

# FCC RF Test Report

APPLICANT : ASUSTek COMPUTER INC.  
EQUIPMENT : ASUS Transformer Pad  
BRAND NAME : ASUS  
MODEL NAME : TF300TL  
MARKETING NAME : ASUS Transformer Pad  
FCC ID : MSQTF300TL  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Jan. 18, 2012 and completely tested on Mar. 30, 2012. 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.



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### 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	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 5.30 dB at 0.190 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.11 dB at 4824.000 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**ASUSTek COMPUTER INC.**

No. 15, Li-Te Rd., Peitou, Taipei, Taiwan

## 1.2 Manufacturer

**WISTRON INFOCOMM (KUNSHAN) CO., LTD.**

FIRST AVE. KUNSHAN INTEGRATED FREE TRADE ZONE. KUNSHAN. JIANGSU

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
<b>Equipment</b>	ASUS Transformer Pad
<b>Brand Name</b>	ASUS
<b>Model Name</b>	TF300TL
<b>Marketing Name</b>	ASUS Transformer Pad
<b>FCC ID</b>	MSQTF300TL
<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 : 17.26 dBm (0.0532 W) 802.11g : 19.85 dBm (0.0966 W) 802.11g/n (BW 20MHz) : 19.31 dBm (0.0853 W)
<b>Duty Cycle</b>	802.11b : 97.64% 802.11g : 86.89% 802.11g/n (BW 20MHz) : 86.26%
<b>Antenna Type</b>	Chip Antenna with gain 3.50 dBi
<b>HW Version</b>	R1.0
<b>SW Version</b>	V9.4.4.8
<b>Type of Modulation</b>	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
<b>EUT Stage</b>	Production Unit

**Remark:** 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>
	CO05-HY	03CH05-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 D01 DTS Meas. Guidance v01
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8
- ♦ IC RSS-Gen Issue 3

**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, 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.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
3.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
4.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
5.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	LCD Monitor	Acer	H223HQ	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
7.	Bluetooth Earphone	Sony Ericsson	MW600	PY70DA2029	N/A	N/A
8.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A
9.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
10.	iPod Earphone	Apple	N/A	DoC	Unshielded, 1.2 m	N/A
11.	SD Card	Transcend	SD HC	N/A	N/A	N/A

## 2 Test Configuration of Equipment Under Test

### 2.1 Pre-Scanned RF Power

Preliminary tests were performed in different data rate as below table and the highest power data rates (11b, 11g, 11g/n (BW 20MHz) modes) were chosen for full test in the following sections to demonstrate compliance to the FCC limit line.

2.4GHz 802.11b mode				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	17.26	17.14	16.49	16.23

2.4GHz 802.11g mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	19.85	19.10	18.91	18.64	18.33	17.82	17.09	17.03

2.4GHz 802.11g/n (BW 20MHz) mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	19.31	18.79	18.59	18.31	17.94	17.46	17.07	17.09

### 2.2 Maximum Peak Conducted Output Power:

Band	2.4GHz 802.11b RF Power (dBm)			2.4GHz 802.11g RF Power (dBm)		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Peak Power	17.26	15.27	14.34	19.85	18.56	17.81

Band	2.4GHz 802.11g/n (BW 20MHz) RF Power (dBm)		
Channel	1	6	11
Frequency (MHz)	2412	2437	2462
Peak Power	19.31	18.03	18.06

**Remark:**

The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 6Mbps for 802.11g, MCS0 for 802.11g/n (BW 20MHz), for all the test cases due to the highest RF output power.

### 2.3 Maximum Average Conducted Output Power:

Band	2.4GHz 802.11b RF Power (dBm)			2.4GHz 802.11g RF Power (dBm)		
	1	6	11	1	6	11
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Average Power	14.55	12.80	12.15	13.77	12.52	11.75

Band	2.4GHz 802.11g/n (BW 20MHz) RF Power (dBm)		
Channel	1	6	11
Frequency (MHz)	2412	2437	2462
Average Power	13.31	12.07	12.01

**Remark:**

1. The average power, which is used by the test method, AVG2, in DTS Meas. Guidance v01, is reporting only.
2. The EUT is programmed to transmit signals continuously.

## 2.4 Test Mode

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

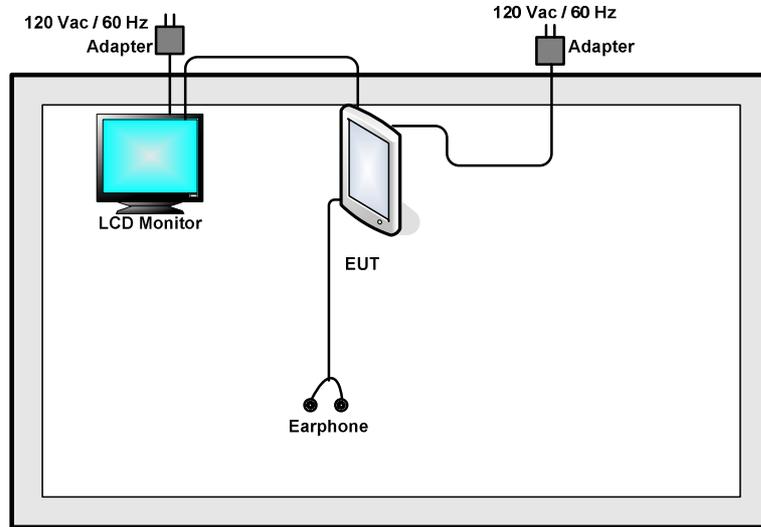
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

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

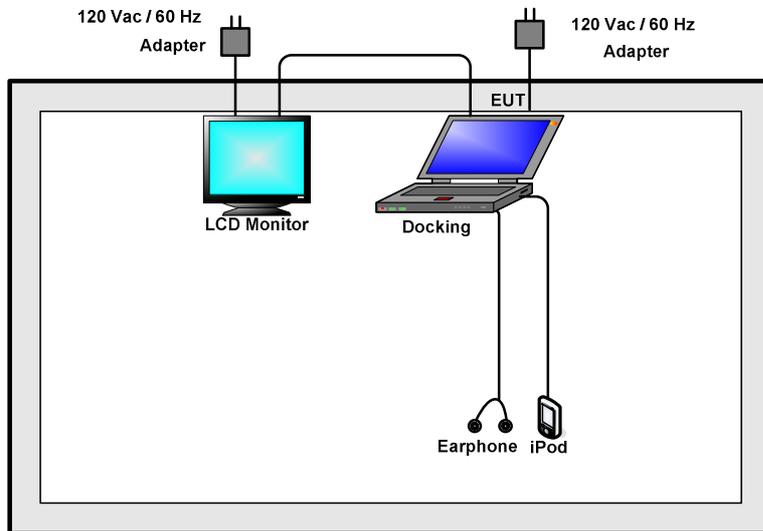
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
<b>Conducted TCs</b>	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11g/n (BW 20M)_CH01_2412 MHz Mode 8: 802.11g/n (BW 20M)_CH06_2437 MHz Mode 9: 802.11g/n (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 : 802.11b CH01_2412 MHz + Docking + iPod	Mode 5: 802.11g_CH01_2412 MHz Mode 6: 802.11g_CH06_2437 MHz Mode 7: 802.11g_CH11_2462 MHz Mode 8: 802.11g/n (BW 20M)_CH01_2412 MHz Mode 9: 802.11g/n (BW 20M)_CH06_2437 MHz Mode 10: 802.11g/n (BW 20M)_CH11_2462 MHz
<b>AC Conducted Emission</b>	Mode 1 : GSM850 (GPRS 8) Idle + WLAN Link + Bluetooth Link + TC + Camera + USB Cable (Charging from Adapter 1) Mode 2 : GSM1900 (GPRS 8) Idle + WLAN Link + Bluetooth Link + TC + GPS Rx + Docking + iPod + USB Cable (Charging from Adapter 1) Mode 3 WCDMA Band II Idle + WLAN Link + Bluetooth Link + TC + MPEG4 + Docking + iPod + USB Cable (Charging from Adapter 2) Mode 4 WCDMA Band V Idle + WLAN Link + Bluetooth Link + TC + H Pattern + USB Cable (Charging from Adapter 2) Mode 5 LTE Band 4 Idle + WLAN Link + Bluetooth Link + TC + GPS Rx + Docking + iPod + USB Cable (Charging from Adapter 1) Mode 6 LTE Band 17 Idle + WLAN Link + Bluetooth Link + TC + GPS Rx + Docking + iPod + USB Cable (Charging from Adapter 1)	
<b>Remark:</b>		
<ol style="list-style-type: none"> <li>1. TC stands for Test Configuration, and consists of earphone, SD Card, and HDMI Cable.</li> <li>2. The worst case of conducted emission is mode 5; only the test data of it was reported.</li> <li>3. All the Radiation tests were performance with earphone, Adapter 2, SD Card, and HDMI Cable.</li> </ol>		

## 2.5 Connection Diagram of Test System

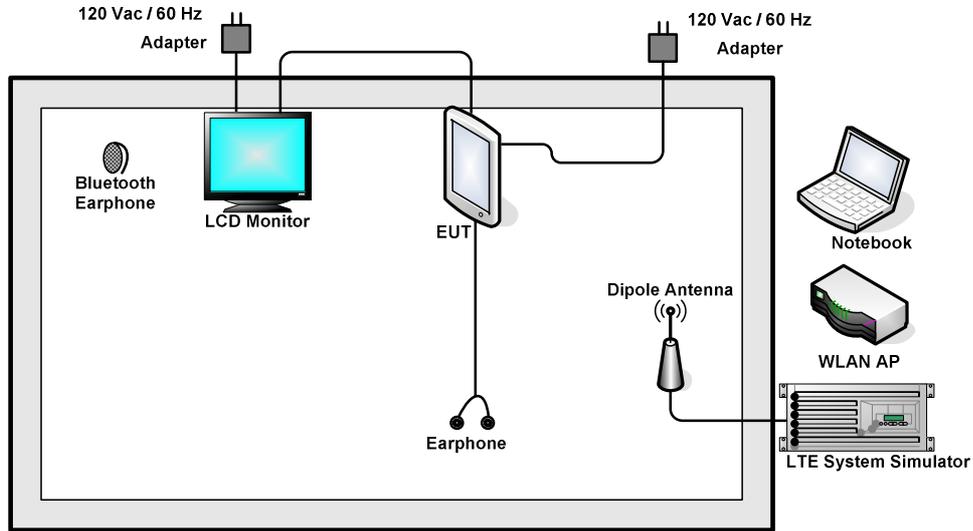
### <WLAN Tx Mode>



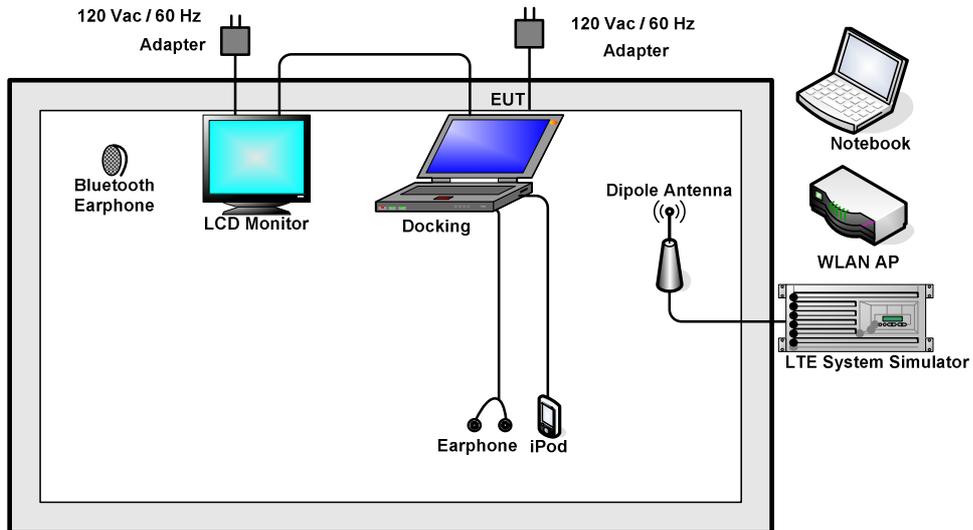
### <WLAN Tx with Docking Mode>



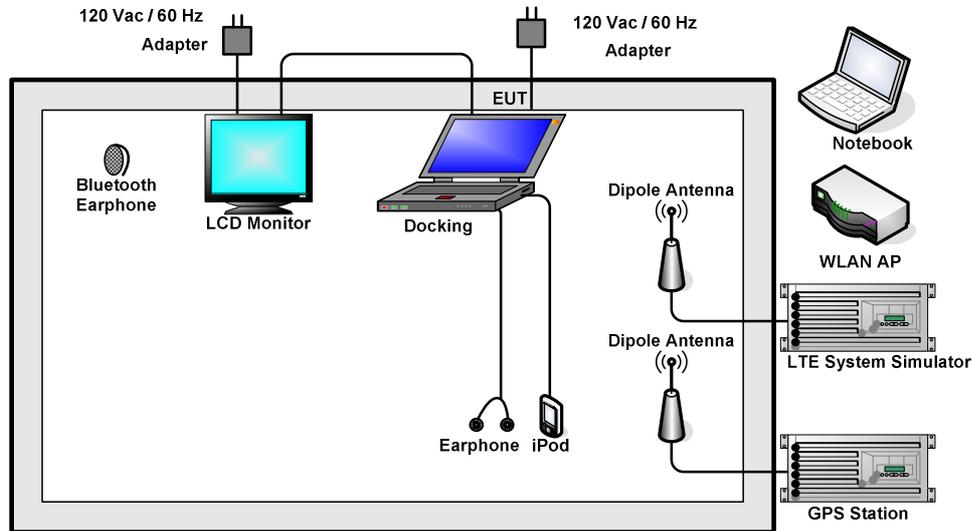
<AC Conducted Emission Mode>



<AC Conducted Emission with Docking Mode>



<AC Conducted Emission with Docking in GPS Rx Mode>



## 2.6 RF Utility

The programmed RF utility "WLAN RF Test Tool" 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.

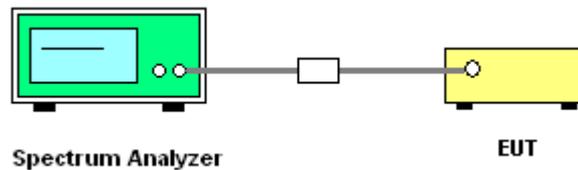
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1-5% of the emission bandwidth (EBW). Set the Video bandwidth (VBW)  $\geq 3 * RBW$ . In order to make an accurate measurement. 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



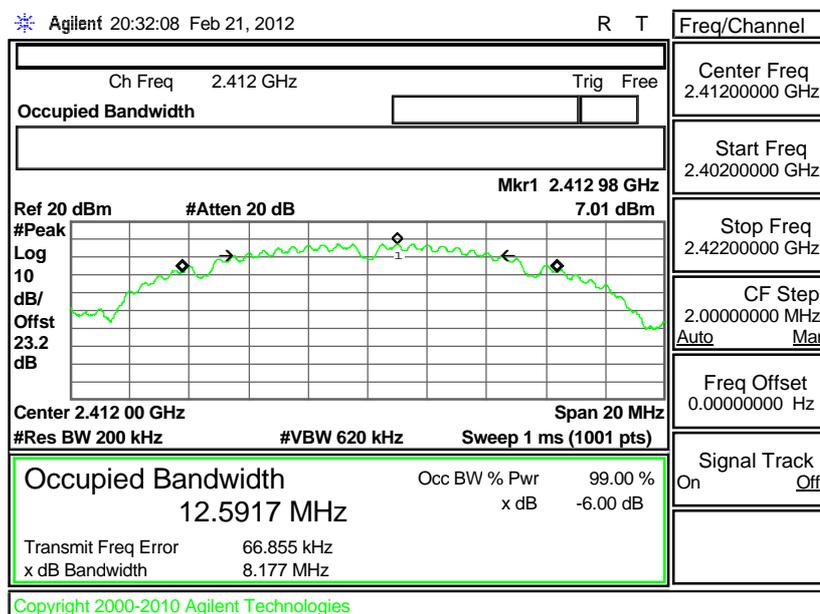


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

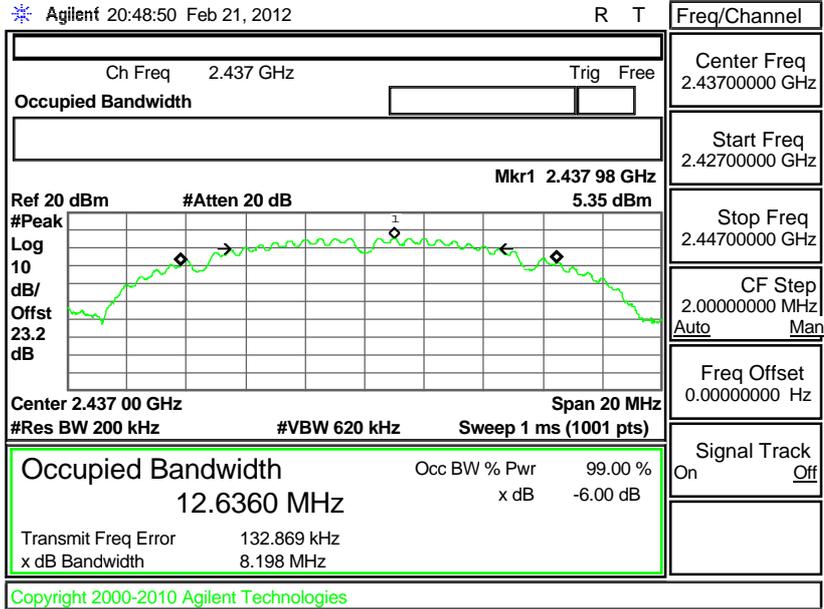
Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	8.177	0.5	Pass
06	2437	8.198	0.5	Pass
11	2462	8.190	0.5	Pass

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

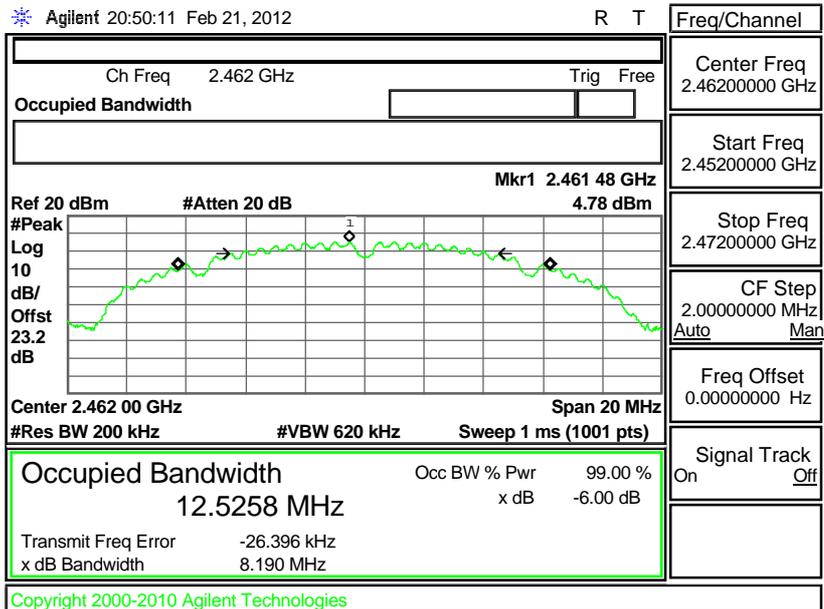




Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



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

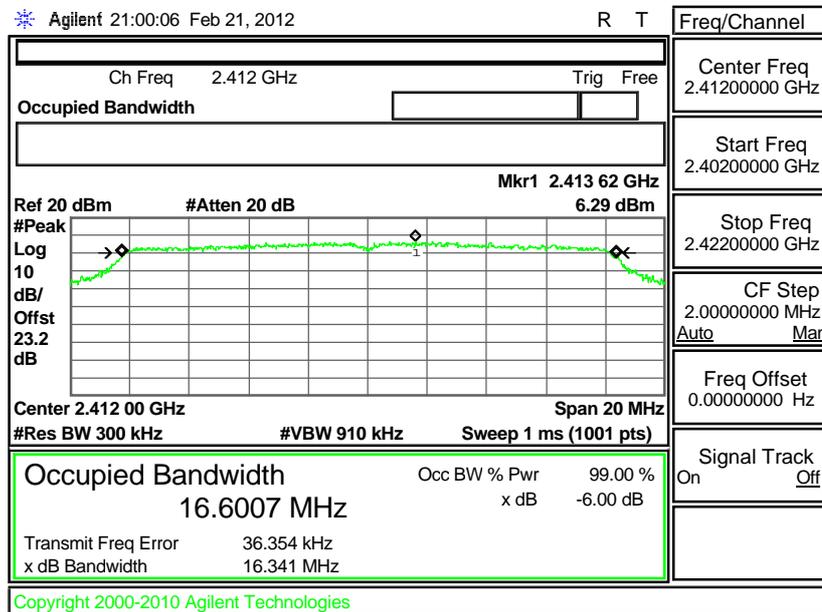




Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

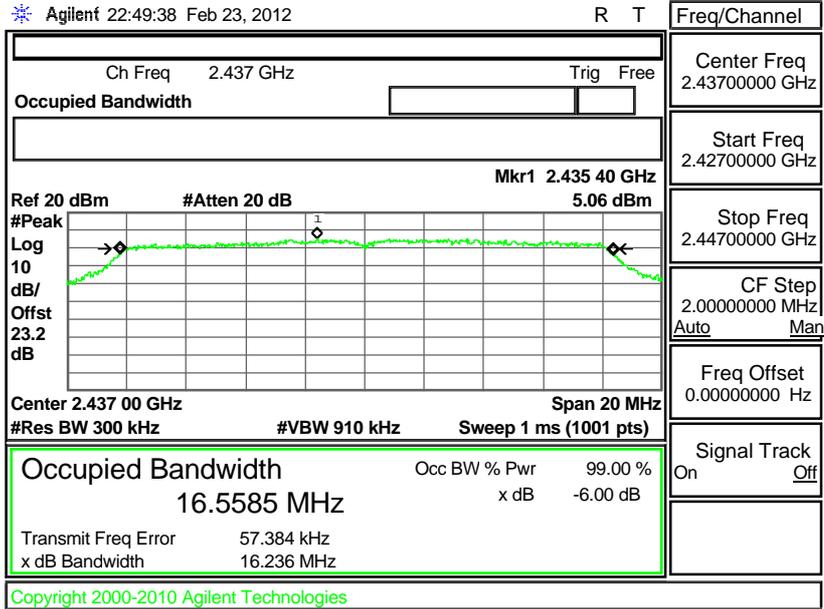
Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.341	0.5	Pass
06	2437	16.236	0.5	Pass
11	2462	16.153	0.5	Pass

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

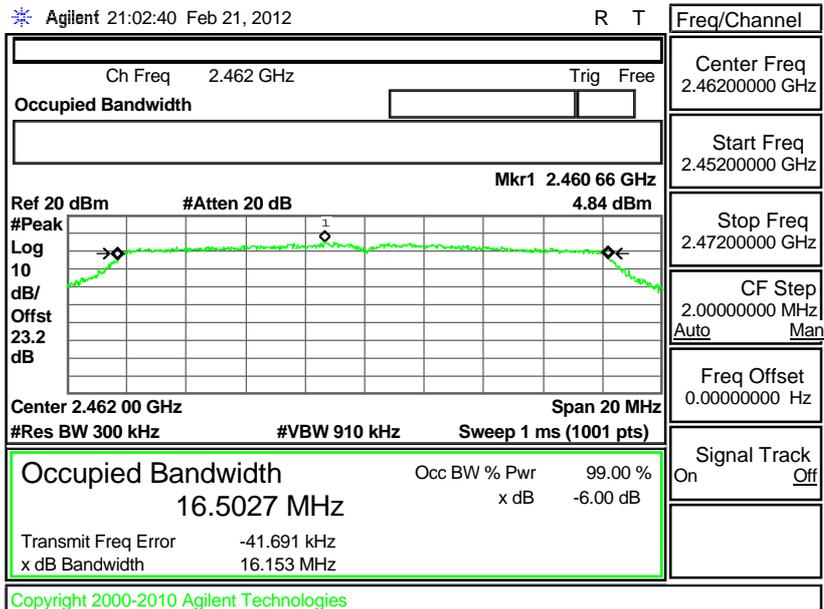




Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



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



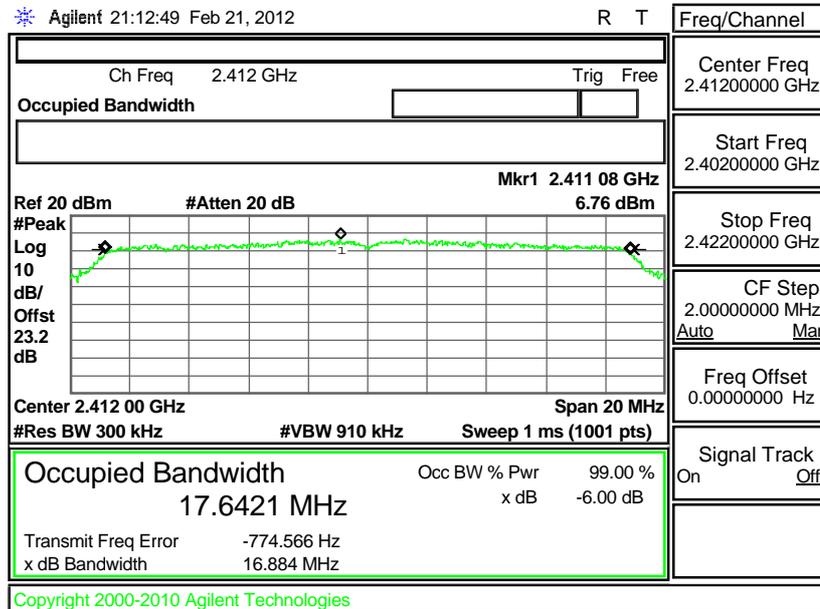


Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g/n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.884	0.5	Pass
06	2437	17.260	0.5	Pass
11	2462	17.167	0.5	Pass

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

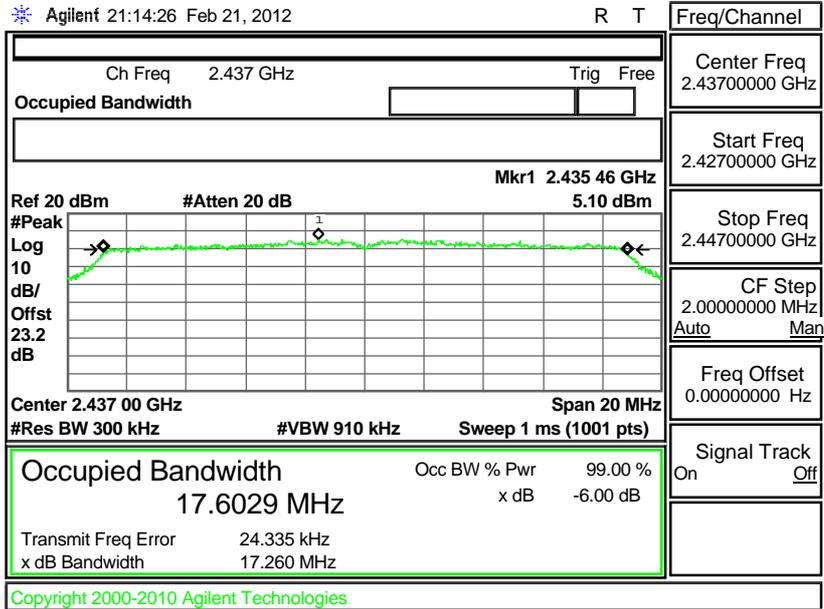
01





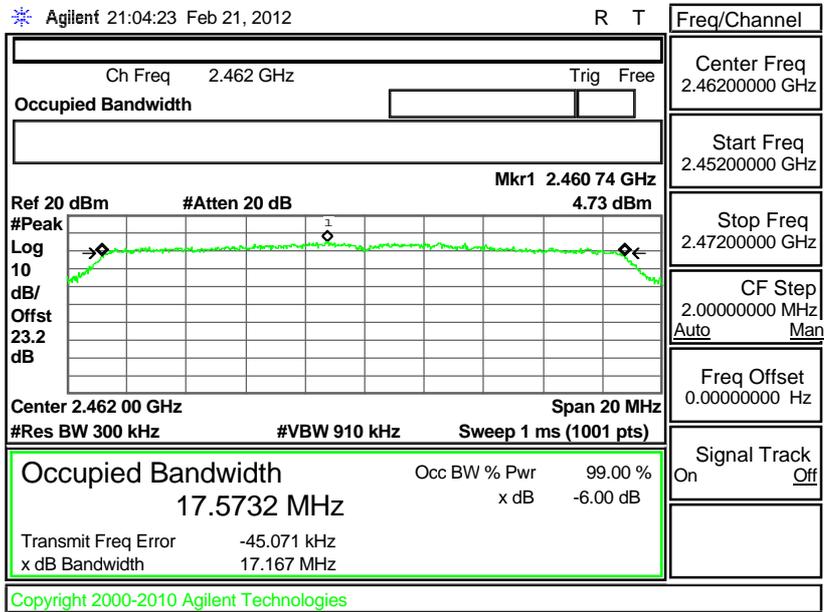
Mode 8 : 6 dB Bandwidth Plot on 802.11g/n(BW 20MHz) Channel

06



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

11



## 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.

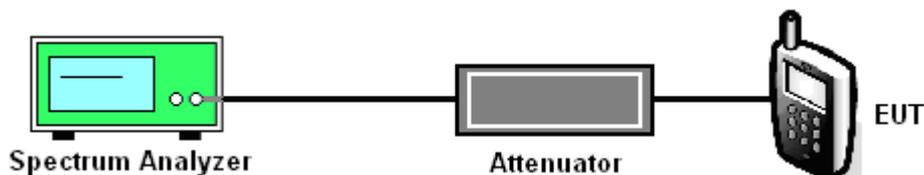
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The testing follows the Measurement Procedure PK2 of FCC KDB No. 558074 DTS Meas. Guidance v01.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
3. The spectrum analyzer's settings are Resolution bandwidth (RBW) = 1MHz, Video bandwidth (VBW) = 3MHz, Peak Detector, auto sweep time, and the frequency span to a value that is 5-30 % greater than the EBW.
4. The spectrum analyzer's integrated band power measurement function is used to measure the peak power and the test results are demonstrated to compliance to the limit line as following plots.

### 3.2.4 Test Setup



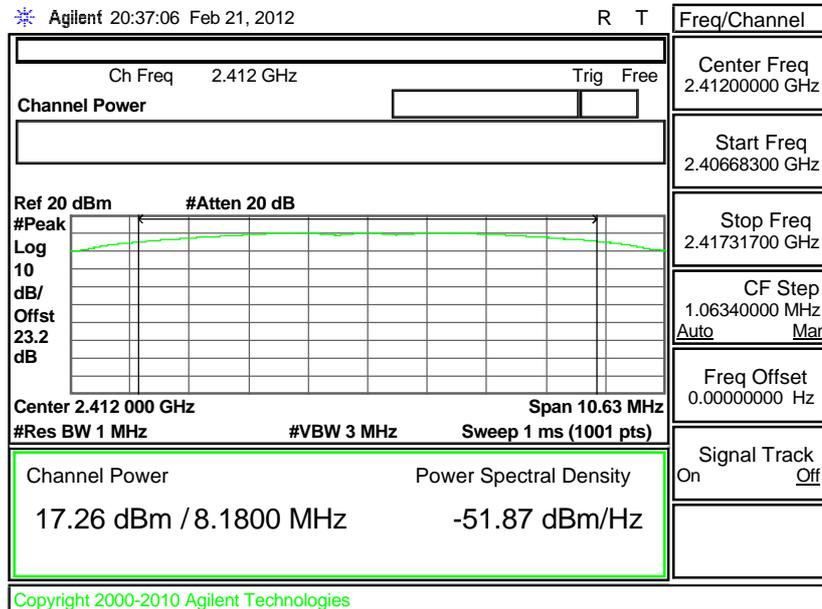


3.2.5 Test Result of Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	17.26	30	Pass
06	2437	15.27	30	Pass
11	2462	14.34	30	Pass

Mode 1 : Output Power Plot on 802.11b Channel 01

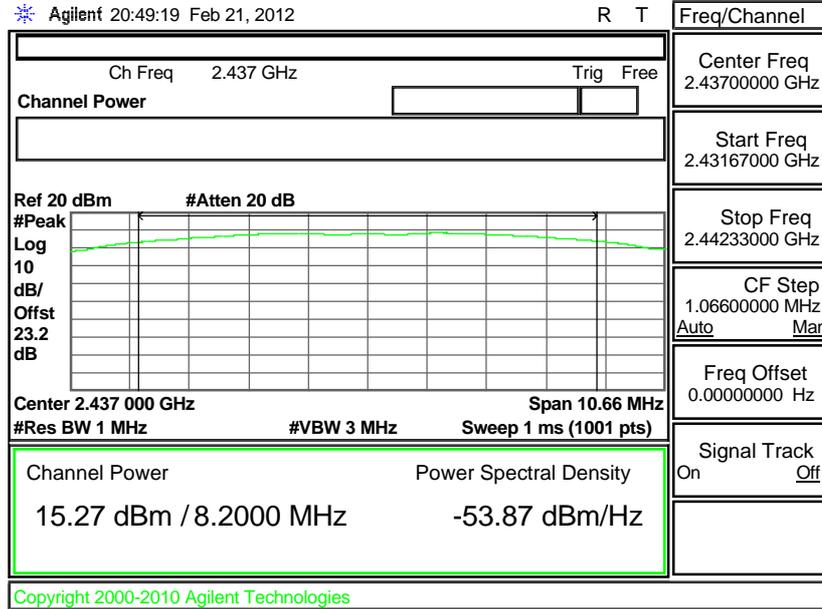




**Mode 2 : Output Power Plot on 802.11b Channel 06**

\* Agilent 20:49:19 Feb 21, 2012

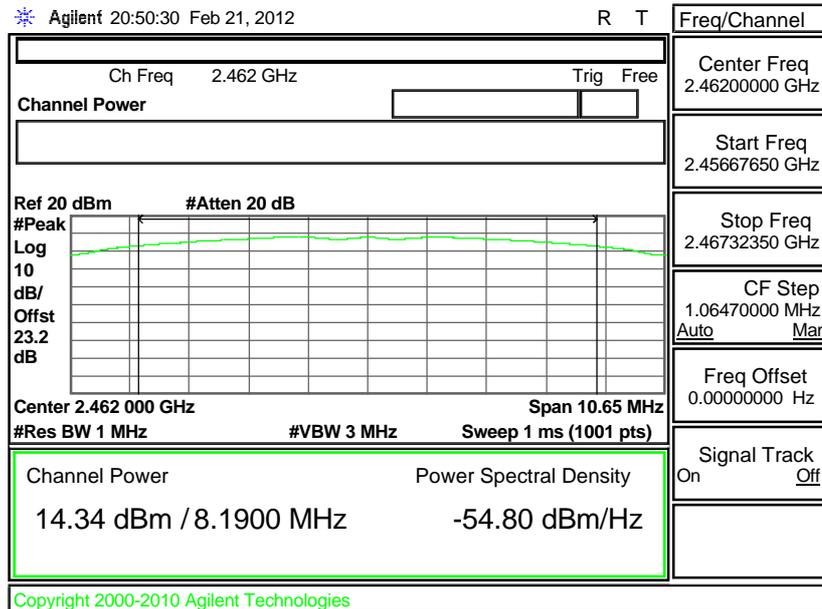
R T



**Mode 3 : Output Power Plot on 802.11b Channel 11**

\* Agilent 20:50:30 Feb 21, 2012

R T

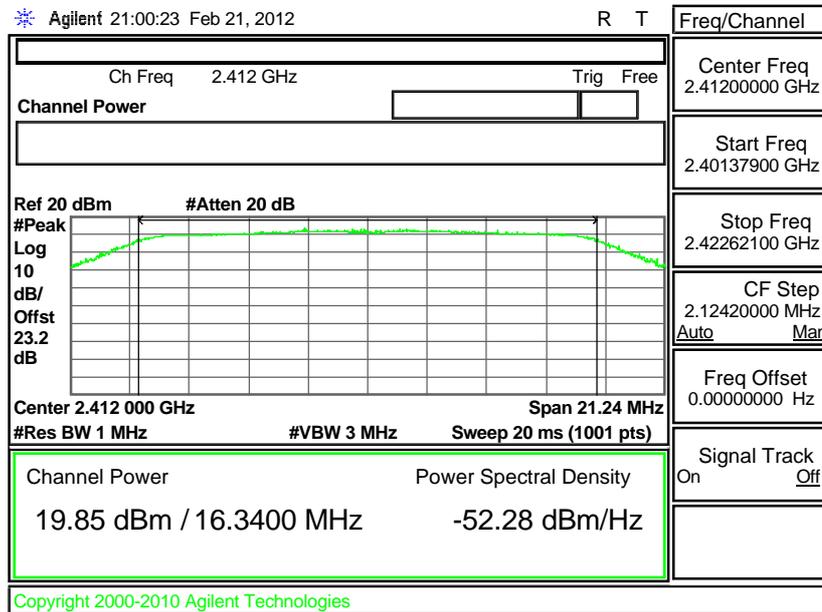




Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	19.85	30	Pass
06	2437	18.56	30	Pass
11	2462	17.81	30	Pass

Mode 4 : Output Power Plot on 802.11g Channel 01

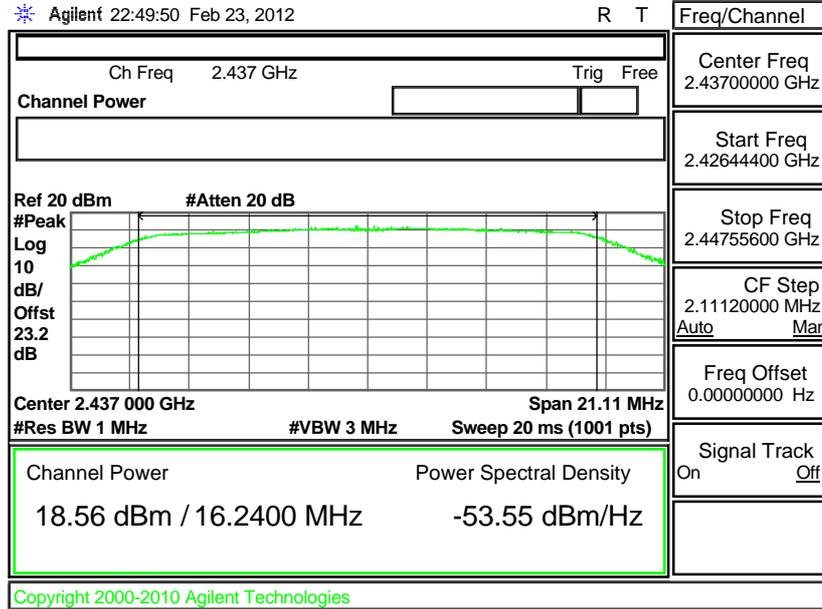




Mode 5 : Output Power Plot on 802.11g Channel 06

\* Agilent 22:49:50 Feb 23, 2012

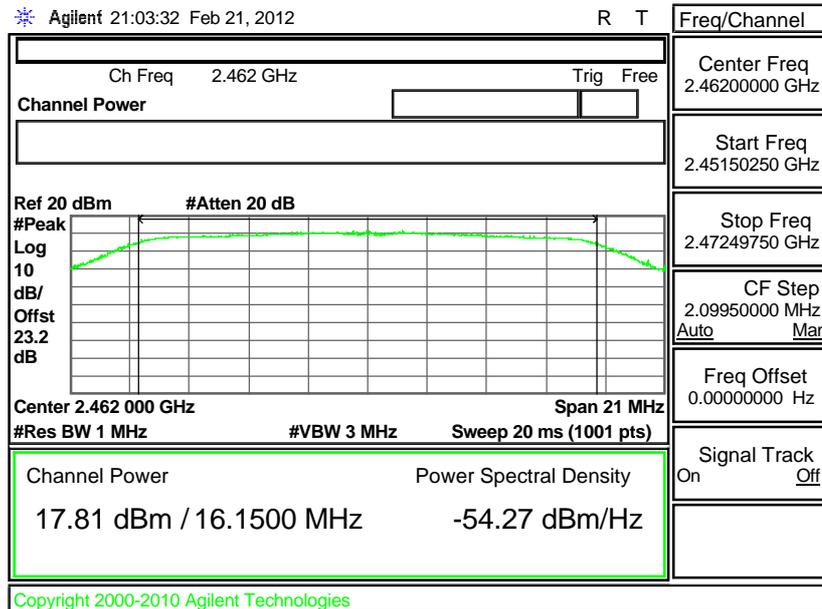
R T



Mode 6 : Output Power Plot on 802.11g Channel 11

\* Agilent 21:03:32 Feb 21, 2012

R T

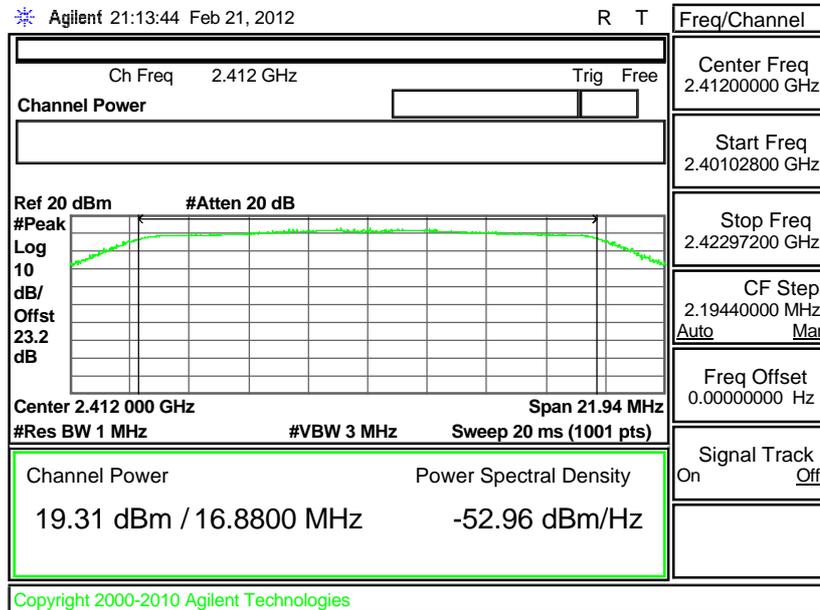




Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

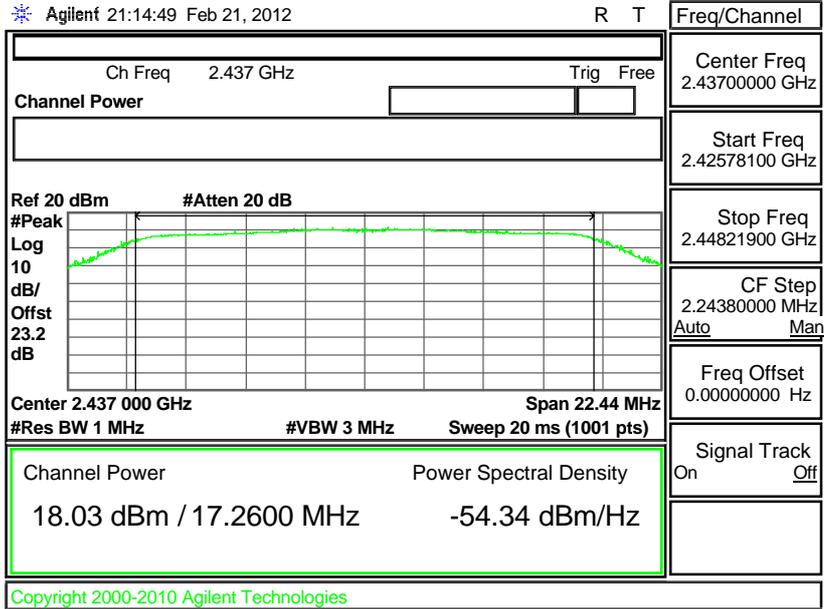
Channel	Frequency (MHz)	802.11g/n (BW 20MHz) Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	19.31	30	Pass
06	2437	18.03	30	Pass
11	2462	18.06	30	Pass

Mode 7: Output Power Plot on 802.11g/n (BW 20MHz) channel 01

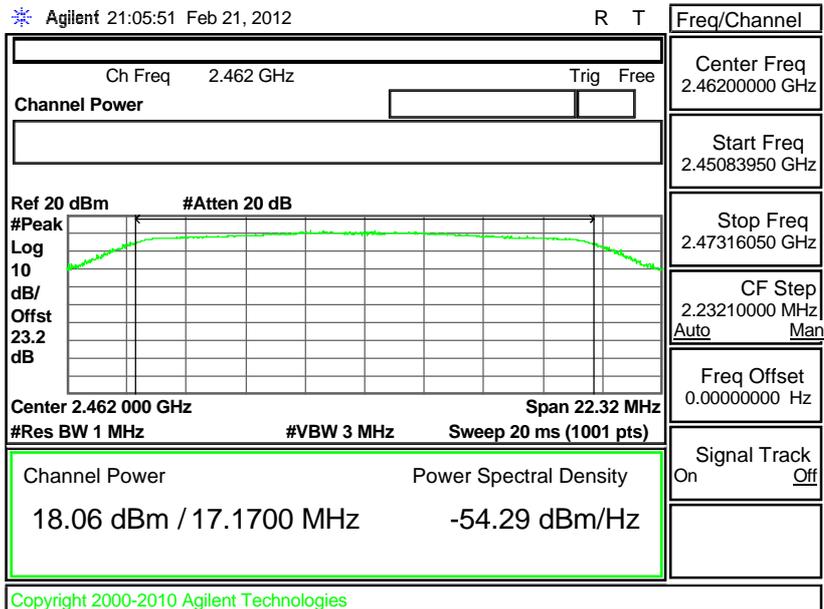




**Mode 8 : Output Power Plot on 802.11g/n (BW 20MHz) Channel 06**



**Mode 9 : Output Power Plot on 802.11g/n (BW 20MHz) Channel 11**





### **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**

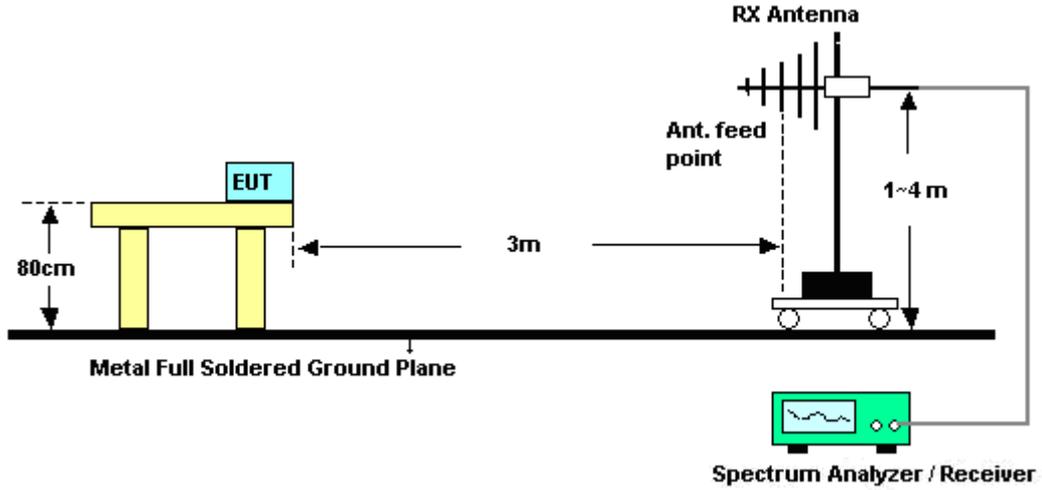
See list of measuring instruments of this test report.

#### **3.3.3 Test Procedures**

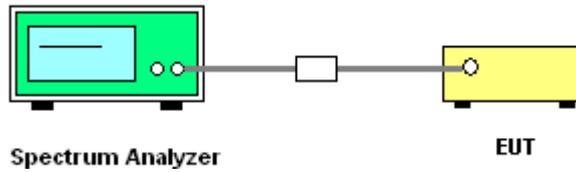
1. The testing follows the guidelines in ANSI C63.4-2003 and the Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01.
2. Conducted emission test: Set RBW = 100 KHz, Video bandwidth (VBW)  $\geq$  RBW. Out of the authorized frequency band emissions must be at least 20 dB lower than the highest emission level within the authorized band as measured with a 100 KHz RBW. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
3. Radiated emission test: Apply to band edge emissions that falling on 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 measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, then modify the unit for continuous operation. Use the settings in this paragraph to correct the reading level by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation per 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 :	23~24°C
Test Band :	802.11b	Relative Humidity :	46~47%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.42	49.04	-24.96	74	48.32	32.02	4.58	35.88	104	171	Peak
2389.42	37.75	-16.25	54	37.03	32.02	4.58	35.88	104	171	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.61	47.04	-26.96	74	46.32	32.02	4.58	35.88	184	80	Peak
2389.61	35.72	-18.28	54	35	32.02	4.58	35.88	184	80	Average

Test Mode :	Mode 3	Temperature :	23~24°C
Test Band :	802.11b	Relative Humidity :	46~47%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	51.32	-22.68	74	50.4	32.09	4.64	35.81	100	131	Peak
2483.5	41.47	-12.53	54	40.55	32.09	4.64	35.81	100	131	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2488.03	50.01	-23.99	74	49.08	32.1	4.64	35.81	184	81	Peak
2488.03	38.95	-15.05	54	38.02	32.1	4.64	35.81	184	81	Average



Test Mode :	Mode 4	Temperature :	23~24°C
Test Band :	802.11b	Relative Humidity :	46~47%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2387.14	50	-24	74	49.28	32.02	4.58	35.88	144	360	Peak
2387.14	37.87	-16.13	54	37.15	32.02	4.58	35.88	144	360	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2388.66	48.25	-25.75	74	47.53	32.02	4.58	35.88	115	81	Peak
2388.66	36.67	-17.33	54	35.95	32.02	4.58	35.88	115	81	Average



Test Mode :	Mode 5	Temperature :	23~24°C
Test Band :	802.11g	Relative Humidity :	46~47%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2385.43	68.39	-5.61	74	67.69	32	4.58	35.88	103	169	Peak
2385.43	49.64	-4.36	54	48.94	32	4.58	35.88	103	169	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.8	62.67	-11.33	74	61.93	32.02	4.58	35.86	156	73	Peak
2389.8	43.32	-10.68	54	42.58	32.02	4.58	35.86	156	73	Average

Test Mode :	Mode 7	Temperature :	23~24°C
Test Band :	802.11g	Relative Humidity :	46~47%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	73.31	-0.69	74	72.39	32.09	4.64	35.81	100	172	Peak
2483.5	50.93	-3.07	54	50.01	32.09	4.64	35.81	100	172	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.66	69.99	-4.01	74	69.07	32.09	4.64	35.81	183	82	Peak
2483.66	48.36	-5.64	54	47.44	32.09	4.64	35.81	183	82	Average



Test Mode :	Mode 8	Temperature :	23~24°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	46~47%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.61	71.29	-2.71	74	70.57	32.02	4.58	35.88	103	172	Peak
2389.61	51.49	-2.51	54	50.77	32.02	4.58	35.88	103	172	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.23	64.02	-9.98	74	63.3	32.02	4.58	35.88	157	77	Peak
2389.23	45.09	-8.91	54	44.37	32.02	4.58	35.88	157	77	Average

Test Mode :	Mode 10	Temperature :	23~24°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	46~47%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.85	71.94	-2.06	74	71.02	32.09	4.64	35.81	100	172	Peak
2483.85	51.83	-2.17	54	50.91	32.09	4.64	35.81	100	172	Average

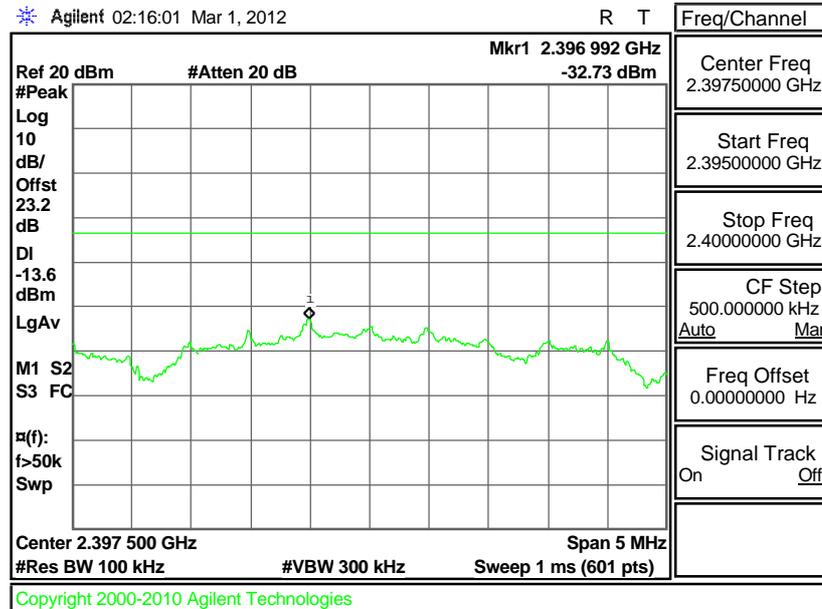
ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	68.47	-5.53	74	67.55	32.09	4.64	35.81	184	81	Peak
2483.5	48.44	-5.56	54	47.52	32.09	4.64	35.81	184	81	Average



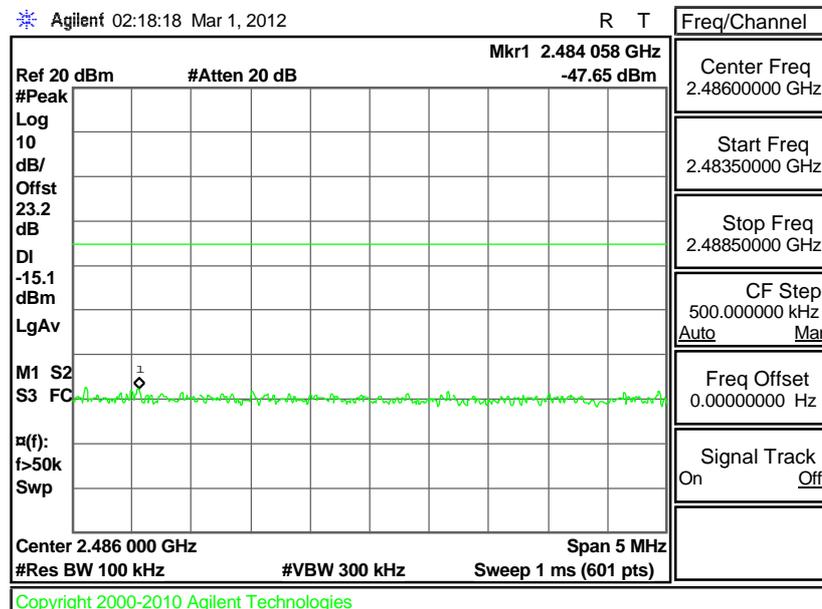
3.3.6 Test Plots of Conducted Band Edges

Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Book Lin

Low Band Edge Plot on 802.11b Channel 01



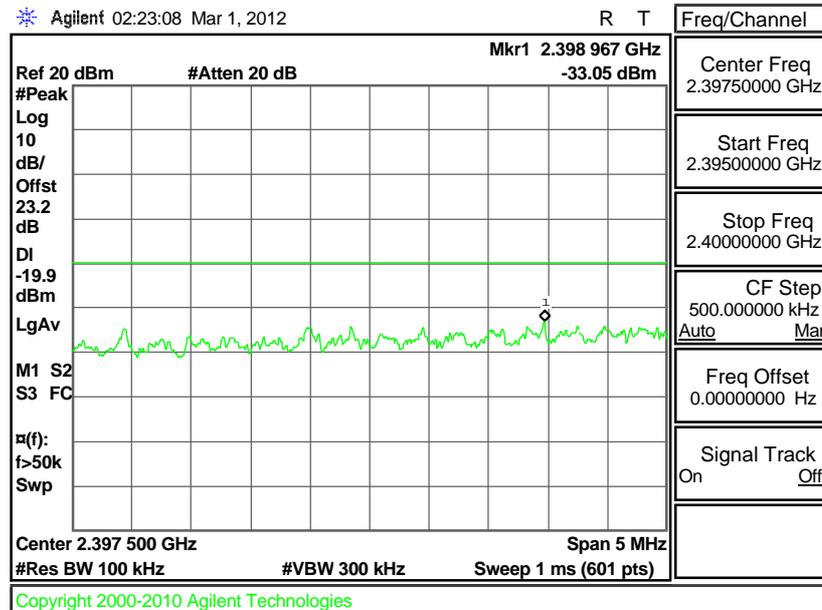
High Band Edge Plot on 802.11b Channel 11



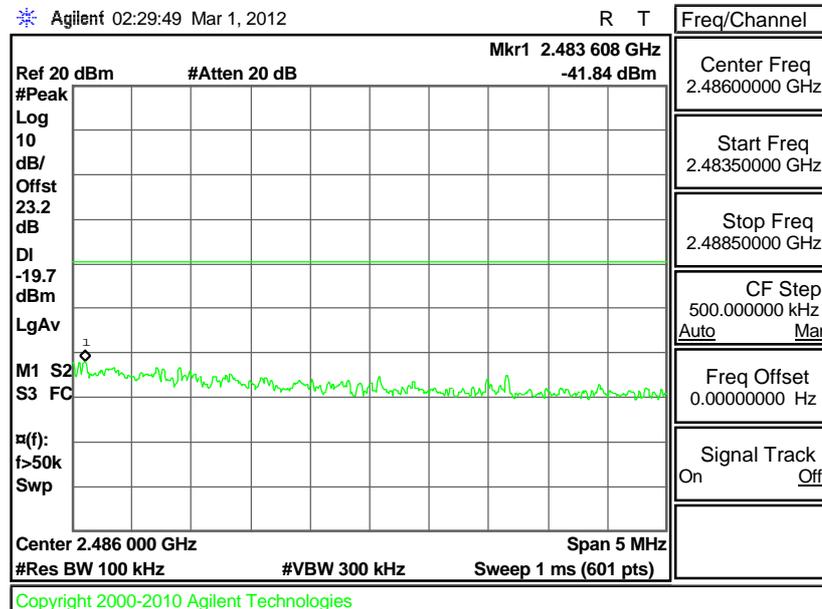


Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Book Lin

Low Band Edge Plot on 802.11g Channel 01



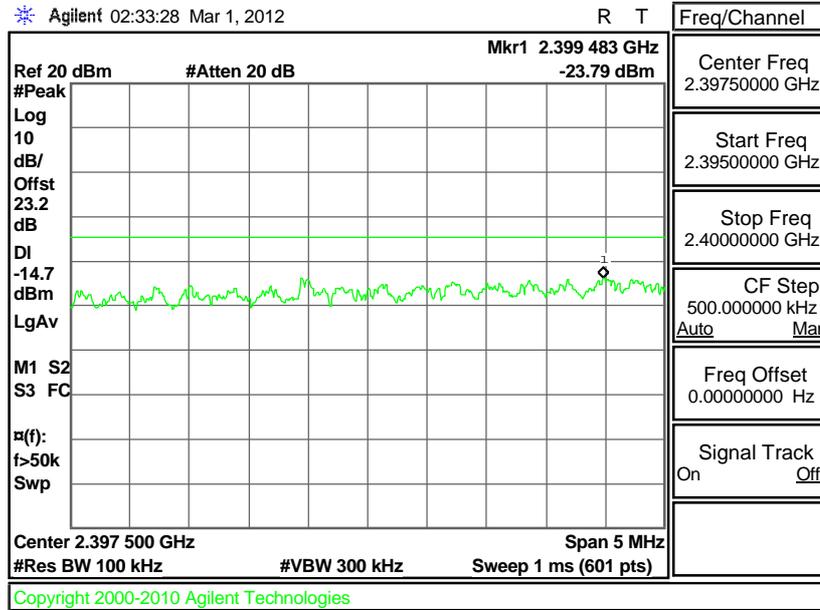
High Band Edge Plot on 802.11g Channel 11



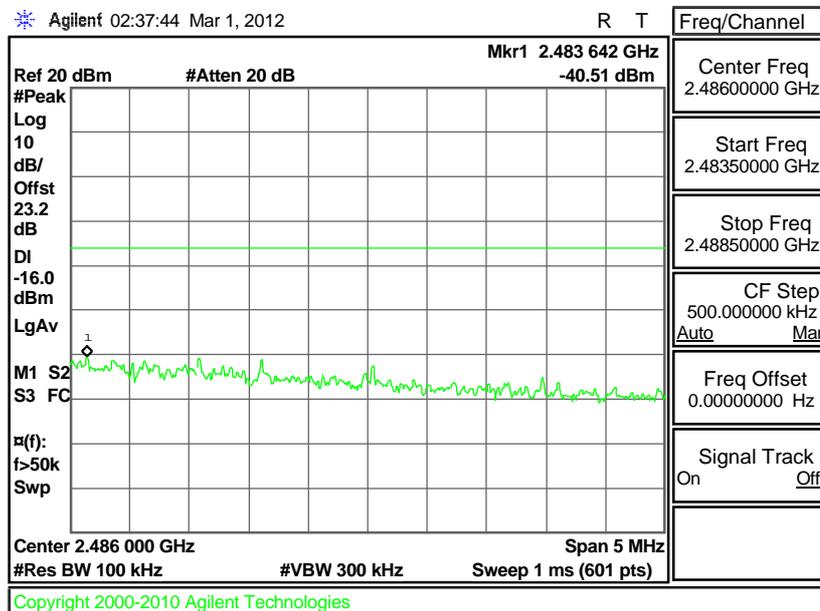


Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Book Lin

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



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



## 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.

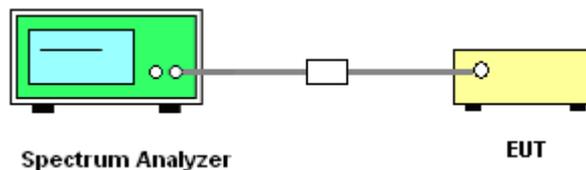
### 3.4.2 Measuring Instruments

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. The path loss was compensated to the results for each measurement.
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

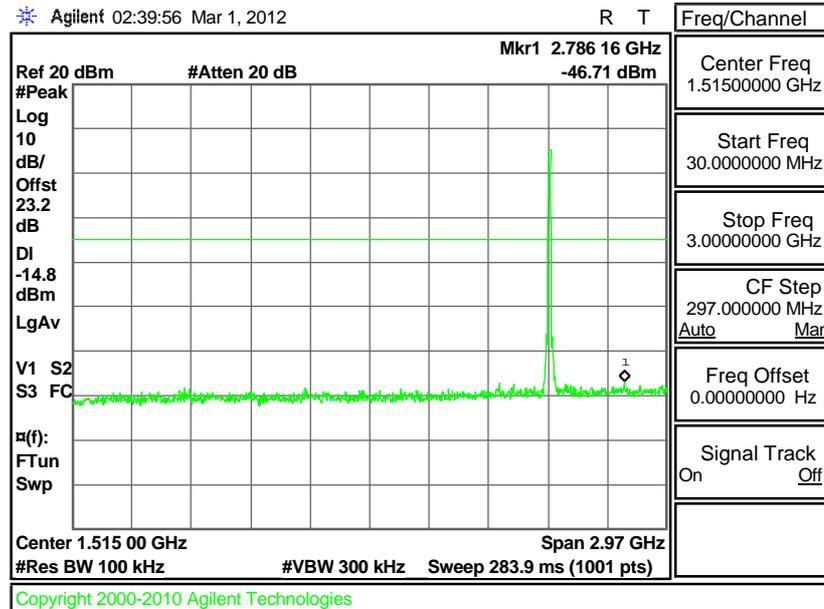




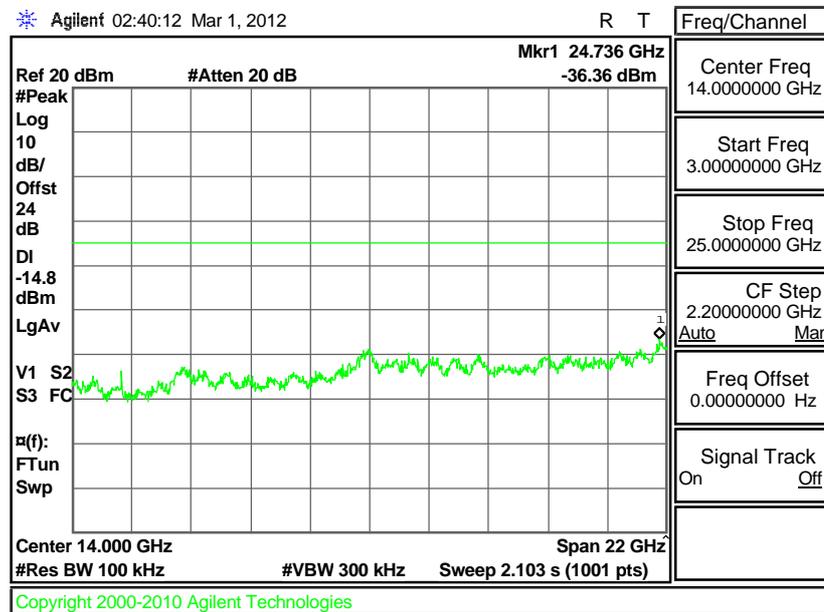
3.4.5 Test Plots of Spurious Emission

Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Book Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



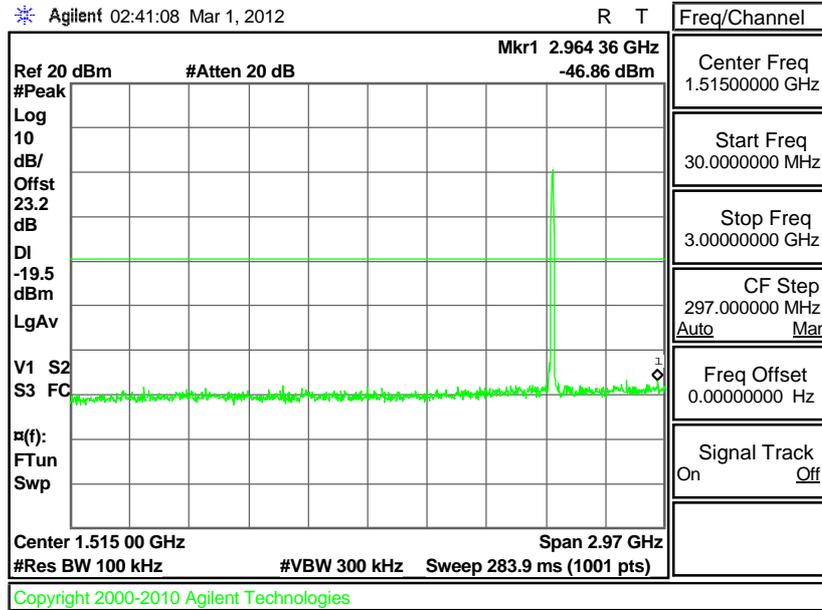
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



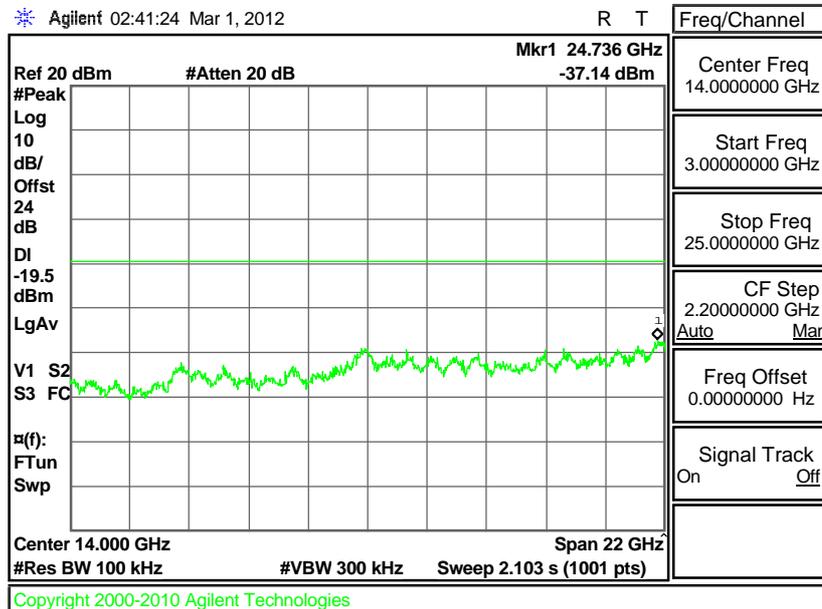


Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Book Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



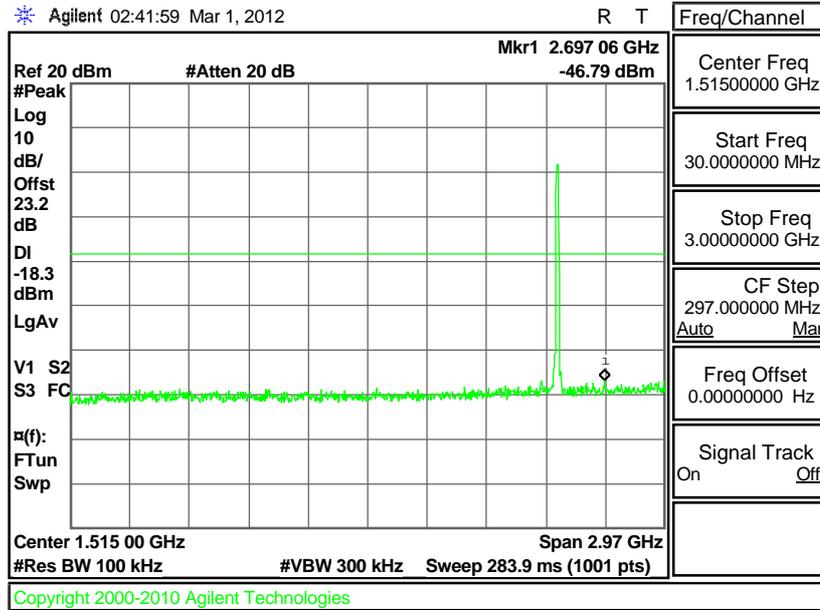
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



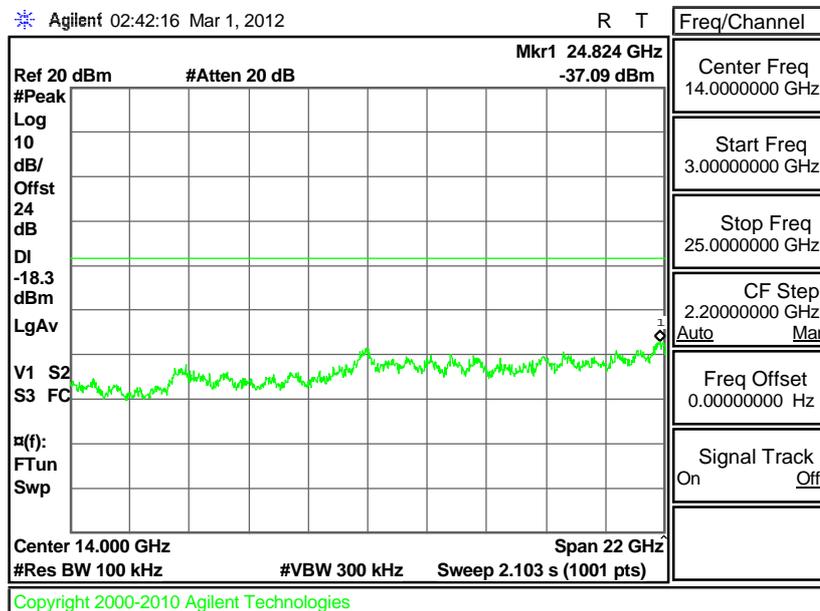


Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Book Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



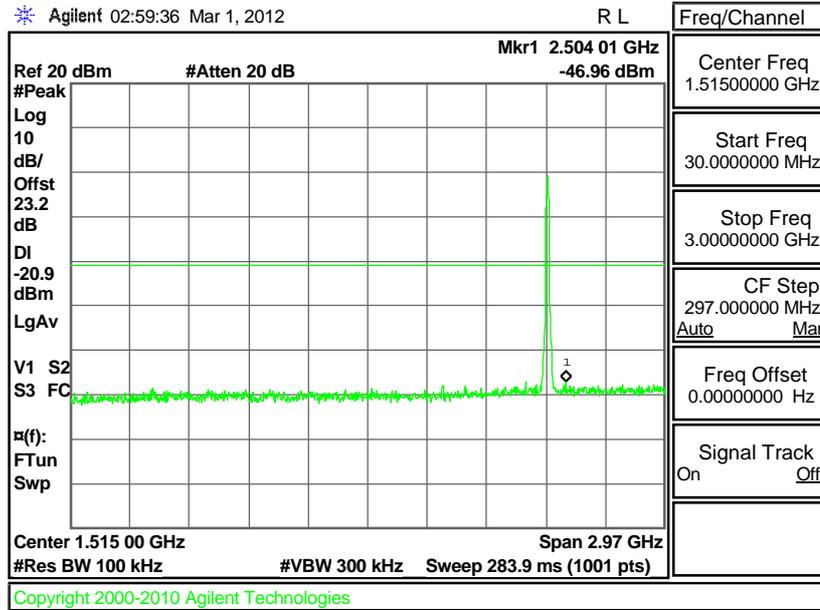
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



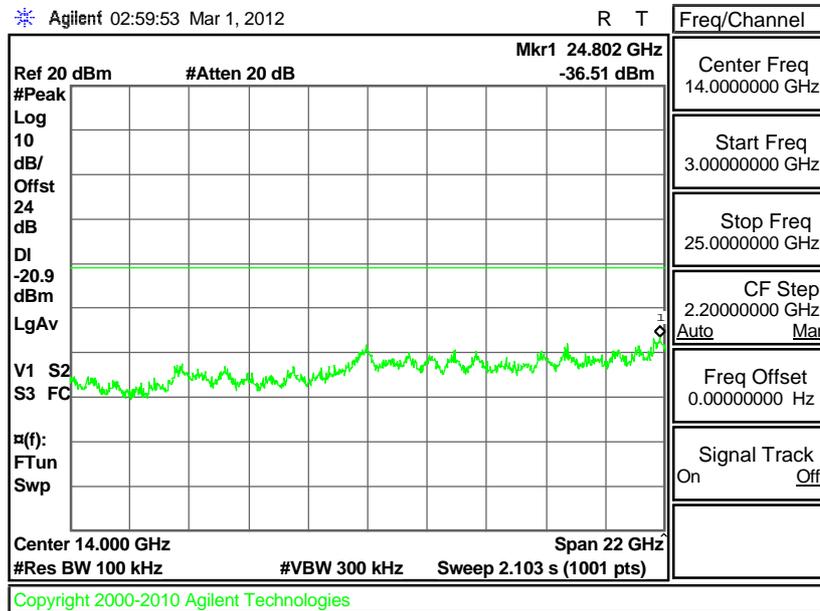


Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Book Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



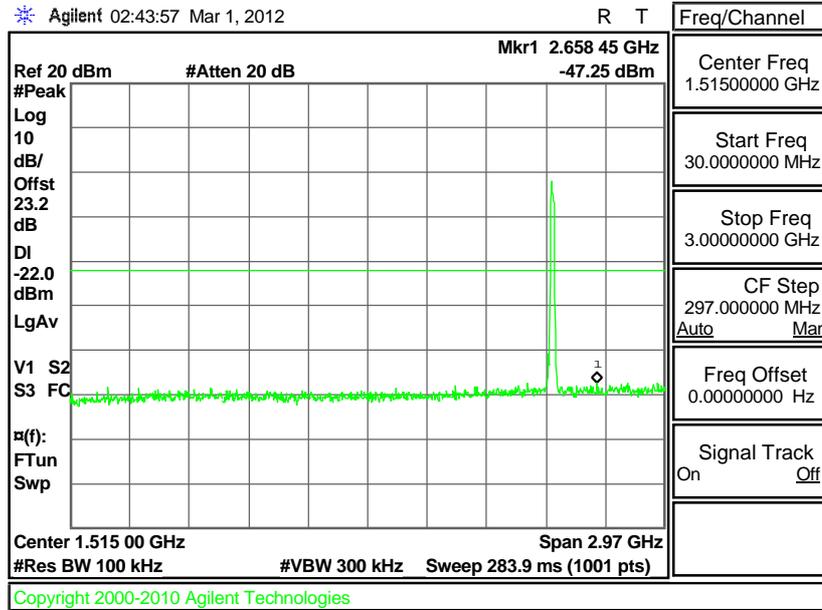
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



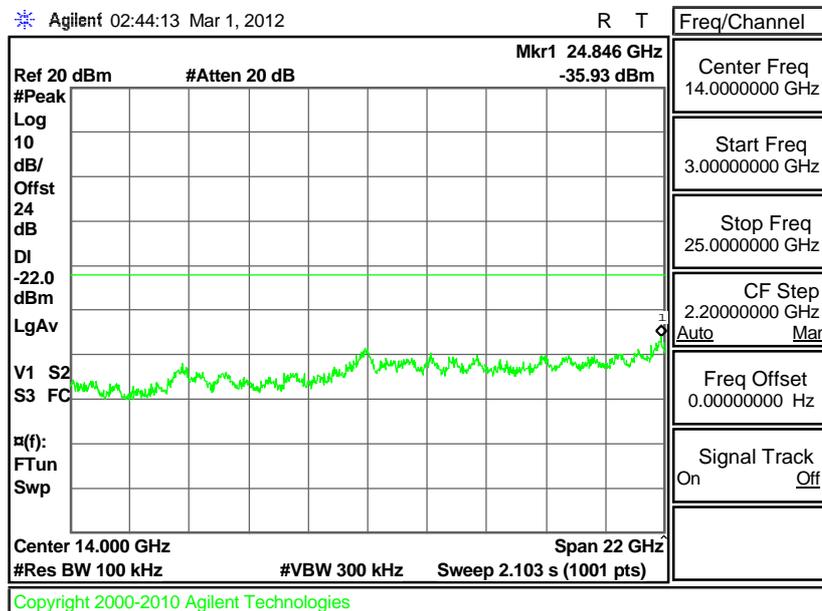


Test Mode :	Mode 5	Temperature :	24~26
Test Band :	802.11g	Relative Humidity :	50~53
Test Channel :	06	Test Engineer :	Book Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



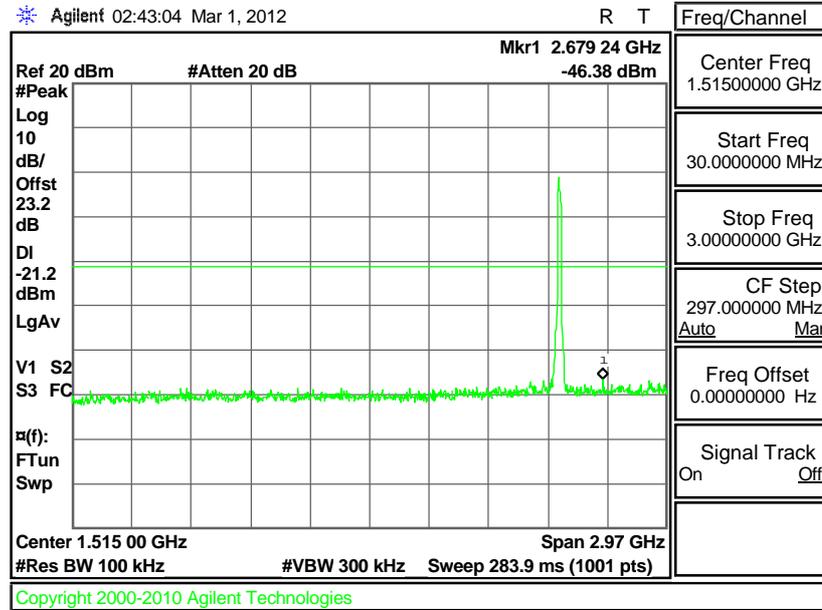
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



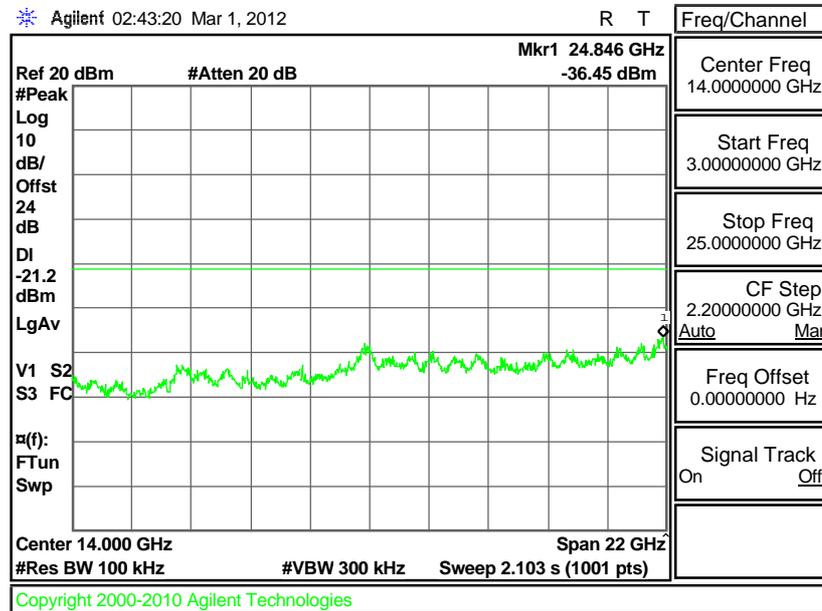


Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Book Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



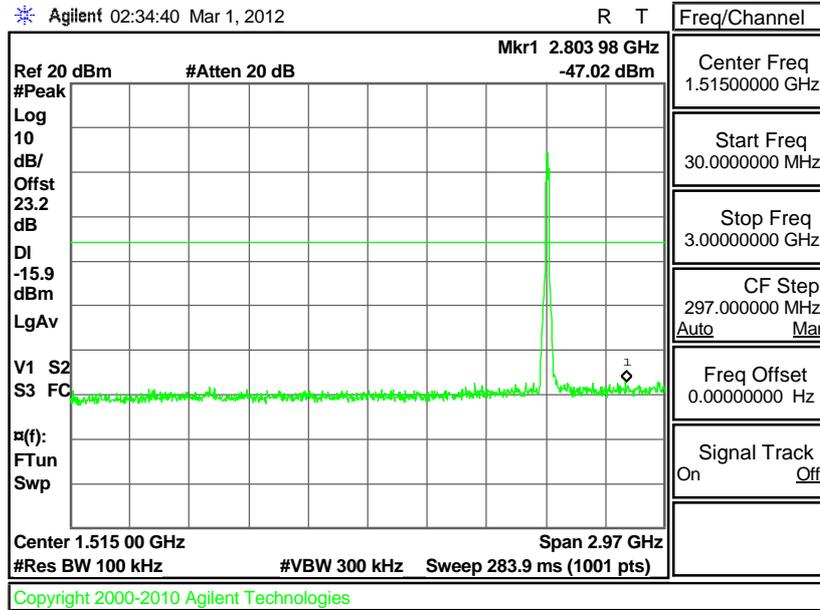
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



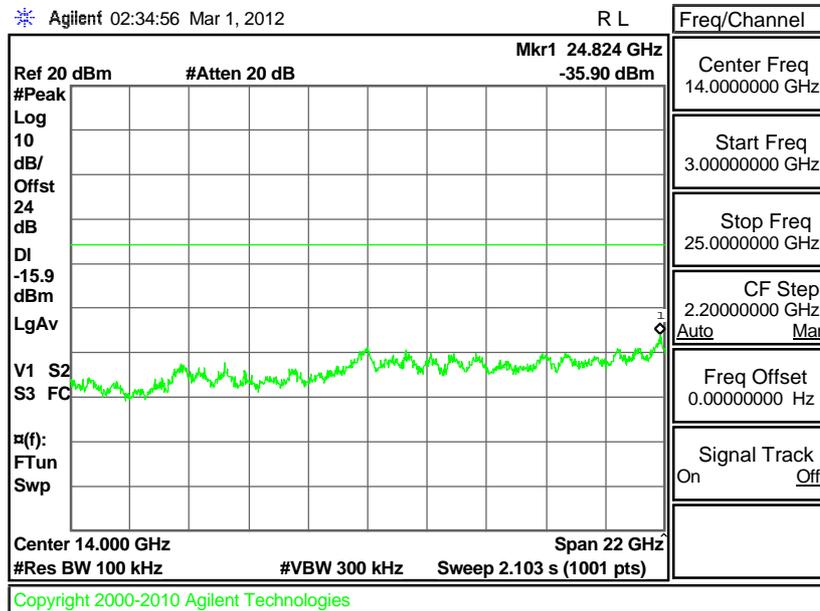


Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Book Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



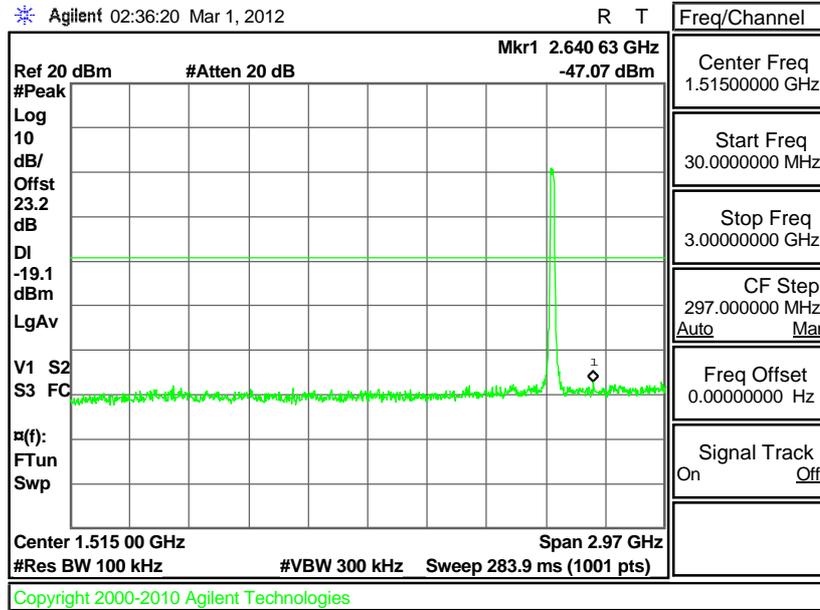
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



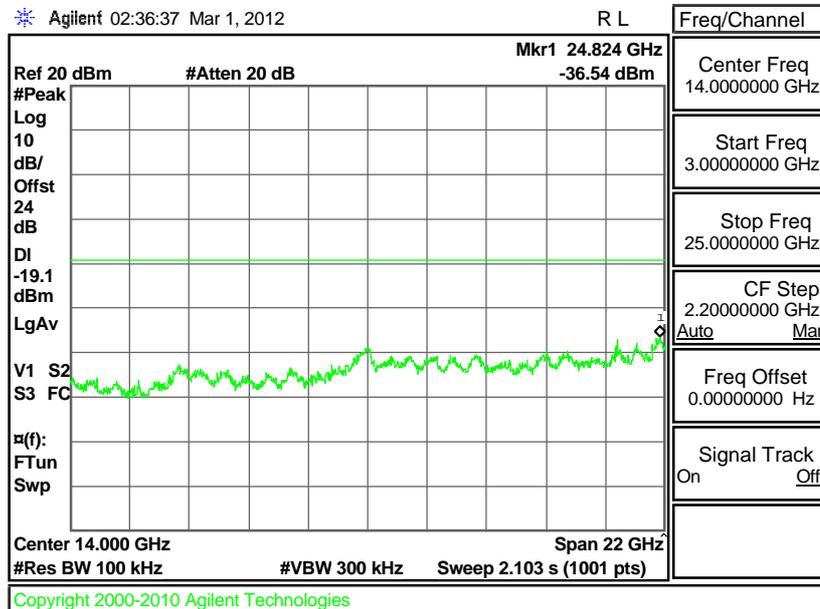


Test Mode :	Mode 8	Temperature :	24~26°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Book Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



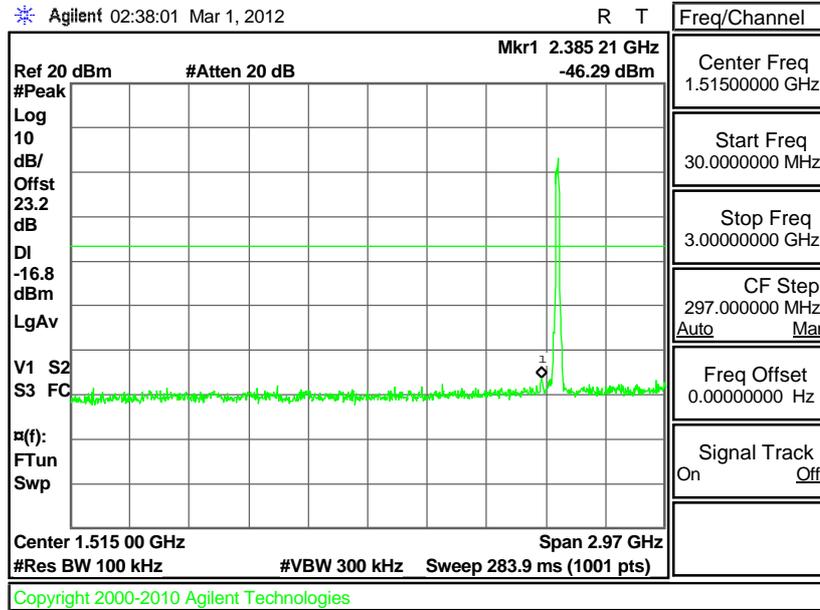
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



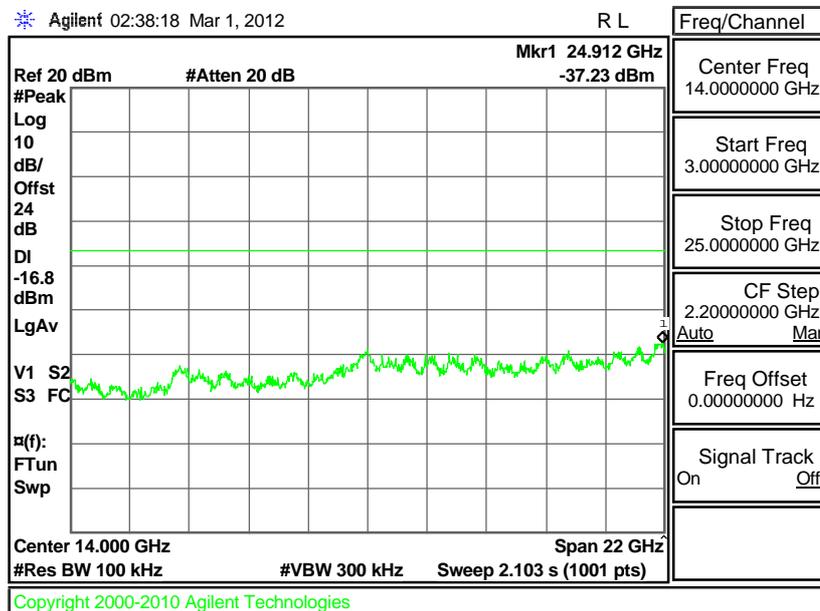


Test Mode :	Mode 9	Temperature :	24~26°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Book Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



## 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.

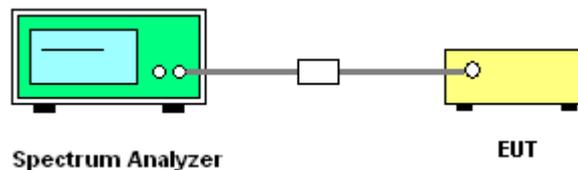
### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

1. The testing follows Measurement Procedure PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
3. Record the measurement data derived from spectrum analyzer.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 KHz. Video bandwidth (VBW)  $\geq$  300 KHz In order to make an accurate measurement, set the span to 5-30% greater than Emission Bandwidth (EBW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(3\text{ kHz}/100\text{ kHz} = -15.2\text{ dB})$ .

### 3.5.4 Test Setup





### 3.5.5 Test Result of Power Spectral Density

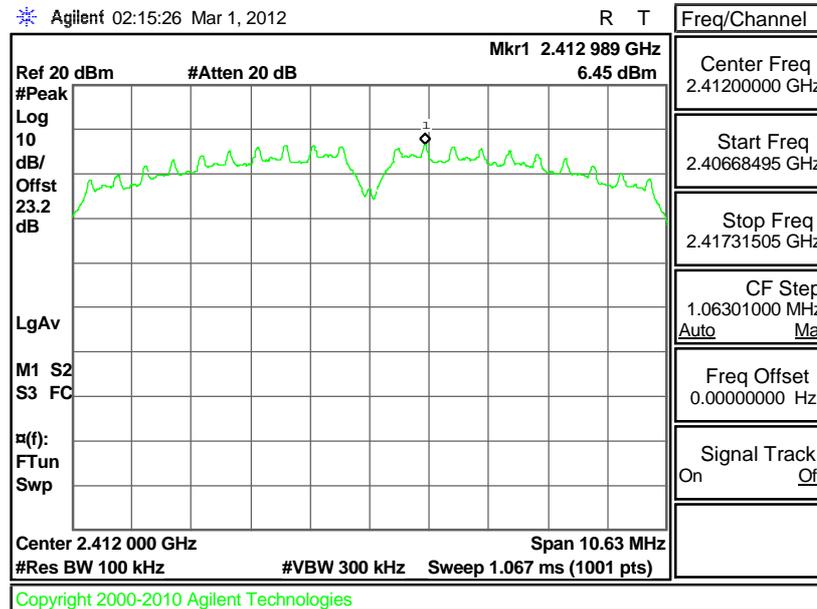
Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	6.45	-8.75	8	Pass
06	2437	4.92	-10.28	8	Pass
11	2462	4.88	-10.32	8	Pass

**Note:**

1. Measured power density (dBm) has offset with cable loss.
2. BWCF (dB) =  $10 \log (3k/100k) = -15.2 \text{ dB}$
3. Power Density/ 3kHz (dBm) = Measured power density/ 100KHz (dBm) + BWCF (dB)

#### Mode 1 : PSD Plot on 802.11b Channel 01

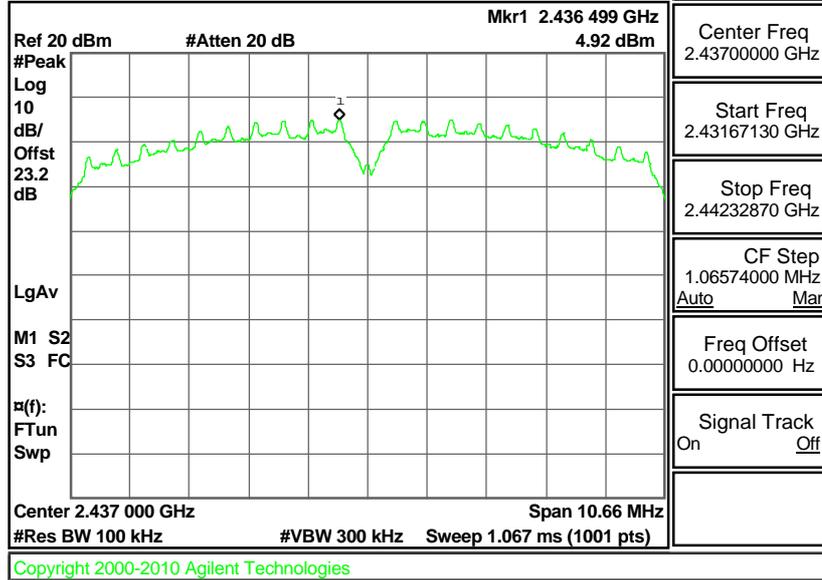




Mode 2 : PSD Plot on 802.11b Channel 06

Agilent 02:13:02 Mar 1, 2012

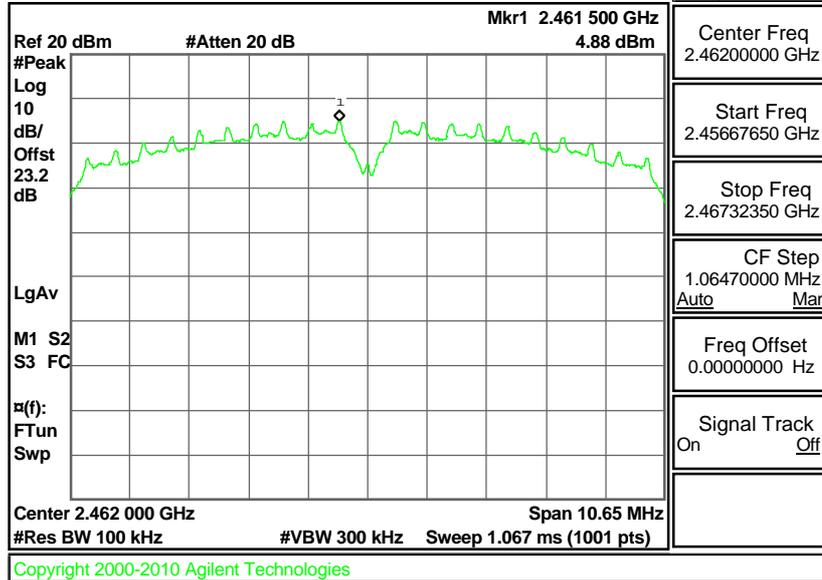
R T



Mode 3 : PSD Plot on 802.11b Channel 11

Agilent 02:17:42 Mar 1, 2012

R T





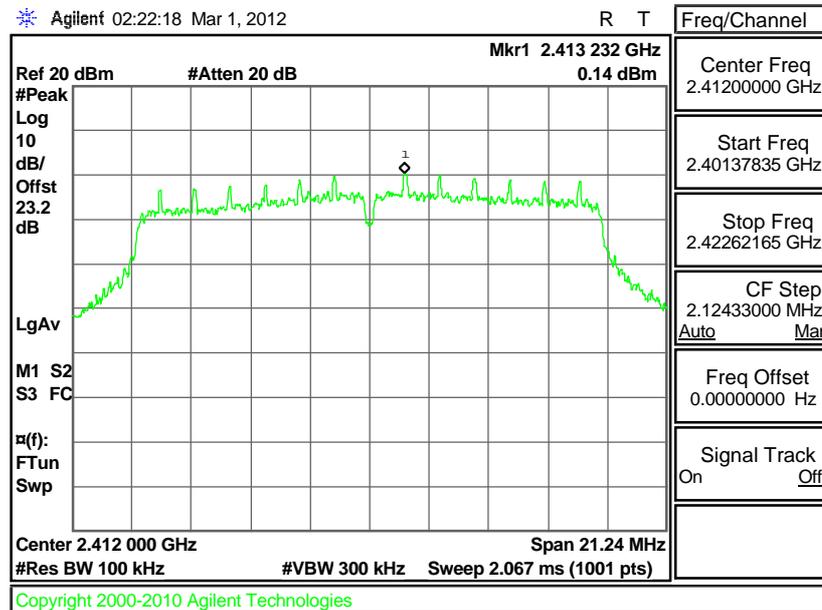
Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	0.14	-15.06	8	Pass
06	2437	3.88	-11.32	8	Pass
11	2462	0.33	-14.87	8	Pass

Note:

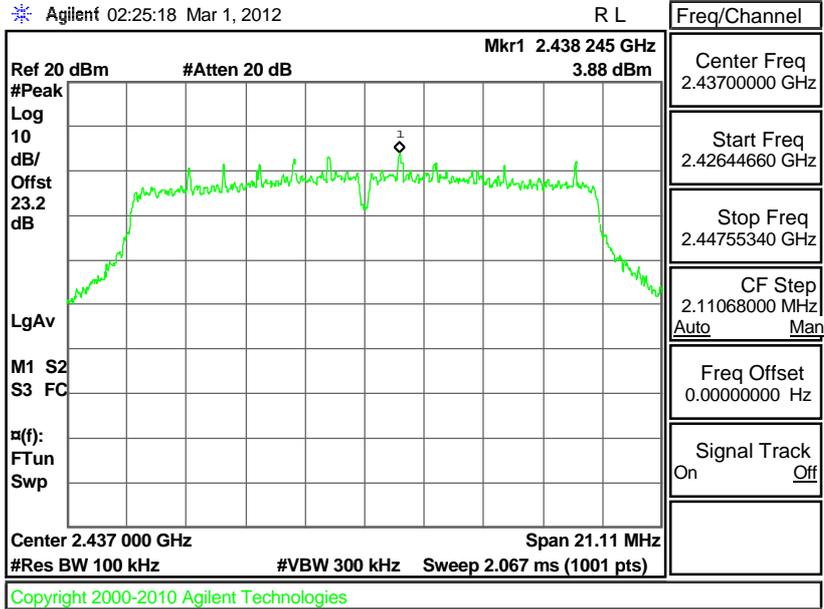
1. Measured power density (dBm) has offset with cable loss.
2. BWCF (dB) =  $10 \log (3k/100k) = -15.2 \text{ dB}$
3. Power Density/ 3KHz (dBm) = Measured power density/ 100KHz (dBm) + BWCF (dB)

Mode 4 : PSD Plot on 802.11g Channel 01

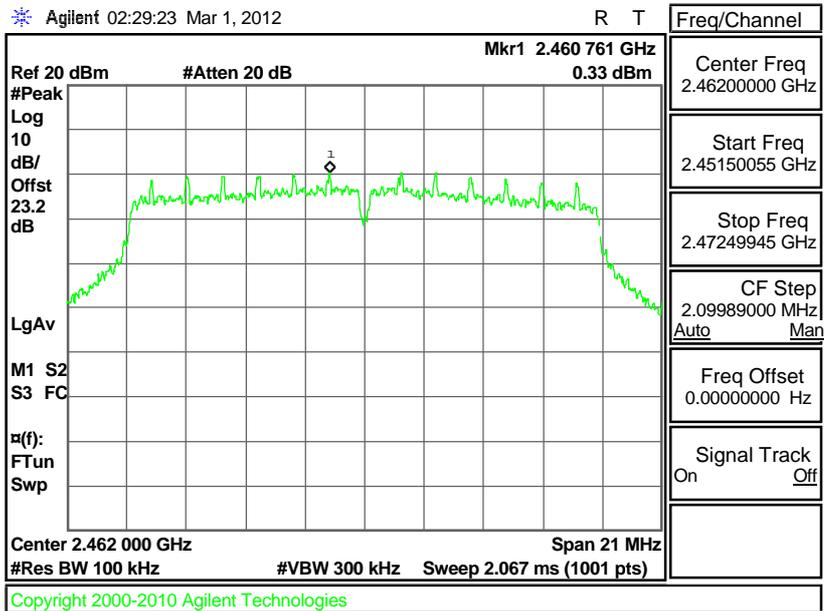




Mode 5 : PSD Plot on 802.11g Channel 06



Mode 6 : PSD Plot on 802.11g Channel 11





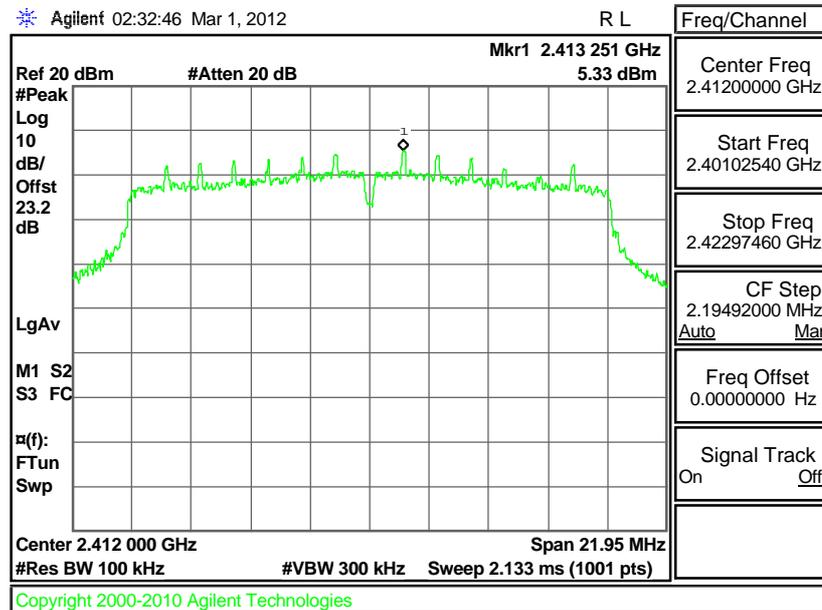
Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g/n (BW 20MHz) Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	5.33	-9.87	8	Pass
06	2437	4.40	-10.80	8	Pass
11	2462	3.98	-11.22	8	Pass

Note:

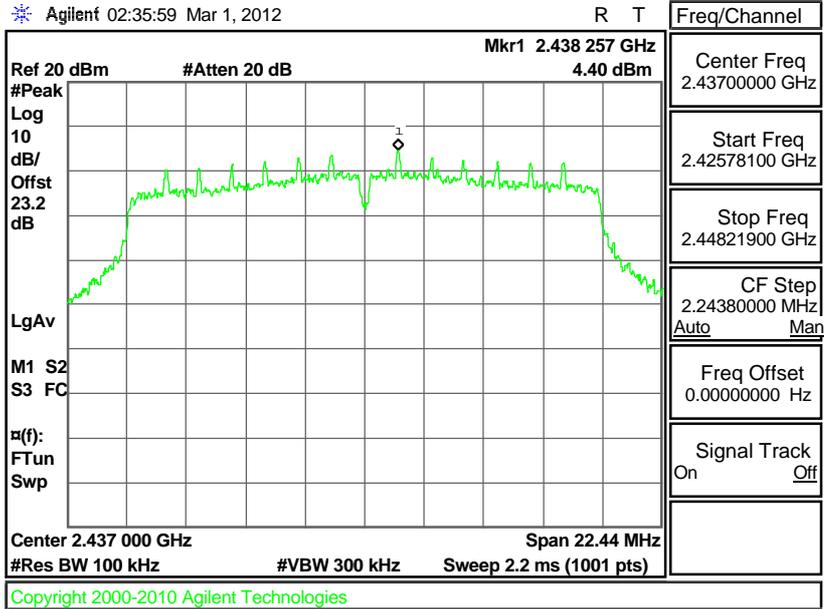
1. Measured power density (dBm) has offset with cable loss.
2. BWCF (dB) = 10 log (3k/100k) = -15.2 dB
3. Power Density/ 3KHz (dBm)= Measured power density/ 100KHz (dBm) + BWCF (dB)

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

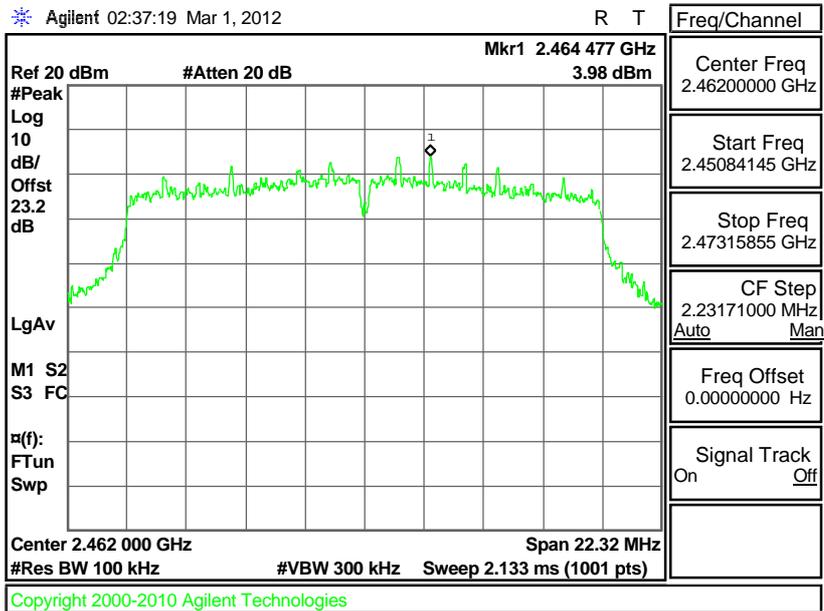




Mode 8 : PSD Plot on 802.11g/n (BW 20MHz) Channel 06



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



## 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.

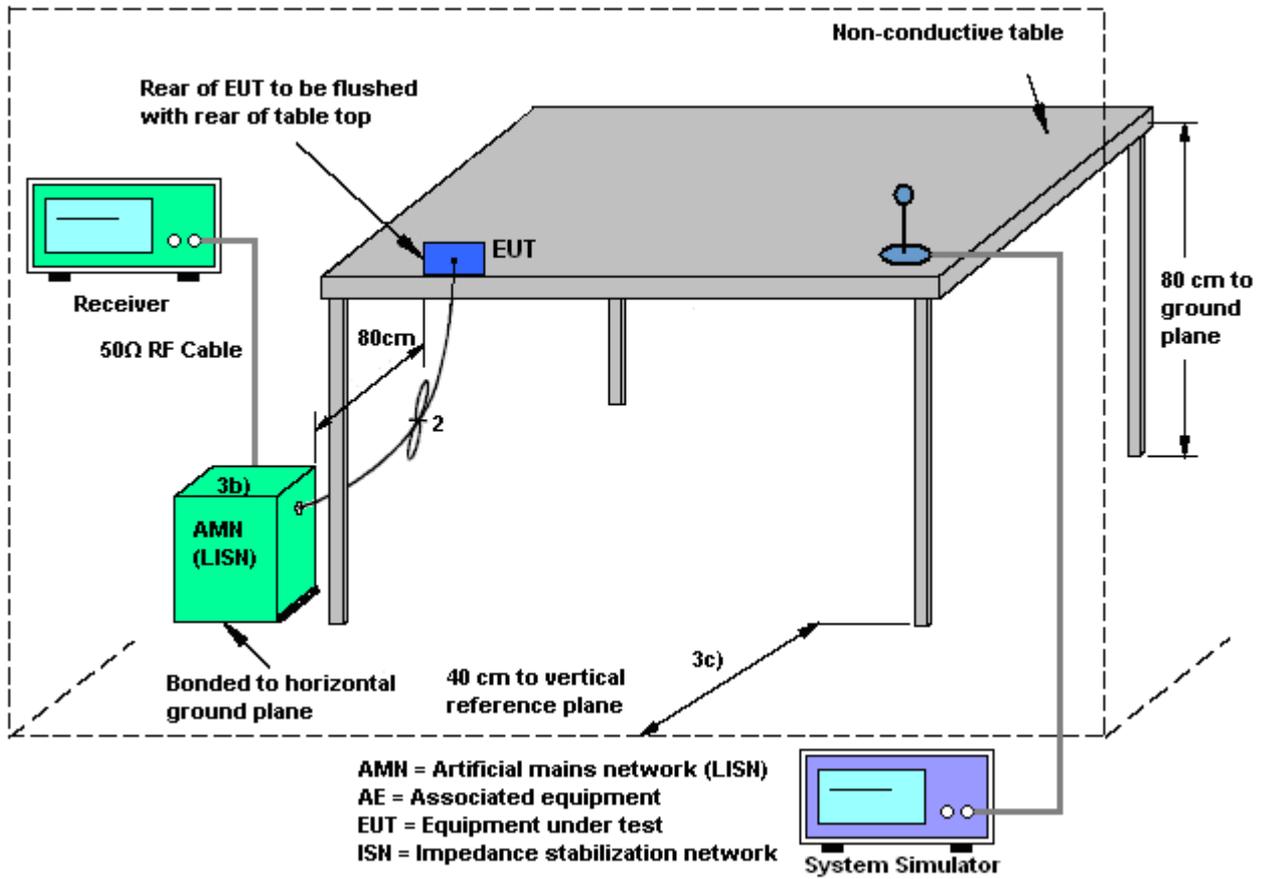
### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.6.3 Test Procedures

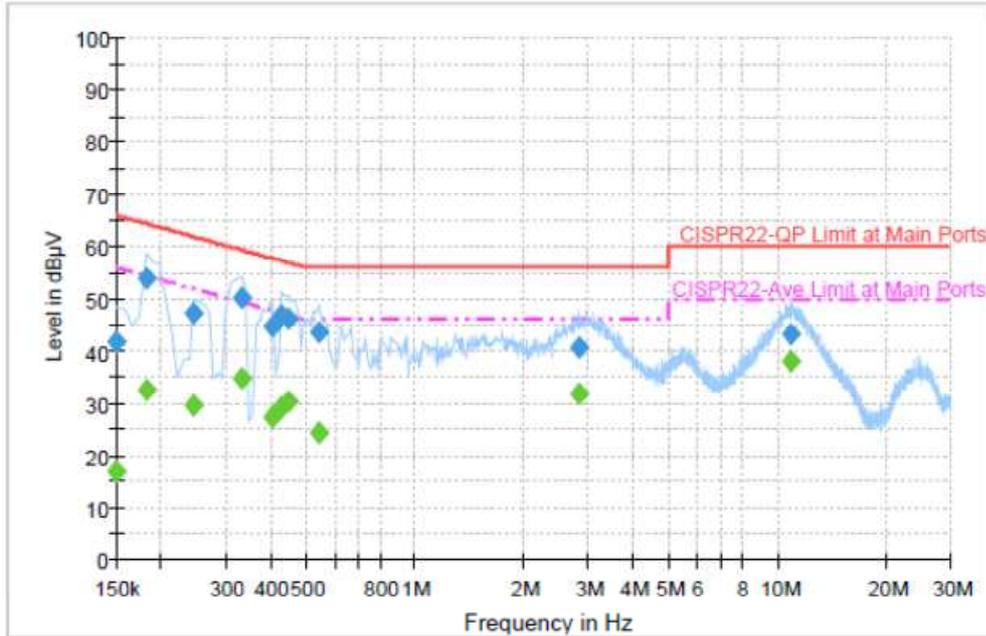
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

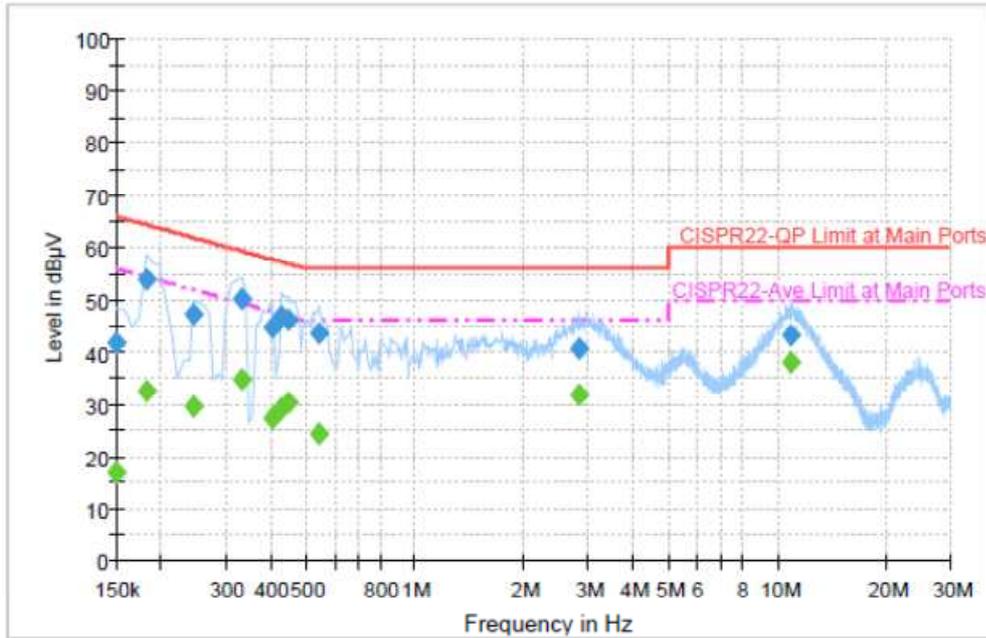
Test Mode :	Mode 5	Temperature :	23~24°C
Test Engineer :	Hayden Wu	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	LTE Band 4 Idle + WLAN Link + Bluetooth Link + TC + GPS Rx + Docking + iPod + USB Cable (Charging from Adapter 1)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



**Final Result : QuasiPeak**

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	41.6	Off	L1	19.4	24.4	66.0
0.182000	53.7	Off	L1	19.4	10.7	64.4
0.246000	47.3	Off	L1	19.4	14.6	61.9
0.334000	50.1	Off	L1	19.4	9.3	59.4
0.406000	44.6	Off	L1	19.5	13.1	57.7
0.430000	47.0	Off	L1	19.5	10.3	57.3
0.446000	46.2	Off	L1	19.4	10.7	56.9
0.542000	43.6	Off	L1	19.4	12.4	56.0
2.846000	40.7	Off	L1	19.4	15.3	56.0
10.918000	43.2	Off	L1	19.6	16.8	60.0

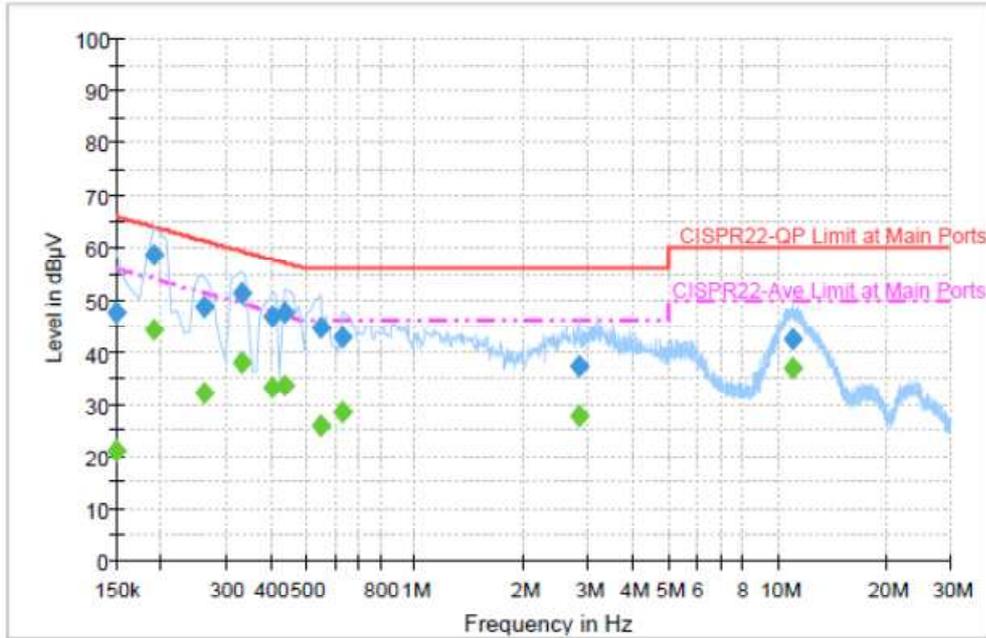
Test Mode :	Mode 5	Temperature :	23~24°C
Test Engineer :	Hayden Wu	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	LTE Band 4 Idle + WLAN Link + Bluetooth Link + TC + GPS Rx + Docking + iPod + USB Cable (Charging from Adapter 1)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	16.9	Off	L1	19.4	39.1	56.0
0.182000	32.4	Off	L1	19.4	22.0	54.4
0.246000	29.4	Off	L1	19.4	22.5	51.9
0.334000	34.7	Off	L1	19.4	14.7	49.4
0.406000	27.2	Off	L1	19.5	20.5	47.7
0.430000	29.2	Off	L1	19.5	18.1	47.3
0.446000	30.4	Off	L1	19.4	16.5	46.9
0.542000	24.2	Off	L1	19.4	21.8	46.0
2.846000	31.7	Off	L1	19.4	14.3	46.0
10.918000	37.9	Off	L1	19.6	12.1	50.0

Test Mode :	Mode 5	Temperature :	23~24°C
Test Engineer :	Hayden Wu	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	LTE Band 4 Idle + WLAN Link + Bluetooth Link + TC + GPS Rx + Docking + iPod + USB Cable (Charging from Adapter 1)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

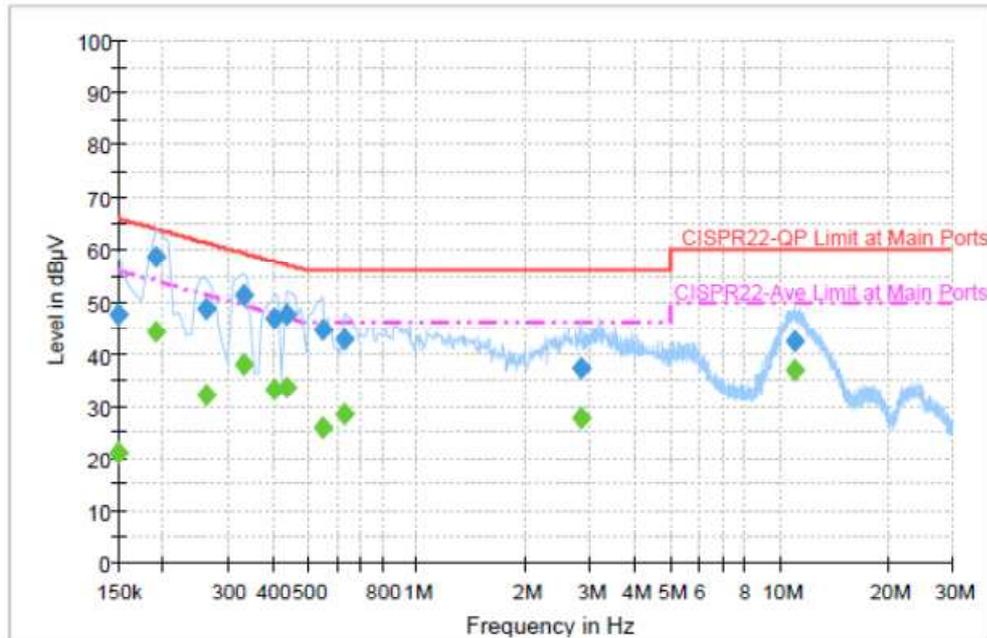


Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	47.6	Off	N	19.4	18.4	66.0
0.190000	58.7	Off	N	19.4	5.3	64.0
0.262000	48.6	Off	N	19.4	12.8	61.4
0.334000	51.2	Off	N	19.4	8.2	59.4
0.406000	47.0	Off	N	19.5	10.7	57.7
0.438000	47.8	Off	N	19.5	9.3	57.1
0.550000	44.6	Off	N	19.4	11.4	56.0
0.630000	42.7	Off	N	19.4	13.3	56.0
2.822000	37.3	Off	N	19.5	18.7	56.0
10.950000	42.4	Off	N	19.6	17.6	60.0



Test Mode :	Mode 5	Temperature :	23~24°C
Test Engineer :	Hayden Wu	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	LTE Band 4 Idle + WLAN Link + Bluetooth Link + TC + GPS Rx + Docking + iPod + USB Cable (Charging from Adapter 1)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	21.2	Off	N	19.4	34.8	56.0
0.190000	44.2	Off	N	19.4	9.8	54.0
0.262000	32.0	Off	N	19.4	19.4	51.4
0.334000	38.0	Off	N	19.4	11.4	49.4
0.406000	33.3	Off	N	19.5	14.4	47.7
0.438000	33.6	Off	N	19.5	13.5	47.1
0.550000	25.8	Off	N	19.4	20.2	46.0
0.630000	28.5	Off	N	19.4	17.5	46.0
2.822000	27.8	Off	N	19.5	18.2	46.0
10.950000	36.9	Off	N	19.6	13.1	50.0

### 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.

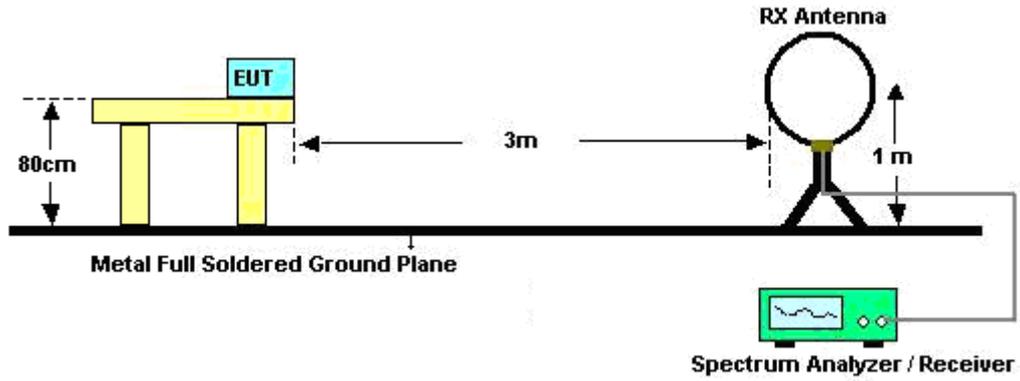
#### 3.7.3

#### 3.7.4 Test Procedures

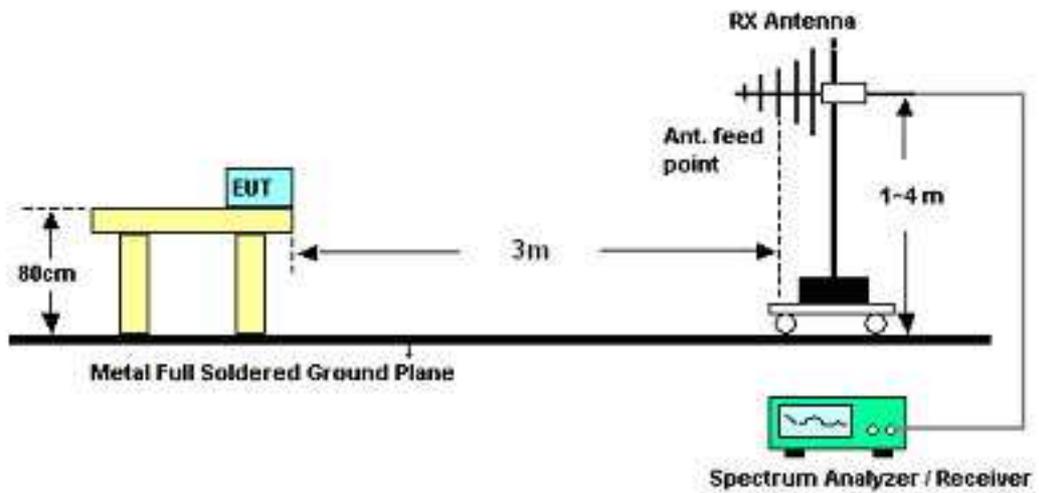
1. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW = 1 MHz for  $f \geq 1$  GHz, 100 KHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Measurement above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB per decade from 3m to 1m.  
 Distance extrapolation factor =  $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$  (dB)
2. Maximize the emission by rotating the EUT for three orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines in ANSI C63.4-2003.

### 3.7.5 Test Setup

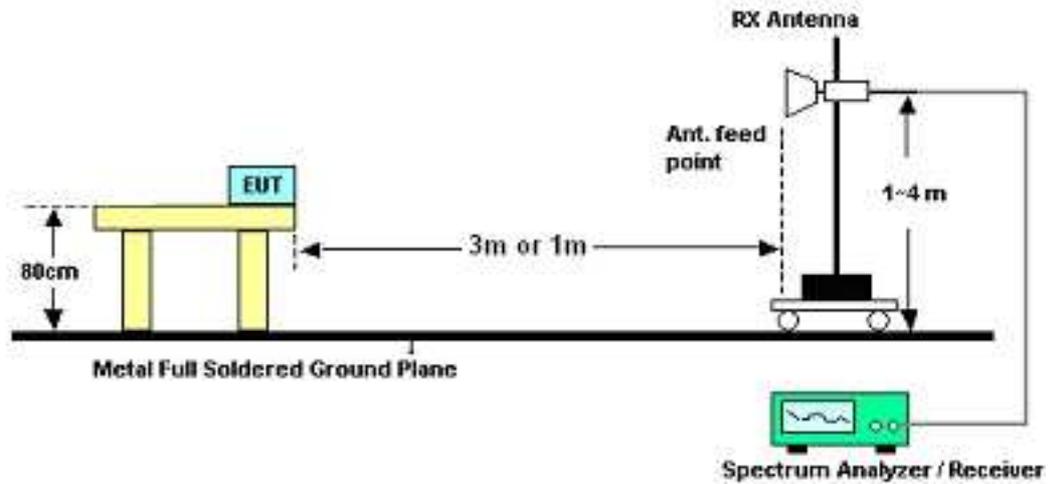
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.7.6 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

The low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.



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

Test Mode :	Mode 1	Temperature :	23~24°C
Test Channel :	01	Relative Humidity :	46~47%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.65	-15.35	40	35.71	19.8	0.7	31.56	-	-	Peak
85.35	22.07	-17.93	40	44.48	8.1	1.04	31.55	-	-	Peak
239.79	24.53	-21.47	46	43.02	11.4	1.62	31.51	-	-	Peak
475.7	31.93	-14.07	46	43.21	17.65	2.18	31.11	100	82	Peak
510	30.75	-15.25	46	41.35	18.2	2.25	31.05	-	-	Peak
714.4	28.94	-17.06	46	35.63	21.3	2.68	30.67	-	-	Peak
2389.42	37.75	-16.25	54	37.03	32.02	4.58	35.88	104	171	Average
2389.42	49.04	-24.96	74	48.32	32.02	4.58	35.88	104	171	Peak
2412	96.46	-	-	95.7	32.03	4.59	35.86	104	171	Average
2412	100.8	-	-	100.04	32.03	4.59	35.86	104	171	Peak
2494	36.82	-17.18	54	35.88	32.1	4.64	35.8	104	171	Average
2494	47.56	-26.44	74	46.62	32.1	4.64	35.8	104	171	Peak
4824	53.89	-0.11	54	72.01	33.83	6.51	58.46	100	257	Average
4824	56.16	-17.84	74	74.28	33.83	6.51	58.46	100	257	Peak



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 96.71dBuV/m - 20dB = 76.71dBuV/m.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	34.71	-5.29	40	45.77	19.8	0.7	31.56	100	35	Peak
127.74	23.8	-19.7	43.5	42.54	11.56	1.22	31.52	-	-	Peak
170.13	22.26	-21.24	43.5	42.95	9.5	1.36	31.55	-	-	Peak
475.7	35.07	-10.93	46	46.35	17.65	2.18	31.11	-	-	Peak
510	35.14	-10.86	46	45.74	18.2	2.25	31.05	-	-	Peak
612.2	30.76	-15.24	46	38.89	20.26	2.46	30.85	-	-	Peak
2389.61	35.72	-18.28	54	35	32.02	4.58	35.88	184	80	Average
2389.61	47.04	-26.96	74	46.32	32.02	4.58	35.88	184	80	Peak
2412	92.73	-	-	91.97	32.03	4.59	35.86	184	80	Average
2412	96.71	-	-	95.95	32.03	4.59	35.86	184	80	Peak
2492	36.48	-17.52	54	35.54	32.1	4.64	35.8	184	80	Average
2492	47.29	-26.71	74	46.35	32.1	4.64	35.8	184	80	Peak
4824	52.31	-1.69	54	70.43	33.83	6.51	58.46	147	21	Average
4824	53.33	-20.67	74	71.45	33.83	6.51	58.46	147	21	Peak
7236	46.19	-30.52	76.71	59.96	35.6	8.29	57.66	100	0	Peak



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2437 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.91	-15.09	40	35.97	19.8	0.7	31.56	-	-	Peak
85.08	22.35	-17.65	40	44.76	8.1	1.04	31.55	-	-	Peak
170.13	23.23	-20.27	43.5	43.92	9.5	1.36	31.55	-	-	Peak
475.7	31.37	-14.63	46	42.65	17.65	2.18	31.11	100	86	Peak
510	29.46	-16.54	46	40.06	18.2	2.25	31.05	-	-	Peak
714.4	26.92	-19.08	46	33.61	21.3	2.68	30.67	-	-	Peak
2386	35.01	-18.99	54	34.29	32.02	4.58	35.88	100	173	Average
2386	46.99	-27.01	74	46.27	32.02	4.58	35.88	100	173	Peak
2437	94.85	-	-	94.02	32.06	4.61	35.84	100	173	Average
2437	98.88	-	-	98.05	32.06	4.61	35.84	100	173	Peak
2490	34.76	-19.24	54	33.83	32.1	4.64	35.81	100	173	Average
2490	47.87	-26.13	74	46.94	32.1	4.64	35.81	100	173	Peak
4874	50.2	-23.8	74	68.21	33.82	6.53	58.36	100	0	Peak



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2437 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	35.05	-4.95	40	46.11	19.8	0.7	31.56	100	59	Peak
128.01	23.17	-20.33	43.5	41.91	11.56	1.22	31.52	-	-	Peak
170.13	22.94	-20.56	43.5	43.63	9.5	1.36	31.55	-	-	Peak
475.7	34.87	-11.13	46	46.15	17.65	2.18	31.11	-	-	Peak
510	34.63	-11.37	46	45.23	18.2	2.25	31.05	-	-	Peak
612.2	30.02	-15.98	46	38.15	20.26	2.46	30.85	-	-	Peak
2350	34.93	-19.07	54	34.29	31.98	4.55	35.89	180	77	Average
2350	46.41	-27.59	74	45.77	31.98	4.55	35.89	180	77	Peak
2437	92.43	-	-	91.6	32.06	4.61	35.84	180	77	Average
2437	96.38	-	-	95.55	32.06	4.61	35.84	180	77	Peak
2500	33.78	-20.22	54	32.84	32.1	4.64	35.8	180	77	Average
2500	46.58	-27.42	74	45.64	32.1	4.64	35.8	180	77	Peak
4874	47.38	-26.62	74	65.39	33.82	6.53	58.36	100	0	Peak



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24	-16	40	35.06	19.8	0.7	31.56	-	-	Peak
85.35	22.52	-17.48	40	44.93	8.1	1.04	31.55	-	-	Peak
239.25	23.4	-22.6	46	41.89	11.4	1.62	31.51	-	-	Peak
475.7	31.74	-14.26	46	43.02	17.65	2.18	31.11	100	98	Peak
510	30.35	-15.65	46	40.95	18.2	2.25	31.05	-	-	Peak
612.2	28.88	-17.12	46	37.01	20.26	2.46	30.85	-	-	Peak
2382	45.56	-8.44	54	44.86	32	4.58	35.88	100	131	Average
2382	52.32	-21.68	74	51.62	32	4.58	35.88	100	131	Peak
2462	97.9	-	-	97.04	32.07	4.62	35.83	100	131	Average
2462	101.82	-	-	100.96	32.07	4.62	35.83	100	131	Peak
2483.5	41.47	-12.53	54	40.55	32.09	4.64	35.81	100	131	Average
2483.5	51.32	-22.68	74	50.4	32.09	4.64	35.81	100	131	Peak
7386	46.98	-27.02	74	60.59	35.6	8.55	57.76	100	0	Peak



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	34.62	-5.38	40	45.68	19.8	0.7	31.56	100	113	Peak
128.01	22.87	-20.63	43.5	41.61	11.56	1.22	31.52	-	-	Peak
227.91	23.08	-22.92	46	42.98	10.02	1.57	31.49	-	-	Peak
475.7	34.16	-11.84	46	45.44	17.65	2.18	31.11	-	-	Peak
510	34.88	-11.12	46	45.48	18.2	2.25	31.05	-	-	Peak
612.2	31.24	-14.76	46	39.37	20.26	2.46	30.85	-	-	Peak
2382	40.55	-13.45	54	39.85	32	4.58	35.88	184	81	Average
2382	49.85	-24.15	74	49.15	32	4.58	35.88	184	81	Peak
2462	94.41	-	-	93.55	32.07	4.62	35.83	184	81	Average
2462	98.47	-	-	97.61	32.07	4.62	35.83	184	81	Peak
2488.03	38.95	-15.05	54	38.02	32.1	4.64	35.81	184	81	Average
2488.03	50.01	-23.99	74	49.08	32.1	4.64	35.81	184	81	Peak
7386	49.05	-24.95	74	62.66	35.6	8.55	57.76	100	0	Peak



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	23.64	-16.36	40	34.7	19.8	0.7	31.56	-	-	Peak
204.96	24.02	-19.48	43.5	44.85	9.15	1.48	31.46	-	-	Peak
257.88	25.35	-20.65	46	41.52	13.64	1.68	31.49	-	-	Peak
475.7	34.91	-11.09	46	46.19	17.65	2.18	31.11	100	27	Peak
510	32.92	-13.08	46	43.52	18.2	2.25	31.05	-	-	Peak
612.2	31.49	-14.51	46	39.62	20.26	2.46	30.85	-	-	Peak
2387.14	37.87	-16.13	54	37.15	32.02	4.58	35.88	144	360	Average
2387.14	50	-24	74	49.28	32.02	4.58	35.88	144	360	Peak
2412	94.91	-	-	94.15	32.03	4.59	35.86	144	360	Average
2412	98.95	-	-	98.19	32.03	4.59	35.86	144	360	Peak
2490	36.49	-17.51	54	35.56	32.1	4.64	35.81	144	360	Average
2490	47.36	-26.64	74	46.43	32.1	4.64	35.81	144	360	Peak
4824	53.04	-0.96	54	71.16	33.83	6.51	58.46	112	358	Average
4824	55.28	-18.72	74	73.4	33.83	6.51	58.46	112	358	Peak
7236	47.47	-31.48	78.95	61.24	35.6	8.29	57.66	100	0	Peak



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	33.94	-6.06	40	45	19.8	0.7	31.56	100	42	Peak
115.05	27.2	-16.3	43.5	45.74	11.8	1.18	31.52	-	-	Peak
257.88	26.22	-19.78	46	42.39	13.64	1.68	31.49	-	-	Peak
475.7	32.99	-13.01	46	44.27	17.65	2.18	31.11	-	-	Peak
510	37.36	-8.64	46	47.96	18.2	2.25	31.05	-	-	Peak
612.2	32.23	-13.77	46	40.36	20.26	2.46	30.85	-	-	Peak
2388.66	36.67	-17.33	54	35.95	32.02	4.58	35.88	115	81	Average
2388.66	48.25	-25.75	74	47.53	32.02	4.58	35.88	115	81	Peak
2412	92.35	-	-	91.59	32.03	4.59	35.86	115	81	Average
2412	96.52	-	-	95.76	32.03	4.59	35.86	115	81	Peak
2486	34.99	-19.01	54	34.07	32.09	4.64	35.81	115	81	Average
2486	46.44	-27.56	74	45.52	32.09	4.64	35.81	115	81	Peak
4824	49.82	-4.18	54	67.94	33.83	6.51	58.46	100	316	Average
4824	52.32	-21.68	74	70.44	33.83	6.51	58.46	100	316	Peak
7236	45.54	-30.98	76.52	59.31	35.6	8.29	57.66	100	0	Peak



<b>Test Mode :</b>	Mode 5	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2412 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	23.56	-16.44	40	34.62	19.8	0.7	31.56	-	-	Peak
89.13	22.28	-21.22	43.5	44.18	8.58	1.06	31.54	-	-	Peak
170.13	23.88	-19.62	43.5	44.57	9.5	1.36	31.55	-	-	Peak
475.7	31.75	-14.25	46	43.03	17.65	2.18	31.11	100	91	Peak
510	31.54	-14.46	46	42.14	18.2	2.25	31.05	-	-	Peak
612.2	29.12	-16.88	46	37.25	20.26	2.46	30.85	-	-	Peak
2385.43	49.64	-4.36	54	48.94	32	4.58	35.88	103	169	Average
2385.43	68.39	-5.61	74	67.69	32	4.58	35.88	103	169	Peak
2412	91.71	-	-	90.95	32.03	4.59	35.86	103	169	Average
2412	102.5	-	-	101.74	32.03	4.59	35.86	103	169	Peak
2490	36.92	-17.08	54	35.99	32.1	4.64	35.81	103	169	Average
2490	49.02	-24.98	74	48.09	32.1	4.64	35.81	103	169	Peak
4824	40.72	-13.28	54	58.84	33.83	6.51	58.46	100	258	Average
4824	53.23	-20.77	74	71.35	33.83	6.51	58.46	100	258	Peak



<b>Test Mode :</b>	Mode 5	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2412 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	34.52	-5.48	40	45.58	19.8	0.7	31.56	100	7	Peak
128.01	23.09	-20.41	43.5	41.83	11.56	1.22	31.52	-	-	Peak
153.39	24.26	-19.24	43.5	43.45	11.02	1.29	31.5	-	-	Peak
475.7	35.13	-10.87	46	46.41	17.65	2.18	31.11	-	-	Peak
510	35.49	-10.51	46	46.09	18.2	2.25	31.05	-	-	Peak
612.2	30.05	-15.95	46	38.18	20.26	2.46	30.85	-	-	Peak
2389.8	43.32	-10.68	54	42.58	32.02	4.58	35.86	156	73	Average
2389.8	62.67	-11.33	74	61.93	32.02	4.58	35.86	156	73	Peak
2412	85.96	-	-	85.2	32.03	4.59	35.86	156	73	Average
2412	95.89	-	-	95.13	32.03	4.59	35.86	156	73	Peak
2486	35.11	-18.89	54	34.19	32.09	4.64	35.81	156	73	Average
2486	46.87	-27.13	74	45.95	32.09	4.64	35.81	156	73	Peak
4824	50.18	-23.82	74	68.29	33.83	6.52	58.46	100	0	Peak



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2437 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.03	-15.97	40	35.09	19.8	0.7	31.56	-	-	Peak
85.08	21.39	-18.61	40	43.8	8.1	1.04	31.55	-	-	Peak
170.13	22.76	-20.74	43.5	43.45	9.5	1.36	31.55	-	-	Peak
475.7	31.65	-14.35	46	42.93	17.65	2.18	31.11	100	68	Peak
510	30.86	-15.14	46	41.46	18.2	2.25	31.05	-	-	Peak
612.2	28.35	-17.65	46	36.48	20.26	2.46	30.85	-	-	Peak
2388	35.62	-18.38	54	34.9	32.02	4.58	35.88	103	173	Average
2388	47.17	-26.83	74	46.45	32.02	4.58	35.88	103	173	Peak
2437	90.58	-	-	89.75	32.06	4.61	35.84	103	173	Average
2437	102.43	-	-	101.6	32.06	4.61	35.84	103	173	Peak
2486	34.99	-19.01	54	34.07	32.09	4.64	35.81	103	173	Average
2486	46.17	-27.83	74	45.25	32.09	4.64	35.81	103	173	Peak
4874	47.59	-26.41	74	65.6	33.82	6.53	58.36	100	0	Peak



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2437 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	34.44	-5.56	40	45.5	19.8	0.7	31.56	100	14	Peak
127.74	23.75	-19.75	43.5	42.49	11.56	1.22	31.52	-	-	Peak
170.13	22.68	-20.82	43.5	43.37	9.5	1.36	31.55	-	-	Peak
475.7	34.46	-11.54	46	45.74	17.65	2.18	31.11	-	-	Peak
510	33.82	-12.18	46	44.42	18.2	2.25	31.05	-	-	Peak
612.2	30.65	-15.35	46	38.78	20.26	2.46	30.85	-	-	Peak
2384	35.06	-18.94	54	34.36	32	4.58	35.88	121	88	Average
2384	46.57	-27.43	74	45.87	32	4.58	35.88	121	88	Peak
2437	85.65	-	-	84.82	32.06	4.61	35.84	121	88	Average
2437	96.32	-	-	95.49	32.06	4.61	35.84	121	88	Peak
2484	34.88	-19.12	54	33.96	32.09	4.64	35.81	121	88	Average
2484	46.08	-27.92	74	45.16	32.09	4.64	35.81	121	88	Peak
4874	47.19	-26.81	74	65.2	33.82	6.53	58.36	100	0	Peak



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	23.29	-16.71	40	34.35	19.8	0.7	31.56	-	-	Peak
85.62	22.64	-17.36	40	45.05	8.1	1.04	31.55	-	-	Peak
149.34	23.58	-19.92	43.5	42.63	11.18	1.27	31.5	-	-	Peak
475.7	31.56	-14.44	46	42.84	17.65	2.18	31.11	-	-	Peak
510	32.88	-13.12	46	43.48	18.2	2.25	31.05	100	22	Peak
612.2	29.86	-16.14	46	37.99	20.26	2.46	30.85	-	-	Peak
2382	46.21	-7.79	54	45.51	32	4.58	35.88	100	172	Average
2382	57.37	-16.63	74	56.67	32	4.58	35.88	100	172	Peak
2462	92.59	-	-	91.73	32.07	4.62	35.83	100	172	Average
2462	103.54	-	-	102.68	32.07	4.62	35.83	100	172	Peak
2483.5	50.93	-3.07	54	50.01	32.09	4.64	35.81	100	172	Average
2483.5	73.31	-0.69	74	72.39	32.09	4.64	35.81	100	172	Peak
7386	48.16	-25.84	74	61.77	35.6	8.55	57.76	100	0	Peak



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	34.53	-5.47	40	45.59	19.8	0.7	31.56	100	97	Peak
128.55	24.95	-18.55	43.5	43.77	11.48	1.22	31.52	-	-	Peak
170.13	22.9	-20.6	43.5	43.59	9.5	1.36	31.55	-	-	Peak
475.7	34.52	-11.48	46	45.8	17.65	2.18	31.11	-	-	Peak
510	34.52	-11.48	46	45.12	18.2	2.25	31.05	-	-	Peak
612.2	31.1	-14.9	46	39.23	20.26	2.46	30.85	-	-	Peak
2382	39.94	-14.06	54	39.24	32	4.58	35.88	183	82	Average
2382	50.76	-23.24	74	50.06	32	4.58	35.88	183	82	Peak
2462	88.78	-	-	87.92	32.07	4.62	35.83	183	82	Average
2462	99.96	-	-	99.1	32.07	4.62	35.83	183	82	Peak
2483.66	48.36	-5.64	54	47.44	32.09	4.64	35.81	183	82	Average
2483.66	69.99	-4.01	74	69.07	32.09	4.64	35.81	183	82	Peak
7386	50.73	-23.27	74	64.34	35.6	8.55	57.76	100	0	Peak



<b>Test Mode :</b>	Mode 8	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2412 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.3	-15.7	40	35.36	19.8	0.7	31.56	-	-	Peak
85.08	22.48	-17.52	40	44.89	8.1	1.04	31.55	-	-	Peak
169.86	23.56	-19.94	43.5	44.25	9.5	1.36	31.55	-	-	Peak
475.7	32.72	-13.28	46	44	17.65	2.18	31.11	100	71	Peak
510	30.59	-15.41	46	41.19	18.2	2.25	31.05	-	-	Peak
612.2	28.45	-17.55	46	36.58	20.26	2.46	30.85	-	-	Peak
2389.61	51.49	-2.51	54	50.77	32.02	4.58	35.88	103	172	Average
2389.61	71.29	-2.71	74	70.57	32.02	4.58	35.88	103	172	Peak
2412	91.65	-	-	90.89	32.03	4.59	35.86	103	172	Average
2412	102.58	-	-	101.82	32.03	4.59	35.86	103	172	Peak
2490	37.44	-16.56	54	36.51	32.1	4.64	35.81	103	172	Average
2490	48.63	-25.37	74	47.7	32.1	4.64	35.81	103	172	Peak
4824	40.51	-13.49	54	58.63	33.83	6.51	58.46	100	260	Average
4824	54.24	-19.76	74	72.35	33.83	6.52	58.46	100	260	Peak



<b>Test Mode :</b>	Mode 8	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2412 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	34.45	-5.55	40	45.51	19.8	0.7	31.56	100	99	Peak
133.41	26	-17.5	43.5	44.88	11.4	1.24	31.52	-	-	Peak
170.13	22.05	-21.45	43.5	42.74	9.5	1.36	31.55	-	-	Peak
475.7	35.36	-10.64	46	46.64	17.65	2.18	31.11	-	-	Peak
510	34.11	-11.89	46	44.71	18.2	2.25	31.05	-	-	Peak
612.2	31.77	-14.23	46	39.9	20.26	2.46	30.85	-	-	Peak
2389.23	45.09	-8.91	54	44.37	32.02	4.58	35.88	157	77	Average
2389.23	64.02	-9.98	74	63.3	32.02	4.58	35.88	157	77	Peak
2412	86.27	-	-	85.51	32.03	4.59	35.86	157	77	Average
2412	95.9	-	-	95.14	32.03	4.59	35.86	157	77	Peak
2484	35.18	-18.82	54	34.26	32.09	4.64	35.81	157	77	Average
2484	46.37	-27.63	74	45.45	32.09	4.64	35.81	157	77	Peak
4824	50.52	-23.48	74	68.63	33.83	6.52	58.46	100	0	Peak



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2437 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	23.33	-16.67	40	34.39	19.8	0.7	31.56	-	-	Peak
85.35	22.43	-17.57	40	44.84	8.1	1.04	31.55	-	-	Peak
170.13	21.96	-21.54	43.5	42.65	9.5	1.36	31.55	-	-	Peak
475.7	31.54	-14.46	46	42.82	17.65	2.18	31.11	-	-	Peak
510	32.97	-13.03	46	43.57	18.2	2.25	31.05	100	91	Peak
612.2	28.76	-17.24	46	36.89	20.26	2.46	30.85	-	-	Peak
2388	35.23	-18.77	54	34.51	32.02	4.58	35.88	100	175	Average
2388	47.01	-26.99	74	46.29	32.02	4.58	35.88	100	175	Peak
2437	89.87	-	-	89.04	32.06	4.61	35.84	100	175	Average
2437	101.68	-	-	100.85	32.06	4.61	35.84	100	175	Peak
2484	35.03	-18.97	54	34.11	32.09	4.64	35.81	100	175	Average
2484	47.78	-26.22	74	46.86	32.09	4.64	35.81	100	175	Peak
4874	47.24	-26.76	74	65.25	33.82	6.53	58.36	100	0	Peak



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2437 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	35.31	-4.69	40	46.37	19.8	0.7	31.56	100	45	Peak
128.55	23.37	-20.13	43.5	42.19	11.48	1.22	31.52	-	-	Peak
170.13	23.05	-20.45	43.5	43.74	9.5	1.36	31.55	-	-	Peak
475.7	36.33	-9.67	46	47.61	17.65	2.18	31.11	-	-	Peak
510	33.54	-12.46	46	44.14	18.2	2.25	31.05	-	-	Peak
612.2	30.78	-15.22	46	38.91	20.26	2.46	30.85	-	-	Peak
2352	34.94	-19.06	54	34.29	31.99	4.55	35.89	145	72	Average
2352	47.4	-26.6	74	46.75	31.99	4.55	35.89	145	72	Peak
2437	87.47	-	-	86.64	32.06	4.61	35.84	145	72	Average
2437	97.77	-	-	96.94	32.06	4.61	35.84	145	72	Peak
2484	34.92	-19.08	54	34	32.09	4.64	35.81	145	72	Average
2484	46.14	-27.86	74	45.22	32.09	4.64	35.81	145	72	Peak
4874	47.1	-26.9	74	65.11	33.82	6.53	58.36	100	0	Peak



<b>Test Mode :</b>	Mode 10	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	23.43	-16.57	40	34.49	19.8	0.7	31.56	-	-	Peak
85.08	22.33	-17.67	40	44.74	8.1	1.04	31.55	-	-	Peak
170.13	23.41	-20.09	43.5	44.1	9.5	1.36	31.55	-	-	Peak
475.7	31.55	-14.45	46	42.83	17.65	2.18	31.11	100	63	Peak
510	30.52	-15.48	46	41.12	18.2	2.25	31.05	-	-	Peak
612.2	28.3	-17.7	46	36.43	20.26	2.46	30.85	-	-	Peak
2384	45.45	-8.55	54	44.75	32	4.58	35.88	100	172	Average
2384	56.51	-17.49	74	55.81	32	4.58	35.88	100	172	Peak
2462	92.25	-	-	91.39	32.07	4.62	35.83	100	172	Average
2462	101.68	-	-	100.82	32.07	4.62	35.83	100	172	Peak
2483.85	51.83	-2.17	54	50.91	32.09	4.64	35.81	100	172	Average
2483.85	71.94	-2.06	74	71.02	32.09	4.64	35.81	100	172	Peak
7386	47.06	-26.94	74	60.66	35.6	8.55	57.75	100	0	Peak



<b>Test Mode :</b>	Mode 10	<b>Temperature :</b>	23~24°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	46~47%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	34.27	-5.73	40	45.33	19.8	0.7	31.56	100	75	Peak
127.47	23.36	-20.14	43.5	42.02	11.64	1.22	31.52	-	-	Peak
170.13	22.08	-21.42	43.5	42.77	9.5	1.36	31.55	-	-	Peak
475.7	35.14	-10.86	46	46.42	17.65	2.18	31.11	-	-	Peak
510	35.53	-10.47	46	46.13	18.2	2.25	31.05	-	-	Peak
612.2	31.45	-14.55	46	39.58	20.26	2.46	30.85	-	-	Peak
2382	39.57	-14.43	54	38.87	32	4.58	35.88	184	81	Average
2382	51.05	-22.95	74	50.35	32	4.58	35.88	184	81	Peak
2462	89.28	-	-	88.42	32.07	4.62	35.83	184	81	Average
2462	99.34	-	-	98.48	32.07	4.62	35.83	184	81	Peak
2483.5	48.44	-5.56	54	47.52	32.09	4.64	35.81	184	81	Average
2483.5	68.47	-5.53	74	67.55	32.09	4.64	35.81	184	81	Peak
7386	50.98	-23.02	74	64.58	35.6	8.55	57.75	100	0	Peak



## **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	100055	9kHz~40GHz	Jun. 13, 2011	Feb. 21, 2012 ~ Mar. 01, 2012	Jun. 12, 2012	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	Mar. 30, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	Mar. 30, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	Mar. 30, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	Mar. 30, 2012	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117995	N/A	Jul. 28, 2011	Mar. 30, 2012	Jul. 27, 2012	Conduction (CO05-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	Mar. 30, 2012	N/A	Conduction (CO05-HY)
LTE Base Station	Anritsu	MT8820C	6201074414	N/A	Jan. 05, 2012	Mar. 30, 2012	Jan. 04, 2013	Conduction (CO05-HY)
Spectrum Analyzer	R&S	ESU26	100390	20Hz ~ 26.5GHz	Dec. 22, 2011	Mar. 03, 2012 ~ Mar. 15, 2012	Dec. 21, 2012	Radiation (03CH05-HY)
COM-POWER	COM-POWER	PA-103A	161075	10Hz~1000MHz Gain:32dB	Feb. 27, 2012	Mar. 03, 2012 ~ Mar. 15, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 2GHz	Oct. 22, 2011	Mar. 03, 2012 ~ Mar. 15, 2012	Oct. 21, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 ~ 360 degree	N/A	Mar. 03, 2012 ~ Mar. 15, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m ~ 4 m	N/A	Mar. 03, 2012 ~ Mar. 15, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz ~ 18GHz	Aug. 04, 2011	Mar. 03, 2012 ~ Mar. 15, 2012	Aug. 03, 2012	Radiation (03CH05-HY)
Pre Amplifier	COM-POWER	PA-103	161075	10Hz ~ 1000MHz Gain:32dB	Feb. 27, 2012	Mar. 03, 2012 ~ Mar. 15, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Pre Amplifier	EMCI	EMC05184 5	SN980048	1GHz~18GHz	Jul. 18, 2011	Mar. 03, 2012 ~ Mar. 15, 2012	Jul. 17, 2012	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz~26.5GHz	Aug. 30, 2011	Mar. 03, 2012 ~ Mar. 15, 2012	Aug. 29, 2012	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Mar. 03, 2012 ~ Mar. 15, 2012	Jul. 28, 2012	Radiation (03CH05-HY)

## 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>				



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP211844 as below.