

# FCC RF Test Report

APPLICANT : ZTE CORPORATION  
EQUIPMENT : Vodafone Mobile Wi-Fi  
BRAND NAME : ZTE  
MODEL NAME : R203-Z  
FCC ID : Q78-R203-Z  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Dec. 02, 2011 and completely tested on Jan. 29, 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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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.2	15.247(b)	Power Output	≤ 30dBm	Pass	-
3.3	15.247(d)	Frequency Band Edges	≤ 20dBc	Pass	-
3.4	15.247(d)	Spurious Emission	< 20 dBc	Pass	-
3.5	15.247(e)	Power Spectral Density	≤ 8dBm	Pass	-
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 18.39 dB at 1.81 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

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

## 1.2 Manufacturer

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
<b>Equipment</b>	Vodafone Mobile Wi-Fi
<b>Brand Name</b>	ZTE
<b>Model Name</b>	R203-Z
<b>FCC ID</b>	Q78-R203-Z
<b>Tx/Rx Frequency Range</b>	2400 MHz ~ 2483.5 MHz
<b>Number of Channels</b>	11
<b>Carrier Frequency of Each Channel</b>	2412+(n-1)*5 MHz; n=1~11
<b>Channel Spacing</b>	5 MHz
<b>Maximum Output Power to Antenna</b>	802.11b : 18.21 dBm (0.066 W) 802.11g : 23.25 dBm (0.211 W) 802.11n (BW 20MHz) : 22.21 dBm (0.166 W)
<b>Antenna Type</b>	Chip Antenna with gain 0.10 dBi
<b>HW Version</b>	Ver.B(T5)
<b>SW Version</b>	BD_R203V2.1
<b>Type of Modulation</b>	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
<b>EUT Stage</b>	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

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.		
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		
	TH01-KS	CO01-KS	03CH01-KS

### 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003

**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	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	Acer	Trave Imate 2413Lci	QDS-BRCM1016	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m

## 2 Test Configuration of Equipment Under Test

### 2.1 RF Power

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

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	18.21	18.17	18.18	18.2
CH 06	2437 MHz	17.78	17.66	17.72	17.75
CH 11	2462 MHz	17.75	17.64	17.73	17.71

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	22.02	21.82	21.92	21.59	22.81	23.15	23.03	23.07
CH 06	2437 MHz	21.68	21.48	21.56	21.12	22.59	22.93	22.54	22.74
CH 11	2462 MHz	22.08	21.88	22.03	21.68	22.89	23.25	23.13	23.17

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		MCS=0	MCS=1	MCS=2	MCS=3	MCS=4	MCS=5	MCS=6	MCS=7
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 01	2412 MHz	21.79	21.64	21.74	22.21	21.23	21.96	21.34	20.38
CH 06	2437 MHz	21.53	21.47	21.31	22.07	22.03	21.48	21.02	20.03
CH 11	2462 MHz	21.71	21.63	21.76	22.17	21.14	21.67	21.21	20.12

**Remark:**

1. The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 36Mbps for 802.11g, and 26Mbps for 802.11n (BW 20MHz) for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

## 2.2 Test Mode

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

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

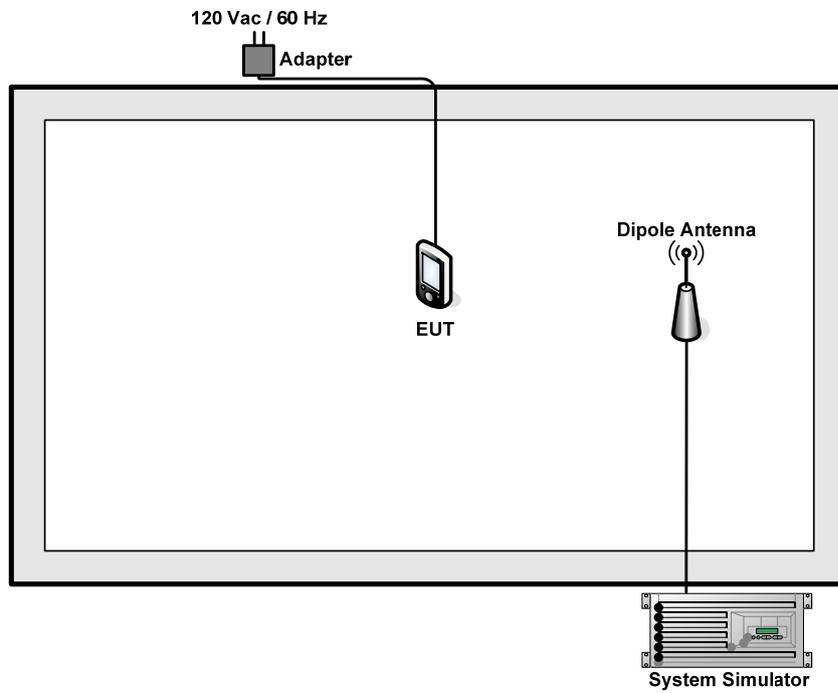
The following tables are showing the test modes as the worst cases (E2 & H plane) and recorded in this report.

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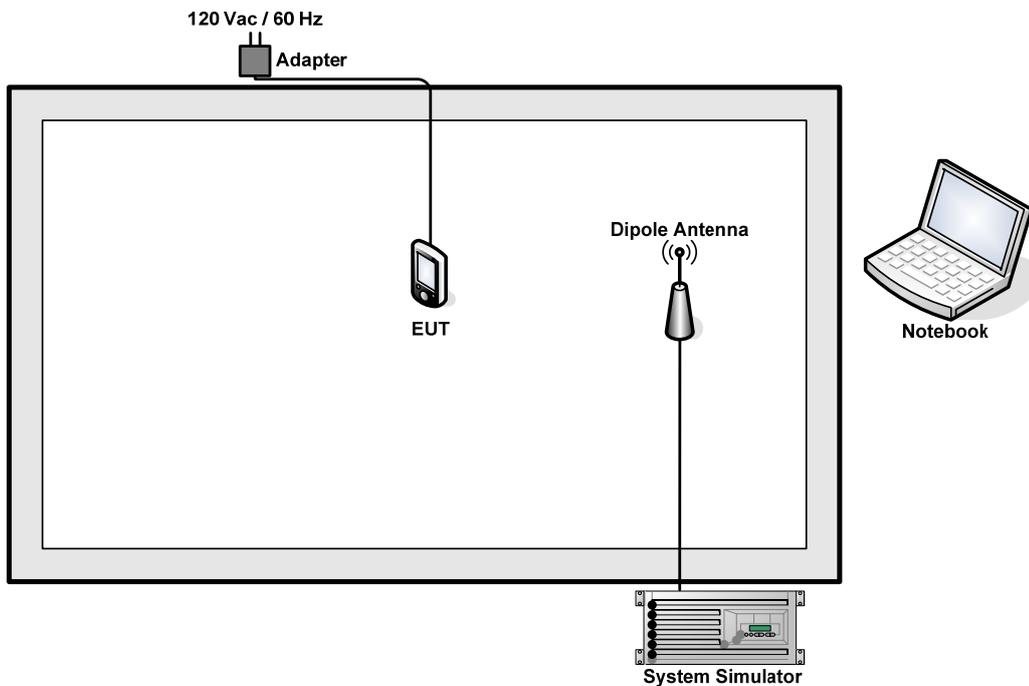
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
<b>Conducted TCs</b>	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz
<b>Radiated TCs</b>	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz
<b>AC Conducted Emission</b>	Mode 1 : GSM 850 Idle + WLAN Link + Adapter	

## 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.

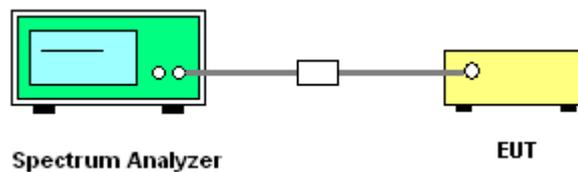
##### 3.1.2 Measuring Instruments

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

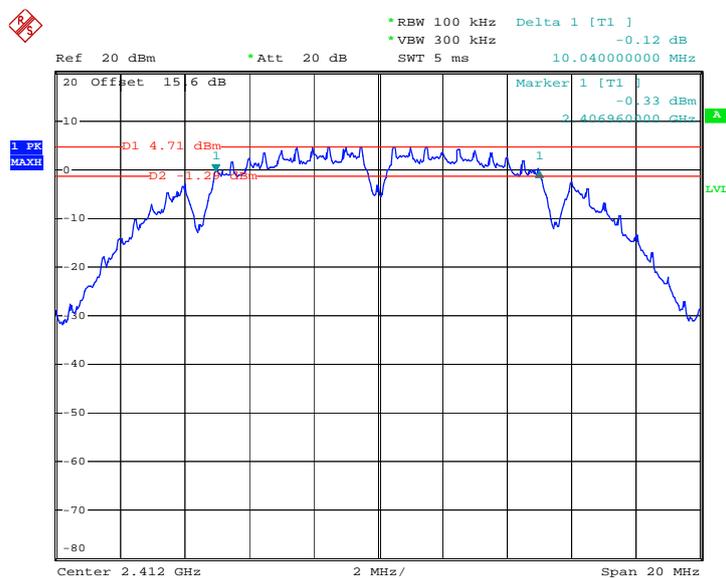


### 3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~25°C
Test Engineer :	Zhi Lu	Relative Humidity :	46~47%

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	10.08	0.5	Pass

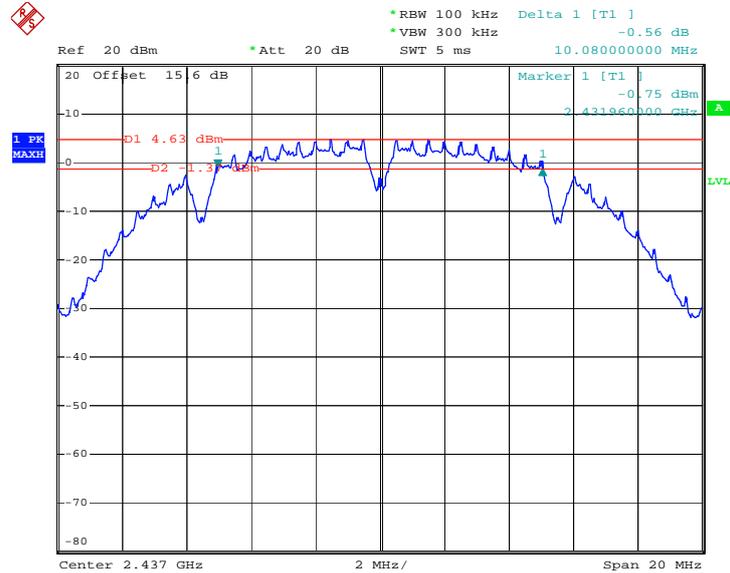
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 6.JAN.2012 18:24:33

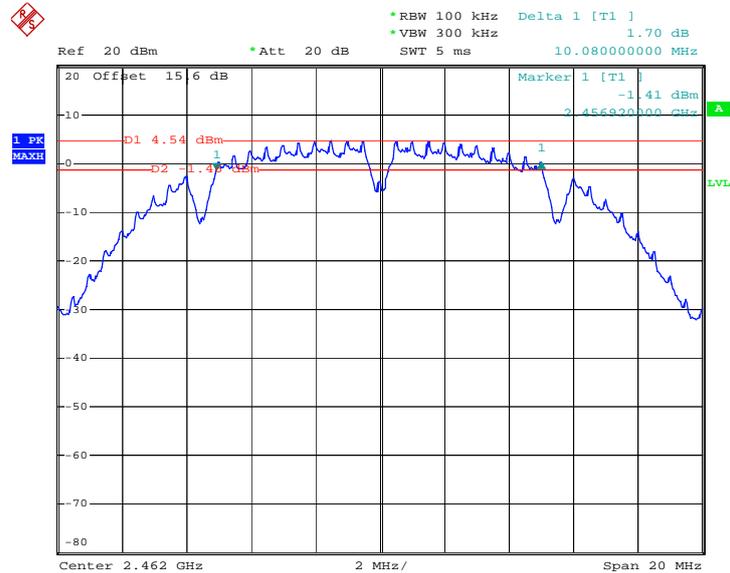


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



Date: 6.JAN.2012 18:30:55

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



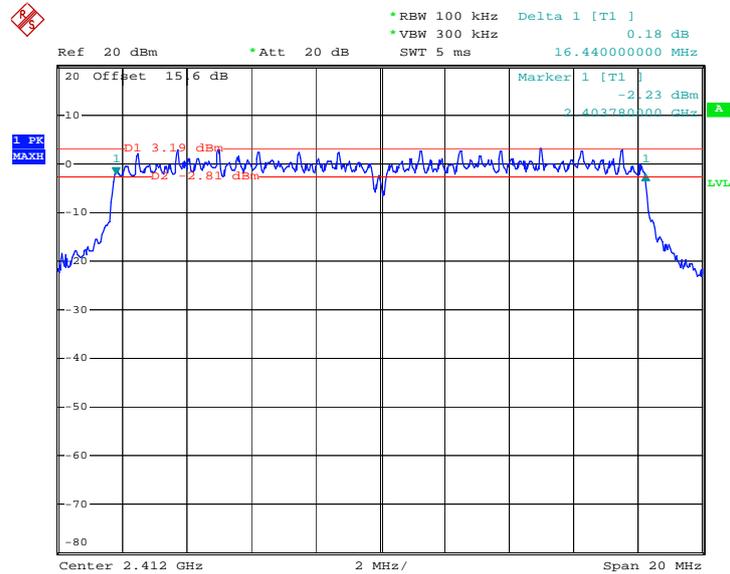
Date: 6.JAN.2012 18:37:13



Test Mode :	Mode 4, 5, 6	Temperature :	24~25°C
Test Engineer :	Zhi Lu	Relative Humidity :	46~47%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.44	0.5	Pass
06	2437	16.36	0.5	Pass
11	2462	16.48	0.5	Pass

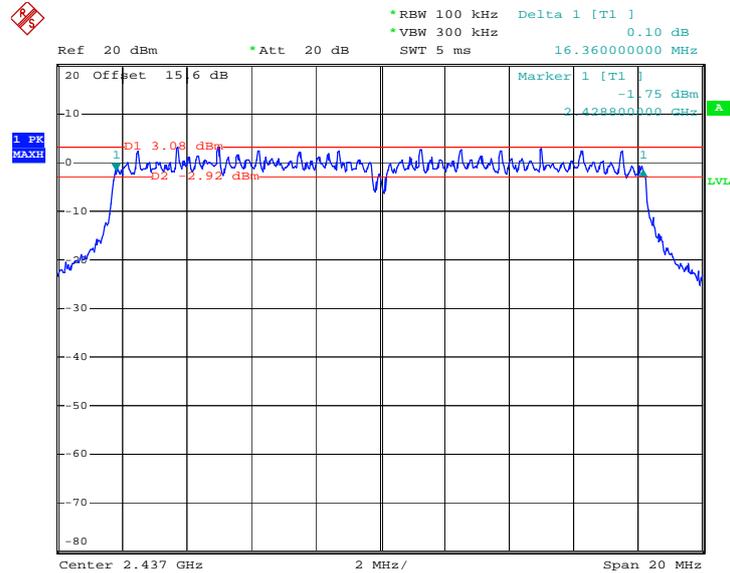
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 23.DEC.2011 13:10:12

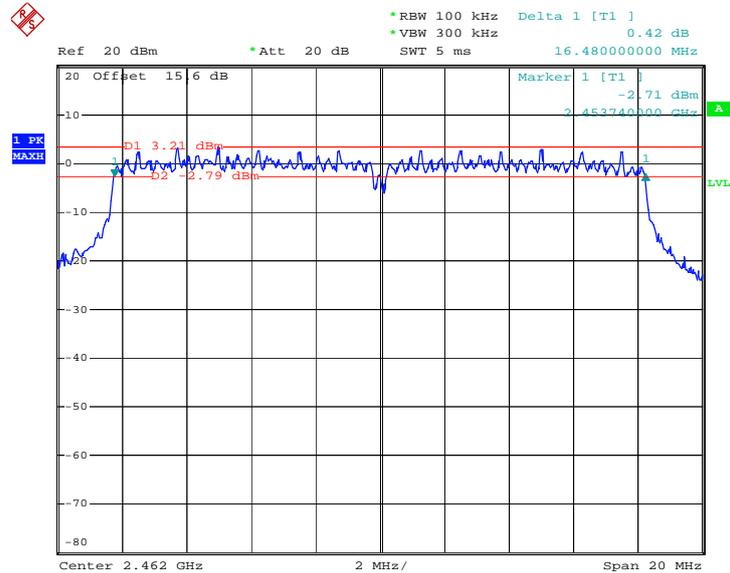


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Date: 23.DEC.2011 13:40:54

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



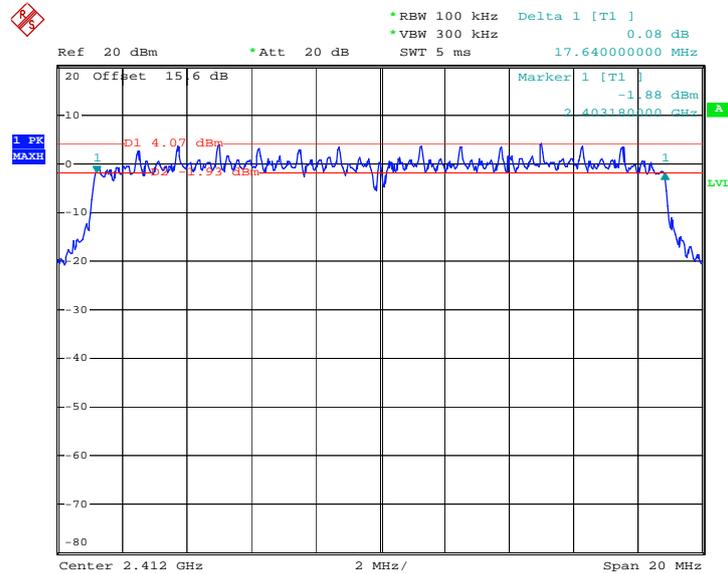
Date: 23.DEC.2011 13:59:05



Test Mode :	Mode 7, 8, 9	Temperature :	24~25°C
Test Engineer :	Zhi Lu	Relative Humidity :	46~47%

Channel	Frequency (MHz)	802.11n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	17.64	0.5	Pass
06	2437	17.56	0.5	Pass
11	2462	17.56	0.5	Pass

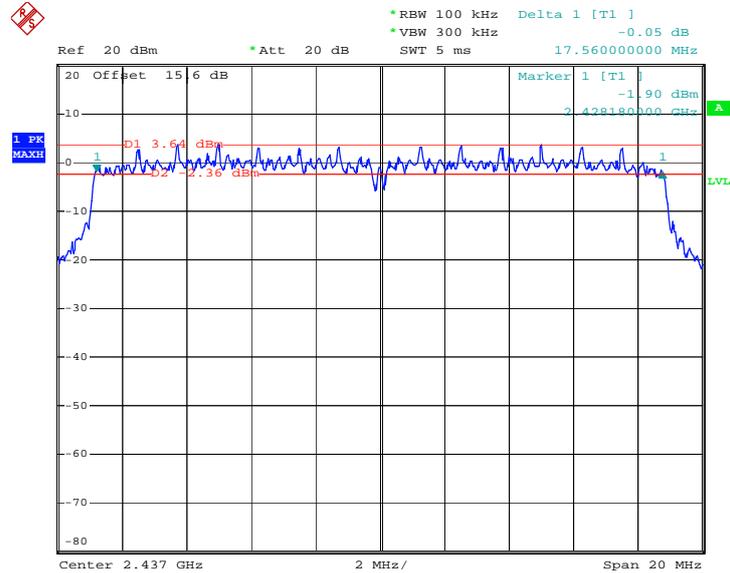
Mode 7 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 01



Date: 6.JAN.2012 19:03:36

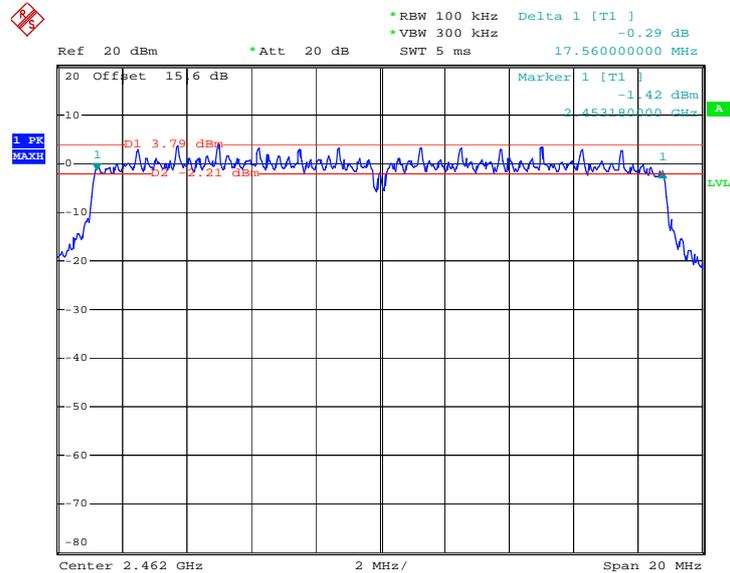


Mode 8 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 06



Date: 6.JAN.2012 19:18:49

Mode 9 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 11



Date: 6.JAN.2012 19:33:39

## 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.

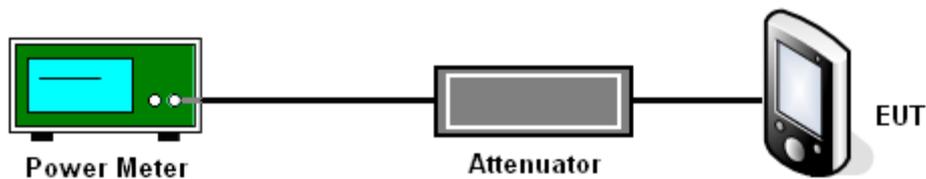
### 3.2.2 Measuring Instruments

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 :	24~25°C
Test Engineer :	Zhi Lu	Relative Humidity :	46~47%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.21	30	Pass
06	2437	17.78	30	Pass
11	2462	17.75	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	24~25°C
Test Engineer :	Zhi Lu	Relative Humidity :	46~47%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	23.15	30	Pass
06	2437	22.93	30	Pass
11	2462	23.25	30	Pass

Test Mode :	Mode 7, 8, 9	Temperature :	24~25°C
Test Engineer :	Zhi Lu	Relative Humidity :	46~47%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.21	30	Pass
06	2437	22.07	30	Pass
11	2462	22.17	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

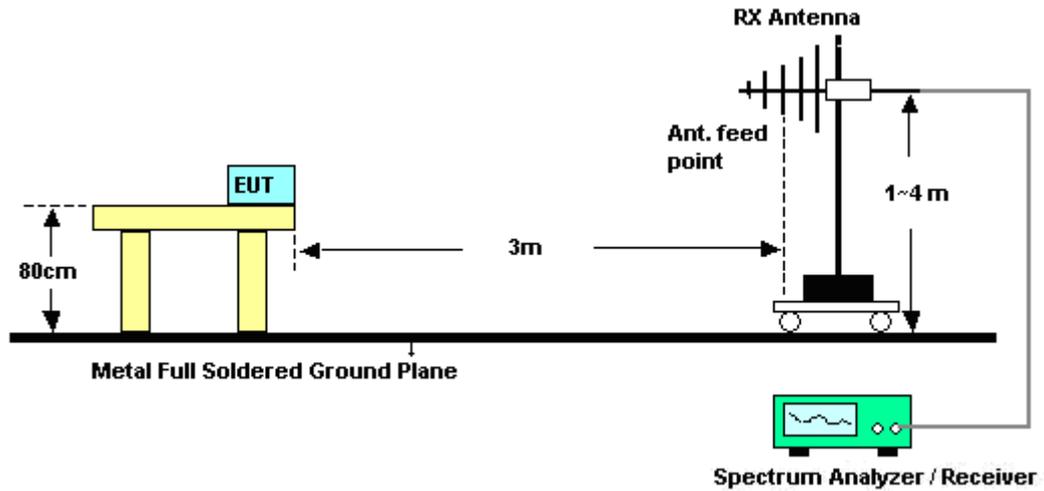
See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

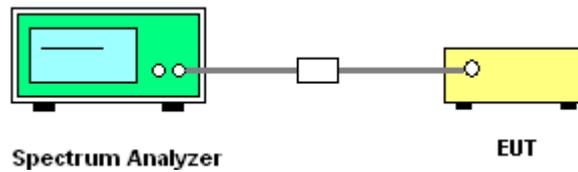
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized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

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2386.38	52.56	-21.44	74	50.28	32.86	3.47	34.05	100	26	Peak
2386.38	40.44	-13.56	54	38.16	32.86	3.47	34.05	100	26	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
2333.56	49.55	-24.45	74	47.42	32.76	3.27	33.9	100	0	Peak
2333.56	36.29	-17.71	54	34.16	32.76	3.27	33.9	100	0	Average

Test Mode :	Mode 3	Temperature :	20~21°C
Test Band :	802.11b	Relative Humidity :	41~42%
Test Channel :	11	Test Engineer :	Jack Li

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	50.48	-23.52	74	47.99	33.01	3.68	34.2	200	308	Peak
2483.5	37.78	-16.22	54	35.29	33.01	3.68	34.2	200	308	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
2487.84	49.36	-24.64	74	46.82	33.05	3.72	34.23	200	308	Peak
2487.84	36.7	-17.3	54	34.16	33.05	3.72	34.23	200	308	Average



Test Mode :	Mode 4	Temperature :	20~21°C
Test Band :	802.11g	Relative Humidity :	41~42%
Test Channel :	01	Test Engineer :	Jack Li

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2390	64.14	-9.86	74	61.86	32.86	3.47	34.05	100	67	Peak
2390	48.57	-5.43	54	46.29	32.86	3.47	34.05	100	67	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	68.36	-5.64	74	66.08	32.86	3.47	34.05	100	0	Peak
2390	50.05	-3.95	54	47.77	32.86	3.47	34.05	100	0	Average

Test Mode :	Mode 6	Temperature :	20~21°C
Test Band :	802.11g	Relative Humidity :	41~42%
Test Channel :	11	Test Engineer :	Jack Li

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	63.53	-10.47	74	61.04	33.01	3.68	34.2	198	341	Peak
2483.5	47.37	-6.63	54	44.88	33.01	3.68	34.2	198	341	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	63.31	-10.69	74	60.82	33.01	3.68	34.2	169	297	Peak
2483.5	45.21	-8.79	54	42.72	33.01	3.68	34.2	169	297	Average



Test Mode :	Mode 7	Temperature :	20~21°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	41~42%
Test Channel :	01	Test Engineer :	Jack Li

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.8	64.78	-9.22	74	62.5	32.86	3.47	34.05	111	58	Peak
2389.8	48.19	-5.81	54	45.91	32.86	3.47	34.05	111	58	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.23	65.95	-8.05	74	63.67	32.86	3.47	34.05	100	60	Peak
2389.23	49.97	-4.03	54	47.69	32.86	3.47	34.05	100	60	Average

Test Mode :	Mode 9	Temperature :	20~21°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	41~42%
Test Channel :	11	Test Engineer :	Jack Li

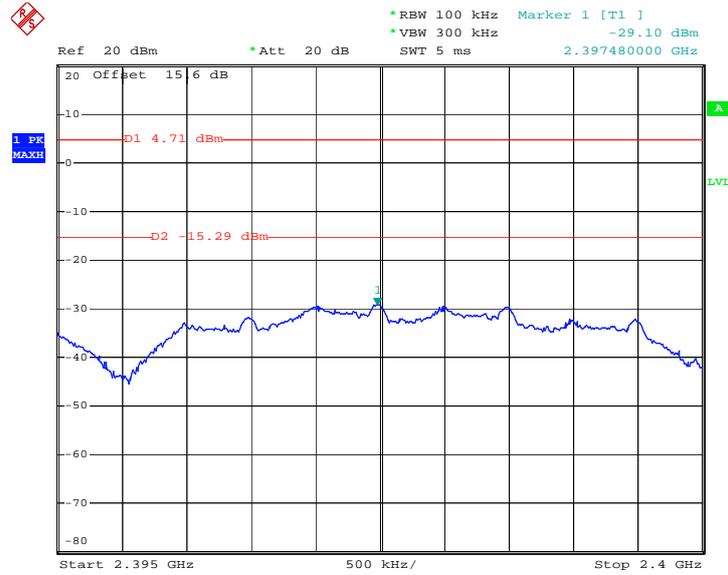
ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	59.18	-14.82	74	56.69	33.01	3.68	34.2	200	87	Peak
2483.5	45.49	-8.51	54	43	33.01	3.68	34.2	200	87	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2484.04	61.39	-12.61	74	58.9	33.01	3.68	34.2	198	112	Peak
2484.04	43.59	-10.41	54	41.1	33.01	3.68	34.2	198	112	Average

### 3.3.6 Test Plots of Conducted Band Edges

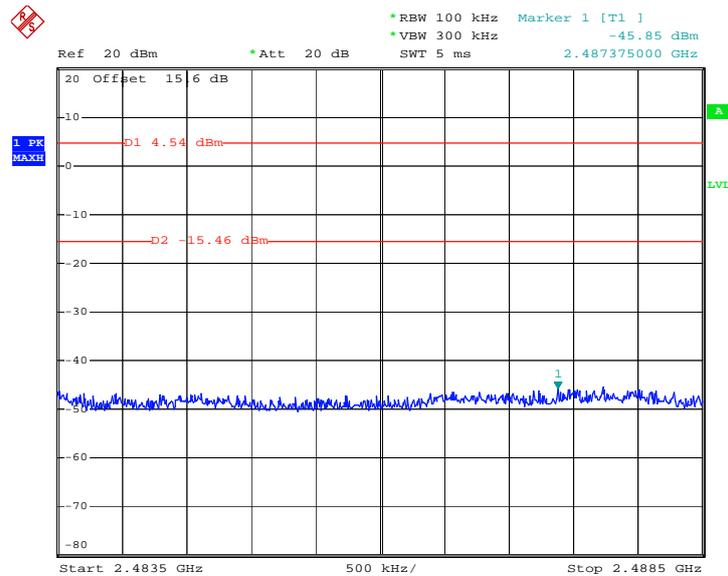
Test Mode :	Mode 1 and 3	Temperature :	24~25°C
Test Band :	802.11b	Relative Humidity :	46~47%
Test Channel :	01 and 11	Test Engineer :	Zhi Lu

Low Band Edge Plot on 802.11b Channel 01



Date: 6.JAN.2012 18:25:42

High Band Edge Plot on 802.11b Channel 11

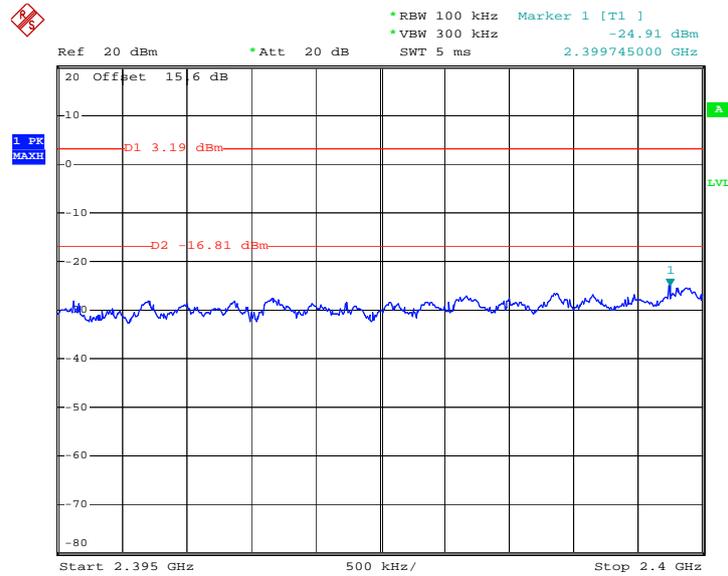


Date: 6.JAN.2012 18:38:18



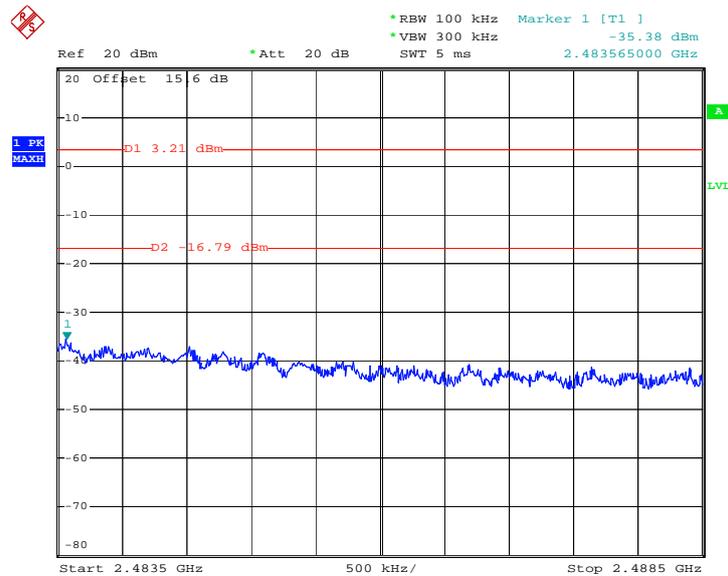
Test Mode :	Mode 4 and 6	Temperature :	24~25°C
Test Band :	802.11g	Relative Humidity :	46~47%
Test Channel :	01 and 11	Test Engineer :	Zhi Lu

Low Band Edge Plot on 802.11g Channel 01



Date: 23.DEC.2011 13:12:01

High Band Edge Plot on 802.11g Channel 11

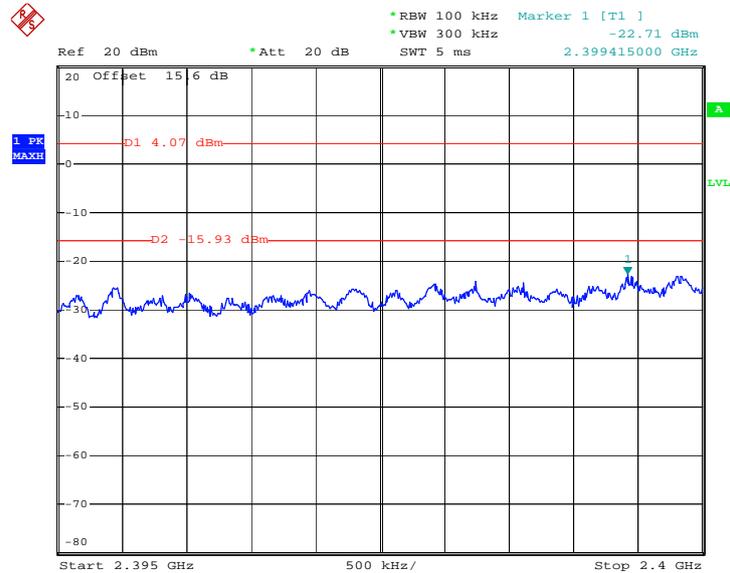


Date: 23.DEC.2011 14:00:01



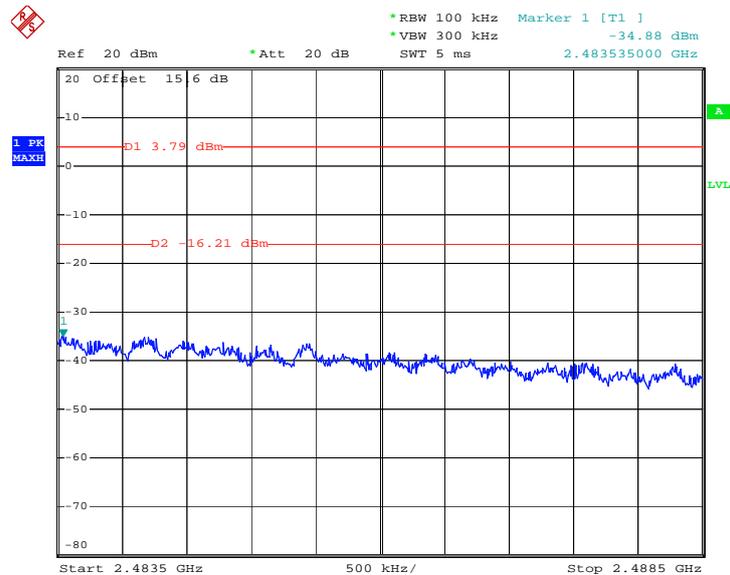
Test Mode :	Mode 7 and 9	Temperature :	24~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	46~47%
Test Channel :	01 and 11	Test Engineer :	Zhi Lu

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 01



Date: 6.JAN.2012 19:04:46

High Band Edge Plot on 802.11n (BW 20MHz) Channel 11



Date: 6.JAN.2012 19:34:27

## 3.4 Spurious Emission Measurement

### 3.4.1 Limit of Spurious Emission Measurement

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

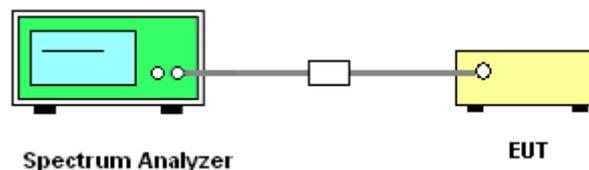
### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 Test Procedure

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

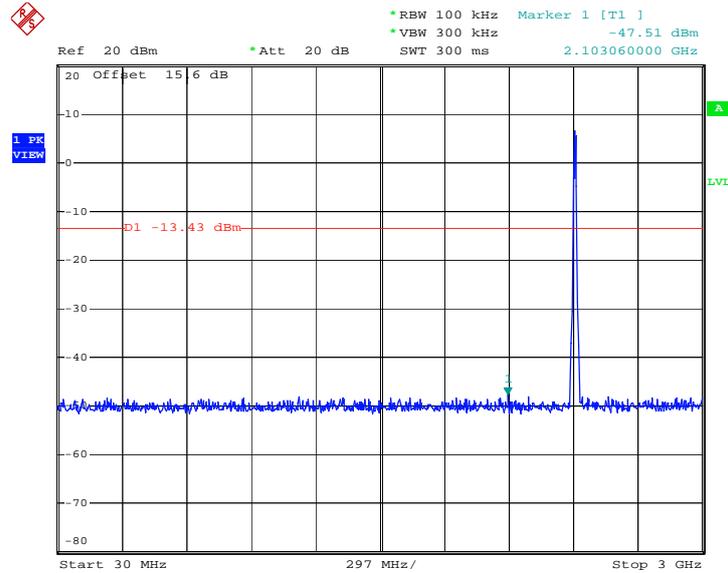
### 3.4.4 Test Setup



### 3.4.5 Test Plots of Spurious Emission

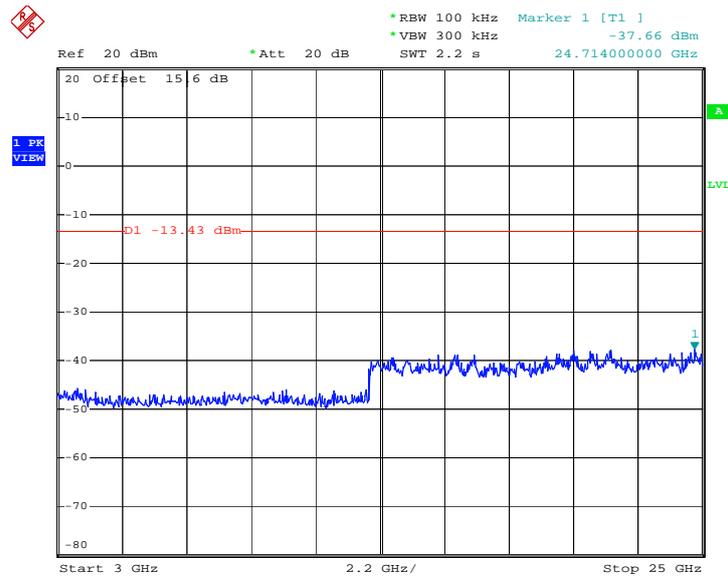
Test Mode :	Mode 1	Temperature :	24~25°C
Test Band :	802.11b	Relative Humidity :	46~47%
Test Channel :	01	Test Engineer :	Zhi Lu

#### Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 23.DEC.2011 09:35:38

#### Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

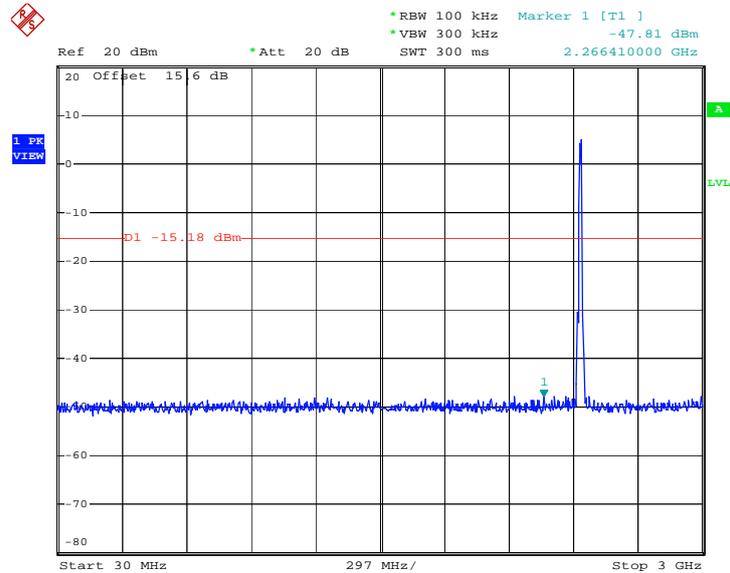


Date: 23.DEC.2011 09:35:55



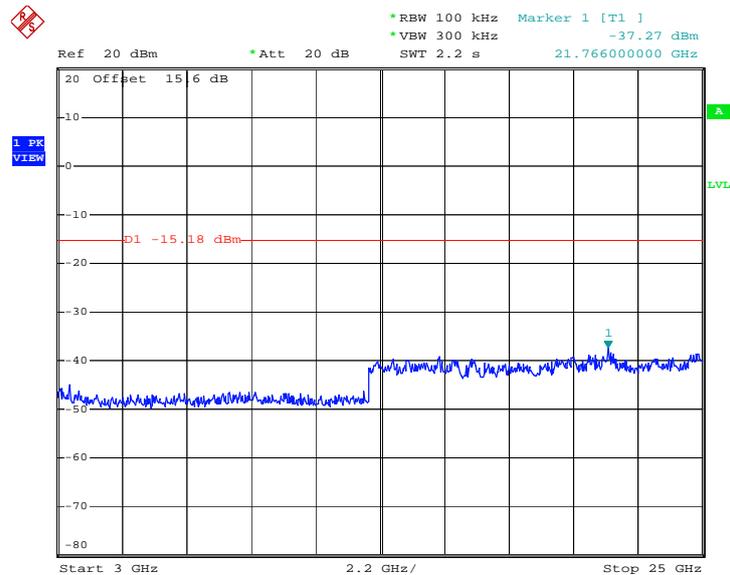
Test Mode :	Mode 2	Temperature :	24~25°C
Test Band :	802.11b	Relative Humidity :	46~47%
Test Channel :	06	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 23.DEC.2011 11:37:43

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

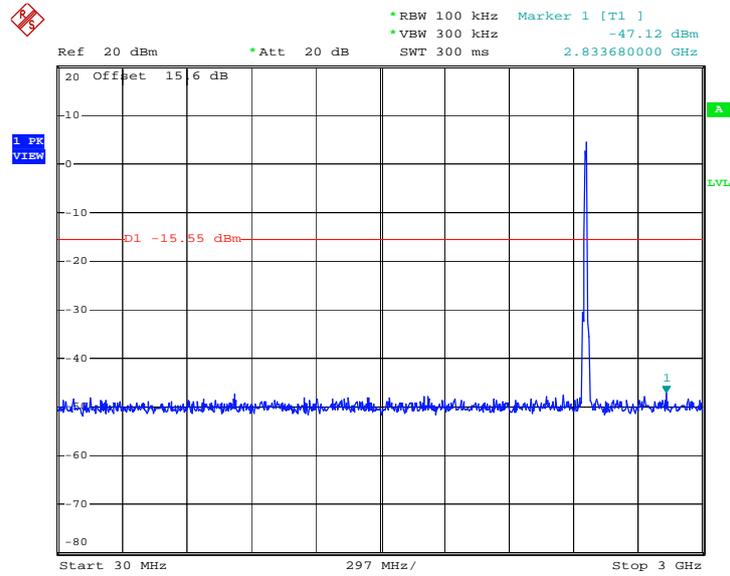


Date: 23.DEC.2011 11:38:00



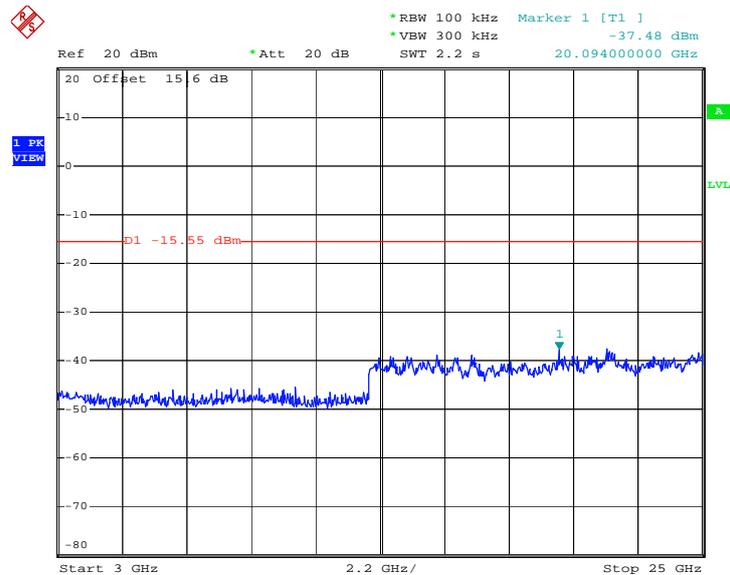
Test Mode :	Mode 3	Temperature :	24~25°C
Test Band :	802.11b	Relative Humidity :	46~47%
Test Channel :	11	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 23.DEC.2011 11:58:24

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

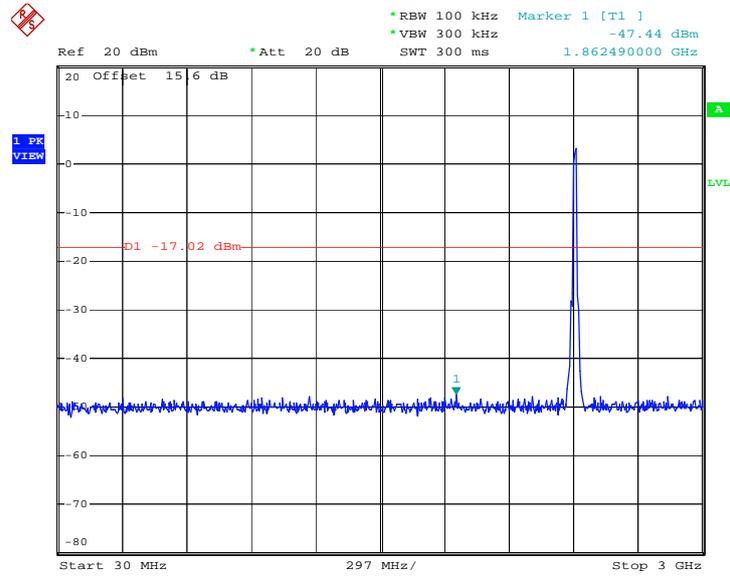


Date: 23.DEC.2011 11:58:41



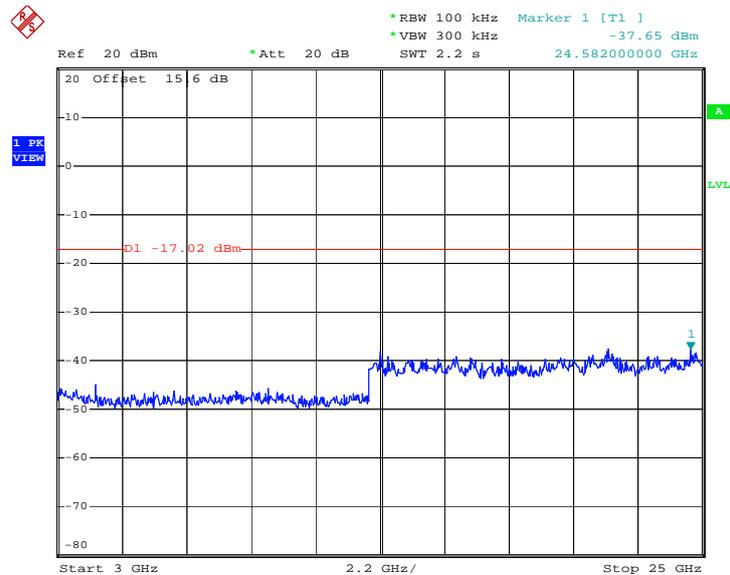
Test Mode :	Mode 4	Temperature :	24~25°C
Test Band :	802.11g	Relative Humidity :	46~47%
Test Channel :	01	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 23.DEC.2011 13:12:49

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

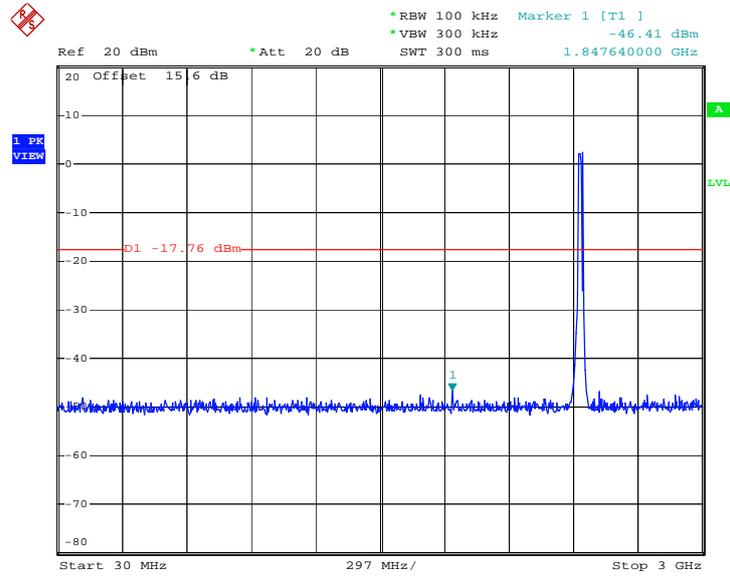


Date: 23.DEC.2011 13:13:06



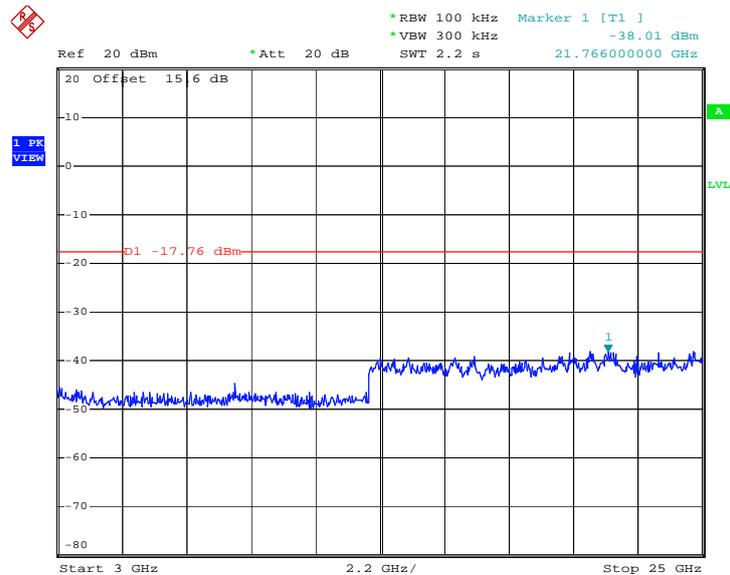
Test Mode :	Mode 5	Temperature :	24~25
Test Band :	802.11g	Relative Humidity :	46~47
Test Channel :	06	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 23.DEC.2011 13:45:01

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

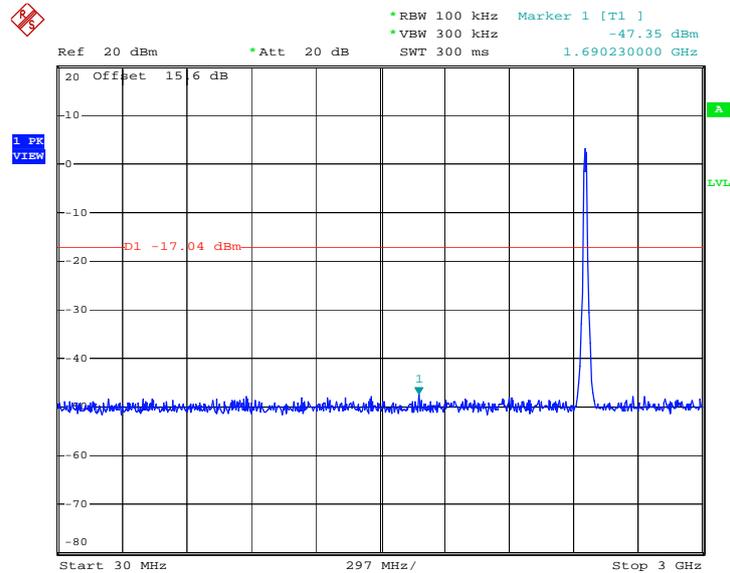


Date: 23.DEC.2011 13:45:18



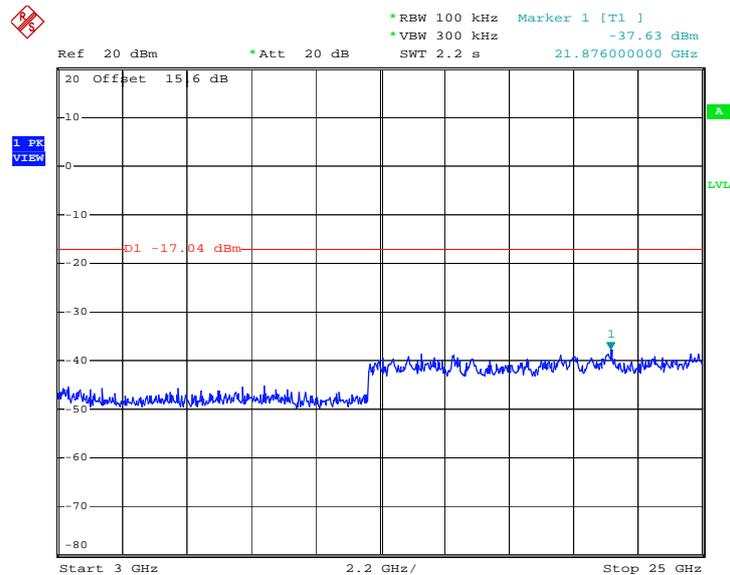
Test Mode :	Mode 6	Temperature :	24~25°C
Test Band :	802.11g	Relative Humidity :	46~47%
Test Channel :	11	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 9.JAN.2012 19:14:38

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

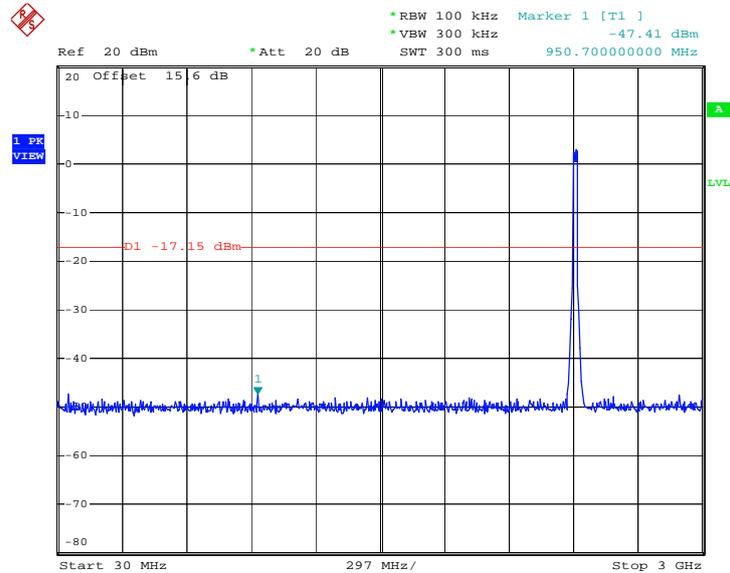


Date: 9.JAN.2012 19:14:55



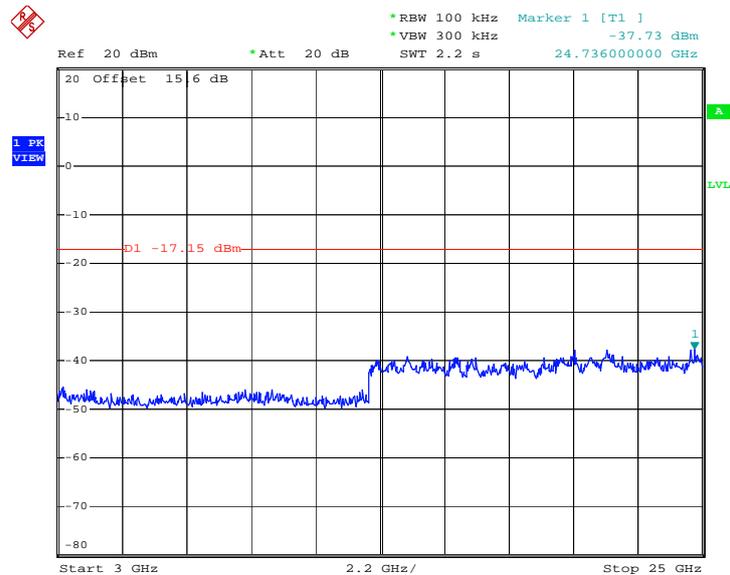
Test Mode :	Mode 7	Temperature :	24~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	46~47%
Test Channel :	01	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.JAN.2012 19:07:10

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

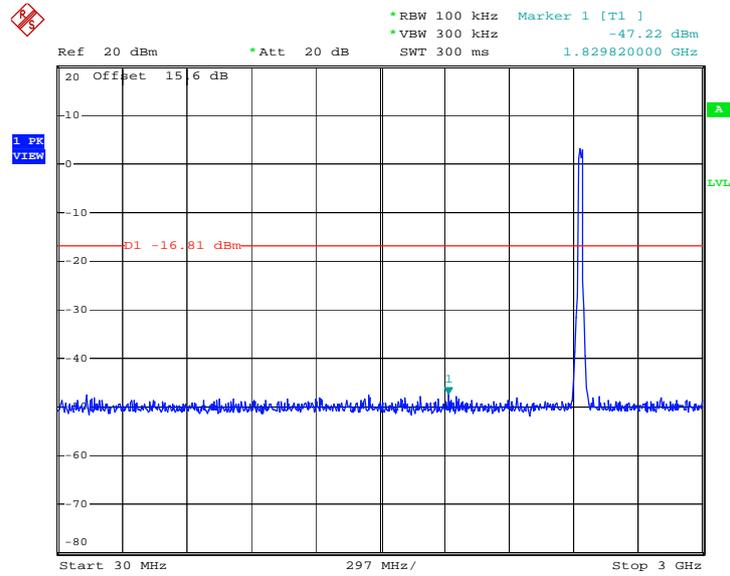


Date: 6.JAN.2012 19:07:27



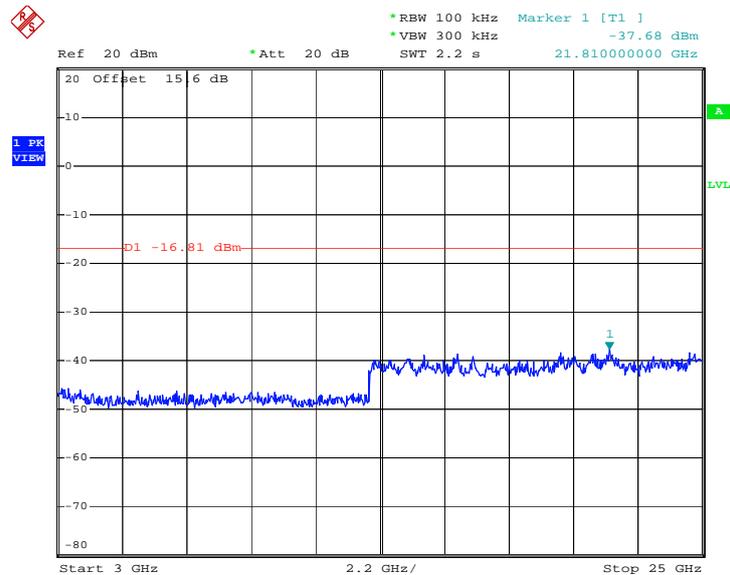
Test Mode :	Mode 8	Temperature :	24~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	46~47%
Test Channel :	06	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.JAN.2012 19:19:41

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

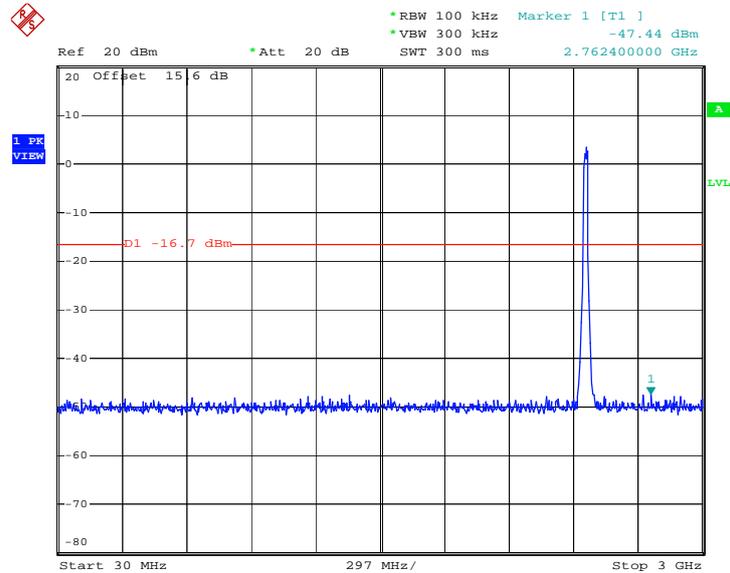


Date: 6.JAN.2012 19:19:58



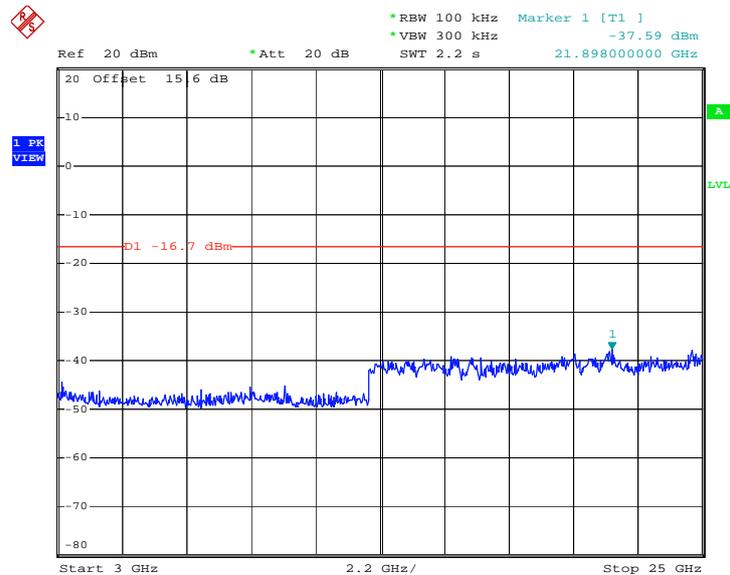
Test Mode :	Mode 9	Temperature :	24~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	46~47%
Test Channel :	11	Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.JAN.2012 19:36:10

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 6.JAN.2012 19:36:27

## 3.5 Power Spectral Density Measurement

### 3.5.1 Limit of Power Spectral Density

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

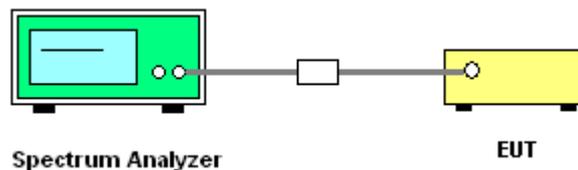
### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

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

### 3.5.4 Test Setup



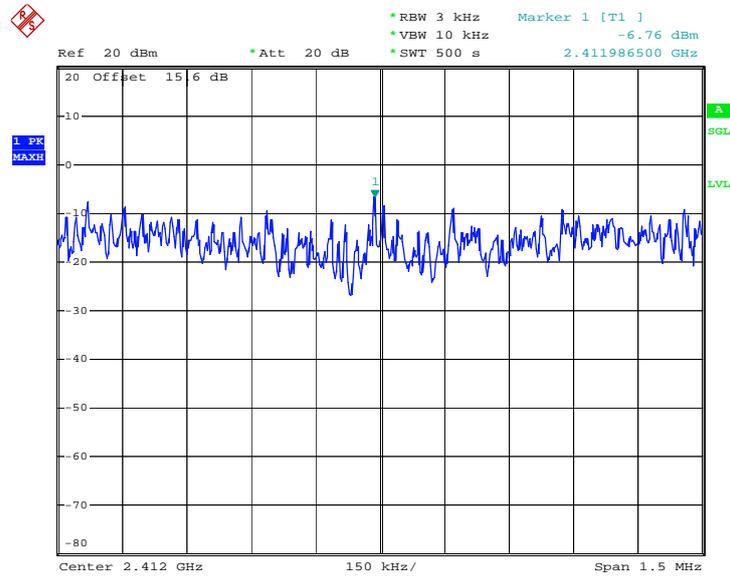


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	24~25°C
Test Engineer :	Zhi Lu	Relative Humidity :	46~47%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-6.76	8	Pass
06	2437	-7.83	8	Pass
11	2462	-9.00	8	Pass

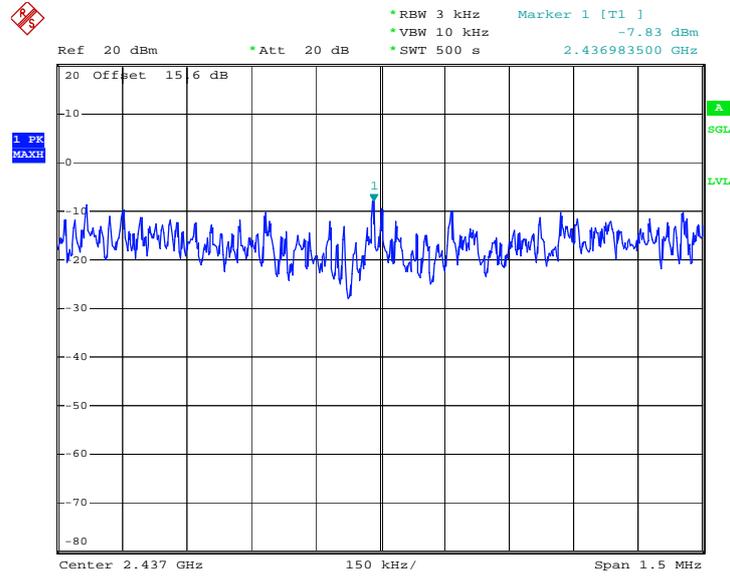
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 23.DEC.2011 09:46:09

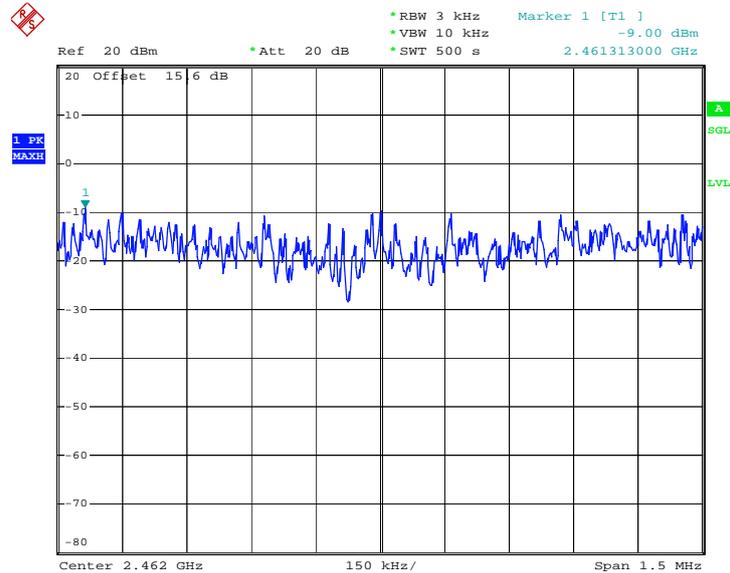


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 23.DEC.2011 11:48:26

Mode 3 : PSD Plot on 802.11b Channel 11



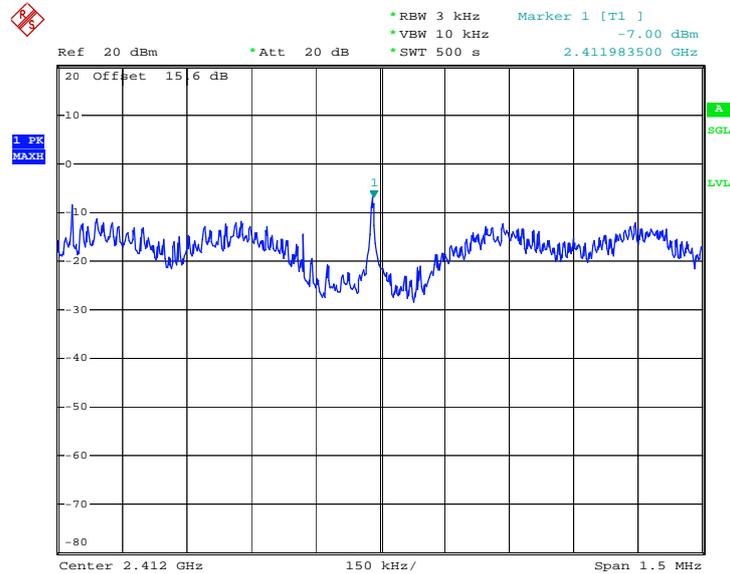
Date: 23.DEC.2011 12:33:07



Test Mode :	Mode 4, 5, 6	Temperature :	24~25°C
Test Engineer :	Zhi Lu	Relative Humidity :	46~47%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-7.00	8	Pass
06	2437	-6.33	8	Pass
11	2462	-6.66	8	Pass

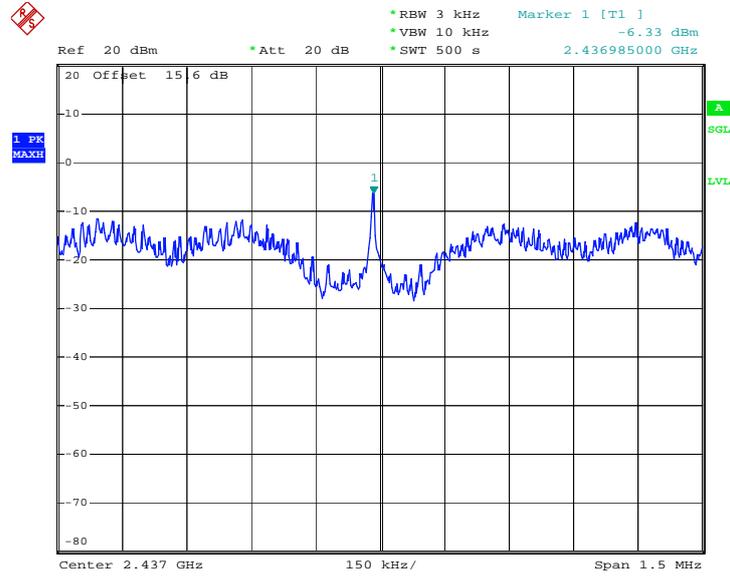
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 23.DEC.2011 13:35:15

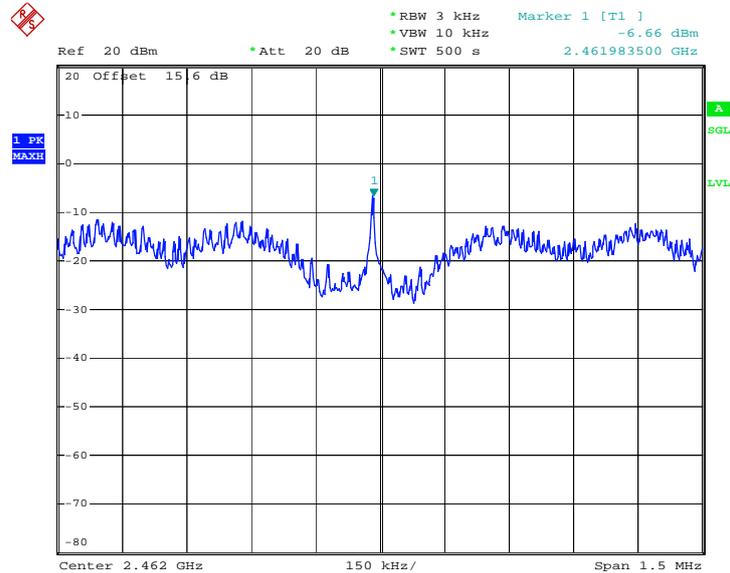


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 23.DEC.2011 13:57:17

Mode 6 : PSD Plot on 802.11g Channel 11



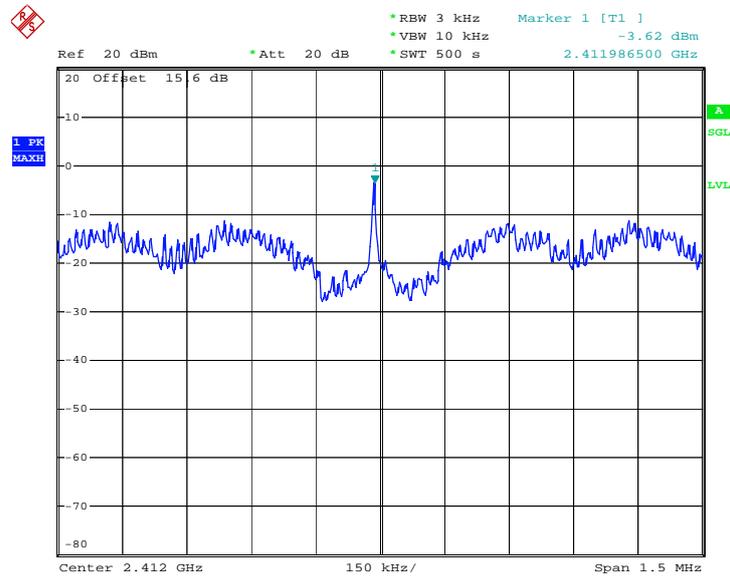
Date: 23.DEC.2011 14:18:47



Test Mode :	Mode 7, 8, 9	Temperature :	24~25°C
Test Engineer :	Zhi Lu	Relative Humidity :	46~47%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-3.62	8	Pass
06	2437	-5.38	8	Pass
11	2462	-6.84	8	Pass

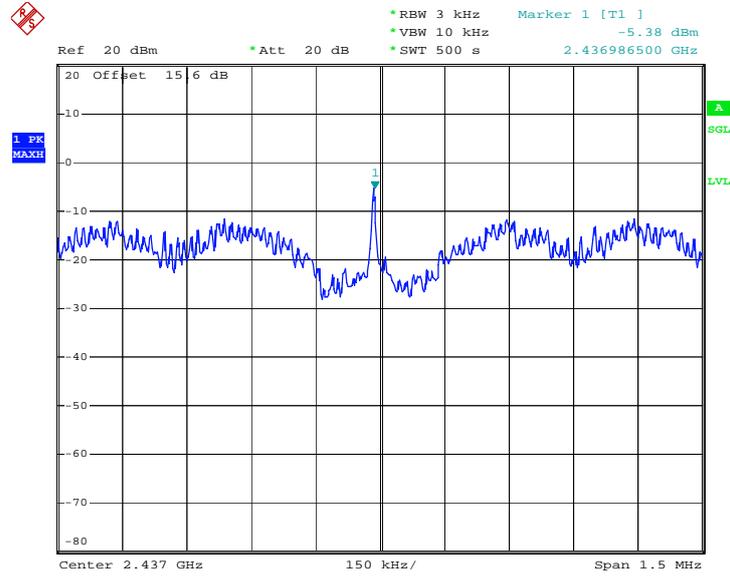
Mode 7 : PSD Plot on 802.11n (BW 20MHz) Channel 01



Date: 6.JAN.2012 19:16:56

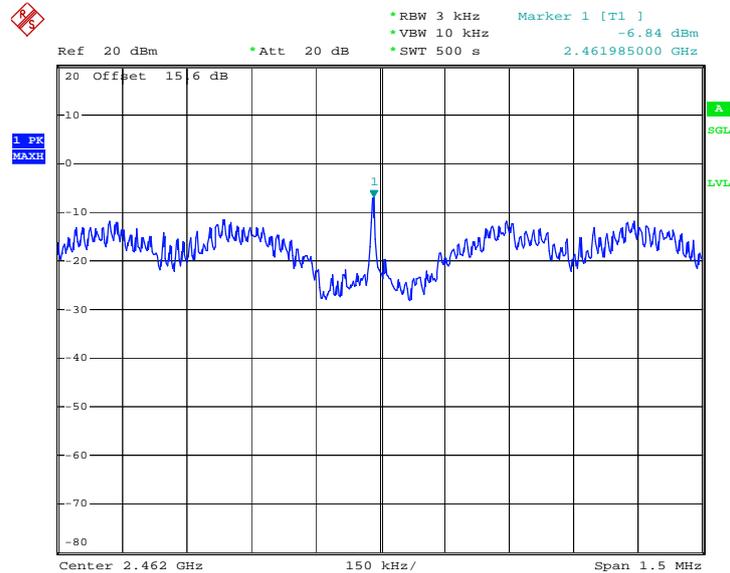


Mode 8 : PSD Plot on 802.11n (BW 20MHz) Channel 06



Date: 6.JAN.2012 19:31:14

Mode 9 : PSD Plot on 802.11n (BW 20MHz) Channel 11



Date: 6.JAN.2012 19:49:34

### 3.6 AC Conducted Emission Measurement

#### 3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

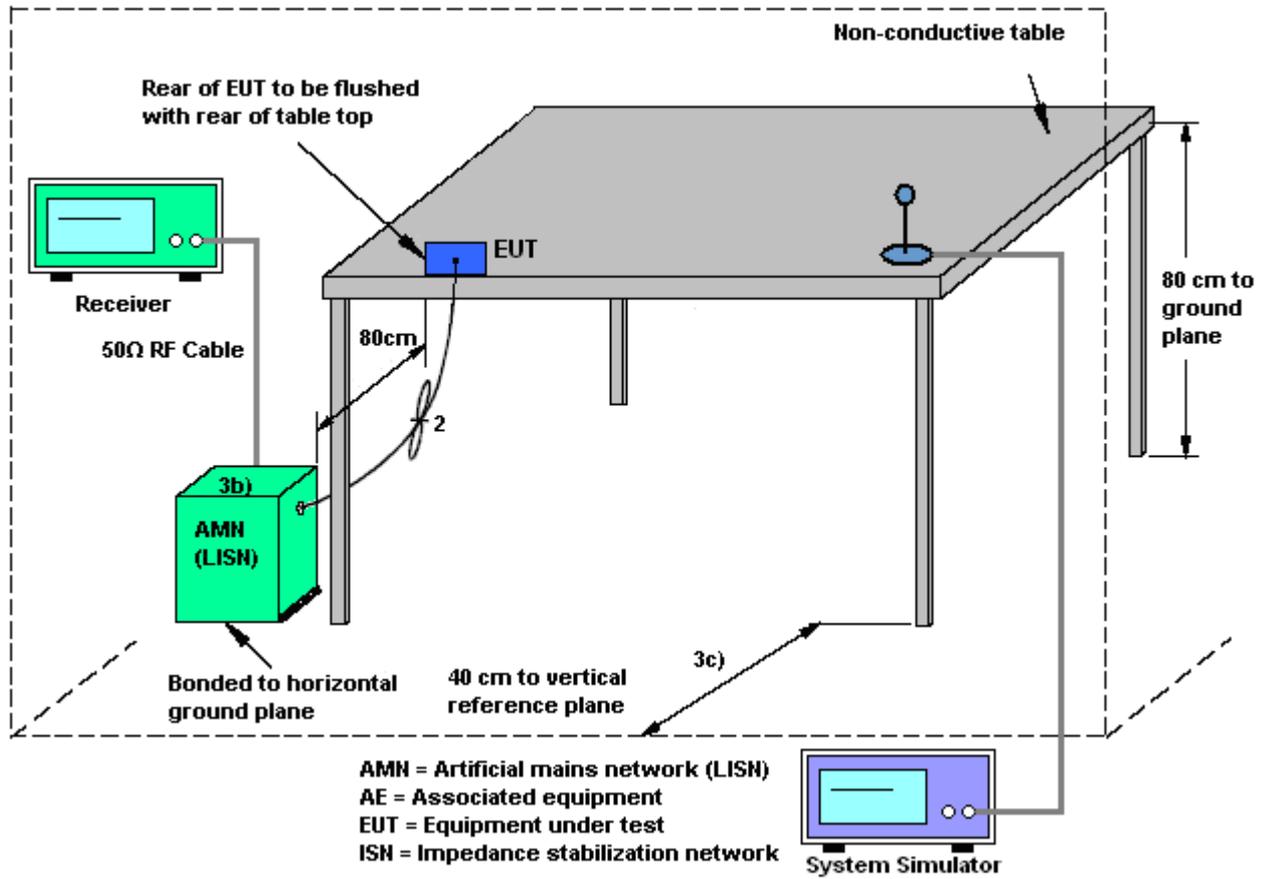
#### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.6.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

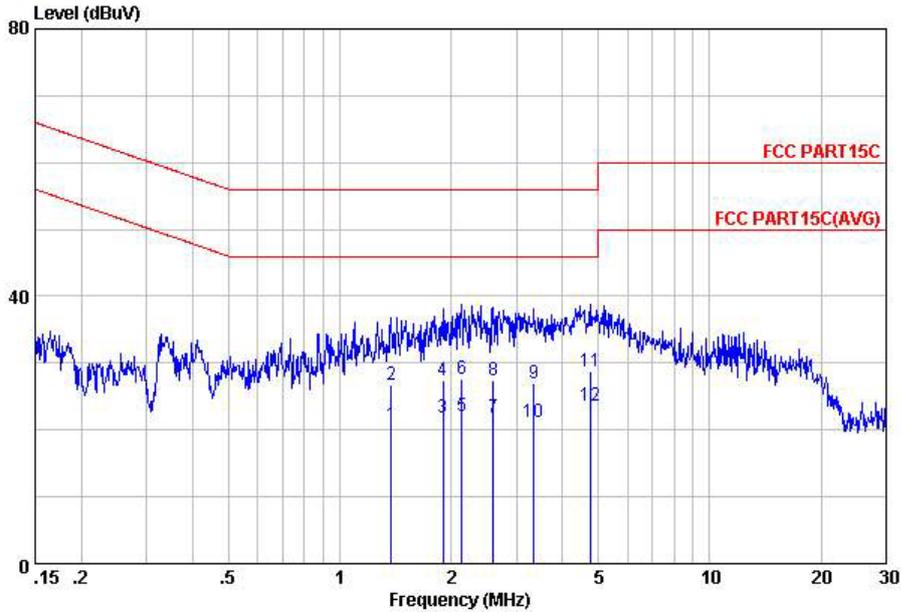
### 3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~22°C
Test Engineer :	Jack Li	Relative Humidity :	42~43%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM 850 Idle + WLAN Link + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

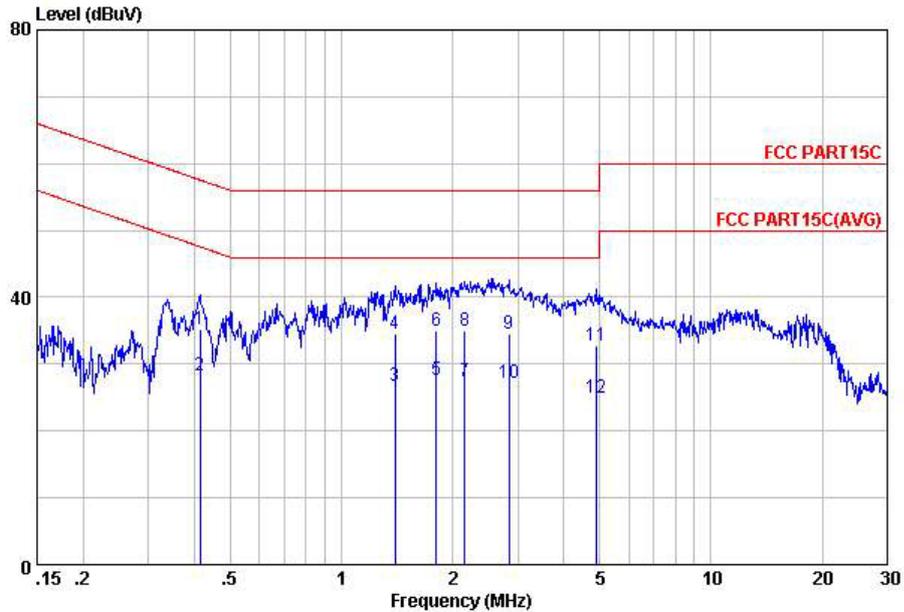


Site : C001-KS  
 Condition: FCC PART15C LISN-100807 LINE  
 Project : (FR) 1D0202  
 mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	1.37	20.79	-25.21	46.00	10.60	-0.10	10.29	Average
2	1.37	26.79	-29.21	56.00	16.60	-0.10	10.29	QP
3	1.90	21.91	-24.09	46.00	11.70	-0.11	10.32	Average
4	1.90	27.31	-28.69	56.00	17.10	-0.11	10.32	QP
5	2.13	22.03	-23.97	46.00	11.80	-0.11	10.34	Average
6	2.13	27.73	-28.27	56.00	17.50	-0.11	10.34	QP
7	2.59	21.84	-24.16	46.00	11.59	-0.11	10.36	Average
8	2.59	27.44	-28.56	56.00	17.19	-0.11	10.36	QP
9	3.35	26.85	-29.15	56.00	16.59	-0.12	10.38	QP
10	3.35	21.25	-24.75	46.00	10.99	-0.12	10.38	Average
11	4.77	28.77	-27.23	56.00	18.50	-0.13	10.40	QP
12	4.77	23.57	-22.43	46.00	13.30	-0.13	10.40	Average



Test Mode :	Mode 1	Temperature :	21~22°C
Test Engineer :	Jack Li	Relative Humidity :	42~43%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM 850 Idle + WLAN Link + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-RS  
 Condition: FCC PART15C LISN-100807 NEUTRAL  
 Project : (FR) 1D0202  
 mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.41	35.11	-22.44	57.55	25.00	-0.08	10.19	QP
2	0.41	28.31	-19.24	47.55	18.20	-0.08	10.19	Average
3	1.40	26.69	-19.31	46.00	16.50	-0.10	10.29	Average
4	1.40	34.49	-21.51	56.00	24.30	-0.10	10.29	QP
5	1.81	27.61	-18.39	46.00	17.40	-0.11	10.32	Average
6	1.81	35.01	-20.99	56.00	24.80	-0.11	10.32	QP
7	2.16	27.33	-18.67	46.00	17.10	-0.11	10.34	Average
8	2.16	34.93	-21.07	56.00	24.70	-0.11	10.34	QP
9	2.84	34.55	-21.45	56.00	24.31	-0.12	10.36	QP
10	2.84	27.15	-18.85	46.00	16.91	-0.12	10.36	Average
11	4.87	32.67	-23.33	56.00	22.40	-0.13	10.40	QP
12	4.87	25.07	-20.93	46.00	14.80	-0.13	10.40	Average

### 3.7 Radiated Emission Measurement

#### 3.7.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

#### 3.7.2 Measuring Instruments

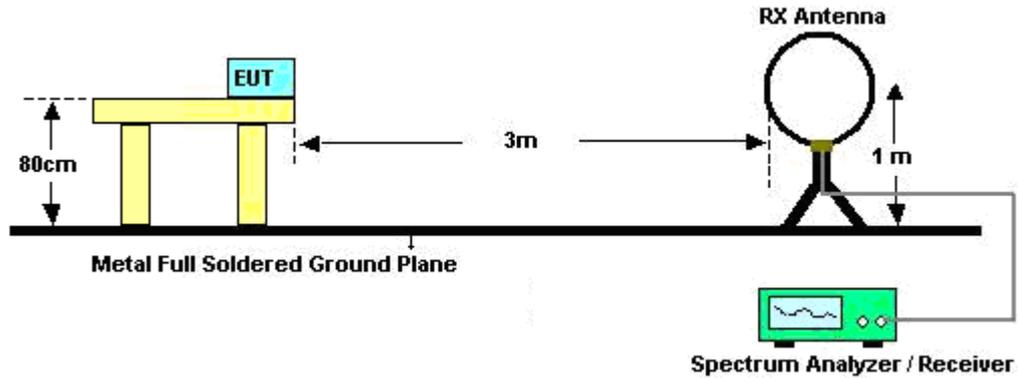
See list of measuring instruments of this test report.

#### 3.7.3 Test Procedures

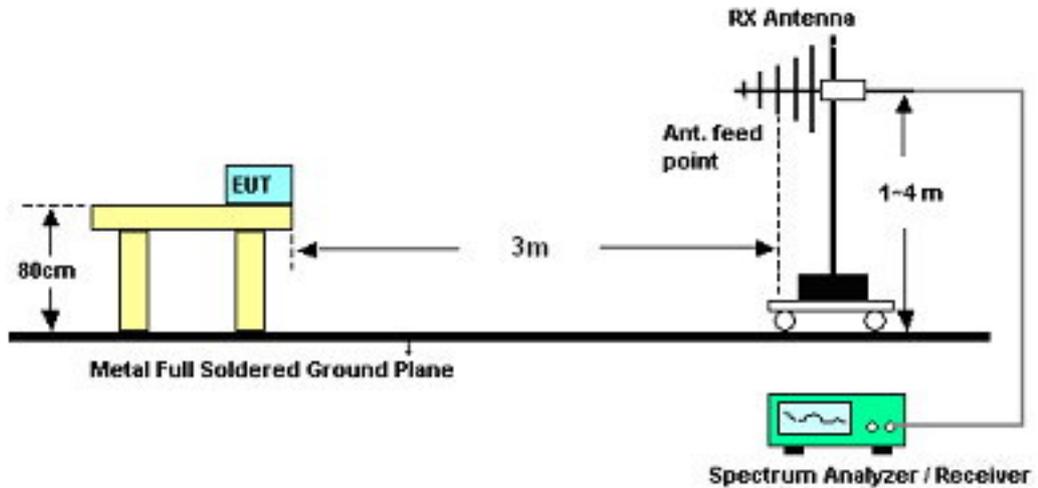
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
  - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold.
  - Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.  
Distance extrapolation factor =  $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$  (dB)
- Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

### 3.7.4 Test Setup

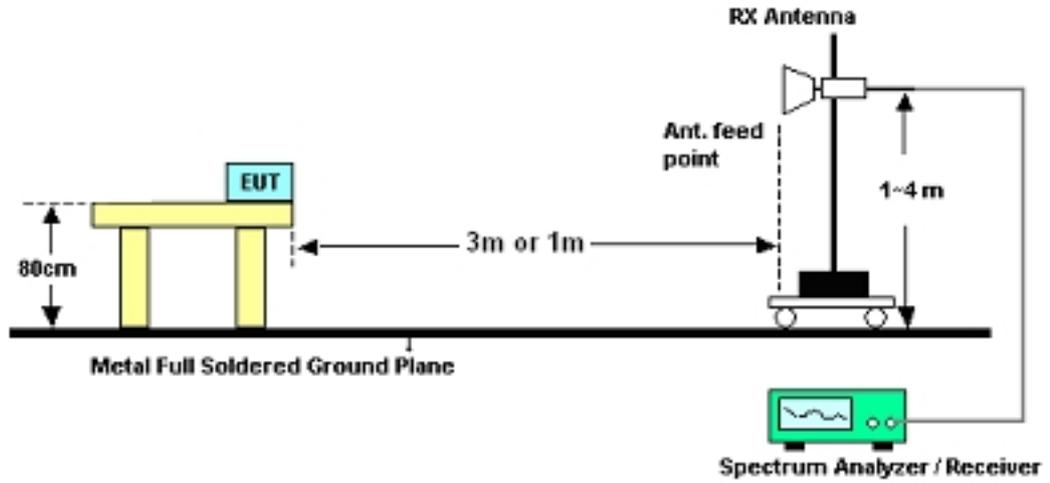
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	Jack Li	Temperature :	20~21°C	
		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 (specific distance / test distance) (dB);

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



3.7.6 Test Result of Radiated Emission (30 MHz ~ 10<sup>th</sup> Harmonic)

Test Mode :	Mode 1	Temperature :	20~21°C
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.81	19.14	-20.86	40	31.68	17.29	0.25	30.08	-	-	Peak
288.39	26.66	-19.34	46	43.08	12.82	0.71	29.95	-	-	Peak
294.33	27.39	-18.61	46	43.69	12.93	0.72	29.95	100	208	Peak
371.4	26.1	-19.9	46	40.08	15.09	0.83	29.9	-	-	Peak
383.3	26.48	-19.52	46	39.95	15.56	0.83	29.86	-	-	Peak
946.8	25.93	-28.07	54	33.42	20.72	1.33	29.54	-	-	Peak
2386.38	52.56	-21.44	74	50.28	32.86	3.47	34.05	100	26	Peak
2386.38	40.44	-13.56	54	38.16	32.86	3.47	34.05	100	26	Average
2412	107.74	-	-	105.41	32.89	3.52	34.08	143	360	Peak
2412	103.12	-	-	100.79	32.89	3.52	34.08	143	360	Average
2485.56	49.79	-24.21	74	47.3	33.01	3.68	34.2	131	343	Peak
2485.56	36.79	-17.21	54	34.3	33.01	3.68	34.2	131	343	Average



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	26.45	-13.55	40	38.27	18	0.26	30.08	100	112	Peak
120.99	21.32	-22.18	43.5	39.05	11.79	0.45	29.97	-	-	Peak
210.36	26.29	-17.21	43.5	46.2	9.49	0.6	30	-	-	Peak
764.8	23.63	-22.37	46	32.09	19.89	1.2	29.55	-	-	Peak
873.3	24.53	-21.47	46	32.34	20.48	1.29	29.58	-	-	Peak
944.7	27.85	-26.15	54	35.35	20.71	1.33	29.54	-	-	Peak
2333.56	49.55	-24.45	74	47.42	32.76	3.27	33.9	100	0	Peak
2333.56	36.29	-17.71	54	34.16	32.76	3.27	33.9	100	0	Average
2412	99.73	-	-	97.4	32.89	3.52	34.08	101	25	Peak
2412	94.24	-	-	91.91	32.89	3.52	34.08	101	25	Average
2493.35	50.07	-23.93	74	47.53	33.05	3.72	34.23	103	30	Peak
2493.35	36.51	-17.49	54	33.97	33.05	3.72	34.23	103	30	Average



Test Mode :	Mode 2	Temperature :	20~21°C
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
31.08	19.42	-20.58	40	31.96	17.29	0.25	30.08	-	-	Peak
277.05	23.27	-22.73	46	39.93	12.58	0.7	29.94	-	-	Peak
291.36	27.8	-18.2	46	44.17	12.87	0.71	29.95	100	175	Peak
377.7	26.77	-19.23	46	40.48	15.34	0.83	29.88	-	-	Peak
770.4	23.62	-22.38	46	32.09	19.88	1.21	29.56	-	-	Peak
944.7	26.56	-27.44	54	34.06	20.71	1.33	29.54	-	-	Peak
2383.53	49.16	-24.84	74	46.92	32.83	3.42	34.01	100	221	Peak
2383.53	35.7	-18.3	54	33.46	32.83	3.42	34.01	100	221	Average
2437	104.52	-	-	102.12	32.95	3.6	34.15	200	331	Peak
2437	101.02	-	-	98.62	32.95	3.6	34.15	200	331	Average
2485.18	49.34	-24.66	74	46.85	33.01	3.68	34.2	100	116	Peak
2485.18	36.01	-17.99	54	33.52	33.01	3.68	34.2	100	116	Average



Test Mode :	Mode 2	Temperature :	20~21°C
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.76	-15.24	40	36.58	18	0.26	30.08	100	23	Peak
201.99	22.47	-21.03	43.5	42.81	9.08	0.59	30.01	-	-	Peak
213.6	23.53	-19.97	43.5	43.26	9.65	0.61	29.99	-	-	Peak
540.1	22.28	-23.72	46	32.67	18.31	0.99	29.69	-	-	Peak
871.2	24.2	-21.8	46	32.01	20.49	1.29	29.59	-	-	Peak
944.7	25.26	-28.74	54	32.76	20.71	1.33	29.54	-	-	Peak
2353.89	49.18	-24.82	74	46.97	32.81	3.38	33.98	200	0	Peak
2353.89	36.39	-17.61	54	34.18	32.81	3.38	33.98	200	0	Average
2437	98.54	-	-	96.14	32.95	3.6	34.15	200	0	Peak
2437	94.03	-	-	91.63	32.95	3.6	34.15	200	0	Average
2490.12	48.66	-25.34	74	46.12	33.05	3.72	34.23	200	12	Peak
2490.12	36.64	-17.36	54	34.1	33.05	3.72	34.23	200	12	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	20.84	-19.16	40	32.66	18	0.26	30.08	100	22	Peak
282.99	22.66	-23.34	46	39.18	12.72	0.71	29.95	-	-	Peak
297.57	23.71	-22.29	46	39.97	12.97	0.72	29.95	-	-	Peak
377.7	25.24	-20.76	46	38.95	15.34	0.83	29.88	-	-	Peak
876.1	24.97	-21.03	46	32.76	20.48	1.29	29.56	-	-	Peak
944.7	26.14	-27.86	54	33.64	20.71	1.33	29.54	-	-	Peak
2368.9	49.05	-24.95	74	46.81	32.83	3.42	34.01	200	331	Peak
2368.9	36.6	-17.4	54	34.36	32.83	3.42	34.01	200	331	Average
2462	103.25	-	-	100.8	32.98	3.64	34.17	200	339	Peak
2462	98.96	-	-	96.51	32.98	3.64	34.17	200	339	Average
2483.5	50.48	-23.52	74	47.99	33.01	3.68	34.2	200	308	Peak
2483.5	37.78	-16.22	54	35.29	33.01	3.68	34.2	200	308	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.55	-15.45	40	36.37	18	0.26	30.08	100	159	Peak
207.93	24.6	-18.9	43.5	44.66	9.34	0.6	30	-	-	Peak
213.6	23.32	-20.18	43.5	43.05	9.65	0.61	29.99	-	-	Peak
384	21.44	-24.56	46	34.88	15.59	0.83	29.86	-	-	Peak
870.5	23.55	-22.45	46	31.36	20.49	1.29	29.59	-	-	Peak
944.7	25.32	-28.68	54	32.82	20.71	1.33	29.54	-	-	Peak
2381.82	49.3	-24.7	74	47.06	32.83	3.42	34.01	200	113	Peak
2381.82	36.45	-17.55	54	34.21	32.83	3.42	34.01	200	113	Average
2462	95.16	-	-	92.71	32.98	3.64	34.17	200	10	Peak
2462	91.12	-	-	88.67	32.98	3.64	34.17	200	10	Average
2487.84	49.36	-24.64	74	46.82	33.05	3.72	34.23	200	308	Peak
2487.84	36.7	-17.3	54	34.16	33.05	3.72	34.23	200	308	Average



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	20.49	-19.51	40	32.31	18	0.26	30.08	-	-	Peak
282.99	25.45	-20.55	46	41.97	12.72	0.71	29.95	-	-	Peak
297.57	25.61	-20.39	46	41.87	12.97	0.72	29.95	-	-	Peak
377.7	27.48	-18.52	46	41.19	15.34	0.83	29.88	100	223	Peak
871.2	23.53	-22.47	46	31.34	20.49	1.29	29.59	-	-	Peak
944.7	27.53	-26.47	54	35.03	20.71	1.33	29.54	-	-	Peak
1900	62.36	-18.49	80.85	61.33	32.12	2.45	33.54	-	-	Peak
2390	48.57	-5.43	54	46.29	32.86	3.47	34.05	100	67	Average
2390	64.14	-9.86	74	61.86	32.86	3.47	34.05	100	67	Peak
2412	100.85	-	-	98.52	32.89	3.52	34.08	100	0	Peak
2412	84.68	-	-	82.35	32.89	3.52	34.08	100	0	Average
2483.5	49.02	-24.98	74	46.53	33.01	3.68	34.2	100	0	Peak
2483.5	35.89	-18.11	54	33.4	33.01	3.68	34.2	100	0	Average



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.81	22.82	-17.18	40	35.36	17.29	0.25	30.08	100	288	Peak
204.96	23.99	-19.51	43.5	44.18	9.21	0.6	30	-	-	Peak
207.93	25.25	-18.25	43.5	45.31	9.34	0.6	30	-	-	Peak
871.2	23.5	-22.5	46	31.31	20.49	1.29	29.59	-	-	Peak
944.7	27.82	-26.18	54	35.32	20.71	1.33	29.54	-	-	Peak
979	23.18	-30.82	54	30.37	20.96	1.38	29.53	-	-	Peak
1904	57.43	-26.72	84.15	56.4	32.12	2.45	33.54	-	-	Peak
2390	50.05	-3.95	54	47.77	32.86	3.47	34.05	100	0	Average
2390	68.36	-5.64	74	66.08	32.86	3.47	34.05	100	0	Peak
2412	104.15	-	-	101.82	32.89	3.52	34.08	100	268	Peak
2412	89.2	-	-	86.87	32.89	3.52	34.08	100	268	Average
2483.5	36.29	-17.71	54	33.8	33.01	3.68	34.2	100	0	Average
2483.5	49.25	-24.75	74	46.76	33.01	3.68	34.2	100	0	Peak



Test Mode :	Mode 5	Temperature :	20~21°C
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level (dBuV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
31.89	19.62	-20.38	40	32.92	16.55	0.24	30.09	100	226	Peak
286.23	23.71	-22.29	46	40.17	12.78	0.71	29.95	-	-	Peak
294.6	24.8	-21.2	46	41.1	12.93	0.72	29.95	-	-	Peak
381.2	24.32	-21.68	46	37.87	15.49	0.83	29.87	-	-	Peak
876.1	23.38	-22.62	46	31.17	20.48	1.29	29.56	-	-	Peak
946.8	25.85	-28.15	54	33.34	20.72	1.33	29.54	-	-	Peak
2390	47.85	-26.15	74	45.57	32.86	3.47	34.05	100	0	Peak
2390	35.88	-18.12	54	33.6	32.86	3.47	34.05	100	0	Average
2437	102.53	-	-	100.13	32.95	3.6	34.15	110	350	Peak
2437	88.47	-	-	86.07	32.95	3.6	34.15	110	350	Average
2483.5	47.46	-26.54	74	44.97	33.01	3.68	34.2	100	0	Peak
2483.5	36.39	-17.61	54	33.9	33.01	3.68	34.2	100	0	Average



Test Mode :	Mode 5	Temperature :	20~21°C
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.89	-15.11	40	36.71	18	0.26	30.08	100	308	Peak
207.93	25.76	-17.74	43.5	45.82	9.34	0.6	30	-	-	Peak
210.9	24.46	-19.04	43.5	44.37	9.49	0.6	30	-	-	Peak
531	21.12	-24.88	46	31.78	18.05	0.99	29.7	-	-	Peak
871.9	24.43	-21.57	46	32.24	20.49	1.29	29.59	-	-	Peak
944.7	26.93	-27.07	54	34.43	20.71	1.33	29.54	-	-	Peak
2390	47.37	-26.63	74	45.09	32.86	3.47	34.05	100	0	Peak
2390	35.28	-18.72	54	33	32.86	3.47	34.05	100	0	Average
2437	100.57	-	-	98.17	32.95	3.6	34.15	176	65	Peak
2437	85.87	-	-	83.47	32.95	3.6	34.15	176	65	Average
2483.5	47.94	-26.06	74	45.45	33.01	3.68	34.2	100	0	Peak
2483.5	36.99	-17.01	54	34.5	33.01	3.68	34.2	100	0	Average



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
31.35	20.9	-19.1	40	33.44	17.29	0.25	30.08	200	31	Peak
207.93	20.44	-23.06	43.5	40.5	9.34	0.6	30	-	-	Peak
286.23	26.07	-19.93	46	42.53	12.78	0.71	29.95	-	-	Peak
381.2	25.09	-20.91	46	38.64	15.49	0.83	29.87	-	-	Peak
871.2	23.91	-22.09	46	31.72	20.49	1.29	29.59	-	-	Peak
944.7	27.92	-26.08	54	35.42	20.71	1.33	29.54	-	-	Peak
1914	62.57	-22.2	84.77	61.47	32.17	2.43	33.5	-	-	Peak
2390	36.49	-17.51	54	34.21	32.86	3.47	34.05	100	0	Average
2390	48.45	-25.55	74	46.17	32.86	3.47	34.05	100	0	Peak
2462	104.77	-	-	102.32	32.98	3.64	34.17	100	74	Peak
2462	85.65	-	-	83.2	32.98	3.64	34.17	100	74	Average
2483.5	63.53	-10.47	74	61.04	33.01	3.68	34.2	198	341	Peak
2483.5	47.37	-6.63	54	44.88	33.01	3.68	34.2	198	341	Average



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	23.73	-16.27	40	35.55	18	0.26	30.08	100	332	Peak
108.03	23.45	-20.05	43.5	41.42	11.56	0.43	29.96	-	-	Peak
208.2	24.78	-18.72	43.5	44.79	9.39	0.6	30	-	-	Peak
799.1	22.46	-23.54	46	30.95	19.85	1.25	29.59	-	-	Peak
876.1	24.54	-21.46	46	32.33	20.48	1.29	29.56	-	-	Peak
944.7	26.19	-27.81	54	33.69	20.71	1.33	29.54	-	-	Peak
1918	59.21	-23.66	82.87	58.11	32.17	2.43	33.5	-	-	Peak
2390	34.38	-19.62	54	32.1	32.86	3.47	34.05	100	0	Average
2390	48.23	-25.77	74	45.95	32.86	3.47	34.05	100	0	Peak
2462	102.87	-	-	100.42	32.98	3.64	34.17	100	360	Peak
2462	84.2	-	-	81.75	32.98	3.64	34.17	100	360	Average
2483.5	45.21	-8.79	54	42.72	33.01	3.68	34.2	169	297	Average
2483.5	63.31	-10.69	74	60.82	33.01	3.68	34.2	169	297	Peak



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.81	19.56	-20.44	40	32.1	17.29	0.25	30.08	100	33	Peak
208.2	20.87	-22.63	43.5	40.88	9.39	0.6	30	-	-	Peak
292.17	25.05	-20.95	46	41.4	12.89	0.71	29.95	-	-	Peak
381.2	23.67	-22.33	46	37.22	15.49	0.83	29.87	-	-	Peak
872.6	24.45	-21.55	46	32.26	20.48	1.29	29.58	-	-	Peak
946.8	26.65	-27.35	54	34.14	20.72	1.33	29.54	-	-	Peak
2389.8	64.78	-9.22	74	62.5	32.86	3.47	34.05	111	58	Peak
2389.8	48.19	-5.81	54	45.91	32.86	3.47	34.05	111	58	Average
2412	100.6	-	-	98.27	32.89	3.52	34.08	111	27	Peak
2412	87.64	-	-	85.31	32.89	3.52	34.08	111	27	Average
2499.43	49.68	-24.32	74	47.14	33.05	3.72	34.23	110	46	Peak
2499.43	37.78	-16.22	54	35.24	33.05	3.72	34.23	110	46	Average



Test Mode :	Mode 7	Temperature :	20~21°C
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.54	23.06	-16.94	40	35.6	17.29	0.25	30.08	122	198	Peak
187.95	19.09	-24.41	43.5	39.97	8.48	0.57	29.93	-	-	Peak
208.2	24.86	-18.64	43.5	44.87	9.39	0.6	30	-	-	Peak
531.7	22.75	-23.25	46	33.38	18.08	0.99	29.7	-	-	Peak
872.6	26.88	-19.12	46	34.69	20.48	1.29	29.58	-	-	Peak
944.7	26.93	-27.07	54	34.43	20.71	1.33	29.54	-	-	Peak
2389.23	65.95	-8.05	74	63.67	32.86	3.47	34.05	100	60	Peak
2389.23	49.97	-4.03	54	47.69	32.86	3.47	34.05	100	60	Average
2412	103.58	-	-	101.25	32.89	3.52	34.08	102	63	Peak
2412	90.23	-	-	87.9	32.89	3.52	34.08	102	63	Average
2490.12	50	-24	74	47.46	33.05	3.72	34.23	111	102	Peak
2490.12	33.88	-20.12	54	31.34	33.05	3.72	34.23	111	102	Average



Test Mode :	Mode 8	Temperature :	20~21°C
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.54	20.37	-19.63	40	32.91	17.29	0.25	30.08	-	-	Peak
283.26	24.63	-21.37	46	41.15	12.72	0.71	29.95	-	-	Peak
289.2	27.09	-18.91	46	43.49	12.84	0.71	29.95	100	166	Peak
378.4	24.81	-21.19	46	38.48	15.38	0.83	29.88	-	-	Peak
872.6	23.36	-22.64	46	31.17	20.48	1.29	29.58	-	-	Peak
944.7	28.45	-25.55	54	35.95	20.71	1.33	29.54	-	-	Peak
2324.82	49.16	-24.84	74	47.03	32.76	3.27	33.9	110	56	Peak
2324.82	37.15	-16.85	54	35.02	32.76	3.27	33.9	110	56	Average
2437	101.78	-	-	99.38	32.95	3.6	34.15	105	23	Peak
2437	86.41	-	-	84.01	32.95	3.6	34.15	105	23	Average
2499.05	47.09	-26.91	74	44.55	33.05	3.72	34.23	159	344	Peak
2499.05	33.6	-20.4	54	31.06	33.05	3.72	34.23	159	344	Average



Test Mode :	Mode 8	Temperature :	20~21°C
Test Channel :	06	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.27	23.08	-16.92	40	34.9	18	0.26	30.08	100	225	Peak
208.2	25.17	-18.33	43.5	45.18	9.39	0.6	30	-	-	Peak
292.17	21.22	-24.78	46	37.57	12.89	0.71	29.95	-	-	Peak
841.8	22.39	-23.61	46	30.33	20.43	1.28	29.65	-	-	Peak
871.2	24	-22	46	31.81	20.49	1.29	29.59	-	-	Peak
944.7	25.86	-28.14	54	33.36	20.71	1.33	29.54	-	-	Peak
2329.38	48.44	-25.56	74	46.31	32.76	3.27	33.9	198	113	Peak
2329.38	36.28	-17.72	54	34.15	32.76	3.27	33.9	198	113	Average
2437	101.47	-	-	99.07	32.95	3.6	34.15	174	119	Peak
2437	87.46	-	-	85.06	32.95	3.6	34.15	174	119	Average
2486.51	47.19	-26.81	74	44.7	33.01	3.68	34.2	200	342	Peak
2486.51	33.76	-20.24	54	31.27	33.01	3.68	34.2	200	342	Average



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.54	19.66	-20.34	40	32.2	17.29	0.25	30.08	100	266	Peak
211.17	20.94	-22.56	43.5	40.79	9.54	0.6	29.99	-	-	Peak
289.2	25.53	-20.47	46	41.93	12.84	0.71	29.95	-	-	Peak
381.2	23.81	-22.19	46	37.36	15.49	0.83	29.87	-	-	Peak
870.5	24.76	-21.24	46	32.57	20.49	1.29	29.59	-	-	Peak
944.7	27.45	-26.55	54	34.95	20.71	1.33	29.54	-	-	Peak
2318.93	47.03	-26.97	74	44.9	32.76	3.27	33.9	200	0	Peak
2318.93	33.14	-20.86	54	31.01	32.76	3.27	33.9	200	0	Average
2462	100.13	-	-	97.68	32.98	3.64	34.17	199	32	Peak
2462	87.42	-	-	84.97	32.98	3.64	34.17	199	32	Average
2483.5	59.18	-14.82	74	56.69	33.01	3.68	34.2	200	87	Peak
2483.5	45.49	-8.51	54	43	33.01	3.68	34.2	200	87	Average



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	20~21°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Jack Li	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.27	24.02	-15.98	40	35.84	18	0.26	30.08	102	0	Peak
208.2	25.54	-17.96	43.5	45.55	9.39	0.6	30	-	-	Peak
211.17	26.46	-17.04	43.5	46.31	9.54	0.6	29.99	-	-	Peak
871.2	24.56	-21.44	46	32.37	20.49	1.29	29.59	-	-	Peak
944.7	27.67	-26.33	54	35.17	20.71	1.33	29.54	-	-	Peak
983.2	22.41	-31.59	54	29.54	21	1.4	29.53	-	-	Peak
2359.02	47.53	-26.47	74	45.32	32.81	3.38	33.98	179	92	Peak
2359.02	35.26	-18.74	54	33.05	32.81	3.38	33.98	179	92	Average
2462	100.55	-	-	98.1	32.98	3.64	34.17	200	120	Peak
2462	85.49	-	-	83.04	32.98	3.64	34.17	200	120	Average
2484.04	61.39	-12.61	74	58.9	33.01	3.68	34.2	198	112	Peak
2484.04	43.59	-10.41	54	41.1	33.01	3.68	34.2	198	112	Average



## **3.8 Antenna Requirements**

### **3.8.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

### **3.8.2 Antenna Connected Construction**

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

### **3.8.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 20, 2011	Dec. 23, 2011 ~ Jan. 6, 2012	Dec. 19, 2012	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY451015 55	N/A	Aug. 23, 2011	Dec. 23, 2011 ~ Jan. 6, 2012	Aug. 22, 2012	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY444211 98	N/A	Aug. 23, 2011	Dec. 23, 2011 ~ Jan. 6, 2012	Aug. 22, 2012	Conducted (TH01-KS)
DC Power Supply	TOPWARD	GPS-3030D	E1884515	N/A	Aug. 23, 2011	Dec. 23, 2011 ~ Jan. 6, 2012	Aug. 22, 2012	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-9605 02	N/A	Dec. 20, 2011	Dec. 23, 2011 ~ Jan. 6, 2012	Dec. 19, 2012	Conducted (TH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Jun. 02, 2011	Jan. 29, 2012	Jun. 01, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Dec. 30, 2011	Jan. 29, 2012	Dec. 29, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Dec. 30, 2011	Jan. 29, 2012	Dec. 29, 2012	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	N/A	Nov. 16, 2011	Jan. 29, 2012	Nov. 15, 2012	Conduction (CO01-KS)
System Simulator	R&S	CMU200	837587/06 6	2G Full-Band	Dec. 30, 2011	Jan. 29, 2012	Dec. 29, 2012	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 09, 2011	Jan. 29, 2012	Nov. 08, 2012	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 30, 2011	Jan. 29, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 08, 2011	Jan. 29, 2012	Dec. 07, 2012	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/00	9 kHz~30 MHz	Jul. 28, 2011	Jan. 29, 2012	Jul. 27, 2012	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 06, 2012	Jan. 29, 2012	Jan. 05, 2013	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 30, 2011	Jan. 29, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A023 70	1GHz~26.5GHz	Dec. 30, 2011	Jan. 29, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 07, 2011	Jan. 29, 2012	Nov. 06, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA1702 49	15GHz~40GHz	Oct. 11, 2011	Jan. 29, 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
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.13</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.26</b>		

### 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
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.27</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.54</b>		



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
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>2.36</b>				
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>4.72</b>				