

FCC RF Test Report

APPLICANT : CIPHERLAB Co., Ltd.
EQUIPMENT : Mobile Computer
BRAND NAME : CIPHERLAB
MODEL NAME : 8770
FCC ID : Q3N-8770
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Jan. 13, 2012 and completely tested on Feb. 23, 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.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR211342B	Rev. 01	Initial issue of report	Feb. 29, 202

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	Gen 4.6.1	99% Bandwidth	-	Pass	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 2.70 dB at 0.446 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.52 dB at 2334.700 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

CIPHERLAB Co., Ltd.

12F., 333 Dunhua S. Rd., Sec. 2, Taipei, Taiwan 106

1.2 Manufacturer

CIPHERLAB Co., Ltd.

12F., 333 Dunhua S. Rd., Sec. 2, Taipei, Taiwan 106

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile Computer
Brand Name	CIPHERLAB
Model Name	8770
Integrated Module	Brand Name : AzureWave Model Name : AW-GH321
FCC ID	Q3N-8770
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 : 18.54 dBm (0.0714 W) 802.11g : 21.57 dBm (0.1435 W)
Antenna Type	PIFA Antenna with gain -2.52 dBi
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : 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	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, 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	ASUS	WL-320GE	M8QWL320GE	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
4.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
5.	USB DONGLE	Global sun Technology Inc.	GL2BDDG92	O7JGL2BDG92	N/A	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) (Duty cycle 100%)			2.4GHz 802.11g RF Power (dBm) (Duty cycle 100%)		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Peak Power	18.54	17.18	16.79	21.57	21.42	21.06

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 were set in 1Mbps for 802.11b and 6Mbps for 802.11g, 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).

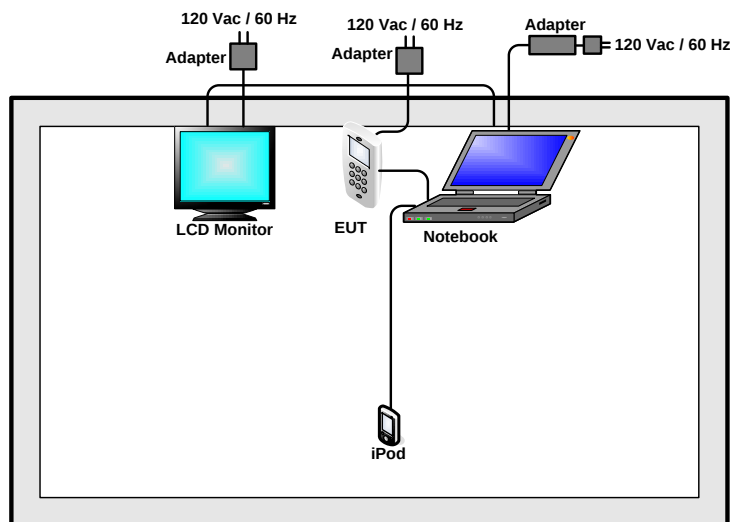
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

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

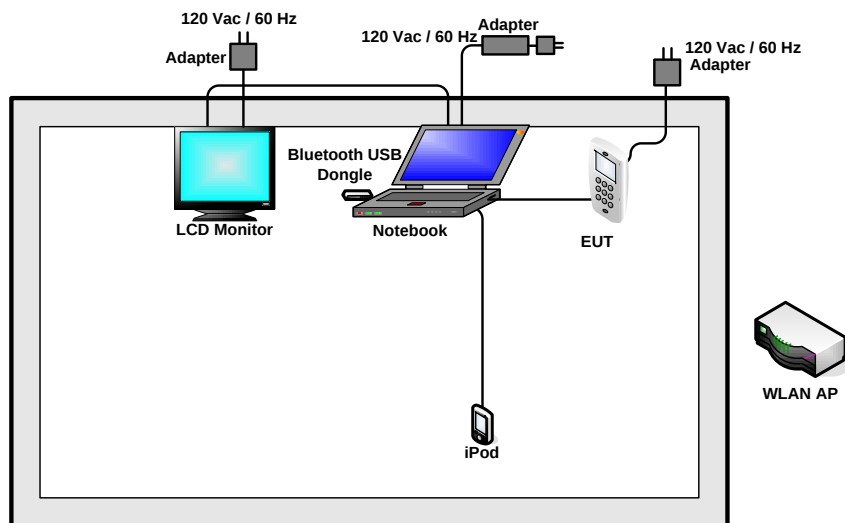
Test Cases		
Test Item	802.11b	802.11g
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
AC Conducted Emission	Mode 1 :Bluetooth Link + WLAN Link + 44 Keypad + Pistol + Reader (Laser) + RFID + Battery + USB Cable (Data Link with Notebook) + Adapter	
Remark:		
1. All the Radiation tests were performance with Pistol, Reader (Laser), RFID, Adapter, Battery, and 44 Keypad.		
2. Link with Notebook means data application transferred mode between EUT and Notebook.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

8 + after the power turn on → activate → RF TEST1 → WLAN → SETTING CHANNEL DATARATE POWER → ACTIVATEESC → START , to make the EUT provides functions like channel selection and power level for continuous transmitting and receiving signals

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 KHz.

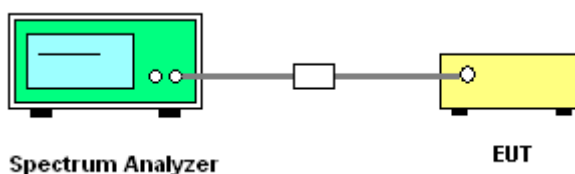
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 KHz.
In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 KHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

3.1.4 Test Setup

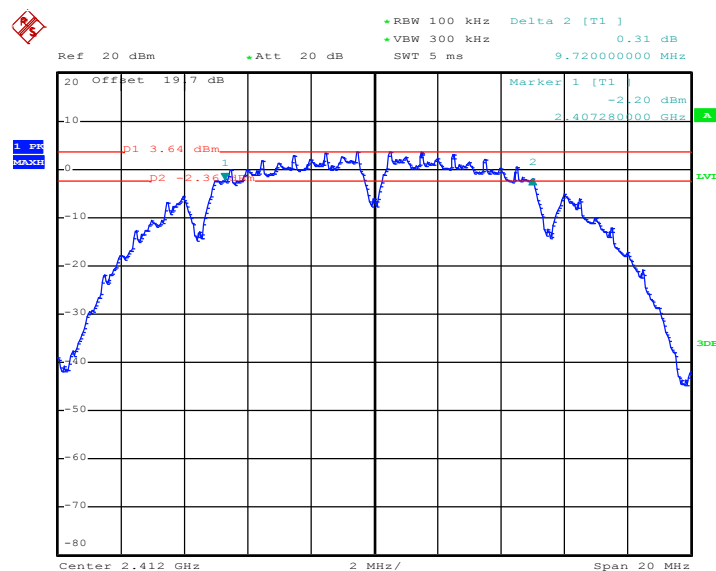


3.1.5 Test Result of 6dB Bandwidth

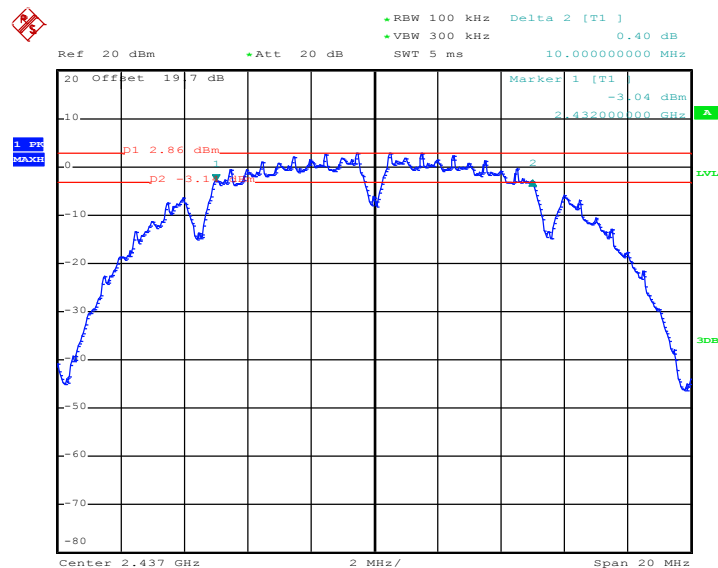
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	9.72	0.5	Pass
06	2437	10.00	0.5	Pass
11	2462	10.04	0.5	Pass

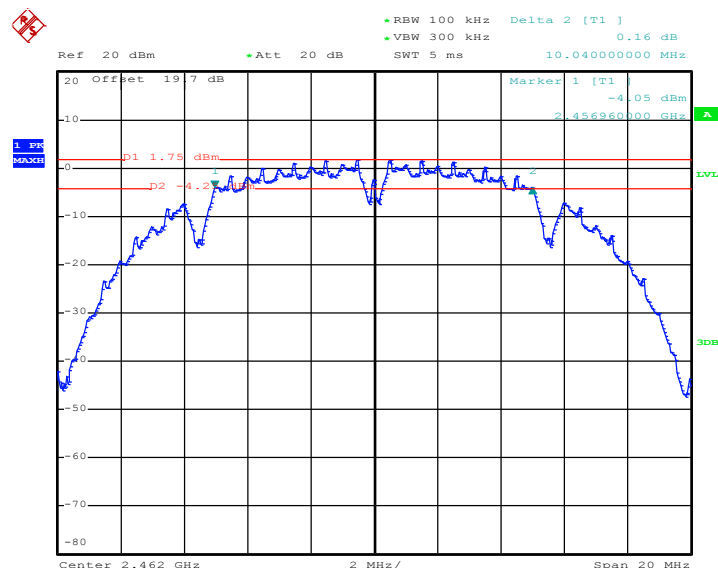
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 30.JAN.2012 22:30:03

Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06


Date: 30.JAN.2012 22:51:20

Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 11


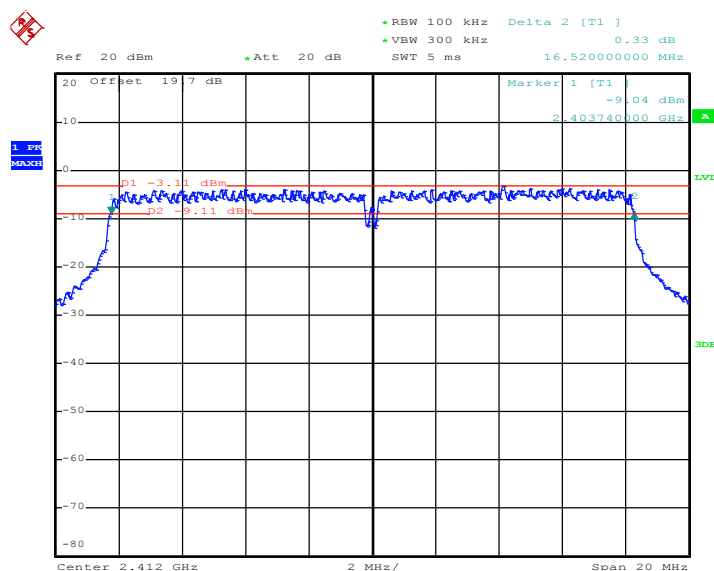
Date: 30.JAN.2012 23:13:26



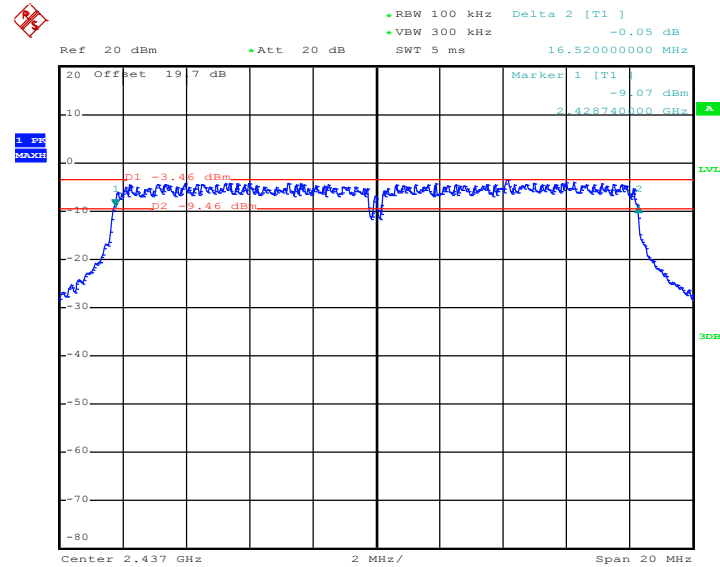
Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.52	0.5	Pass
06	2437	16.52	0.5	Pass
11	2462	16.52	0.5	Pass

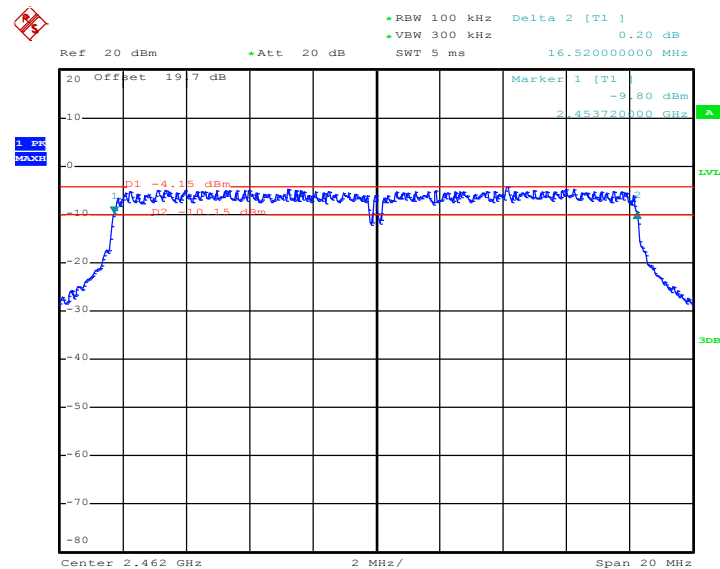
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 31.JAN.2012 00:06:46

Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06


Date: 30.JAN.2012 23:47:06

Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11


Date: 30.JAN.2012 23:33:49

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

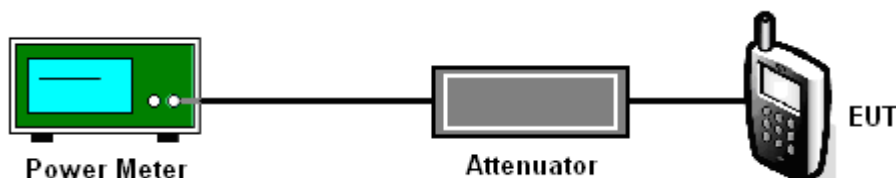
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the power meter by a low loss cable. Measure the power by power meter.

3.2.4 Test Setup



3.2.5 Test Result of Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.54	30	Pass
06	2437	17.18	30	Pass
11	2462	16.79	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	24~26℃
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	21.57	30	Pass
06	2437	21.42	30	Pass
11	2462	21.06	30	Pass

3.3 Band Edges Measurement

3.3.1 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.

3.3.2 Measuring Instruments

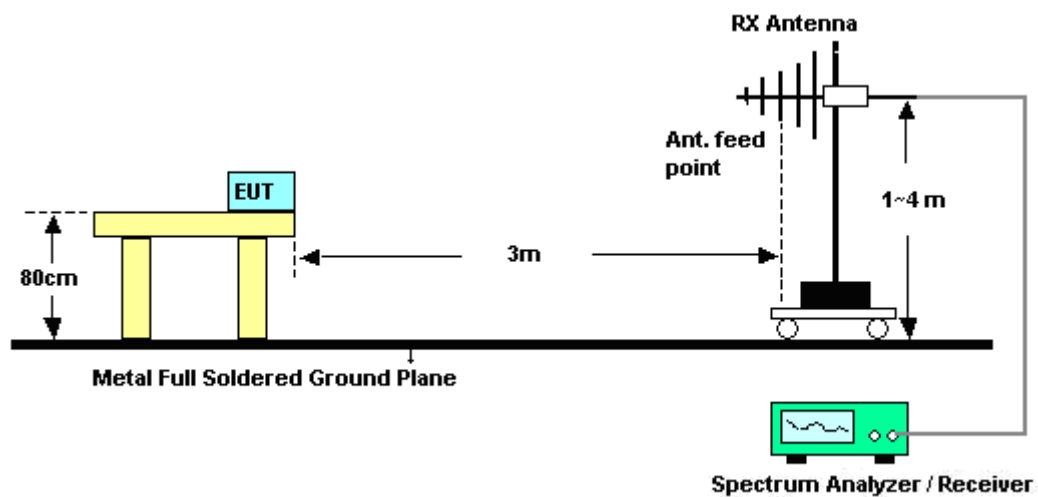
See list of measuring instruments of this test report.

3.3.3 Test Procedures

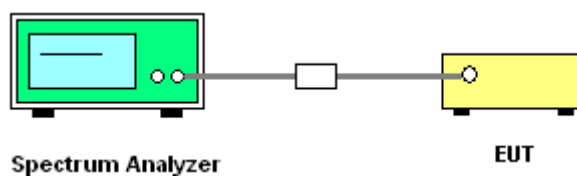
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 KHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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).

3.3.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>



3.3.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	22~23℃
Test Band :	802.11b	Relative Humidity :	45~56%
Test Channel :	01	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2334.7	55.7	-18.3	74	51.71	31.98	5.95	33.94	115	0	Peak
2334.7	46.48	-7.52	54	42.29	31.98	5.95	33.94	115	0	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
2337.93	49.44	-24.56	74	45.45	31.98	5.95	33.94	100	20	Peak
2337.93	38.21	-15.79	54	34.22	31.98	5.95	33.94	100	20	Average

Test Mode :	Mode 3	Temperature :	22~23℃
Test Band :	802.11b	Relative Humidity :	45~56%
Test Channel :	11	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2494.49	56.33	-17.67	74	51.95	32.2	6.18	34	112	360	Peak
2494.49	43.11	-10.89	54	38.73	32.2	6.18	34	112	360	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
2499.05	51.22	-22.78	74	46.84	32.2	6.18	34	100	17	Peak
2499.05	38.34	-15.66	54	33.96	32.2	6.18	34	100	17	Average



Test Mode :	Mode 4	Temperature :	22~23°C
Test Band :	802.11g	Relative Humidity :	45~56%
Test Channel :	01	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	61.77	-12.23	74	57.64	32.06	6.03	33.96	113	0	Peak
2389.61	44.54	-9.46	54	40.41	32.06	6.03	33.96	113	0	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	52.59	-21.41	74	48.46	32.06	6.03	33.96	102	14	Peak
2389.61	37.04	-16.96	54	32.91	32.06	6.03	33.96	102	14	Average

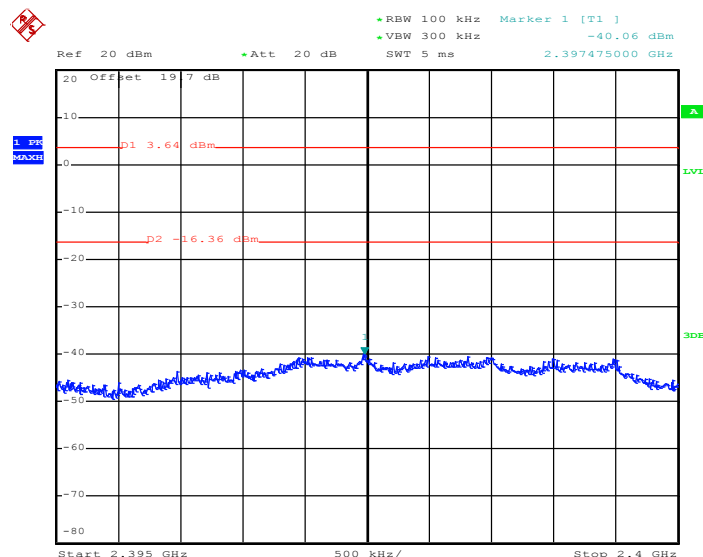
Test Mode :	Mode 6	Temperature :	22~23°C
Test Band :	802.11g	Relative Humidity :	45~56%
Test Channel :	11	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.66	57.91	-16.09	74	53.55	32.18	6.18	34	111	0	Peak
2483.66	43.5	-10.5	54	39.14	32.18	6.18	34	111	0	Average

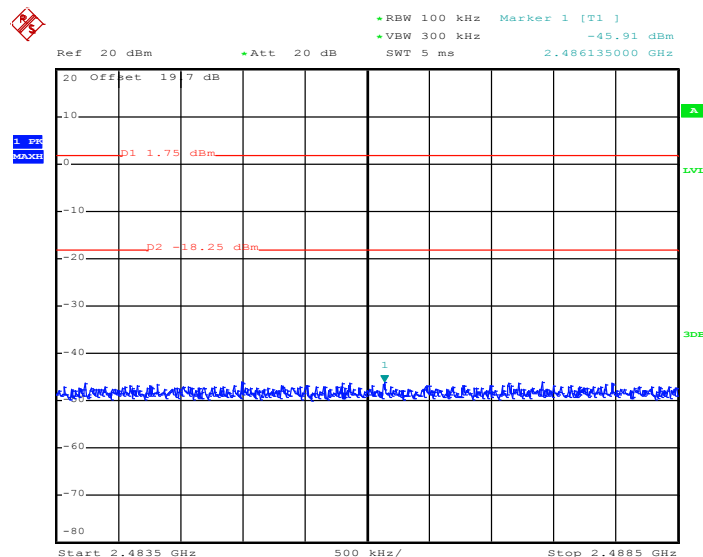
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.61	53.3	-20.7	74	48.94	32.18	6.18	34	100	6	Peak
2484.61	39.32	-14.68	54	34.96	32.18	6.18	34	100	6	Average



Test Mode :	Mode 1 and 3	Temperature :	24~26℃
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Reece Li



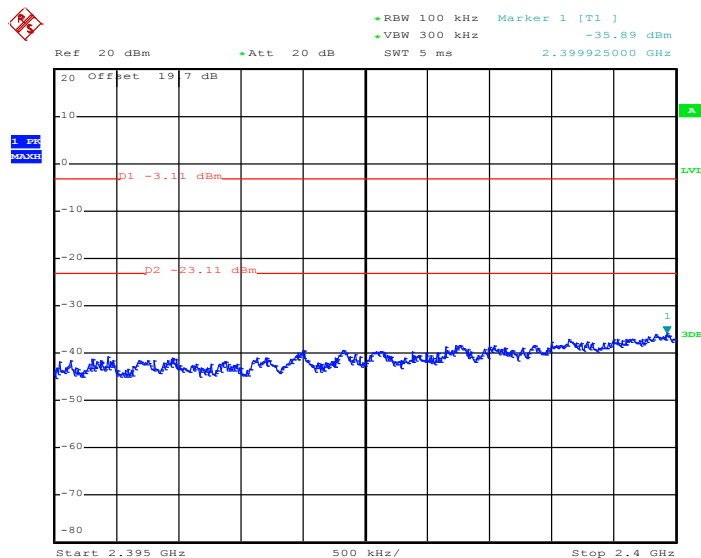
Date: 30.JAN.2012 22:31:12



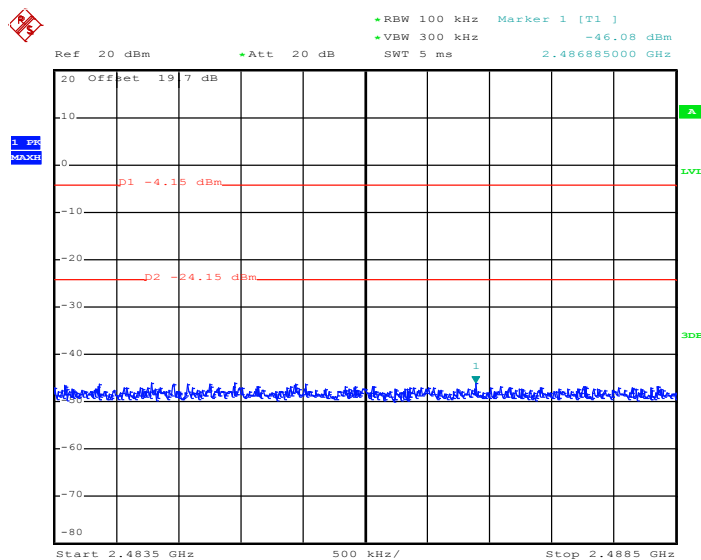
Date: 30.JAN.2012 23:14:12



Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Reece Li

Low Band Edge Plot on 802.11g Channel 01

Date: 31.JAN.2012 00:07:54

High Band Edge Plot on 802.11g Channel 11

Date: 30.JAN.2012 23:34:36

3.4 Spurious Emission Measurement

3.4.1 Limit of Spurious Emission Measurement

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

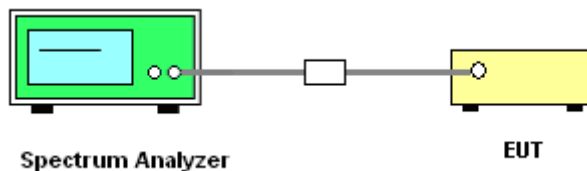
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 KHz, Video bandwidth (VBW) $\geq$ RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 KHz RBW.

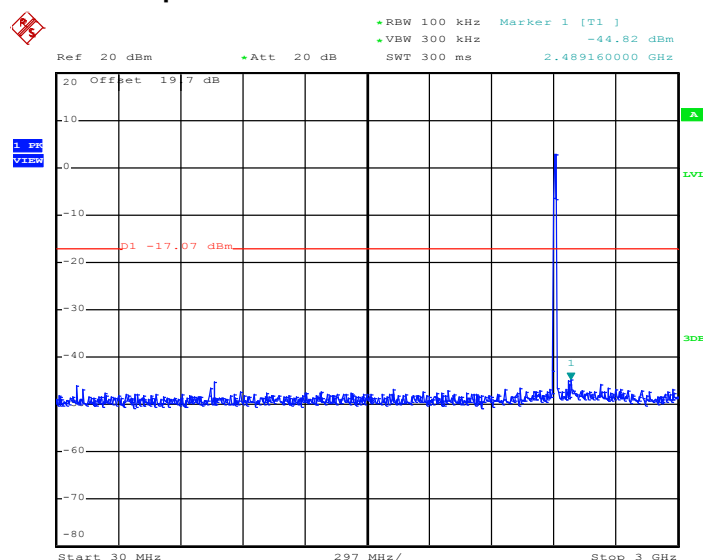
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

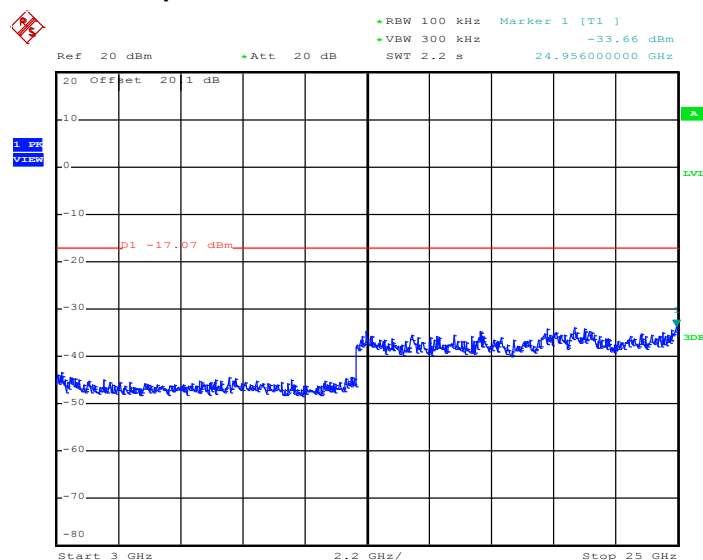
Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.JAN.2012 22:48:43

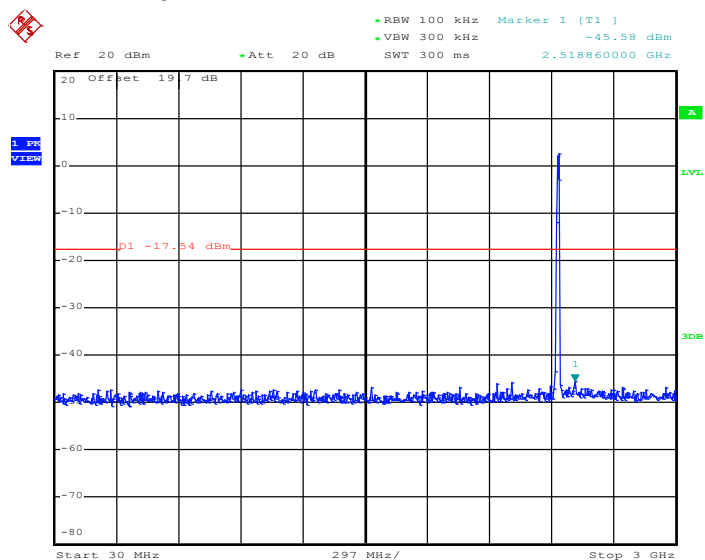
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



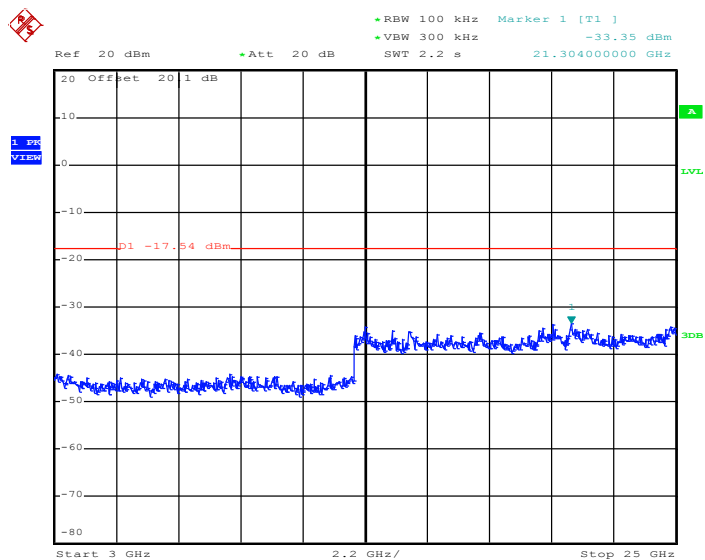
Date: 30.JAN.2012 22:49:00



Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 30.JAN.2012 23:09:36

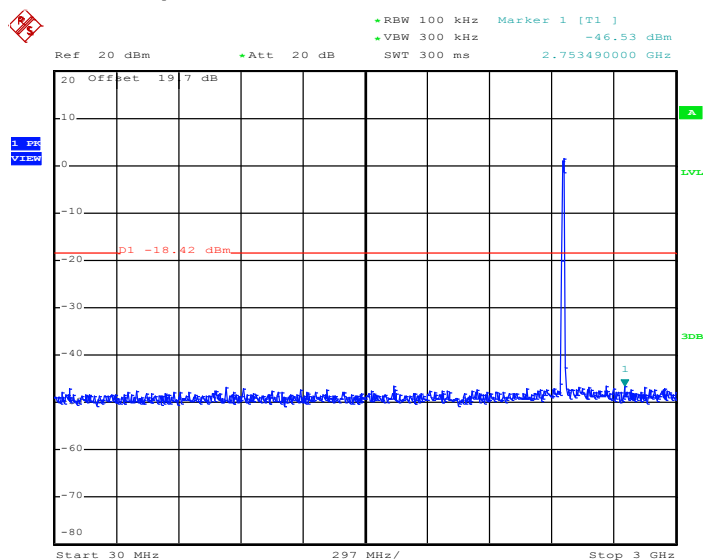
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

Date: 30.JAN.2012 23:09:53



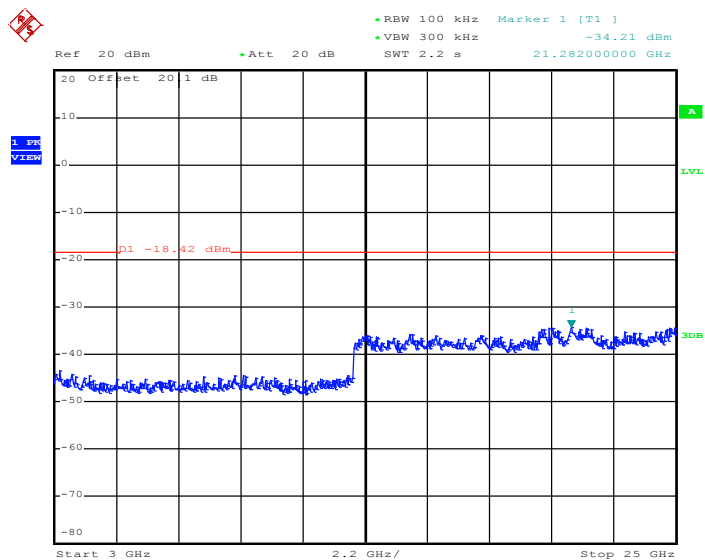
Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.JAN.2012 23:31:02

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

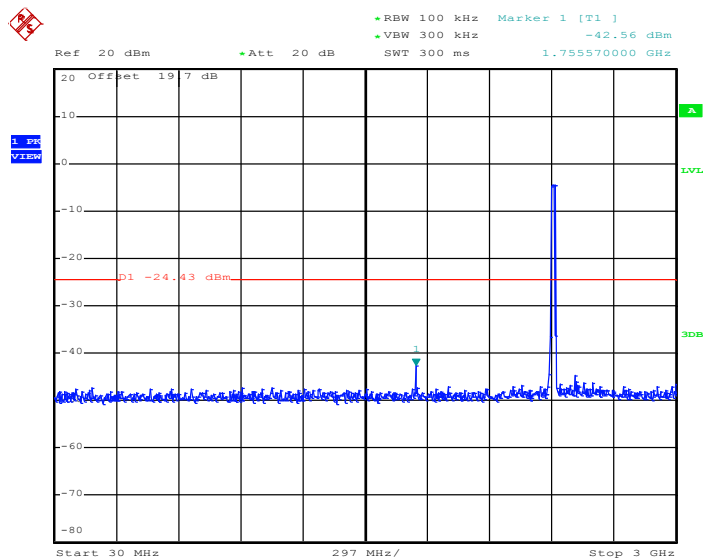


Date: 30.JAN.2012 23:31:19



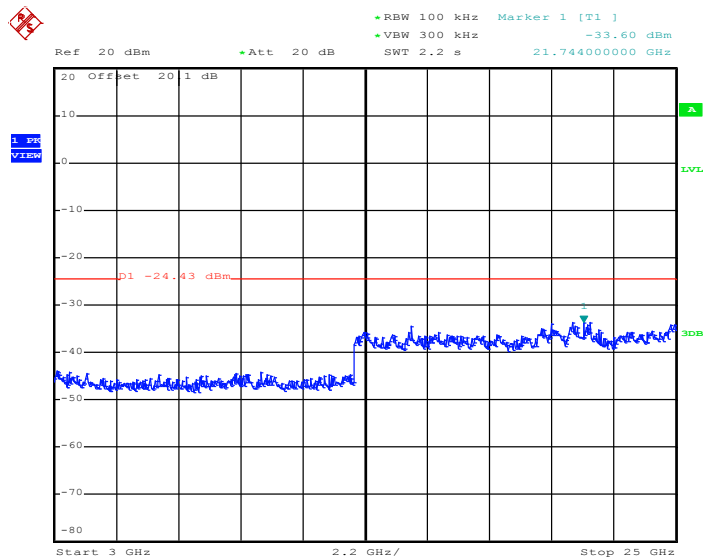
Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 31.JAN.2012 00:08:41

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

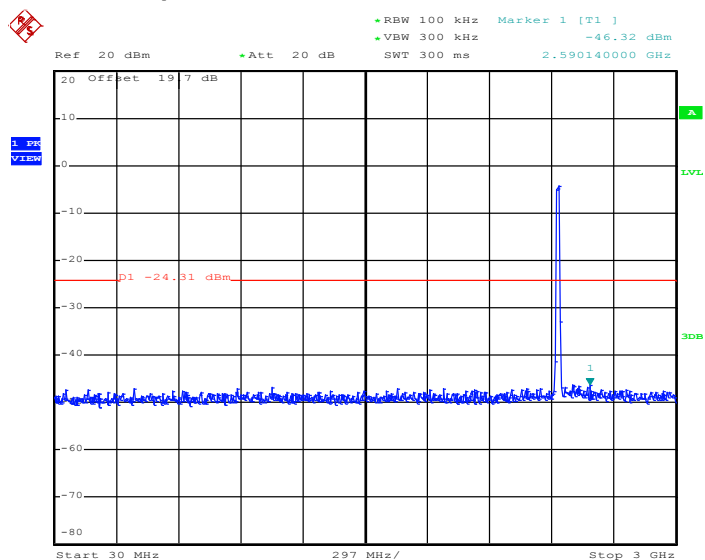


Date: 31.JAN.2012 00:08:58



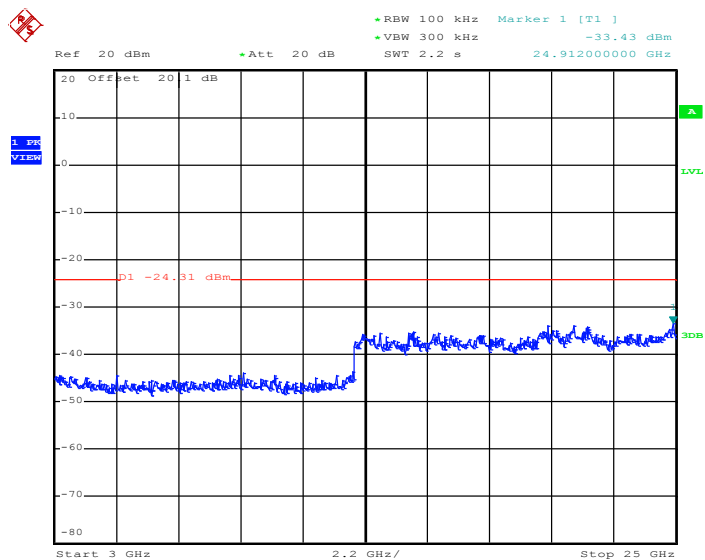
Test Mode :	Mode 5	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.JAN.2012 23:47:57

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

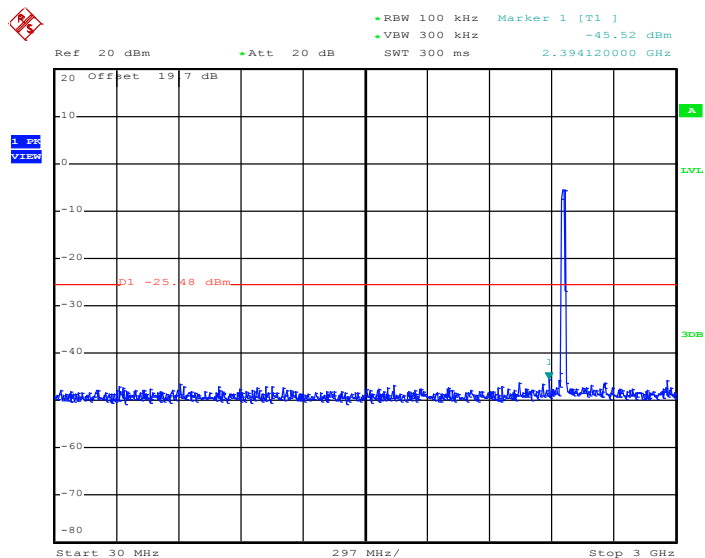


Date: 30.JAN.2012 23:48:14



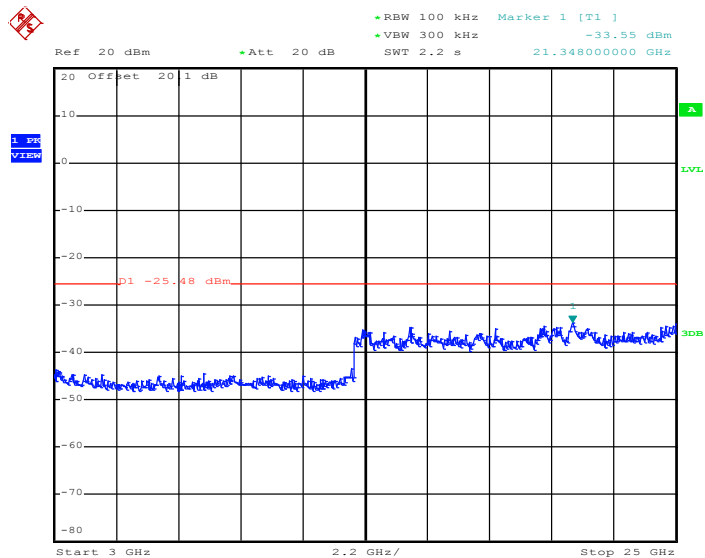
Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.JAN.2012 23:35:22

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 30.JAN.2012 23:35:39

3.5 Power Spectral Density Measurement

3.5.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3KHz band at any time interval of continuous transmission.

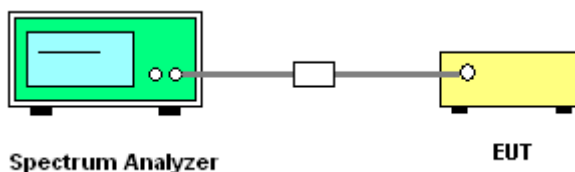
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Take the measured data from spectrum analyzer.

3.5.4 Test Setup

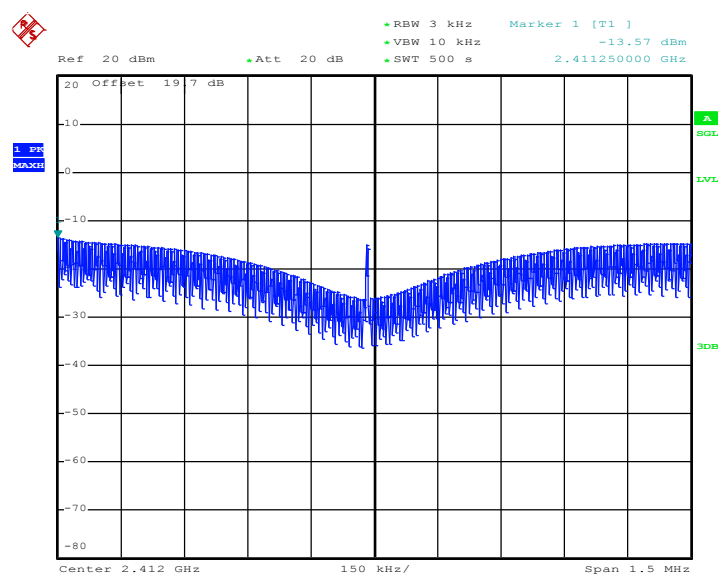


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-13.57	8	Pass
06	2437	-14.65	8	Pass
11	2462	-14.62	8	Pass

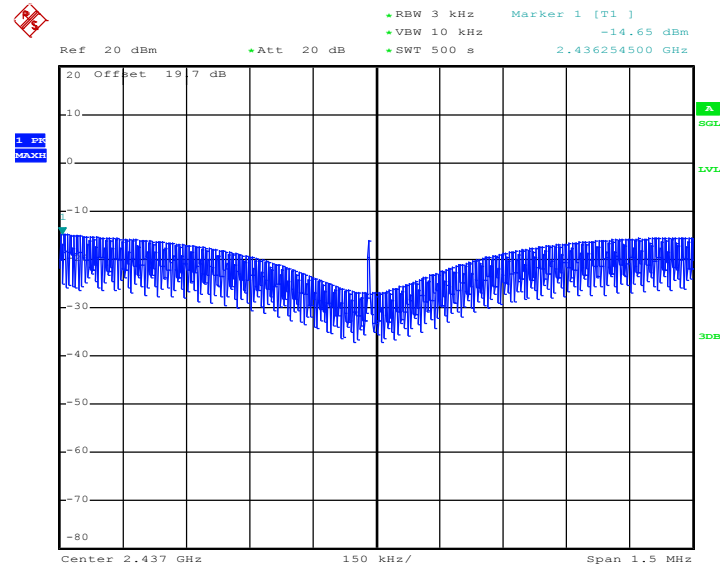
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 30.JAN.2012 22:48:23

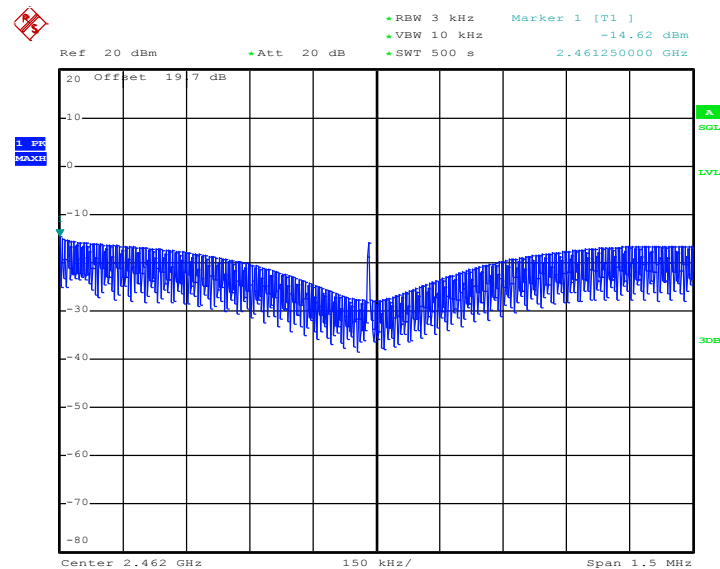


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 30.JAN.2012 23:09:15

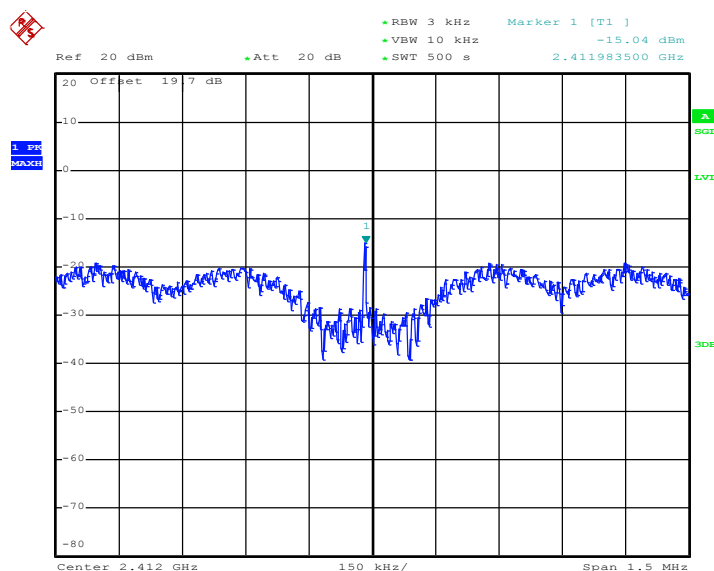
Mode 3 : PSD Plot on 802.11b Channel 11



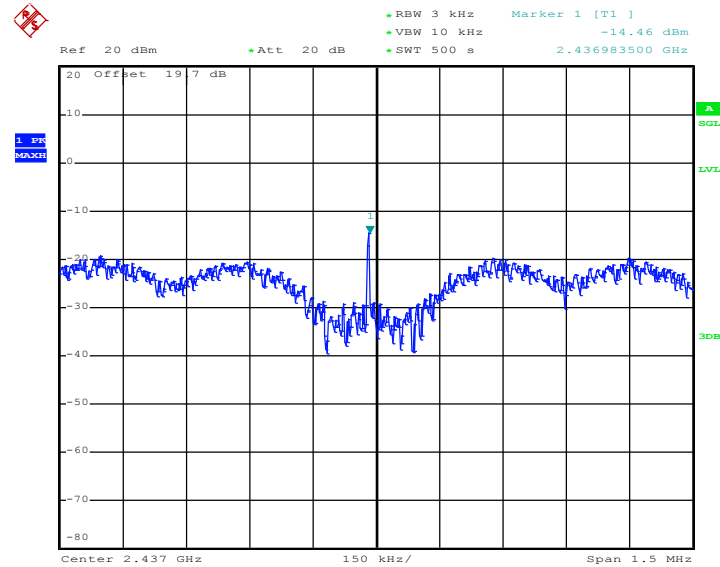
Date: 30.JAN.2012 23:30:41

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

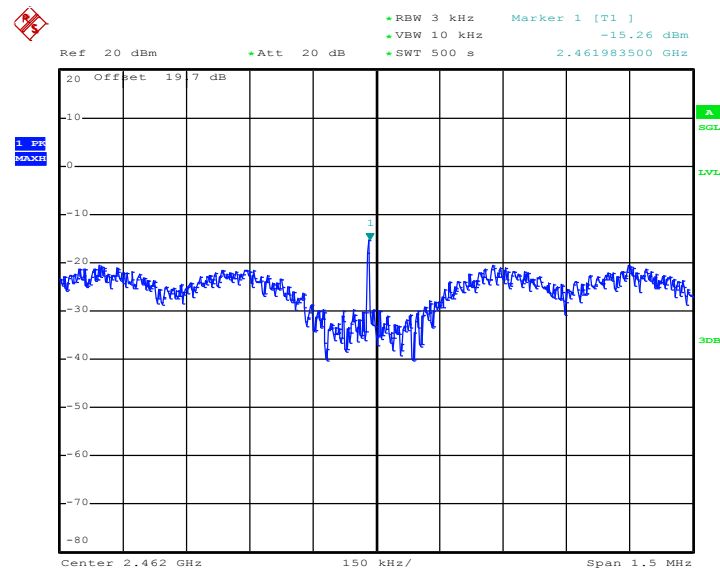
Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-15.04	8	Pass
06	2437	-14.46	8	Pass
11	2462	-15.26	8	Pass

Mode 4 : PSD Plot on 802.11g Channel 01


Date: 31.JAN.2012 00:17:57

Mode 5 : PSD Plot on 802.11g Channel 06


Date: 31.JAN.2012 00:05:29

Mode 6 : PSD Plot on 802.11g Channel 11


Date: 30.JAN.2012 23:45:16

3.6 AC Conducted Emission Measurement

3.6.1 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.

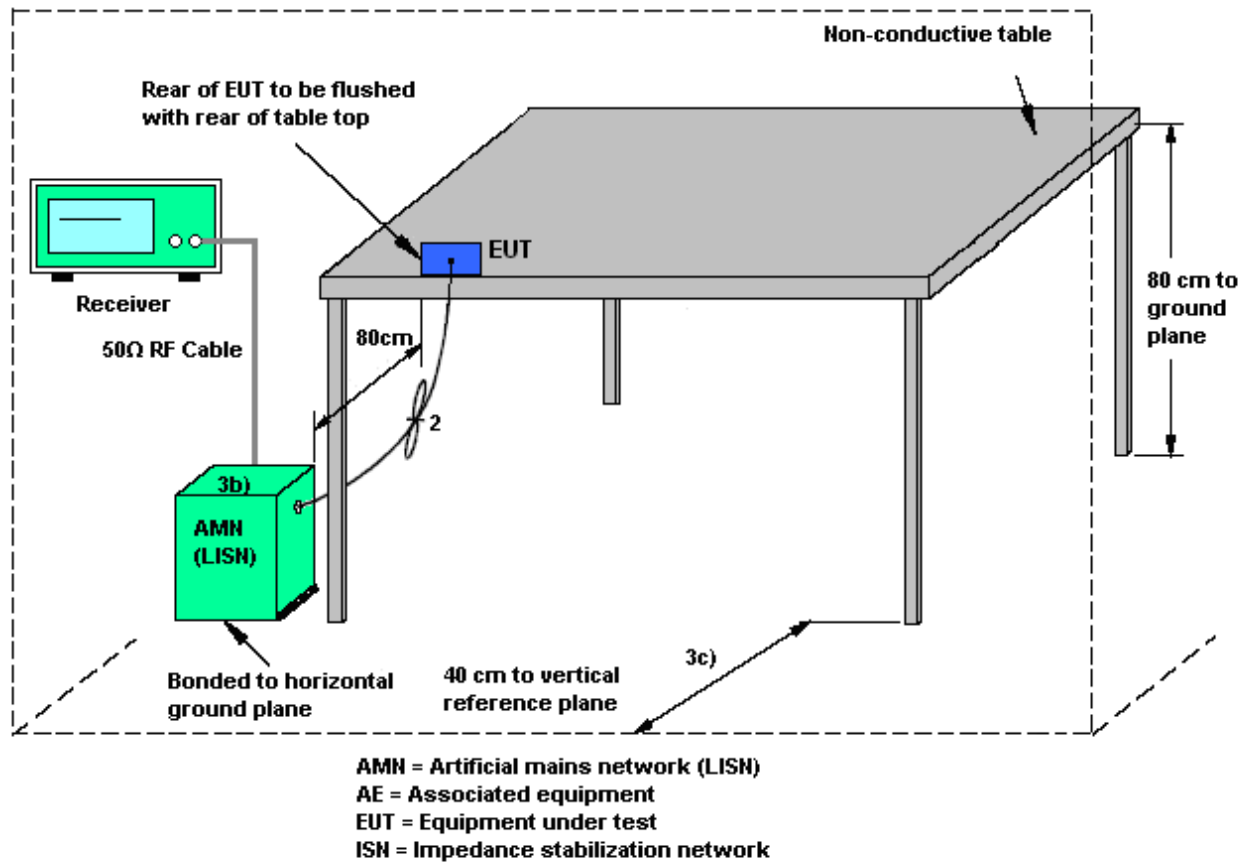
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

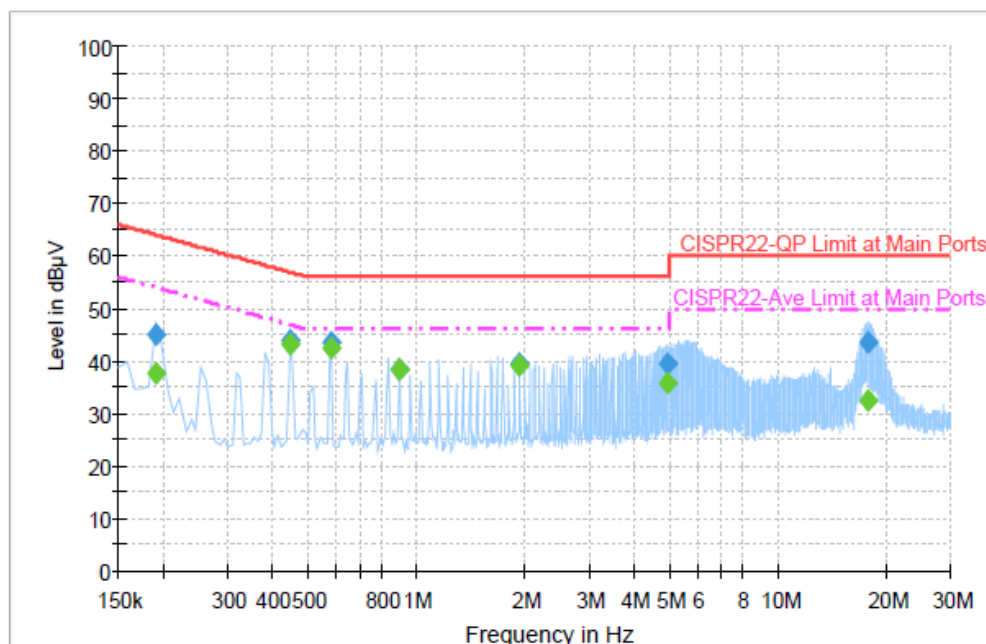
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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.

3.6.4 Test Setup



3.6.5 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 :	Bluetooth Link + WLAN Link + 44 Keypad + Pistol + Reader (Laser) + RFID + Battery + USB Cable (Data Link with Notebook) + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



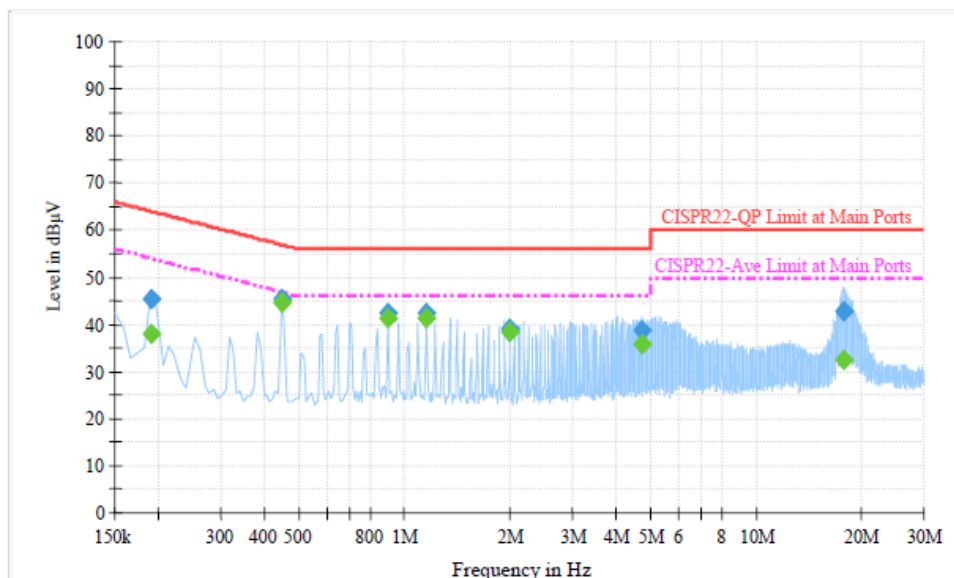
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	45.2	Off	L1	19.4	18.8	64.0
0.446000	44.0	Off	L1	19.3	12.9	56.9
0.582000	43.4	Off	L1	19.3	12.6	56.0
0.902000	38.5	Off	L1	19.4	17.5	56.0
1.926000	39.6	Off	L1	19.4	16.4	56.0
4.950000	39.6	Off	L1	19.6	16.4	56.0
17.806000	43.4	Off	L1	19.8	16.6	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	37.5	Off	L1	19.4	16.5	54.0
0.446000	43.0	Off	L1	19.3	3.9	46.9
0.582000	42.6	Off	L1	19.3	3.4	46.0
0.902000	38.5	Off	L1	19.4	7.5	46.0
1.926000	39.1	Off	L1	19.4	6.9	46.0
4.950000	35.8	Off	L1	19.6	10.2	46.0
17.806000	32.3	Off	L1	19.8	17.7	50.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link + 44 Keypad + Pistol + Reader (Laser) + RFID + Battery + USB Cable (Data Link with Notebook) + 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)
0.190000	45.4	Off	N	19.4	18.6	64.0
0.446000	45.5	Off	N	19.3	11.4	56.9
0.902000	42.4	Off	N	19.4	13.6	56.0
1.158000	42.4	Off	N	19.4	13.6	56.0
1.990000	39.0	Off	N	19.5	17.0	56.0
4.758000	38.7	Off	N	19.5	17.3	56.0
17.662000	42.9	Off	N	19.8	17.1	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	38.1	Off	N	19.4	15.9	54.0
0.446000	44.2	Off	N	19.3	2.7	46.9
0.902000	41.2	Off	N	19.4	4.8	46.0
1.158000	41.2	Off	N	19.4	4.8	46.0
1.990000	38.4	Off	N	19.5	7.6	46.0
4.758000	35.7	Off	N	19.5	10.3	46.0
17.662000	32.3	Off	N	19.8	17.7	50.0

3.7 Radiated Emission Measurement

3.7.1 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

3.7.2 Measuring Instruments

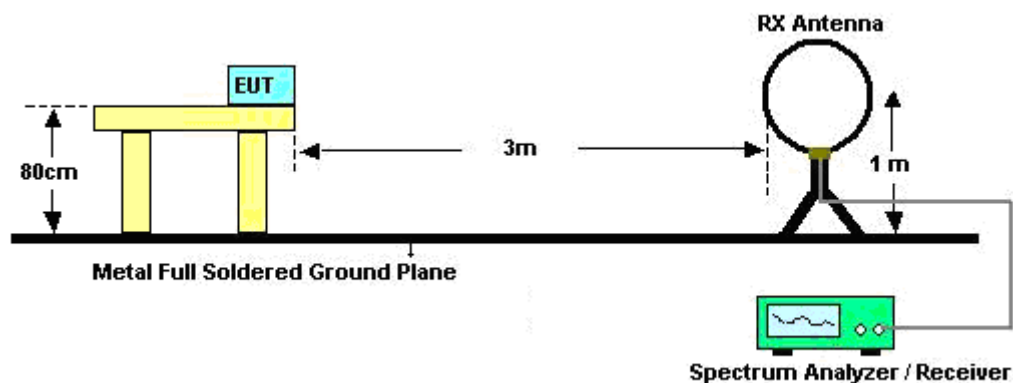
See list of measuring instruments of this test report.

3.7.3 Test Procedures

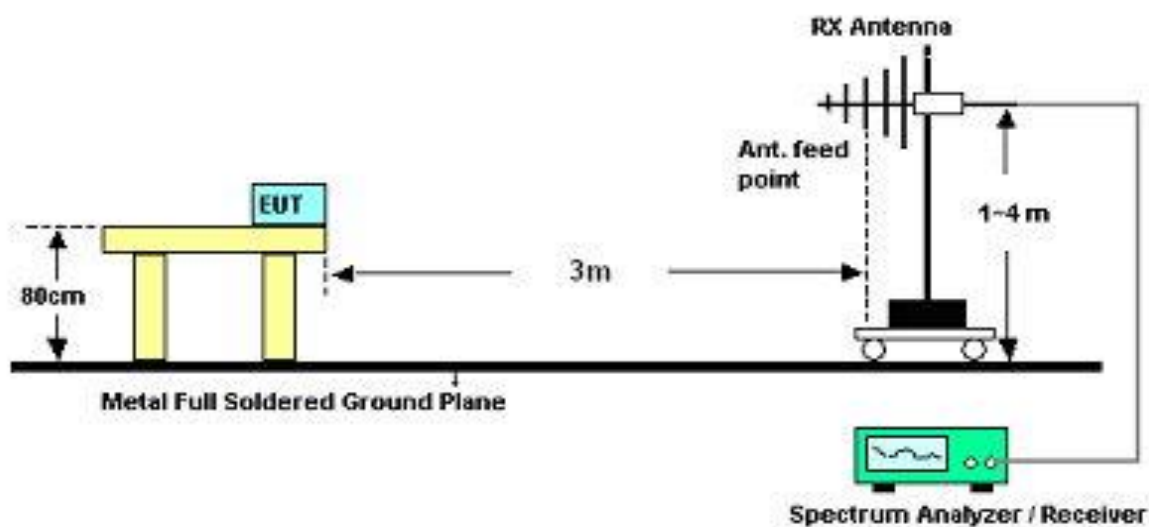
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep =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

3.7.4 Test Setup

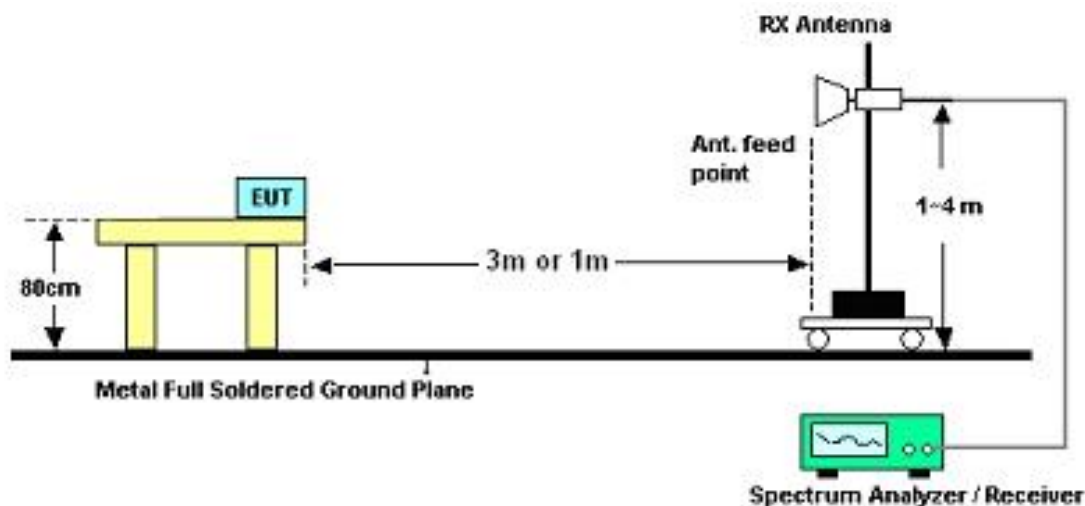
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.7.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

The low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

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

Test Mode :	Mode 1	Temperature :	22~23℃
Test Channel :	01	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2412 MHz is Fundamental Signals 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, 107.17 dBuV/m - 20dB = 87.17 dBuV/m.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
49.17	25.23	-14.77	40	47.57	8.5	0.69	31.53	-	-	Peak
179.85	21.02	-22.48	43.5	42.37	8.93	1.25	31.53	-	-	Peak
299.73	31.18	-14.82	46	47.44	13.3	1.77	31.33	-	-	Peak
316.1	32.86	-13.14	46	48.63	13.75	1.8	31.32	-	-	Peak
402.2	37.08	-8.92	46	50.05	16.06	2.15	31.18	100	19	Peak
996.5	25.59	-28.41	54	28.12	24.54	3.51	30.58	-	-	Peak
2334.7	55.7	-18.3	74	51.71	31.98	5.95	33.94	115	0	Peak
2334.7	46.48	-7.52	54	42.29	31.98	5.95	33.94	115	0	Average
2412	107.17	-	-	102.99	32.08	6.07	33.97	115	0	Peak
2412	103.35	-	-	99.17	32.08	6.07	33.97	115	0	Average
2486	45.05	-8.95	54	40.69	32.18	6.18	34	115	0	Average
2486	54.75	-19.25	74	50.39	32.18	6.18	34	115	0	Peak
4824	47	-27	74	62.89	34.1	9.12	59.11	100	0	Peak
7236	44.62	-42.55	87.17	57	35.7	10.03	58.11	100	0	Peak



Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	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
43.77	24.17	-15.83	40	43.93	11.1	0.64	31.5	-	-	Peak
106.41	21	-22.5	43.5	41.09	10.43	1.03	31.55	-	-	Peak
289.74	27.87	-18.13	46	44.34	13.16	1.69	31.32	-	-	Peak
402.2	34.2	-11.8	46	47.17	16.06	2.15	31.18	100	33	Peak
539.4	31.44	-14.56	46	41.15	18.76	2.53	31	-	-	Peak
959.4	25.92	-20.08	46	29.03	23.99	3.47	30.57	-	-	Peak
2337.93	49.44	-24.56	74	45.45	31.98	5.95	33.94	100	20	Peak
2337.93	38.21	-15.79	54	34.22	31.98	5.95	33.94	100	20	Average
2412	99.71	-	-	95.53	32.08	6.07	33.97	100	20	Peak
2412	95.88	-	-	91.7	32.08	6.07	33.97	100	20	Average
2486	42.18	-11.82	54	37.82	32.18	6.18	34	100	20	Average
2486	52.51	-21.49	74	48.15	32.18	6.18	34	100	20	Peak
4824	44.68	-29.32	74	60.57	34.1	9.12	59.11	100	0	Peak

Test Mode :	Mode 2	Temperature :	22~23℃
Test Channel :	06	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
48.9	25.6	-14.4	40	47.55	8.9	0.68	31.53	-	-	Peak
179.85	19.83	-23.67	43.5	41.18	8.93	1.25	31.53	-	-	Peak
299.73	32.36	-13.64	46	48.62	13.3	1.77	31.33	-	-	Peak
402.2	36.91	-9.09	46	49.88	16.06	2.15	31.18	100	14	Peak
539.4	25	-21	46	34.71	18.76	2.53	31	-	-	Peak
985.3	25.77	-28.23	54	28.47	24.38	3.5	30.58	-	-	Peak
2364	54.76	-19.24	74	50.71	32.01	5.99	33.95	113	0	Peak
2364	46.4	-7.6	54	42.35	32.01	5.99	33.95	113	0	Average
2437	102.08	-	-	97.82	32.13	6.11	33.98	113	0	Average
2437	105.86	-	-	101.63	32.1	6.11	33.98	113	0	Peak
2500	54.76	-19.24	74	50.38	32.2	6.18	34	113	0	Peak
2500	42.65	-11.35	54	38.27	32.2	6.18	34	113	0	Average
4874	46.81	-27.19	74	62.62	34.1	9.13	59.04	100	0	Peak
7311	43.95	-30.05	74	56.32	35.7	10.06	58.13	100	0	Peak

Test Mode :	Mode 2	Temperature :	22~23°C
Test Channel :	06	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
49.17	23.53	-16.47	40	45.87	8.5	0.69	31.53	-	-	Peak
129.09	22.26	-21.24	43.5	41.07	11.62	1.14	31.57	-	-	Peak
297.57	24.43	-21.57	46	40.74	13.27	1.75	31.33	-	-	Peak
402.2	33.04	-12.96	46	46.01	16.06	2.15	31.18	100	69	Peak
539.4	31.35	-14.65	46	41.06	18.76	2.53	31	-	-	Peak
987.4	25.5	-28.5	54	28.17	24.41	3.5	30.58	-	-	Peak
2364	50.83	-23.17	74	46.78	32.01	5.99	33.95	100	0	Peak
2364	40.53	-13.47	54	36.48	32.01	5.99	33.95	100	0	Average
2437	98.79	-	-	94.53	32.13	6.11	33.98	100	0	Peak
2437	94.61	-	-	90.35	32.13	6.11	33.98	100	0	Average
2486	51.54	-22.46	74	47.18	32.18	6.18	34	100	0	Peak
2486	38.72	-15.28	54	34.36	32.18	6.18	34	100	0	Average
4874	43.69	-30.31	74	59.5	34.1	9.13	59.04	100	0	Peak

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	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
48.9	25.76	-14.24	40	47.71	8.9	0.68	31.53	-	-	Peak
171.21	20.61	-22.89	43.5	41.52	9.38	1.23	31.52	-	-	Peak
299.73	31.94	-14.06	46	48.2	13.3	1.77	31.33	-	-	Peak
402.2	36.38	-9.62	46	49.35	16.06	2.15	31.18	100	58	Peak
522.6	26.27	-19.73	46	36.32	18.48	2.5	31.03	-	-	Peak
971.3	25.61	-28.39	54	28.54	24.16	3.48	30.57	-	-	Peak
2388	56.9	-17.1	74	52.77	32.06	6.03	33.96	112	360	Peak
2388	45.71	-8.29	54	41.58	32.06	6.03	33.96	112	360	Average
2462	102.53	-	-	98.23	32.15	6.14	33.99	112	360	Average
2462	106.34	-	-	102.04	32.15	6.14	33.99	112	360	Peak
2494.49	56.33	-17.67	74	51.95	32.2	6.18	34	112	360	Peak
2494.49	43.11	-10.89	54	38.73	32.2	6.18	34	112	360	Average
4924	48.3	-25.7	74	64.01	34.1	9.15	58.96	100	0	Peak
7386	44.15	-29.85	74	56.52	35.7	10.1	58.17	100	0	Peak



Test Mode :	Mode 3	Temperature :	22~23℃
Test Channel :	11	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
48.9	22.9	-17.1	40	44.85	8.9	0.68	31.53	-	-	Peak
91.02	28.2	-15.3	43.5	50.05	8.72	0.95	31.52	-	-	Peak
280.29	22.15	-23.85	46	38.83	13.03	1.64	31.35	-	-	Peak
402.2	33.81	-12.19	46	46.78	16.06	2.15	31.18	100	67	Peak
539.4	30.97	-15.03	46	40.68	18.76	2.53	31	-	-	Peak
993	25.87	-28.13	54	28.45	24.5	3.5	30.58	-	-	Peak
2382	51.53	-22.47	74	47.43	32.03	6.03	33.96	100	17	Peak
2382	40.78	-13.22	54	36.68	32.03	6.03	33.96	100	17	Average
2462	96.32	-	-	92.02	32.15	6.14	33.99	100	17	Average
2462	100.27	-	-	95.97	32.15	6.14	33.99	100	17	Peak
2499.05	51.22	-22.78	74	46.84	32.2	6.18	34	100	17	Peak
2499.05	38.34	-15.66	54	33.96	32.2	6.18	34	100	17	Average
4924	46.04	-27.96	74	61.75	34.1	9.15	58.96	100	0	Peak

Test Mode :	Mode 4	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2412 MHz is Fundamental Signals which can be ignored. 2. 7236 MHz is not within a restricted band.		

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
48.9	23.21	-16.79	40	45.16	8.9	0.68	31.53	-	-	Peak
218.46	20.51	-25.49	46	40.18	10.38	1.41	31.46	-	-	Peak
299.73	31.33	-14.67	46	47.59	13.3	1.77	31.33	-	-	Peak
316.1	33.2	-12.8	46	48.97	13.75	1.8	31.32	-	-	Peak
393.8	36.38	-9.62	46	49.61	15.84	2.13	31.2	100	29	Peak
990.9	25.45	-28.55	54	28.06	24.47	3.5	30.58	-	-	Peak
2389.61	61.77	-12.23	74	57.64	32.06	6.03	33.96	113	0	Peak
2389.61	44.54	-9.46	54	40.41	32.06	6.03	33.96	113	0	Average
2412	105.12	-	-	100.92	32.1	6.07	33.97	113	0	Peak
2412	95.8	-	-	91.62	32.08	6.07	33.97	113	0	Average
2494	44.64	-9.36	54	40.26	32.2	6.18	34	113	0	Average
2494	57.05	-16.95	74	52.67	32.2	6.18	34	113	0	Peak
7236	43.99	-41.13	85.12	56.36	35.7	10.03	58.1	100	0	Peak



Test Mode :	Mode 4	Temperature :	22~23℃
Test Channel :	01	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	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
30.81	21.79	-18.21	40	33.43	19.28	0.54	31.46	-	-	Peak
202.26	22.41	-21.09	43.5	43.26	9.3	1.33	31.48	-	-	Peak
299.73	22.5	-23.5	46	38.76	13.3	1.77	31.33	-	-	Peak
393.8	32.27	-13.73	46	45.5	15.84	2.13	31.2	100	77	Peak
539.4	31.02	-14.98	46	40.73	18.76	2.53	31	-	-	Peak
985.3	25.19	-28.81	54	27.89	24.38	3.5	30.58	-	-	Peak
2389.61	52.59	-21.41	74	48.46	32.06	6.03	33.96	102	14	Peak
2389.61	37.04	-16.96	54	32.91	32.06	6.03	33.96	102	14	Average
2412	98.08	-	-	93.9	32.08	6.07	33.97	102	14	Peak
2412	88.83	-	-	84.65	32.08	6.07	33.97	102	14	Average
2494	40.47	-13.53	54	36.09	32.2	6.18	34	102	14	Average
2494	52.46	-21.54	74	48.08	32.2	6.18	34	102	14	Peak

Test Mode :	Mode 5	Temperature :	22~23℃
Test Channel :	06	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
48.9	22.48	-17.52	40	44.43	8.9	0.68	31.53	-	-	Peak
179.85	19.16	-24.34	43.5	40.51	8.93	1.25	31.53	-	-	Peak
299.73	31.11	-14.89	46	47.37	13.3	1.77	31.33	-	-	Peak
316.1	32.93	-13.07	46	48.7	13.75	1.8	31.32	-	-	Peak
402.2	36.77	-9.23	46	49.74	16.06	2.15	31.18	100	25	Peak
993.7	26.13	-27.87	54	28.7	24.51	3.5	30.58			Peak
2388	53.8	-20.2	74	49.67	32.06	6.03	33.96	136	360	Peak
2388	41.31	-12.69	54	37.18	32.06	6.03	33.96	136	360	Average
2437	104.89	-	-	100.66	32.1	6.11	33.98	136	360	Peak
2437	95.53	-	-	91.27	32.13	6.11	33.98	136	360	Average
2486	54.62	-19.38	74	50.26	32.18	6.18	34	136	360	Peak
2486	41.84	-12.16	54	37.48	32.18	6.18	34	136	360	Average
7311	44.97	-29.03	74	57.34	35.7	10.06	58.13	100	0	Peak



Test Mode :	Mode 5	Temperature :	22~23℃
Test Channel :	06	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	22.22	-17.78	40	33.15	20	0.53	31.46	-	-	Peak
117.21	21.75	-21.75	43.5	40.79	11.43	1.09	31.56	-	-	Peak
289.74	23.03	-22.97	46	39.5	13.16	1.69	31.32	-	-	Peak
402.2	32.8	-13.2	46	45.77	16.06	2.15	31.18	100	69	Peak
539.4	30.98	-15.02	46	40.69	18.76	2.53	31	-	-	Peak
976.2	25.26	-28.74	54	28.11	24.24	3.49	30.58	-	-	Peak
2358	50.84	-23.16	74	46.79	32.01	5.99	33.95	100	0	Peak
2358	37.16	-16.84	54	33.11	32.01	5.99	33.95	100	0	Average
2437	88.97	-	-	84.71	32.13	6.11	33.98	100	0	Average
2437	98.41	-	-	94.15	32.13	6.11	33.98	100	0	Peak
2500	50.84	-23.16	74	46.46	32.2	6.18	34	100	0	Peak
2500	38.06	-15.94	54	33.68	32.2	6.18	34	100	0	Average

Test Mode :	Mode 6	Temperature :	22~23℃
Test Channel :	11	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	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
48.9	23.09	-16.91	40	45.04	8.9	0.68	31.53	-	-	Peak
179.85	20.03	-23.47	43.5	41.38	8.93	1.25	31.53	-	-	Peak
299.73	32.29	-13.71	46	48.55	13.3	1.77	31.33	-	-	Peak
316.1	32.63	-13.37	46	48.4	13.75	1.8	31.32	-	-	Peak
402.2	37.2	-8.8	46	50.17	16.06	2.15	31.18	100	81	Peak
993.7	25.85	-28.15	54	28.42	24.51	3.5	30.58	-	-	Peak
2388	54.54	-19.46	74	50.41	32.06	6.03	33.96	111	0	Peak
2388	42.31	-11.69	54	38.18	32.06	6.03	33.96	111	0	Average
2462	94.34	-	-	90.04	32.15	6.14	33.99	111	0	Average
2462	103.8	-	-	99.5	32.15	6.14	33.99	111	0	Peak
2483.66	57.91	-16.09	74	53.55	32.18	6.18	34	111	0	Peak
2483.66	43.5	-10.5	54	39.14	32.18	6.18	34	111	0	Average
4924	44.38	-29.62	74	60.13	34.1	9.14	58.99	100	0	Peak
7386	45.64	-28.36	74	58	35.7	10.1	58.16	100	0	Peak

Test Mode :	Mode 6	Temperature :	22~23℃
Test Channel :	11	Relative Humidity :	45~56%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	22.57	-17.43	40	33.5	20	0.53	31.46	-	-	Peak
91.02	21.03	-22.47	43.5	42.88	8.72	0.95	31.52	-	-	Peak
223.86	24.41	-21.59	46	43.64	10.78	1.44	31.45	-	-	Peak
393.8	31.82	-14.18	46	45.05	15.84	2.13	31.2	100	62	Peak
539.4	30.84	-15.16	46	40.55	18.76	2.53	31	-	-	Peak
959.4	25.57	-20.43	46	28.68	23.99	3.47	30.57	-	-	Peak
2372	48.84	-25.16	74	44.77	32.03	5.99	33.95	100	6	Peak
2372	36.8	-17.2	54	32.73	32.03	5.99	33.95	100	6	Average
2462	89.3	-	-	85	32.15	6.14	33.99	100	6	Average
2462	98.71	-	-	94.41	32.15	6.14	33.99	100	6	Peak
2484.61	53.3	-20.7	74	48.94	32.18	6.18	34	100	6	Peak
2484.61	39.32	-14.68	54	34.96	32.18	6.18	34	100	6	Average

3.8 Antenna Requirements

3.8.1 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.

3.8.2 Antenna Connected Construction

The antennas type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement.

3.8.3 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
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Jan. 17, 2012	Jun. 12, 2012	Conducted (TH02-HY)
EMI Test Receiver	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Feb. 03, 2012	Aug. 21, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz~30MHz	Dec. 09, 2011	Feb. 03, 2012~ Feb. 23, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz~30MHz	Dec. 06, 2011	Feb. 03, 2012~ Feb. 23, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Feb. 03, 2012~ Feb. 23, 2012	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 22, 2011	Feb. 04, 2012	Oct. 21, 2012	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	Feb. 04, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 10, 2011	Feb. 04, 2012	Aug. 09, 2012	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A023 62	1GHz~ 26.5GHz	Dec. 05, 2011	Feb. 04, 2012	Dec. 04, 2012	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 29, 2011	Feb. 04, 2012	Mar. 28, 2012	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Feb. 04, 2012	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159088	1GHz ~ 18GHz	Feb. 21, 2011	Feb. 04, 2012	Feb. 20, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/00 1	9 kHz~30 MHz	Jul. 29, 2010	Feb. 04, 2012	Jul. 28, 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 EP211340 as below.