

FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : CDMA2000 Digital Mobile Phone
BRAND NAME : ZTE
MODEL NAME : X501
FCC ID : Q78-X501
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Feb. 01, 2012 and completely tested on Feb. 20, 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
FR220101B	Rev. 01	Initial issue of report	Feb. 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 2.18 dB at 0.15 MHz
3.7	15.247(d)	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.65 dB at 2388.66 MHz
3.8	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	CDMA2000 Digital Mobile Phone
Brand Name	ZTE
Model Name	X501
FCC ID	Q78-X501
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 : 16.58 dBm (0.045 W) 802.11g : 22.57 dBm (0.181 W)
Antenna Type	PIFA Antenna with gain -3 dBi
HW Version	QB7627-05AMB_E
SW Version	X501_CKT_1.10
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

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 (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	03CH01-KS

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	

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.	System Simulator	Agilent	8960	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	Bluetooth Earphone	Nokia	BH-108	N/A	N/A	N/A
4.	Notebook	IBM	1706	FCC DoC	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
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	16.49	16.46	16.47	16.48
CH 06	2437 MHz	16.58	16.52	16.53	16.56
CH 11	2462 MHz	16.44	16.34	16.32	16.34

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	22.36	22.26	22.18	22.12	22.22	22.29	22.27	22.31
CH 06	2437 MHz	22.57	22.54	22.49	22.43	22.35	22.32	22.28	22.23
CH 11	2462 MHz	22.48	22.27	22.44	22.19	22.38	22.36	22.34	22.17

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

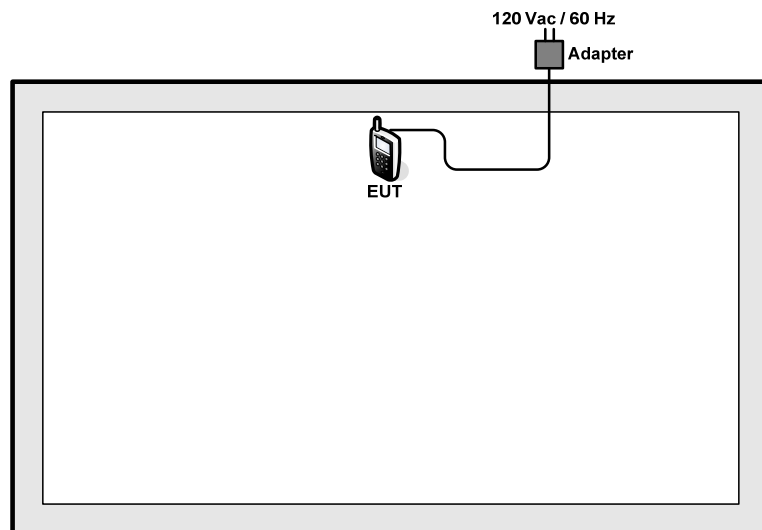
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic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

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

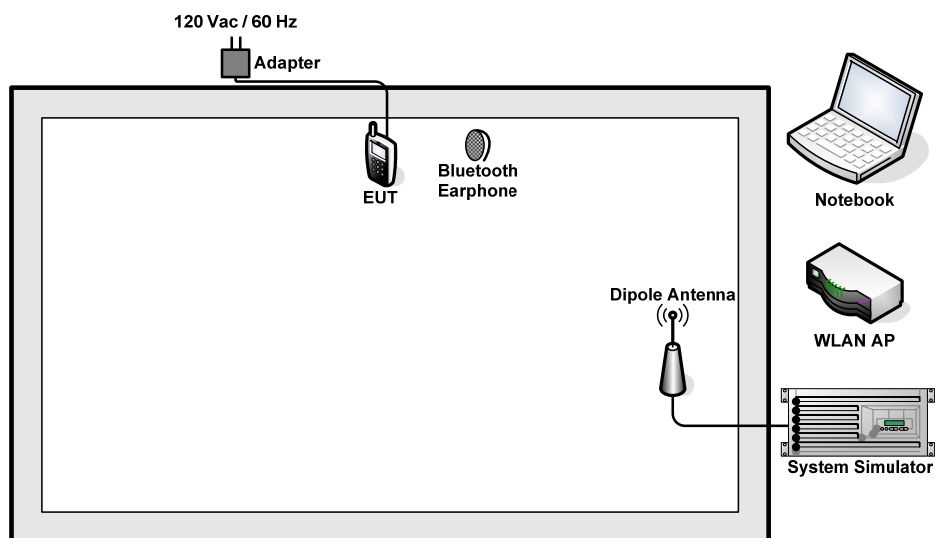
Test Cases		
Test Item	802.11b	802.11g
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g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

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

The programmed RF utility, "CMD" 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.

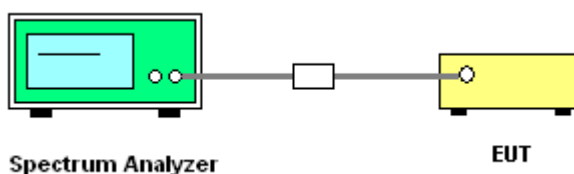
3.1.2 Measuring Instruments

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

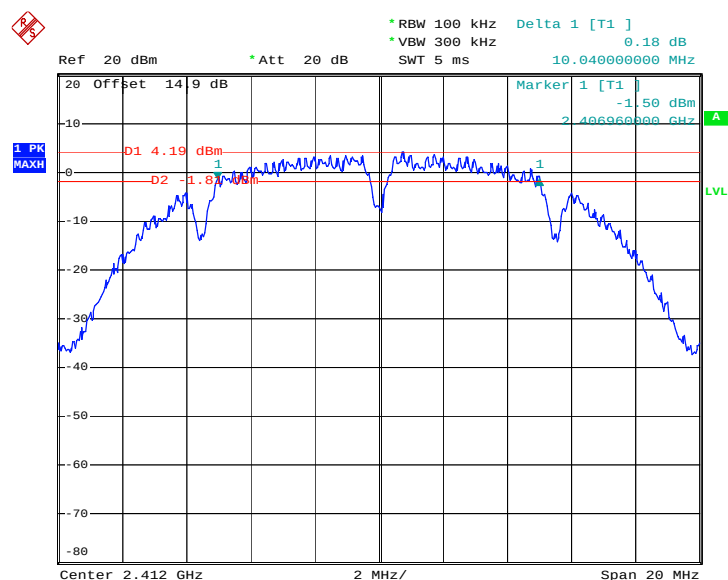


3.1.5 Test Result of 6dB Bandwidth

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	10.08	0.5	Pass
11	2462	10.06	0.5	Pass

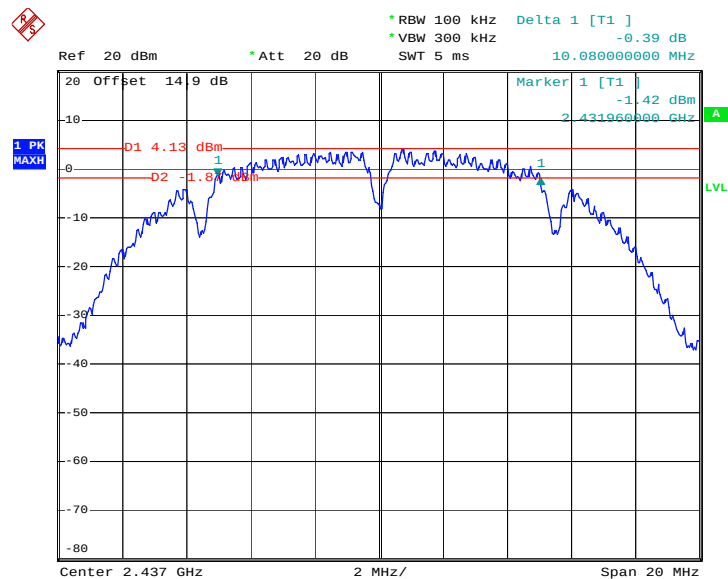
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 15.FEB.2012 19:17:57

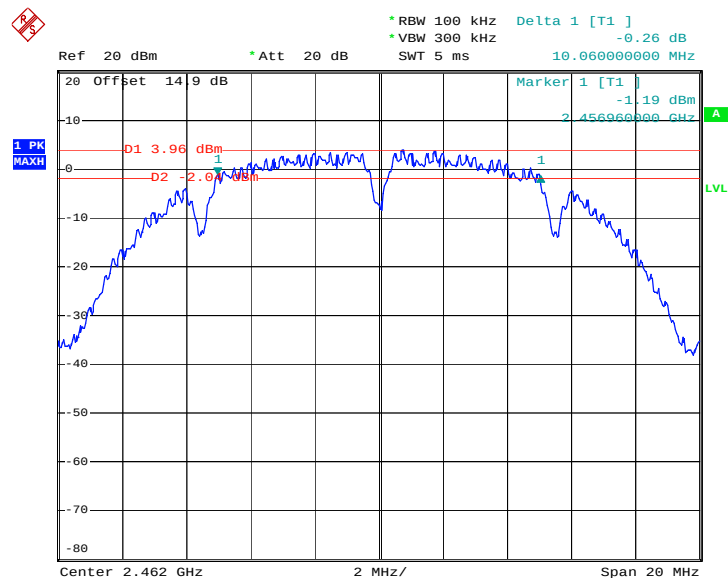


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



Date: 15.FEB.2012 19:32:09

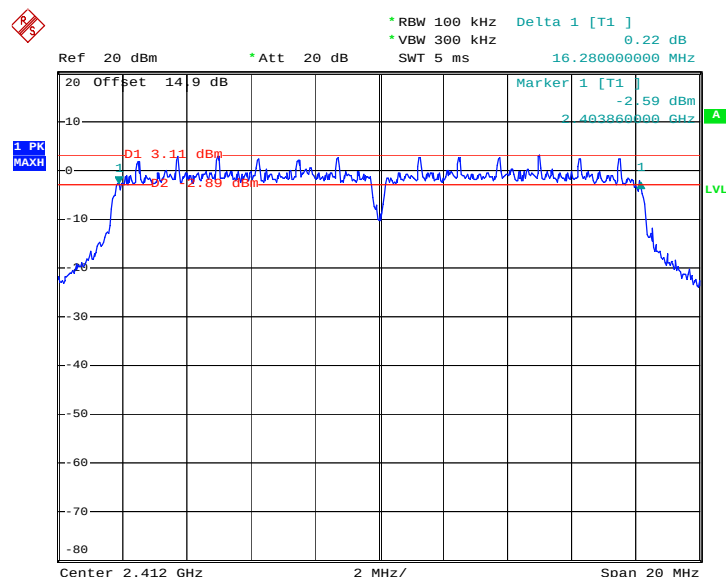
Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 11



Date: 15.FEB.2012 19:49:31

Test Mode :	Mode 4, 5, 6	Temperature :	23~24℃
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	16.28	0.5	Pass
06	2437	16.32	0.5	Pass
11	2462	16.28	0.5	Pass

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


Date: 15.FEB.2012 20:11:19



Ref 20 dBm Att 20 dB RBW 100 kHz VBW 300 kHz SWT 5 ms Delta 1 [T1] -0.39 dB 16.32000000 MHz

20 Offset 14.9 dB

1 PK MAX

01 2.87 dBm 02 3.13 dBm

Marker 1 [T1] -2.62 dBm 2.42849900 GHz

Center 2.437 GHz 2 MHz/ Span 20 MHz

Date: 15.FEB.2012 20:27:59

* RBW 100 kHz
 * VBW 300 kHz
 Delta 1 [T1]
 -0.27 dB
 16.28000000 MHz
 Ref 20 dBm
 * Att 20 dB
 SWT 5 ms
 20 Offset 14.9 dB
 Marker 1 [T1]
 -2.28 dBm
 2.453860000 GHz
 1 PK
 MAX
 01 3.01 dBm
 02 2.99 dBm
 LVL
 Center 2.462 GHz
 2 MHz/
 Span 20 MHz

Date: 15.FEB.2012 20:42:55

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.

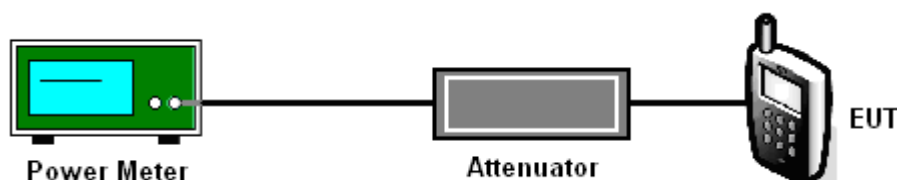
3.2.2 Measuring Instruments

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 :	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	16.49	30	Pass
06	2437	16.58	30	Pass
11	2462	16.44	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	22.36	30	Pass
06	2437	22.57	30	Pass
11	2462	22.48	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

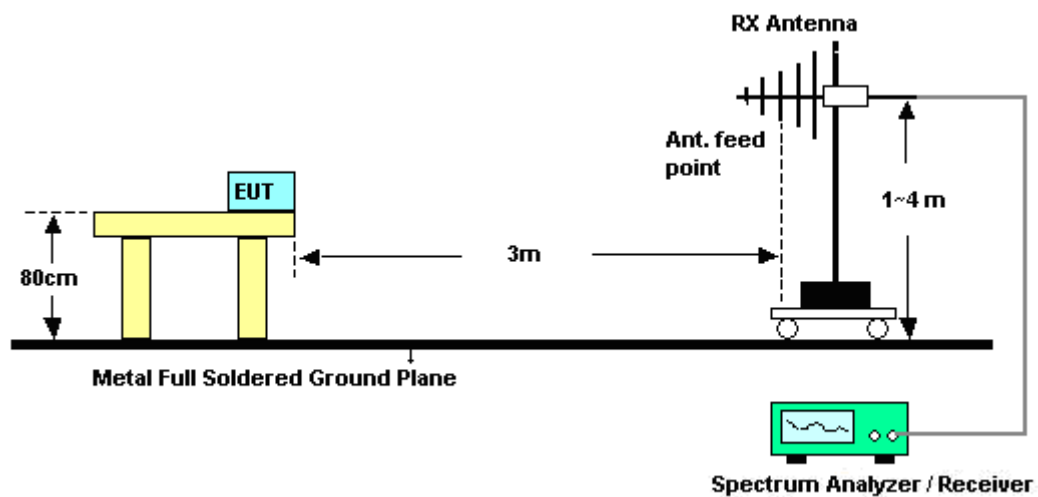
See list of measuring instruments of this test report.

3.3.3 Test Procedures

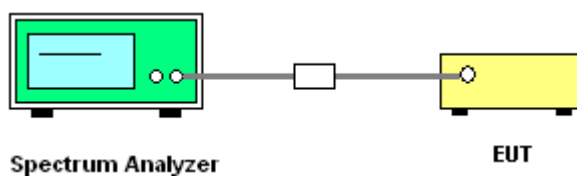
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	40~41%
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
2389.8	53.54	-20.46	74	51.26	32.86	3.47	34.05	100	275	Peak
2389.8	45.2	-8.8	54	42.92	32.86	3.47	34.05	100	275	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.28	51.27	-22.73	74	48.99	32.86	3.47	34.05	100	242	Peak
2388.28	43.3	-10.7	54	41.02	32.86	3.47	34.05	100	242	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Band :	802.11b	Relative Humidity :	40~41%
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	45.99	-8.01	54	43.5	33.01	3.68	34.2	100	278	Average
2483.5	54.39	-19.61	74	51.9	33.01	3.68	34.2	100	278	Peak

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	53.39	-20.61	74	50.9	33.01	3.68	34.2	100	208	Peak
2483.5	43.1	-10.9	54	40.61	33.01	3.68	34.2	100	208	Average



Test Mode :	Mode 4	Temperature :	21~22°C
Test Band :	802.11g	Relative Humidity :	40~41%
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
2388.66	60.5	-13.5	74	58.22	32.86	3.47	34.05	110	0	Peak
2388.66	46.35	-7.65	54	44.07	32.86	3.47	34.05	110	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
2388.66	57.72	-16.28	74	55.44	32.86	3.47	34.05	154	122	Peak
2388.66	44.44	-9.56	54	42.16	32.86	3.47	34.05	154	122	Average

Test Mode :	Mode 6	Temperature :	21~22°C
Test Band :	802.11g	Relative Humidity :	40~41%
Test Channel :	11	Test Engineer :	Jack Li

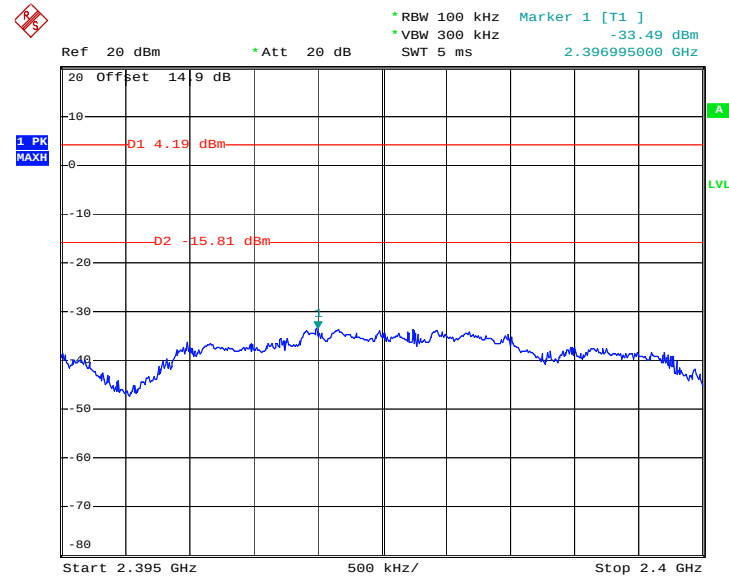
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	59.07	-14.93	74	56.58	33.01	3.68	34.2	105	358	Peak
2483.5	45.63	-8.37	54	43.14	33.01	3.68	34.2	105	358	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
2483.66	59.01	-14.99	74	56.52	33.01	3.68	34.2	198	57	Peak
2483.66	45.87	-8.13	54	43.38	33.01	3.68	34.2	198	57	Average

3.3.6 Test Plots of Conducted Band Edges

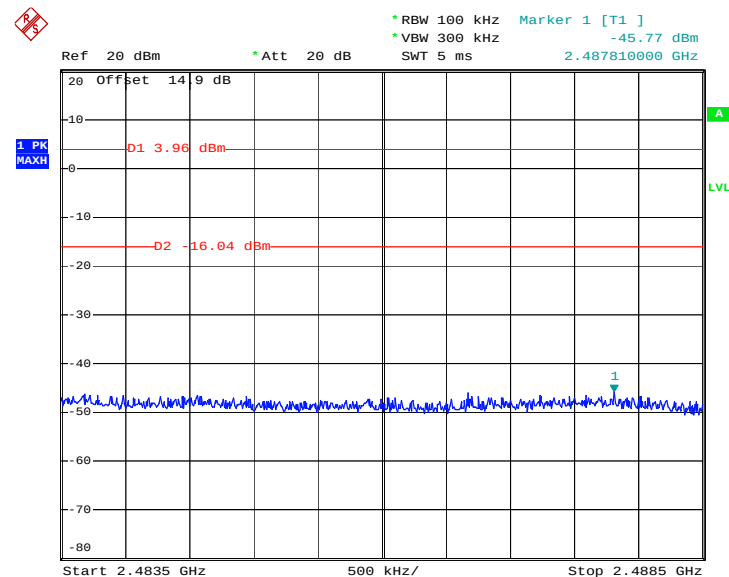
Test Mode :	Mode 1 and 3	Temperature :	23~24°C
Test Band :	802.11b	Relative Humidity :	47~48%
Test Channel :	01 and 11	Test Engineer :	Zhi Lu

Low Band Edge Plot on 802.11b Channel 01



Date: 15.FEB.2012 19:19:06

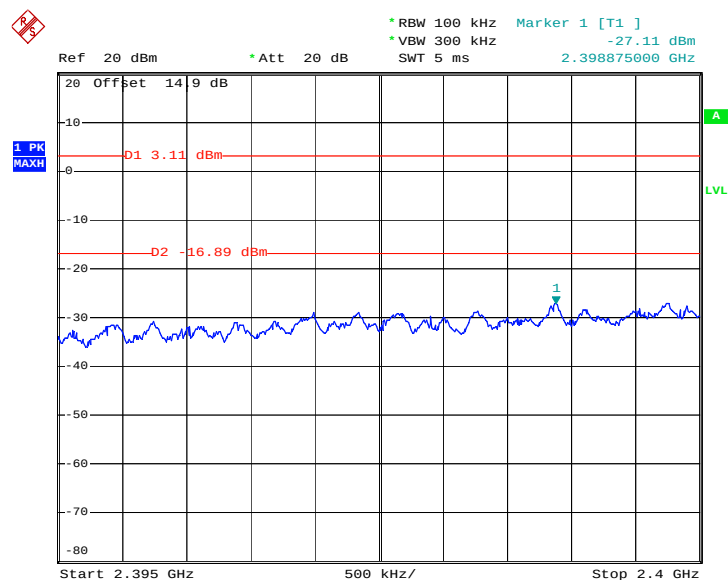
High Band Edge Plot on 802.11b Channel 11



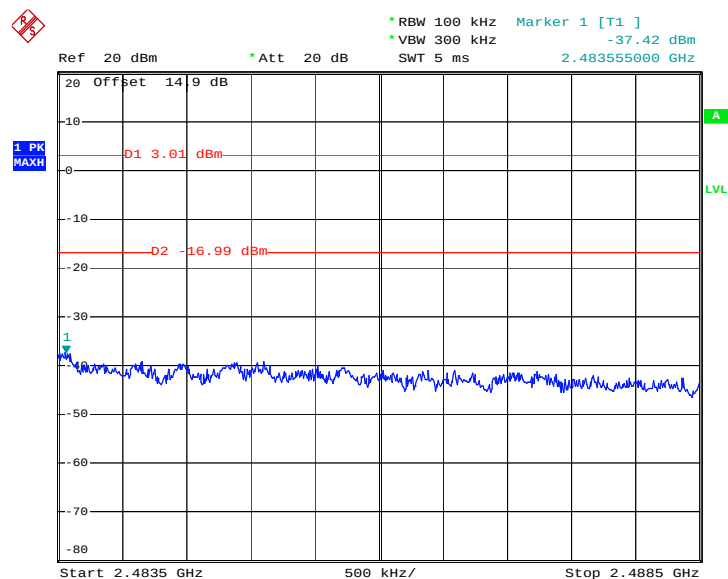
Date: 15.FEB.2012 19:50:17



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: 15.FEB.2012 20:12:32

High Band Edge Plot on 802.11g Channel 11

Date: 15.FEB.2012 20:43:39

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.

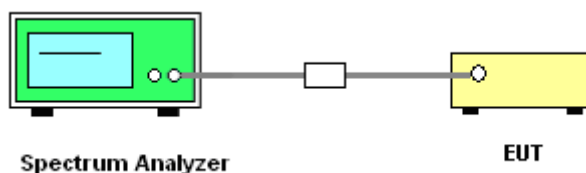
3.4.2 Measuring Instruments

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.

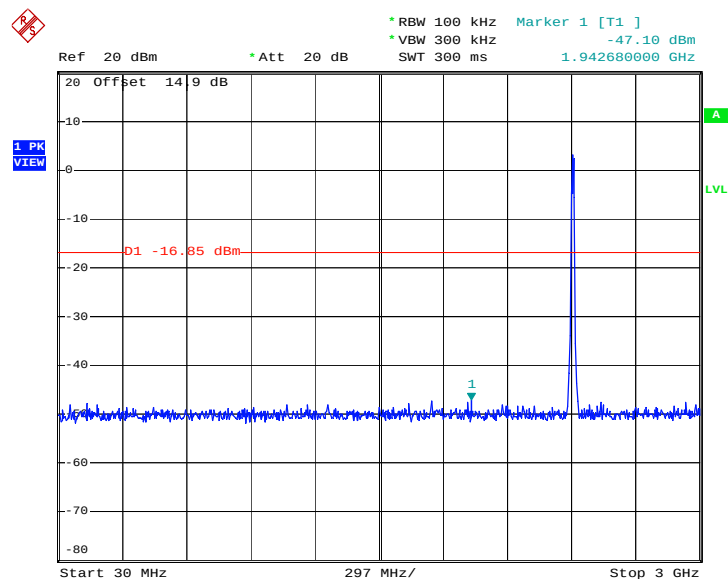
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

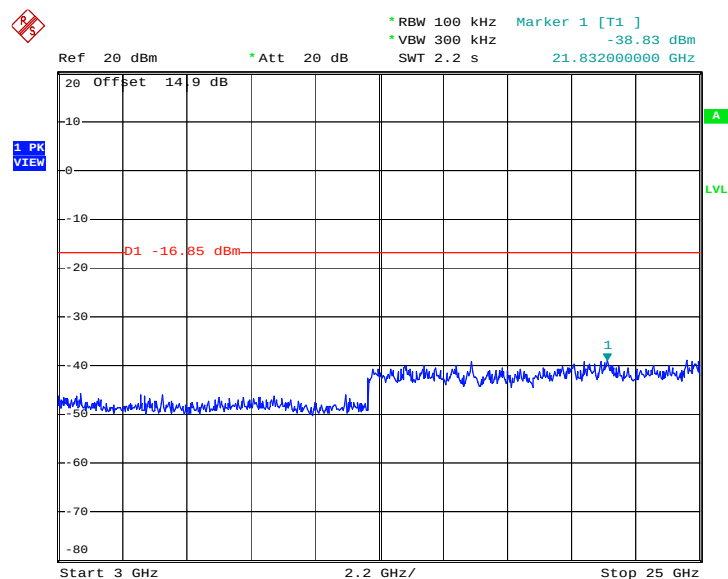
Test Mode :	Mode 1	Temperature :	23~24℃
Test Band :	802.11b	Relative Humidity :	47~48%
Test Channel :	01	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



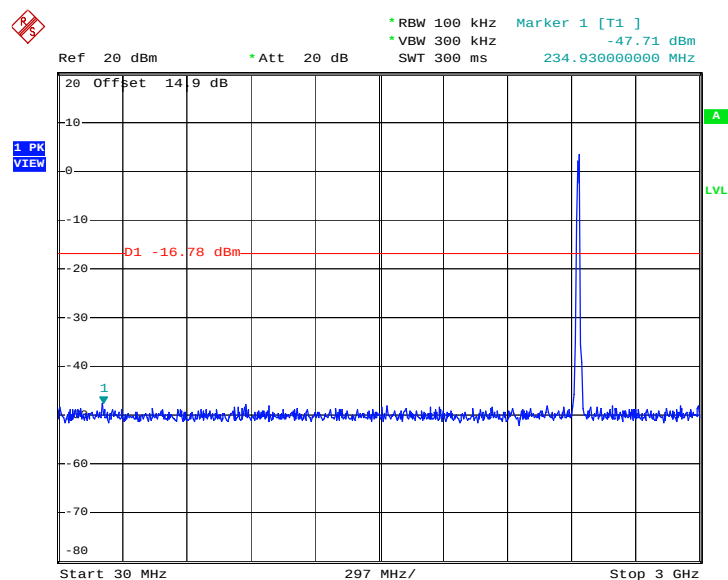
Date: 15.FEB.2012 19:19:38

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

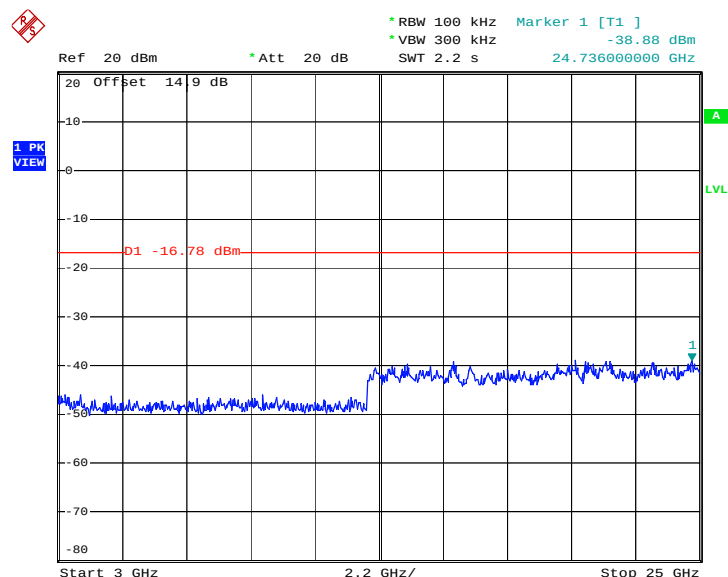


Date: 15.FEB.2012 19:19:55

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: 15.FEB.2012 20:01:21

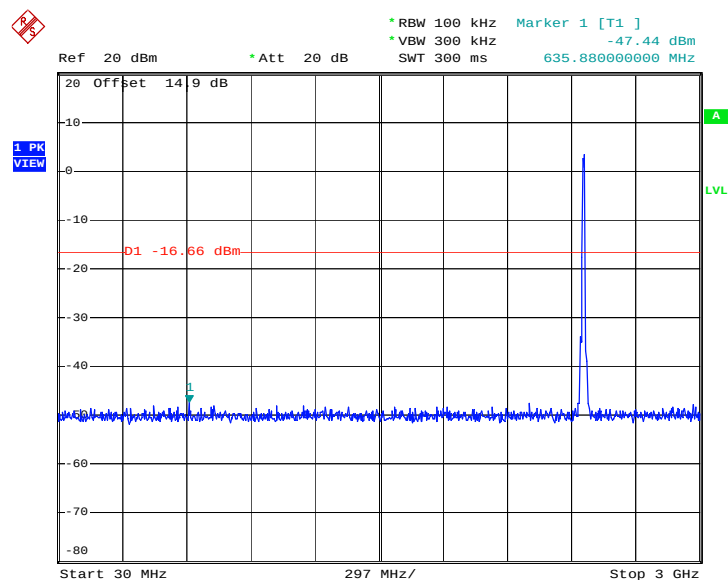
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 15.FEB.2012 20:01:38



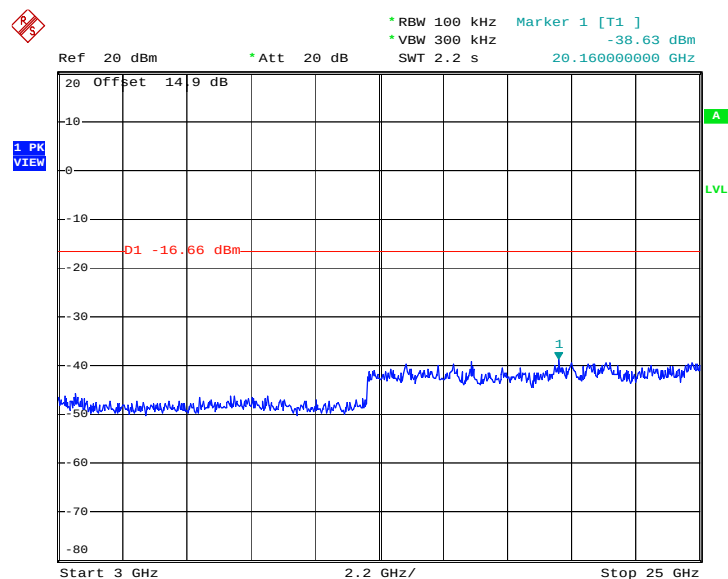
Test Mode :	Mode 3	Temperature :	23~24℃
Test Band :	802.11b	Relative Humidity :	47~48%
Test Channel :	11	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.FEB.2012 19:50:55

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

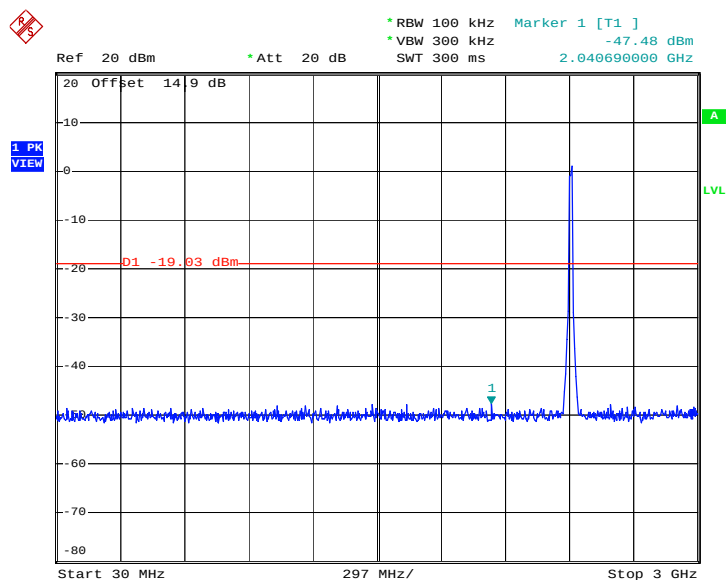


Date: 15.FEB.2012 19:51:12



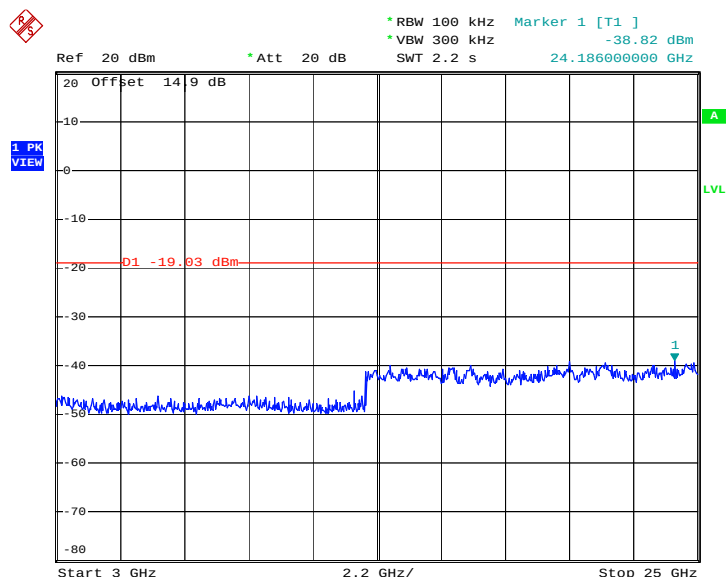
Test Mode :	Mode 4	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	47~48%
Test Channel :	01	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.FEB.2012 20:12:53

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

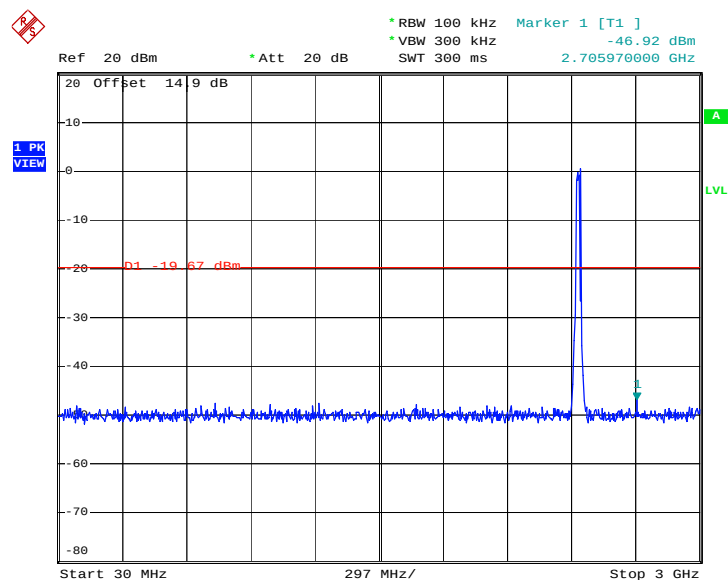


Date: 15.FEB.2012 20:13:10



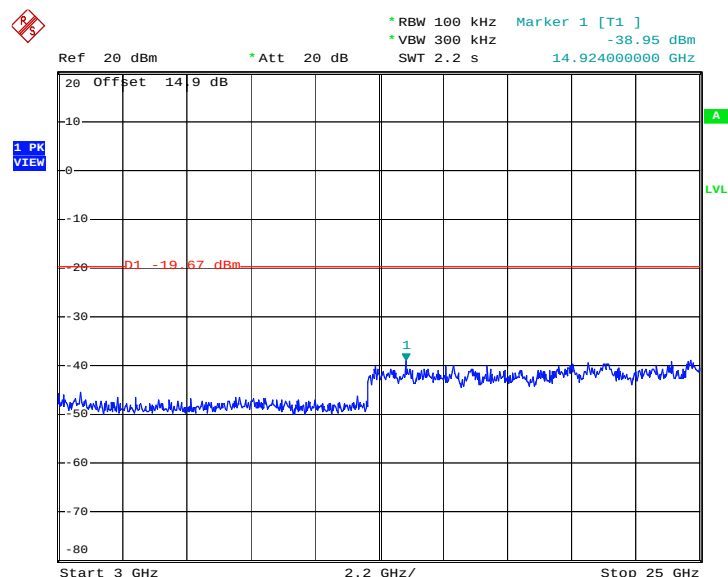
Test Mode :	Mode 5	Temperature :	23~24℃
Test Band :	802.11g	Relative Humidity :	47~48%
Test Channel :	06	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



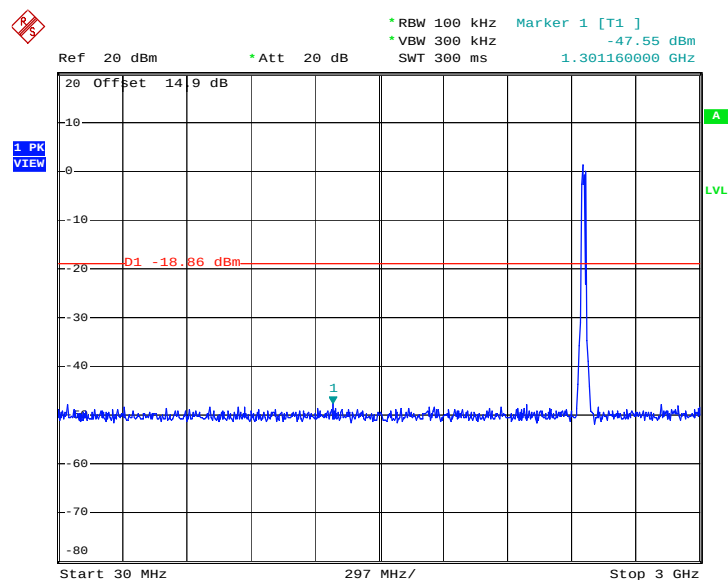
Date: 15.FEB.2012 20:39:30

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

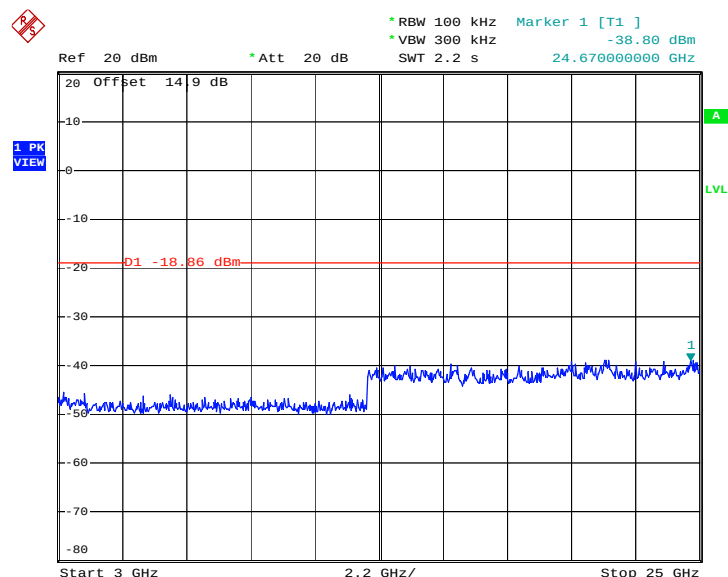


Date: 15.FEB.2012 20:39:47

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: 15.FEB.2012 20:43:59

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 15.FEB.2012 20:44:16

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.

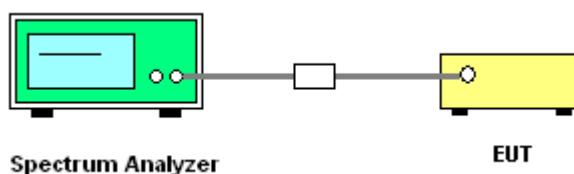
3.5.2 Measuring Instruments

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

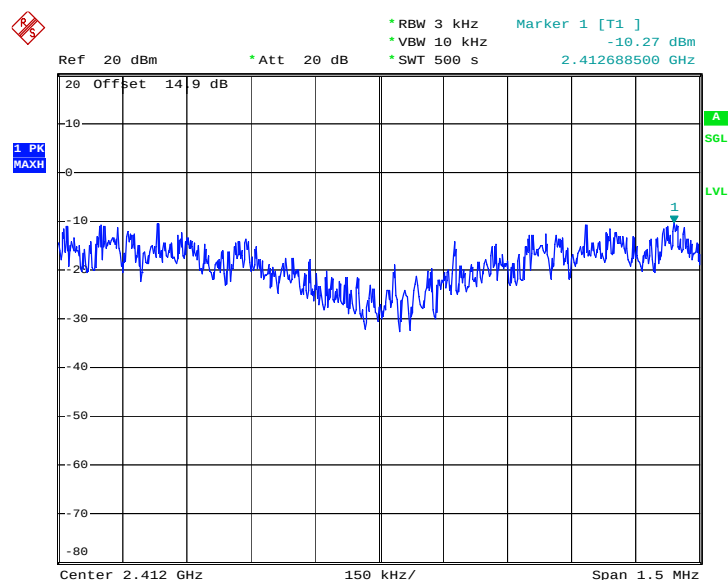


3.5.5 Test Result of Power Spectral Density

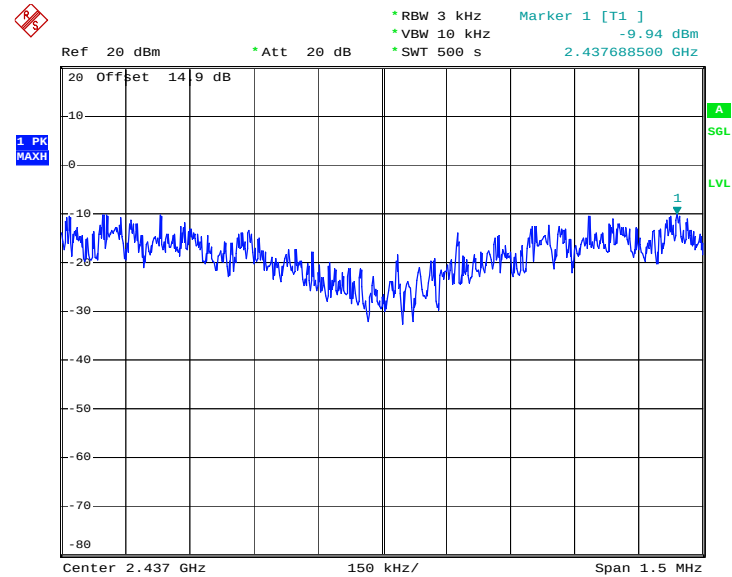
Test Mode :	Mode 1, 2, 3	Temperature :	23~24℃
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-10.27	8	Pass
06	2437	-9.94	8	Pass
11	2462	-10.46	8	Pass

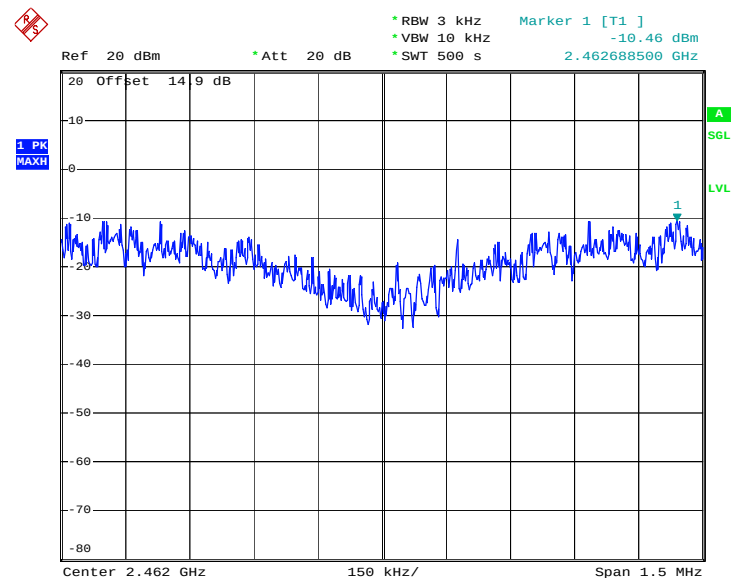
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 15.FEB.2012 19:28:53

Mode 2 : PSD Plot on 802.11b Channel 06


Date: 15.FEB.2012 19:46:00

Mode 3 : PSD Plot on 802.11b Channel 11


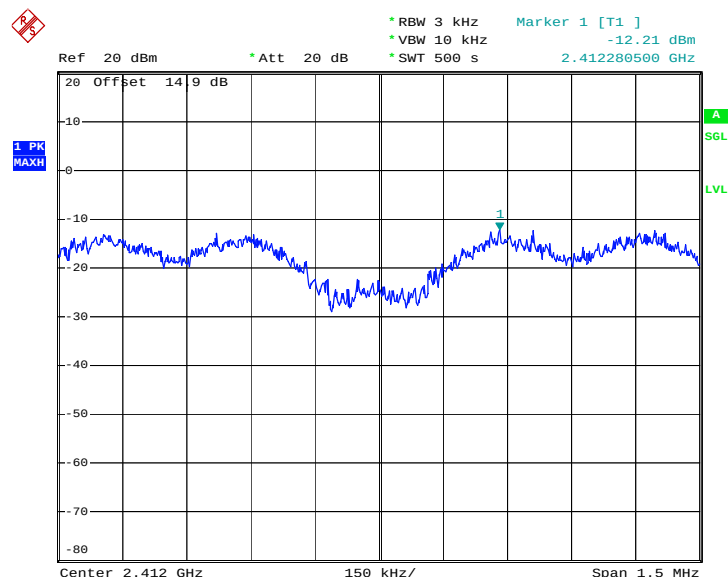
Date: 15.FEB.2012 19:59:46



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	-12.21	8	Pass
06	2437	-12.35	8	Pass
11	2462	-12.23	8	Pass

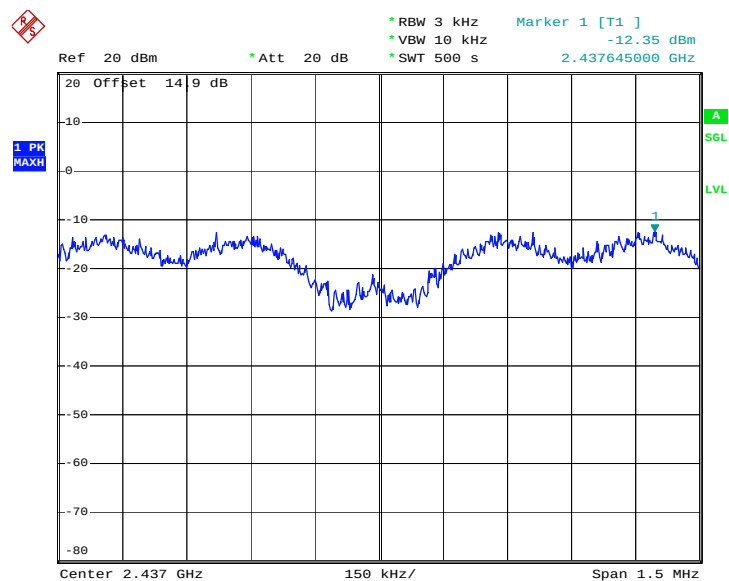
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 15.FEB.2012 20:22:25

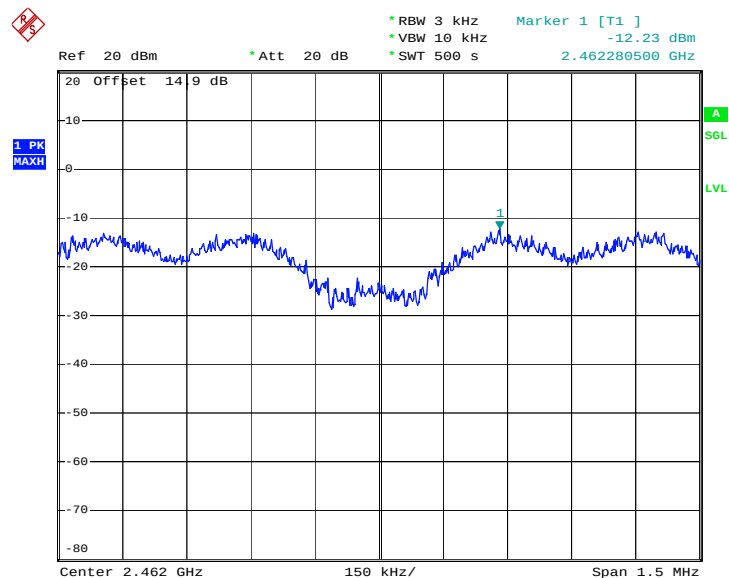


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 15.FEB.2012 20:39:05

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 15.FEB.2012 20:52:50

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.

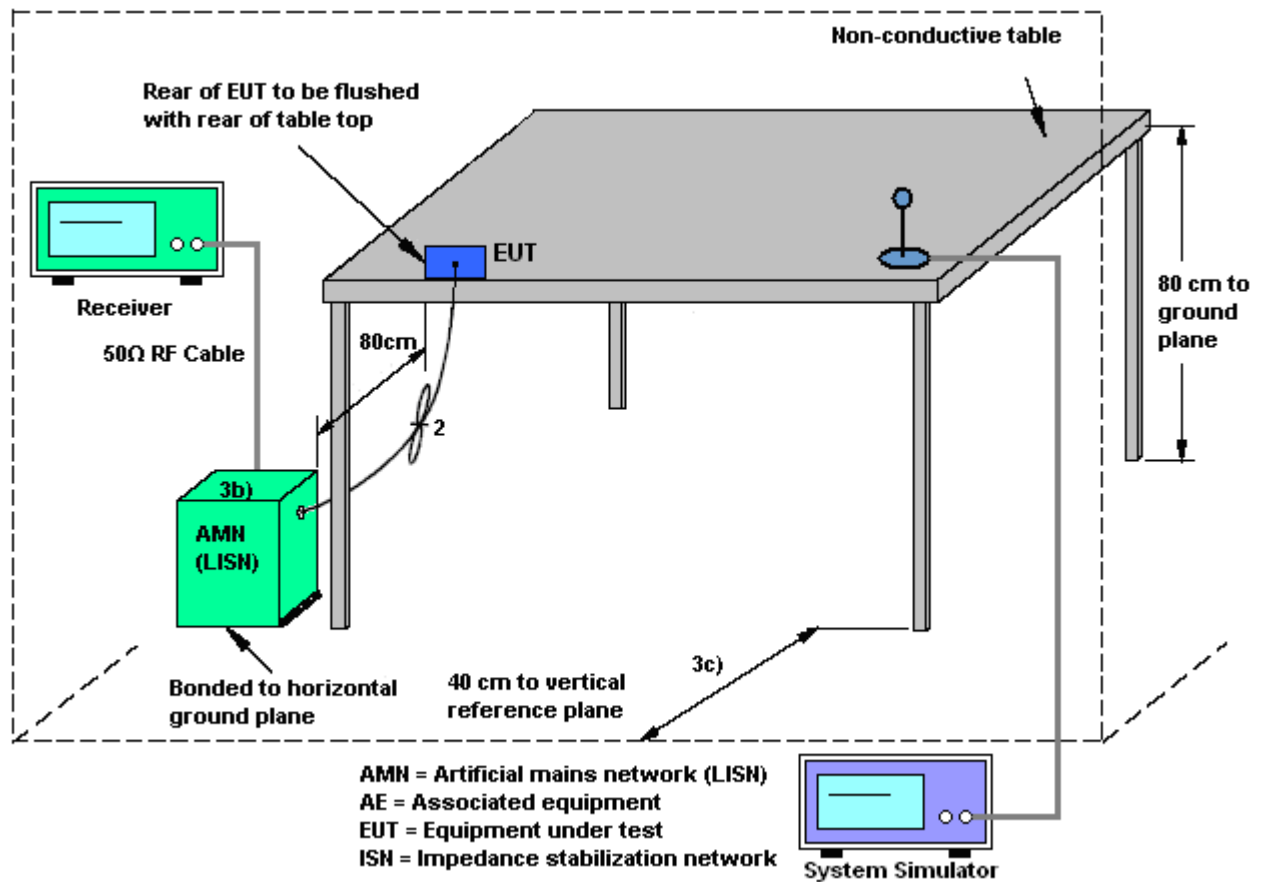
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

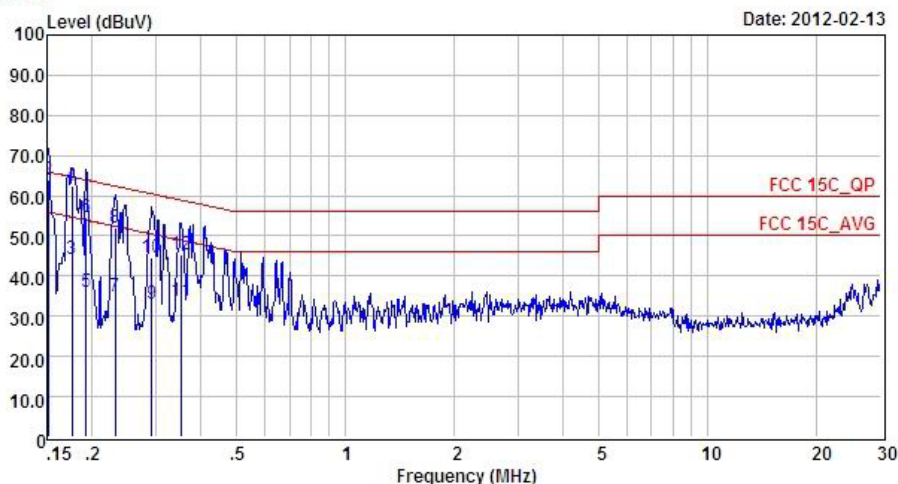
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

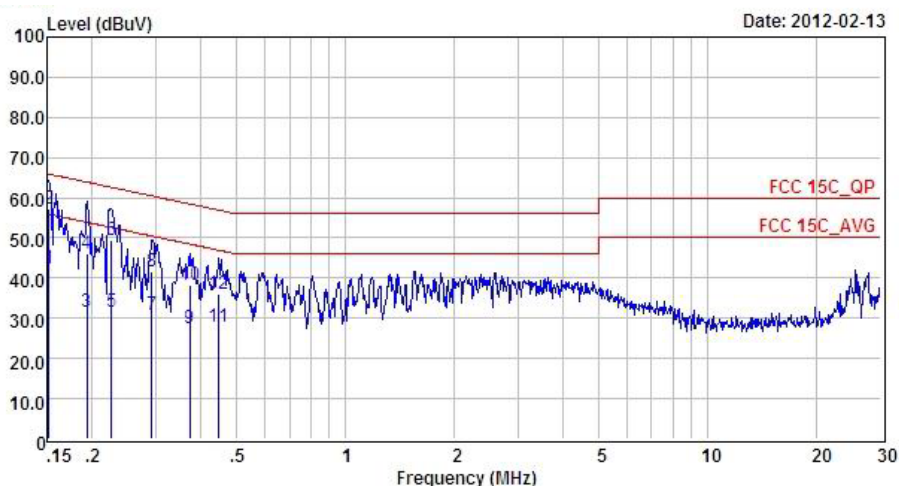
Test Mode :	Mode 1	Temperature :	22~23℃
Test Engineer :	King Liu	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	CDMA 850 Idle + Bluetooth Link + WLAN Link + Adapter + Camera		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_L_2000601 LINE
Project : (FR)220101
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	0.15	45.58	-10.38	55.96	35.50	0.03	10.05	Average
2	0.15	63.78	-2.18	65.96	53.70	0.03	10.05	QP
3	0.18	44.38	-10.30	54.68	34.30	0.03	10.05	Average
4	0.18	62.48	-2.20	64.68	52.40	0.03	10.05	QP
5	0.19	36.08	-17.85	53.93	26.00	0.03	10.05	Average
6	0.19	54.78	-9.15	63.93	44.70	0.03	10.05	QP
7	0.23	34.88	-17.51	52.39	24.80	0.02	10.06	Average
8	0.23	52.18	-10.21	62.39	42.10	0.02	10.06	QP
9	0.29	33.09	-17.37	50.46	23.01	0.02	10.06	Average
10	0.29	44.79	-15.67	60.46	34.71	0.02	10.06	QP
11	0.35	33.89	-15.02	48.91	23.80	0.02	10.07	Average
12	0.35	45.29	-13.62	58.91	35.20	0.02	10.07	QP

Test Mode :	Mode 1	Temperature :	22~23°C
Test Engineer :	King Liu	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	CDMA 850 Idle + Bluetooth Link + WLAN Link + Adapter + Camera		
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)220101
Mode : Model

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV		dBuV	dBuV	dB	dB	
1	0.15	42.27	-13.64	55.91	32.20	0.02	10.05	Average
2	0.15	57.17	-8.74	65.91	47.10	0.02	10.05	QP
3	0.19	31.67	-22.22	53.89	21.60	0.02	10.05	Average
4	0.19	45.97	-17.92	63.89	35.90	0.02	10.05	QP
5	0.23	31.68	-20.93	52.61	21.60	0.02	10.06	Average
6	0.23	49.28	-13.33	62.61	39.20	0.02	10.06	QP
7	0.29	30.98	-19.48	50.46	20.90	0.02	10.06	Average
8	0.29	41.78	-18.68	60.46	31.70	0.02	10.06	QP
9	0.37	27.59	-20.88	48.47	17.50	0.02	10.07	Average
10	0.37	38.39	-20.08	58.47	28.30	0.02	10.07	QP
11	0.45	27.80	-19.13	46.93	17.70	0.02	10.08	Average
12	0.45	36.00	-20.93	56.93	25.90	0.02	10.08	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

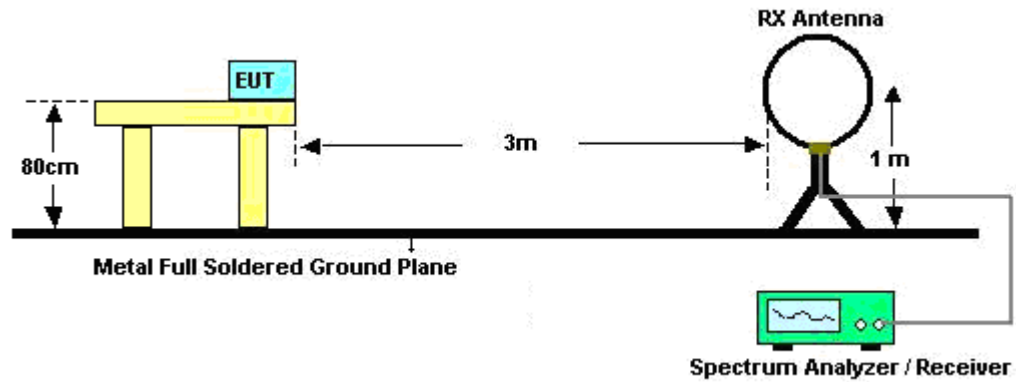
See list of measuring instruments of this test report.

3.7.3 Test Procedures

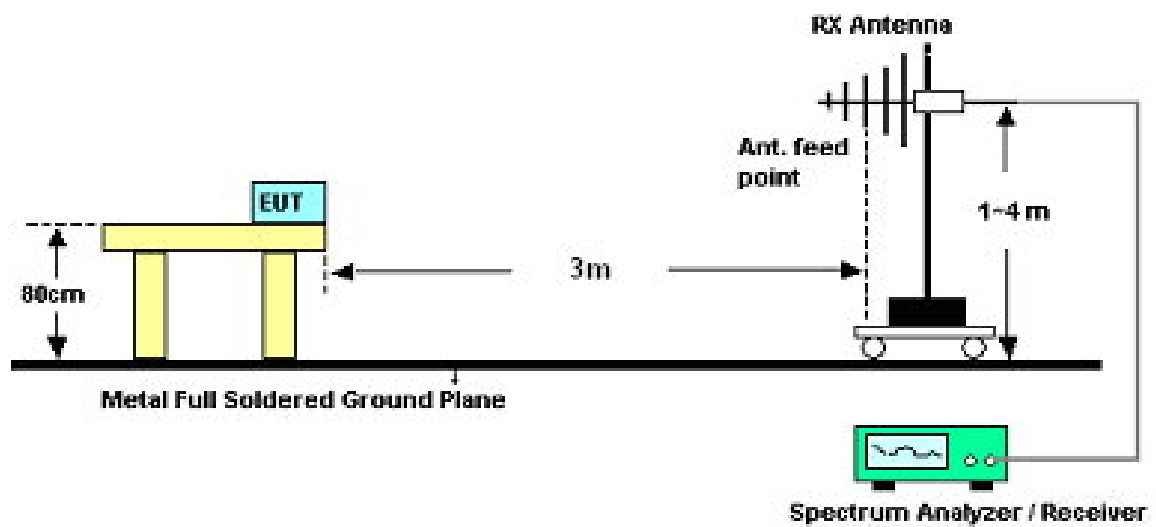
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep =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

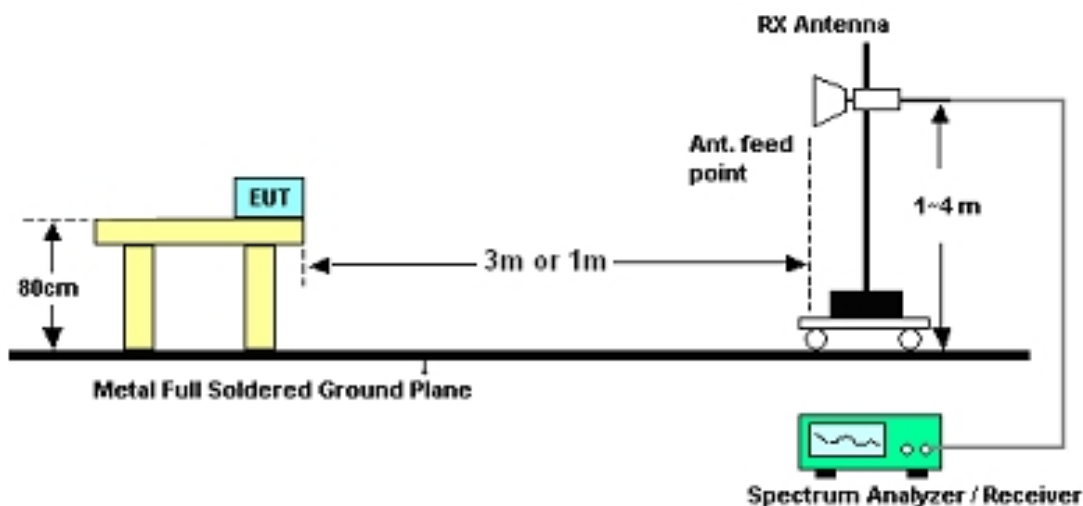
For radiated emissions below 30MHz



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 :	Jack Li	Temperature :	21~22℃	
		Relative Humidity :	40~41%	

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 :	40~41%
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
80.76	17.9	-22.1	40	40.99	6.6	0.35	30.04	-	-	Peak
102.36	25.51	-17.99	43.5	44.18	10.87	0.42	29.96	100	28	Peak
161.49	20.27	-23.23	43.5	40.14	9.53	0.53	29.93	-	-	Peak
816.6	23.96	-22.04	46	32.28	20.03	1.26	29.61	-	-	Peak
944	24.41	-29.59	54	31.9	20.71	1.33	29.53	-	-	Peak
960.1	29.01	-24.99	54	36.42	20.79	1.34	29.54	-	-	Peak
2389.8	53.54	-20.46	74	51.26	32.86	3.47	34.05	100	275	Peak
2389.8	45.2	-8.8	54	42.92	32.86	3.47	34.05	100	275	Average
2412	102.84	-	-	100.51	32.89	3.52	34.08	101	273	Average
2412	107.26	-	-	104.93	32.89	3.52	34.08	101	273	Peak
2488.6	49.18	-24.82	74	46.64	33.05	3.72	34.23	120	311	Peak
2488.6	37.02	-16.98	54	34.48	33.05	3.72	34.23	120	311	Average

Test Mode :	Mode 1	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	40~41%
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
88.86	24.79	-18.71	43.5	45.78	8.61	0.39	29.99	-	-	Peak
102.36	25.94	-17.56	43.5	44.61	10.87	0.42	29.96	100	0	Peak
161.22	25.13	-18.37	43.5	44.98	9.56	0.53	29.94	-	-	Peak
783	22.31	-23.69	46	30.8	19.86	1.23	29.58	-	-	Peak
872.6	23.56	-22.44	46	31.37	20.48	1.29	29.58	-	-	Peak
960.1	28.99	-25.01	54	36.4	20.79	1.34	29.54	-	-	Peak
2388.28	51.27	-22.73	74	48.99	32.86	3.47	34.05	100	242	Peak
2388.28	43.3	-10.7	54	41.02	32.86	3.47	34.05	100	242	Average
2412	103.01	-	-	100.68	32.89	3.52	34.08	100	240	Peak
2412	98.71	-	-	96.38	32.89	3.52	34.08	100	240	Average
2485.18	49.42	-24.58	74	46.93	33.01	3.68	34.2	102	122	Peak
2485.18	39.67	-14.33	54	37.18	33.01	3.68	34.2	102	122	Average

Test Mode :	Mode 2	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	40~41%
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
86.16	20.55	-19.45	40	42.3	7.89	0.37	30.01	-	-	Peak
102.36	25.32	-18.18	43.5	43.99	10.87	0.42	29.96	100	10	Peak
161.49	21.19	-22.31	43.5	41.06	9.53	0.53	29.93	-	-	Peak
800.5	25.51	-20.49	46	34	19.85	1.25	29.59	-	-	Peak
960.1	26.41	-27.59	54	33.82	20.79	1.34	29.54	-	-	Peak
994.4	26.64	-27.36	54	33.68	21.07	1.41	29.52	-	-	Peak
2359.21	49.74	-24.26	74	47.53	32.81	3.38	33.98	102	315	Peak
2359.21	35.69	-18.31	54	33.48	32.81	3.38	33.98	102	315	Average
2437	107.59	-	-	105.19	32.95	3.6	34.15	100	273	Peak
2437	104.21	-	-	101.81	32.95	3.6	34.15	100	273	Average
2496.96	50	-24	74	47.46	33.05	3.72	34.23	153	248	Peak
2496.96	36.64	-17.36	54	34.1	33.05	3.72	34.23	153	248	Average

Test Mode :	Mode 2	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	40~41%
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
85.89	30.72	-9.28	40	52.47	7.89	0.37	30.01	100	0	Peak
101.55	24.93	-18.57	43.5	43.74	10.74	0.41	29.96	-	-	Peak
161.49	25.77	-17.73	43.5	45.64	9.53	0.53	29.93	-	-	Peak
871.9	23.38	-22.62	46	31.19	20.49	1.29	29.59	-	-	Peak
960.1	29.55	-24.45	54	36.96	20.79	1.34	29.54	-	-	Peak
997.9	25.59	-28.41	54	32.6	21.09	1.42	29.52	-	-	Peak
2363.58	46.93	-27.07	74	44.72	32.81	3.38	33.98	100	321	Peak
2363.58	34.69	-19.31	54	32.48	32.81	3.38	33.98	100	321	Average
2437	96.33	-	-	93.93	32.95	3.6	34.15	100	247	Average
2437	104.18	-	-	101.78	32.95	3.6	34.15	100	247	Peak
2498.1	46.1	-27.9	74	43.56	33.05	3.72	34.23	125	244	Peak
2498.1	33.73	-20.27	54	31.19	33.05	3.72	34.23	125	244	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	40~41%
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
85.89	20.79	-19.21	40	42.54	7.89	0.37	30.01	-	-	Peak
102.36	25.66	-17.84	43.5	44.33	10.87	0.42	29.96	100	20	Peak
161.49	20.47	-23.03	43.5	40.34	9.53	0.53	29.93	-	-	Peak
773.9	25.83	-20.17	46	34.3	19.88	1.21	29.56	-	-	Peak
850.2	26.11	-19.89	46	33.98	20.51	1.28	29.66	-	-	Peak
960.1	28.75	-25.25	54	36.16	20.79	1.34	29.54	-	-	Peak
2351.23	49.93	-24.07	74	47.76	32.78	3.33	33.94	102	279	Peak
2351.23	40.41	-13.59	54	38.24	32.78	3.33	33.94	102	279	Average
2462	104.83	-	-	102.38	32.98	3.64	34.17	100	273	Peak
2462	100.8	-	-	98.35	32.98	3.64	34.17	100	273	Average
2483.5	45.99	-8.01	54	43.5	33.01	3.68	34.2	100	278	Average
2483.5	54.39	-19.61	74	51.9	33.01	3.68	34.2	100	278	Peak

Test Mode :	Mode 3	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	40~41%
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
85.62	30.8	-9.2	40	52.74	7.7	0.37	30.01	100	201	Peak
102.09	25.21	-18.29	43.5	44.02	10.74	0.41	29.96	-	-	Peak
161.49	26.37	-17.13	43.5	46.24	9.53	0.53	29.93	-	-	Peak
731.9	24.02	-21.98	46	32.73	19.72	1.17	29.6	-	-	Peak
872.6	23.67	-22.33	46	31.48	20.48	1.29	29.58	-	-	Peak
960.1	29.31	-24.69	54	36.72	20.79	1.34	29.54	-	-	Peak
2387.9	49.92	-24.08	74	47.64	32.86	3.47	34.05	100	103	Peak
2387.9	40.49	-13.51	54	38.21	32.86	3.47	34.05	100	103	Average
2462	100.83	-	-	98.38	32.98	3.64	34.17	100	80	Peak
2462	96.96	-	-	94.51	32.98	3.64	34.17	100	80	Average
2483.5	53.39	-20.61	74	50.9	33.01	3.68	34.2	100	208	Peak
2483.5	43.1	-10.9	54	40.61	33.01	3.68	34.2	100	208	Average

Test Mode :	Mode 4	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	40~41%
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
101.01	25.7	-17.8	43.5	44.63	10.62	0.41	29.96	100	106	Peak
161.76	21.53	-21.97	43.5	41.4	9.53	0.53	29.93	-	-	Peak
233.58	24.86	-21.14	46	42.9	11.17	0.65	29.86	-	-	Peak
817.3	25.67	-20.33	46	33.97	20.05	1.26	29.61	-	-	Peak
960.1	30.87	-23.13	54	38.28	20.79	1.34	29.54	-	-	Peak
993	26.77	-27.23	54	33.82	21.06	1.41	29.52	-	-	Peak
2388.66	60.5	-13.5	74	58.22	32.86	3.47	34.05	110	0	Peak
2388.66	46.35	-7.65	54	44.07	32.86	3.47	34.05	110	0	Average
2412	101.32	-	-	98.99	32.89	3.52	34.08	106	360	Peak
2412	91.51	-	-	89.18	32.89	3.52	34.08	106	360	Average
2487.08	49.36	-24.64	74	46.87	33.01	3.68	34.2	105	354	Peak
2487.08	37.95	-16.05	54	35.46	33.01	3.68	34.2	105	354	Average

Test Mode :	Mode 4	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	40~41%
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
85.62	30.43	-9.57	40	52.37	7.7	0.37	30.01	100	201	Peak
102.36	24.54	-18.96	43.5	43.21	10.87	0.42	29.96	-	-	Peak
161.22	25.73	-17.77	43.5	45.58	9.56	0.53	29.94	-	-	Peak
872.6	23.6	-22.4	46	31.41	20.48	1.29	29.58	-	-	Peak
960.1	28.16	-25.84	54	35.57	20.79	1.34	29.54	-	-	Peak
992.3	26.29	-27.71	54	33.34	21.06	1.41	29.52	-	-	Peak
2388.66	57.72	-16.28	74	55.44	32.86	3.47	34.05	154	122	Peak
2388.66	44.44	-9.56	54	42.16	32.86	3.47	34.05	154	122	Average
2412	98.64	-	-	96.31	32.89	3.52	34.08	169	60	Peak
2412	88.17	-	-	85.84	32.89	3.52	34.08	169	60	Average
2487.65	49.46	-24.54	74	46.92	33.05	3.72	34.23	200	0	Peak
2487.65	40.03	-13.97	54	37.49	33.05	3.72	34.23	200	0	Average

Test Mode :	Mode 5	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	40~41%
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
86.16	20.51	-19.49	40	42.26	7.89	0.37	30.01	-	-	Peak
102.36	23.91	-19.59	43.5	42.58	10.87	0.42	29.96	-	-	Peak
161.22	21.04	-22.46	43.5	40.89	9.56	0.53	29.94	-	-	Peak
848.8	27.02	-18.98	46	34.9	20.5	1.28	29.66	100	213	Peak
897.1	25.94	-20.06	46	33.68	20.45	1.3	29.49	-	-	Peak
960.1	28.43	-25.57	54	35.84	20.79	1.34	29.54	-	-	Peak
2364.34	49.85	-24.15	74	47.64	32.81	3.38	33.98	175	344	Peak
2364.34	38.79	-15.21	54	36.58	32.81	3.38	33.98	175	344	Average
2437	104.96	-	-	102.56	32.95	3.6	34.15	192	360	Peak
2437	95.32	-	-	92.92	32.95	3.6	34.15	192	360	Average
2495.06	49.55	-24.45	74	47.01	33.05	3.72	34.23	120	243	Peak
2495.06	40.03	-13.97	54	37.49	33.05	3.72	34.23	120	243	Average

Test Mode :	Mode 5	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	40~41%
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
85.35	30.34	-9.66	40	52.28	7.7	0.37	30.01	100	60	Peak
101.55	23.65	-19.85	43.5	42.46	10.74	0.41	29.96	-	-	Peak
161.22	24.73	-18.77	43.5	44.58	9.56	0.53	29.94	-	-	Peak
580.7	23.47	-22.53	46	33.49	18.57	1.05	29.64	-	-	Peak
630.4	22.95	-23.05	46	32.72	18.79	1.08	29.64	-	-	Peak
960.1	28.43	-25.57	54	35.84	20.79	1.34	29.54	-	-	Peak
2312.85	49.38	-24.62	74	47.29	32.73	3.22	33.86	189	102	Peak
2312.85	38.36	-15.64	54	36.27	32.73	3.22	33.86	189	102	Average
2437	100.86	-	-	98.46	32.95	3.6	34.15	200	52	Peak
2437	90.52	-	-	88.12	32.95	3.6	34.15	200	52	Average
2489.36	49.95	-24.05	74	47.41	33.05	3.72	34.23	155	56	Peak
2489.36	38.3	-15.7	54	35.76	33.05	3.72	34.23	155	56	Average

Test Mode :	Mode 6	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	40~41%
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
88.86	20.6	-22.9	43.5	41.59	8.61	0.39	29.99	-	-	Peak
102.09	24.18	-19.32	43.5	42.99	10.74	0.41	29.96	100	0	Peak
161.49	20.71	-22.79	43.5	40.58	9.53	0.53	29.93	-	-	Peak
850.2	26.52	-19.48	46	34.39	20.51	1.28	29.66	-	-	Peak
890.8	25.09	-20.91	46	32.84	20.46	1.3	29.51	-	-	Peak
960.1	27.4	-26.6	54	34.81	20.79	1.34	29.54	-	-	Peak
2360.92	49.92	-24.08	74	47.71	32.81	3.38	33.98	125	348	Peak
2360.92	38.88	-15.12	54	36.67	32.81	3.38	33.98	125	348	Average
2462	100.91	-	-	98.46	32.98	3.64	34.17	103	360	Peak
2462	90.67	-	-	88.22	32.98	3.64	34.17	103	360	Average
2483.5	59.07	-14.93	74	56.58	33.01	3.68	34.2	105	358	Peak
2483.5	45.63	-8.37	54	43.14	33.01	3.68	34.2	105	358	Average

Test Mode :	Mode 6	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	40~41%
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
86.16	28.81	-11.19	40	50.56	7.89	0.37	30.01	100	201	Peak
102.36	24.27	-19.23	43.5	42.94	10.87	0.42	29.96	-	-	Peak
161.49	25.25	-18.25	43.5	45.12	9.53	0.53	29.93	-	-	Peak
582.1	23.77	-22.23	46	33.79	18.57	1.05	29.64	-	-	Peak
944	26.51	-27.49	54	34	20.71	1.33	29.53	-	-	Peak
960.1	29.33	-24.67	54	36.74	20.79	1.34	29.54	-	-	Peak
2378.78	50	-24	74	47.76	32.83	3.42	34.01	167	249	Peak
2378.78	38.73	-15.27	54	36.49	32.83	3.42	34.01	167	249	Average
2462	98.8	-	-	96.35	32.98	3.64	34.17	200	54	Peak
2462	88.12	-	-	85.67	32.98	3.64	34.17	200	54	Average
2483.66	59.01	-14.99	74	56.52	33.01	3.68	34.2	198	57	Peak
2483.66	45.87	-8.13	54	43.38	33.01	3.68	34.2	198	57	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	Feb. 15, 2012	Dec. 29, 2012	Conducted (TH01-KS)
DC Power Supply	TOPWARD	GPS-3030D	E1884515	N/A	Aug. 23, 2011	Feb. 15, 2012	Aug. 22, 2012	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-9605 02	N/A	Dec. 30, 2011	Feb. 15, 2012	Dec. 29, 2012	Conducted (TH01-KS)
EMI TEST Receiver	R&S	ECSI	100724	9K-3GHz	Mar. 08, 2011	Feb. 13, 2012	Mar. 07, 2012	Conduction (CO01-SZ)
AC LISN	ETS-LINDGRE N	3816/2SH	00103912	0.1MHz~108MHz	Feb. 28, 2011	Feb. 13, 2012	Feb. 27, 2012	Conduction (CO01-SZ)
AC LISN	ETS-LINDGRE N	3816/2SH	00103892	0.1MHz~108MHz	Feb. 28, 2011	Feb. 13, 2012	Feb. 27, 2012	Conduction (CO01-SZ)
AVR	Throma	61602	616020000 891N/A	/	Oct. 12, 2011	Feb. 13, 2012	Oct. 11, 2012	Conduction (CO01-SZ)
AC Filter	ETS-LINDGRE N	LRE-2030/PE N 256260	00093783	/	N/A	Feb. 13, 2012	N/A	Conduction (CO01-SZ)
AC Filter	ETS-LINDGRE N	LRE-2030/PE N 256260	00097973	/	N/A	Feb. 13, 2012	N/A	Conduction (CO01-SZ)
System Simulator	Aglient	E5515C	MY502641 68	GSM/WCDMA /CDMA2000	Mar. 14, 2011	Feb. 13, 2012	Mar. 13, 2012	Conduction (CO01-SZ)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 09, 2011	Feb. 20, 2012	Nov. 08, 2012	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 30, 2011	Feb. 20, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 08, 2011	Feb. 20, 2012	Dec. 07, 2012	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/00	9 kHz~30 MHz	Jul. 28, 2011	Feb. 20, 2012	Jul. 27, 2012	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 06, 2012	Feb. 20, 2012	Jan. 05, 2013	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 30, 2011	Feb. 20, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A023 70	1GHz~26.5GHz	Dec. 30, 2011	Feb. 20, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 07, 2011	Feb. 20, 2012	Nov. 06, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA1702 49	15GHz~40GHz	Oct. 11, 2011	Feb. 20, 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 = $20\log(1-\Gamma_1*\Gamma_2)$	+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 EP220101 as below.