

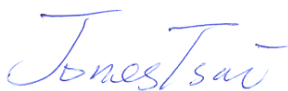
FCC RF Test Report

APPLICANT : Brightstar Corporation
EQUIPMENT : Mobile phone
BRAND NAME : Avvio
MODEL NAME : Avvio 560S
FCC ID : WVBA560S
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Feb. 28, 2012 and completely tested on Mar. 16, 2012. 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.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR222801B	Rev. 01	Initial issue of report	Mar. 23, 2012

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.37 dB at 0.18 MHz
3.7	15.247(d)	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.95 dB at 2390 MHz
3.8	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Brightstar Corporation

9725 NW 117th Ave., Miami, Florida, United States

1.2 Manufacturer

Skycom Telecommunications Co Limited

Room 604, East Block, Shengtang Building, Futian District, Shenzhen, China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile phone
Brand Name	Avvio
Model Name	Avvio 560S
FCC ID	WVBA560S
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 : 13.89 dBm (0.024 W) 802.11g : 15.98 dBm (0.040 W)
Antenna Type	PIFA Antenna with gain 1.00 dBi
HW Version	X228 V2.3
SW Version	X228_7E_MEU_V17
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

Remark:

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

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	No. 101, Complex Building C, Guanglong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755-8637-9589 FAX: +86-755-8637-9595
Test Site No.	Sporton Site No. : CO01-SZ

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.		FCC/IC Registration No.
	TH01-KS	03CH01-KS	149928/4086E-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

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 (Certification), 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	GPS-30300	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	Agilent	E5515C	N/A	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	P08S	QDS-BRCM1030	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-108	N/A	N/A	N/A
5.	Router	D-Link	DIR-615	N/A	N/A	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	13.89	13.86	13.84	13.85
CH 06	2437 MHz	13.61	13.59	13.57	13.55
CH 11	2462 MHz	13.38	13.33	13.29	13.31

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	15.98	15.95	15.93	15.89	15.88	15.87	15.85	15.86
CH 06	2437 MHz	15.84	15.78	15.76	15.75	15.73	15.74	15.71	15.77
CH 11	2462 MHz	15.68	15.65	15.63	15.62	15.57	15.56	15.59	15.61

Remark:

1. 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.
2. The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

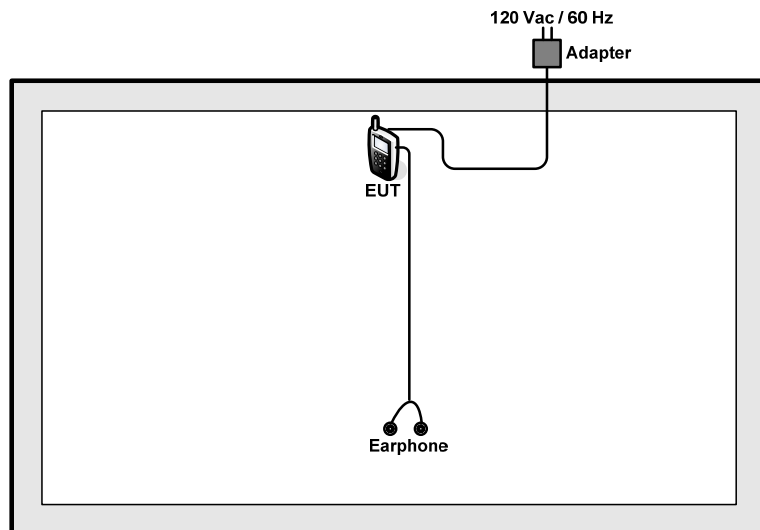
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases (E2 plane) and recorded in this report.

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

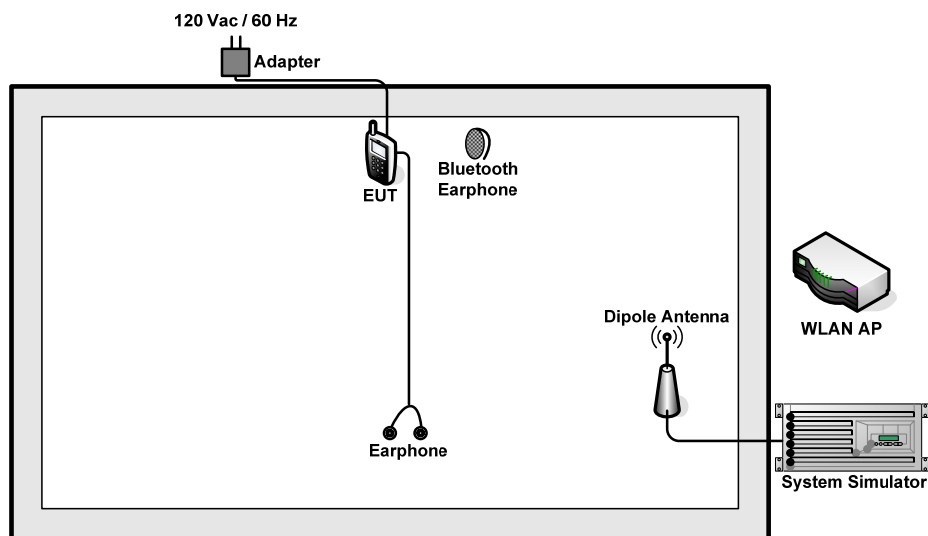
Test Cases		
Test Item	802.11b	802.11g
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g 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 : GSM 850 Idle + Bluetooth Link + WLAN Link + Adapter + Earphone	

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

The programmed RF utility, “* #4224876 #” 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 Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

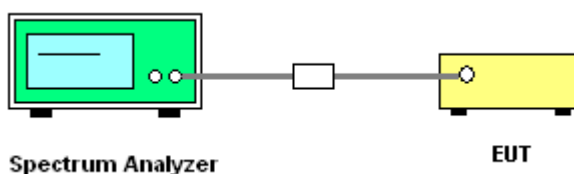
3.1.2 Measuring Instruments

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

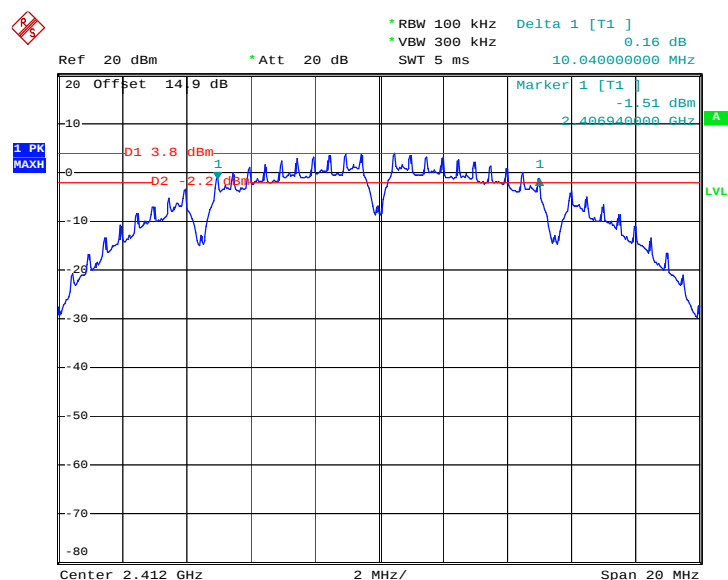


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	23~24℃
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

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

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



Date : 6.MAR.2012 13:13:30



Ref 20 dBm * Att 20 dB Delta 1 [T1] -0.45 dB
 * RBW 100 kHz * VBW 300 kHz 10.04000000 MHz
 SWT 5 ms

20 Offset 14 9 dB Marker 1 [T1] -1.71 dBm
 2.431940000 GHz

1 PK MAX

D1 3.24 dBm D2 -2.75 dBm

Center 2.437 GHz 2 MHz/ Span 20 MHz

Date: 6.MAR.2012 13:31:32

* RBW 100 kHz
 * VBW 300 kHz
 * Att 20 dB
 Delta 1 [T1]
 -0.24 dB
 10.04000000 MHz
 20 Offset 14.9 dB
 Ref 20 dBm
 SWT 5 ms
 Marker 1 [T1]
 -2.04 dBm
 2.456940000 GHz
 1 PK
 MAXH
 D1 3.06 dBm
 D2 -2.94 dBm
 LVL
 Center 2.462 GHz
 2 MHz/
 Span 20 MHz

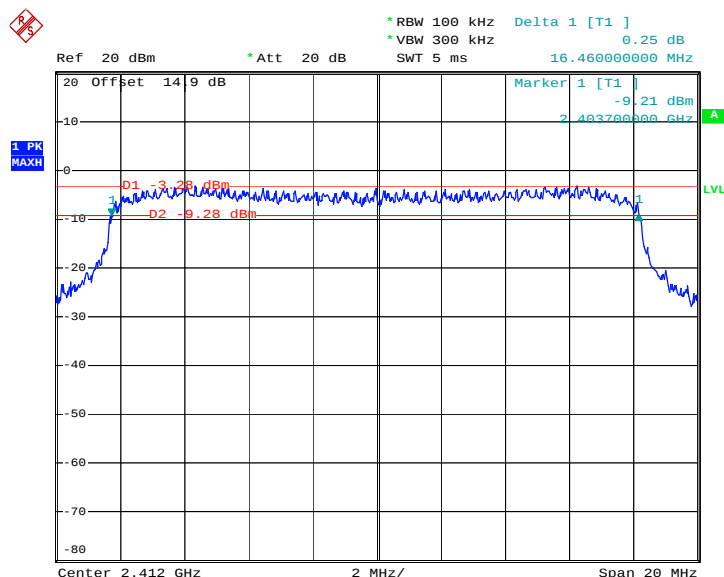
Date: 6.MAR.2012 13:46:50



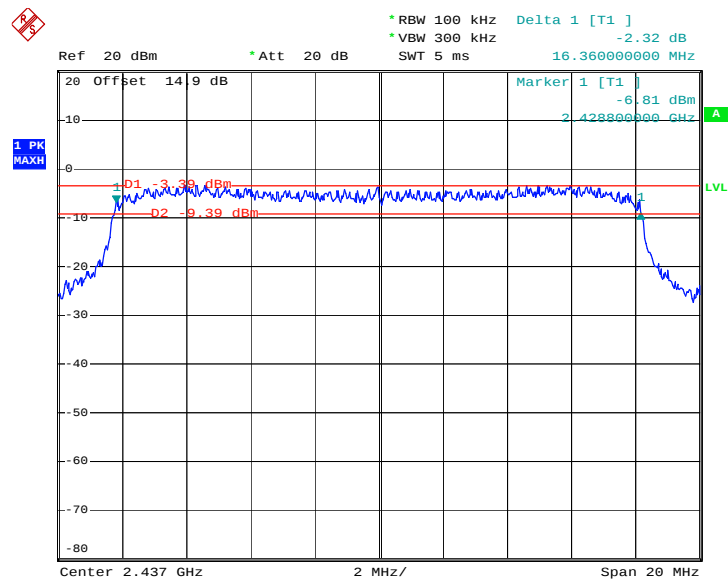
Test Mode :	Mode 4, 5, 6	Temperature :	23~24°C
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.46	0.5	Pass
06	2437	16.36	0.5	Pass
11	2462	16.36	0.5	Pass

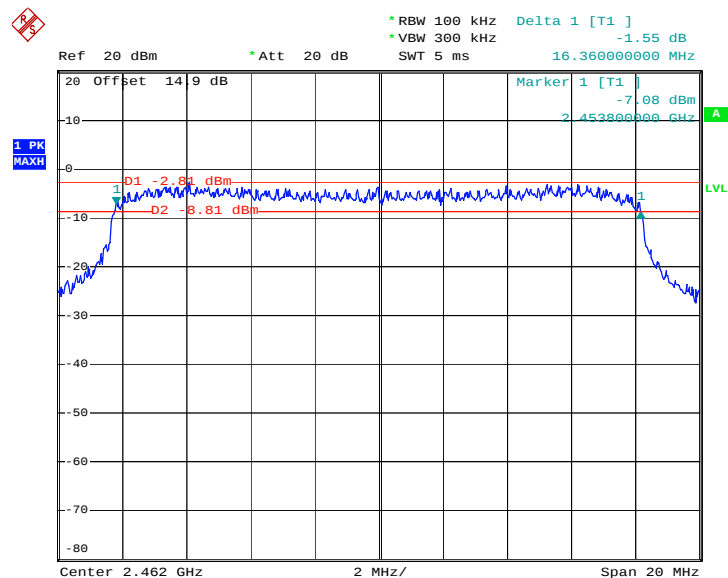
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 6.MAR.2012 14:05:33

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


Date: 6.MAR.2012 14:21:50

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


Date: 6.MAR.2012 14:34:03

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.

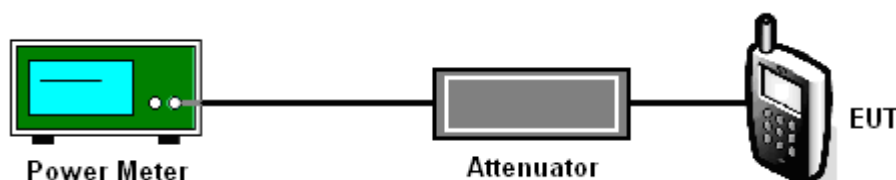
3.2.2 Measuring Instruments

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 :	23~24℃
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	13.89	30	Pass
06	2437	13.61	30	Pass
11	2462	13.38	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	23~24℃
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	15.98	30	Pass
06	2437	15.84	30	Pass
11	2462	15.68	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

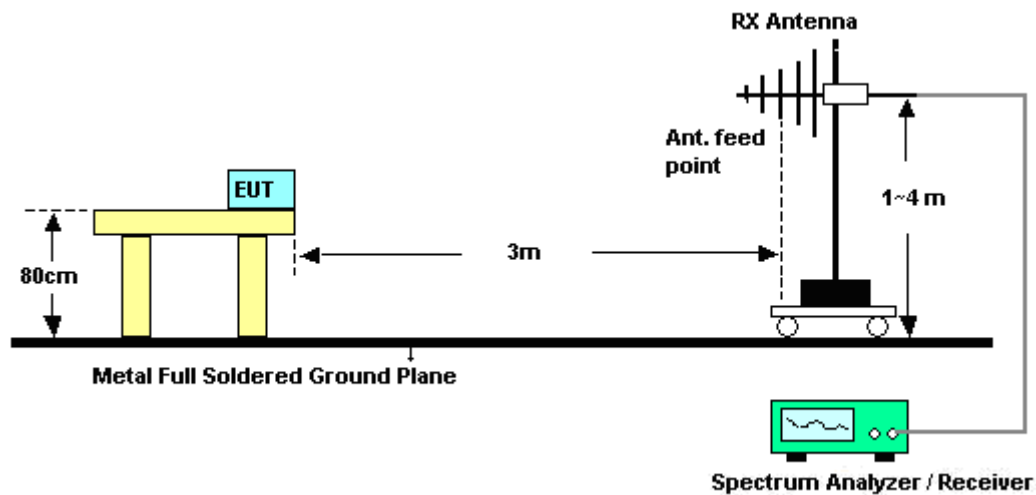
See list of measuring instruments of this test report.

3.3.3 Test Procedures

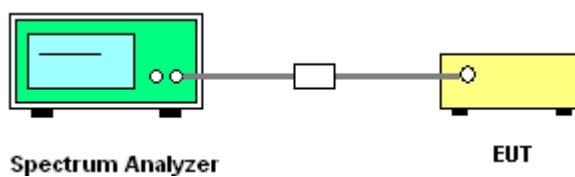
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized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

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
2385.81	55.61	-18.39	74	53.33	32.86	3.47	34.05	200	10	Peak
2385.81	42.46	-11.54	54	40.18	32.86	3.47	34.05	200	10	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
2386	54.43	-19.57	74	52.15	32.86	3.47	34.05	100	306	Peak
2386	41.89	-12.11	54	39.61	32.86	3.47	34.05	100	306	Average

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

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
2488.22	59.25	-14.75	74	56.71	33.05	3.72	34.23	200	335	Peak
2488.22	46.22	-7.78	54	43.68	33.05	3.72	34.23	200	335	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
2487.65	58.08	-15.92	74	55.54	33.05	3.72	34.23	100	62	Peak
2487.65	45.22	-8.78	54	42.68	33.05	3.72	34.23	100	62	Average



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

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	70.05	-3.95	74	67.77	32.86	3.47	34.05	200	119	Peak
2390	39.87	-14.13	54	37.59	32.86	3.47	34.05	200	119	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	68.98	-5.02	74	66.7	32.86	3.47	34.05	100	355	Peak
2390	39.13	-14.87	54	36.85	32.86	3.47	34.05	100	355	Average

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

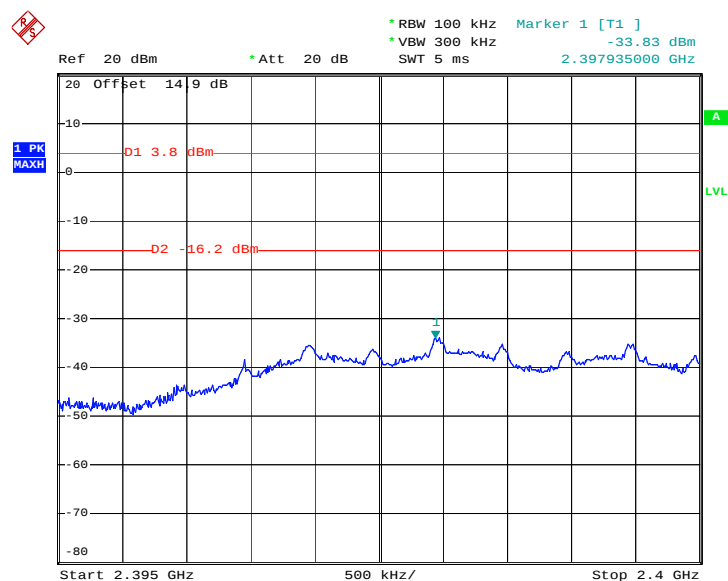
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.8	67.99	-6.01	74	65.5	33.01	3.68	34.2	200	306	Peak
2484.8	42.38	-11.62	54	39.89	33.01	3.68	34.2	200	306	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	65.19	-8.81	74	62.7	33.01	3.68	34.2	100	61	Peak
2483.5	41.31	-12.69	54	38.82	33.01	3.68	34.2	100	61	Average

3.3.6 Test Plots of Conducted Band Edges

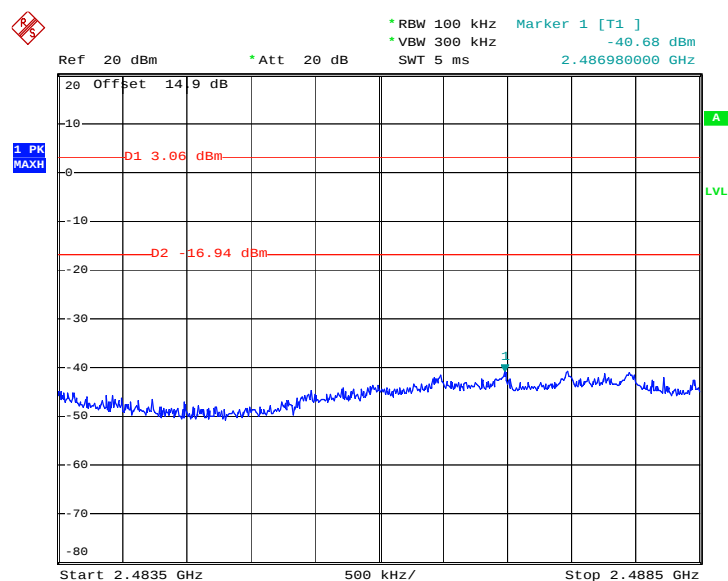
Test Mode :	Mode 1 and 3	Temperature :	23~24℃
Test Band :	802.11b	Relative Humidity :	47~48%
Test Channel :	01 and 11	Test Engineer :	Zhi Lu

Low Band Edge Plot on 802.11b Channel 01



Date: 6.MAR.2012 13:14:39

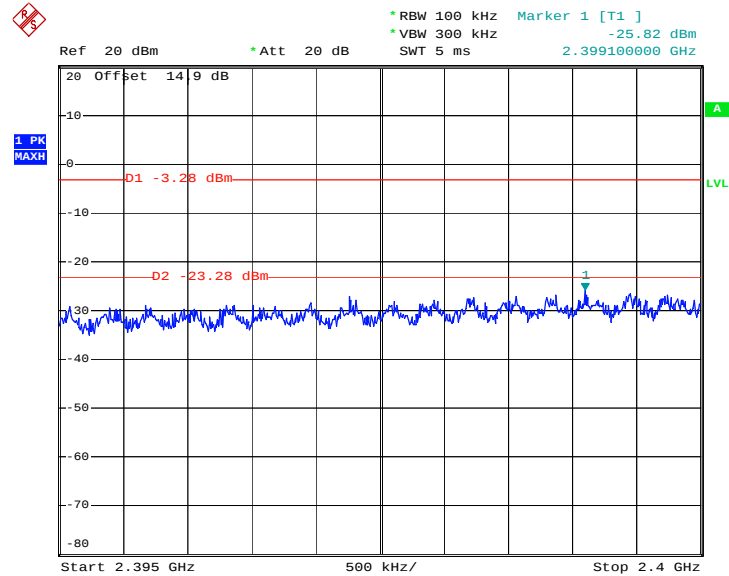
High Band Edge Plot on 802.11b Channel 11



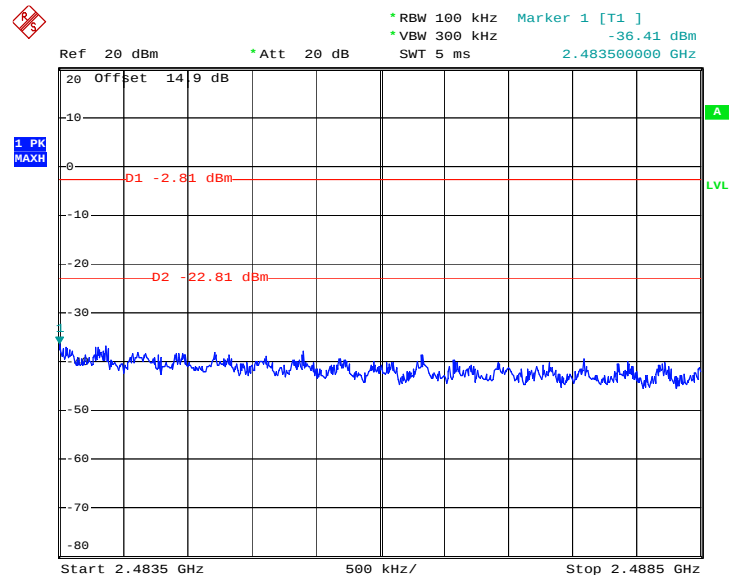
Date: 6.MAR.2012 13:47:36



Test Mode :	Mode 4 and 6	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	47~48%
Test Channel :	01 and 11	Test Engineer :	Zhi Lu

Low Band Edge Plot on 802.11g Channel 01

Date: 6.MAR.2012 14:06:40

High Band Edge Plot on 802.11g Channel 11

Date: 6.MAR.2012 14:34:51

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.

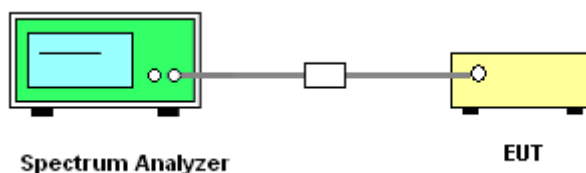
3.4.2 Measuring Instruments

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.

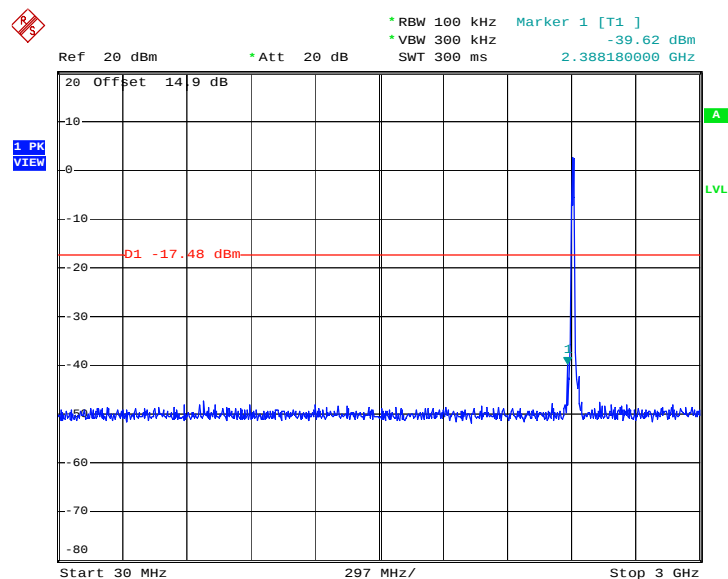
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

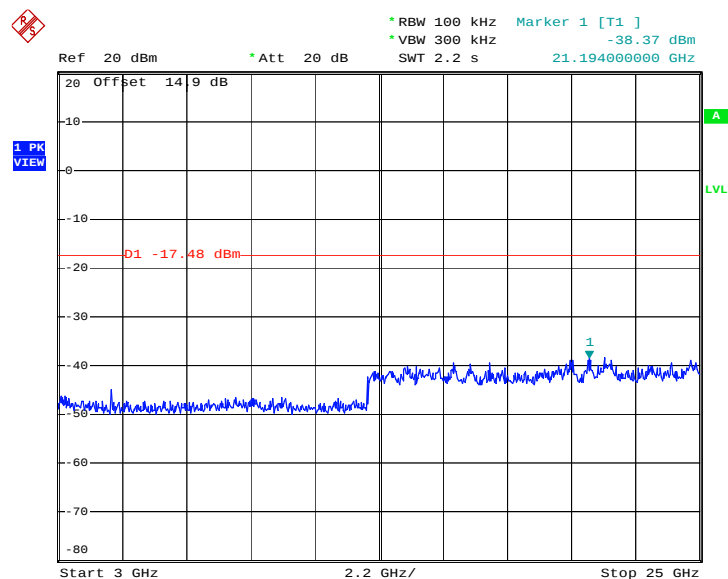
Test Mode :	Mode 1	Temperature :	23~24℃
Test Band :	802.11b	Relative Humidity :	47~48%
Test Channel :	01	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.MAR.2012 13:17:35

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

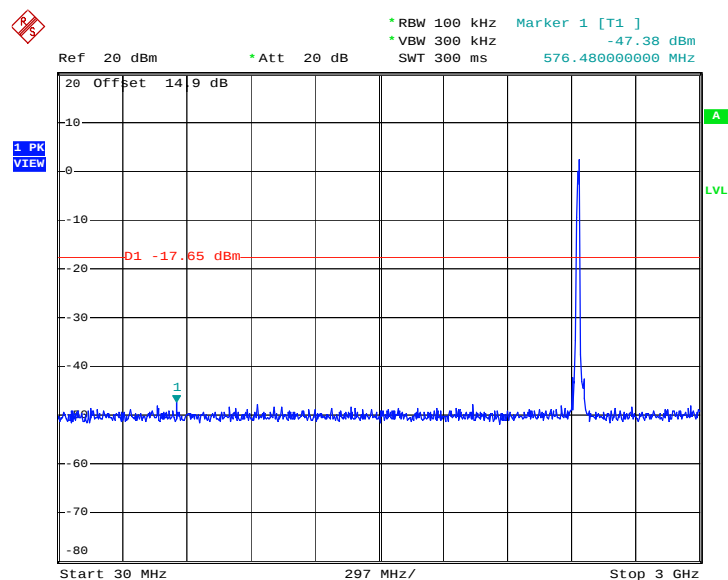


Date: 6.MAR.2012 13:17:52



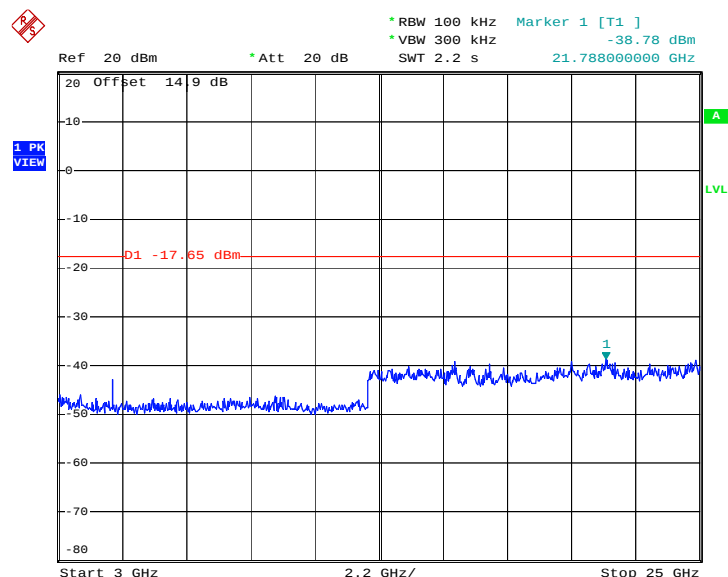
Test Mode :	Mode 2	Temperature :	23~24℃
Test Band :	802.11b	Relative Humidity :	47~48%
Test Channel :	06	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.MAR.2012 13:32:18

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

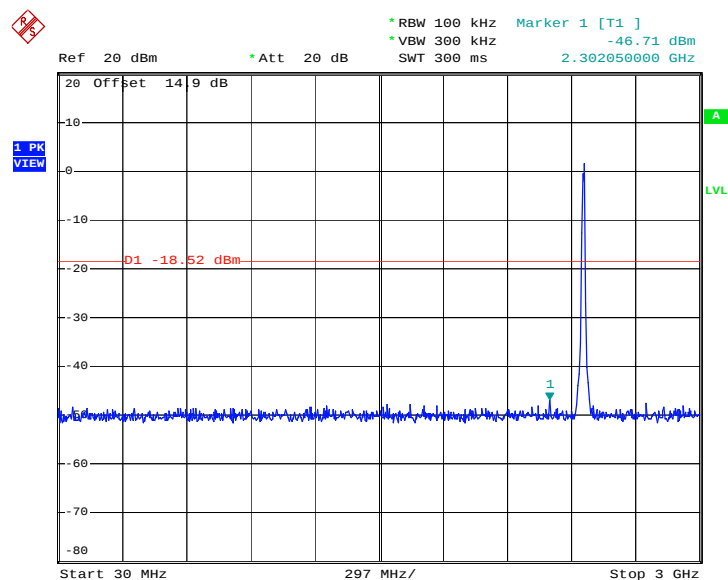


Date: 6.MAR.2012 13:32:35



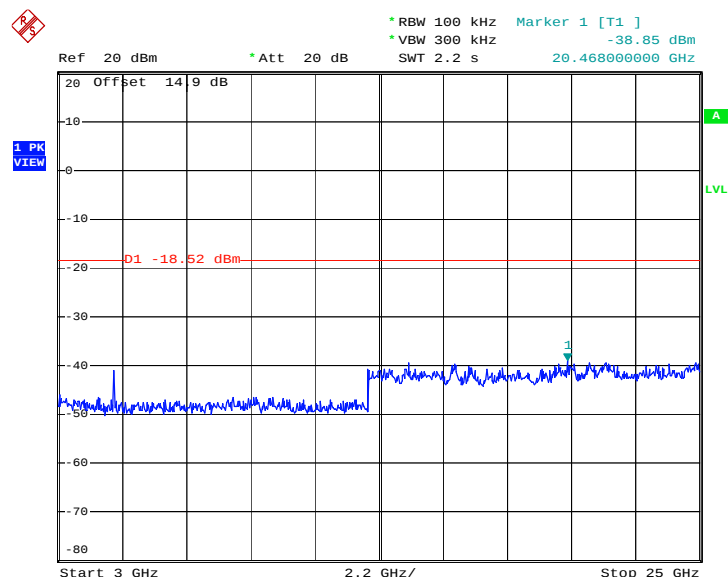
Test Mode :	Mode 3	Temperature :	23~24℃
Test Band :	802.11b	Relative Humidity :	47~48%
Test Channel :	11	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.MAR.2012 13:50:57

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

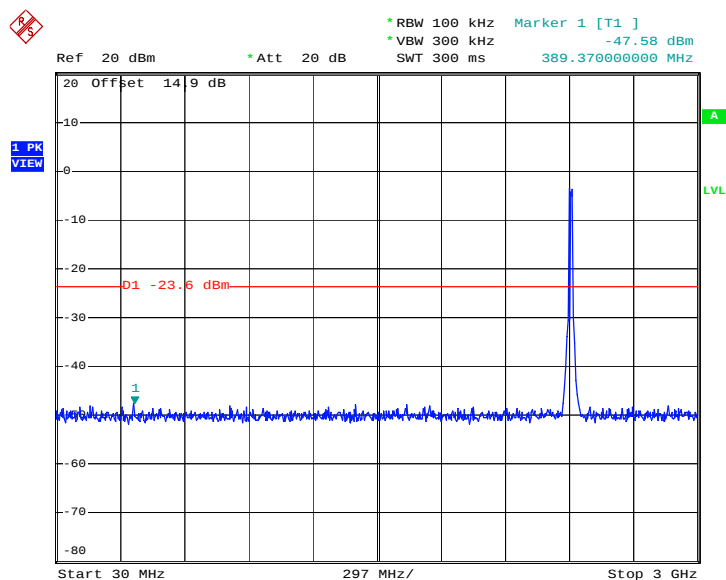


Date: 6.MAR.2012 13:51:14



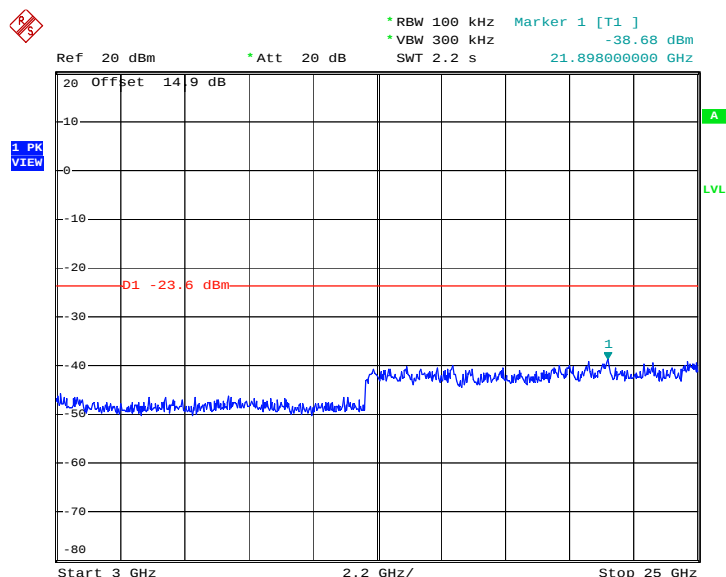
Test Mode :	Mode 4	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	47~48%
Test Channel :	01	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.MAR.2012 14:07:41

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

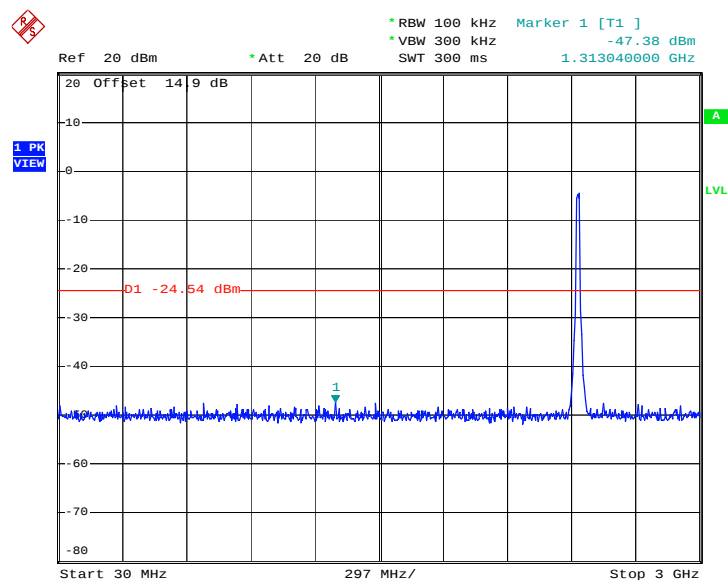


Date: 6.MAR.2012 14:07:58



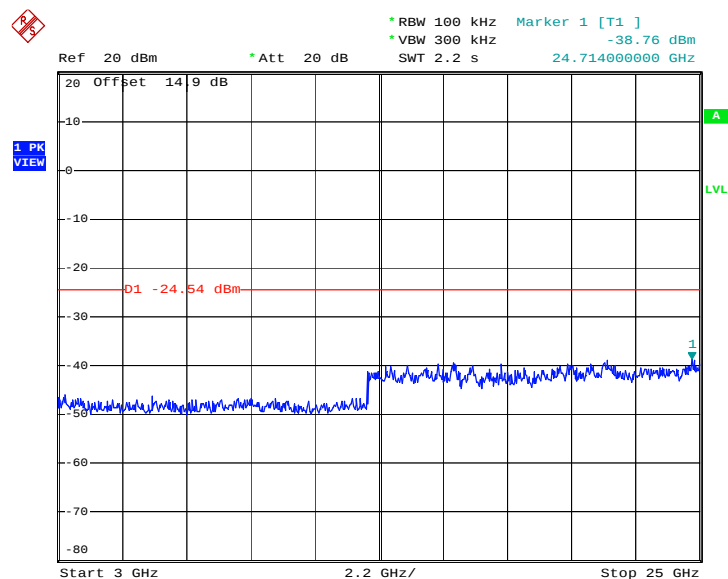
Test Mode :	Mode 5	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	47~48%
Test Channel :	06	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.MAR.2012 14:22:40

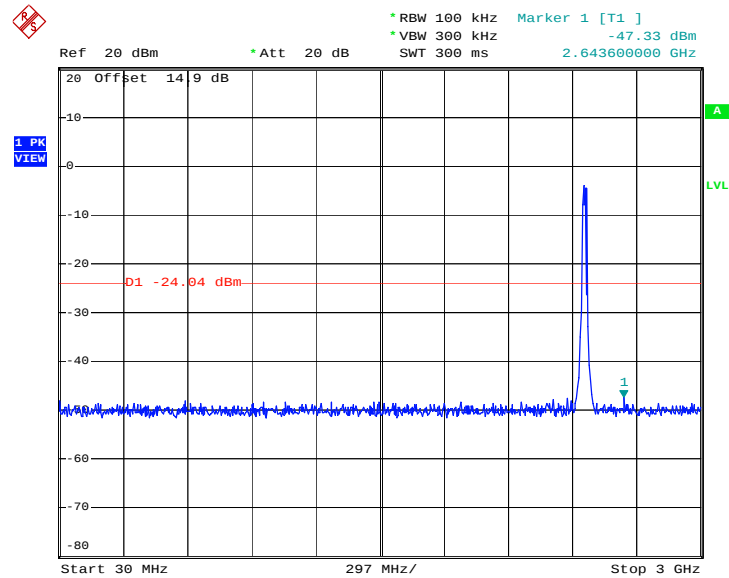
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



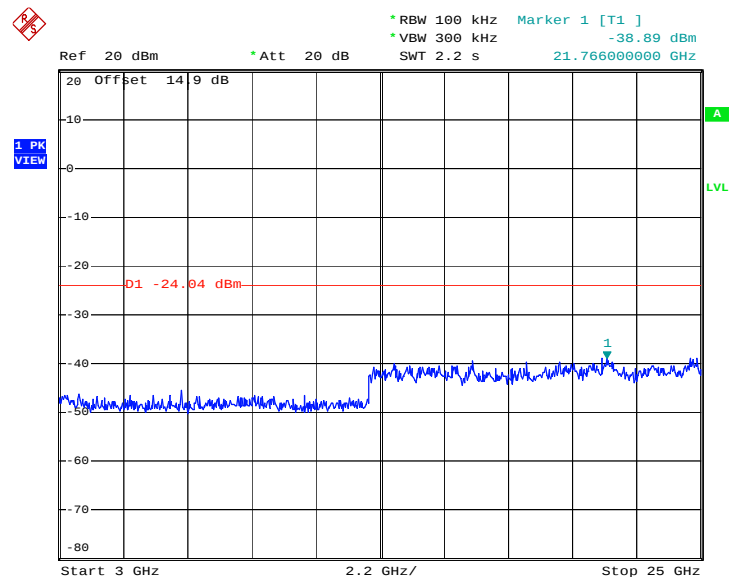
Date: 6.MAR.2012 14:22:56



Test Mode :	Mode 6	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	47~48%
Test Channel :	11	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 6.MAR.2012 14:36:21

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

Date: 6.MAR.2012 14:36:38

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.

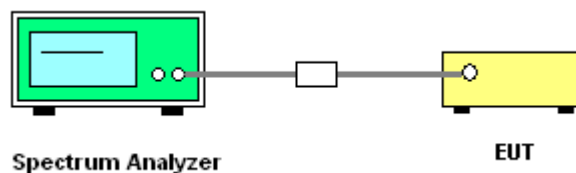
3.5.2 Measuring Instruments

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

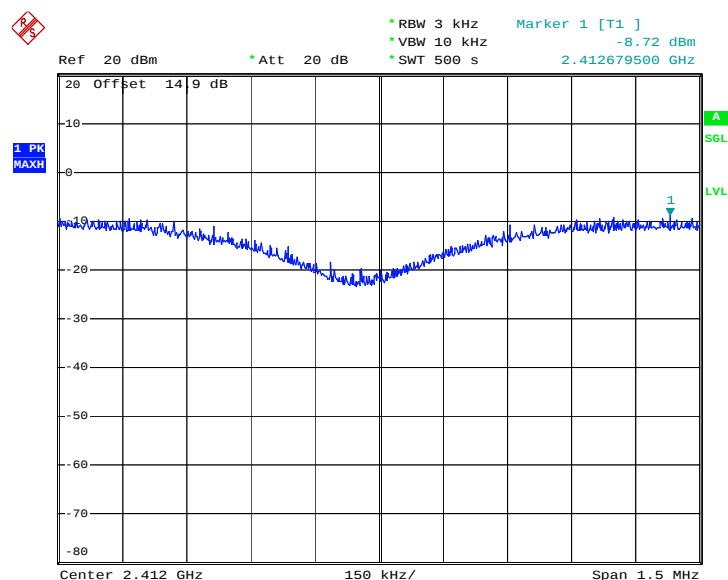


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	23~24℃
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

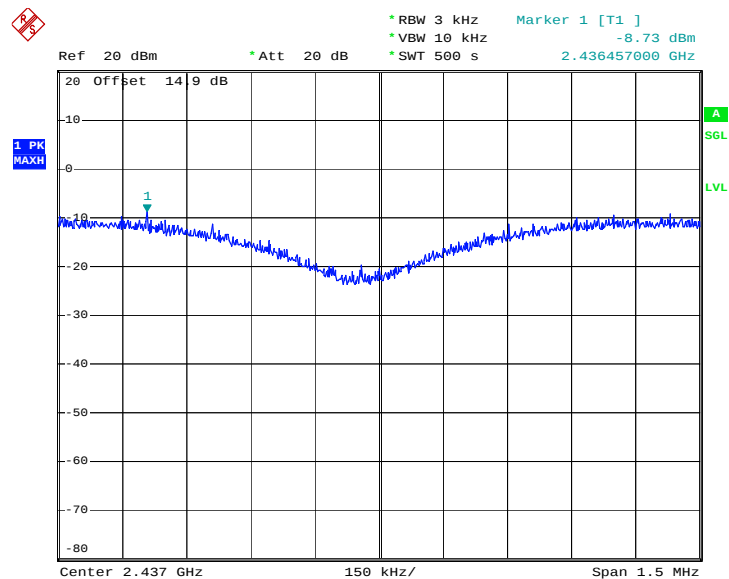
Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-8.72	8	Pass
06	2437	-8.73	8	Pass
11	2462	-8.68	8	Pass

Mode 1 : PSD Plot on 802.11b Channel 01



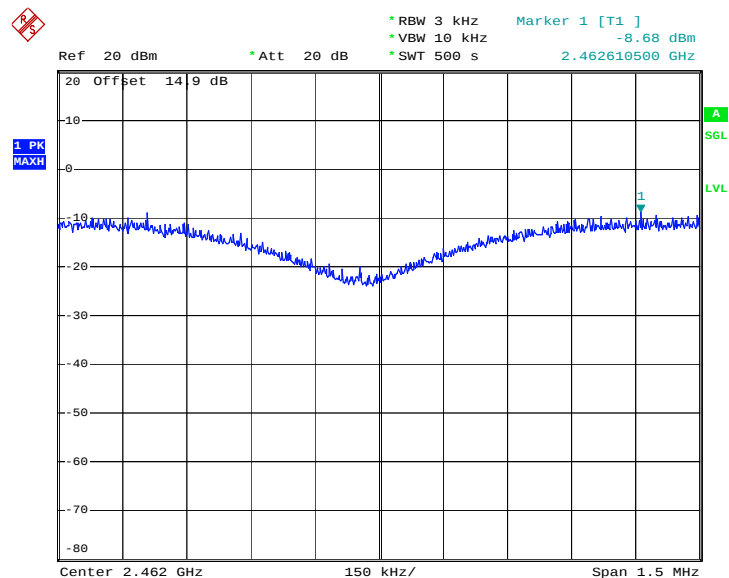
Date: 6.MAR.2012 13:30:16

Mode 2 : PSD Plot on 802.11b Channel 06



Date: 6.MAR.2012 13:45:32

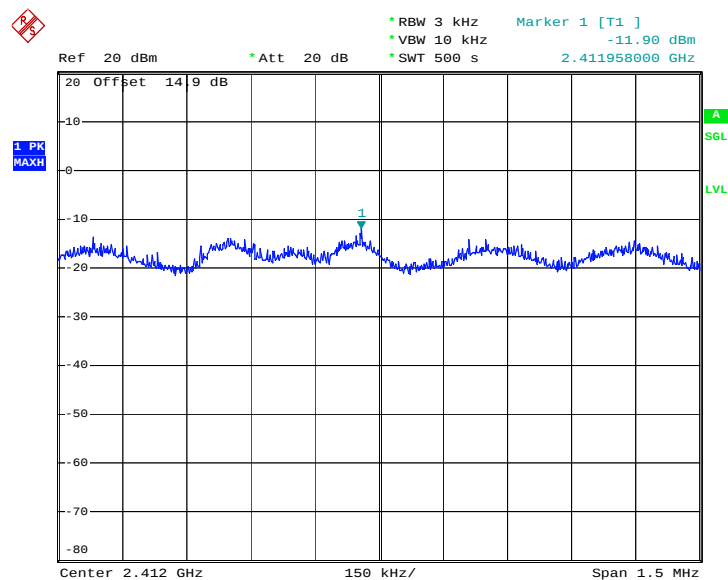
Mode 3 : PSD Plot on 802.11b Channel 11



Date: 6.MAR.2012 14:03:21

Test Mode :	Mode 4, 5, 6	Temperature :	23~24℃
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

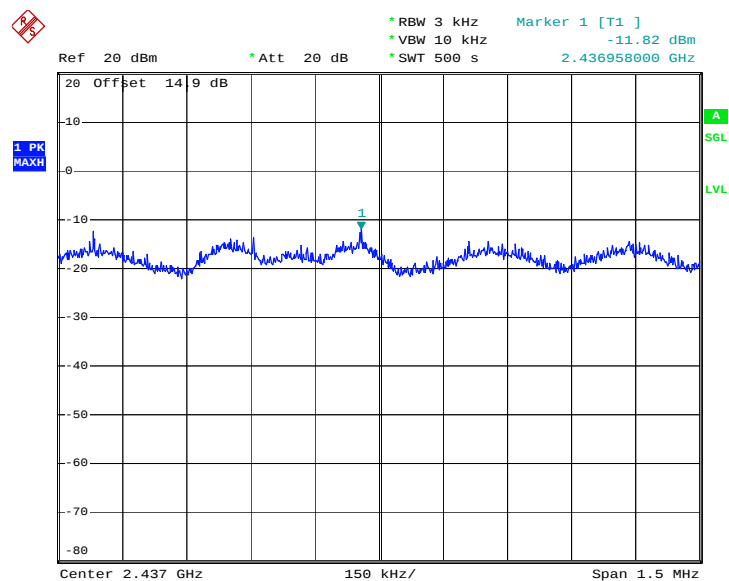
Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-11.90	8	Pass
06	2437	-11.82	8	Pass
11	2462	-12.42	8	Pass

Mode 4 : PSD Plot on 802.11g Channel 01


Date: 6.MAR.2012 14:20:01

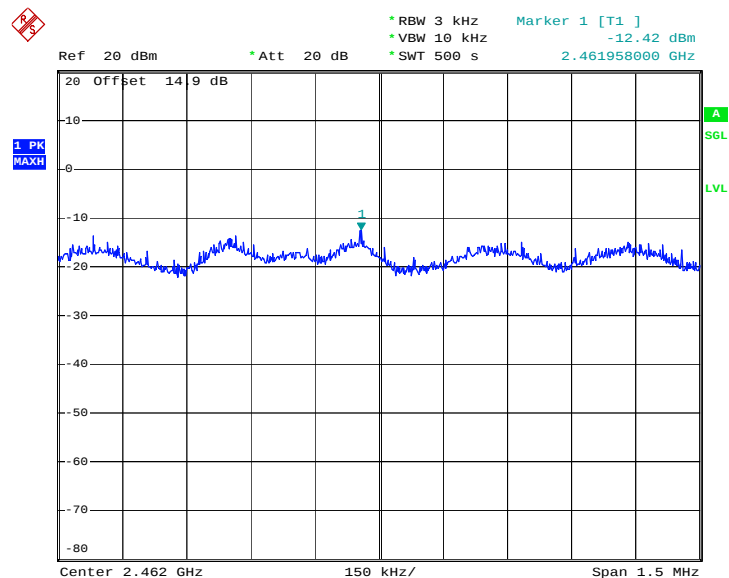


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 6.MAR.2012 14:31:40

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 6.MAR.2012 14:55:57

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.

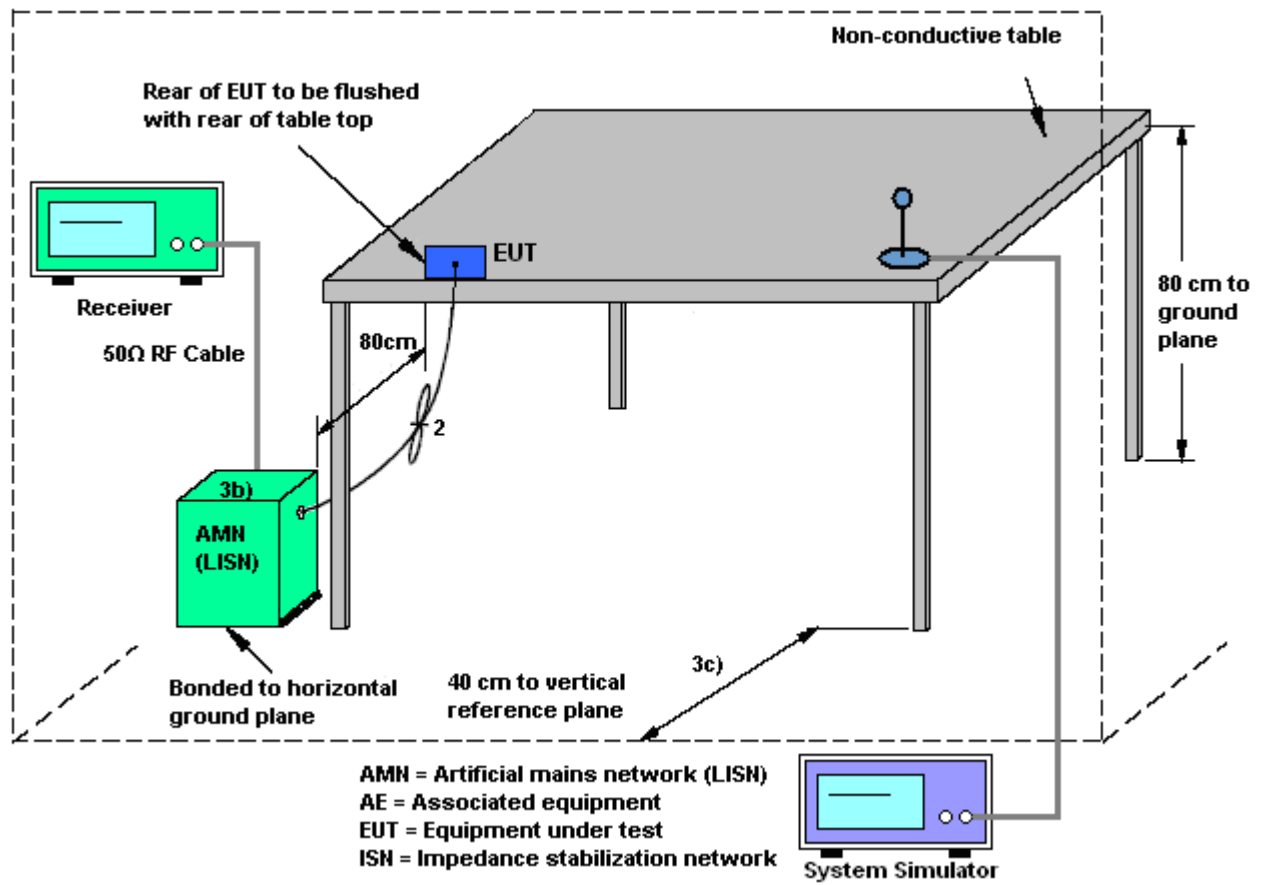
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

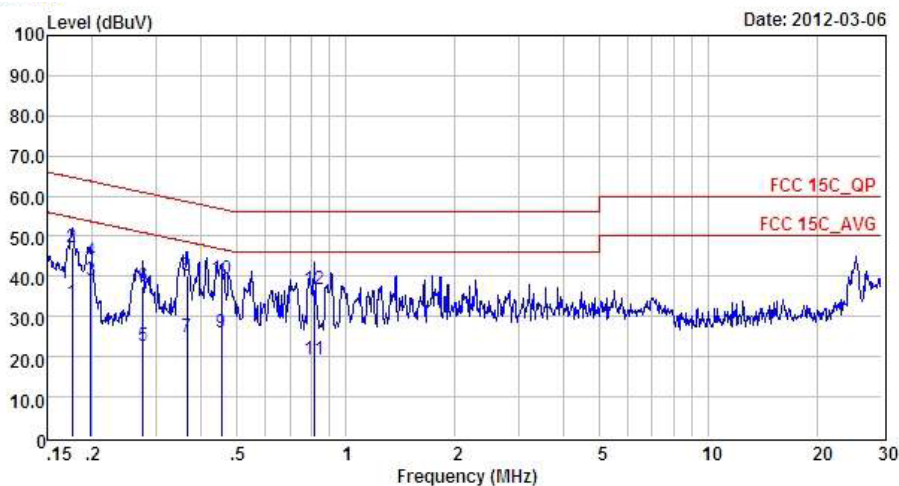
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

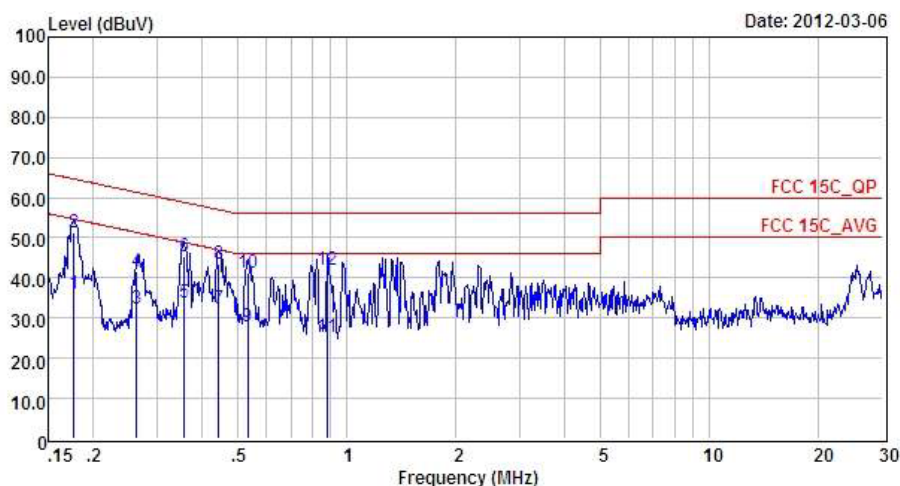
Test Mode :	Mode 1	Temperature :	22~23℃
Test Engineer :	Shiwei Jia	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM 850 Idle + Bluetooth Link + WLAN Link + Adapter + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
 Condition: FCC 15C_QP LISN_L_2000601 LINE
 Project : (FR)222801
 Mode : Model

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.18	33.28	-21.40	54.68	23.20	0.03	10.05	Average
2	0.18	47.18	-17.50	64.68	37.10	0.03	10.05	QP
3	0.20	39.18	-14.53	53.71	29.09	0.03	10.06	Average
4	0.20	43.68	-20.03	63.71	33.59	0.03	10.06	QP
5	0.28	22.78	-28.16	50.94	12.70	0.02	10.06	Average
6	0.28	37.58	-23.36	60.94	27.50	0.02	10.06	QP
7	0.37	25.09	-23.52	48.61	15.00	0.02	10.07	Average
8	0.37	40.29	-18.32	58.61	30.20	0.02	10.07	QP
9	0.45	26.10	-20.70	46.80	16.00	0.02	10.08	Average
10	0.45	39.30	-17.50	56.80	29.20	0.02	10.08	QP
11	0.82	19.23	-26.77	46.00	9.10	0.02	10.11	Average
12	0.82	36.83	-19.17	56.00	26.70	0.02	10.11	QP

Test Mode :	Mode 1	Temperature :	22~23℃
Test Engineer :	Shiwei Jia	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM 850 Idle + Bluetooth Link + WLAN Link + Adapter + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_N_2000601 NEUTRAL
Project : (FR)222801
Mode : Model

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV		dB	dBuV		dB	
1	0.18	35.97	-18.67	54.64	25.90	0.02	10.05	Average
2	0.18	51.27	-13.37	64.64	41.20	0.02	10.05	QP
3	0.26	32.38	-18.96	51.34	22.30	0.02	10.06	Average
4	0.26	41.68	-19.66	61.34	31.60	0.02	10.06	QP
5	0.36	33.69	-15.14	48.83	23.60	0.02	10.07	Average
6	0.36	45.19	-13.64	58.83	35.10	0.02	10.07	QP
7	0.44	32.30	-14.72	47.02	22.20	0.02	10.08	Average
8	0.44	43.40	-13.62	57.02	33.30	0.02	10.08	QP
9	0.53	27.70	-18.30	46.00	17.59	0.02	10.09	Average
10	0.53	41.30	-14.70	56.00	31.19	0.02	10.09	QP
11	0.88	25.43	-20.57	46.00	15.30	0.02	10.11	Average
12	0.88	41.93	-14.07	56.00	31.80	0.02	10.11	QP

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

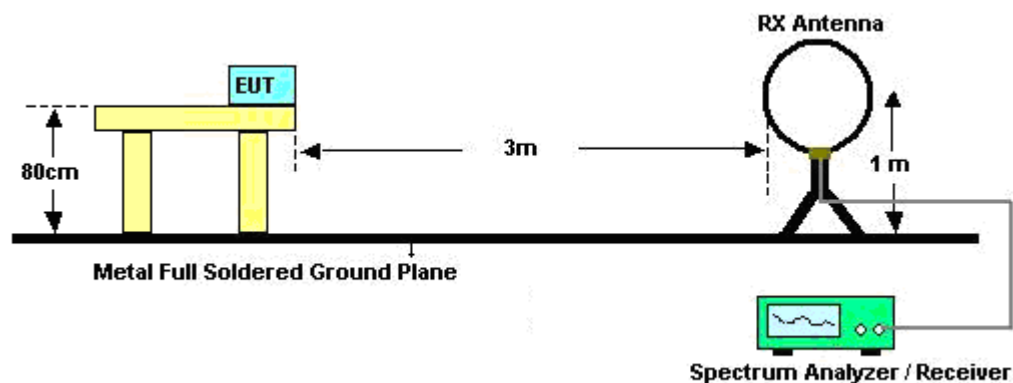
See list of measuring instruments of this test report.

3.7.3 Test Procedures

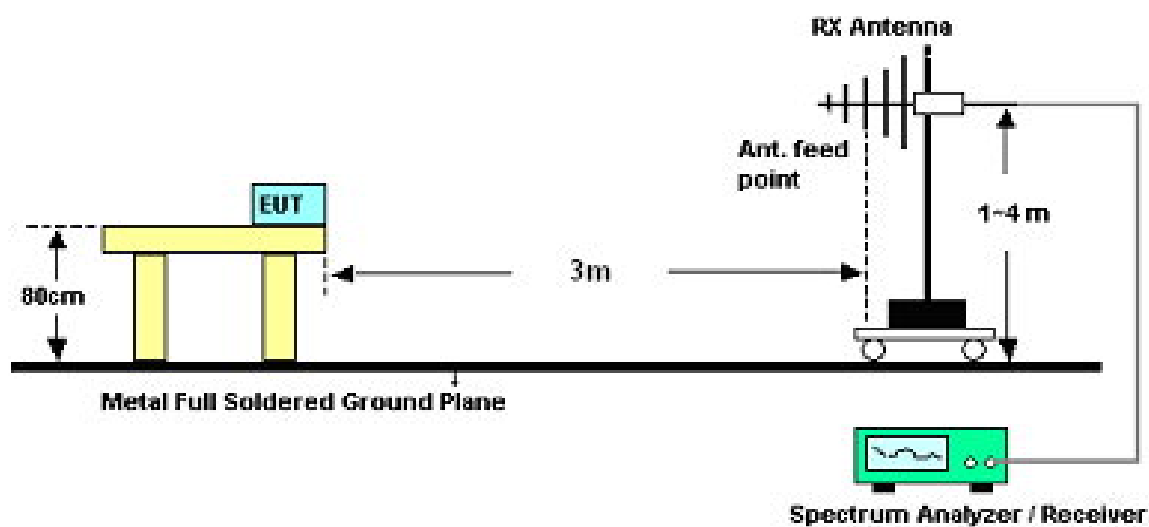
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep =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

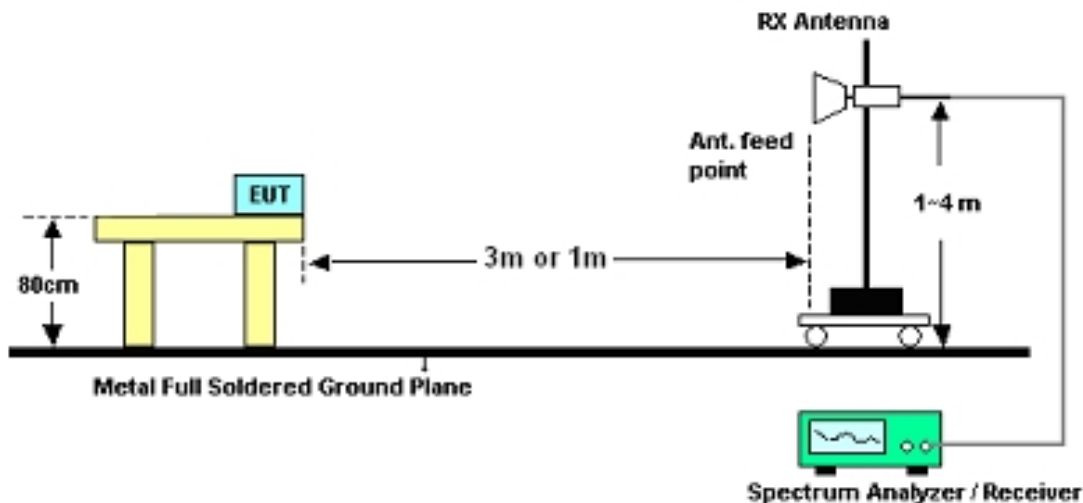
For radiated emissions below 30MHz



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 :	Cloud Peng	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 :	Cloud Peng	Polarization :	Horizontal
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.35	21.77	-18.23	40	34.31	17.29	0.25	30.08	-	-	Peak
70.77	18.4	-21.6	40	42.76	5.38	0.34	30.08	-	-	Peak
148.53	18.53	-24.97	43.5	37.86	10.14	0.51	29.98	-	-	Peak
363.7	36.83	-9.17	46	51.1	14.83	0.82	29.92	100	0	Peak
482.7	36.07	-9.93	46	47.95	16.93	0.94	29.75	-	-	Peak
572.3	35.03	-10.97	46	45.12	18.54	1.03	29.66	-	-	Peak
2385.81	55.61	-18.39	74	53.33	32.86	3.47	34.05	200	10	Peak
2385.81	42.46	-11.54	54	40.18	32.86	3.47	34.05	200	10	Average
2412	102.66	-	-	100.33	32.89	3.52	34.08	200	30	Peak
2412	71.88	-	-	69.55	32.89	3.52	34.08	200	30	Average
2490.88	49.23	-24.77	74	46.69	33.05	3.72	34.23	200	106	Peak
2490.88	37.4	-16.6	54	34.86	33.05	3.72	34.23	200	106	Average
4824	55	-19	74	47.13	35.17	4.97	32.27	180	171	Peak
4824	44.27	-9.73	54	36.4	35.17	4.97	32.27	180	171	Average

Test Mode :	Mode 1	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Vertical
Remark :	2412 MHz is fundamental signal 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
37.83	22.15	-17.85	40	38.27	13.7	0.24	30.06	-	-	Peak
42.96	22.01	-17.99	40	41.36	10.48	0.26	30.09	-	-	Peak
109.65	15.72	-27.78	43.5	33.46	11.8	0.43	29.97	-	-	Peak
371.4	32.06	-13.94	46	46.04	15.09	0.83	29.9	100	0	Peak
519.8	35.54	-10.46	46	46.61	17.67	0.97	29.71	-	-	Peak
946.8	30.54	-23.46	54	38.03	20.72	1.33	29.54	-	-	Peak
2386	54.43	-19.57	74	52.15	32.86	3.47	34.05	100	306	Peak
2386	41.89	-12.11	54	39.61	32.86	3.47	34.05	100	306	Average
2412	101.01	-	-	98.68	32.89	3.52	34.08	100	166	Peak
2412	70.95	-	-	68.62	32.89	3.52	34.08	100	166	Average
2496.58	49.45	-24.55	74	46.91	33.05	3.72	34.23	100	201	Peak
2496.58	36.77	-17.23	54	34.23	33.05	3.72	34.23	100	201	Average
4826	55.95	-18.05	74	48.08	35.17	4.97	32.27	100	66	Peak
4826	44.39	-9.61	54	36.52	35.17	4.97	32.27	100	66	Average

Test Mode :	Mode 2	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Horizontal
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.35	20.84	-19.16	40	33.38	17.29	0.25	30.08	-	-	Peak
107.49	18.1	-25.4	43.5	36.07	11.56	0.43	29.96	-	-	Peak
275.16	21.63	-24.37	46	38.33	12.53	0.7	29.93	-	-	Peak
415.5	38.86	-7.14	46	51.74	16.08	0.86	29.82	100	0	Peak
624.1	27.08	-18.92	46	36.9	18.73	1.08	29.63	-	-	Peak
951	29.58	-24.42	54	37.06	20.73	1.33	29.54	-	-	Peak
2376.69	49.38	-24.62	74	47.14	32.83	3.42	34.01	200	0	Peak
2376.69	36.8	-17.2	54	34.56	32.83	3.42	34.01	200	0	Average
2437	102.47	-	-	100.07	32.95	3.6	34.15	200	61	Peak
2437	72.68	-	-	70.28	32.95	3.6	34.15	200	61	Average
2493.54	49.46	-24.54	74	46.92	33.05	3.72	34.23	200	20	Peak
2493.54	36.73	-17.27	54	34.19	33.05	3.72	34.23	200	20	Average
4874	54.62	-19.38	74	46.73	35.18	4.98	32.27	200	16	Peak
4874	43.76	-10.24	54	35.87	35.18	4.98	32.27	200	16	Average

Test Mode :	Mode 2	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Vertical
Remark :	2437 MHz is fundamental signal 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
37.56	21.27	-18.73	40	37.39	13.7	0.24	30.06	-	-	Peak
42.15	20.78	-19.22	40	40.13	10.48	0.26	30.09	-	-	Peak
163.38	15.11	-28.39	43.5	35.06	9.44	0.54	29.93	-	-	Peak
386.1	28	-18	46	41.36	15.66	0.84	29.86	-	-	Peak
549.9	30.08	-15.92	46	40.26	18.5	1	29.68	100	0	Peak
951	29.86	-24.14	54	37.34	20.73	1.33	29.54	-	-	Peak
2384.48	49.3	-24.7	74	47.06	32.83	3.42	34.01	100	21	Peak
2384.48	37.37	-16.63	54	35.13	32.83	3.42	34.01	100	21	Average
2437	101.18	-	-	98.78	32.95	3.6	34.15	200	286	Peak
2437	70.99	-	-	68.59	32.95	3.6	34.15	100	286	Average
2486.7	49.5	-24.5	74	47.01	33.01	3.68	34.2	100	0	Peak
2486.7	36.75	-17.25	54	34.26	33.01	3.68	34.2	100	0	Average
4874	55.85	-18.15	74	47.96	35.18	4.98	32.27	100	0	Peak
4874	43.68	-10.32	54	35.79	35.18	4.98	32.27	100	0	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Horizontal
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	20.71	-19.29	40	32.53	18	0.26	30.08	-	-	Peak
98.31	21.38	-22.12	43.5	40.79	10.15	0.41	29.97	-	-	Peak
223.05	14.87	-31.13	46	33.87	10.33	0.63	29.96	-	-	Peak
393.8	38.81	-7.19	46	51.94	15.87	0.84	29.84	100	0	Peak
794.9	28.37	-17.63	46	36.86	19.85	1.25	29.59	-	-	Peak
951	32.66	-21.34	54	40.14	20.73	1.33	29.54	-	-	Peak
2363.58	49.45	-24.55	74	47.24	32.81	3.38	33.98	200	10	Peak
2363.58	36.52	-17.48	54	34.31	32.81	3.38	33.98	200	10	Average
2462	101.83	-	-	99.38	32.98	3.64	34.17	200	80	Peak
2462	72.57	-	-	70.12	32.98	3.64	34.17	200	80	Average
2488.22	59.25	-14.75	74	56.71	33.05	3.72	34.23	200	335	Peak
2488.22	46.22	-7.78	54	43.68	33.05	3.72	34.23	200	335	Average
4924	55.71	-18.29	74	47.79	35.19	4.99	32.26	200	208	Peak
4924	43.55	-10.45	54	35.63	35.19	4.99	32.26	200	208	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Vertical
Remark :	2462 MHz is fundamental signal 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
37.29	21.36	-18.64	40	37.48	13.7	0.24	30.06	-	-	Peak
102.9	24.82	-18.68	43.5	43.49	10.87	0.42	29.96	-	-	Peak
271.11	15.2	-30.8	46	32.01	12.41	0.69	29.91	-	-	Peak
378.4	32.27	-13.73	46	45.94	15.38	0.83	29.88	-	-	Peak
572.3	36.95	-9.05	46	47.04	18.54	1.03	29.66	100	0	Peak
946.8	29.16	-24.84	54	36.65	20.72	1.33	29.54	-	-	Peak
2376.5	49.95	-24.05	74	47.71	32.83	3.42	34.01	100	0	Peak
2376.5	36.75	-17.25	54	34.51	32.83	3.42	34.01	100	0	Average
2462	99.87	-	-	97.42	32.98	3.64	34.17	100	182	Peak
2462	70.1	-	-	67.65	32.98	3.64	34.17	100	182	Average
2487.65	58.08	-15.92	74	55.54	33.05	3.72	34.23	100	62	Peak
2487.65	45.22	-8.78	54	42.68	33.05	3.72	34.23	100	62	Average
4924	56.73	-17.27	74	48.81	35.19	4.99	32.26	100	166	Peak
4924	44.84	-9.16	54	36.92	35.19	4.99	32.26	100	166	Average

Test Mode :	Mode 4	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Horizontal
Remark :	2412 MHz is fundamental signal 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	21.2	-18.8	40	33.02	18	0.26	30.08	-	-	Peak
57.27	18	-22	40	42.09	5.75	0.3	30.14	-	-	Peak
142.05	16.06	-27.44	43.5	34.92	10.64	0.49	29.99	-	-	Peak
393.8	38.23	-7.77	46	51.36	15.87	0.84	29.84	100	0	Peak
572.3	36.03	-9.97	46	46.12	18.54	1.03	29.66	-	-	Peak
946.8	31.13	-22.87	54	38.62	20.72	1.33	29.54	-	-	Peak
2390	70.05	-3.95	74	67.77	32.86	3.47	34.05	200	119	Peak
2390	39.87	-14.13	54	37.59	32.86	3.47	34.05	200	119	Average
2412	101.35	-	-	99.02	32.89	3.52	34.08	200	66	Peak
2412	52.58	-	-	50.25	32.89	3.52	34.08	200	66	Average
2495.63	49.79	-24.21	74	47.25	33.05	3.72	34.23	200	10	Peak
2495.63	37.06	-16.94	54	34.52	33.05	3.72	34.23	200	10	Average
4824	53.61	-20.39	74	45.74	35.17	4.97	32.27	200	0	Peak
4824	36.83	-17.17	54	28.96	35.17	4.97	32.27	200	0	Average

Test Mode :	Mode 4	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Vertical
Remark :	2412 MHz is fundamental signal 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
38.37	31.69	-8.31	40	48.5	12.98	0.25	30.04	100	0	Peak
50.52	20.3	-19.7	40	42.75	7.4	0.28	30.13	-	-	Peak
170.94	15.09	-28.41	43.5	35.31	9.14	0.55	29.91	-	-	Peak
371.4	34.84	-11.16	46	48.82	15.09	0.83	29.9	-	-	Peak
445.6	32.01	-13.99	46	44.62	16.28	0.9	29.79	-	-	Peak
556.9	30.5	-15.5	46	40.65	18.51	1.01	29.67	-	-	Peak
2390	68.98	-5.02	74	66.7	32.86	3.47	34.05	100	355	Peak
2390	39.13	-14.87	54	36.85	32.86	3.47	34.05	100	355	Average
2412	100.18	-	-	97.85	32.89	3.52	34.08	100	82	Peak
2412	50.68	-	-	48.35	32.89	3.52	34.08	100	82	Average
2489.93	49.02	-24.98	74	46.48	33.05	3.72	34.23	100	0	Peak
2489.93	36.79	-17.21	54	34.25	33.05	3.72	34.23	100	0	Average
4824	55.85	-18.15	74	47.98	35.17	4.97	32.27	100	21	Peak
4824	36.04	-17.96	54	28.17	35.17	4.97	32.27	100	21	Average

Test Mode :	Mode 5	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Horizontal
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	19.39	-20.61	40	31.21	18	0.26	30.08	-	-	Peak
108.03	13.97	-29.53	43.5	31.94	11.56	0.43	29.96	-	-	Peak
280.29	14.6	-31.4	46	31.19	12.66	0.7	29.95	-	-	Peak
363.7	40.93	-5.07	46	55.2	14.83	0.82	29.92	100	0	Peak
430.9	37.69	-8.31	46	50.41	16.2	0.88	29.8	-	-	Peak
780.2	29.76	-16.24	46	38.24	19.87	1.22	29.57	-	-	Peak
2390	52.84	-21.16	74	50.56	32.86	3.47	34.05	200	56	Peak
2390	37.9	-16.1	54	35.62	32.86	3.47	34.05	200	56	Average
2437	102.17	-	-	99.77	32.95	3.6	34.15	200	158	Peak
2437	51.38	-	-	48.98	32.95	3.6	34.15	200	158	Average
2487.27	51.2	-22.8	74	48.71	33.01	3.68	34.2	200	0	Peak
2487.27	37.35	-16.65	54	34.86	33.01	3.68	34.2	200	0	Average
4874	56.06	-17.94	74	48.17	35.18	4.98	32.27	200	28	Peak
4874	37.13	-16.87	54	29.24	35.18	4.98	32.27	200	28	Average

Test Mode :	Mode 5	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Vertical
Remark :	2437 MHz is fundamental signal 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
37.02	21.73	-18.27	40	37.37	14.19	0.24	30.07	-	-	Peak
50.25	18.59	-21.41	40	41.04	7.4	0.28	30.13	-	-	Peak
163.38	16.31	-27.19	43.5	36.26	9.44	0.54	29.93	-	-	Peak
468	31.3	-14.7	46	43.56	16.59	0.92	29.77	-	-	Peak
624.1	32.32	-13.68	46	42.14	18.73	1.08	29.63	100	0	Peak
951	32.08	-21.92	54	39.56	20.73	1.33	29.54	-	-	Peak
2390	52.65	-21.35	74	50.37	32.86	3.47	34.05	100	0	Peak
2390	38.53	-15.47	54	36.25	32.86	3.47	34.05	100	0	Average
2437	99.04	-	-	96.64	32.95	3.6	34.15	100	166	Peak
2437	49.22	-	-	46.82	32.95	3.6	34.15	100	166	Average
2485.37	49.79	-24.21	74	47.3	33.01	3.68	34.2	100	91	Peak
2485.37	37.65	-16.35	54	35.16	33.01	3.68	34.2	100	91	Average
4874	53.54	-20.46	74	45.65	35.18	4.98	32.27	100	66	Peak
4874	36.25	-17.75	54	28.36	35.18	4.98	32.27	100	66	Average

Test Mode :	Mode 6	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Horizontal
Remark :	2462 MHz is fundamental signal 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	21.29	-18.71	40	33.11	18	0.26	30.08	-	-	Peak
84.54	33.11	-6.89	40	55.23	7.53	0.37	30.02	100	0	Peak
94.8	29.28	-14.22	43.5	49.05	9.8	0.4	29.97	-	-	Peak
408.5	32.45	-13.55	46	45.38	16.04	0.85	29.82	-	-	Peak
835.5	30.03	-15.97	46	38.05	20.35	1.27	29.64	-	-	Peak
951	28.47	-25.53	54	35.95	20.73	1.33	29.54	-	-	Peak
2349.14	49.17	-24.83	74	47	32.78	3.33	33.94	200	0	Peak
2349.14	36.46	-17.54	54	34.29	32.78	3.33	33.94	200	0	Average
2462	99.15	-	-	96.7	32.98	3.64	34.17	200	108	Peak
2462	49.76	-	-	47.31	32.98	3.64	34.17	200	108	Average
2484.8	67.99	-6.01	74	65.5	33.01	3.68	34.2	200	306	Peak
2484.8	42.38	-11.62	54	39.89	33.01	3.68	34.2	200	306	Average
4926	55.75	-18.25	74	47.83	35.19	4.99	32.26	200	31	Peak
4926	36.56	-17.44	54	28.64	35.19	4.99	32.26	200	31	Average

Test Mode :	Mode 6	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Cloud Peng	Polarization :	Vertical
Remark :	2462 MHz is fundamental signal 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
37.02	22.03	-17.97	40	37.67	14.19	0.24	30.07	-	-	Peak
146.37	19.79	-23.71	43.5	38.98	10.29	0.5	29.98	-	-	Peak
230.34	16.22	-29.78	46	34.5	10.97	0.64	29.89	-	-	Peak
393.8	31.37	-14.63	46	44.5	15.87	0.84	29.84	-	-	Peak
519.8	33.53	-12.47	46	44.6	17.67	0.97	29.71	100	0	Peak
835.5	29.38	-16.62	46	37.4	20.35	1.27	29.64	-	-	Peak
2338.69	49.37	-24.63	74	47.2	32.78	3.33	33.94	100	22	Peak
2338.69	36.78	-17.22	54	34.61	32.78	3.33	33.94	100	22	Average
2462	99.21	-	-	96.76	32.98	3.64	34.17	100	108	Peak
2462	49.16	-	-	46.71	32.98	3.64	34.17	100	108	Average
2483.5	65.19	-8.81	74	62.7	33.01	3.68	34.2	100	61	Peak
2483.5	41.31	-12.69	54	38.82	33.01	3.68	34.2	100	61	Average
4924	53.91	-20.09	74	45.99	35.19	4.99	32.26	100	83	Peak
4924	34.5	-19.5	54	26.58	35.19	4.99	32.26	100	83	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	100319	9kHz~40GHz	Dec. 30, 2011	Mar. 06, 2012	Dec. 29, 2012	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 23, 2011	Mar. 06, 2012	Aug. 22, 2012	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 23, 2011	Mar. 06, 2012	Aug. 22, 2012	Conducted (TH01-KS)
DC Power Supply	TOPWARD	GPS-30300	E1884515	N/A	Aug. 23, 2011	Mar. 06, 2012	Aug. 22, 2012	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	N/A	Dec. 30, 2011	Mar. 06, 2012	Dec. 29, 2012	Conducted (TH01-KS)
AC LISN	ETS-LINDGREEN	3816/2SH	00103912	0.1MHz~108MHz	Feb. 27, 2012	Mar. 06, 2012	Feb. 26, 2013	Conduction (CO01-SZ)
AC LISN	ETS-LINDGREEN	3816/2SH	00103892	0.1MHz~108MHz	Feb. 27, 2012	Mar. 06, 2012	Feb. 26, 2013	Conduction (CO01-SZ)
ESCIO TEST Receiver	R&S	1142.8007.03	100724	9K-3GHz	Mar. 08, 2011	Mar. 06, 2012	Mar. 07, 2012	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891N/A	N/A	Oct. 12, 2011	Mar. 06, 2012	Oct. 11, 2012	Conduction (CO01-SZ)
AC LISN	SCHWARZBECK	NNLK 8121	8121370	10KHz-30MHz	Jun. 13, 2011	Mar. 06, 2012	Jun. 12, 2012	Conduction (CO01-SZ)
System Simulator	Agilent	E5515C	MY50264168	GSM/WCDMA /CDMA2000	Mar. 14, 2011	Mar. 06, 2012	Mar. 13, 2012	Conduction (CO01-SZ)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 09, 2011	Mar. 16, 2012	Nov. 08, 2012	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 30, 2011	Mar. 16, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 08, 2011	Mar. 16, 2012	Dec. 07, 2012	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/00	9 kHz~30 MHz	Jul. 28, 2011	Mar. 16, 2012	Jul. 27, 2012	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 06, 2012	Mar. 16, 2012	Jan. 05, 2013	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 30, 2011	Mar. 16, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Dec. 30, 2011	Mar. 16, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 07, 2011	Mar. 16, 2012	Nov. 06, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Oct. 11, 2011	Mar. 16, 2012	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 EP222801 as below.