



# FCC RF Test Report

**APPLICANT** : Nest Labs Inc.  
**EQUIPMENT** : Home Monitoring Device  
**FCC ID** : ZQAT77  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : Digital Transmission System (DTS)

The product was received on Jun. 30, 2011 and completely tested on Oct. 07, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai / Manager



**SPORTON INTERNATIONAL INC.**

No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



# TABLE OF CONTENTS

**REVISION HISTORY..... 3**

**SUMMARY OF TEST RESULT ..... 4**

**1 GENERAL DESCRIPTION ..... 5**

    1.1 Applicant ..... 5

    1.2 Manufacturer ..... 5

    1.3 Feature of Equipment Under Test ..... 5

    1.4 Testing Site ..... 6

    1.5 Applied Standards ..... 6

**2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST ..... 7**

    2.1 RF Power ..... 7

    2.2 Test Mode ..... 8

    2.3 Connection Diagram of Test System ..... 9

    2.4 RF Utility ..... 9

**3 TEST RESULT ..... 10**

    3.1 6dB and 99% Bandwidth Measurement ..... 10

    3.2 Output Power Measurement ..... 23

    3.3 Band Edges Measurement ..... 25

    3.4 Spurious Emission Measurement ..... 33

    3.5 Power Spectral Density Measurement ..... 43

    3.6 Radiated Emission Measurement ..... 50

    3.7 Antenna Requirements ..... 71

**4 LIST OF MEASURING EQUIPMENT ..... 72**

**5 UNCERTAINTY OF EVALUATION ..... 73**



## SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	Gen 4.4.1	99% Bandwidth	-	Pass	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 5.6 dB at 2487.65 MHz
3.7	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**Nest Labs Inc.**

855 El Camino Real Ste 290, Palo Alto California, 94301

## 1.2 Manufacturer

**PROTEK (SHANGHAI) LIMITED**

No. 3768, Xiu Yan Rd., Kang Qiao Town, Pu Dong Dist., Shang Hai Zip: 201319

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
<b>Equipment</b>	Home Monitoring Device
<b>FCC ID</b>	ZQAT77
<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 : 17.81 dBm (0.060 W) 802.11g : 23.22 dBm (0.210 W) 802.11n (BW 20MHz) : 22.42 dBm (0.175 W)
<b>Antenna Type</b>	WLAN : FPC Antenna and PIFA Antenna with gain 0.00 dBi Zigbee : FPC Antenna and PIFA Antenna with gain 0.00 dBi
<b>Type of Antenna Connector</b>	N/A
<b>Type of Modulation</b>	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Zigbee : O-QPSK
<b>EUT Stage</b>	Production Unit

**Remark:**

1. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.	
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC/IC Registration No.</b>
	03CH06-HY	722060/4086B-1

## 1.5 Applied Standards

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

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8

### Remark:

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

## 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	17.69	-	-	-
CH 06	2437 MHz	17.81	17.75	17.49	17.39
CH 11	2462 MHz	17.62	-	-	-

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	22.88	-	-	-	-	-	-	-
CH 06	2437 MHz	23.22	23.12	22.92	22.80	23.02	22.83	22.95	22.78
CH 11	2462 MHz	22.86	-	-	-	-	-	-	-

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412 MHz	22.22	-	-	-	-	-	-	-
CH 06	2437 MHz	22.42	22.19	22.02	21.86	21.81	21.69	21.56	21.59
CH 11	2462 MHz	22.29	-	-	-	-	-	-	-

**Remark:**

1. The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 6Mbps for 802.11g, and MCS0 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 were conducted to determine the final configuration from all possible combinations.

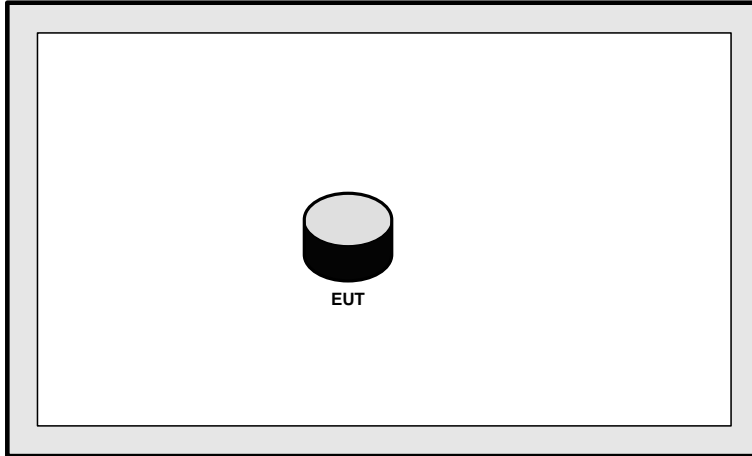
The following tables are showing the test modes as the worst cases and recorded in this report.

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



## 2.3 Connection Diagram of Test System

<WLAN Tx Mode>



## 2.4 RF Utility

The programmed RF utility "Putty" is installed in EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

### 3 Test Result

#### 3.1 6dB and 99% Bandwidth Measurement

##### 3.1.1 Limit of 6dB Bandwidth

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

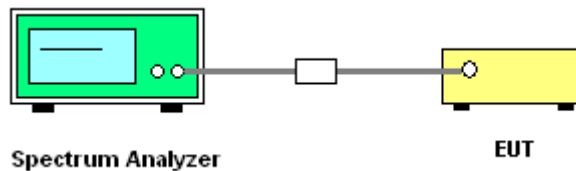
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

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

##### 3.1.4 Test Setup



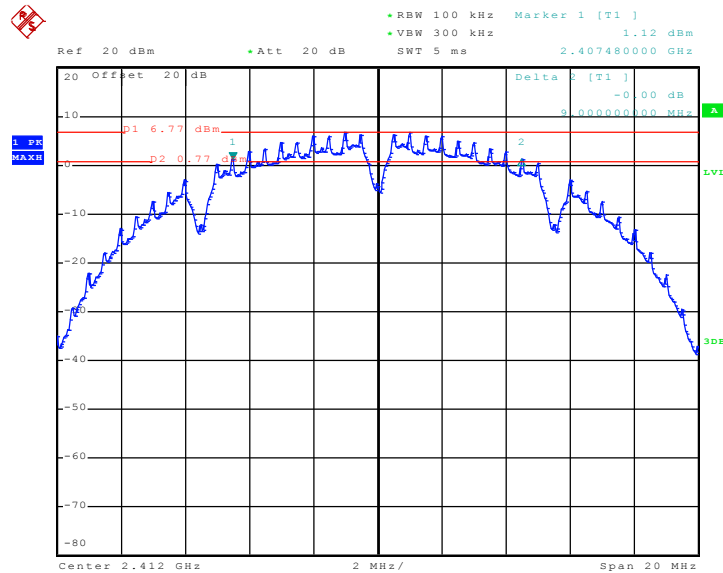


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	9.00	0.5	Pass
06	2437	9.04	0.5	Pass
11	2462	9.04	0.5	Pass

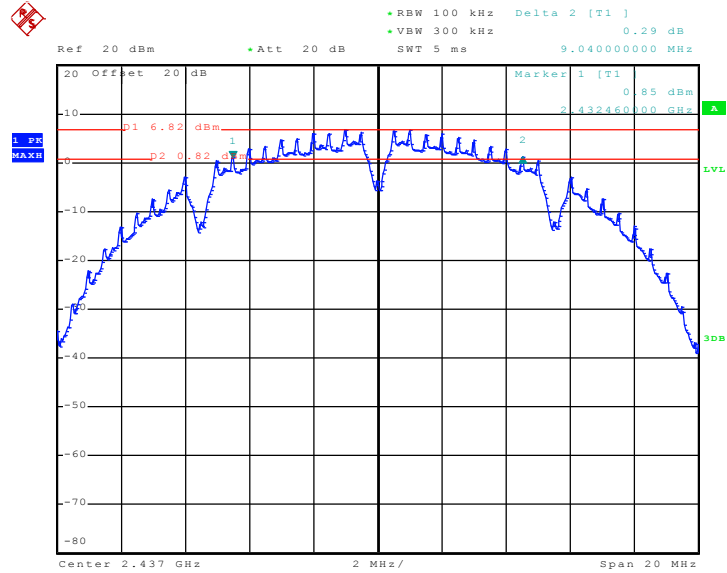
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 15.JUL.2011 22:38:28

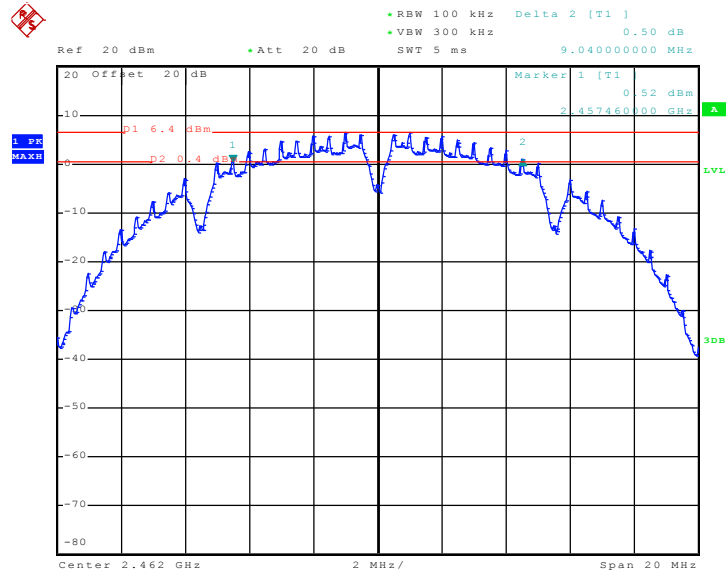


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



Date: 15.JUL.2011 22:50:05

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



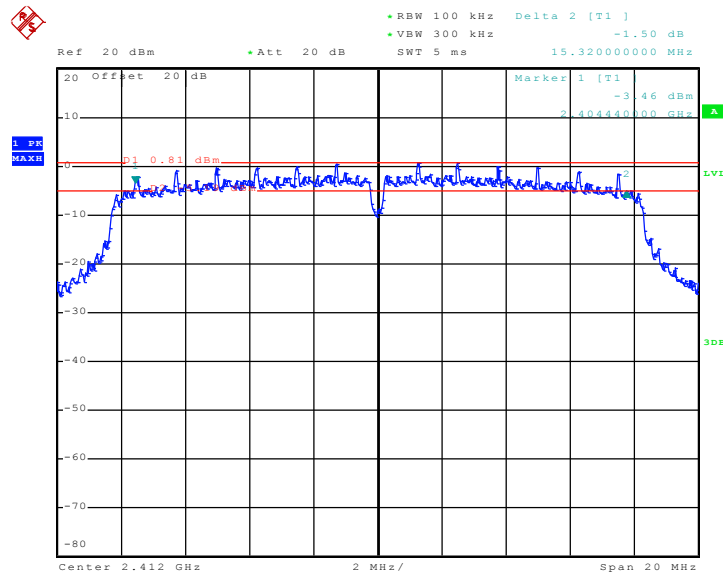
Date: 15.JUL.2011 22:43:34



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.32	0.5	Pass
06	2437	15.68	0.5	Pass
11	2462	15.68	0.5	Pass

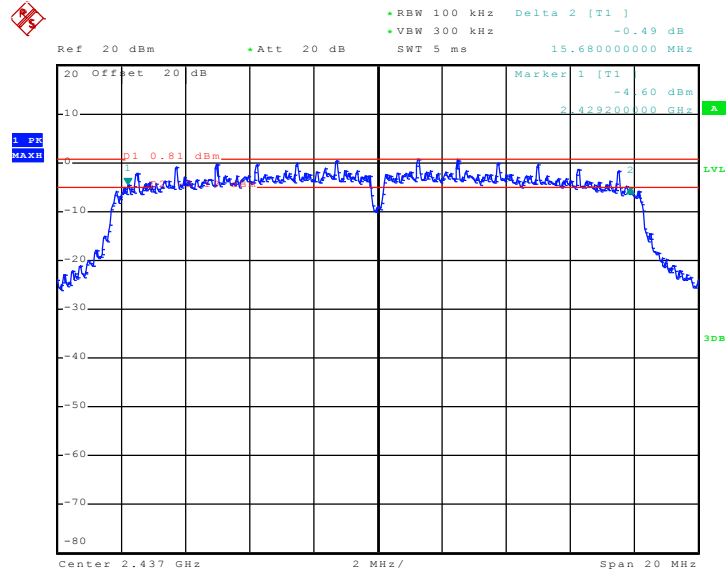
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 15.JUL.2011 23:03:10

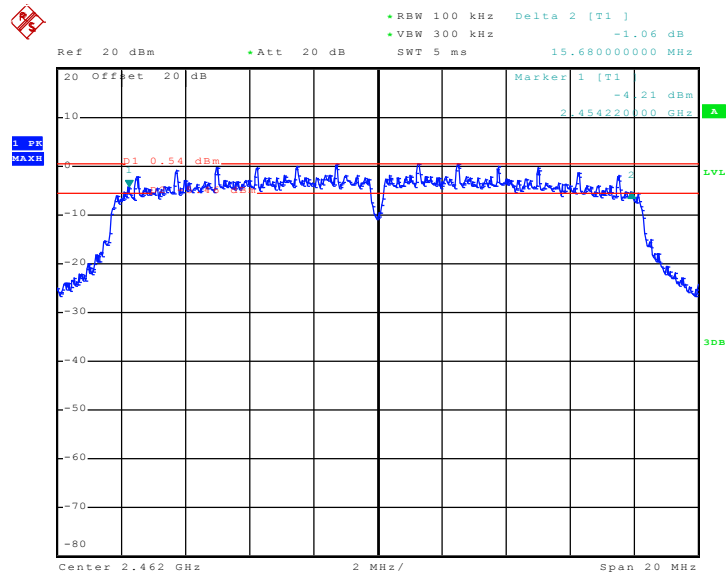


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Date: 15.JUL.2011 22:58:59

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



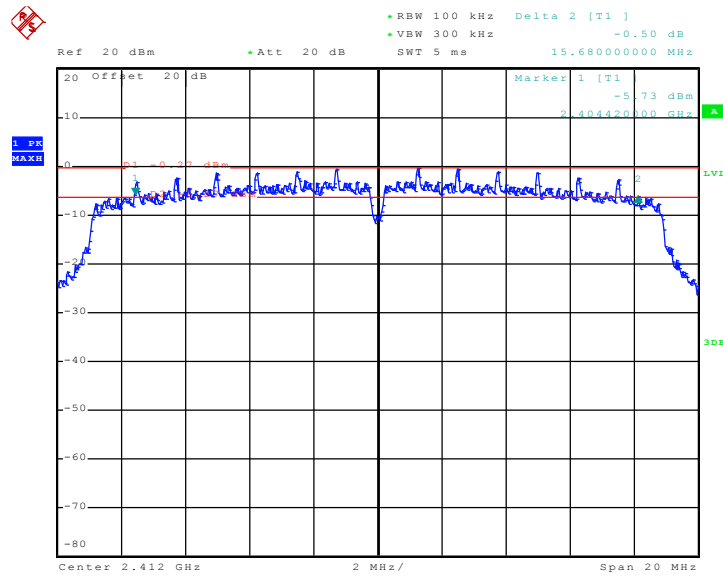
Date: 15.JUL.2011 23:07:03



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.68	0.5	Pass
06	2437	15.88	0.5	Pass
11	2462	15.52	0.5	Pass

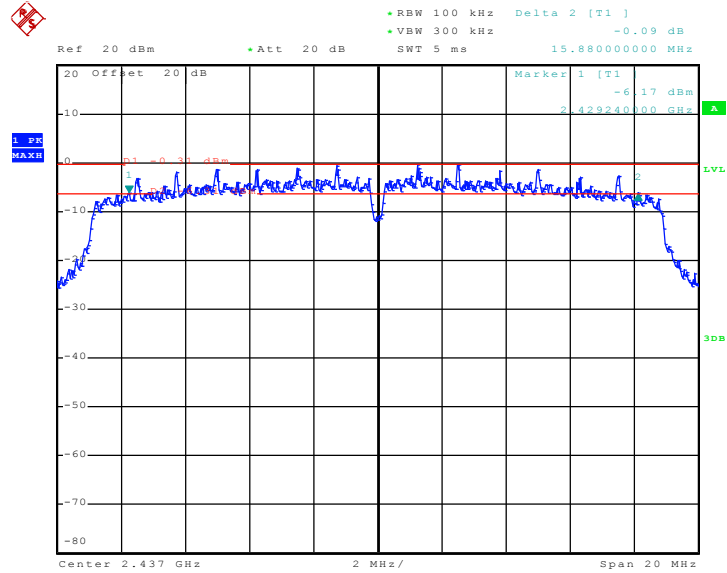
Mode 7 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 01



Date: 15.JUL.2011 23:24:23

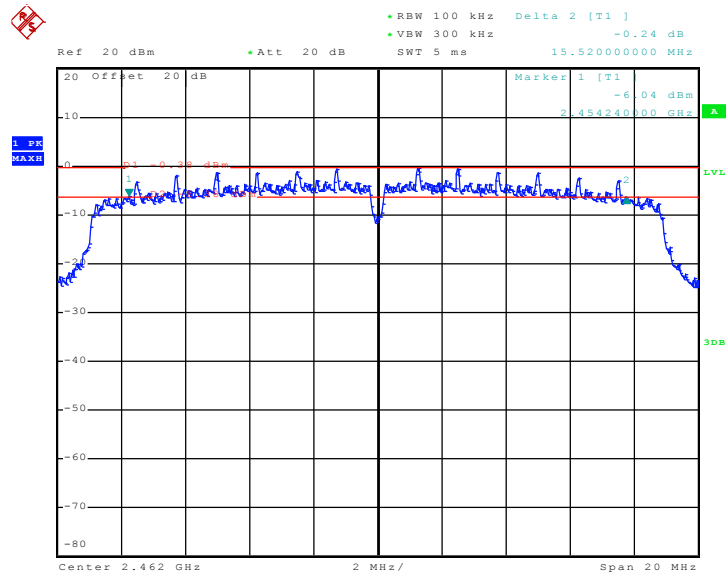


Mode 8 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 06



Date: 15.JUL.2011 23:27:51

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



Date: 15.JUL.2011 23:20:00

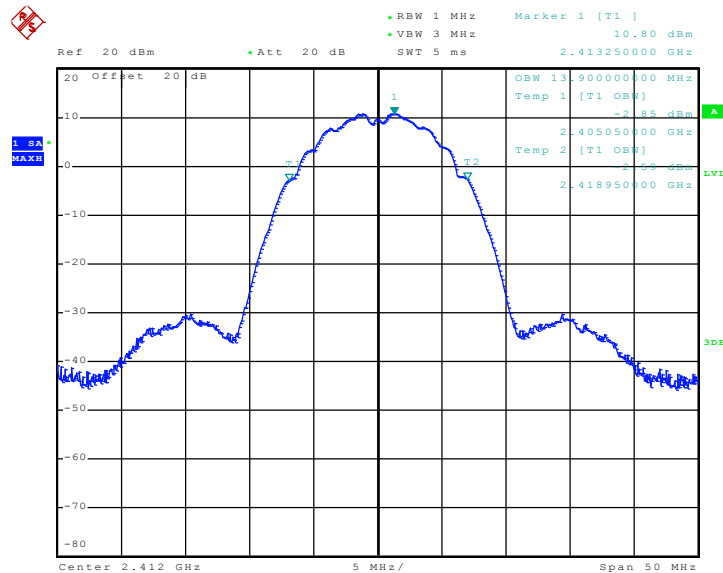


3.1.6 Test Result of 99% Occupied Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11b 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	13.90	Pass
06	2437	13.90	Pass
11	2462	13.90	Pass

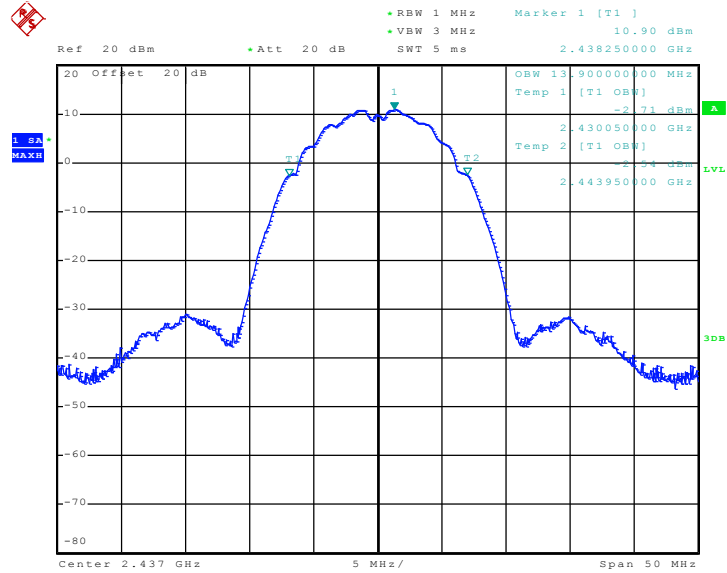
Mode 1 : 99% Occupied Bandwidth Plot on 802.11b Channel 01



Date: 7.OCT.2011 08:51:42

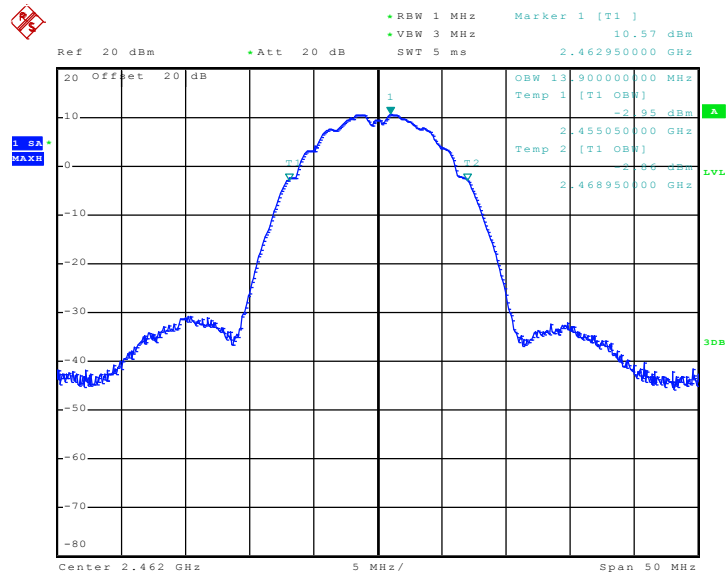


Mode 2 : 99% Occupied Bandwidth Plot on 802.11b Channel 06



Date: 7.OCT.2011 09:09:26

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



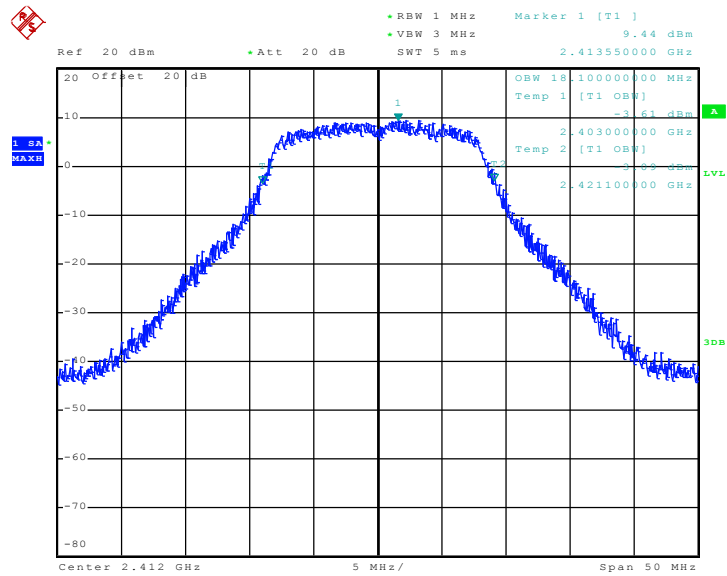
Date: 7.OCT.2011 09:08:20



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11g 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	18.10	Pass
06	2437	18.00	Pass
11	2462	18.10	Pass

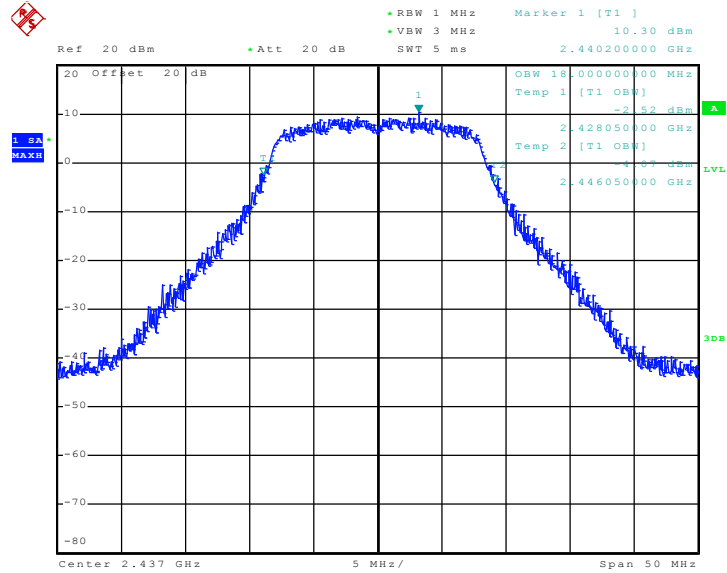
Mode 4 : 99% Occupied Bandwidth Plot on 802.11g Channel 01



Date: 7.OCT.2011 08:53:02

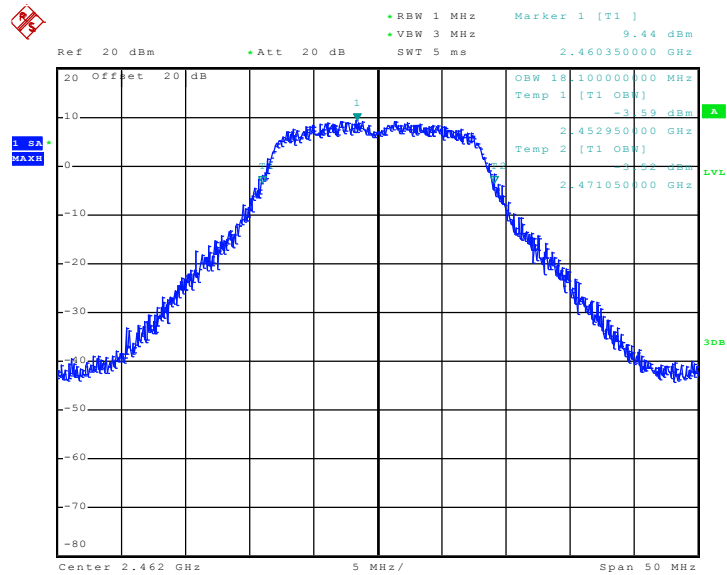


Mode 5 : 99% Occupied Bandwidth Plot on 802.11g Channel 06



Date: 7.OCT.2011 09:11:21

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



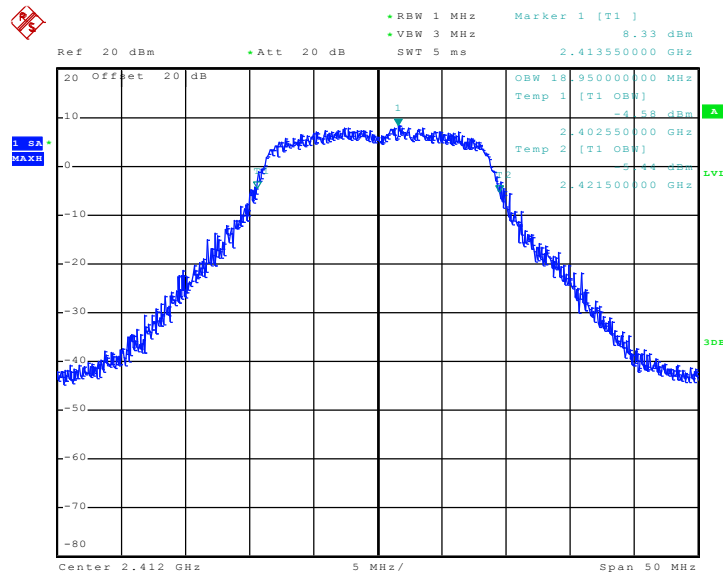
Date: 7.OCT.2011 09:07:24



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11n (BW 20MHz) 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	18.95	Pass
06	2437	19.00	Pass
11	2462	19.10	Pass

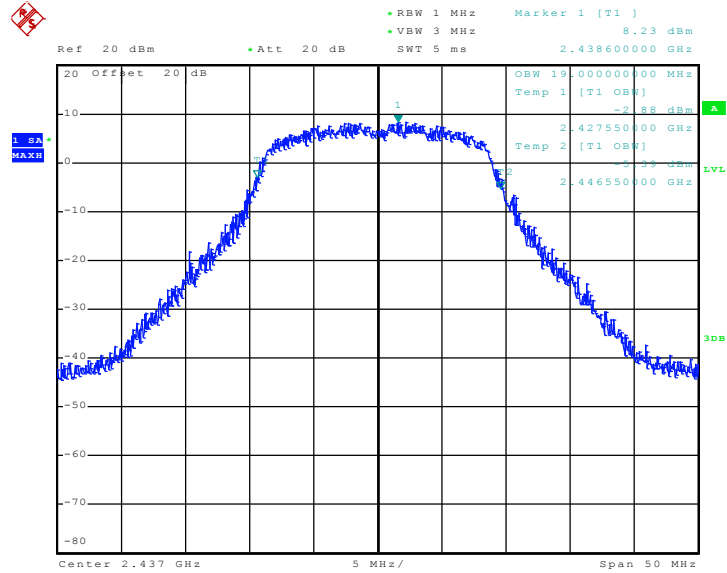
Mode 7 : 99% Occupied Bandwidth Plot on 802.11n(BW 20MHz) Channel 01



Date: 7.OCT.2011 08:55:17

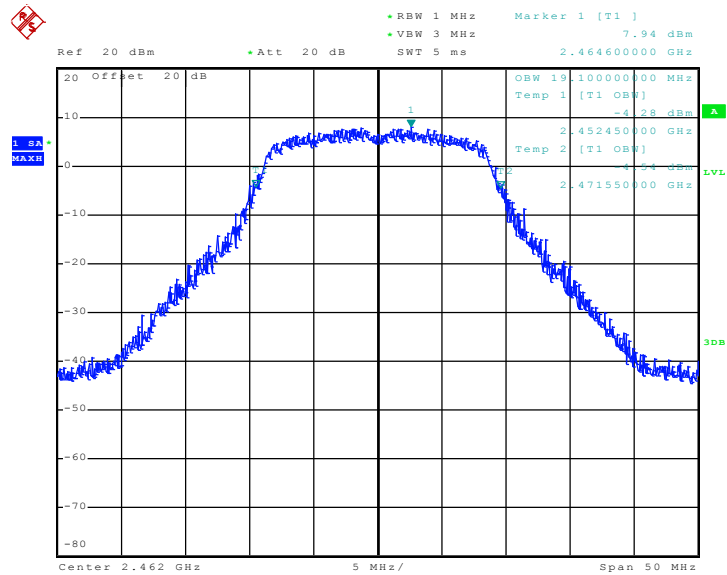


Mode 8 : 99% Occupied Bandwidth Plot on 802.11n(BW 20MHz) Channel 06



Date: 7.OCT.2011 09:12:38

Mode 9 : 99% Occupied Bandwidth Plot on 802.11n(BW 20MHz) Channel 11



Date: 7.OCT.2011 08:56:50

## 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.

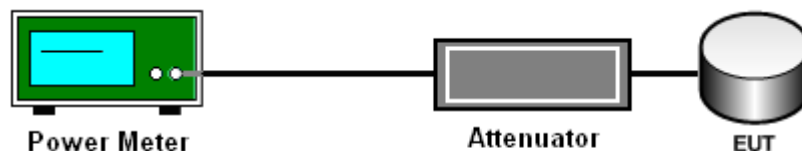
### 3.2.2 Measuring Instruments

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 :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	17.69	30	Pass
06	2437	17.81	30	Pass
11	2462	17.62	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.88	30	Pass
06	2437	23.22	30	Pass
11	2462	22.86	30	Pass

Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.22	30	Pass
06	2437	22.42	30	Pass
11	2462	22.29	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**

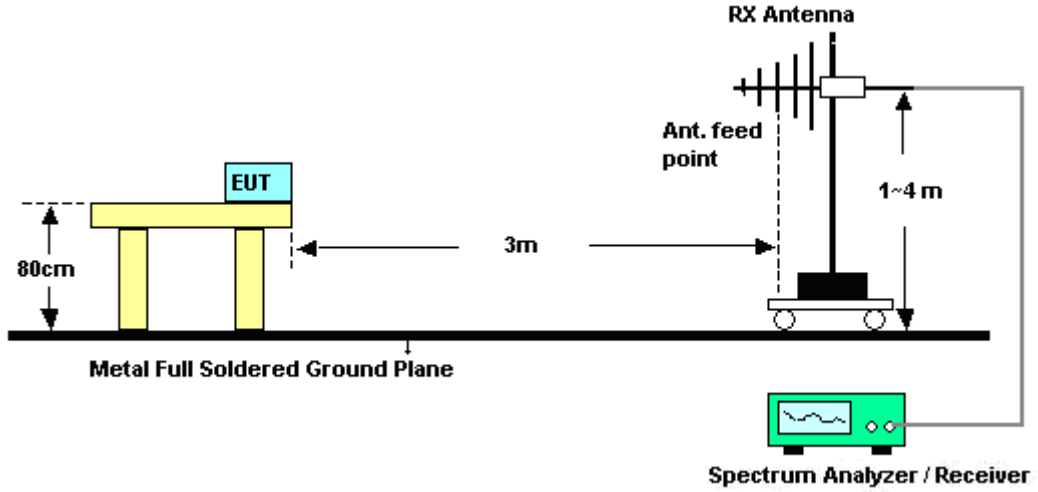
See list of measuring instruments of this test report.

#### **3.3.3 Test Procedures**

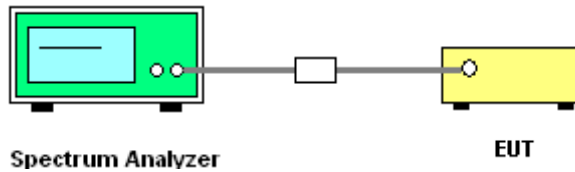
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	26~27°C
Test Band :	802.11b	Relative Humidity :	51~52%
Test Channel :	01	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2385.81	53.9	-20.1	74	50.99	31.9	5.4	34.39	105	235	Peak
2385.81	44.71	-9.29	54	41.8	31.9	5.4	34.39	105	235	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
2385.81	49.57	-24.43	74	46.66	31.9	5.4	34.39	121	125	Peak
2385.81	39.42	-14.58	54	36.51	31.9	5.4	34.39	121	125	Average

Test Mode :	Mode 3	Temperature :	26~27°C
Test Band :	802.11b	Relative Humidity :	51~52%
Test Channel :	11	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2487.65	55.66	-18.34	74	52.51	32	5.52	34.37	103	232	Peak
2487.65	48.4	-5.6	54	45.25	32	5.52	34.37	103	232	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
2488.22	48.27	-25.73	74	45.12	32	5.52	34.37	144	148	Peak
2488.22	37.16	-16.84	54	34.01	32	5.52	34.37	144	148	Average



Test Mode :	Mode 4	Temperature :	26~27°C
Test Band :	802.11g	Relative Humidity :	51~52%
Test Channel :	01	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.99	57.91	-16.09	74	55	31.9	5.4	34.39	100	228	Peak
2389.99	38.59	-15.41	54	35.68	31.9	5.4	34.39	100	228	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
2389.42	52	-22	74	49.09	31.9	5.4	34.39	121	122	Peak
2389.42	35.9	-18.1	54	32.99	31.9	5.4	34.39	121	122	Average

Test Mode :	Mode 6	Temperature :	26~27°C
Test Band :	802.11g	Relative Humidity :	51~52%
Test Channel :	11	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	65.48	-8.52	74	62.35	31.98	5.52	34.37	104	239	Peak
2483.5	43	-11	54	39.87	31.98	5.52	34.37	104	239	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	61.91	-12.09	74	58.78	31.98	5.52	34.37	187	270	Peak
2483.5	41.04	-12.96	54	37.91	31.98	5.52	34.37	187	270	Average



Test Mode :	Mode 7	Temperature :	26~27°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	51~52%
Test Channel :	01	Test Engineer :	Kay Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2388.85	59.65	-14.35	74	56.74	31.9	5.4	34.39	138	229	Peak
2388.85	38.74	-15.26	54	35.83	31.9	5.4	34.39	138	229	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
2388.85	50.4	-23.6	74	47.49	31.9	5.4	34.39	120	111	Peak
2388.85	35.29	-18.71	54	32.38	31.9	5.4	34.39	120	111	Average

Test Mode :	Mode 9	Temperature :	26~27°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	51~52%
Test Channel :	11	Test Engineer :	Kay Wu

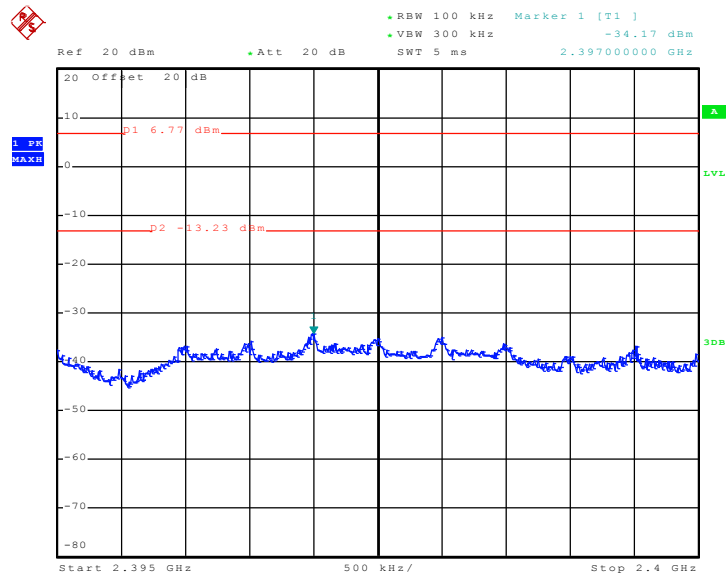
ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2484.42	65.14	-8.86	74	62.01	31.98	5.52	34.37	102	236	Peak
2484.42	42.82	-11.18	54	39.69	31.98	5.52	34.37	102	236	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	50.24	-23.76	74	47.11	31.98	5.52	34.37	196	256	Peak
2483.5	34.99	-19.01	54	31.86	31.98	5.52	34.37	196	256	Average

### 3.3.6 Test Plots of Conducted Band Edges

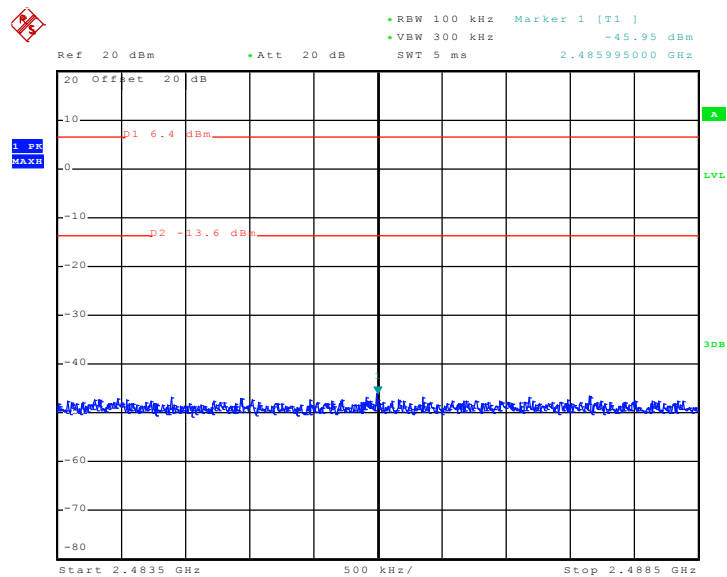
Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	52~55%
Test Channel :	01 and 11	Test Engineer :	Hank Yu

Low Band Edge Plot on 802.11b Channel 01



Date: 15.JUL.2011 22:39:36

High Band Edge Plot on 802.11b Channel 11

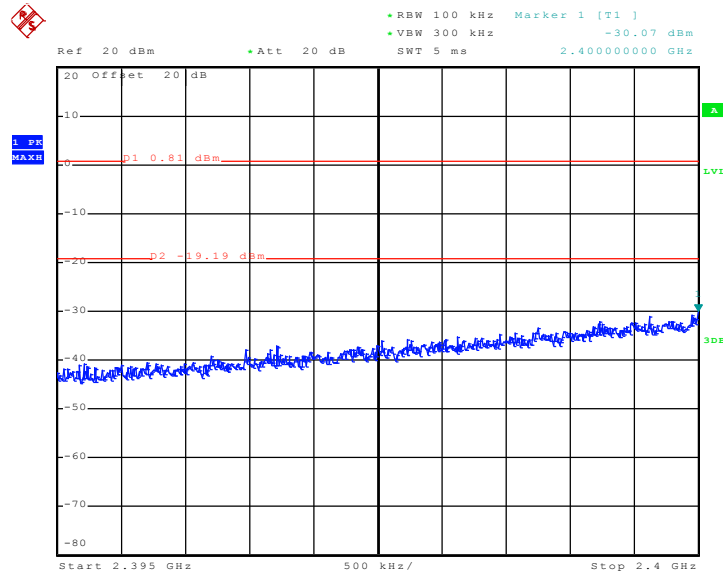


Date: 15.JUL.2011 22:44:20



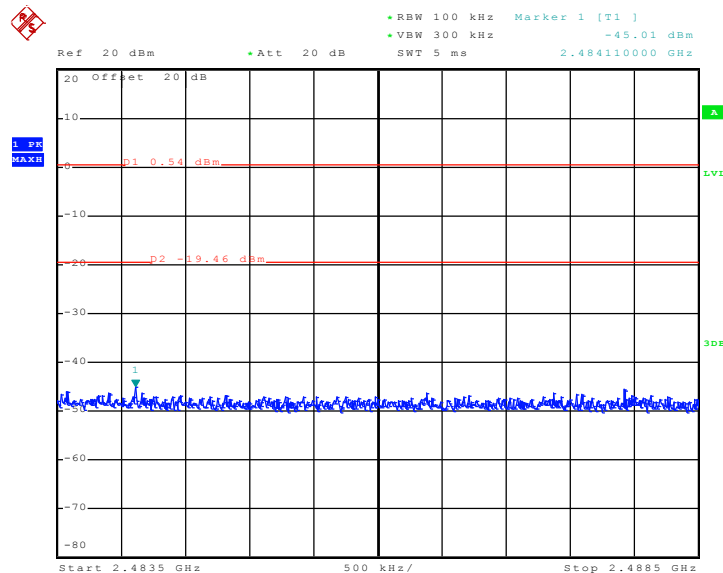
Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	52~55%
Test Channel :	01 and 11	Test Engineer :	Hank Yu

Low Band Edge Plot on 802.11g Channel 01



Date: 15.JUL.2011 23:04:18

High Band Edge Plot on 802.11g Channel 11

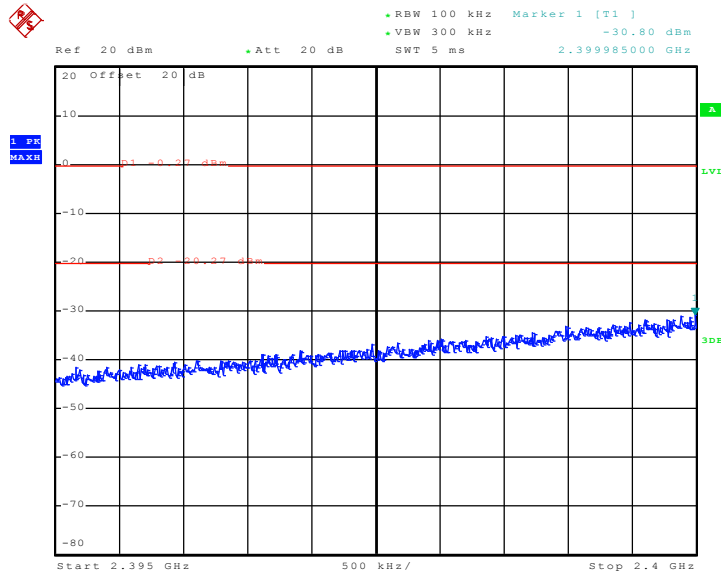


Date: 15.JUL.2011 23:07:50



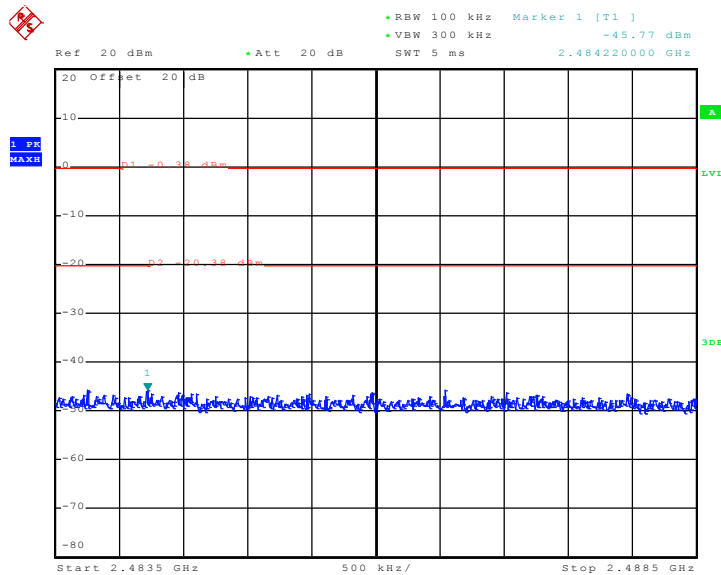
Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	52~55%
Test Channel :	01 and 11	Test Engineer :	Hank Yu

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



Date: 15.JUL.2011 23:25:32

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



Date: 15.JUL.2011 23:20:47



## 3.4 Spurious Emission Measurement

### 3.4.1 Limit of Spurious Emission Measurement

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

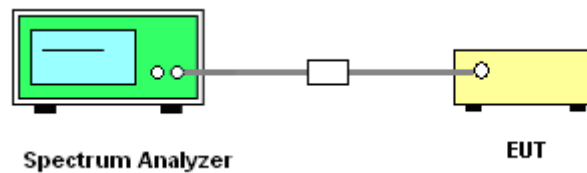
### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 Test Procedure

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

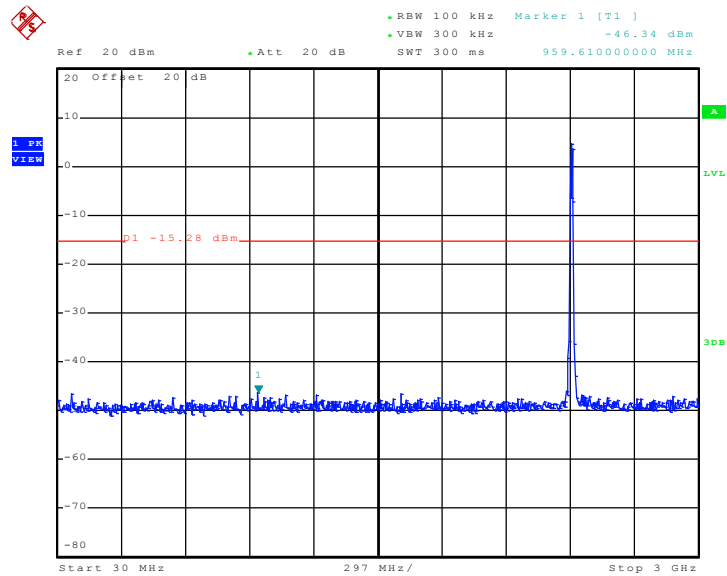
### 3.4.4 Test Setup



### 3.4.5 Test Plots of Spurious Emission

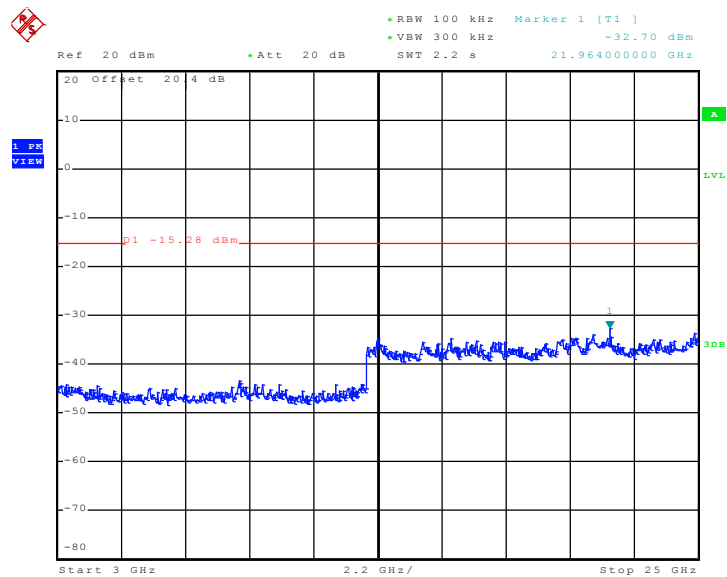
Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	52~55%
Test Channel :	01	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.JUL.2011 22:46:28

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

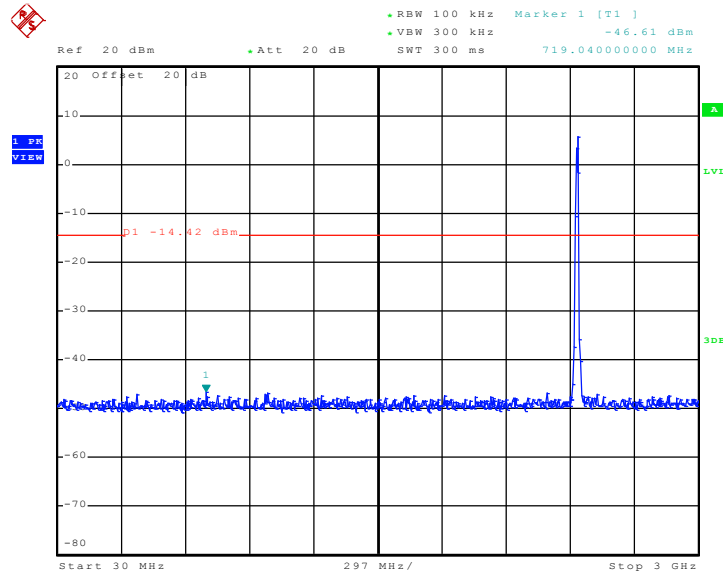


Date: 15.JUL.2011 22:46:45



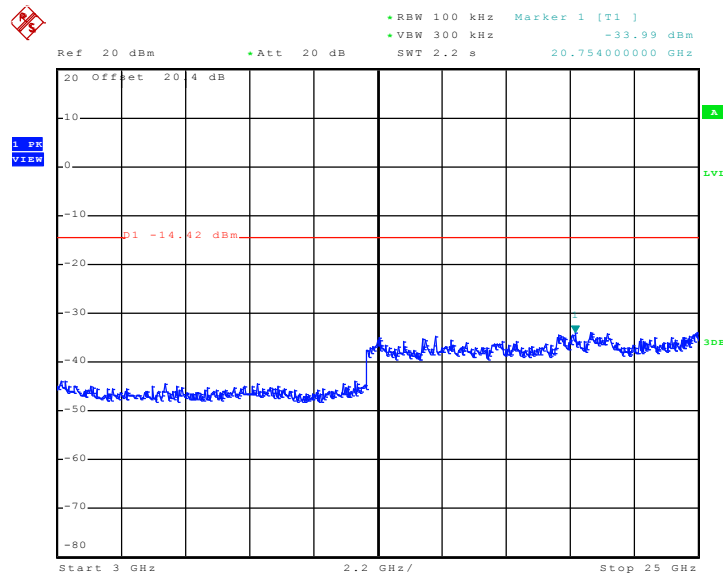
Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	52~55%
Test Channel :	06	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.JUL.2011 22:48:01

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

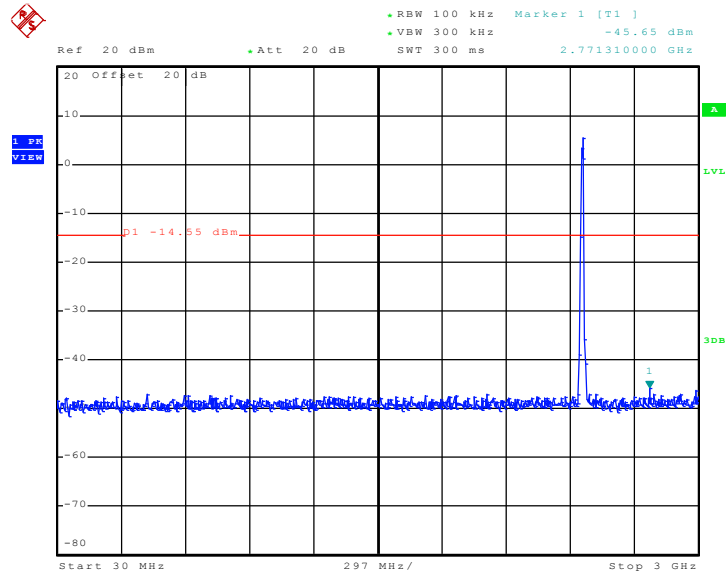


Date: 15.JUL.2011 22:48:18



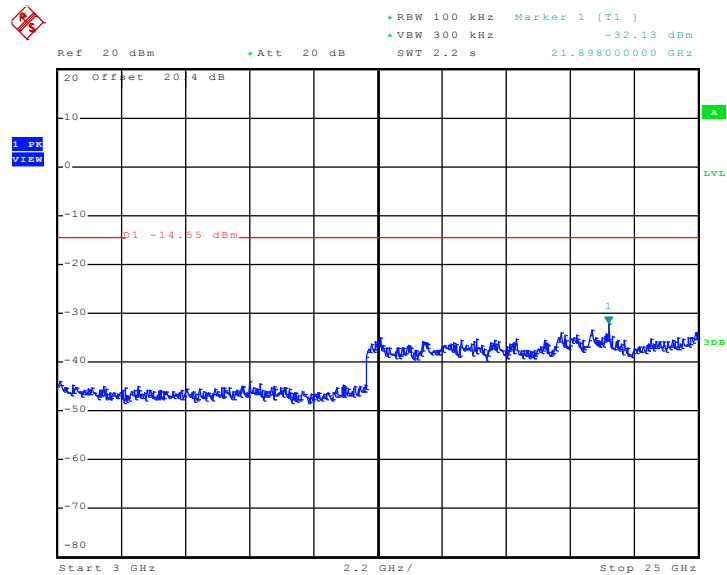
Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	52~55%
Test Channel :	11	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.JUL.2011 22:45:07

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

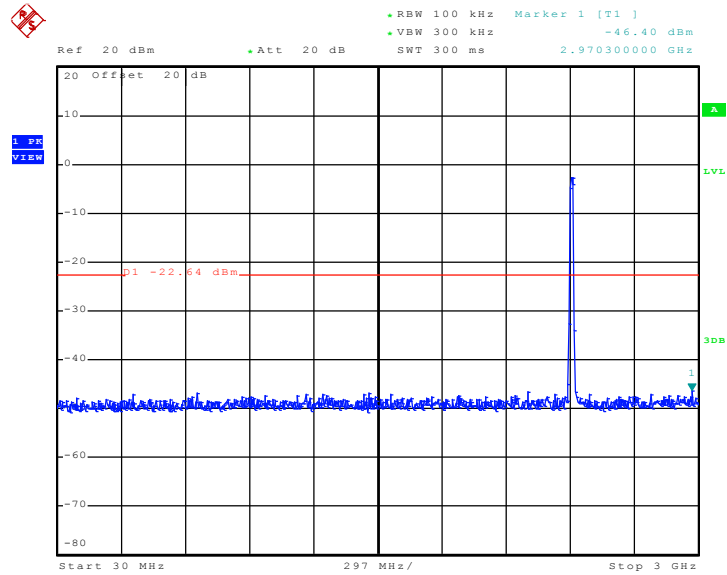


Date: 15.JUL.2011 22:45:24



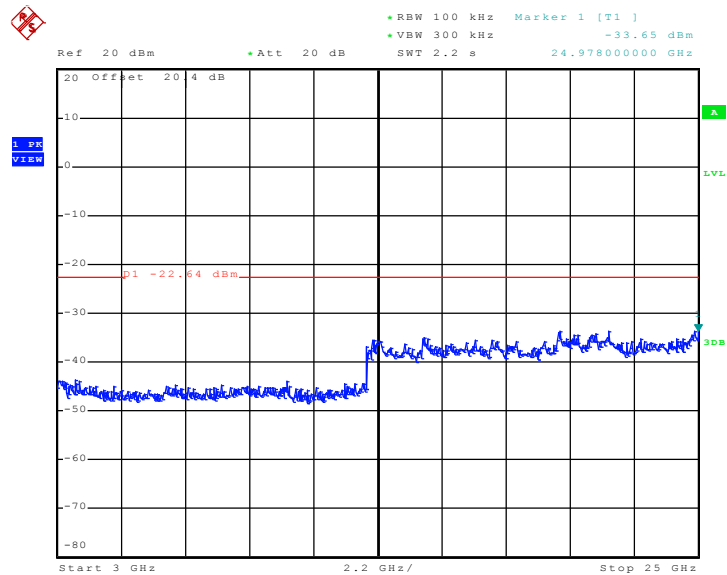
Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	52~55%
Test Channel :	01	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.JUL.2011 23:05:05

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

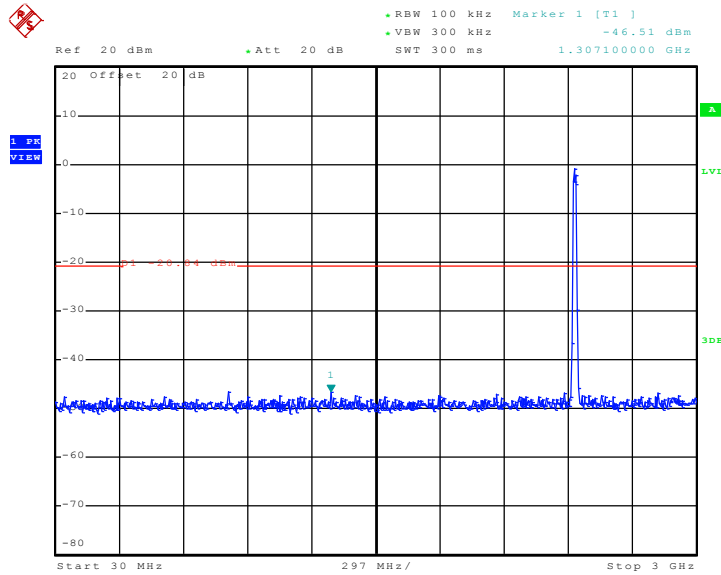


Date: 15.JUL.2011 23:05:22



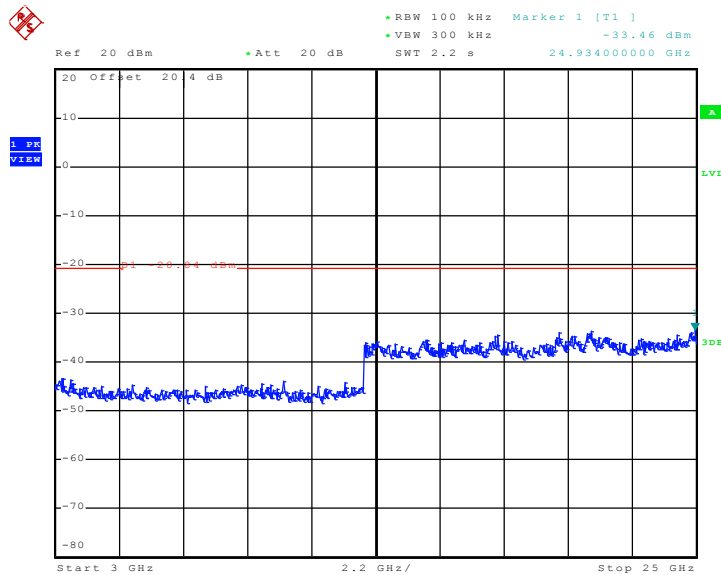
Test Mode :	Mode 5	Temperature :	24~26
Test Band :	802.11g	Relative Humidity :	52~55
Test Channel :	06	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.JUL.2011 22:59:45

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

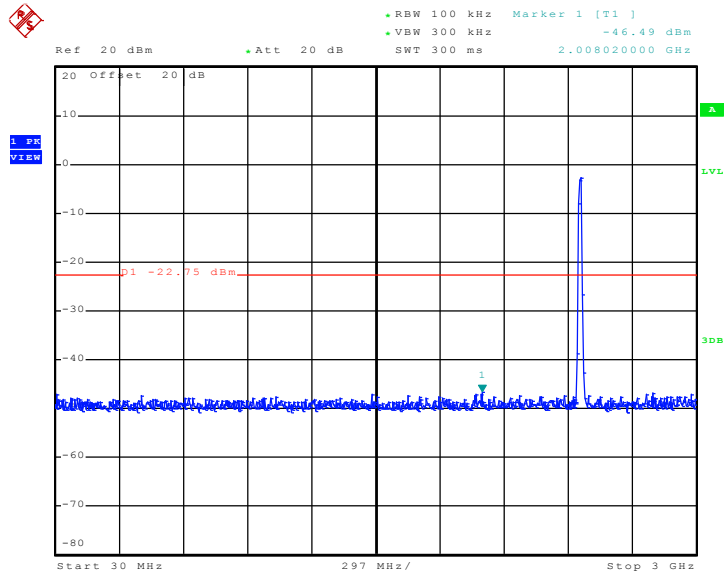


Date: 15.JUL.2011 23:00:02



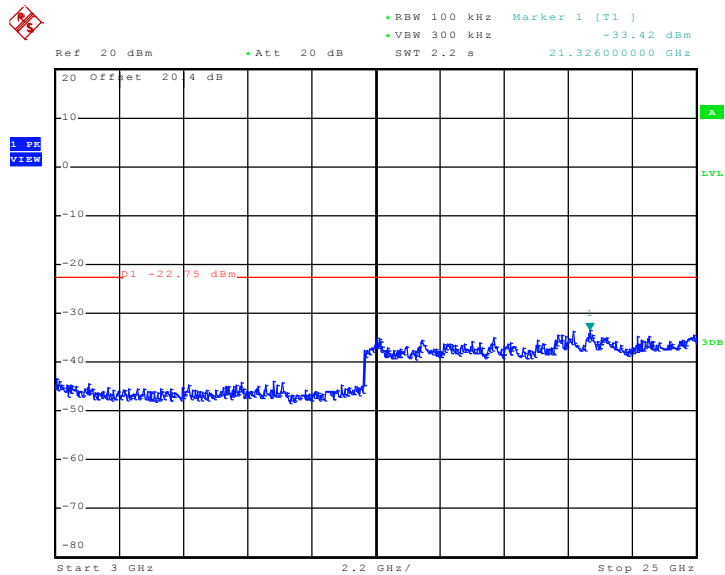
Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	52~55%
Test Channel :	11	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.JUL.2011 23:08:36

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

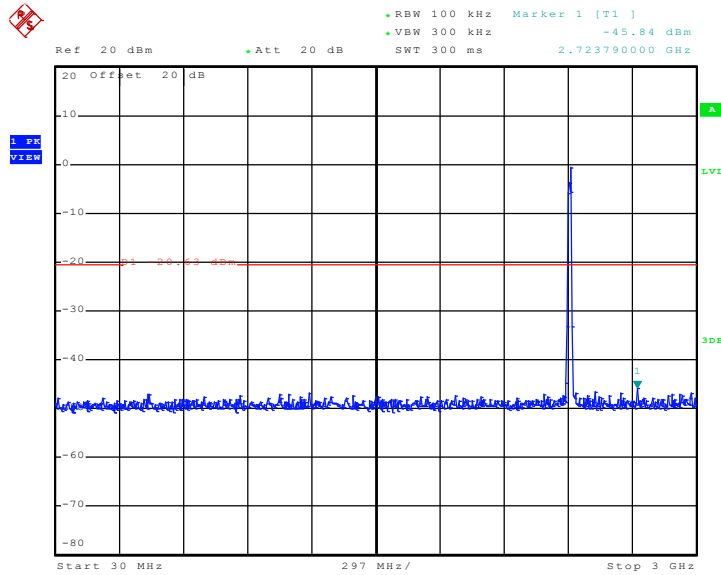


Date: 15.JUL.2011 23:08:53



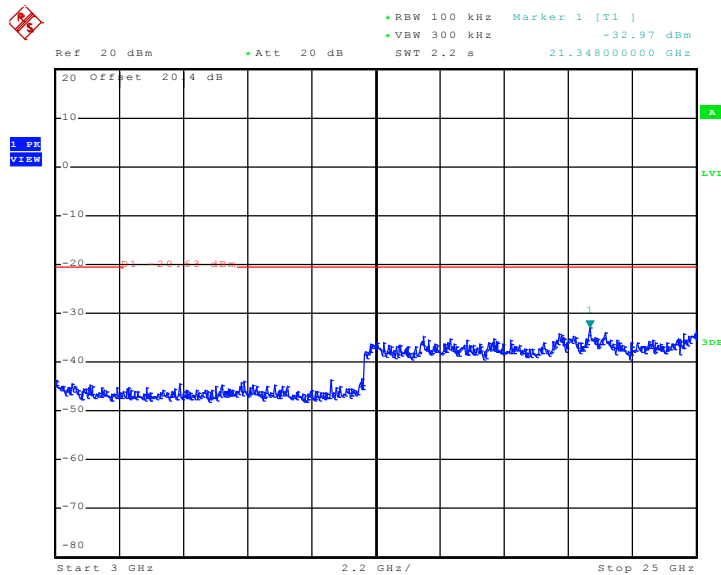
Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	52~55%
Test Channel :	01	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.JUL.2011 23:26:18

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



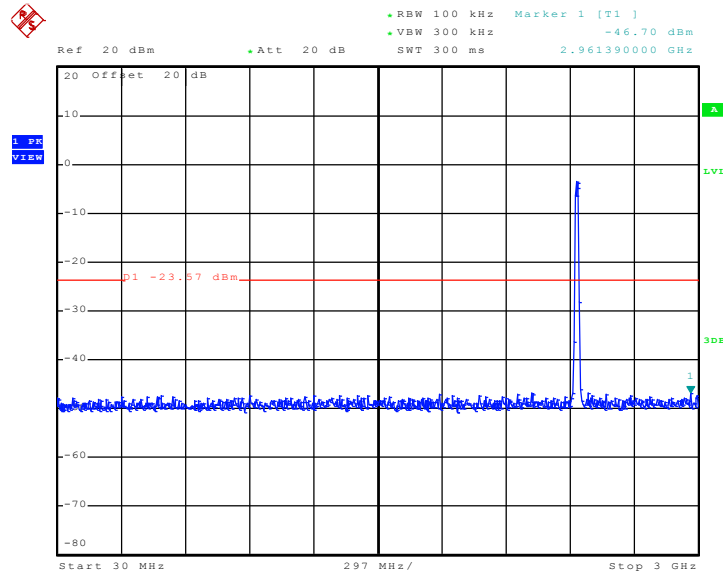
Date: 15.JUL.2011 23:26:35





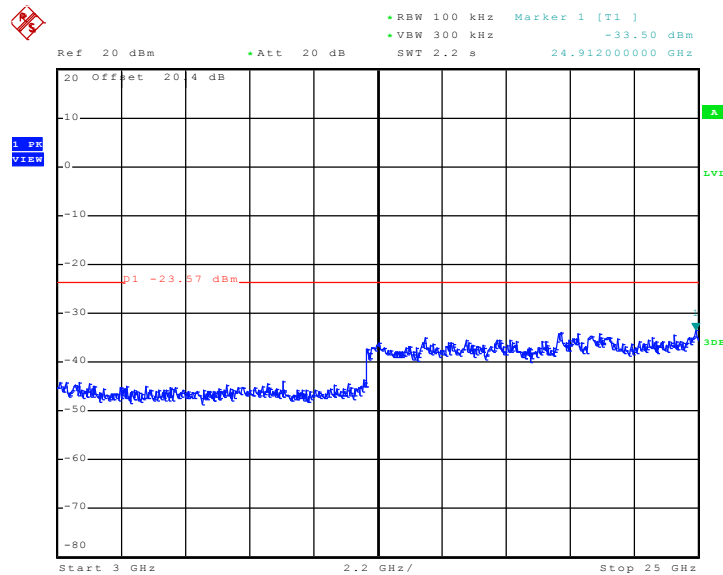
Test Mode :	Mode 8	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	52~55%
Test Channel :	06	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.JUL.2011 23:28:38

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

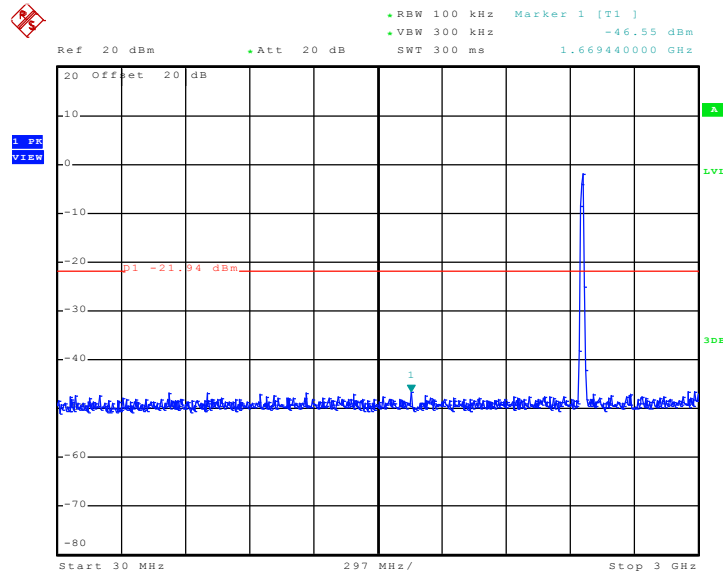


Date: 15.JUL.2011 23:28:55



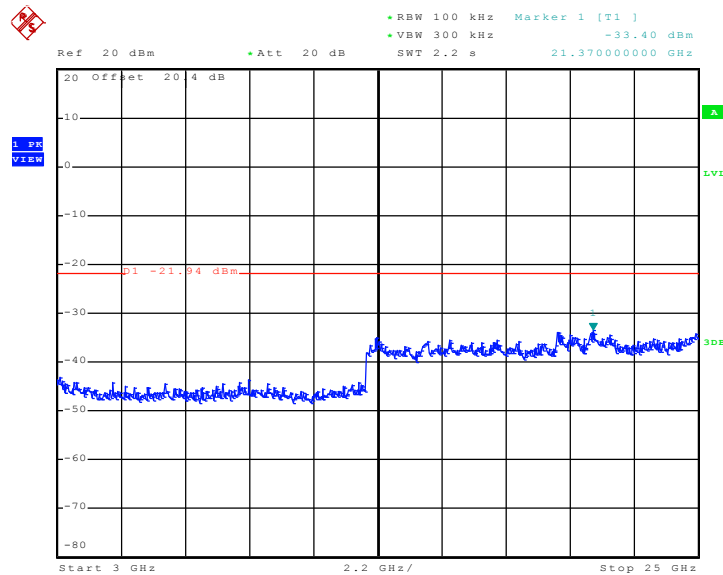
Test Mode :	Mode 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	52~55%
Test Channel :	11	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 15.JUL.2011 23:21:33

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 15.JUL.2011 23:21:50

## 3.5 Power Spectral Density Measurement

### 3.5.1 Limit of Power Spectral Density

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

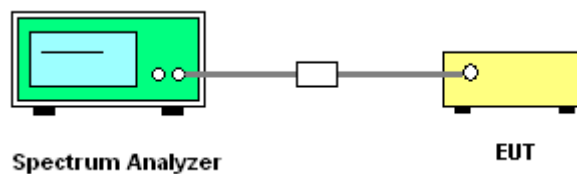
### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

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

### 3.5.4 Test Setup



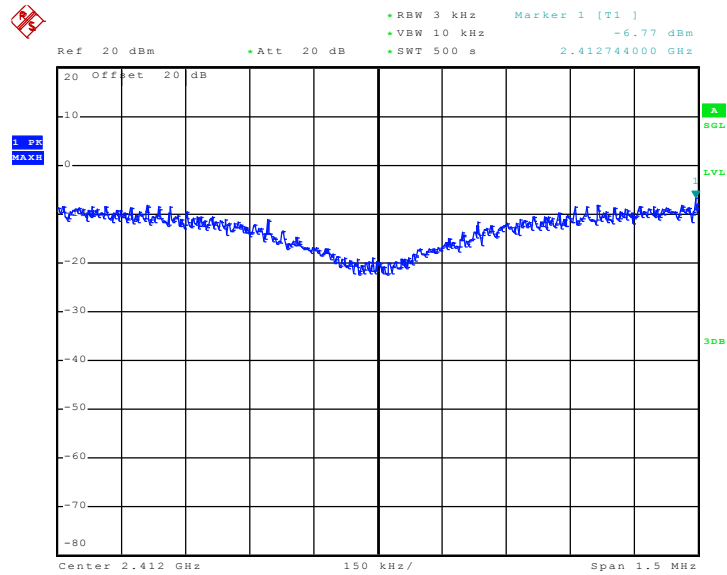


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-6.77	8	Pass
06	2437	-6.85	8	Pass
11	2462	-6.85	8	Pass

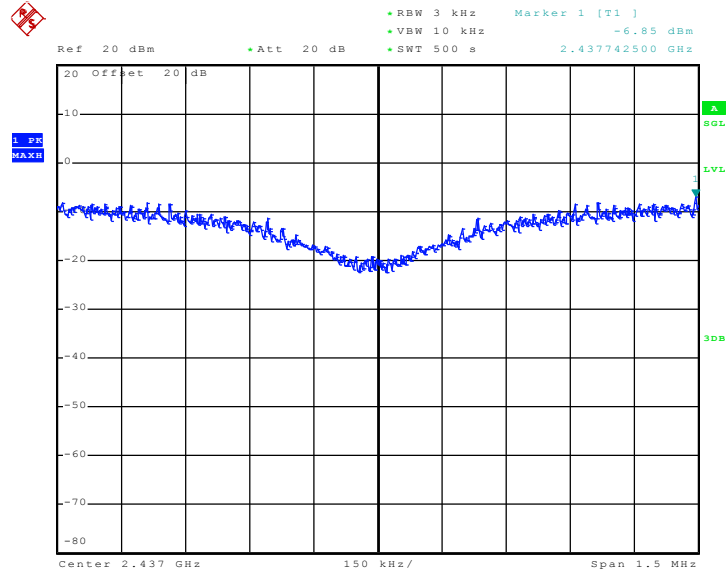
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 16.JUL.2011 00:10:39

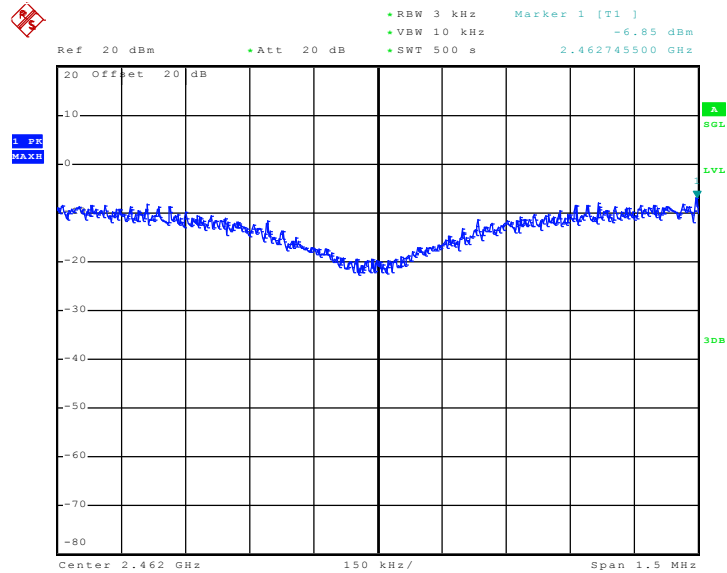


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 16.JUL.2011 00:19:17

Mode 3 : PSD Plot on 802.11b Channel 11



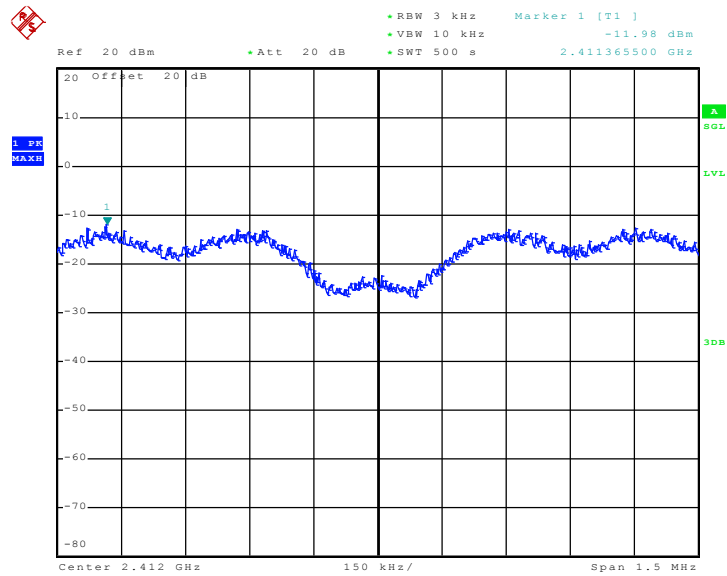
Date: 16.JUL.2011 00:28:08



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-11.98	8	Pass
06	2437	-11.82	8	Pass
11	2462	-12.10	8	Pass

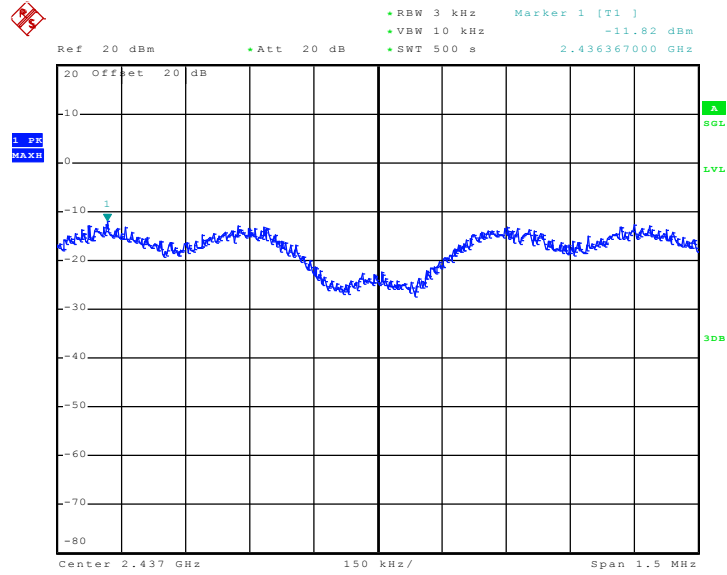
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 16.JUL.2011 00:48:29

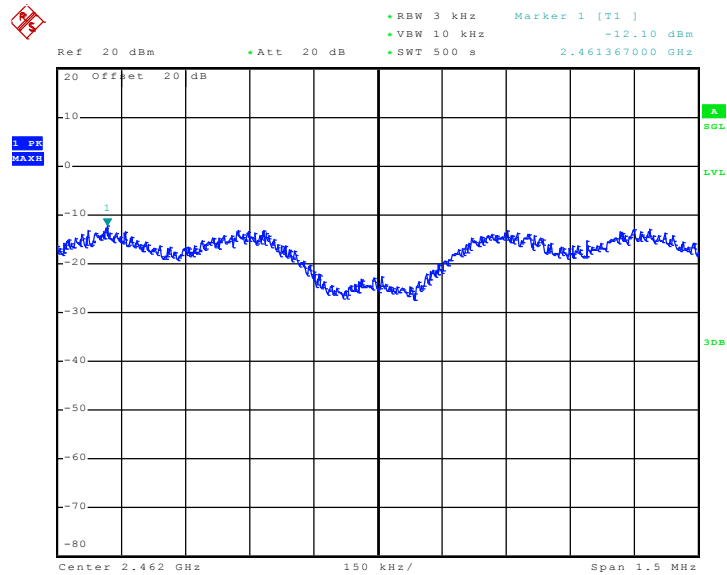


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 16.JUL.2011 00:57:19

Mode 6 : PSD Plot on 802.11g Channel 11



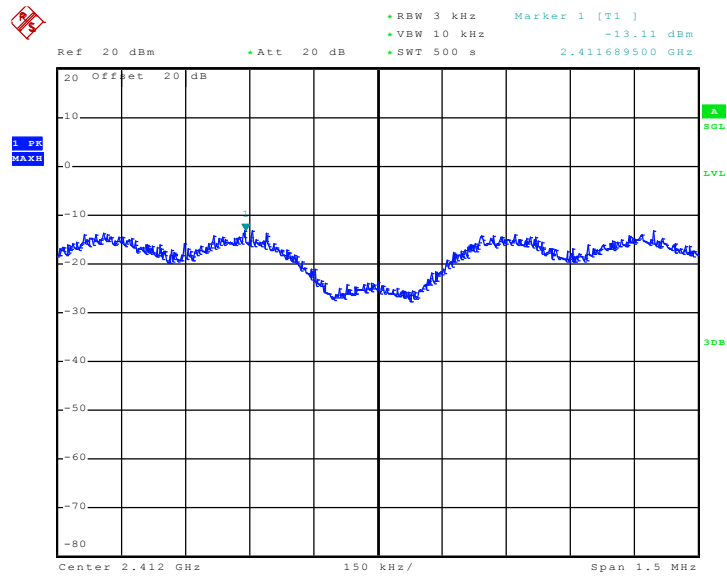
Date: 16.JUL.2011 00:38:13



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-13.11	8	Pass
06	2437	-13.11	8	Pass
11	2462	-13.31	8	Pass

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

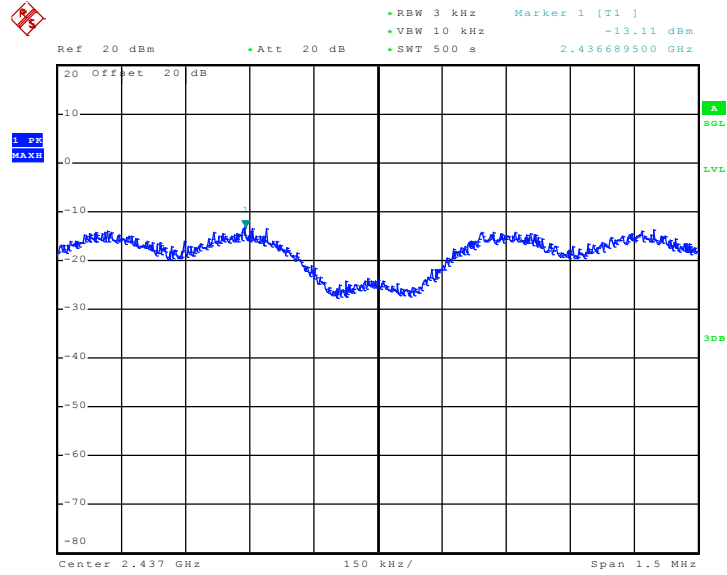


Date: 15.JUL.2011 23:56:34



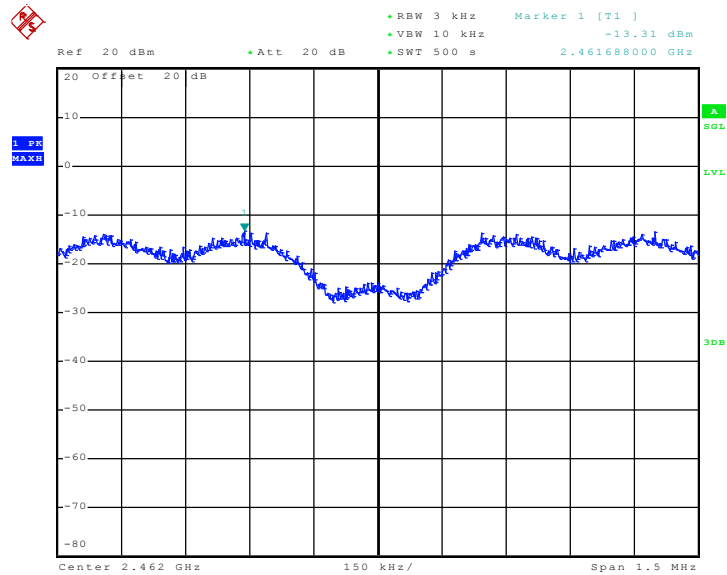


Mode 8 : PSD Plot on 802.11n (BW 20MHz) Channel 06



Date: 15.JUL.2011 23:38:00

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



Date: 15.JUL.2011 23:47:28

### 3.6 Radiated Emission Measurement

#### 3.6.1 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

#### 3.6.2 Measuring Instruments

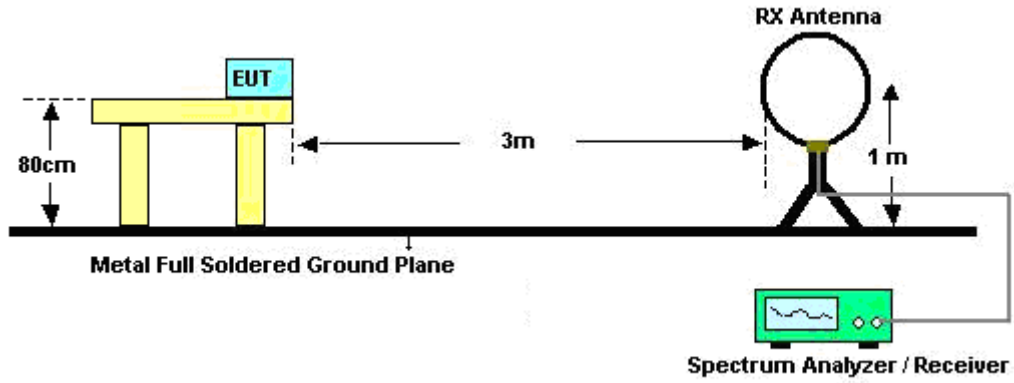
See list of measuring instruments of this test report.

#### 3.6.3 Test Procedures

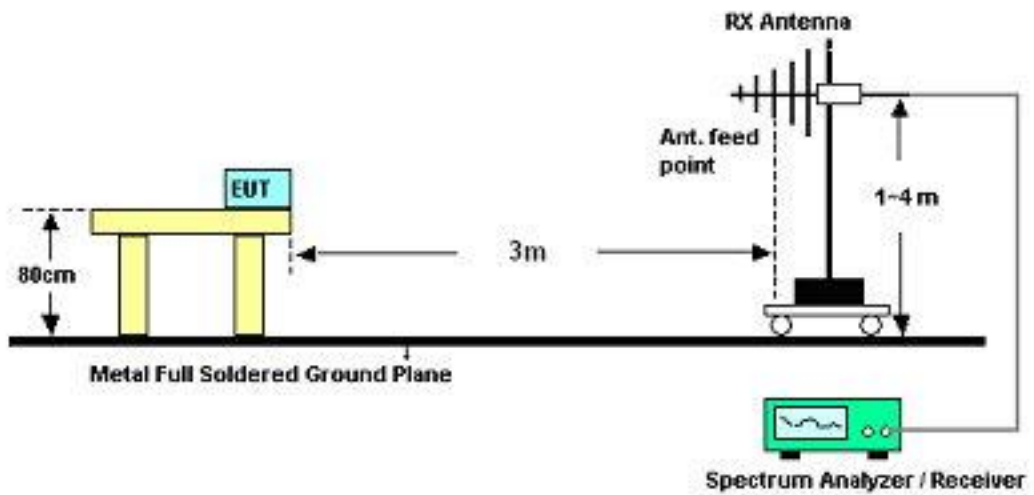
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
  - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold.
  - (2) 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)
3. 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.

### 3.6.4 Test Setup

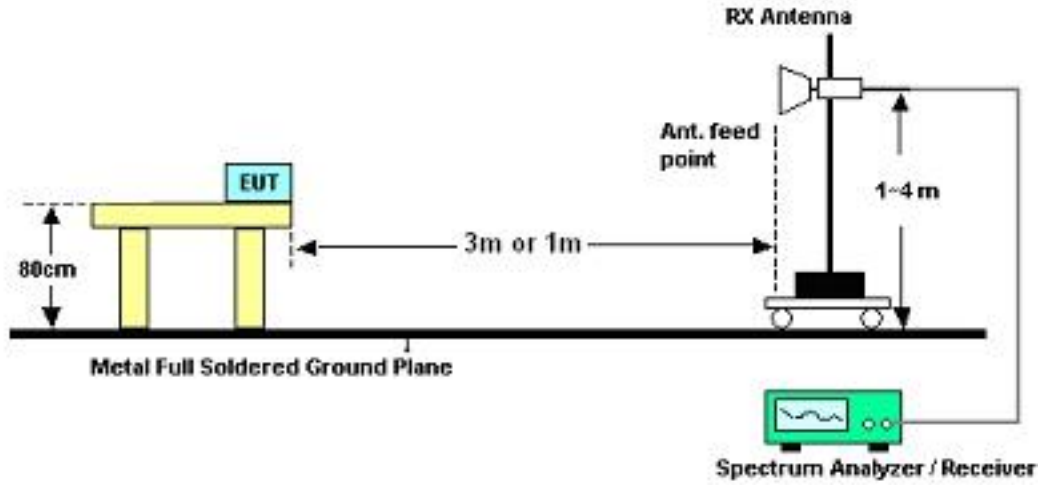
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	Kay Wu	Temperature :	26~27°C	
		Relative Humidity :	51~52%	
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.



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

Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	51~52%
Test Engineer :	Kay Wu	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
208.74	28.88	-14.62	43.5	48.9	9.92	1.69	31.63	112	125	Peak
222.78	30.37	-15.63	46	49.39	10.88	1.75	31.65	-	-	Peak
251.94	26.09	-19.91	46	43.19	12.7	1.86	31.66	-	-	Peak
330.8	23.25	-22.75	46	38.51	14.17	2.16	31.59	-	-	Peak
815.9	25.53	-20.47	46	33.16	20.9	3.42	31.95	-	-	Peak
901.3	26.69	-19.31	46	32.88	21.63	3.76	31.58	-	-	Peak
2385.81	44.71	-9.29	54	41.8	31.9	5.4	34.39	105	235	Average
2385.81	53.9	-20.1	74	50.99	31.9	5.4	34.39	105	235	Peak
2412	97.14	-	-	94.19	31.91	5.43	34.39	105	235	Average
2412	105.46	-	-	102.51	31.91	5.43	34.39	105	235	Peak
2494	49.47	-24.53	74	46.32	32	5.52	34.37	105	235	Peak
2494	40.47	-13.53	54	37.32	32	5.52	34.37	105	235	Average
4824	48.12	-25.88	74	62.21	34.4	7.96	56.45	100	0	Peak



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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
30.54	22.65	-17.35	40	36.34	17.31	0.72	31.72	-	-	Peak
208.74	23.49	-20.01	43.5	43.51	9.92	1.69	31.63	-	-	Peak
222.78	29.72	-16.28	46	48.74	10.88	1.75	31.65	100	215	Peak
330.8	23.41	-22.59	46	38.67	14.17	2.16	31.59	-	-	Peak
827.8	26.55	-19.45	46	34.03	21	3.46	31.94	-	-	Peak
929.3	26.52	-19.48	46	32.3	21.76	3.78	31.32	-	-	Peak
2385.81	39.42	-14.58	54	36.51	31.9	5.4	34.39	121	125	Average
2385.81	49.57	-24.43	74	46.66	31.9	5.4	34.39	121	125	Peak
2412	103.85	-	-	100.9	31.91	5.43	34.39	121	125	Peak
2412	95.42	-	-	92.47	31.91	5.43	34.39	121	125	Average
2494	39.65	-14.35	54	36.5	32	5.52	34.37	121	125	Average
2494	49.25	-24.75	74	46.1	32	5.52	34.37	121	125	Peak
4824	44.99	-29.01	74	59.08	34.4	7.96	56.45	100	0	Peak



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
151.23	23.21	-20.29	43.5	42.8	10.64	1.46	31.69	-	-	Peak
194.43	23.56	-19.94	43.5	44.21	9.37	1.63	31.65	-	-	Peak
237.63	26.35	-19.65	46	44.35	11.84	1.8	31.64	-	-	Peak
330.8	25.05	-20.95	46	40.31	14.17	2.16	31.59	-	-	Peak
826.4	25.33	-20.67	46	32.81	21	3.46	31.94	-	-	Peak
892.9	26.45	-19.55	46	32.79	21.57	3.73	31.64	111	217	Peak
2356	46.95	-27.05	74	44.16	31.86	5.34	34.41	105	226	Peak
2356	38.11	-15.89	54	35.32	31.86	5.34	34.41	105	226	Average
2437	104.99	-	-	101.98	31.93	5.46	34.38	105	226	Peak
2437	96.94	-	-	93.91	31.95	5.46	34.38	105	226	Average
2484	48.13	-25.87	74	45	31.98	5.52	34.37	105	226	Peak
2484	38.26	-15.74	54	35.13	31.98	5.52	34.37	105	226	Average
4874	48.76	-25.24	74	62.87	34.37	8.01	56.49	100	0	Peak



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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	22.13	-17.87	40	35.82	17.31	0.72	31.72	-	-	Peak
44.58	20.69	-19.31	40	41.41	10.17	0.81	31.7	-	-	Peak
222.78	29.46	-16.54	46	48.48	10.88	1.75	31.65	100	236	Peak
330.8	23.87	-22.13	46	39.13	14.17	2.16	31.59	-	-	Peak
834.8	25.84	-20.16	46	33.21	21.07	3.49	31.93	-	-	Peak
917.4	26.51	-19.49	46	32.46	21.71	3.77	31.43	-	-	Peak
2356	45.16	-28.84	74	42.37	31.86	5.34	34.41	177	131	Peak
2356	34.4	-19.6	54	31.61	31.86	5.34	34.41	177	131	Average
2437	103.6	-	-	100.57	31.95	5.46	34.38	177	131	Peak
2437	95.42	-	-	92.39	31.95	5.46	34.38	177	131	Average
2492	34.52	-19.48	54	31.37	32	5.52	34.37	177	131	Average
2492	45.6	-28.4	74	42.45	32	5.52	34.37	177	131	Peak
4874	45.41	-28.59	74	59.53	34.37	8	56.49	100	0	Peak





<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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	22.83	-17.17	40	36.52	17.31	0.72	31.72	100	210	Peak
208.74	23.1	-20.4	43.5	43.12	9.92	1.69	31.63	-	-	Peak
222.78	23.82	-22.18	46	42.84	10.88	1.75	31.65	-	-	Peak
836.9	24.98	-21.02	46	32.33	21.09	3.49	31.93	-	-	Peak
862.8	25.25	-20.75	46	32.17	21.31	3.6	31.83	-	-	Peak
899.9	27.09	-18.91	46	33.3	21.63	3.76	31.6	-	-	Peak
2382	48.48	-25.52	74	45.59	31.88	5.4	34.39	103	232	Peak
2382	39.28	-14.72	54	36.39	31.88	5.4	34.39	103	232	Average
2462	104.08	-	-	101	31.97	5.49	34.38	103	232	Peak
2462	95.88	-	-	92.8	31.97	5.49	34.38	103	232	Average
2487.65	48.4	-5.6	54	45.25	32	5.52	34.37	103	232	Average
2487.65	55.66	-18.34	74	52.51	32	5.52	34.37	103	232	Peak
4924	50.55	-23.45	74	64.69	34.34	8.04	56.52	100	0	Peak



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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
30.54	29.4	-10.6	40	43.09	17.31	0.72	31.72	112	145	Peak
35.94	21.6	-18.4	40	38.03	14.52	0.75	31.7	-	-	Peak
101.28	19.38	-24.12	43.5	39.07	10.76	1.23	31.68	-	-	Peak
708.8	23.29	-22.71	46	32.53	19.51	3.28	32.03	-	-	Peak
806.8	25.02	-20.98	46	32.77	20.83	3.38	31.96	-	-	Peak
883.8	26.1	-19.9	46	32.62	21.49	3.69	31.7	-	-	Peak
2380	46.17	-27.83	74	43.28	31.88	5.4	34.39	144	148	Peak
2380	35.17	-18.83	54	32.28	31.88	5.4	34.39	144	148	Average
2462	101.29	-	-	98.21	31.97	5.49	34.38	144	148	Peak
2462	93.4	-	-	90.32	31.97	5.49	34.38	144	148	Average
2488.22	37.16	-16.84	54	34.01	32	5.52	34.37	144	148	Average
2488.22	48.27	-25.73	74	45.12	32	5.52	34.37	144	148	Peak
4924	49.59	-24.41	74	63.73	34.34	8.04	56.52	100	0	Peak



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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
30.54	22.37	-17.63	40	36.06	17.31	0.72	31.72	112	157	Peak
93.18	18.98	-24.52	43.5	39.95	9.56	1.16	31.69	-	-	Peak
101.28	15.8	-27.7	43.5	35.49	10.76	1.23	31.68	-	-	Peak
768.3	24.87	-21.13	46	33.25	20.33	3.35	32.06	-	-	Peak
799.8	25.8	-20.2	46	33.64	20.77	3.36	31.97	-	-	Peak
826.4	25.83	-20.17	46	33.31	21	3.46	31.94	-	-	Peak
2389.99	38.59	-15.41	54	35.68	31.9	5.4	34.39	100	228	Average
2389.99	57.91	-16.09	74	55	31.9	5.4	34.39	100	228	Peak
2412	67.18	-	-	64.23	31.91	5.43	34.39	100	228	Average
2412	100.31	-	-	97.36	31.91	5.43	34.39	100	228	Peak
2494	53.8	-20.2	74	50.65	32	5.52	34.37	100	228	Peak
2494	36.23	-17.77	54	33.08	32	5.52	34.37	100	228	Average



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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
30.54	29.47	-10.53	40	43.16	17.31	0.72	31.72	121	258	Peak
37.83	22.55	-17.45	40	39.78	13.69	0.78	31.7	-	-	Peak
46.74	22.34	-17.66	40	43.74	9.47	0.83	31.7	-	-	Peak
782.3	24.24	-21.76	46	32.37	20.53	3.36	32.02	-	-	Peak
889.4	25.7	-20.3	46	32.11	21.54	3.71	31.66	-	-	Peak
948.9	26.7	-19.3	46	32.19	21.85	3.79	31.13	-	-	Peak
2389.42	52	-22	74	49.09	31.9	5.4	34.39	121	122	Peak
2389.42	35.9	-18.1	54	32.99	31.9	5.4	34.39	121	122	Average
2412	101.47	-	-	98.52	31.91	5.43	34.39	121	122	Peak
2412	66.1	-	-	63.15	31.91	5.43	34.39	121	122	Average
2492	48.97	-25.03	74	45.82	32	5.52	34.37	121	122	Peak
2492	35.53	-18.47	54	32.38	32	5.52	34.37	121	122	Average



<b>Test Mode :</b>	Mode 5	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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	22.68	-17.32	40	36.37	17.31	0.72	31.72	100	278	Peak
208.74	25.3	-18.2	43.5	45.32	9.92	1.69	31.63	-	-	Peak
222.78	26.55	-19.45	46	45.57	10.88	1.75	31.65	-	-	Peak
745.9	23.18	-22.82	46	31.92	20.02	3.34	32.1	-	-	Peak
827.8	24.8	-21.2	46	32.28	21	3.46	31.94	-	-	Peak
887.3	26.35	-19.65	46	32.81	21.52	3.7	31.68	-	-	Peak
2358	47.06	-26.94	74	44.23	31.86	5.37	34.4	196	213	Peak
2358	34.23	-19.77	54	31.4	31.86	5.37	34.4	196	213	Average
2437	103.67	-	-	100.64	31.95	5.46	34.38	196	213	Peak
2437	68.89	-	-	65.86	31.95	5.46	34.38	196	213	Average
2484	34.2	-19.8	54	31.07	31.98	5.52	34.37	196	213	Average
2484	47.56	-26.44	74	44.43	31.98	5.52	34.37	196	213	Peak



<b>Test Mode :</b>	Mode 5	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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	29.27	-10.73	40	42.96	17.31	0.72	31.72	100	214	Peak
45.93	21.26	-18.74	40	42.32	9.82	0.82	31.7	-	-	Peak
208.74	20.19	-23.31	43.5	40.21	9.92	1.69	31.63	-	-	Peak
742.4	24.58	-21.42	46	33.36	19.97	3.34	32.09	-	-	Peak
784.4	24.74	-21.26	46	32.83	20.56	3.36	32.01	-	-	Peak
885.9	25.57	-20.43	46	32.06	21.5	3.7	31.69	-	-	Peak
2326	45.08	-28.92	74	42.35	31.83	5.31	34.41	177	132	Peak
2326	32.87	-21.13	54	30.14	31.83	5.31	34.41	177	132	Average
2437	102.06	-	-	99.03	31.95	5.46	34.38	177	132	Peak
2437	68.18	-	-	65.15	31.95	5.46	34.38	177	132	Average
2484	33.53	-20.47	54	30.4	31.98	5.52	34.37	177	132	Average
2484	45.46	-28.54	74	42.33	31.98	5.52	34.37	177	132	Peak



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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	16.56	-23.44	40	29.65	17.91	0.72	31.72	-	-	Peak
101.28	15.15	-28.35	43.5	34.84	10.76	1.23	31.68	-	-	Peak
245.73	15.91	-30.09	46	33.38	12.35	1.83	31.65	-	-	Peak
768.3	23.42	-22.58	46	31.8	20.33	3.35	32.06	-	-	Peak
897.8	26.37	-19.63	46	32.62	21.61	3.75	31.61	-	-	Peak
936.3	26.6	-19.4	46	32.27	21.8	3.78	31.25	100	214	Peak
2382	49.76	-24.24	74	46.87	31.88	5.4	34.39	104	239	Peak
2382	35.29	-18.71	54	32.4	31.88	5.4	34.39	104	239	Average
2462	101.81	-	-	98.73	31.97	5.49	34.38	104	239	Peak
2462	67.76	-	-	64.68	31.97	5.49	34.38	104	239	Average
2483.5	43	-11	54	39.87	31.98	5.52	34.37	104	239	Average
2483.5	65.48	-8.52	74	62.35	31.98	5.52	34.37	104	239	Peak



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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
30.54	21.35	-18.65	40	35.04	17.31	0.72	31.72	121	269	Peak
44.04	17.32	-22.68	40	37.5	10.71	0.81	31.7	-	-	Peak
91.29	18.88	-24.62	43.5	40.21	9.24	1.15	31.72	-	-	Peak
330.8	23.02	-22.98	46	38.28	14.17	2.16	31.59	-	-	Peak
750.8	24.5	-21.5	46	33.17	20.09	3.35	32.11	-	-	Peak
908.3	25.95	-20.05	46	32.04	21.67	3.76	31.52	-	-	Peak
2388	45.23	-28.77	74	42.32	31.9	5.4	34.39	187	270	Peak
2388	33.5	-20.5	54	30.59	31.9	5.4	34.39	187	270	Average
2462	99.24	-	-	96.16	31.97	5.49	34.38	187	270	Peak
2462	66.39	-	-	63.31	31.97	5.49	34.38	187	270	Average
2483.5	41.04	-12.96	54	37.91	31.98	5.52	34.37	187	270	Average
2483.5	61.91	-12.09	74	58.78	31.98	5.52	34.37	187	270	Peak





<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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	17.14	-22.86	40	30.23	17.91	0.72	31.72	100	67	Peak
91.29	14.15	-29.35	43.5	35.48	9.24	1.15	31.72	-	-	Peak
129.09	14.94	-28.56	43.5	33.45	11.81	1.38	31.7	-	-	Peak
383.3	17.86	-28.14	46	31.89	15.38	2.35	31.76	-	-	Peak
535.9	21.28	-24.72	46	32.02	18.31	2.8	31.85	-	-	Peak
638.8	22.39	-23.61	46	32.11	19.26	3.02	32	-	-	Peak
2388.85	38.74	-15.26	54	35.83	31.9	5.4	34.39	138	229	Average
2388.85	59.65	-14.35	74	56.74	31.9	5.4	34.39	138	229	Peak
2412	66.54	-	-	63.59	31.91	5.43	34.39	138	229	Average
2412	101.06	-	-	98.11	31.91	5.43	34.39	138	229	Peak
2500	47.79	-26.21	74	44.64	32	5.52	34.37	138	229	Peak
2500	34.58	-19.42	54	31.43	32	5.52	34.37	138	229	Average



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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
30.54	21.06	-18.94	40	34.75	17.31	0.72	31.72	100	33	Peak
91.29	19.42	-24.08	43.5	40.75	9.24	1.15	31.72	-	-	Peak
220.08	17.19	-28.81	46	36.44	10.69	1.74	31.68	-	-	Peak
348.3	20.94	-25.06	46	35.71	14.58	2.22	31.57	-	-	Peak
539.4	21.47	-24.53	46	32.17	18.35	2.81	31.86	-	-	Peak
715.8	22.96	-23.04	46	32.1	19.6	3.3	32.04	-	-	Peak
2388.85	35.29	-18.71	54	32.38	31.9	5.4	34.39	120	111	Average
2388.85	50.4	-23.6	74	47.49	31.9	5.4	34.39	120	111	Peak
2412	99.21	-	-	96.26	31.91	5.43	34.39	120	111	Peak
2412	65.27	-	-	62.32	31.91	5.43	34.39	120	111	Average
2492	34.59	-19.41	54	31.44	32	5.52	34.37	120	111	Average
2492	48.43	-25.57	74	45.28	32	5.52	34.37	120	111	Peak



<b>Test Mode :</b>	Mode 8	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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	16.58	-23.42	40	29.67	17.91	0.72	31.72	-	-	Peak
142.59	24.7	-18.8	43.5	43.74	11.21	1.45	31.7	-	-	Peak
222.78	30.53	-15.47	46	49.55	10.88	1.75	31.65	100	87	Peak
309.8	18.25	-27.75	46	34.12	13.68	2.09	31.64	-	-	Peak
442.8	19.79	-26.21	46	32.48	16.66	2.49	31.84	-	-	Peak
565.3	21.7	-24.3	46	32.09	18.7	2.87	31.96	-	-	Peak
2364	47.15	-26.85	74	44.32	31.86	5.37	34.4	104	214	Peak
2364	34.3	-19.7	54	31.47	31.86	5.37	34.4	104	214	Average
2437	101.65	-	-	98.64	31.93	5.46	34.38	104	214	Peak
2437	66.97	-	-	63.94	31.95	5.46	34.38	104	214	Average
2484	34.37	-19.63	54	31.24	31.98	5.52	34.37	104	214	Average
2484	48.59	-25.41	74	45.46	31.98	5.52	34.37	104	214	Peak



<b>Test Mode :</b>	Mode 8	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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	20.97	-19.03	40	34.66	17.31	0.72	31.72	100	22	Peak
91.29	19.04	-24.46	43.5	40.37	9.24	1.15	31.72	-	-	Peak
207.93	21.98	-21.52	43.5	42.06	9.86	1.69	31.63	-	-	Peak
362.3	17.35	-28.65	46	31.74	14.91	2.28	31.58	-	-	Peak
561.8	21.54	-24.46	46	31.96	18.65	2.87	31.94	-	-	Peak
614.3	23.05	-22.95	46	32.98	19.2	2.96	32.09	-	-	Peak
2356	45.68	-28.32	74	42.89	31.86	5.34	34.41	176	120	Peak
2356	32.93	-21.07	54	30.14	31.86	5.34	34.41	176	120	Average
2437	100.59	-	-	97.56	31.95	5.46	34.38	176	120	Peak
2437	66.14	-	-	63.11	31.95	5.46	34.38	176	120	Average
2484	33.46	-20.54	54	30.33	31.98	5.52	34.37	176	120	Average
2484	45.16	-28.84	74	42.03	31.98	5.52	34.37	176	120	Peak



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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	17.15	-22.85	40	30.24	17.91	0.72	31.72	-	-	Peak
143.13	25.57	-17.93	43.5	44.67	11.15	1.45	31.7	-	-	Peak
222.24	31.06	-14.94	46	50.16	10.82	1.74	31.66	100	48	Peak
309.8	21.94	-24.06	46	37.81	13.68	2.09	31.64	-	-	Peak
409.9	19.3	-26.7	46	32.7	15.98	2.43	31.81	-	-	Peak
645.8	22.39	-23.61	46	32.06	19.27	3.04	31.98	-	-	Peak
2382	47.54	-26.46	74	44.65	31.88	5.4	34.39	102	236	Peak
2382	34.86	-19.14	54	31.97	31.88	5.4	34.39	102	236	Average
2462	101.32	-	-	98.24	31.97	5.49	34.38	102	236	Peak
2462	66.78	-	-	63.7	31.97	5.49	34.38	102	236	Average
2484.42	42.82	-11.18	54	39.69	31.98	5.52	34.37	102	236	Average
2484.42	65.14	-8.86	74	62.01	31.98	5.52	34.37	102	236	Peak



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	26~27°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	51~52%
<b>Test Engineer :</b>	Kay Wu	<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
30.54	21.57	-18.43	40	35.26	17.31	0.72	31.72	-	-	Peak
91.29	19.85	-23.65	43.5	41.18	9.24	1.15	31.72	-	-	Peak
222.24	28.33	-17.67	46	47.43	10.82	1.74	31.66	100	51	Peak
330.8	20.2	-25.8	46	35.46	14.17	2.16	31.59	-	-	Peak
406.4	20.97	-25.03	46	34.45	15.9	2.42	31.8	-	-	Peak
542.9	21.11	-24.89	46	31.75	18.4	2.83	31.87	-	-	Peak
2382	46.36	-27.64	74	43.47	31.88	5.4	34.39	196	256	Peak
2382	33.98	-20.02	54	31.09	31.88	5.4	34.39	196	256	Average
2462	99.35	-	-	96.27	31.97	5.49	34.38	196	256	Peak
2462	64.47	-	-	61.39	31.97	5.49	34.38	196	256	Average
2483.5	34.99	-19.01	54	31.86	31.98	5.52	34.37	196	256	Average
2483.5	50.24	-23.76	74	47.11	31.98	5.52	34.37	196	256	Peak



## **3.7 Antenna Requirements**

### **3.7.1 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.

### **3.7.2 Antenna Connected Construction**

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

### **3.7.3 Antenna Gain**

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

## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
System Simulator	R&S	CMU200	117995	N/A	Aug. 11, 2010	Aug.10, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101329	9kHz~30GHz	May 03, 2011	May 02, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30, 2010	Jul. 29, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 25, 2010	Oct. 24, 2011	Radiation (03CH06-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug.19, 2010	Aug.19, 2011	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2010	Oct. 31, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 02, 2010	Aug. 01, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Oct. 20, 2010	Oct. 19, 2011	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH06-HY)



## 5 Uncertainty of Evaluation

### 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>				

