

FCC RF Test Report

APPLICANT : LSIS Co., Ltd
EQUIPMENT : MINI COMPUTER, MOBILE
COMPUTER
BRAND NAME : LS
MODEL NAME : IU9067
FCC ID : Z8TIU9067LS001
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Aug. 16, 2011 and completely tested on Oct. 29, 2011. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.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	5
1.4 Testing Site.....	6
1.5 Applied Standards	6
1.6 Ancillary Equipment List	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	7
2.1 Pre-Scanned 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 6dB and 99% Bandwidth Measurement	12
3.2 Output Power Measurement.....	21
3.3 Band Edges Measurement.....	23
3.4 Spurious Emission Measurement.....	29
3.5 Power Spectral Density Measurement	36
3.6 AC Conducted Emission Measurement.....	41
3.7 Radiated Emission Measurement.....	45
3.8 Antenna Requirements.....	60
4 LIST OF MEASURING EQUIPMENT	61
5 UNCERTAINTY OF EVALUATION.....	62
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR181603B	Rev. 01	Initial issue of report	Nov. 30, 2011

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 4.4.1	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 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 14.20 dB at 0.29 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 5.55 dB at 32.43 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

LSIS Co., Ltd

1026-6, Hogye-dong, Dong-an-gu Anyang-si, Gyeonggi-do, Korea

1.2 Manufacturer

DongGuan BG Electronic Co., Limited.

The 2nd Bldg, The 5th Industrial Zone, Shang Sha-District, Chang An-Town, Guang Dong-Province, 523870, Dong Guan-City, People's Republic of China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	MINI COMPUTER, MOBILE COMPUTER
Brand Name	LS
Model Name	IU9067
FCC ID	Z8TIU9067LS001
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 : 18.26 dBm (0.067 W) 802.11g : 23.71 dBm (0.235 W)
Antenna Type	Chip Antenna with gain 1.00 dBi
HW Version	IU906X MAIN MP
SW Version	Windows CE5.0 Professional
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

Remark:

1. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
2. 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 (KUNSHAN) INC.		
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	Sporton Site No.		
	TH01-KS	CO01-KS	03CH01-KS

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

Remark:

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

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	GW	GPC-60300	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
3.	Notebook	DELL	PP42L	N/A	N/A	AC I/P: Unshielded, 0.8 m DC O/P: Shielded, 1.8 m
4.	Notebook	DELL	P08S	QDS-BRCM1030	N/A	AC I/P: Unshielded, 0.9 m DC O/P: Shielded, 1.8 m
5.	Router	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
6.	iPod	Apple	A1199	FCC DoC	Shielded, 1.2 m	N/A
7.	Monitor	DELL	E1910Hc	FCC DoC	Shielded, 1.2 m	Unshielded, 1.8 m

2 Test Configuration of Equipment Under Test

2.1 RF Power

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

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	18.02	18.18	18.22	18.23
CH 06	2437 MHz	17.89	17.67	18.13	18.24
CH 11	2462 MHz	18.05	17.95	18.21	18.26

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	22.95	22.46	23.52	22.58	23.46	22.83	22.63	23.59
CH 06	2437 MHz	22.91	22.38	23.39	22.89	23.34	22.89	22.91	23.64
CH 11	2462 MHz	23.39	22.91	23.55	22.86	23.51	23.02	22.94	23.71

Remark:

1. The data rates of WLAN 802.11b/g were set in 11Mbps for 802.11b and 54Mbps for 802.11g, for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

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

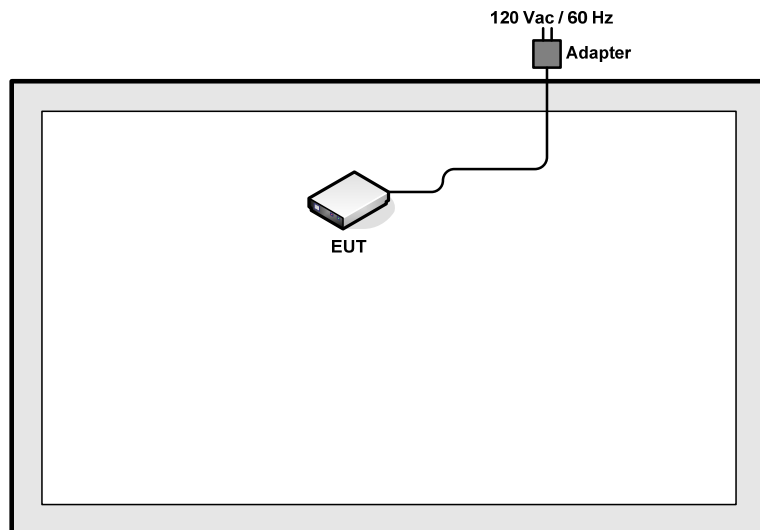
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

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

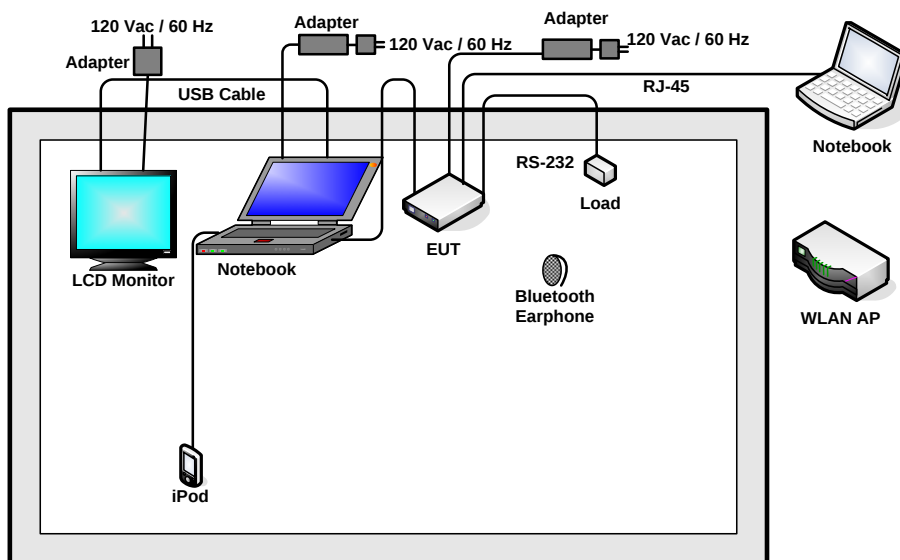
Test Cases		
Test Item	802.11b	802.11g
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g 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 :WLAN Link(2.4GHz) + Bluetooth Link + Adapter + Scanner + Cradle + TC	
Remark:		
1. TC stands for Test Configuration, and consists of iPod, monitor, RJ-45, and RS-232.		
2. The worst case of conducted emission is mode 1; only the test data of it was reported.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

The programmed RF utility, "sru" 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 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

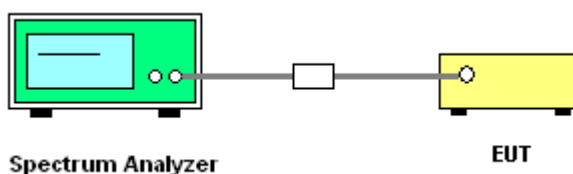
3.1.2 Measuring Instruments

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

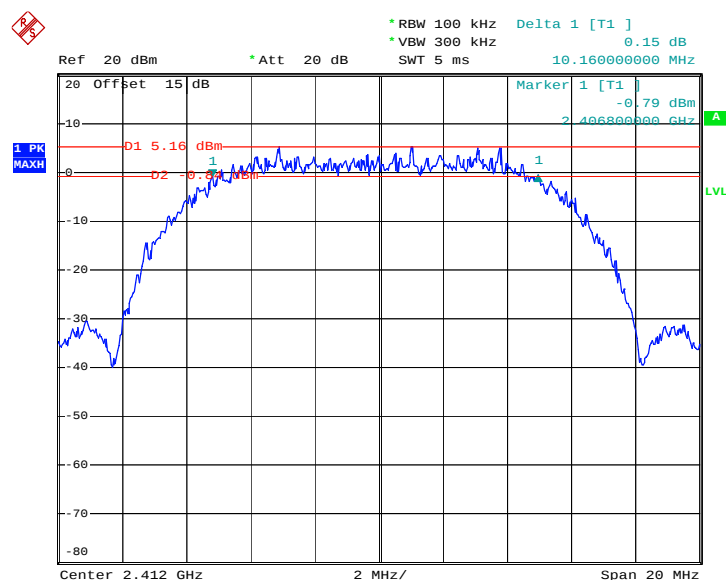


3.1.5 Test Result of 6dB Bandwidth

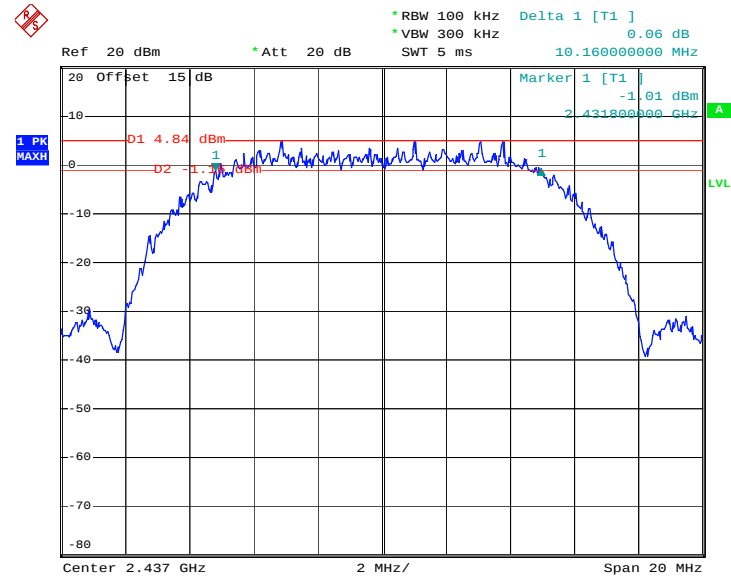
Test Mode :	Mode 1, 2, 3	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	43~45%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	10.16	0.5	Pass
06	2437	10.16	0.5	Pass
11	2462	9.64	0.5	Pass

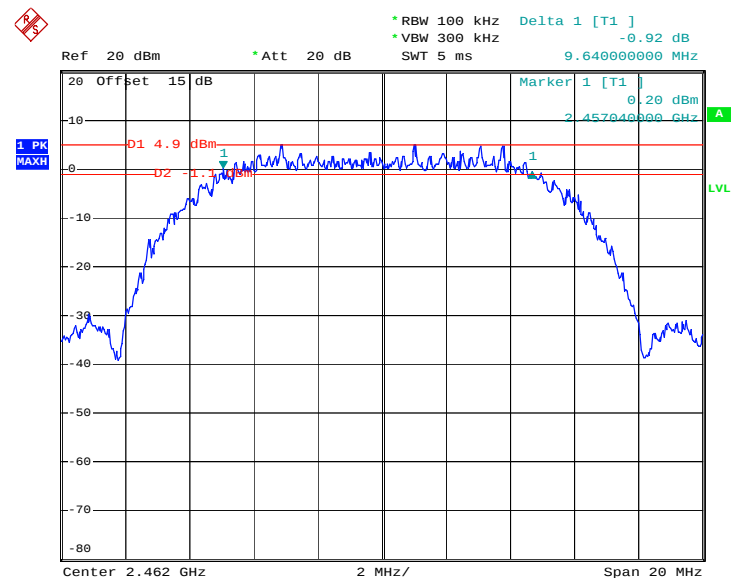
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date : 26.OCT.2011 09:07:41

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


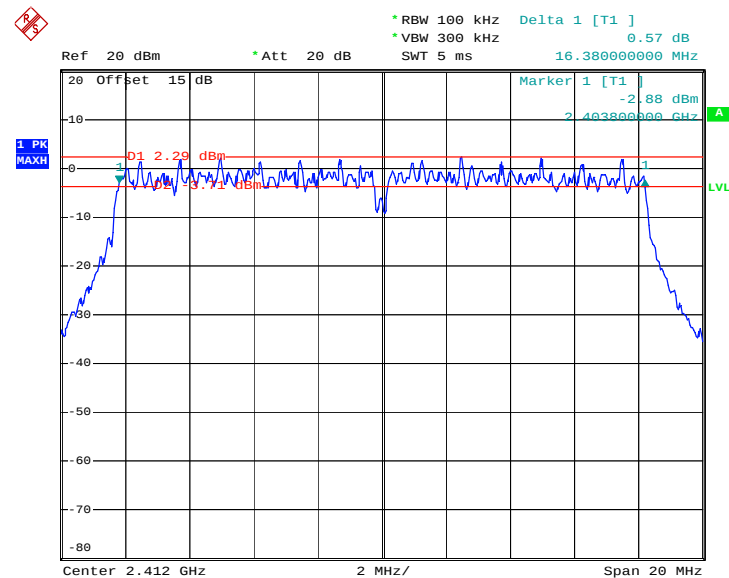
Date: 26.OCT.2011 09:32:12

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


Date: 26.OCT.2011 09:53:09

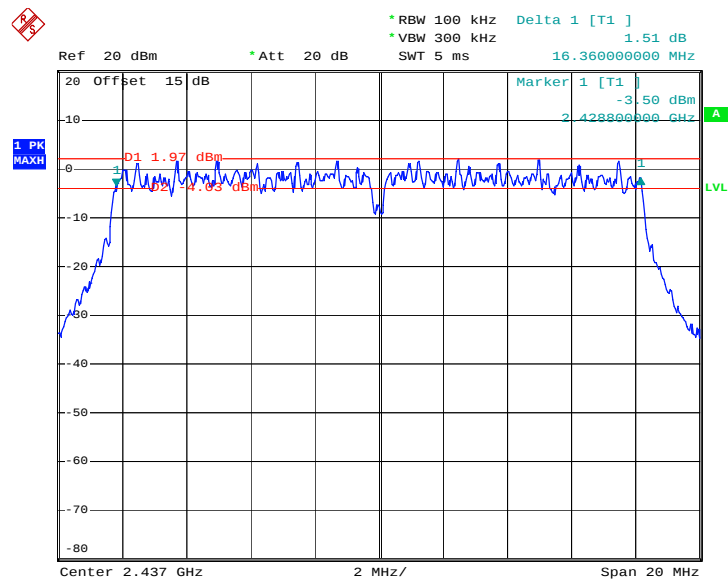
Test Mode :	Mode 4, 5, 6	Temperature :	22~23°C
Test Engineer :	Jun Liu	Relative Humidity :	43~45%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.38	0.5	Pass
06	2437	16.36	0.5	Pass
11	2462	16.36	0.5	Pass

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


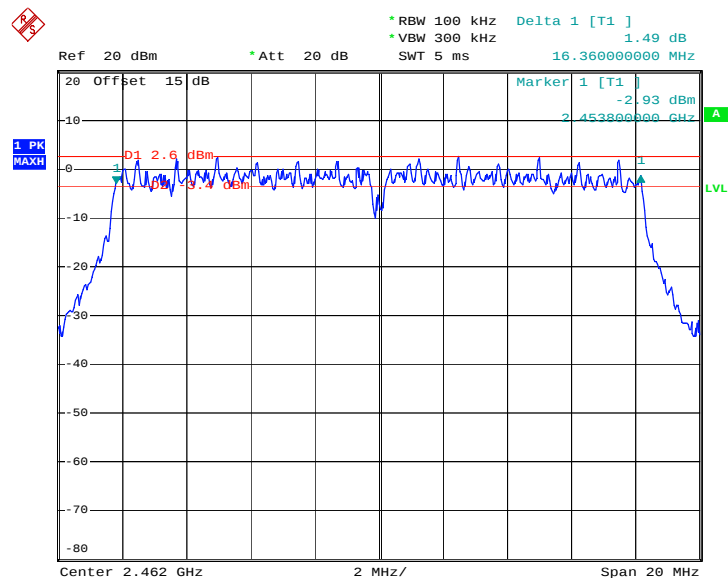
Date: 26.OCT.2011 10:07:46

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



Date: 26.OCT.2011 10:33:29

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



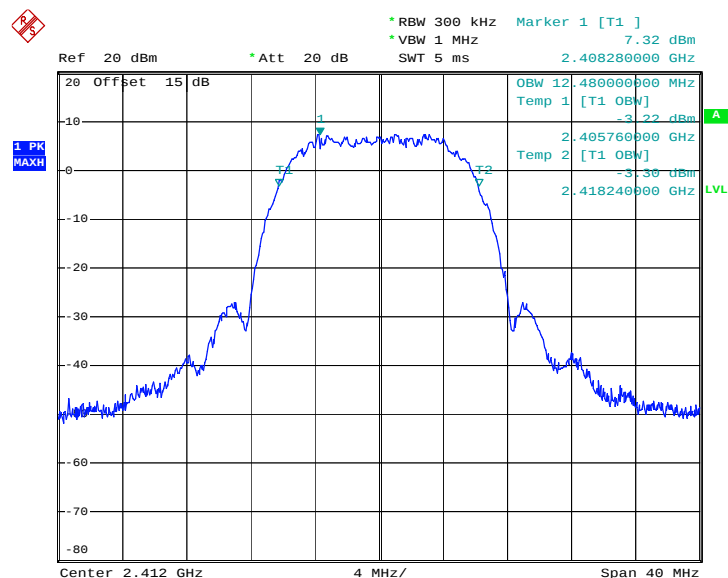
Date: 26.OCT.2011 10:48:23

3.1.6 Test Result of 99% Occupied Bandwidth

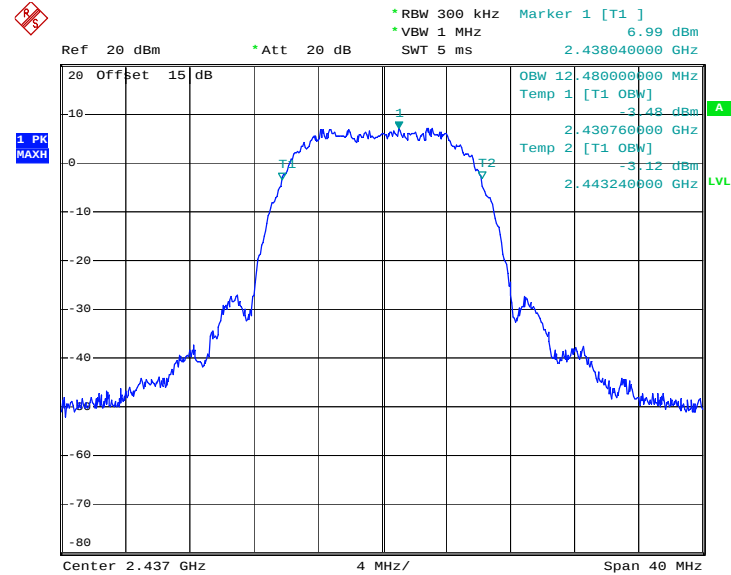
Test Mode :	Mode 1, 2, 3	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	43~45%

Channel	Frequency (MHz)	802.11b 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	12.48	Pass
06	2437	12.48	Pass
11	2462	12.48	Pass

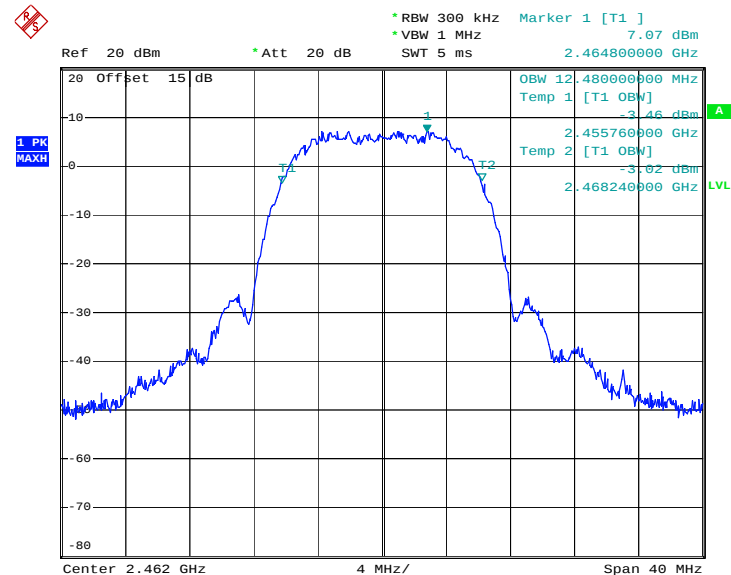
Mode 1 : 99% Occupied Bandwidth Plot on 802.11b Channel 01



Date: 26.OCT.2011 09:12:04

Mode 2 : 99% Occupied Bandwidth Plot on 802.11b Channel 06


Date: 26.OCT.2011 09:32:40

Mode 3 : 99% Occupied Bandwidth Plot on 802.11b Channel 11


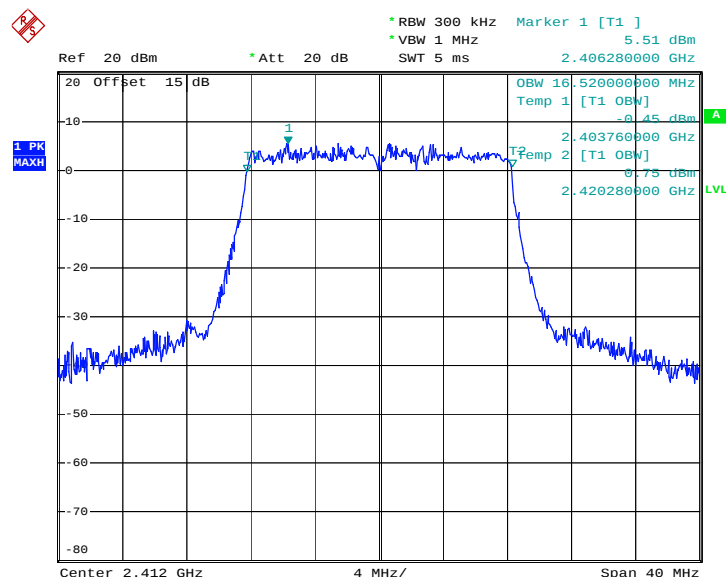
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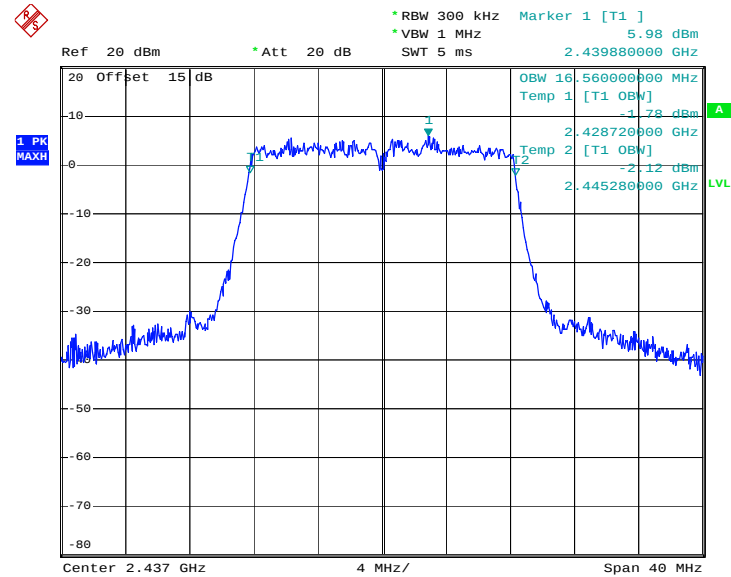
Test Mode :	Mode 4, 5, 6	Temperature :	22~23°C
Test Engineer :	Jun Liu	Relative Humidity :	43~45%

Channel	Frequency (MHz)	802.11g 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	16.52	Pass
06	2437	16.56	Pass
11	2462	16.56	Pass

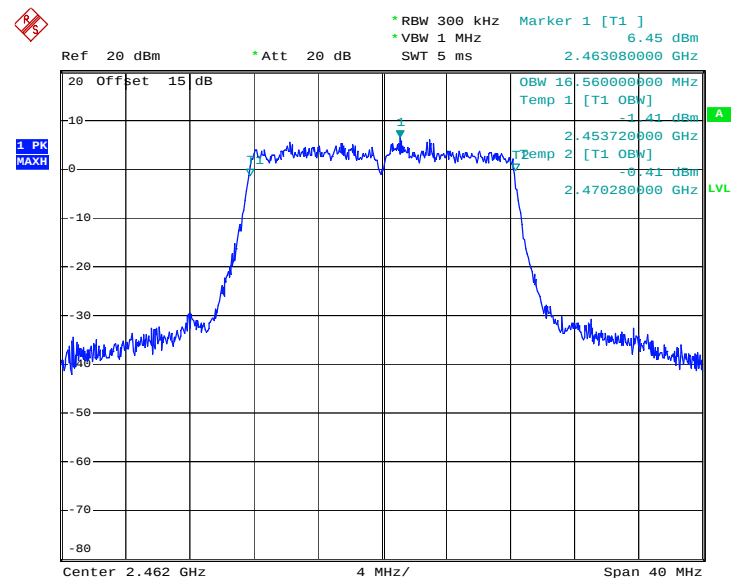
Mode 4 : 99% Occupied Bandwidth Plot on 802.11g Channel 01



Date: 26.OCT.2011 10:11:57

Mode 5 : 99% Occupied Bandwidth Plot on 802.11g Channel 06


Date: 26.OCT.2011 10:34:32

Mode 6 : 99% Occupied Bandwidth Plot on 802.11g Channel 11


Date: 26.OCT.2011 10:50:05

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.

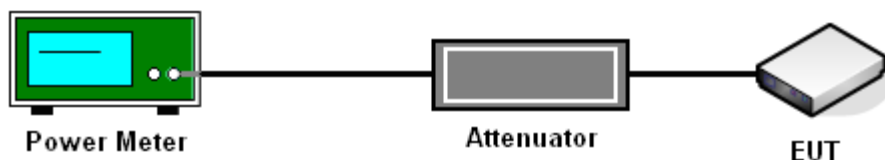
3.2.2 Measuring Instruments

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.
3. 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 :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	43~45%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.23	30	Pass
06	2437	18.24	30	Pass
11	2462	18.26	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	43~45%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	23.59	30	Pass
06	2437	23.64	30	Pass
11	2462	23.71	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

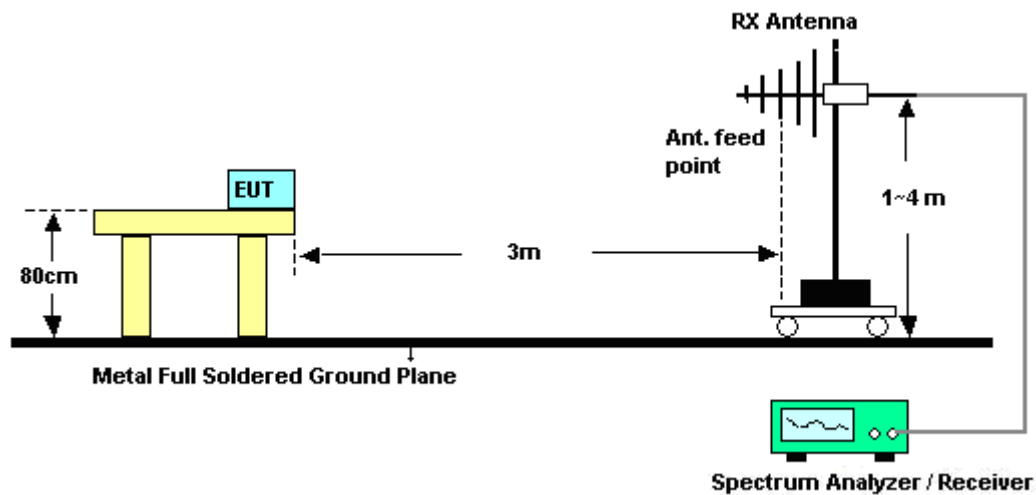
See list of measuring instruments of this test report.

3.3.3 Test Procedures

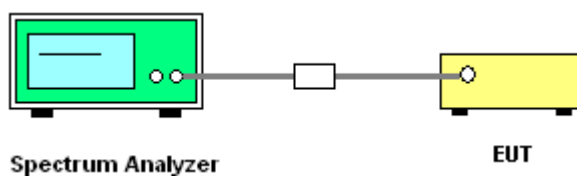
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	21~22℃
Test Band :	802.11b	Relative Humidity :	41~42%
Test Channel :	01	Test Engineer :	Jack Li

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
2390	54.3	-19.7	74	52.02	32.86	3.47	34.05	100	0	Peak
2390	42.57	-11.43	54	40.29	32.86	3.47	34.05	100	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
2390	49.95	-24.05	74	47.67	32.86	3.47	34.05	100	0	Peak
2390	37.65	-16.35	54	35.37	32.86	3.47	34.05	100	0	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Band :	802.11b	Relative Humidity :	41~42%
Test Channel :	11	Test Engineer :	Jack Li

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	51.67	-22.33	74	49.18	33.01	3.68	34.2	200	59	Peak
2483.5	40.95	-13.05	54	38.46	33.01	3.68	34.2	200	59	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	49.75	-24.25	74	47.26	33.01	3.68	34.2	100	360	Peak
2483.5	38.16	-15.84	54	35.67	33.01	3.68	34.2	100	360	Average



Test Mode :	Mode 4	Temperature :	21~22°C
Test Band :	802.11g	Relative Humidity :	41~42%
Test Channel :	01	Test Engineer :	Jack Li

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
2390	65.13	-8.87	74	62.85	32.86	3.47	34.05	100	360	Peak
2390	40.45	-13.55	54	38.17	32.86	3.47	34.05	100	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
2390	56.24	-17.76	74	53.96	32.86	3.47	34.05	122	32	Peak
2390	38.54	-15.46	54	36.26	32.86	3.47	34.05	122	32	Average

Test Mode :	Mode 6	Temperature :	21~22°C
Test Band :	802.11g	Relative Humidity :	41~42%
Test Channel :	11	Test Engineer :	Jack Li

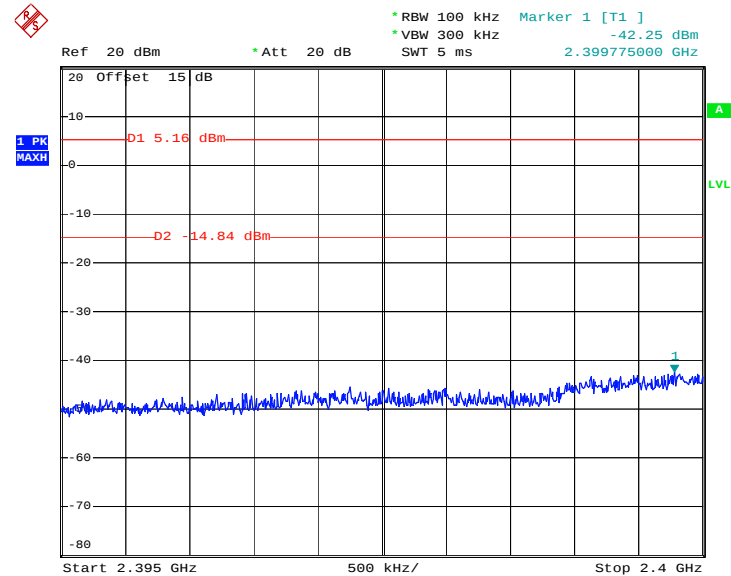
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	58.28	-15.72	74	55.79	33.01	3.68	34.2	100	0	Peak
2483.5	38.07	-15.93	54	35.58	33.01	3.68	34.2	100	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
2483.5	55.05	-18.95	74	52.56	33.01	3.68	34.2	100	0	Peak
2483.5	38.39	-15.61	54	35.9	33.01	3.68	34.2	100	0	Average

3.3.6 Test Plots of Conducted Band Edges

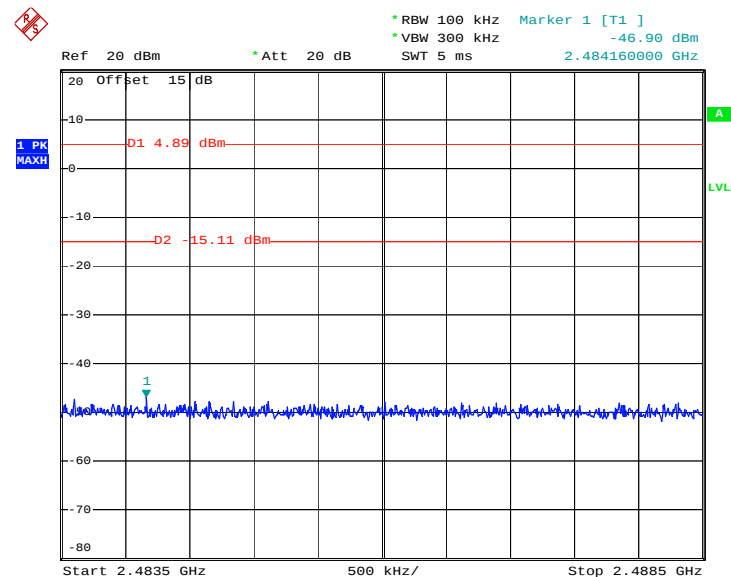
Test Mode :	Mode 1 and 3	Temperature :	22~23°C
Test Band :	802.11b	Relative Humidity :	43~45%
Test Channel :	01 and 11	Test Engineer :	Jun Liu

Low Band Edge Plot on 802.11b Channel 01



Date: 26.OCT.2011 09:09:12

High Band Edge Plot on 802.11b Channel 11

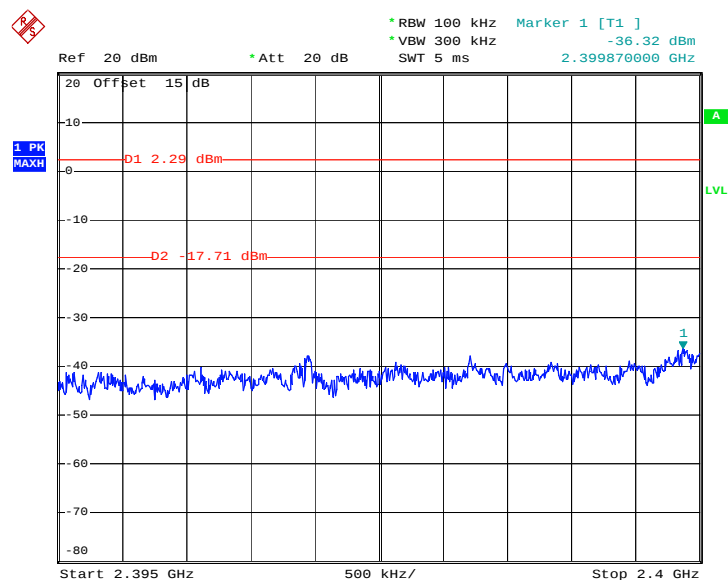


Date: 26.OCT.2011 09:50:29



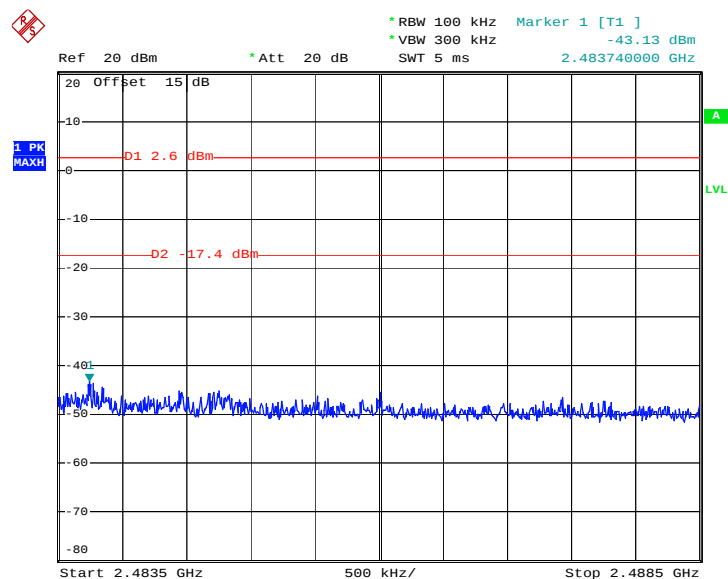
Test Mode :	Mode 4 and 6	Temperature :	22~23°C
Test Band :	802.11g	Relative Humidity :	43~45%
Test Channel :	01 and 11	Test Engineer :	Jun Liu

Low Band Edge Plot on 802.11g Channel 01



Date: 26.OCT.2011 10:08:54

High Band Edge Plot on 802.11g Channel 11



Date: 26.OCT.2011 10:49:34

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.

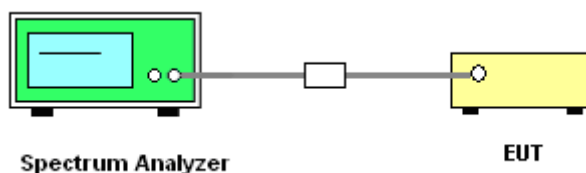
3.4.2 Measuring Instruments

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.

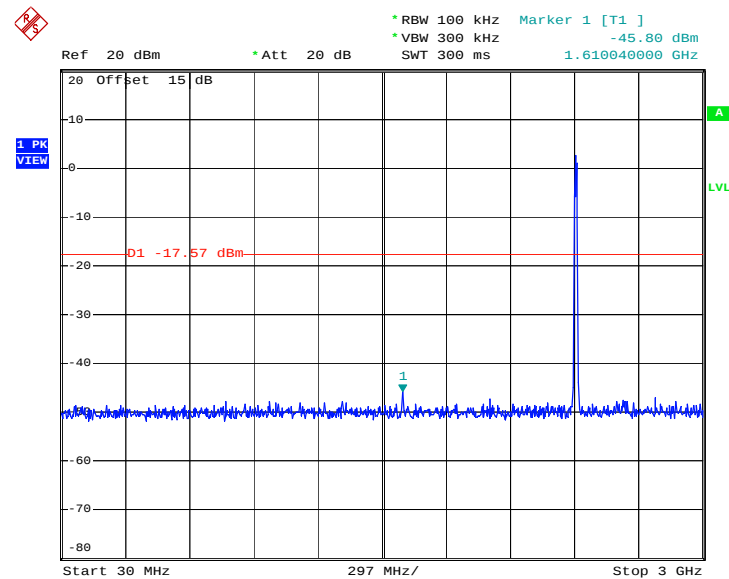
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

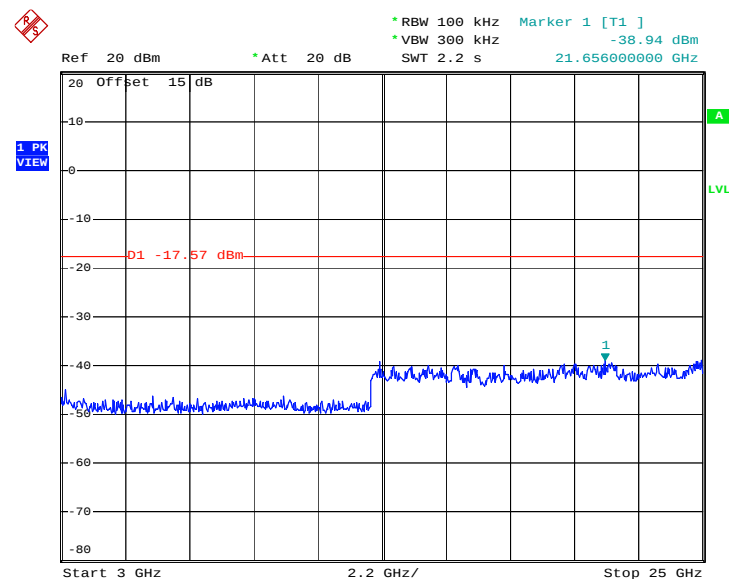
Test Mode :	Mode 1	Temperature :	22~23°C
Test Band :	802.11b	Relative Humidity :	43~45%
Test Channel :	01	Test Engineer :	Jun Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.OCT.2011 09:12:28

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

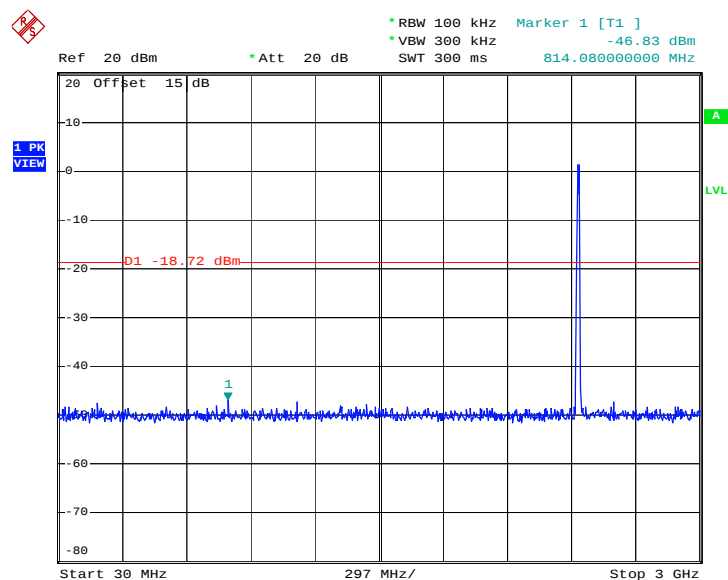


Date: 26.OCT.2011 09:12:45



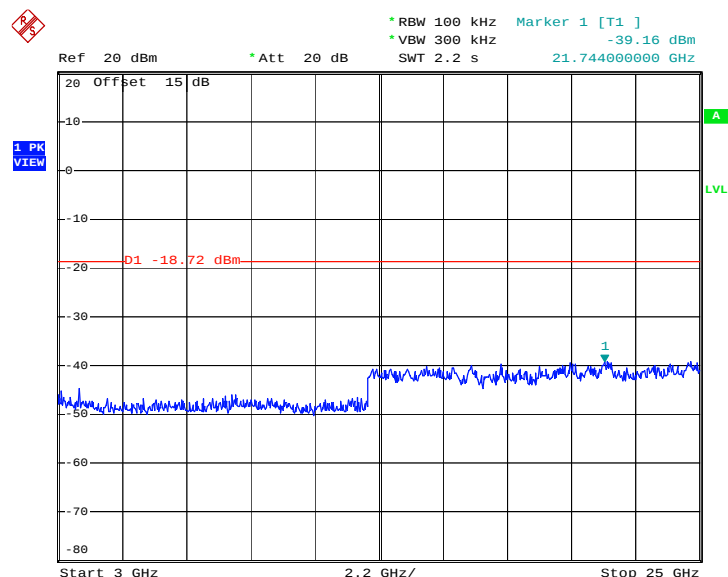
Test Mode :	Mode 2	Temperature :	22~23°C
Test Band :	802.11b	Relative Humidity :	43~45%
Test Channel :	06	Test Engineer :	Jun Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



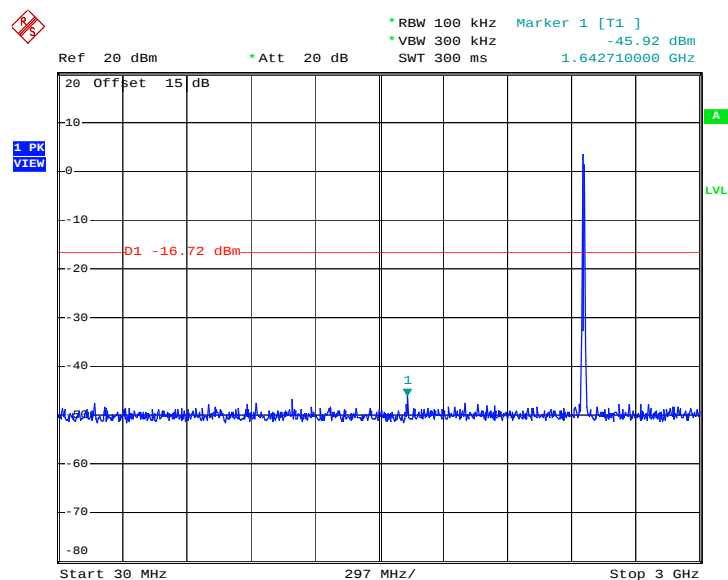
Date: 26.OCT.2011 09:33:50

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

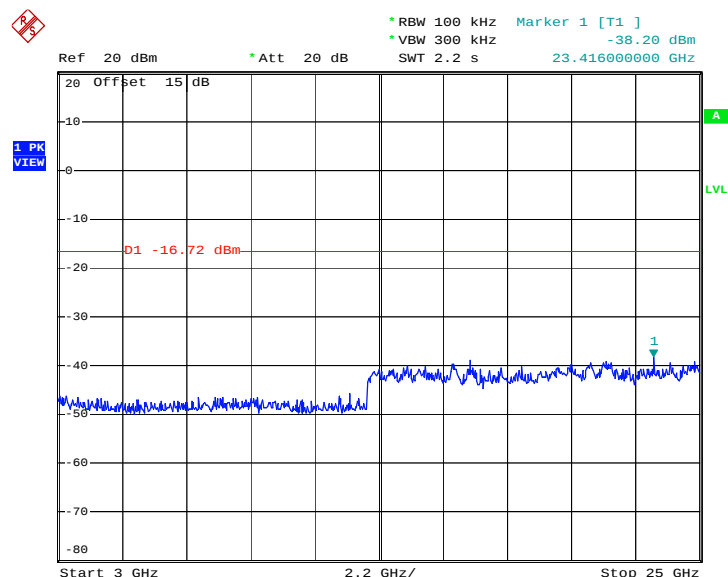


Date: 26.OCT.2011 09:34:07

Test Mode :	Mode 3	Temperature :	22~23°C
Test Band :	802.11b	Relative Humidity :	43~45%
Test Channel :	11	Test Engineer :	Jun Liu

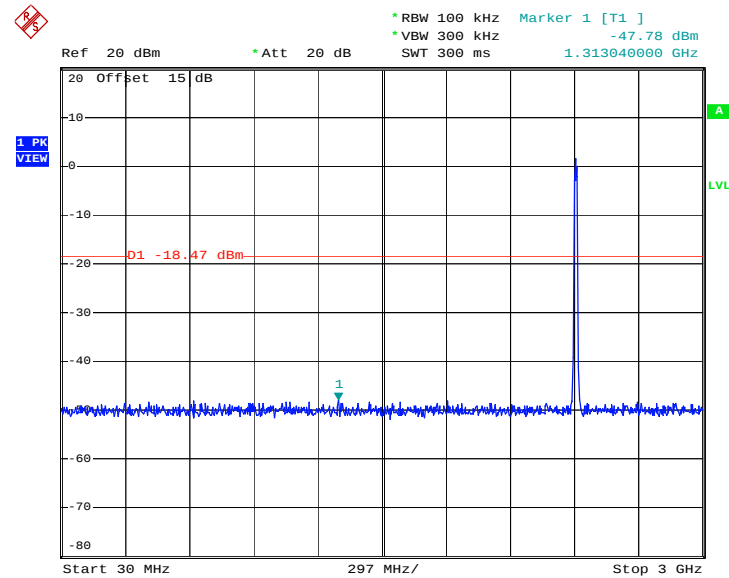
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 26.OCT.2011 09:54:46

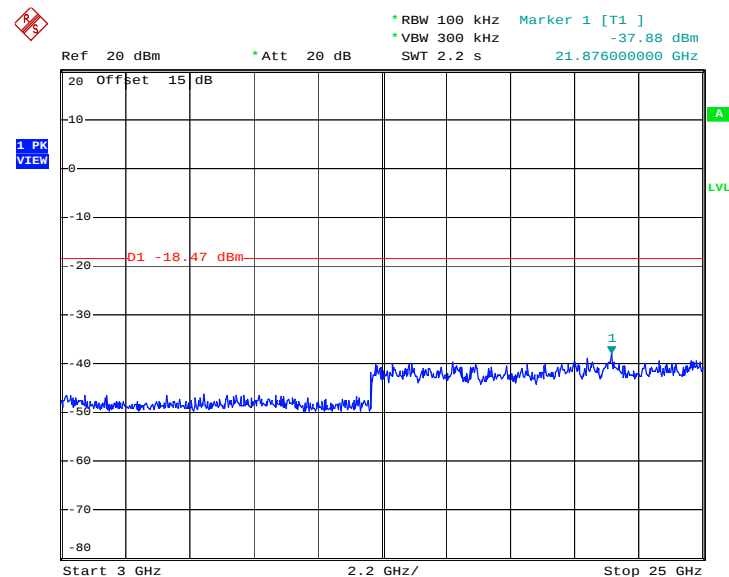
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 26.OCT.2011 09:55:03

Test Mode :	Mode 4	Temperature :	22~23°C
Test Band :	802.11g	Relative Humidity :	43~45%
Test Channel :	01	Test Engineer :	Jun Liu

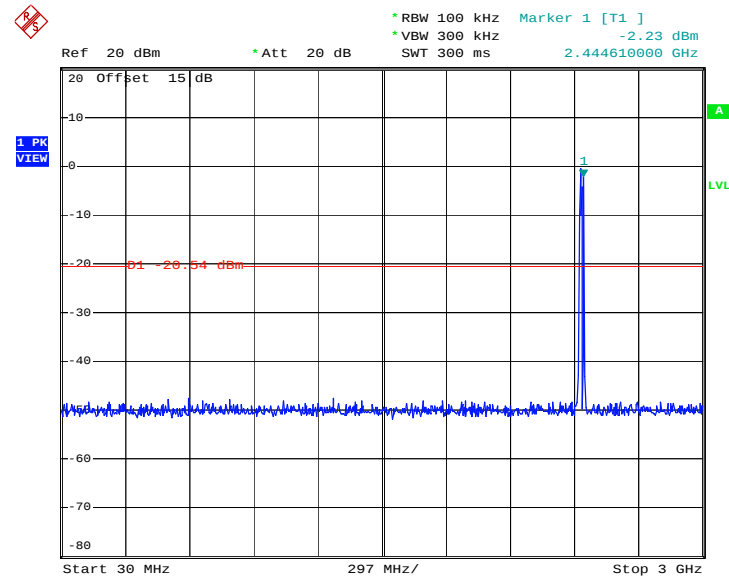
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 26.OCT.2011 10:12:41

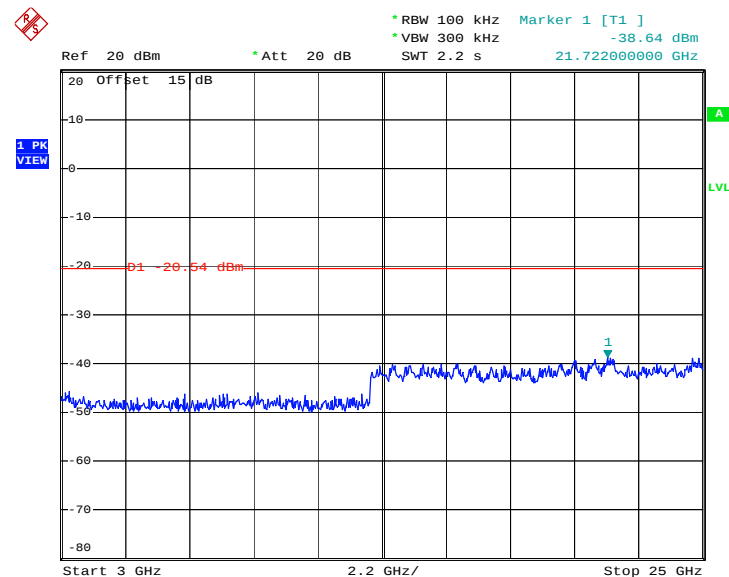
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 26.OCT.2011 10:12:58

Test Mode :	Mode 5	Temperature :	22~23°C
Test Band :	802.11g	Relative Humidity :	43~45%
Test Channel :	06	Test Engineer :	Jun Liu

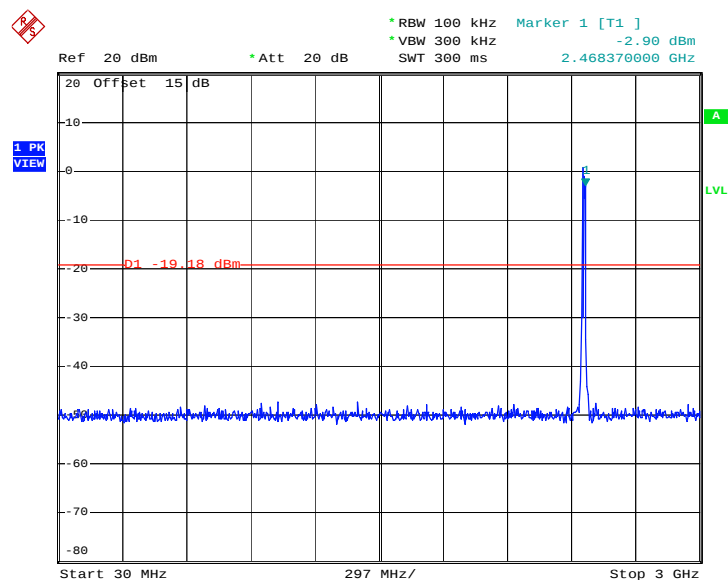
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 26.OCT.2011 10:35:35

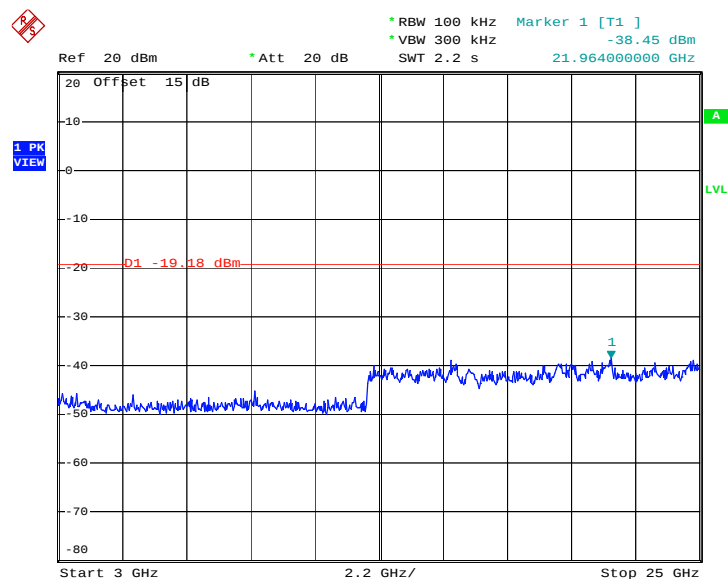
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 26.OCT.2011 10:35:52

Test Mode :	Mode 6	Temperature :	22~23°C
Test Band :	802.11g	Relative Humidity :	43~45%
Test Channel :	11	Test Engineer :	Jun Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 26.OCT.2011 10:51:05

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 26.OCT.2011 10:51:22

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.

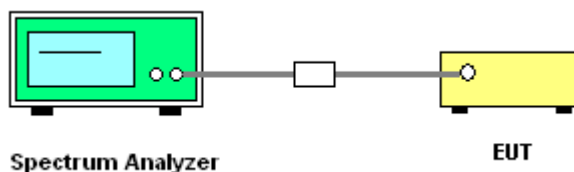
3.5.2 Measuring Instruments

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

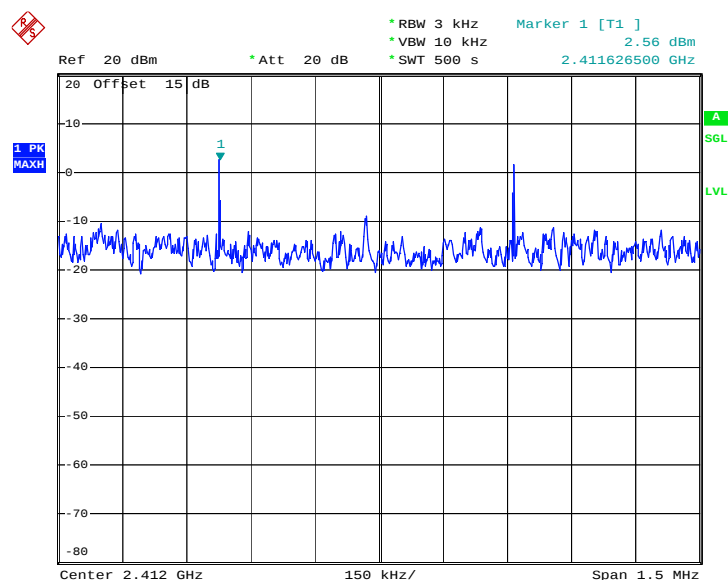


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	43~45%

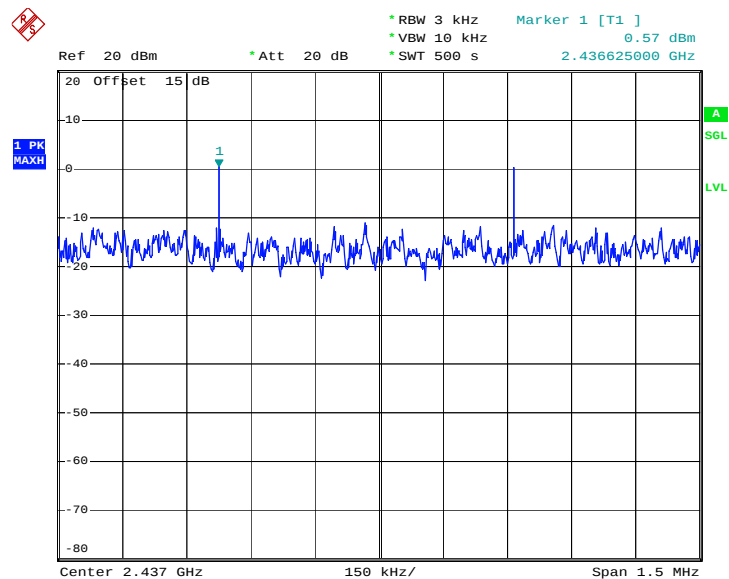
Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	2.56	8	Pass
06	2437	0.57	8	Pass
11	2462	-8.04	8	Pass

Mode 1 : PSD Plot on 802.11b Channel 01



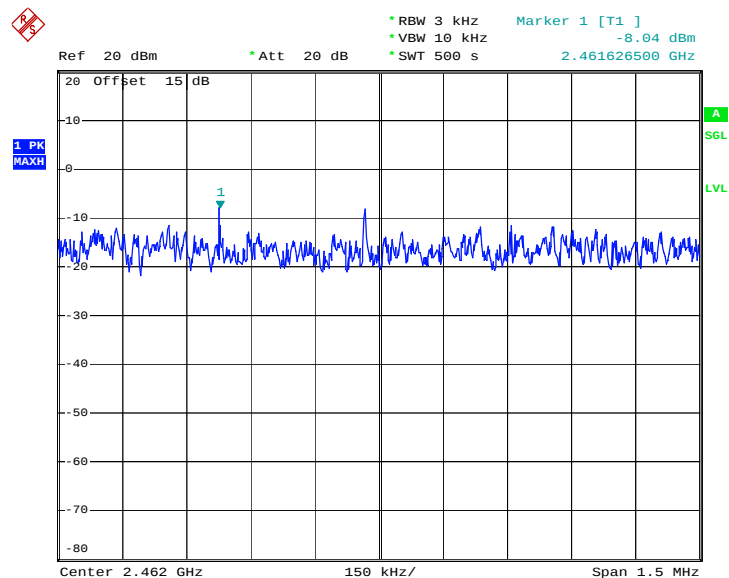
Date: 26.OCT.2011 09:27:31

Mode 2 : PSD Plot on 802.11b Channel 06



Date: 26.OCT.2011 09:44:05

Mode 3 : PSD Plot on 802.11b Channel 11



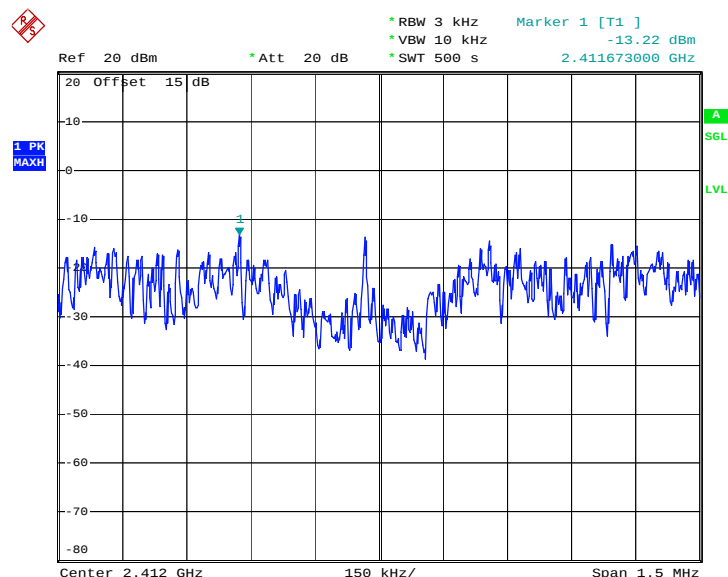
Date: 26.OCT.2011 10:03:50



Test Mode :	Mode 4, 5, 6	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	43~45%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-13.22	8	Pass
06	2437	-13.15	8	Pass
11	2462	-13.10	8	Pass

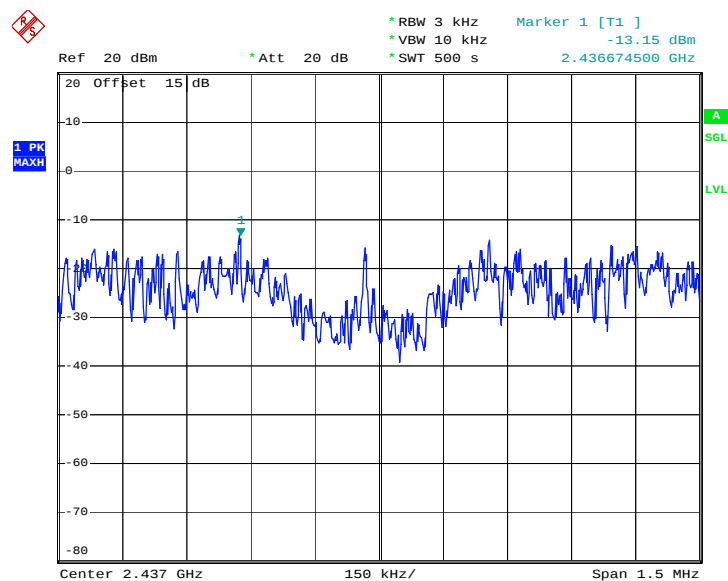
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 26.OCT.2011 10:30:40

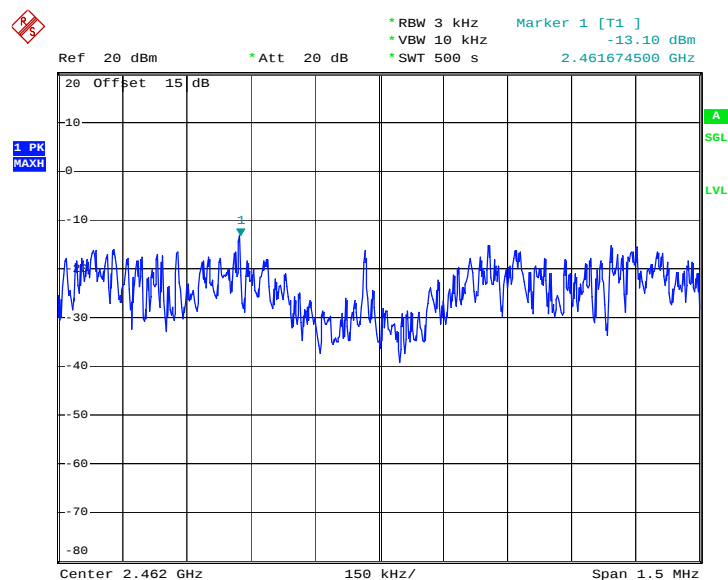


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 26.OCT.2011 10:44:35

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 26.OCT.2011 11:00:27

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.

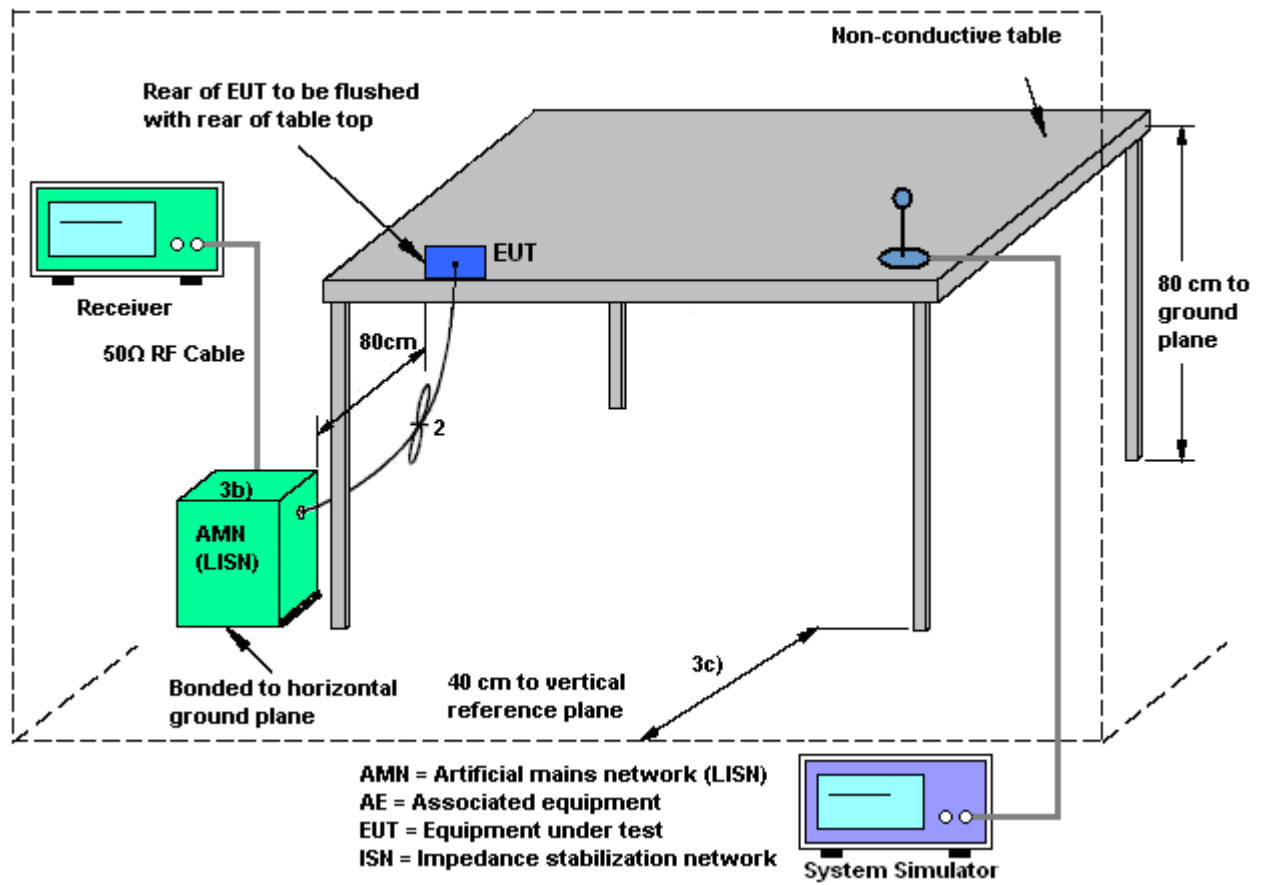
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

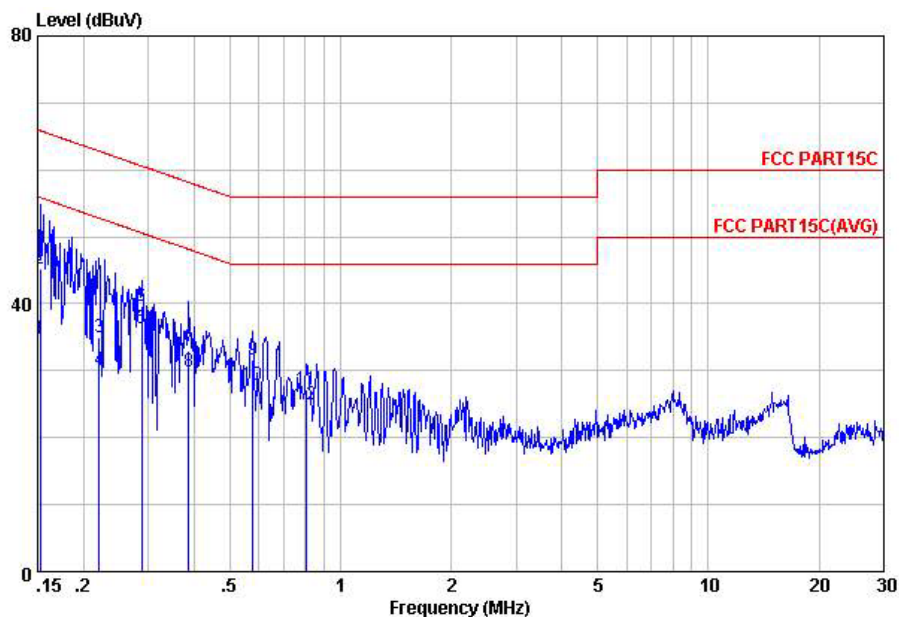
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

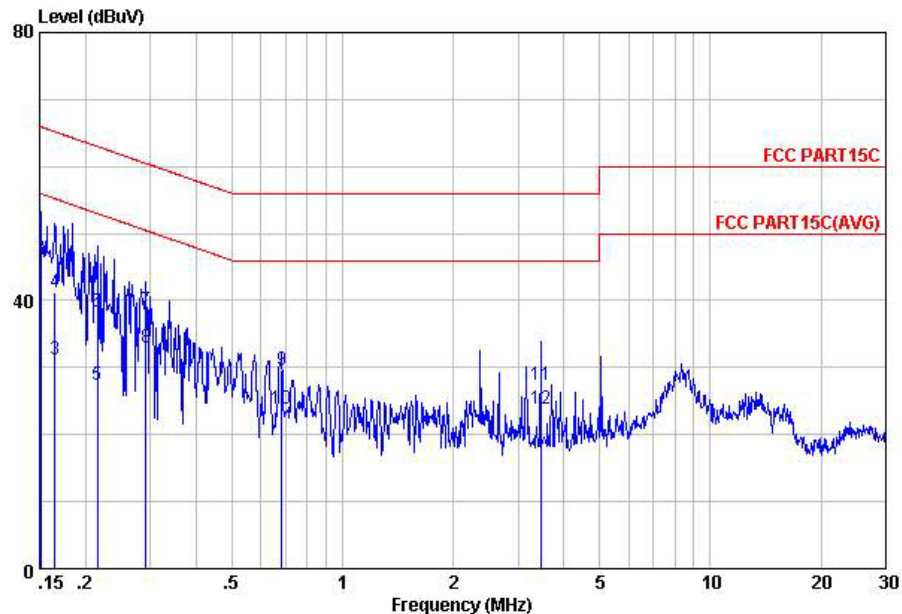
Test Mode :	Mode 1	Temperature :	21~22°C
Test Engineer :	Jack Li	Relative Humidity :	40~41%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link(2.4GHz) + Bluetooth Link + Adapter + Scanner + Cradle + TC		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
 Condition: FCC PART15C LISN-100807 LINE
 Project : (FR) 181603
 mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.15	34.67	-21.20	55.87	24.60	-0.07	10.14	Average
2	0.15	45.17	-20.70	65.87	35.10	-0.07	10.14	QP
3	0.22	34.88	-27.91	62.79	24.80	-0.07	10.15	QP
4	0.22	29.98	-22.81	52.79	19.90	-0.07	10.15	Average
5	0.29	36.39	-14.20	50.59	26.29	-0.07	10.17	Average
6	0.29	39.59	-21.00	60.59	29.49	-0.07	10.17	QP
7	0.39	33.01	-25.11	58.12	22.90	-0.08	10.19	QP
8	0.39	29.91	-18.21	48.12	19.80	-0.08	10.19	Average
9	0.58	31.63	-24.37	56.00	21.49	-0.08	10.22	QP
10	0.58	27.93	-18.07	46.00	17.79	-0.08	10.22	Average
11	0.81	27.15	-28.85	56.00	16.99	-0.09	10.25	QP
12	0.81	24.95	-21.05	46.00	14.79	-0.09	10.25	Average

Test Mode :	Mode 1	Temperature :	21~22°C
Test Engineer :	Jack Li	Relative Humidity :	40~41%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link(2.4GHz) + Bluetooth Link + Adapter + Scanner + Cradle + TC		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
 Condition: FCC PART15C LISN-100807 NEUTRAL
 Project : (FR) 181603
 mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.15	34.85	-21.11	55.96	24.80	-0.09	10.14	Average
2	0.15	46.25	-19.71	65.96	36.20	-0.09	10.14	QP
3	0.17	31.16	-24.05	55.21	21.10	-0.08	10.14	Average
4	0.17	41.26	-23.95	65.21	31.20	-0.08	10.14	QP
5	0.22	27.48	-25.53	53.01	17.40	-0.07	10.15	Average
6	0.22	38.28	-24.73	63.01	28.20	-0.07	10.15	QP
7	0.29	38.60	-21.86	60.46	28.50	-0.07	10.17	QP
8	0.29	33.00	-17.46	50.46	22.90	-0.07	10.17	Average
9	0.68	29.75	-26.25	56.00	19.60	-0.08	10.23	QP
10	0.68	23.85	-22.15	46.00	13.70	-0.08	10.23	Average
11	3.45	27.36	-28.64	56.00	17.10	-0.12	10.38	QP
12	3.45	23.86	-22.14	46.00	13.60	-0.12	10.38	Average

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

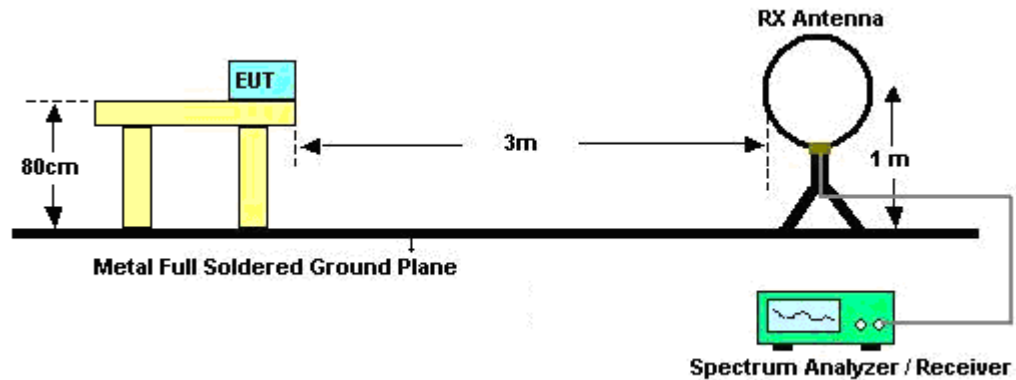
See list of measuring instruments of this test report.

3.7.3 Test Procedures

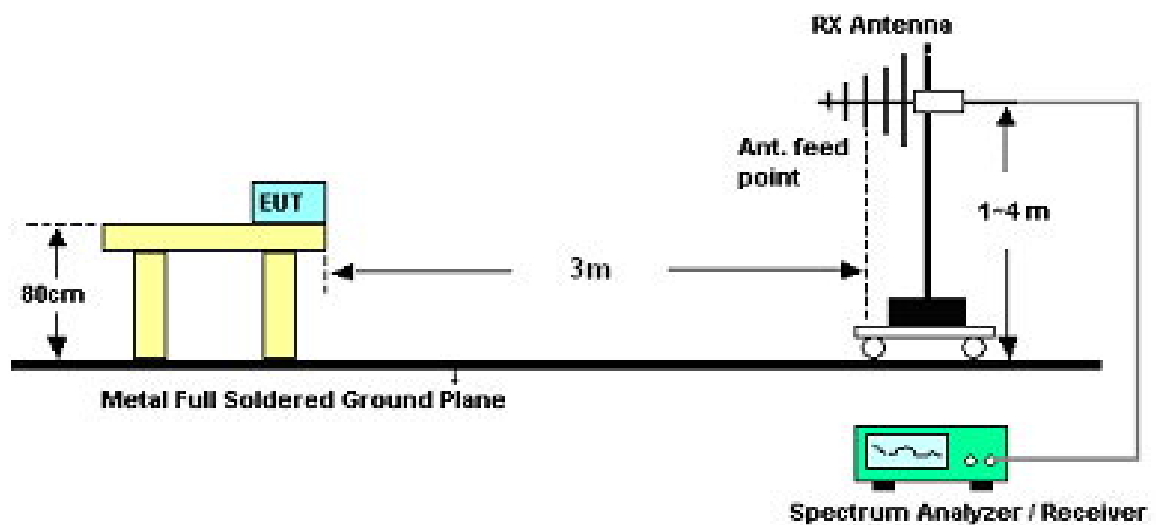
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep =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

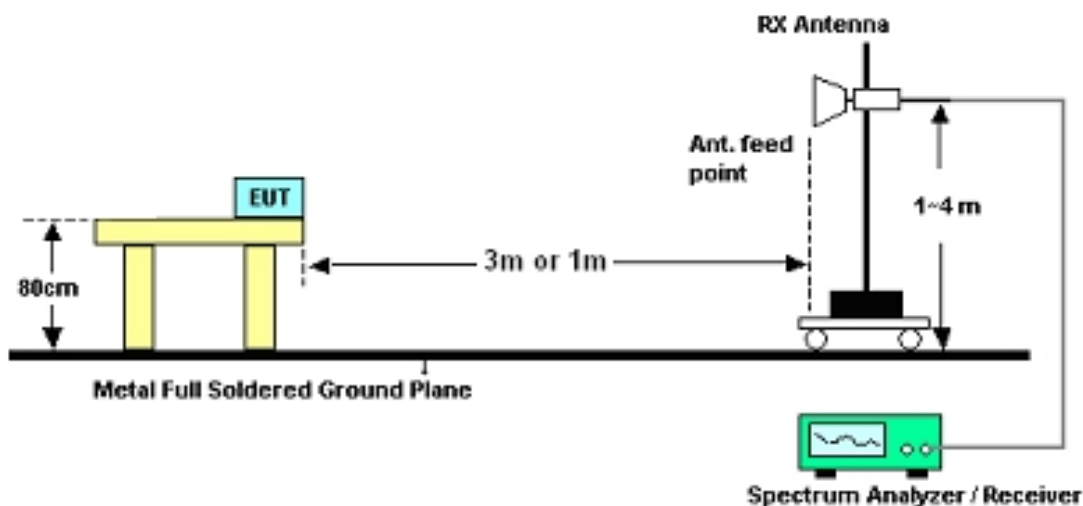
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	Jack Li	Temperature :	21~22℃	
		Relative Humidity :	41~42%	

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

Note:

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

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

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

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

Test Mode :	Mode 1	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
35.94	30.75	-9.25	40	45.95	14.65	0.23	30.08	100	103	Peak
250.05	26.56	-19.44	46	43.73	12	0.67	29.84	-	-	Peak
286.23	26.8	-19.2	46	43.26	12.78	0.71	29.95	-	-	Peak
519.8	31.74	-14.26	46	42.81	17.67	0.97	29.71	-	-	Peak
806.1	32.13	-13.87	46	40.57	19.91	1.25	29.6	-	-	Peak
942.6	31.85	-22.15	54	39.35	20.7	1.33	29.53	-	-	Peak
2390	54.3	-19.7	74	52.02	32.86	3.47	34.05	100	0	Peak
2390	42.57	-11.43	54	40.29	32.86	3.47	34.05	100	0	Average
2412	109.64	-	-	107.31	32.89	3.52	34.08	100	360	Peak
2412	98.49	-	-	96.16	32.89	3.52	34.08	100	360	Average
2483.5	49.94	-24.06	74	47.45	33.01	3.68	34.2	100	0	Peak
2483.5	35.63	-18.37	54	33.14	33.01	3.68	34.2	100	0	Average
4826	55.65	-18.35	74	47.78	35.17	4.97	32.27	100	0	Peak
4826	42.76	-11.24	54	34.89	35.17	4.97	32.27	100	0	Average

Test Mode :	Mode 1	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	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
32.16	34.4	-5.6	40	47.7	16.55	0.24	30.09	100	122	Peak
53.76	27.11	-12.89	40	50.15	6.8	0.29	30.13	-	-	Peak
250.05	27.75	-18.25	46	44.92	12	0.67	29.84	-	-	Peak
858.6	34.36	-11.64	46	42.22	20.5	1.28	29.64	-	-	Peak
936.3	36.55	-9.45	46	44.09	20.67	1.32	29.53	-	-	Peak
962.2	36.27	-17.73	54	43.66	20.8	1.35	29.54	-	-	Peak
2390	49.95	-24.05	74	47.67	32.86	3.47	34.05	100	0	Peak
2390	37.65	-16.35	54	35.37	32.86	3.47	34.05	100	0	Average
2412	104.81	-	-	102.48	32.89	3.52	34.08	122	241	Peak
2412	95.27	-	-	92.94	32.89	3.52	34.08	122	241	Average
2483.5	49.28	-24.72	74	46.79	33.01	3.68	34.2	100	0	Peak
2483.5	35.96	-18.04	54	33.47	33.01	3.68	34.2	100	0	Average

Test Mode :	Mode 2	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	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
32.16	32.66	-7.34	40	45.96	16.55	0.24	30.09	100	118	Peak
250.05	26.41	-19.59	46	43.58	12	0.67	29.84	-	-	Peak
263.82	27.34	-18.66	46	44.3	12.23	0.68	29.87	-	-	Peak
806.1	28.9	-17.1	46	37.34	19.91	1.25	29.6	-	-	Peak
936.3	30.87	-15.13	46	38.41	20.67	1.32	29.53	-	-	Peak
962.2	31.06	-22.94	54	38.45	20.8	1.35	29.54	-	-	Peak
2390	52.8	-21.2	74	50.52	32.86	3.47	34.05	100	0	Peak
2390	41.51	-12.49	54	39.23	32.86	3.47	34.05	100	0	Average
2437	106.95	-	-	104.55	32.95	3.6	34.15	119	360	Peak
2437	96.17	-	-	93.77	32.95	3.6	34.15	119	360	Average
2483.5	49.43	-24.57	74	46.94	33.01	3.68	34.2	100	0	Peak
2483.5	36.5	-17.5	54	34.01	33.01	3.68	34.2	100	0	Average
4876	55.12	-18.88	74	47.23	35.18	4.98	32.27	124	49	Peak
4876	41.79	-12.21	54	33.9	35.18	4.98	32.27	124	49	Average

Test Mode :	Mode 2	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.43	34.45	-5.55	40	48.26	16.04	0.24	30.09	100	118	Peak
55.65	26.64	-13.36	40	50.28	6.2	0.29	30.13	-	-	Peak
250.05	27.66	-18.34	46	44.83	12	0.67	29.84	-	-	Peak
858.6	33.96	-12.04	46	41.82	20.5	1.28	29.64	-	-	Peak
962.2	36.25	-17.75	54	43.64	20.8	1.35	29.54	-	-	Peak
988.1	35.1	-18.9	54	42.19	21.03	1.4	29.52	-	-	Peak
2390	48.65	-25.35	74	46.37	32.86	3.47	34.05	100	0	Peak
2390	36.26	-17.74	54	33.98	32.86	3.47	34.05	100	0	Average
2437	105.19	-	-	102.79	32.95	3.6	34.15	153	336	Peak
2437	93.6	-	-	91.2	32.95	3.6	34.15	153	336	Average
2483.5	49.36	-24.64	74	46.87	33.01	3.68	34.2	100	0	Peak
2483.5	36.69	-17.31	54	34.2	33.01	3.68	34.2	100	0	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Jack Li	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
35.94	33.46	-6.54	40	48.66	14.65	0.23	30.08	100	332	Peak
39.45	28.95	-11.05	40	46.42	12.3	0.25	30.02	-	-	Peak
250.32	26.28	-19.72	46	43.45	12	0.67	29.84	-	-	Peak
598.2	28.61	-17.39	46	38.56	18.6	1.07	29.62	-	-	Peak
806.1	29.11	-16.89	46	37.55	19.91	1.25	29.6	-	-	Peak
942.6	31.03	-22.97	54	38.53	20.7	1.33	29.53	-	-	Peak
2390	52.33	-21.67	74	50.05	32.86	3.47	34.05	100	0	Peak
2390	38.34	-15.66	54	36.06	32.86	3.47	34.05	100	0	Average
2462	108.55	-	-	106.1	32.98	3.64	34.17	116	360	Peak
2462	96.38	-	-	93.93	32.98	3.64	34.17	116	360	Average
2483.5	51.67	-22.33	74	49.18	33.01	3.68	34.2	200	59	Peak
2483.5	40.95	-13.05	54	38.46	33.01	3.68	34.2	200	59	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Jack Li	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
32.43	33.42	-6.58	40	47.23	16.04	0.24	30.09	126	225	Peak
217.11	34.28	-11.72	46	53.76	9.89	0.61	29.98	-	-	Peak
271.38	34.97	-11.03	46	51.78	12.41	0.69	29.91	-	-	Peak
832.7	33.56	-12.44	46	41.61	20.32	1.27	29.64	-	-	Peak
858.6	35.19	-10.81	46	43.05	20.5	1.28	29.64	-	-	Peak
936.3	33.28	-12.72	46	40.82	20.67	1.32	29.53	-	-	Peak
2390	49.04	-24.96	74	46.76	32.86	3.47	34.05	100	0	Peak
2390	36.18	-17.82	54	33.9	32.86	3.47	34.05	100	0	Average
2462	105.26	-	-	102.81	32.98	3.64	34.17	100	360	Peak
2462	93.63	-	-	91.18	32.98	3.64	34.17	100	360	Average
2483.5	49.75	-24.25	74	47.26	33.01	3.68	34.2	100	360	Peak
2483.5	38.16	-15.84	54	35.67	33.01	3.68	34.2	100	360	Average

Test Mode :	Mode 4	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
168.24	26.08	-17.42	43.5	46.21	9.24	0.54	29.91	-	-	Peak
234.12	28.02	-17.98	46	46.06	11.17	0.65	29.86	-	-	Peak
248.97	29.61	-16.39	46	46.82	11.96	0.67	29.84	-	-	Peak
754.3	34.35	-11.65	46	42.81	19.9	1.18	29.54	-	-	Peak
836.9	37.96	-8.04	46	45.97	20.37	1.27	29.65	100	223	Peak
936.3	31.86	-14.14	46	39.4	20.67	1.32	29.53	-	-	Peak
2390	65.13	-8.87	74	62.85	32.86	3.47	34.05	100	360	Peak
2390	40.45	-13.55	54	38.17	32.86	3.47	34.05	100	360	Average
2412	109.85	-	-	107.52	32.89	3.52	34.08	100	0	Peak
2412	55.91	-	-	53.58	32.89	3.52	34.08	100	0	Average
2483.5	49.08	-24.92	74	46.59	33.01	3.68	34.2	100	0	Peak
2483.5	35.99	-18.01	54	33.5	33.01	3.68	34.2	100	0	Average

Test Mode :	Mode 4	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	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
143.94	31.1	-12.4	43.5	50.04	10.55	0.5	29.99	-	-	Peak
250.05	28.56	-17.44	46	45.73	12	0.67	29.84	-	-	Peak
263.82	30.34	-15.66	46	47.3	12.23	0.68	29.87	-	-	Peak
754.3	34.33	-11.67	46	42.79	19.9	1.18	29.54	-	-	Peak
836.9	38.94	-7.06	46	46.95	20.37	1.27	29.65	100	220	Peak
884.5	34.84	-11.16	46	42.61	20.47	1.29	29.53	-	-	Peak
2390	56.24	-17.76	74	53.96	32.86	3.47	34.05	122	32	Peak
2390	38.54	-15.46	54	36.26	32.86	3.47	34.05	122	32	Average
2412	102.61	-	-	100.28	32.89	3.52	34.08	130	291	Peak
2412	54.29	-	-	51.96	32.89	3.52	34.08	130	291	Average
2483.5	48.47	-25.53	74	45.98	33.01	3.68	34.2	100	0	Peak
2483.5	34.51	-19.49	54	32.02	33.01	3.68	34.2	100	0	Average

Test Mode :	Mode 5	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	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
234.12	27.85	-18.15	46	45.89	11.17	0.65	29.86	-	-	Peak
250.05	28.59	-17.41	46	45.76	12	0.67	29.84	-	-	Peak
278.67	28.81	-17.19	46	45.44	12.61	0.7	29.94	-	-	Peak
598.2	30.91	-15.09	46	40.86	18.6	1.07	29.62	-	-	Peak
754.3	34.28	-11.72	46	42.74	19.9	1.18	29.54	-	-	Peak
825.7	38.23	-7.77	46	46.41	20.18	1.26	29.62	200	228	Peak
2390	52.22	-21.78	74	49.94	32.86	3.47	34.05	100	0	Peak
2390	37.18	-16.82	54	34.9	32.86	3.47	34.05	100	0	Average
2437	106.21	-	-	103.81	32.95	3.6	34.15	100	0	Peak
2437	58.65	-	-	56.25	32.95	3.6	34.15	100	0	Average
2483.5	49.38	-24.62	74	46.89	33.01	3.68	34.2	100	0	Peak
2483.5	36.05	-17.95	54	33.56	33.01	3.68	34.2	100	0	Average

Test Mode :	Mode 5	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	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
54.03	31	-9	40	54.35	6.49	0.29	30.13	-	-	Peak
155.82	27.96	-15.54	43.5	47.63	9.76	0.52	29.95	-	-	Peak
263.82	29.06	-16.94	46	46.02	12.23	0.68	29.87	-	-	Peak
754.3	33.97	-12.03	46	42.43	19.9	1.18	29.54	-	-	Peak
825	38.84	-7.16	46	47.02	20.18	1.26	29.62	100	118	Peak
910.4	34.72	-11.28	46	42.4	20.5	1.31	29.49	-	-	Peak
2390	48.21	-25.79	74	45.93	32.86	3.47	34.05	100	0	Peak
2390	36.26	-17.74	54	33.98	32.86	3.47	34.05	100	0	Average
2437	103.09	-	-	100.69	32.95	3.6	34.15	100	0	Peak
2437	54.58	-	-	52.18	32.95	3.6	34.15	100	0	Average
2483.5	48.97	-25.03	74	46.48	33.01	3.68	34.2	100	0	Peak
2483.5	35.65	-18.35	54	33.16	33.01	3.68	34.2	100	0	Average

Test Mode :	Mode 6	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Jack Li	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
234.12	27.98	-18.02	46	46.02	11.17	0.65	29.86	-	-	Peak
250.05	27.8	-18.2	46	44.97	12	0.67	29.84	-	-	Peak
278.67	28.04	-17.96	46	44.67	12.61	0.7	29.94	-	-	Peak
754.3	34.74	-11.26	46	43.2	19.9	1.18	29.54	-	-	Peak
848.1	35.75	-10.25	46	43.64	20.49	1.28	29.66	100	113	Peak
944	32.57	-21.43	54	40.06	20.71	1.33	29.53	-	-	Peak
2390	52.5	-21.5	74	50.22	32.86	3.47	34.05	100	0	Peak
2390	36.4	-17.6	54	34.12	32.86	3.47	34.05	100	0	Average
2462	105.44	-	-	102.99	32.98	3.64	34.17	100	0	Peak
2462	53.01	-	-	50.56	32.98	3.64	34.17	100	0	Average
2483.5	58.28	-15.72	74	55.79	33.01	3.68	34.2	100	0	Peak
2483.5	38.07	-15.93	54	35.58	33.01	3.68	34.2	100	0	Average

Test Mode :	Mode 6	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Jack Li	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
54.03	32.75	-7.25	40	56.1	6.49	0.29	30.13	-	-	Peak
250.05	29.23	-16.77	46	46.4	12	0.67	29.84	-	-	Peak
263.82	30.12	-15.88	46	47.08	12.23	0.68	29.87	-	-	Peak
754.3	33.87	-12.13	46	42.33	19.9	1.18	29.54	-	-	Peak
825.7	39.59	-6.41	46	47.77	20.18	1.26	29.62	110	22	Peak
910.4	34.59	-11.41	46	42.27	20.5	1.31	29.49	-	-	Peak
2390	48.8	-25.2	74	46.52	32.86	3.47	34.05	100	0	Peak
2390	35.68	-18.32	54	33.4	32.86	3.47	34.05	100	0	Average
2462	104.11	-	-	101.66	32.98	3.64	34.17	100	0	Peak
2462	53.73	-	-	51.28	32.98	3.64	34.17	100	0	Average
2483.5	55.05	-18.95	74	52.56	33.01	3.68	34.2	100	0	Peak
2483.5	38.39	-15.61	54	35.9	33.01	3.68	34.2	100	0	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 Chip 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	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Jan. 06, 2012	Conducted (TH01-KS)
DC Power Supply	TOPWARD	GPS-3030 D	E1884515	N/A	Aug. 23, 2011	Aug. 22, 2012	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	N/A	Jan. 17, 2011	Jan. 16, 2012	Conducted (TH01-KS)
EMI Receiver	R&S	ESC17	100768	9kHz~7GHz	Jun. 02, 2011	Jun. 01, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Jan. 07, 2011	Jan. 06, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Jan. 07, 2011	Jan. 06, 2012	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	N/A	Nov. 10, 2010	Nov. 09, 2011	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 16, 2010	Nov. 15, 2011	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/00	9 kHz~30 MHz	Jul. 28, 2011	Jul. 27, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2010	Dec. 06, 2011	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 09, 2010	Dec. 08, 2011	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 09, 2010	Nov. 08, 2011	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Oct. 11, 2011	Oct.10, 2012	Radiation (03CH01-KS)

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 EP181603 as below.