

Partial FCC RF Test Report

APPLICANT : Acer Inc.
EQUIPMENT : 802.11G/DRAFT 802.11N WLAN PCI-E MINICARD
BRAND NAME : Acer
MODEL NAME : BCM94313HMG2L
FCC ID : HLZ-BRCM1050
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

This is a partial report, and includes the AC Conducted Emission and Radiated Emissions test. The product was received on Jan. 19, 2012 and completely tested on Feb. 09, 2012. 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	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 RF Power	8
2.2 Test Mode	9
2.3 Connection Diagram of Test System	10
2.4 RF Utility	11
3 TEST RESULT	12
3.1 Band Edges Measurement	12
3.2 AC Conducted Emission Measurement	17
3.3 Radiated Emission Measurement	21
3.4 Antenna Requirements	40
4 LIST OF MEASURING EQUIPMENT	41
5 UNCERTAINTY OF EVALUATION	42
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR1D2933-02	Rev. 01	Initial issue of report	Feb. 15, 2012

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 17.70 dB at 0.190 MHz
3.3	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.02 dB at 4874.000 MHz
3.4	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Acer Inc.

8F., No. 88, Sec. 1, Hsin Tai Wu Rd., Hsichih, New Taipei City 221, Taiwan, R.O.C.

1.2 Manufacturer

Quanta Computer Inc.

1. No. 2, Lane 58, Sanzhuang Road, Songjiang Export Processing Zone, Shanghai, P.R. China
2. No. 4, Wen Ming 1st Street, Kuei Shan Hsiang, Taoyuan Shien, Taiwan, R.O.C.333
3. No. 8, Dongjing Rd., Songjiang Industrial Zone, Shanghai, P.R. China
4. No. 4, Lane 58 Sanzhuang Road, Songjiang Export Processing Zone, Shanghai, P.R. China
5. North to Songsheng. Road, Songjiang Industrial Zone, Shanghai, P.R. China
6. B#, No. 1 South Rongteng Road, Songjiang Export Processing Zone, Shanghai, P.R. China
7. Standard Factory, South to Valqua, Rongxin Road, Songjiang Export Processing Zone, Shanghai, P.R. China
8. C#, No. 1 South Rongteng Road, Songhjang Export Processing Zone, Shanghai, P.R. China
9. No. 6, Lane 66 Sanzhuang Road, Songjiang Export Processing Zone, Shanghai, P.R. China
10. No. 5, Lane 58 Sanzhuang Road, Songjiang Export Processing Zone, Shanghai, P.R. China
11. Huade Building, No. 18 ChuangYe Rd., ShandDi Zone, HaiDian District, Beijing, P.R.C.
12. No. 68 Sanzhuang Road, Songjiang Export Processing Zone, Shanghai, P.R. China
13. 2F., C Building, XinYe Rd, Export Processing District In Torch, Zhongshan, Guangdong, P.R.C.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	802.11G/DRAFT 802.11N WLAN PCI-E MINICARD
Brand Name	Acer
Model Name	BCM94313HMG2L
FCC ID	HLZ-BRCM1050
Host Notebook Computer	Brand Name: Acer Model Name: ZE7 Marketing Name : AOD270, Aspire one D270, AOHAPPY, Aspire one Happy HW Version : M/B : C3 SW Version : BIOS : V1.01
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 18.01 dBm (0.0632 W) 802.11g : 24.89 dBm (0.3083 W) 802.11n (BW 20MHz) : 24.89 dBm (0.3083 W)
Antenna Type	PIFA Antenna
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

Remark: 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	03CH05-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, recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	LCD Monitor	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
3.	Bluetooth Earphone	Sony Ericsson	HPM-78	N/A	N/A	N/A
4.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
5.	Earphone	Ergotech	ET-E200	FCC DoC	Unshielded, 1.8 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:

Band	2.4GHz 802.11b RF Power (dBm)			2.4GHz 802.11b RF Power (dBm)		
Chain	A			B		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Peak Power	18.01	16.33	14.34	17.97	15.98	14.12

Band	2.4GHz 802.11g RF Power (dBm)			2.4GHz 802.11g RF Power (dBm)		
Chain	A			B		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Peak Power	23.09	24.89	15.42	23.08	24.84	15.04

Band	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)			2.4GHz 802.11n (BW 20MHz) RF Power (dBm)		
Chain	A			B		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Peak Power	22.66	24.89	14.37	22.36	24.83	14.30

Remark:

1. All the test data for each data rate were verified, but only the worst case was reported.
2. The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b (Chain A), 6Mbps for 802.11g (Chain A), and MCS0 for 802.11n (BW 20MHz) (Chain A) for all the test cases due to the highest RF output power.
3. The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

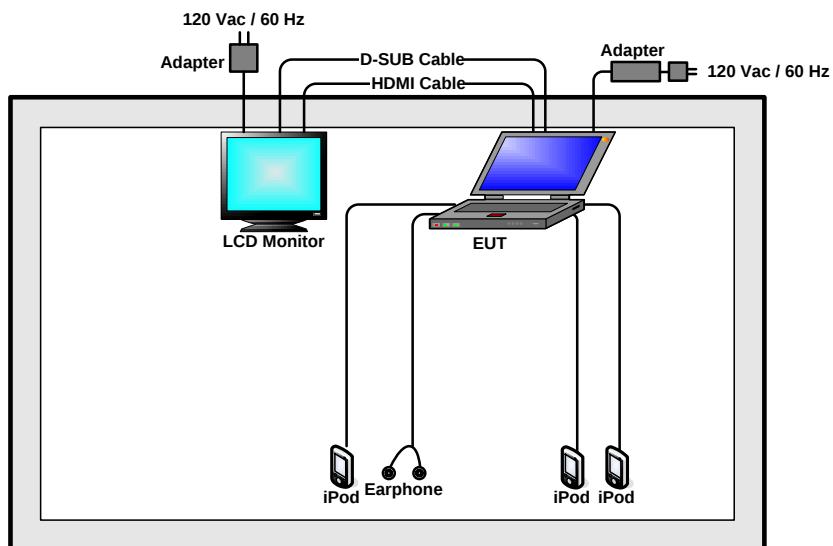
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 KHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic 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.

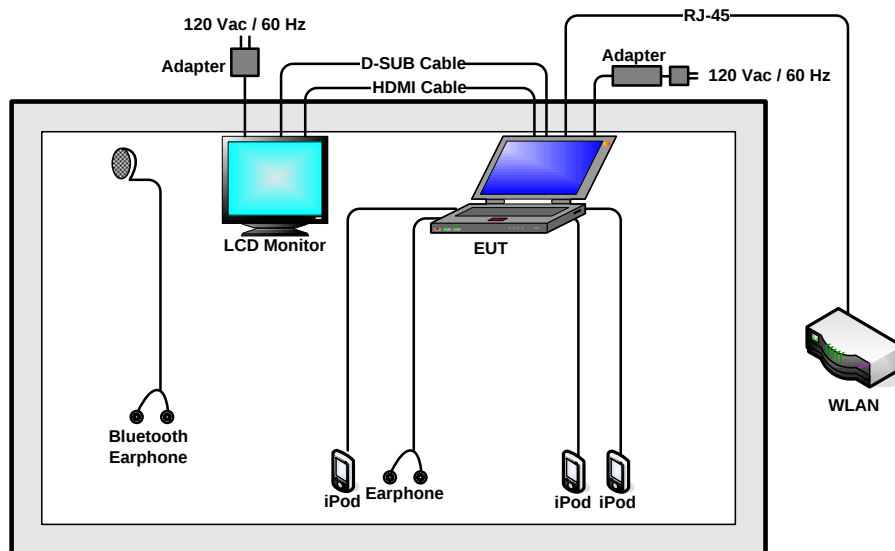
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz for Chain A Mode 2 : 802.11b CH06_2437 MHz for Chain A Mode 3 : 802.11b CH11_2462 MHz for Chain A	Mode 4: 802.11g_CH01_2412 MHz for Chain A Mode 5: 802.11g_CH06_2437 MHz for Chain A Mode 6: 802.11g_CH11_2462 MHz for Chain A Mode 7: 802.11n (BW 20M)_CH01_2412 MHz for Chain A Mode 8: 802.11n (BW 20M)_CH06_2437 MHz for Chain A Mode 9: 802.11n (BW 20M)_CH11_2462 MHz for Chain A
AC Conducted Emission	Mode 1 : WLAN Link + Bluetooth Link + HDMI Cable + RJ-45 + TC + Adapter	
Remark: TC stands for Test Configuration, and consists of iPod, earphone, MPEG4, camera, and D-SUB.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>





2.4 RF Utility

The programmed RF utility "TX Pkteng power_B&G&HT20" 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.

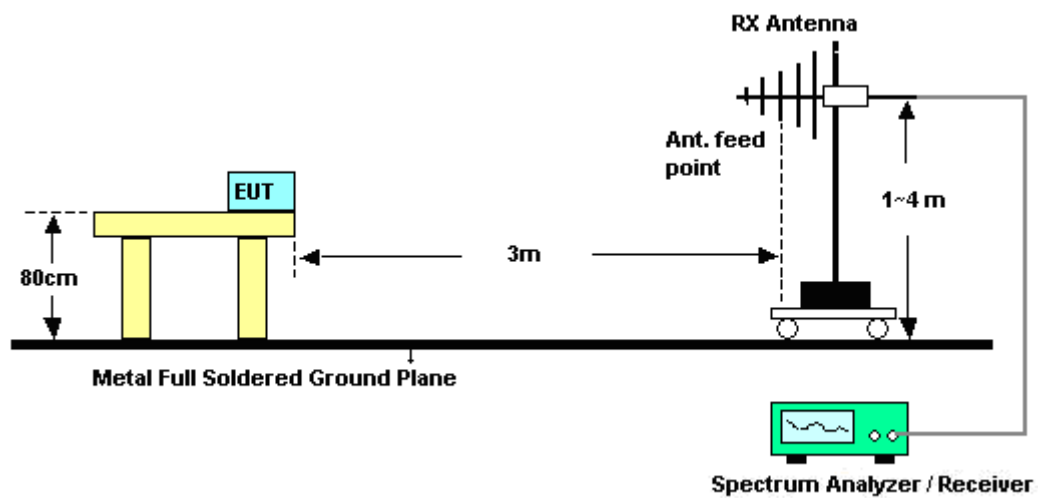
3.1.2 Measuring Instruments

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



3.1.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	20~22°C
Test Band :	802.11b	Relative Humidity :	42~44%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2331.28	56.27	-17.73	74	55.68	31.96	4.53	35.9	159	138	Peak
2331.28	46.74	-7.26	54	46.15	31.96	4.53	35.9	159	138	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2332.99	58.52	-15.48	74	57.91	31.96	4.55	35.9	131	226	Peak
2332.99	50.56	-3.44	54	49.95	31.96	4.55	35.9	131	226	Average

Test Mode :	Mode 3	Temperature :	20~22°C
Test Band :	802.11b	Relative Humidity :	42~44%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2499.62	52.75	-21.25	74	51.81	32.1	4.64	35.8	189	22	Peak
2499.62	41.34	-12.66	54	40.4	32.1	4.64	35.8	189	22	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2498.1	54.38	-19.62	74	53.44	32.1	4.64	35.8	100	132	Peak
2498.1	43.32	-10.68	54	42.38	32.1	4.64	35.8	100	132	Average



Test Mode :	Mode 4	Temperature :	20~22℃
Test Band :	802.11g	Relative Humidity :	42~44%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.8	67.76	-6.24	74	67.02	32.02	4.58	35.86	193	23	Peak
2389.8	50.84	-3.16	54	50.1	32.02	4.58	35.86	193	23	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.09	69.55	-4.45	74	68.83	32.02	4.58	35.88	102	244	Peak
2388.09	52.5	-1.5	54	51.78	32.02	4.58	35.88	102	244	Average

Test Mode :	Mode 6	Temperature :	20~22℃
Test Band :	802.11g	Relative Humidity :	42~44%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2487.27	55.36	-18.64	74	54.44	32.09	4.64	35.81	100	350	Peak
2487.27	42.11	-11.89	54	41.19	32.09	4.64	35.81	100	350	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2487.46	55.85	-18.15	74	54.93	32.09	4.64	35.81	100	126	Peak
2487.46	42.5	-11.5	54	41.58	32.09	4.64	35.81	100	126	Average



Test Mode :	Mode 7	Temperature :	20~22°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	42~44%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	72	-2	74	71.28	32.02	4.58	35.88	160	138	Peak
2389.61	52.3	-1.7	54	51.58	32.02	4.58	35.88	160	138	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.8	72.48	-1.52	74	71.74	32.02	4.58	35.86	135	225	Peak
2389.8	53.77	-0.23	54	53.03	32.02	4.58	35.86	135	225	Average

Test Mode :	Mode 9	Temperature :	20~22°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	42~44%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.61	58.83	-15.17	74	57.91	32.09	4.64	35.81	188	27	Peak
2484.61	44.89	-9.11	54	43.97	32.09	4.64	35.81	188	27	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.8	55.2	-18.8	74	54.28	32.09	4.64	35.81	100	130	Peak
2484.8	41.82	-12.18	54	40.9	32.09	4.64	35.81	100	130	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.

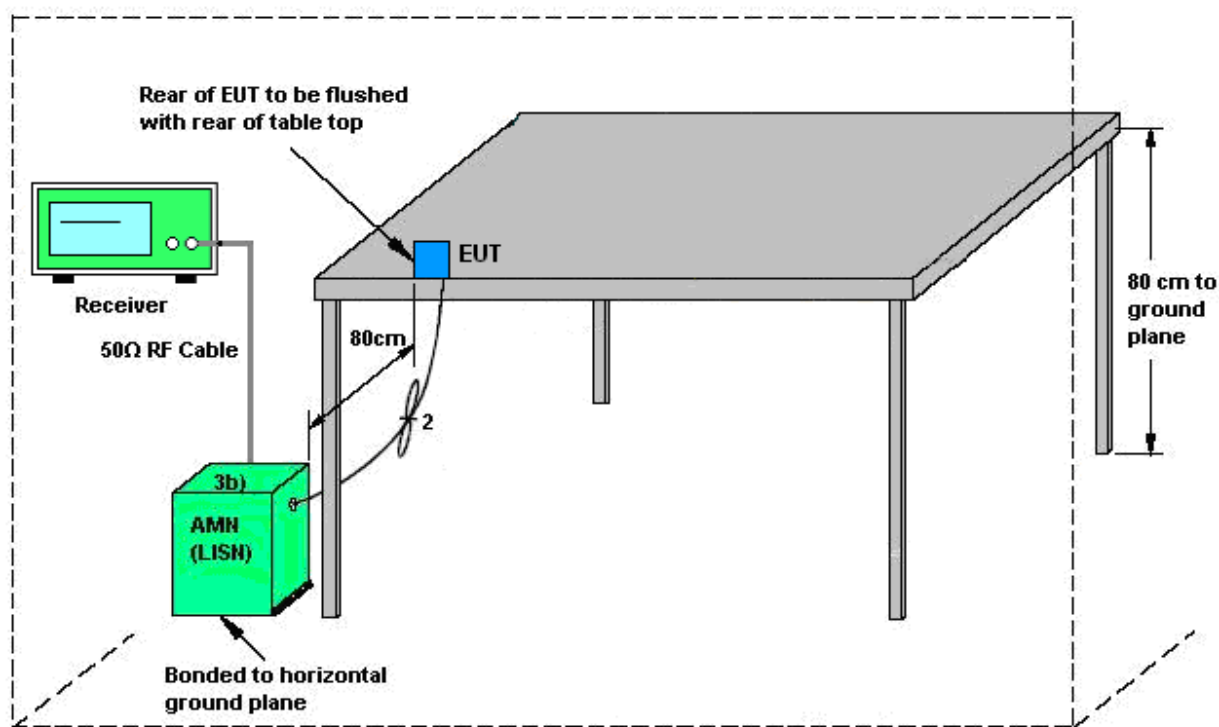
3.2.2 Measuring Instruments

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.

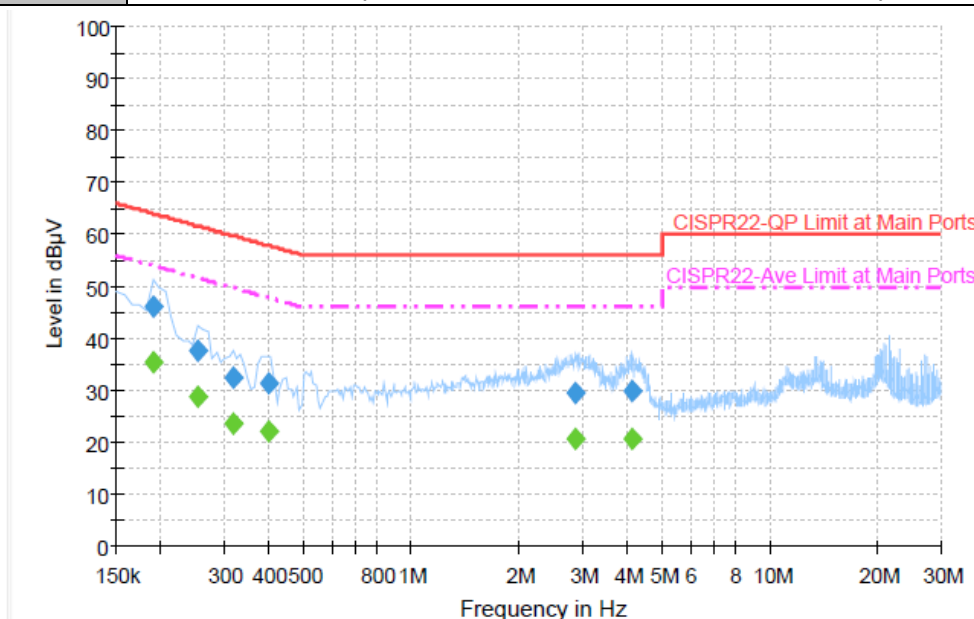
3.2.4 Test Setup



AMN = Artificial mains network (LISN)
 AE = Associated equipment
 EUT = Equipment under test
 ISN = Impedance stabilization network

3.2.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	53~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Bluetooth Link + HDMI Cable + RJ-45 + TC + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



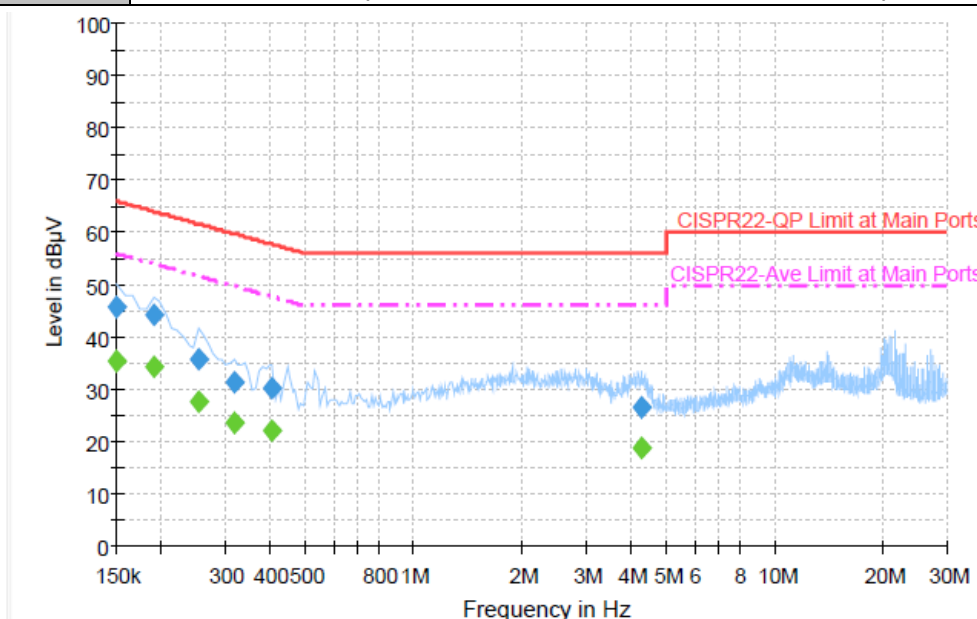
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	46.3	Off	L1	19.4	17.7	64.0
0.254000	37.6	Off	L1	19.3	24.0	61.6
0.318000	32.6	Off	L1	19.3	27.2	59.8
0.398000	31.2	Off	L1	19.4	26.7	57.9
2.878000	29.4	Off	L1	19.5	26.6	56.0
4.150000	29.8	Off	L1	19.5	26.2	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	35.4	Off	L1	19.4	18.6	54.0
0.254000	28.7	Off	L1	19.3	22.9	51.6
0.318000	23.5	Off	L1	19.3	26.3	49.8
0.398000	22.3	Off	L1	19.4	25.6	47.9
2.878000	20.5	Off	L1	19.5	25.5	46.0
4.150000	20.8	Off	L1	19.5	25.2	46.0

Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	53~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Bluetooth Link + HDMI Cable + RJ-45 + TC + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	45.6	Off	N	19.4	20.4	66.0
0.190000	44.4	Off	N	19.4	19.6	64.0
0.254000	35.9	Off	N	19.4	25.7	61.6
0.318000	31.4	Off	N	19.3	28.4	59.8
0.406000	30.4	Off	N	19.4	27.3	57.7
4.270000	26.6	Off	N	19.5	29.4	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	35.5	Off	N	19.4	20.5	56.0
0.190000	34.3	Off	N	19.4	19.7	54.0
0.254000	27.8	Off	N	19.4	23.8	51.6
0.318000	23.5	Off	N	19.3	26.3	49.8
0.406000	22.3	Off	N	19.4	25.4	47.7
4.270000	18.7	Off	N	19.5	27.3	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

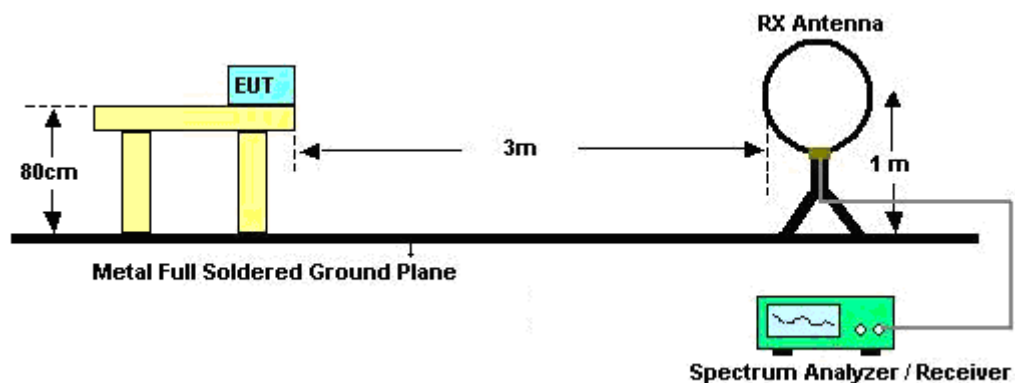
See list of measuring instruments of this test report.

3.3.3 Test Procedures

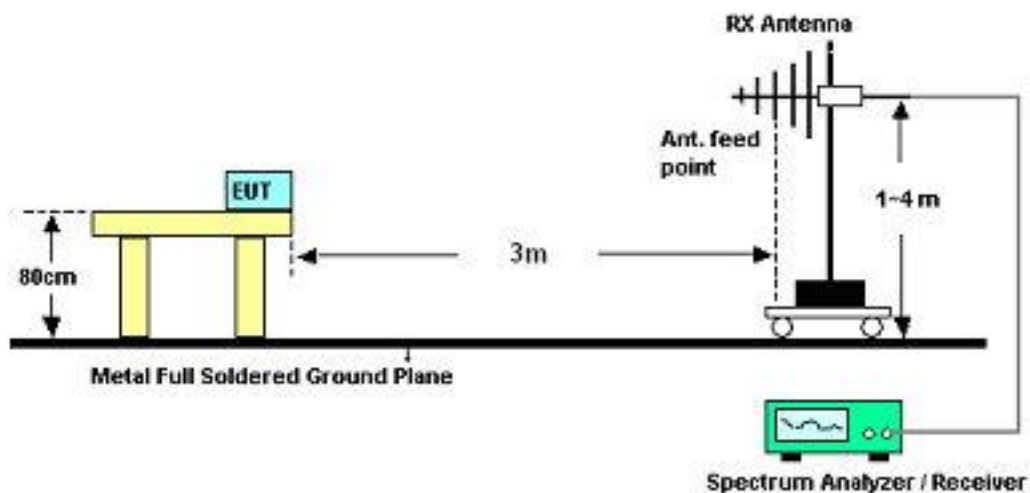
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep =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

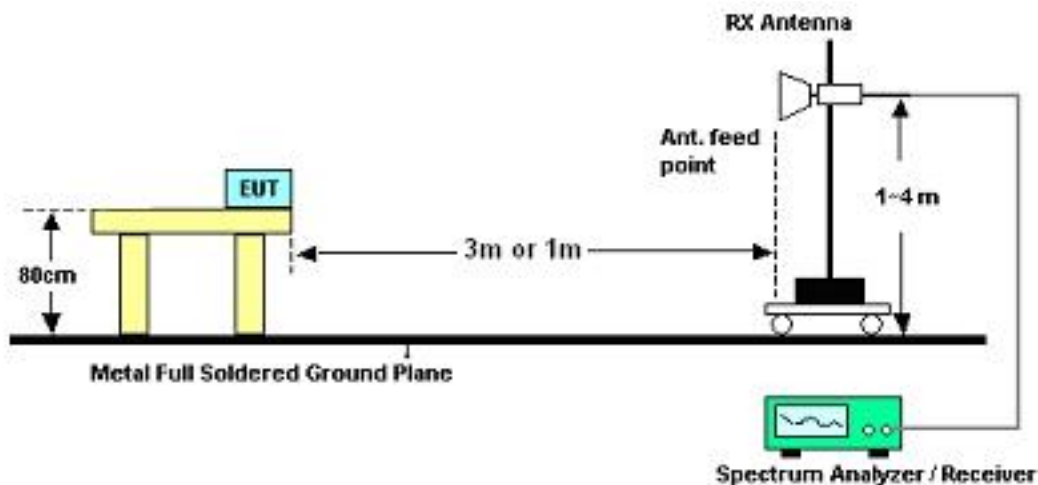
For radiated emissions below 30MHz



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 :	David Ke	Temperature :	20~22℃	
		Relative Humidity :	42~44%	

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 :	20~22℃
Test Channel :	01	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 106.83 dBuV/m - 20dB = 86.83 dBuV/m.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.97	34.87	-5.13	40	47.93	17.76	0.72	31.54	100	34	Peak
157.71	30.52	-12.98	43.5	50.03	10.66	1.33	31.5	-	-	Peak
240.06	33.56	-12.44	46	51.94	11.51	1.62	31.51	-	-	Peak
335.7	32.52	-13.48	46	47.99	13.96	1.87	31.3	-	-	Peak
395.9	28.51	-17.49	46	41.9	15.8	2	31.19	-	-	Peak
582.1	27.47	-18.53	46	36.18	19.8	2.39	30.9	-	-	Peak
2331.28	46.74	-7.26	54	46.15	31.96	4.53	35.9	159	138	Average
2331.28	56.27	-17.73	74	55.68	31.96	4.53	35.9	159	138	Peak
2412	102.53	-	-	101.77	32.03	4.59	35.86	159	138	Average
2412	106.83	-	-	106.07	32.03	4.59	35.86	159	138	Peak
2492	53.57	-0.43	54	52.63	32.1	4.64	35.8	159	138	Average
2492	60.9	-13.1	74	59.96	32.1	4.64	35.8	159	138	Peak
4824	52.99	-1.01	54	71.11	33.83	6.51	58.46	102	152	Average
4824	54.13	-19.87	74	72.25	33.83	6.51	58.46	102	152	Peak
7236	48.88	-37.95	86.83	62.65	35.6	8.29	57.66	100	0	Peak

Test Mode :	Mode 1	Temperature :	20~22°C
Test Channel :	01	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.86	28.85	-11.15	40	43.23	16.4	0.74	31.52	100	27	Peak
103.98	28.47	-15.03	43.5	48.38	10.54	1.11	31.56	-	-	Peak
197.94	26.7	-16.8	43.5	47.72	8.98	1.46	31.46	-	-	Peak
335.7	31.18	-14.82	46	46.65	13.96	1.87	31.3	-	-	Peak
395.9	31.22	-14.78	46	44.61	15.8	2	31.19	-	-	Peak
445.6	32.17	-13.83	46	44.14	17.05	2.13	31.15	-	-	Peak
2332.99	50.56	-3.44	54	49.95	31.96	4.55	35.9	131	226	Average
2332.99	58.52	-15.48	74	57.91	31.96	4.55	35.9	131	226	Peak
2412	102.02	-	-	101.26	32.03	4.59	35.86	131	226	Average
2412	106.1	-	-	105.34	32.03	4.59	35.86	131	226	Peak
2492	53.42	-0.58	54	52.48	32.1	4.64	35.8	131	226	Average
2492	60.65	-13.35	74	59.71	32.1	4.64	35.8	131	226	Peak
4824	52.43	-1.57	54	70.55	33.83	6.51	58.46	100	97	Average
4824	54.51	-19.49	74	72.63	33.83	6.51	58.46	100	97	Peak
4977	48.68	-25.32	74	66.45	33.8	6.58	58.15	100	0	Peak
7236	55.61	-30.49	86.1	69.38	35.6	8.29	57.66	100	0	Peak
7476	49.46	-24.54	74	62.95	35.6	8.72	57.81	100	0	Peak



Test Mode :	Mode 2	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.86	33.98	-6.02	40	48.36	16.4	0.74	31.52	100	81	Peak
104.25	27.38	-16.12	43.5	47.11	10.7	1.12	31.55	-	-	Peak
240.06	33.44	-12.56	46	51.82	11.51	1.62	31.51	-	-	Peak
335.7	32.67	-13.33	46	48.14	13.96	1.87	31.3	-	-	Peak
395.9	30.78	-15.22	46	44.17	15.8	2	31.19	-	-	Peak
436.5	28.78	-17.22	46	41	16.83	2.11	31.16	-	-	Peak
2356	47.74	-6.26	54	47.09	31.99	4.55	35.89	100	142	Average
2356	54.57	-19.43	74	53.92	31.99	4.55	35.89	100	142	Peak
2437	98.78	-	-	97.95	32.06	4.61	35.84	100	142	Average
2437	102.9	-	-	102.07	32.06	4.61	35.84	100	142	Peak
2496	40.71	-13.29	54	39.77	32.1	4.64	35.8	100	142	Average
2496	53.5	-20.5	74	52.56	32.1	4.64	35.8	100	142	Peak
4874	50.96	-23.04	74	68.97	33.82	6.53	58.36	100	0	Peak
4998	45.28	-28.72	74	63.01	33.8	6.59	58.12	100	0	Peak

Test Mode :	Mode 2	Temperature :	20~22°C
Test Channel :	06	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.86	28.11	-11.89	40	42.49	16.4	0.74	31.52	100	55	Peak
103.44	27.89	-15.61	43.5	47.8	10.54	1.11	31.56	-	-	Peak
194.16	27.73	-15.77	43.5	48.97	8.78	1.45	31.47	-	-	Peak
335.7	31.74	-14.26	46	47.21	13.96	1.87	31.3	-	-	Peak
395.9	33.79	-12.21	46	47.18	15.8	2	31.19	-	-	Peak
445.6	32.16	-13.84	46	44.13	17.05	2.13	31.15	-	-	Peak
2356	53.77	-0.23	54	53.12	31.99	4.55	35.89	100	233	Average
2356	59.66	-14.34	74	59.01	31.99	4.55	35.89	100	233	Peak
2437	99.91	-	-	99.08	32.06	4.61	35.84	100	233	Average
2437	103.85	-	-	103.02	32.06	4.61	35.84	100	233	Peak
2500	42.68	-11.32	54	41.74	32.1	4.64	35.8	100	233	Average
2500	54.55	-19.45	74	53.61	32.1	4.64	35.8	100	233	Peak
4874	53.98	-0.02	54	71.99	33.82	6.53	58.36	117	355	Average
4874	55.77	-18.23	74	73.78	33.82	6.53	58.36	117	355	Peak
4992	49.32	-24.68	74	67.06	33.8	6.58	58.12	100	0	Peak
7311	48.72	-25.28	74	62.4	35.6	8.42	57.7	100	0	Peak
7464	47.91	-26.09	74	61.43	35.6	8.68	57.8	100	0	Peak

Test Mode :	Mode 3	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
42.42	34.1	-5.9	40	53.32	11.56	0.76	31.54	100	12	Peak
127.2	31.43	-12.07	43.5	50.09	11.64	1.22	31.52	-	-	Peak
240.06	33.29	-12.71	46	51.67	11.51	1.62	31.51	-	-	Peak
335.7	32.94	-13.06	46	48.41	13.96	1.87	31.3	-	-	Peak
395.9	29.22	-16.78	46	42.61	15.8	2	31.19	-	-	Peak
436.5	27.91	-18.09	46	40.13	16.83	2.11	31.16	-	-	Peak
2384	43.39	-10.61	54	42.69	32	4.58	35.88	189	22	Average
2384	51.26	-22.74	74	50.56	32	4.58	35.88	189	22	Peak
2462	97.9	-	-	97.04	32.07	4.62	35.83	189	22	Average
2462	101.88	-	-	101.02	32.07	4.62	35.83	189	22	Peak
2499.62	41.34	-12.66	54	40.4	32.1	4.64	35.8	189	22	Average
2499.62	52.75	-21.25	74	51.81	32.1	4.64	35.8	189	22	Peak
4924	48.71	-25.29	74	66.6	33.81	6.56	58.26	100	0	Peak

Test Mode :	Mode 3	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.86	28.74	-11.26	40	43.12	16.4	0.74	31.52	100	34	Peak
103.98	28.77	-14.73	43.5	48.68	10.54	1.11	31.56	-	-	Peak
133.14	27.43	-16.07	43.5	46.31	11.4	1.24	31.52	-	-	Peak
335.7	31.66	-14.34	46	47.13	13.96	1.87	31.3	-	-	Peak
388.2	33.32	-12.68	46	47.11	15.44	1.98	31.21	-	-	Peak
444.9	31.67	-14.33	46	43.64	17.05	2.13	31.15	-	-	Peak
2382	45.01	-8.99	54	44.31	32	4.58	35.88	100	132	Average
2382	51.86	-22.14	74	51.16	32	4.58	35.88	100	132	Peak
2462	97.66	-	-	96.8	32.07	4.62	35.83	100	132	Average
2462	101.82	-	-	100.96	32.07	4.62	35.83	100	132	Peak
2498.1	43.32	-10.68	54	42.38	32.1	4.64	35.8	100	132	Average
2498.1	54.38	-19.62	74	53.44	32.1	4.64	35.8	100	132	Peak
4924	50.46	-3.54	54	68.35	33.81	6.56	58.26	100	357	Average
4924	53	-21	74	70.89	33.81	6.56	58.26	100	357	Peak
4995	46.48	-27.52	74	64.22	33.8	6.58	58.12	100	0	Peak

Test Mode :	Mode 4	Temperature :	20~22℃
Test Channel :	01	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.97	33.44	-6.56	40	46.5	17.76	0.72	31.54	100	97	Peak
104.52	27.77	-15.73	43.5	47.5	10.7	1.12	31.55	-	-	Peak
240.06	33.49	-12.51	46	51.87	11.51	1.62	31.51	-	-	Peak
335.7	32.6	-13.4	46	48.07	13.96	1.87	31.3	-	-	Peak
395.9	29.15	-16.85	46	42.54	15.8	2	31.19	-	-	Peak
582.1	28.94	-17.06	46	37.65	19.8	2.39	30.9	-	-	Peak
2389.8	50.84	-3.16	54	50.1	32.02	4.58	35.86	193	23	Average
2389.8	67.76	-6.24	74	67.02	32.02	4.58	35.86	193	23	Peak
2412	93.11	-	-	92.35	32.03	4.59	35.86	193	23	Average
2412	105.46	-	-	104.7	32.03	4.59	35.86	193	23	Peak
2492	49.46	-4.54	54	48.52	32.1	4.64	35.8	193	23	Average
2492	60.62	-13.38	74	59.68	32.1	4.64	35.8	193	23	Peak
4824	48.56	-25.44	74	66.68	33.83	6.51	58.46	100	0	Peak
7236	47.92	-37.54	85.46	61.69	35.6	8.29	57.66	100	0	Peak

Test Mode :	Mode 4	Temperature :	20~22℃
Test Channel :	01	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
42.42	34.02	-5.98	40	53.24	11.56	0.76	31.54	100	92	Peak
103.71	27.87	-15.63	43.5	47.78	10.54	1.11	31.56	-	-	Peak
132.33	27.36	-16.14	43.5	46.25	11.4	1.23	31.52	-	-	Peak
335.7	31.08	-14.92	46	46.55	13.96	1.87	31.3	-	-	Peak
395.9	33.37	-12.63	46	46.76	15.8	2	31.19	-	-	Peak
436.5	31.98	-14.02	46	44.2	16.83	2.11	31.16	-	-	Peak
2388.09	52.5	-1.5	54	51.78	32.02	4.58	35.88	102	244	Average
2388.09	69.55	-4.45	74	68.83	32.02	4.58	35.88	102	244	Peak
2412	92.3	-	-	91.54	32.03	4.59	35.86	102	244	Average
2412	104.39	-	-	103.63	32.03	4.59	35.86	102	244	Peak
2494	49.01	-4.99	54	48.07	32.1	4.64	35.8	102	244	Average
2494	59.96	-14.04	74	59.02	32.1	4.64	35.8	102	244	Peak
4824	46.48	-27.52	74	64.6	33.83	6.51	58.46	100	0	Peak
4977	48.42	-25.58	74	66.19	33.8	6.58	58.15	100	0	Peak
7236	55.51	-28.88	84.39	69.28	35.6	8.29	57.66	100	0	Peak



Test Mode :	Mode 5	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.86	33.41	-6.59	40	47.79	16.4	0.74	31.52	100	26	Peak
103.98	27.16	-16.34	43.5	47.07	10.54	1.11	31.56	-	-	Peak
240.06	33.47	-12.53	46	51.85	11.51	1.62	31.51	-	-	Peak
335.7	33.01	-12.99	46	48.48	13.96	1.87	31.3	-	-	Peak
395.9	28.56	-17.44	46	41.95	15.8	2	31.19	-	-	Peak
582.1	28.91	-17.09	46	37.62	19.8	2.39	30.9	-	-	Peak
2390	50.21	-3.79	54	49.47	32.02	4.58	35.86	100	138	Average
2390	67.68	-6.32	74	66.94	32.02	4.58	35.86	100	138	Peak
2437	99.05	-	-	98.22	32.06	4.61	35.84	100	138	Average
2437	111.68	-	-	110.85	32.06	4.61	35.84	100	138	Peak
2488	52.03	-1.97	54	51.1	32.1	4.64	35.81	100	138	Average
2488	70.57	-3.43	74	69.64	32.1	4.64	35.81	100	138	Peak
4874	42.49	-11.51	54	60.5	33.82	6.53	58.36	100	147	Average
4874	54.43	-19.57	74	72.44	33.82	6.53	58.36	100	147	Peak
7311	47.4	-6.6	54	61.08	35.6	8.42	57.7	100	183	Average
7311	61.24	-12.76	74	74.92	35.6	8.42	57.7	100	183	Peak
12185	39.06	-14.94	54	45.14	38.89	10.6	55.57	100	48	Average
12185	53.41	-20.59	74	59.49	38.89	10.6	55.57	100	48	Peak



Test Mode :	Mode 5	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.86	31.32	-8.68	40	45.7	16.4	0.74	31.52	100	69	Peak
133.68	29.8	-13.7	43.5	48.68	11.4	1.24	31.52	-	-	Peak
194.43	26.29	-17.21	43.5	47.51	8.8	1.45	31.47	-	-	Peak
335.7	30.12	-15.88	46	45.59	13.96	1.87	31.3	-	-	Peak
395.9	33.13	-12.87	46	46.52	15.8	2	31.19	-	-	Peak
445.6	32.21	-13.79	46	44.18	17.05	2.13	31.15	-	-	Peak
2390	53.8	-0.2	54	53.06	32.02	4.58	35.86	100	227	Average
2390	73.43	-0.57	74	72.69	32.02	4.58	35.86	100	227	Peak
2437	99.93	-	-	99.1	32.06	4.61	35.84	100	227	Average
2437	112.53	-	-	111.7	32.06	4.61	35.84	100	227	Peak
2484	53.63	-0.37	54	52.71	32.09	4.64	35.81	100	227	Average
2484	72.35	-1.65	74	71.43	32.09	4.64	35.81	100	227	Peak
3657	41.52	-12.48	54	61.8	32.89	5.78	58.95	100	271	Average
3657	51.97	-22.03	74	72.25	32.89	5.78	58.95	100	271	Peak
4878	47.75	-6.25	54	65.75	33.82	6.54	58.36	103	351	Average
4878	58.64	-15.36	74	76.64	33.82	6.54	58.36	103	351	Peak
4998	46.83	-27.17	74	64.56	33.8	6.59	58.12	100	0	Peak
7311	53.62	-0.38	54	67.3	35.6	8.42	57.7	100	246	Average
7311	66.77	-7.23	74	80.45	35.6	8.42	57.7	100	246	Peak
12185	49.64	-24.36	74	55.72	38.89	10.6	55.57	100	0	Peak

Test Mode :	Mode 6	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.86	33.95	-6.05	40	48.33	16.4	0.74	31.52	100	51	Peak
107.76	27.07	-16.43	43.5	46.47	11	1.13	31.53	-	-	Peak
240.06	33.62	-12.38	46	52	11.51	1.62	31.51	-	-	Peak
335.7	33.59	-12.41	46	49.06	13.96	1.87	31.3	-	-	Peak
388.2	29.17	-16.83	46	42.96	15.44	1.98	31.21	-	-	Peak
582.1	27.68	-18.32	46	36.39	19.8	2.39	30.9	-	-	Peak
2378	35.78	-18.22	54	35.09	32	4.57	35.88	100	350	Average
2378	46.88	-27.12	74	46.19	32	4.57	35.88	100	350	Peak
2462	82.16	-	-	81.3	32.07	4.62	35.83	100	350	Average
2462	94.13	-	-	93.27	32.07	4.62	35.83	100	350	Peak
2487.27	42.11	-11.89	54	41.19	32.09	4.64	35.81	100	350	Average
2487.27	55.36	-18.64	74	54.44	32.09	4.64	35.81	100	350	Peak

Test Mode :	Mode 6	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.86	34.79	-5.21	40	49.17	16.4	0.74	31.52	100	79	Peak
103.44	27.24	-16.26	43.5	47.15	10.54	1.11	31.56	-	-	Peak
240.06	33.48	-12.52	46	51.86	11.51	1.62	31.51	-	-	Peak
335.7	31.7	-14.3	46	47.17	13.96	1.87	31.3	-	-	Peak
395.9	34.3	-11.7	46	47.69	15.8	2	31.19	-	-	Peak
445.6	32.09	-13.91	46	44.06	17.05	2.13	31.15	-	-	Peak
2376	36.48	-17.52	54	35.79	32	4.57	35.88	100	126	Average
2376	47.83	-26.17	74	47.14	32	4.57	35.88	100	126	Peak
2462	83.18	-	-	82.32	32.07	4.62	35.83	100	126	Average
2462	94.78	-	-	93.92	32.07	4.62	35.83	100	126	Peak
2487.46	42.5	-11.5	54	41.58	32.09	4.64	35.81	100	126	Average
2487.46	55.85	-18.15	74	54.93	32.09	4.64	35.81	100	126	Peak
4989	27.87	-26.13	54	45.61	33.8	6.58	58.12	100	146	Average
4989	51.16	-22.84	74	68.9	33.8	6.58	58.12	100	146	Peak

Test Mode :	Mode 7	Temperature :	20~22°C
Test Channel :	01	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	52.3	-1.7	54	51.58	32.02	4.58	35.88	160	138	Average
2389.61	72	-2	74	71.28	32.02	4.58	35.88	160	138	Peak
2412	93.65	-	-	92.89	32.03	4.59	35.86	160	138	Average
2412	106.19	-	-	105.43	32.03	4.59	35.86	160	138	Peak
2496	51.27	-2.73	54	50.33	32.1	4.64	35.8	160	138	Average
2496	63.17	-10.83	74	62.23	32.1	4.64	35.8	160	138	Peak
4824	49.06	-24.94	74	67.18	33.83	6.51	58.46	100	0	Peak

Test Mode :	Mode 7	Temperature :	20~22°C
Test Channel :	01	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.8	53.77	-0.23	54	53.03	32.02	4.58	35.86	135	225	Average
2389.8	72.48	-1.52	74	71.74	32.02	4.58	35.86	135	225	Peak
2412	93.17	-	-	92.41	32.03	4.59	35.86	135	225	Average
2412	106.06	-	-	105.3	32.03	4.59	35.86	135	225	Peak
2498	51.45	-2.55	54	50.51	32.1	4.64	35.8	135	225	Average
2498	64.06	-9.94	74	63.12	32.1	4.64	35.8	135	225	Peak
4824	42.48	-11.52	54	60.6	33.83	6.51	58.46	105	343	Average
4824	51.84	-22.16	74	69.96	33.83	6.51	58.46	105	343	Peak
4977	48.89	-25.11	74	66.66	33.8	6.58	58.15	100	0	Peak
7236	54.09	-31.97	86.06	67.86	35.6	8.29	57.66	100	0	Peak



Test Mode :	Mode 8	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	49.66	-4.34	54	48.92	32.02	4.58	35.86	100	139	Average
2390	68.16	-5.84	74	67.42	32.02	4.58	35.86	100	139	Peak
2437	98.27	-	-	97.44	32.06	4.61	35.84	100	139	Average
2437	110.88	-	-	110.05	32.06	4.61	35.84	100	139	Peak
2486	52.72	-1.28	54	51.8	32.09	4.64	35.81	100	139	Average
2486	70.88	-3.12	74	69.96	32.09	4.64	35.81	100	139	Peak
4874	42.2	-11.8	54	60.21	33.82	6.53	58.36	100	147	Average
4874	55.14	-18.86	74	73.15	33.82	6.53	58.36	100	147	Peak
7311	46.93	-7.07	54	60.61	35.6	8.42	57.7	100	183	Average
7311	61.61	-12.39	74	75.29	35.6	8.42	57.7	100	183	Peak
12185	38.36	-15.64	54	44.44	38.89	10.6	55.57	100	49	Average
12185	52.2	-21.8	74	58.28	38.89	10.6	55.57	100	49	Peak



Test Mode :	Mode 8	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	53.58	-0.42	54	52.84	32.02	4.58	35.86	100	229	Average
2390	70.66	-3.34	74	69.92	32.02	4.58	35.86	100	229	Peak
2437	99.34	-	-	98.5	32.06	4.61	35.83	100	229	Average
2437	112.23	-	-	111.39	32.06	4.61	35.83	100	229	Peak
2486	53.72	-0.28	54	52.8	32.09	4.64	35.81	100	229	Average
2486	71.41	-2.59	74	70.49	32.09	4.64	35.81	100	229	Peak
3654	40.87	-13.13	54	61.15	32.89	5.78	58.95	100	266	Average
3654	52.08	-21.92	74	72.36	32.89	5.78	58.95	100	266	Peak
4874	47.5	-6.5	54	65.51	33.82	6.53	58.36	103	350	Average
4874	58.4	-15.6	74	76.41	33.82	6.53	58.36	103	350	Peak
4998	47.9	-26.1	74	65.63	33.8	6.59	58.12	100	0	Peak
7311	52.87	-1.13	54	66.55	35.6	8.42	57.7	100	245	Average
7311	66.18	-7.82	74	79.86	35.6	8.42	57.7	100	245	Peak

Test Mode :	Mode 9	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2378	37.38	-16.62	54	36.69	32	4.57	35.88	188	27	Average
2378	48.07	-25.93	74	47.38	32	4.57	35.88	188	27	Peak
2462	83.65	-	-	82.79	32.07	4.62	35.83	188	27	Average
2462	95.81	-	-	94.95	32.07	4.62	35.83	188	27	Peak
2484.61	44.89	-9.11	54	43.97	32.09	4.64	35.81	188	27	Average
2484.61	58.83	-15.17	74	57.91	32.09	4.64	35.81	188	27	Peak

Test Mode :	Mode 9	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	42~44%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2348	37.78	-16.22	54	37.14	31.98	4.55	35.89	100	130	Average
2348	48.65	-25.35	74	48.01	31.98	4.55	35.89	100	130	Peak
2462	83.39	-	-	82.53	32.07	4.62	35.83	100	130	Average
2462	95.66	-	-	94.8	32.07	4.62	35.83	100	130	Peak
2484.8	41.82	-12.18	54	40.9	32.09	4.64	35.81	100	130	Average
2484.8	55.2	-18.8	74	54.28	32.09	4.64	35.81	100	130	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	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 18, 2011	Feb. 10, 2012	Sep. 17, 2012	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 18, 2011	Feb. 10, 2012	Sep. 17, 2012	Conducted (TH02-HY)
EMI Test Receiver	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Jan. 31, 2012	Aug. 21, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz~30MHz	Dec. 09, 2011	Jan. 31, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz~30MHz	Dec. 06, 2011	Jan. 31, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Jan. 31, 2012	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz~30GHz	Nov. 03, 2011	Feb. 07, 2012 ~ Feb. 09, 2012	Nov. 02, 2012	Radiation (03CH05-HY)
COM-POWER	Double Ridge Horn	AH-118	701030	1GHz~18GHz	N/A	Feb. 07, 2012 ~ Feb. 09, 2012	N/A	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz~1GHz	Oct. 22, 2011	Feb. 07, 2012 ~ Feb. 09, 2012	Oct. 21, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 - 360 degree	N/A	Feb. 07, 2012 ~ Feb. 09, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m~4 m	N/A	Feb. 07, 2012 ~ Feb. 09, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz~18GHz	Aug. 04, 2011	Feb. 07, 2012 ~ Feb. 09, 2012	Aug. 03, 2012	Radiation (03CH05-HY)
COM-POWER	COM-POWER	PA-103	161075	1KHz~1GHz	Mar. 29, 2011	Feb. 07, 2012 ~ Feb. 09, 2012	Mar. 28, 2012	Radiation (03CH05-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz~18GHz	Jul. 19, 2011	Feb. 07, 2012 ~ Feb. 09, 2012	Jul. 18, 2012	Radiation (03CH05-HY)
Pre Amplifier	MITEQ	AMF-7D-001018 00-30-10P	159087	1GHz~18GHz	Feb. 21, 2011	Feb. 07, 2012 ~ Feb. 09, 2012	Feb. 20, 2012	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz~26.5GHz	Apr. 14, 2011	Feb. 07, 2012 ~ Feb. 09, 2012	Apr. 13, 2012	Radiation (03CH05-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 EP1D2933-02 as below.