32.18	6.18	33.9	101	238	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	58.48	-15.52	74	54.02	32.18	6.18	33.9	175	115	Peak
2483.5	49.69	-4.31	54	45.23	32.18	6.18	33.9	175	115	Average



Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~51%
Test Channel :	01	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	63.32	-10.68	74	59.08	32.06	6.03	33.85	101	246	Peak
2387.14	43.19	-10.81	54	38.95	32.06	6.03	33.85	101	246	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
2387.9	68.3	-5.7	74	64.06	32.06	6.03	33.85	110	121	Peak
2387.9	45.36	-8.64	54	41.12	32.06	6.03	33.85	110	121	Average

Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~51%
Test Channel :	11	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
2485.37	63.68	-10.32	74	59.22	32.18	6.18	33.9	100	237	Peak
2485.37	44.72	-9.28	54	40.26	32.18	6.18	33.9	100	237	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
2484.61	67.43	-6.57	74	62.97	32.18	6.18	33.9	139	115	Peak
2484.61	47.09	-6.91	54	42.63	32.18	6.18	33.9	139	115	Average



Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~51%
Test Channel :	01	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
2387.9	59.6	-14.4	74	55.36	32.06	6.03	33.85	100	246	Peak
2387.9	42.28	-11.72	54	38.04	32.06	6.03	33.85	100	246	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
2388.09	63	-11	74	58.76	32.06	6.03	33.85	108	122	Peak
2388.09	44.67	-9.33	54	40.43	32.06	6.03	33.85	108	122	Average

Test Mode :	Mode 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~51%
Test Channel :	11	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
2486.7	62.93	-11.07	74	58.47	32.18	6.18	33.9	100	239	Peak
2486.7	45.44	-8.56	54	40.98	32.18	6.18	33.9	100	239	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	65.15	-8.85	74	60.69	32.18	6.18	33.9	141	123	Peak
2483.5	47.35	-6.65	54	42.89	32.18	6.18	33.9	141	123	Average

3.2 AC Conducted Emission Measurement

3.2.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

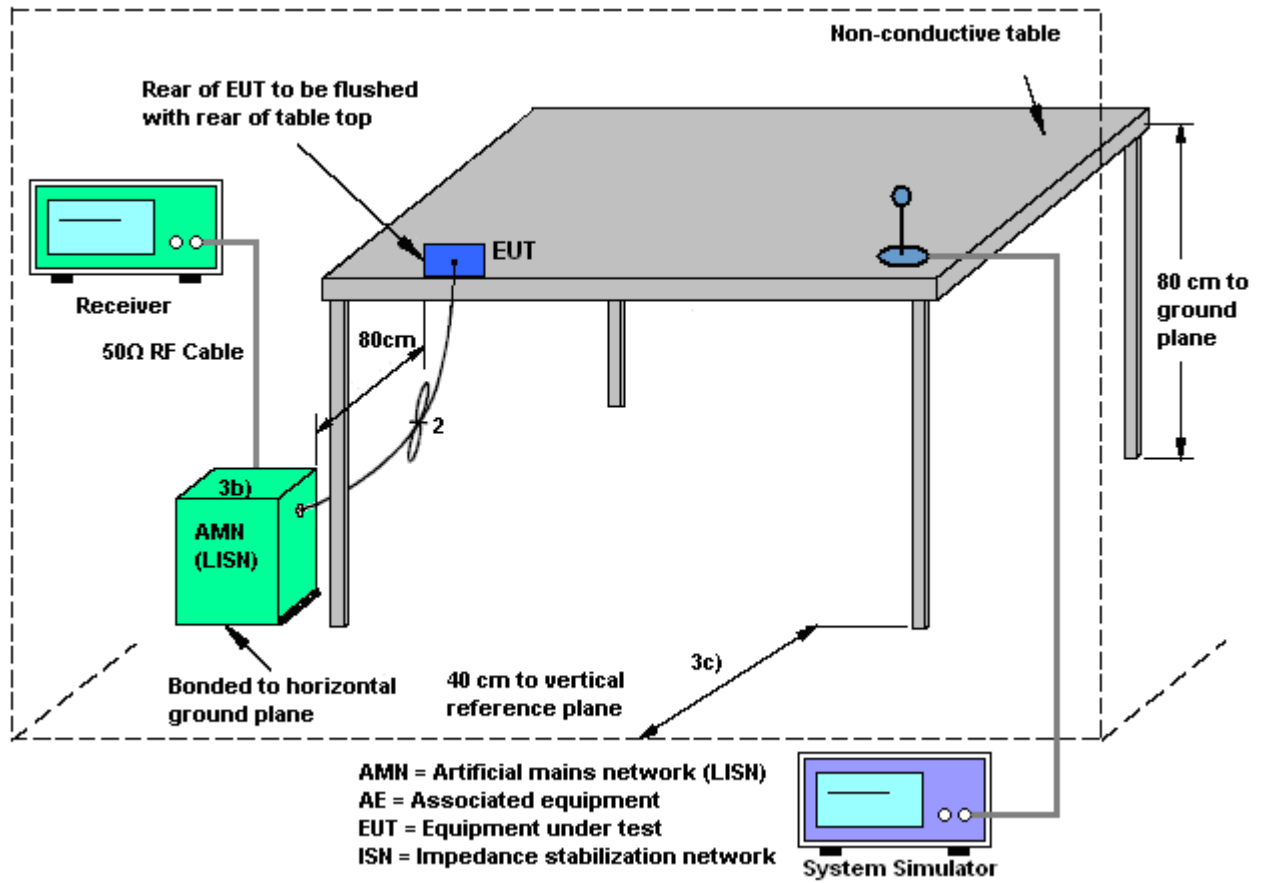
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

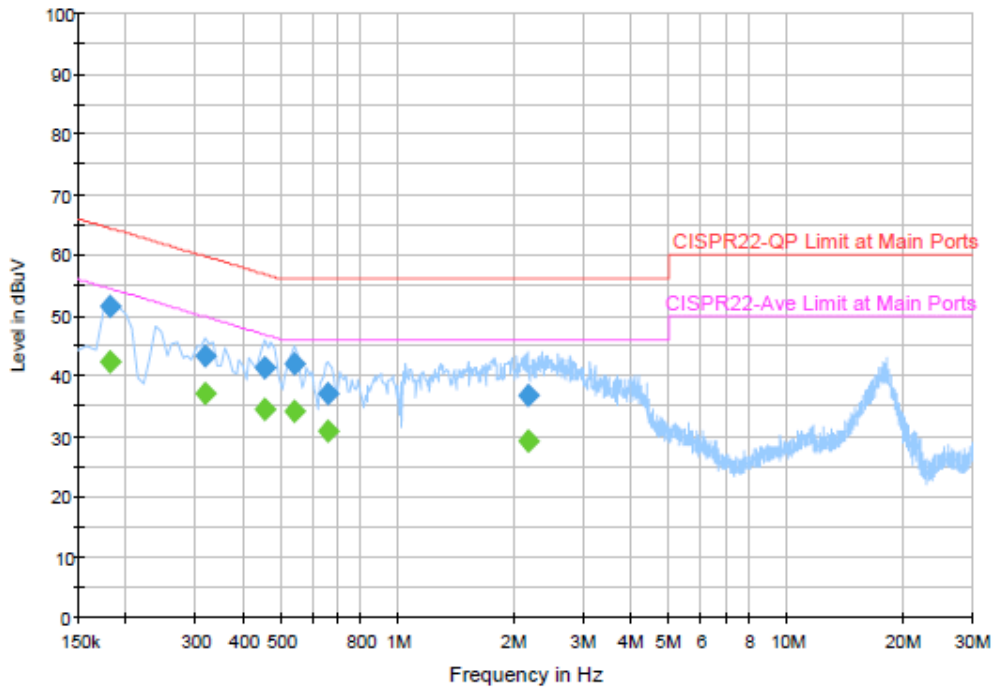
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

3.2.4 Test Setup



3.2.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic 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

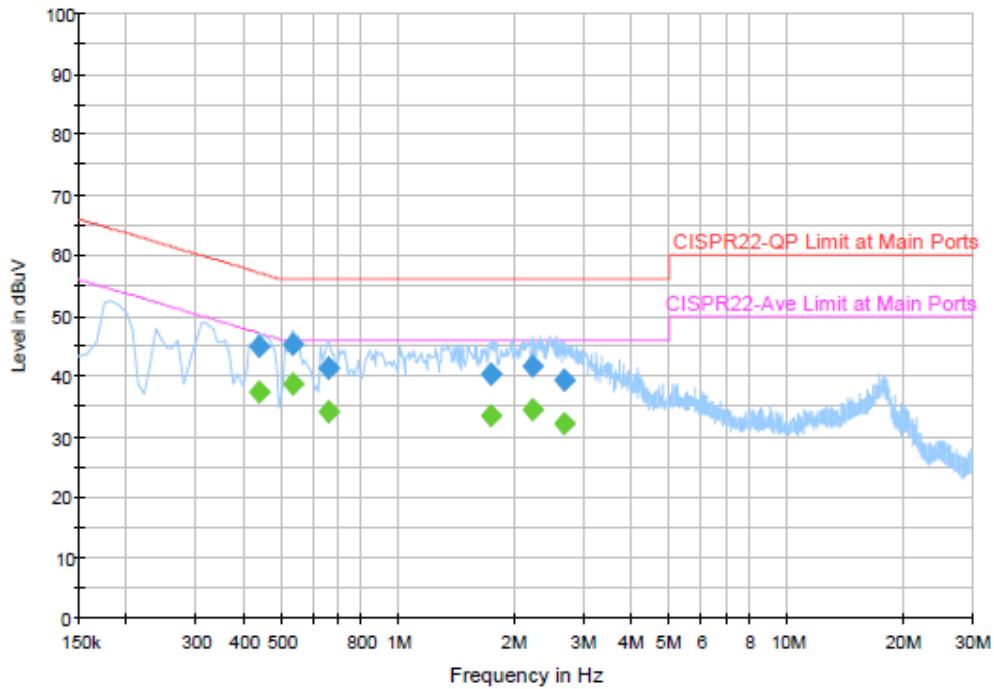
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	51.5	Off	L1	19.4	12.9	64.4
0.318000	43.3	Off	L1	19.4	16.5	59.8
0.454000	41.3	Off	L1	19.4	15.5	56.8
0.542000	41.8	Off	L1	19.4	14.2	56.0
0.662000	36.9	Off	L1	19.4	19.1	56.0
2.158000	36.6	Off	L1	19.4	19.4	56.0

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. 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

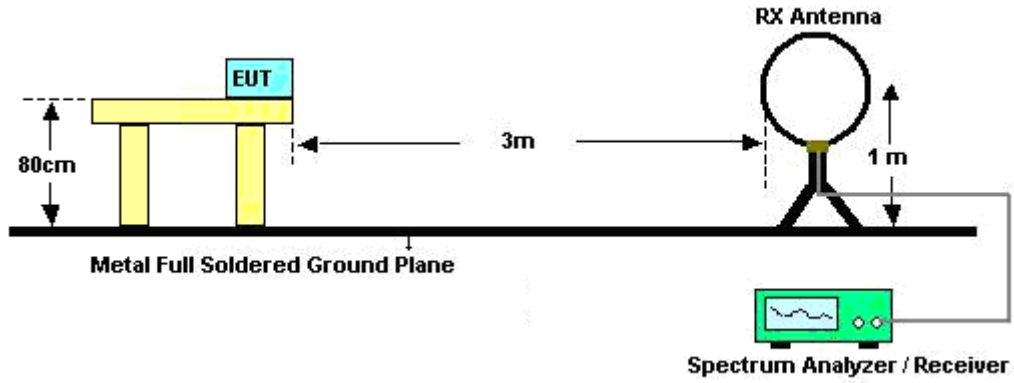
See list of measuring instruments of this test report.

3.3.3 Test Procedures

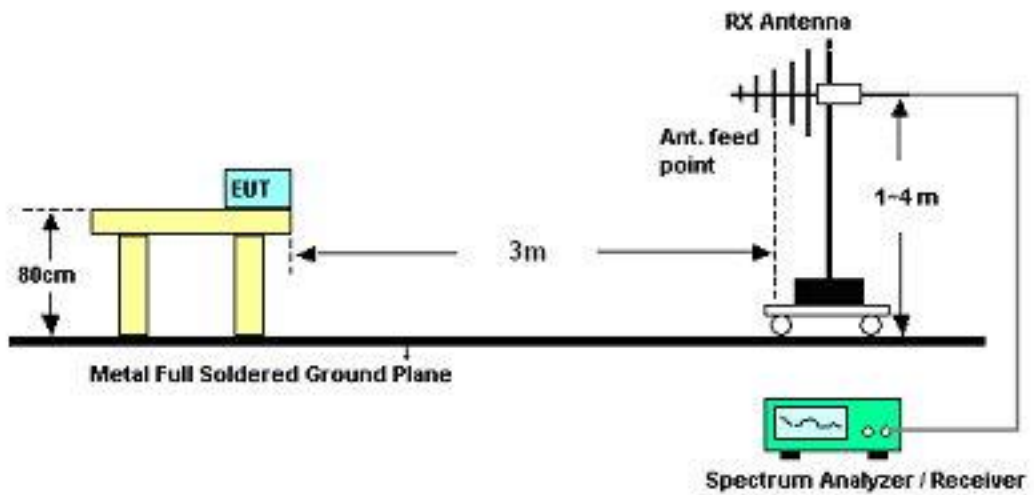
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto;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

3.3.4 Test Setup

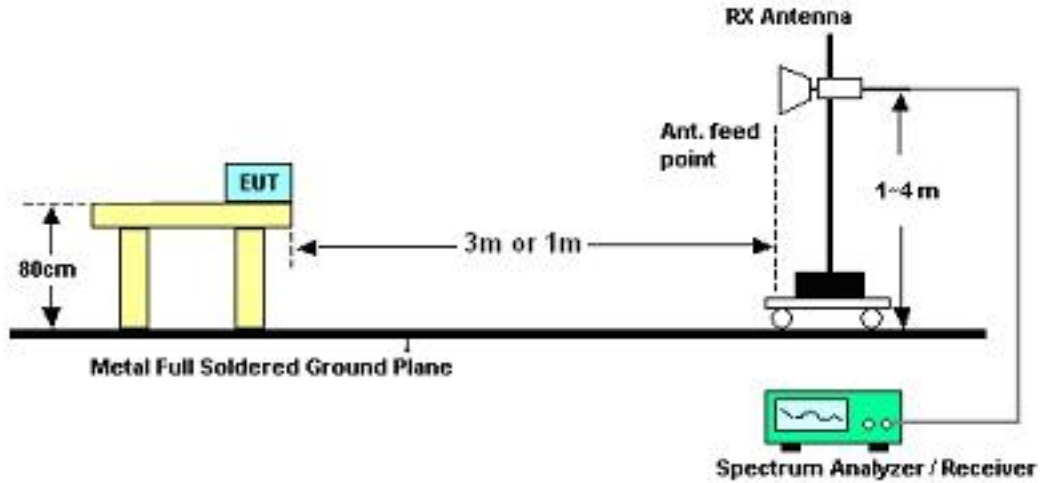
For radiated emissions below 30MHz



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 (specific distance / test distance) (dB);

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



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

Test Mode :	Mode 1	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	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	20.54	-19.46	40	34.96	16.51	0.53	31.46	-	-	Peak
234.66	17.83	-28.17	46	36.19	11.57	1.5	31.43	-	-	Peak
292.17	18.35	-27.65	46	34.62	13.34	1.71	31.32	-	-	Peak
332.2	24.29	-21.71	46	39.26	14.48	1.86	31.31	-	-	Peak
643.7	22.14	-23.86	46	29.94	20.26	2.82	30.88	-	-	Peak
954.5	27.68	-18.32	46	30.47	24.32	3.46	30.57	100	37	Peak
2383.34	51.91	-22.09	74	47.7	32.03	6.03	33.85	100	243	Peak
2383.34	38.71	-15.29	54	34.5	32.03	6.03	33.85	100	243	Average
2412	105.37	-	-	101.09	32.08	6.07	33.87	100	243	Peak
2412	98.75	-	-	94.47	32.08	6.07	33.87	100	243	Average
2494	41.31	-12.69	54	36.83	32.2	6.18	33.9	100	243	Average
2494	52.69	-21.31	74	48.21	32.2	6.18	33.9	100	243	Peak
4824	53.68	-20.32	74	69.57	34.1	9.12	59.11	100	37	Peak
4824	51.23	-2.77	54	67.12	34.1	9.12	59.11	100	37	Average
7236	47.71	-37.66	85.37	60.09	35.7	10.03	58.11	100	0	Peak



Test Mode :	Mode 1	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	19.84	-20.16	40	34.26	16.51	0.53	31.46	-	-	Peak
129.09	17.78	-25.72	43.5	36.64	11.57	1.14	31.57	-	-	Peak
139.62	20.72	-22.78	43.5	39.47	11.6	1.2	31.55	-	-	Peak
498.1	23.78	-22.22	46	34.21	18.2	2.44	31.07	-	-	Peak
665.4	24.08	-21.92	46	31.56	20.5	2.87	30.85	-	-	Peak
939.8	27.11	-18.89	46	30.14	24.13	3.44	30.6	100	27	Peak
2387.14	52.64	-21.36	74	48.4	32.06	6.03	33.85	140	124	Peak
2387.14	40.13	-13.87	54	35.89	32.06	6.03	33.85	140	124	Average
2412	107.4	-	-	103.12	32.08	6.07	33.87	140	124	Peak
2412	100.92	-	-	96.64	32.08	6.07	33.87	140	124	Average
2492	46.07	-7.93	54	41.59	32.2	6.18	33.9	140	124	Average
2492	56.56	-17.44	74	52.08	32.2	6.18	33.9	140	124	Peak
4824	53.03	-20.97	74	68.92	34.1	9.12	59.11	100	331	Peak
4824	50.46	-3.54	54	66.35	34.1	9.12	59.11	100	331	Average
7236	42.38	-45.02	87.4	54.76	35.7	10.03	58.11	100	0	Peak



Test Mode :	Mode 2	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	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
31.89	19.67	-20.33	40	34.54	16.04	0.55	31.46	100	97	Peak
235.74	19.91	-26.09	46	38.19	11.64	1.51	31.43	-	-	Peak
291.09	19.13	-26.87	46	35.43	13.32	1.7	31.32	-	-	Peak
332.2	21.23	-24.77	46	36.2	14.48	1.86	31.31	-	-	Peak
662.6	22.36	-23.64	46	29.88	20.47	2.87	30.86	-	-	Peak
998.6	26.46	-27.54	54	28.65	24.88	3.51	30.58	-	-	Peak
2356	50.29	-23.71	74	46.16	32.01	5.95	33.83	100	246	Peak
2356	39.86	-14.14	54	35.73	32.01	5.95	33.83	100	246	Average
2437	103.99	-	-	99.63	32.13	6.11	33.88	100	246	Peak
2437	97.6	-	-	93.24	32.13	6.11	33.88	100	246	Average
2494	51.12	-22.88	74	46.64	32.2	6.18	33.9	100	246	Peak
2494	38.9	-15.1	54	34.42	32.2	6.18	33.9	100	246	Average
4874	54.47	-19.53	74	70.28	34.1	9.13	59.04	112	37	Peak
4874	51.86	-2.14	54	67.67	34.1	9.13	59.04	112	37	Average
7311	44.78	-29.22	74	57.15	35.7	10.06	58.13	100	0	Peak



Test Mode :	Mode 2	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	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
34.05	19.83	-20.17	40	35.16	15.57	0.57	31.47	100	87	Peak
118.02	16	-27.5	43.5	35.11	11.36	1.09	31.56	-	-	Peak
138.81	20.62	-22.88	43.5	39.37	11.6	1.2	31.55	-	-	Peak
576.5	22.05	-23.95	46	30.98	19.4	2.62	30.95	-	-	Peak
764.1	24.29	-21.71	46	30	21.9	3.08	30.69	-	-	Peak
987.4	26.35	-27.65	54	28.7	24.73	3.5	30.58	-	-	Peak
2388	50.21	-23.79	74	45.97	32.06	6.03	33.85	135	114	Peak
2388	38.6	-15.4	54	34.36	32.06	6.03	33.85	135	114	Average
2437	106.81	-	-	102.45	32.13	6.11	33.88	135	114	Peak
2437	100.3	-	-	95.94	32.13	6.11	33.88	135	114	Average
2492	54.95	-19.05	74	50.47	32.2	6.18	33.9	135	114	Peak
2492	41.75	-12.25	54	37.27	32.2	6.18	33.9	135	114	Average
4874	54.86	-19.14	74	70.67	34.1	9.13	59.04	100	332	Peak
4874	51.4	-2.6	54	67.21	34.1	9.13	59.04	100	332	Average
7311	42.98	-31.02	74	55.35	35.7	10.06	58.13	100	0	Peak



Test Mode :	Mode 3	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.16	19.71	-20.29	40	34.58	16.04	0.55	31.46	100	102	Peak
139.62	14.57	-28.93	43.5	33.32	11.6	1.2	31.55	-	-	Peak
233.58	18.87	-27.13	46	37.3	11.5	1.5	31.43	-	-	Peak
573	21.3	-24.7	46	30.29	19.35	2.61	30.95	-	-	Peak
750.1	24.44	-21.56	46	30.41	21.67	3.06	30.7	-	-	Peak
988.1	27.03	-26.97	54	29.37	24.74	3.5	30.58	-	-	Peak
2382	51.27	-22.73	74	47.06	32.03	6.03	33.85	101	238	Peak
2382	40.32	-13.68	54	36.11	32.03	6.03	33.85	101	238	Average
2462	107.08	-	-	102.68	32.15	6.14	33.89	101	238	Peak
2462	100.46	-	-	96.06	32.15	6.14	33.89	101	238	Average
2483.85	57.22	-16.78	74	52.76	32.18	6.18	33.9	101	238	Peak
2483.85	48.37	-5.63	54	43.91	32.18	6.18	33.9	101	238	Average
4924	52.48	-21.52	74	68.19	34.1	9.15	58.96	110	36	Peak
4924	51.99	-2.01	54	67.7	34.1	9.15	58.96	110	36	Average



Test Mode :	Mode 3	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	20.46	-19.54	40	34.88	16.51	0.53	31.46	100	41	Peak
138.81	21.03	-22.47	43.5	39.78	11.6	1.2	31.55	-	-	Peak
234.66	14.86	-31.14	46	33.22	11.57	1.5	31.43	-	-	Peak
576.5	21.62	-24.38	46	30.55	19.4	2.62	30.95	-	-	Peak
760.6	24.69	-21.31	46	30.47	21.84	3.08	30.7	-	-	Peak
979.7	26.08	-27.92	54	28.54	24.63	3.49	30.58	-	-	Peak
2388	51.54	-22.46	74	47.3	32.06	6.03	33.85	175	115	Peak
2388	40.98	-13.02	54	36.74	32.06	6.03	33.85	175	115	Average
2462	102.64	-	-	98.24	32.15	6.14	33.89	175	115	Average
2462	109.2	-	-	104.8	32.15	6.14	33.89	175	115	Peak
2483.5	58.48	-15.52	74	54.02	32.18	6.18	33.9	175	115	Peak
2483.5	49.69	-4.31	54	45.23	32.18	6.18	33.9	175	115	Average
4924	52.53	-1.47	54	68.24	34.1	9.15	58.96	101	319	Average
4924	55.07	-18.93	74	70.78	34.1	9.15	58.96	101	319	Peak



Test Mode :	Mode 4	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	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
31.62	19.68	-20.32	40	34.55	16.04	0.55	31.46	100	192	Peak
234.66	18.56	-27.44	46	36.92	11.57	1.5	31.43	-	-	Peak
296.49	16.76	-29.24	46	32.93	13.41	1.75	31.33	-	-	Peak
330.1	22.74	-23.26	46	37.81	14.39	1.85	31.31	-	-	Peak
570.9	21.12	-24.88	46	30.14	19.32	2.61	30.95	-	-	Peak
743.8	24.44	-21.56	46	30.53	21.58	3.05	30.72	-	-	Peak
2387.14	63.32	-10.68	74	59.08	32.06	6.03	33.85	101	246	Peak
2387.14	43.19	-10.81	54	38.95	32.06	6.03	33.85	101	246	Average
2412	102.03	-	-	97.75	32.08	6.07	33.87	101	246	Peak
2412	79.19	-	-	74.91	32.08	6.07	33.87	101	246	Average
2500	38.29	-15.71	54	33.81	32.2	6.18	33.9	101	246	Average
2500	52.57	-21.43	74	48.09	32.2	6.18	33.9	101	246	Peak



Test Mode :	Mode 4	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.62	20.05	-19.95	40	34.92	16.04	0.55	31.46	100	313	Peak
128.82	18.44	-25.06	43.5	37.3	11.57	1.14	31.57	-	-	Peak
138.81	20.85	-22.65	43.5	39.6	11.6	1.2	31.55	-	-	Peak
472.9	21.7	-24.3	46	32.63	17.78	2.36	31.07	-	-	Peak
666.1	23.37	-22.63	46	30.84	20.51	2.87	30.85	-	-	Peak
954.5	27.23	-18.77	46	30.02	24.32	3.46	30.57	-	-	Peak
2387.9	68.3	-5.7	74	64.06	32.06	6.03	33.85	110	121	Peak
2387.9	45.36	-8.64	54	41.12	32.06	6.03	33.85	110	121	Average
2412	106.67	-	-	102.39	32.08	6.07	33.87	110	121	Peak
2412	81.92	-	-	77.64	32.08	6.07	33.87	110	121	Average
2494	40.71	-13.29	54	36.23	32.2	6.18	33.9	110	121	Average
2494	56.67	-17.33	74	52.19	32.2	6.18	33.9	110	121	Peak



Test Mode :	Mode 5	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.81	20.53	-19.47	40	35.18	16.27	0.54	31.46	100	238	Peak
233.85	19.93	-26.07	46	38.36	11.5	1.5	31.43	-	-	Peak
283.26	17.2	-28.8	46	33.69	13.2	1.65	31.34	-	-	Peak
559.7	20.91	-25.09	46	30.16	19.14	2.58	30.97	-	-	Peak
749.4	23.73	-22.27	46	29.7	21.67	3.06	30.7	-	-	Peak
996.5	26.85	-27.15	54	29.08	24.84	3.51	30.58	-	-	Peak
2358	50.33	-23.67	74	46.17	32.01	5.99	33.84	102	239	Peak
2358	37.25	-16.75	54	33.09	32.01	5.99	33.84	102	239	Average
2437	101.39	-	-	97.06	32.1	6.11	33.88	102	239	Peak
2437	77.44	-	-	73.08	32.13	6.11	33.88	102	239	Average
2486	53.44	-20.56	74	48.98	32.18	6.18	33.9	102	239	Peak
2486	38.14	-15.86	54	33.68	32.18	6.18	33.9	102	239	Average



Test Mode :	Mode 5	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.7	20.34	-19.66	40	35.45	15.8	0.56	31.47	-	-	Peak
138.81	21.04	-22.46	43.5	39.79	11.6	1.2	31.55	-	-	Peak
234.66	16.31	-29.69	46	34.67	11.57	1.5	31.43	-	-	Peak
399.4	20.52	-25.48	46	33	16.56	2.14	31.18	-	-	Peak
643.7	24.18	-21.82	46	31.98	20.26	2.82	30.88	-	-	Peak
942.6	27.26	-18.74	46	30.24	24.17	3.44	30.59	112	91	Peak
2388	52.91	-21.09	74	48.67	32.06	6.03	33.85	144	121	Peak
2388	38.66	-15.34	54	34.42	32.06	6.03	33.85	144	121	Average
2437	106.1	-	-	101.77	32.1	6.11	33.88	144	121	Peak
2437	81.76	-	-	77.4	32.13	6.11	33.88	144	121	Average
2494	55.41	-18.59	74	50.93	32.2	6.18	33.9	144	121	Peak
2494	40.09	-13.91	54	35.61	32.2	6.18	33.9	144	121	Average



Test Mode :	Mode 6	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.97	20.01	-19.99	40	35.12	15.8	0.56	31.47	100	174	Peak
234.93	20.64	-25.36	46	39	11.57	1.5	31.43	-	-	Peak
275.97	18.34	-27.66	46	34.97	13.09	1.64	31.36	-	-	Peak
332.2	22.75	-23.25	46	37.72	14.48	1.86	31.31	-	-	Peak
755.7	24.74	-21.26	46	30.61	21.76	3.07	30.7	-	-	Peak
971.3	26.24	-27.76	54	28.81	24.52	3.48	30.57	-	-	Peak
2388	51.3	-22.7	74	47.06	32.06	6.03	33.85	100	237	Peak
2388	37.8	-16.2	54	33.56	32.06	6.03	33.85	100	237	Average
2462	80.3	-	-	75.9	32.15	6.14	33.89	100	237	Average
2462	102.84	-	-	98.44	32.15	6.14	33.89	100	237	Peak
2485.37	63.68	-10.32	74	59.22	32.18	6.18	33.9	100	237	Peak
2485.37	44.72	-9.28	54	40.26	32.18	6.18	33.9	100	237	Average
7386	45.71	-28.29	74	58.08	35.7	10.1	58.17	100	0	Peak



Test Mode :	Mode 6	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	20.86	-19.14	40	35.28	16.51	0.53	31.46	-	-	Peak
106.41	15.65	-27.85	43.5	35.8	10.37	1.03	31.55	-	-	Peak
138.81	21.12	-22.38	43.5	39.87	11.6	1.2	31.55	-	-	Peak
576.5	22.27	-23.73	46	31.2	19.4	2.62	30.95	-	-	Peak
746.6	23.42	-22.58	46	29.45	21.63	3.05	30.71	-	-	Peak
920.9	26.95	-19.05	46	30.32	23.89	3.39	30.65	100	126	Peak
2382	51.48	-22.52	74	47.27	32.03	6.03	33.85	139	115	Peak
2382	38.63	-15.37	54	34.42	32.03	6.03	33.85	139	115	Average
2462	83.03	-	-	78.63	32.15	6.14	33.89	139	115	Average
2462	105.52	-	-	101.12	32.15	6.14	33.89	139	115	Peak
2484.61	67.43	-6.57	74	62.97	32.18	6.18	33.9	139	115	Peak
2484.61	47.09	-6.91	54	42.63	32.18	6.18	33.9	139	115	Average



Test Mode :	Mode 7	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	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
2387.9	42.28	-11.72	54	38.04	32.06	6.03	33.85	100	246	Average
2387.9	59.6	-14.4	74	55.36	32.06	6.03	33.85	100	246	Peak
2412	78.51	-	-	74.23	32.08	6.07	33.87	100	246	Average
2412	101.06	-	-	96.78	32.08	6.07	33.87	100	246	Peak
2500	52.37	-21.63	74	47.89	32.2	6.18	33.9	100	246	Peak
2500	38.21	-15.79	54	33.73	32.2	6.18	33.9	100	246	Average

Test Mode :	Mode 7	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.09	44.67	-9.33	54	40.43	32.06	6.03	33.85	108	122	Average
2388.09	63	-11	74	58.76	32.06	6.03	33.85	108	122	Peak
2412	106.09	-	-	101.81	32.08	6.07	33.87	108	122	Peak
2412	81.3	-	-	77.02	32.08	6.07	33.87	108	122	Average
2494	35.74	-18.26	54	31.26	32.2	6.18	33.9	108	122	Average
2494	56.29	-17.71	74	51.81	32.2	6.18	33.9	108	122	Peak



Test Mode :	Mode 8	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	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
2350	49.34	-24.66	74	45.24	31.98	5.95	33.83	100	247	Peak
2350	36.55	-17.45	54	32.45	31.98	5.95	33.83	100	247	Average
2437	102.09	-	-	97.76	32.1	6.11	33.88	100	247	Peak
2437	77.52	-	-	73.16	32.13	6.11	33.88	100	247	Average
2486	37.57	-16.43	54	33.11	32.18	6.18	33.9	100	247	Average
2486	52.1	-21.9	74	47.64	32.18	6.18	33.9	100	247	Peak

Test Mode :	Mode 8	Temperature :	24~26°C
Test Channel :	06	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	52.46	-21.54	74	48.22	32.06	6.03	33.85	143	130	Peak
2390	38.89	-15.11	54	34.65	32.06	6.03	33.85	143	130	Average
2437	103.39	-	-	99.03	32.13	6.11	33.88	143	130	Peak
2437	81.31	-	-	76.95	32.13	6.11	33.88	143	130	Average
2494	53.81	-20.19	74	49.33	32.2	6.18	33.9	143	130	Peak
2494	39.66	-14.34	54	35.18	32.2	6.18	33.9	143	130	Average



Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2382	48.97	-25.03	74	44.76	32.03	6.03	33.85	100	239	Peak
2382	36.8	-17.2	54	32.59	32.03	6.03	33.85	100	239	Average
2462	101.8	-	-	97.4	32.15	6.14	33.89	100	239	Peak
2462	80.18	-	-	75.78	32.15	6.14	33.89	100	239	Average
2486.7	45.44	-8.56	54	40.98	32.18	6.18	33.9	100	239	Average
2486.7	62.93	-11.07	74	58.47	32.18	6.18	33.9	100	239	Peak

Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	11	Relative Humidity :	50~51%
Test Engineer :	Ivan Chiang	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
2382	51.62	-22.38	74	47.41	32.03	6.03	33.85	141	123	Peak
2382	38.5	-15.5	54	34.29	32.03	6.03	33.85	141	123	Average
2462	105.92	-	-	101.52	32.15	6.14	33.89	141	123	Peak
2462	83.38	-	-	78.98	32.15	6.14	33.89	141	123	Average
2483.5	47.35	-6.65	54	42.89	32.18	6.18	33.9	141	123	Average
2483.5	65.15	-8.85	74	60.69	32.18	6.18	33.9	141	123	Peak



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
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-1000 W	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.32 dB.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-00 101800-30-10P	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.