

FCC RF Test Report

APPLICANT : D-Link Corporation
EQUIPMENT : Le Petit HSPA+ router
BRAND NAME : D-Link
MODEL NAME : DWR-710
FCC ID : KA2WR710A1
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Feb. 09, 2012 and completely tested on Mar. 17, 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 1st 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 18.50 dB at 1.694 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 10.68 dB at 2488.22 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

D-Link Corporation

No. 289, Sinhu 3rd Rd, Neihu District Taipei, City 114 Taiwan

1.2 Manufacturer

AzureWave Technologies, Inc.

8F., No. 94, Baozhong Rd., Xindian, Taipei Taiwan 231

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Le Petit HSPA+ router
Brand Name	D-Link
Model Name	DWR-710
FCC ID	KA2WR710A1
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 11.98 dBm (0.0158 W) 802.11g : 15.41 dBm (0.0348 W) 802.11g/n (BW 20MHz) : 15.72 dBm (0.0373 W) 802.11g/n (BW 40MHz) : 15.64 dBm (0.0366 W)
Duty Cycle	802.11b : 100.00% 802.11g : 100.00% 802.11g/n (BW 20MHz) : 100.00% 802.11g/n (BW 40MHz) : 100.00%
Antenna Type	Chip Antenna with gain 1.00 dBi
HW Version	A1
SW Version	v1.00
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

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

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH07-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.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	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), 11g/n (BW 40MHz) 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)	11.98	11.91	11.64	11.58

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)	15.41	15.31	15.39	15.36	15.38	15.31	15.36	15.30

2.4GHz 802.11g/n (BW 20MHz) mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	15.72	15.69	15.65	15.57	15.67	15.40	15.38	15.29

2.4GHz 802.11g/n (BW 40MHz) mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	15.64	15.47	15.40	15.56	15.61	15.31	15.58	15.45

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	11.98	11.86	11.96	15.41	15.17	15.12

Band	2.4GHz 802.11g/n (BW 20MHz) RF Peak Power (dBm)		
Channel	1	6	11
Frequency (MHz)	2412	2437	2462
Peak Power	15.72	15.59	15.51

Band	2.4GHz 802.11g/n (BW 40MHz) RF Peak Power (dBm)		
Channel	3	6	09
Frequency (MHz)	2422	2437	2452
Peak Power	15.53	15.64	15.04

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), MCS0 for 802.11g/n (BW 40MHz) 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	9.59	9.47	9.49	9.44	9.28	9.29

Band	2.4GHz 802.11g/n (BW 20MHz) RF Peak Power (dBm)		
Channel	1	6	11
Frequency (MHz)	2412	2437	2462
Average Power	9.49	9.22	9.24

Band	2.4GHz 802.11g/n (BW 40MHz) RF Peak Power (dBm)		
Channel	3	6	09
Frequency (MHz)	2422	2437	2452
Average Power	9.61	9.75	9.23

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

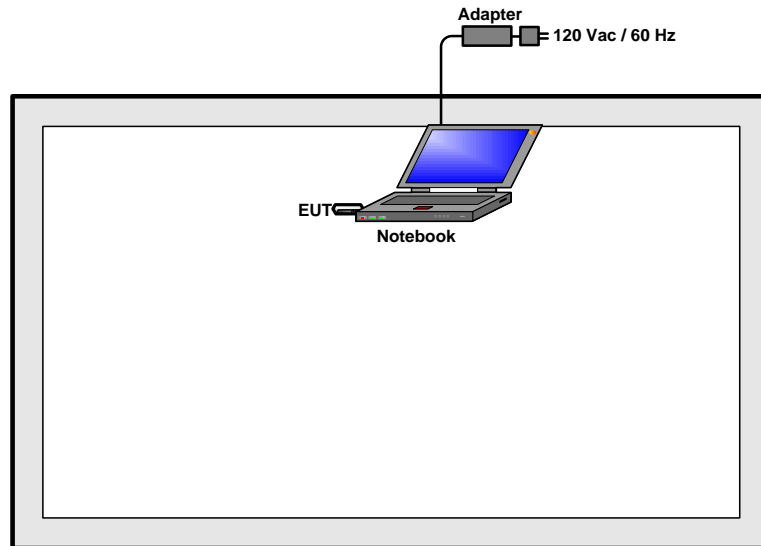
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 KHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic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

Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

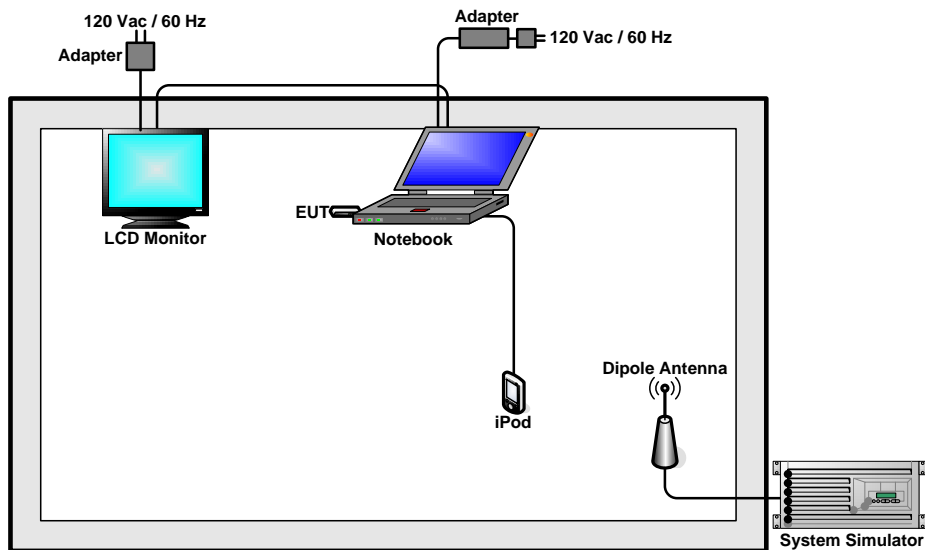
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11g/n (BW 20M)_CH01_2412 MHz Mode 8: 802.11g/n (BW 20M)_CH06_2437 MHz Mode 9: 802.11g/n (BW 20M)_CH11_2462 MHz Mode 10: 802.11g/n (BW 40M)_CH03_2422 MHz Mode 11: 802.11g/n (BW 40M)_CH06_2437 MHz Mode 12: 802.11g/n (BW 40M)_CH09_2452 MHz
Radiated TCs	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 Mode 10: 802.11g/n (BW 40M)_CH03_2422 MHz Mode 11: 802.11g/n (BW 40M)_CH06_2437 MHz Mode 12: 802.11g/n (BW 40M)_CH09_2452 MHz Mode 13: 802.11g/n (BW 40M)_CH09_2452 MHz Mode 14: 802.11g/n (BW 40M)_CH09_2452 MHz Mode 15: 802.11g/n (BW 40M)_CH09_2452 MHz
AC Conducted Emission	Mode 1 : WCDMA Band IV Idle + WLAN Link + USB Cable (Charging from Notebook)	

2.5 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.6 RF Utility

The programmed RF utility set up Driver, and the EUT can recognizable to comport → turn on command → enter Tx Tool 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



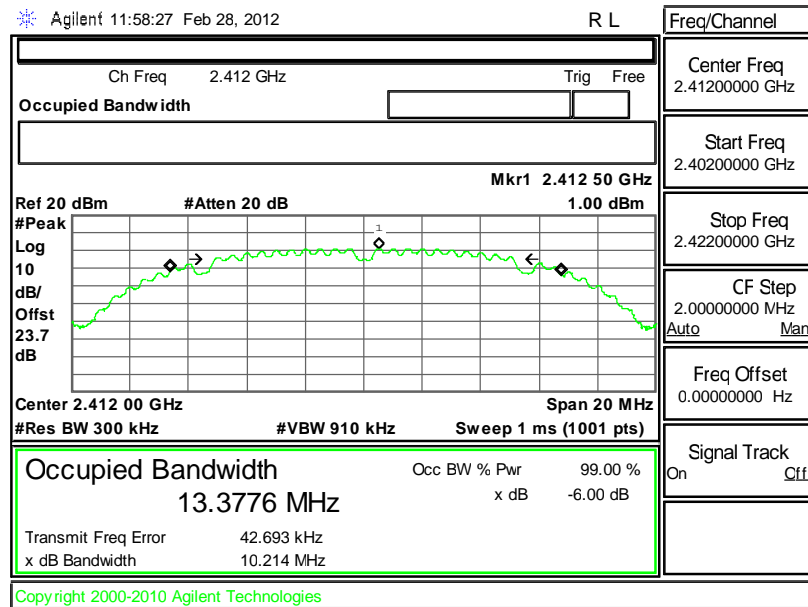


3.1.5 Test Result of 6dB Bandwidth

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

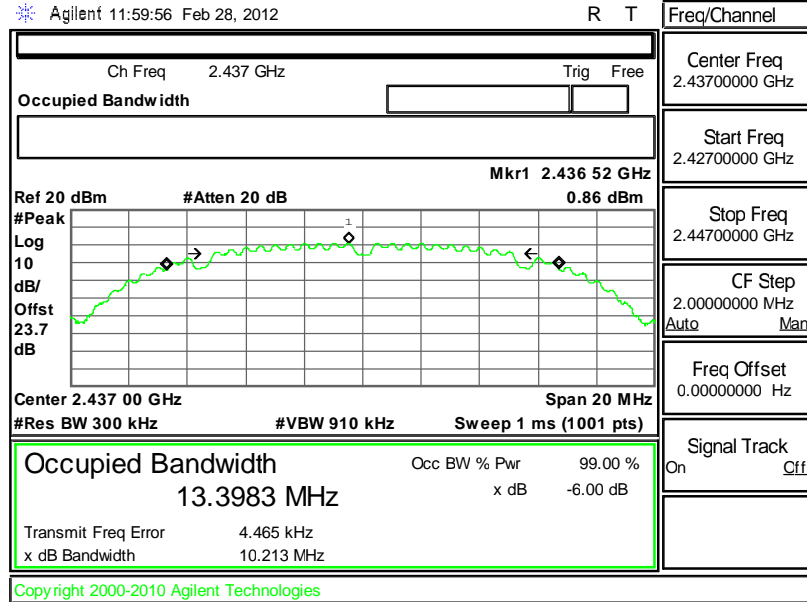
Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	10.214	0.5	Pass
06	2437	10.213	0.5	Pass
11	2462	10.220	0.5	Pass

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

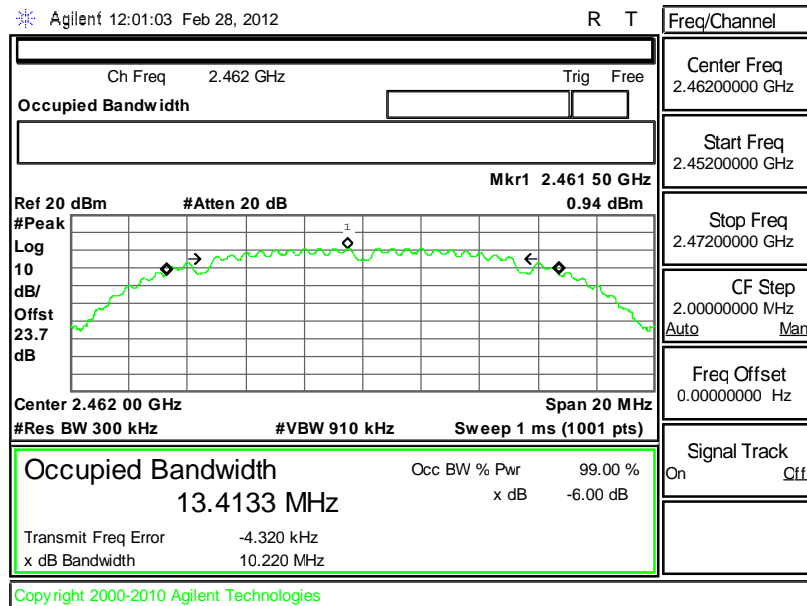




Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



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

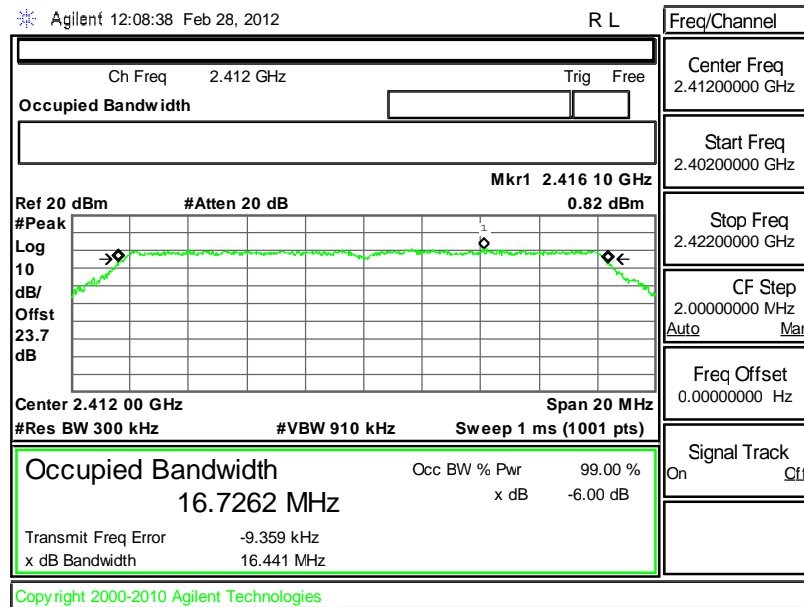




Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

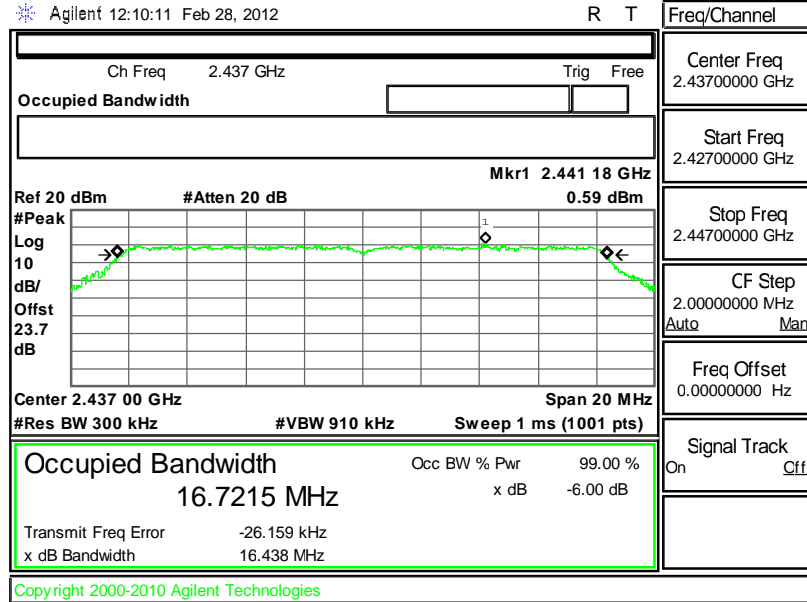
Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.441	0.5	Pass
06	2437	16.438	0.5	Pass
11	2462	16.473	0.5	Pass

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

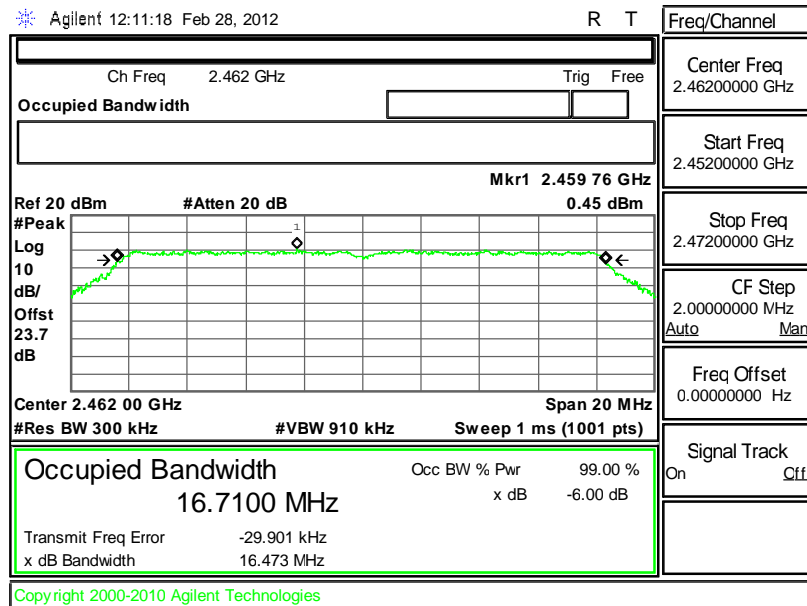




Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



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



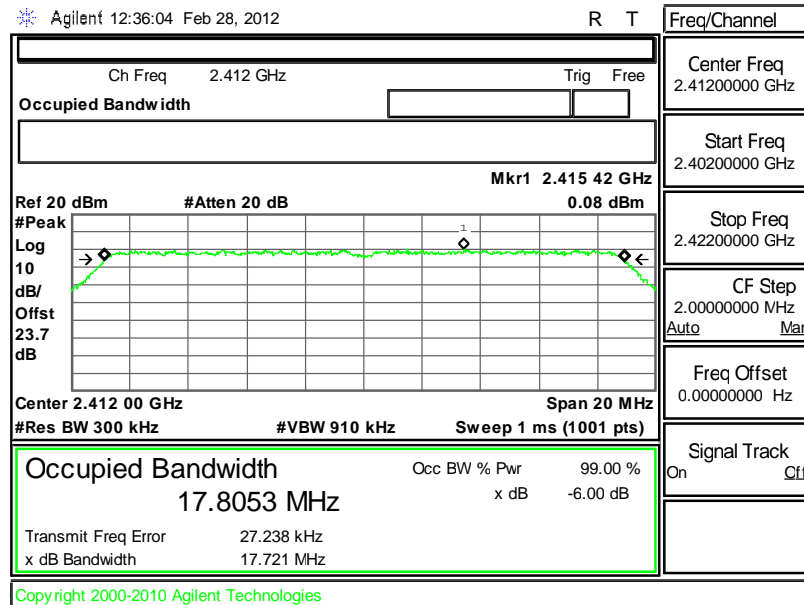


Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g/n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	17.721	0.5	Pass
06	2437	17.728	0.5	Pass
11	2462	17.715	0.5	Pass

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

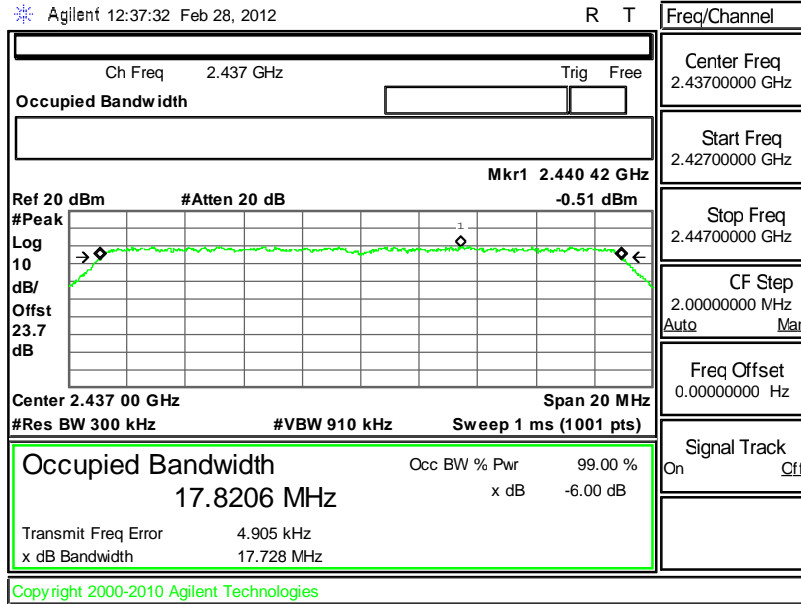
01





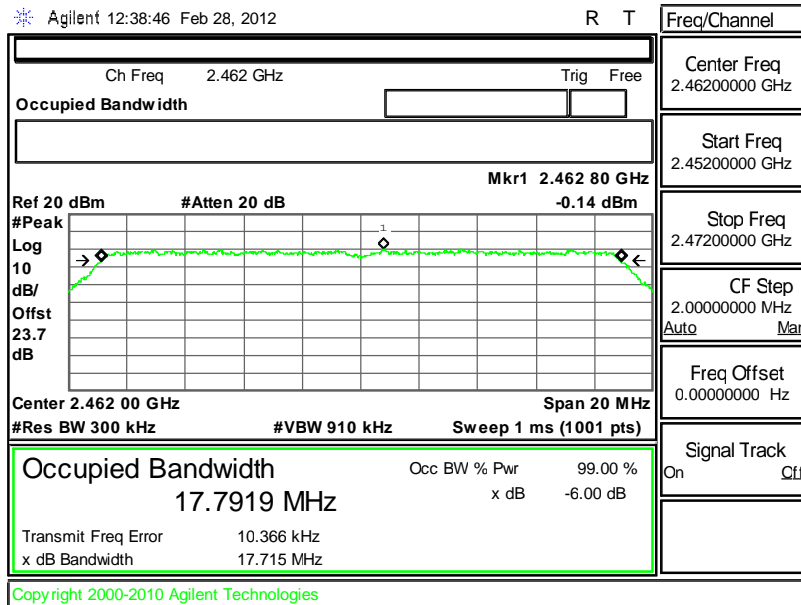
Mode 8 : 6 dB Bandwidth Plot on 802.11g/n(BW 20MHz) Channel

06



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

11



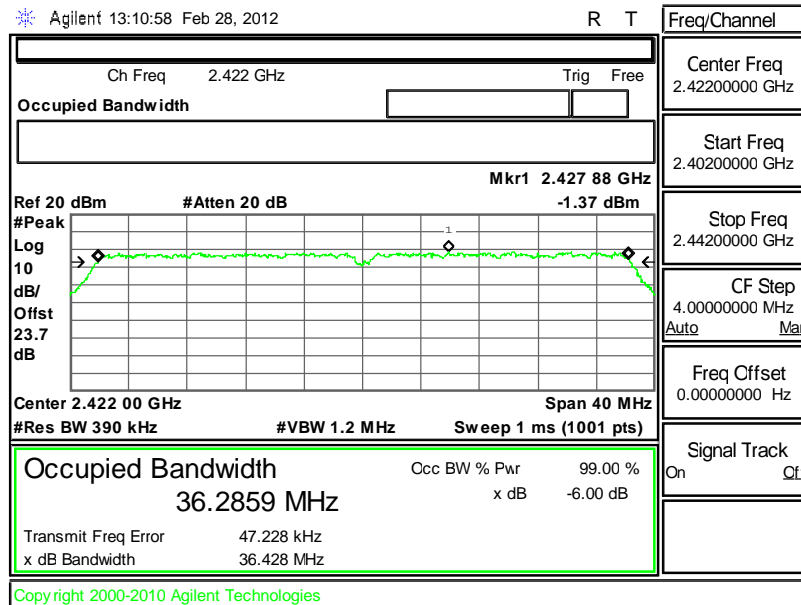


Test Mode :	Mode 10, 11, 12	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g/n (BW 40MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
03	2422	36.428	0.5	Pass
06	2437	36.609	0.5	Pass
09	2452	36.504	0.5	Pass

Mode 10 : 6 dB Bandwidth Plot on 802.11g/n(BW 40MHz) Channel

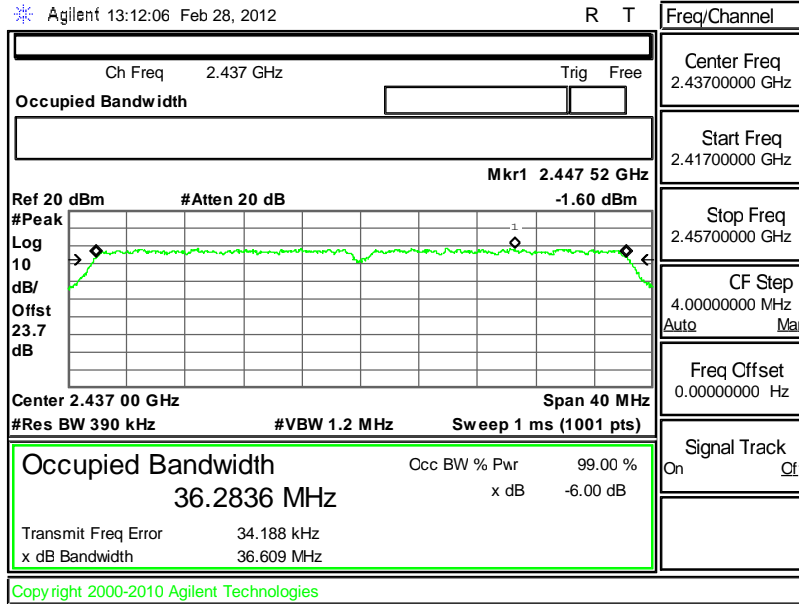
03





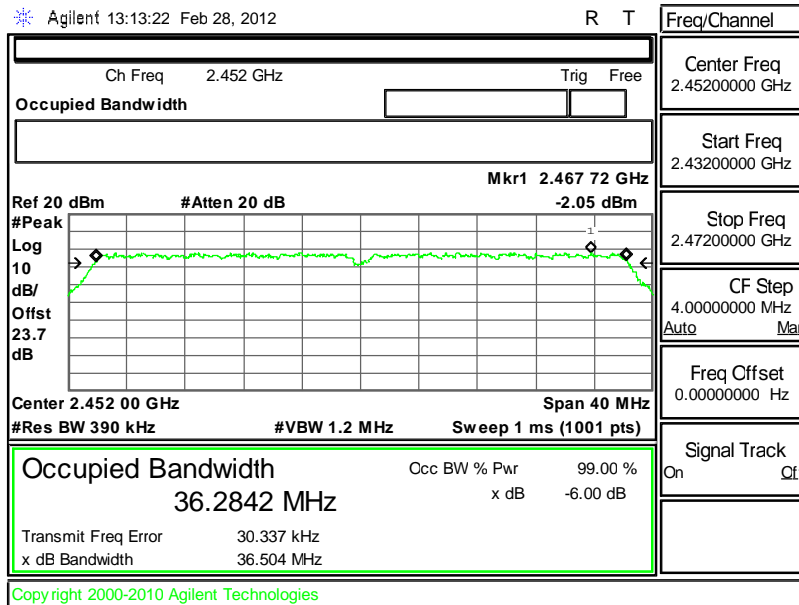
Mode 11 : 6 dB Bandwidth Plot on 802.11g/n(BW 40MHz) Channel

06



Mode 12 : 6 dB Bandwidth Plot on 802.11g/n(BW 40MHz) Channel

09



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.

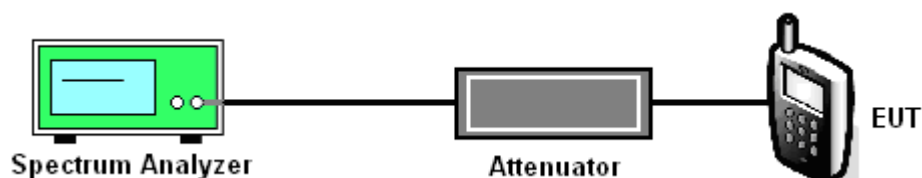
3.2.2 Measuring Instruments

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



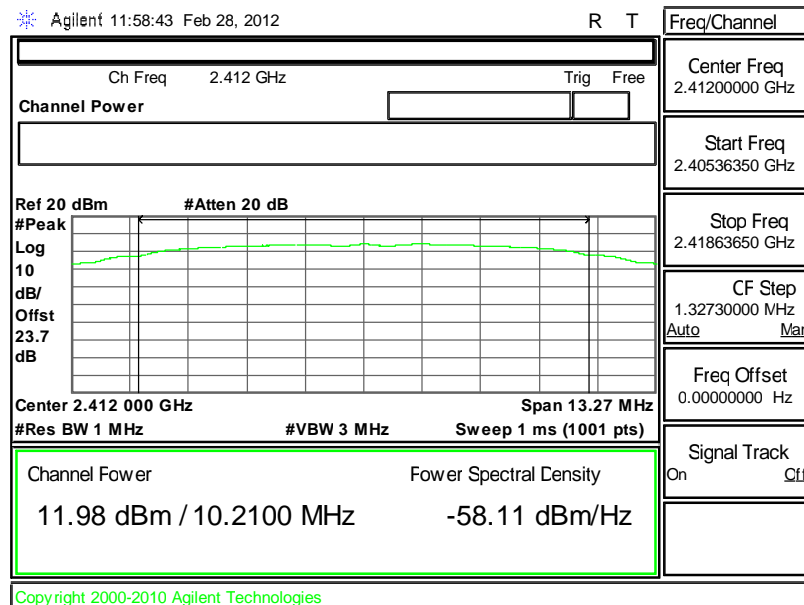


3.2.5 Test Result of Output Power

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

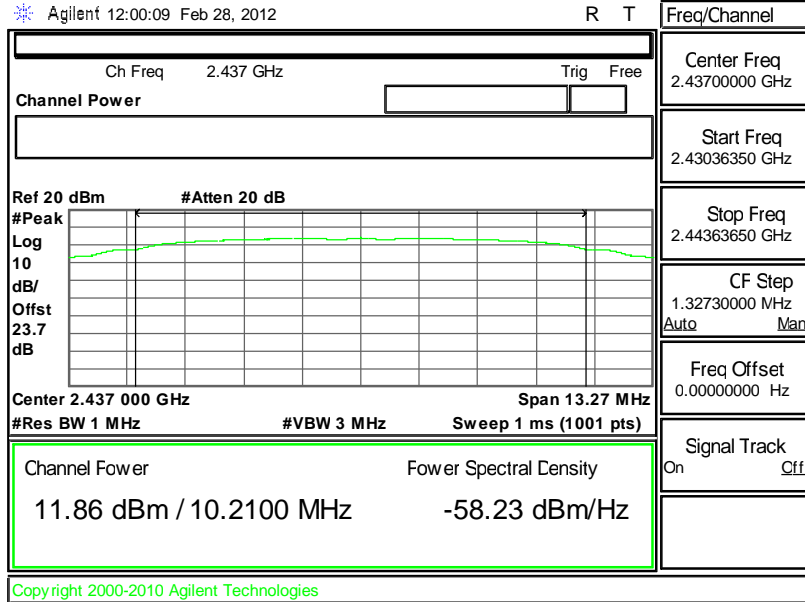
Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	11.98	30	Pass
06	2437	11.86	30	Pass
11	2462	11.96	30	Pass

Mode 1 : Output Power Plot on 802.11b Channel 01

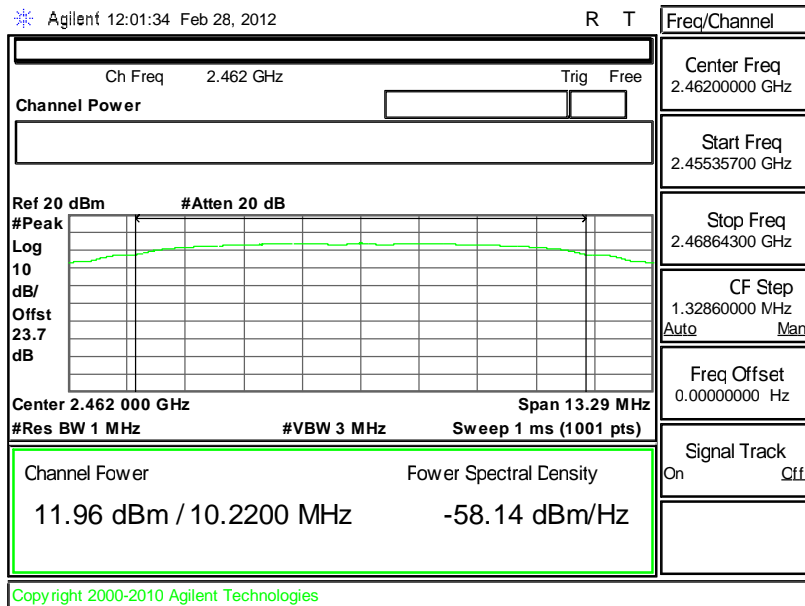




Mode 2 : Output Power Plot on 802.11b Channel 06



Mode 3 : Output Power Plot on 802.11b Channel 11

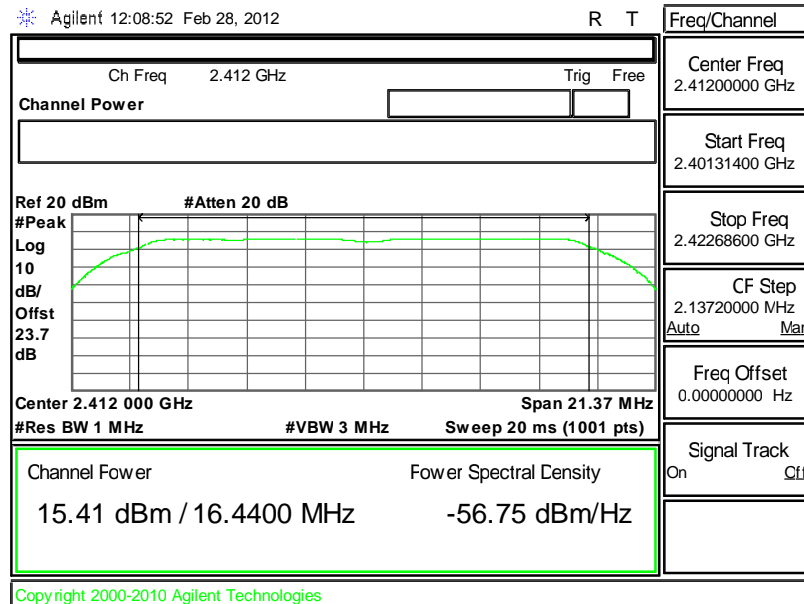




Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

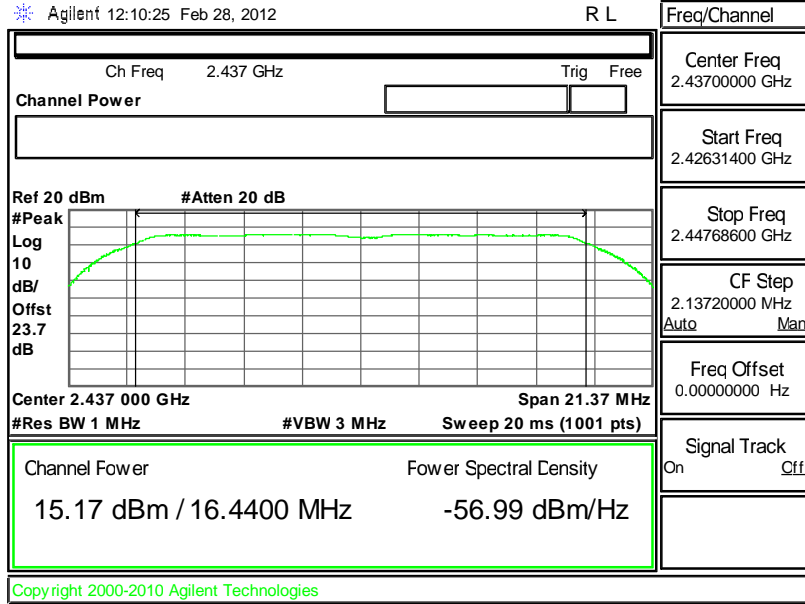
Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	15.41	30	Pass
06	2437	15.17	30	Pass
11	2462	15.12	30	Pass

Mode 4 : Output Power Plot on 802.11g Channel 01

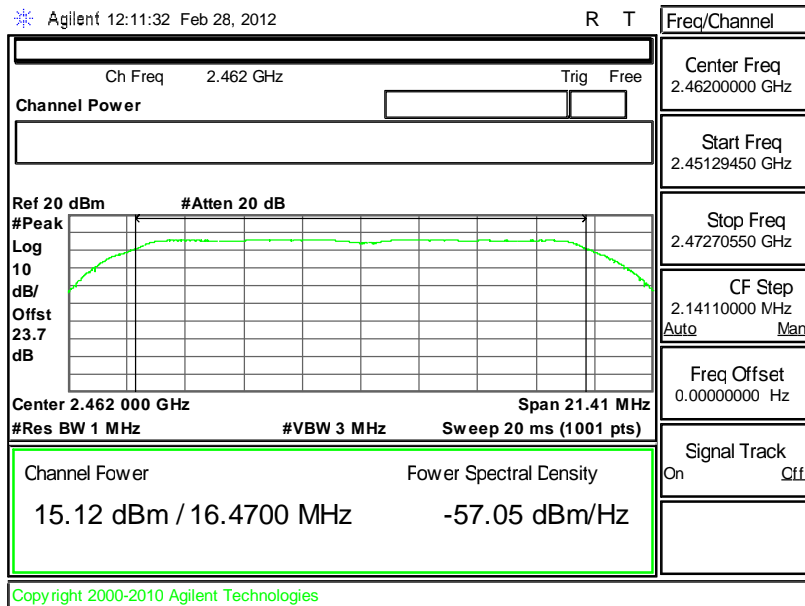




Mode 5 : Output Power Plot on 802.11g Channel 06



Mode 6 : Output Power Plot on 802.11g Channel 11

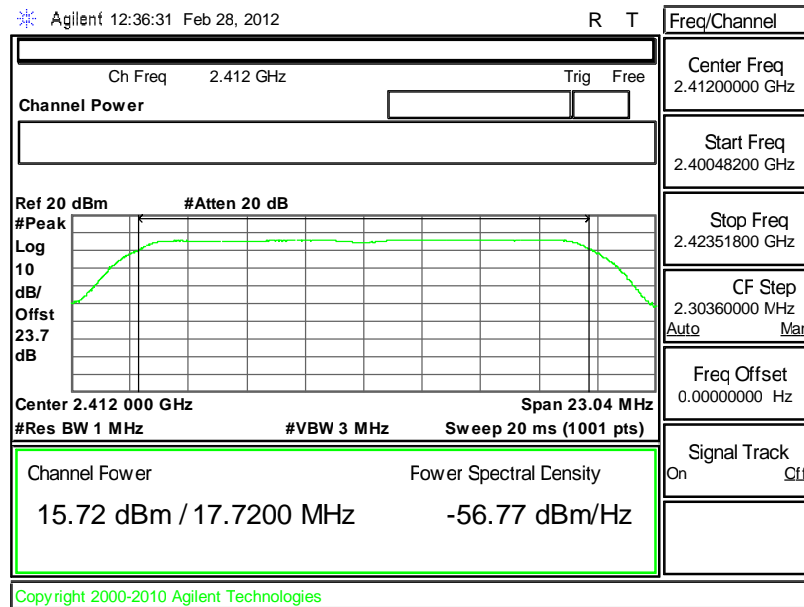




Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

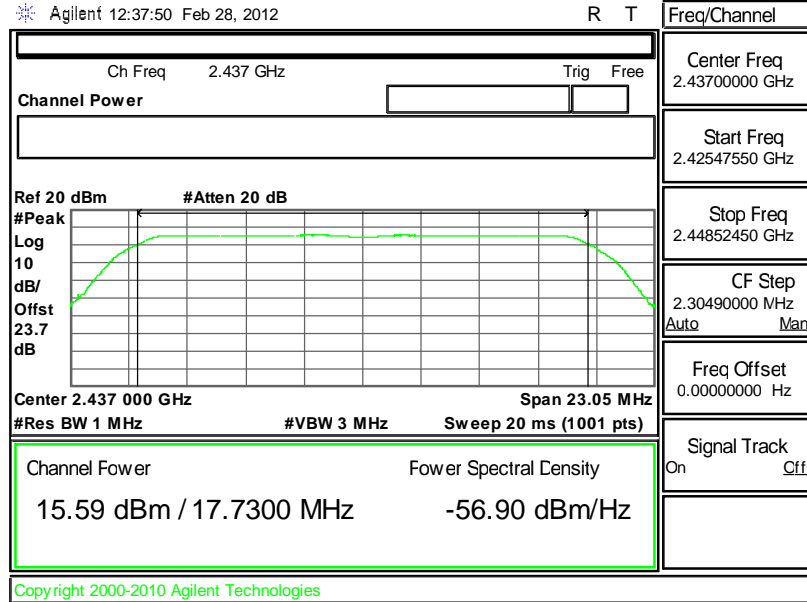
Channel	Frequency (MHz)	802.11g/n (BW 20MHz) Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	15.72	30	Pass
06	2437	15.59	30	Pass
11	2462	15.51	30	Pass

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

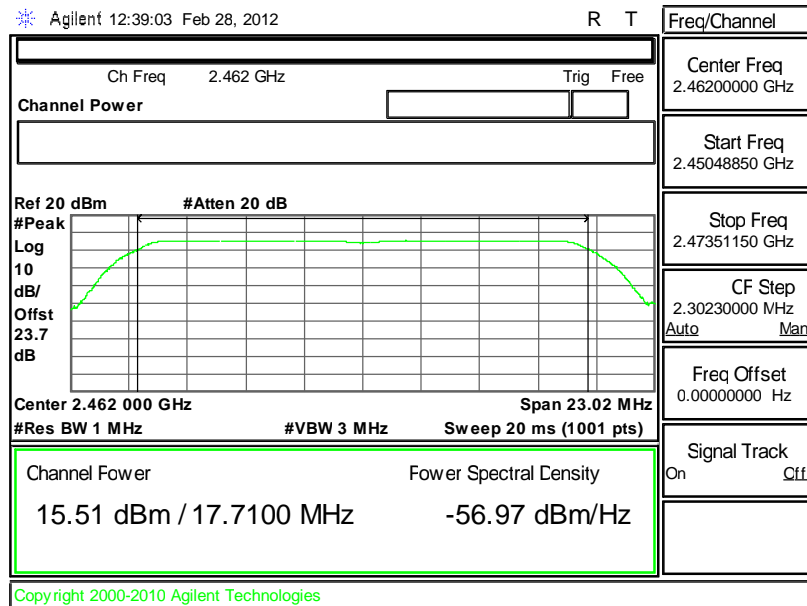




Mode 8 : Output Power Plot on 802.11g/n (BW 20MHz) Channel 06



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



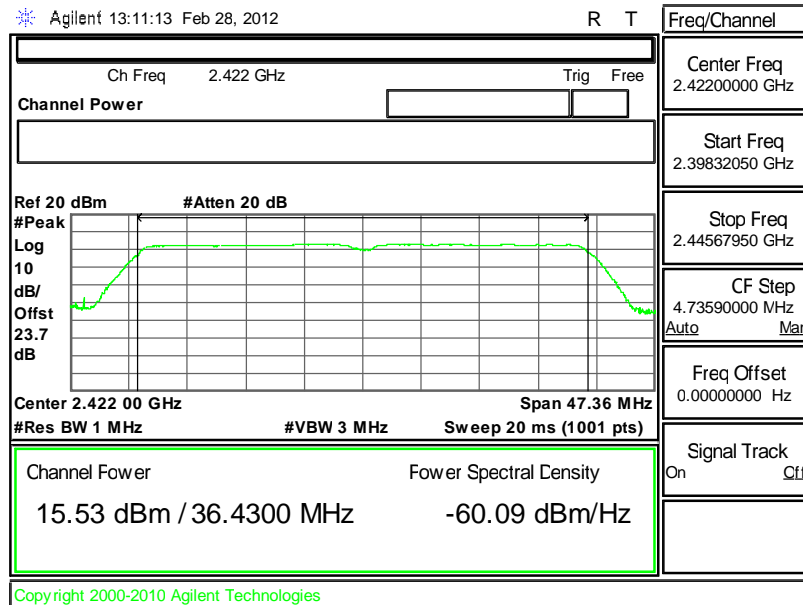


Test Mode :	Mode 10, 11, 12	Temperature :	24~26
Test Engineer :	Reece Li	Relative Humidity :	50~53

Channel	Frequency (MHz)	802.11g/n (BW 40MHz) Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
03	2422	15.53	30	Pass
06	2437	15.64	30	Pass
09	2452	15.04	30	Pass

Mode 10: Output Power Plot on 802.11g/n (BW 40MHz) channel

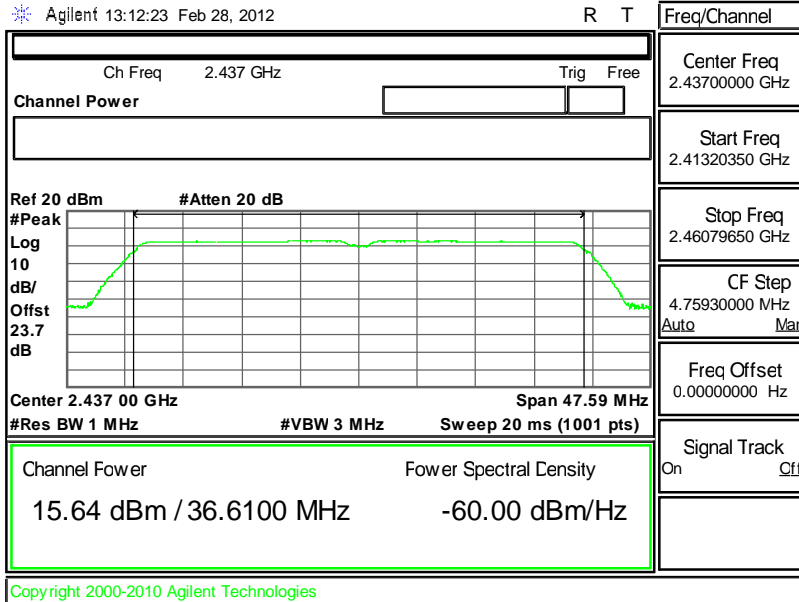
03





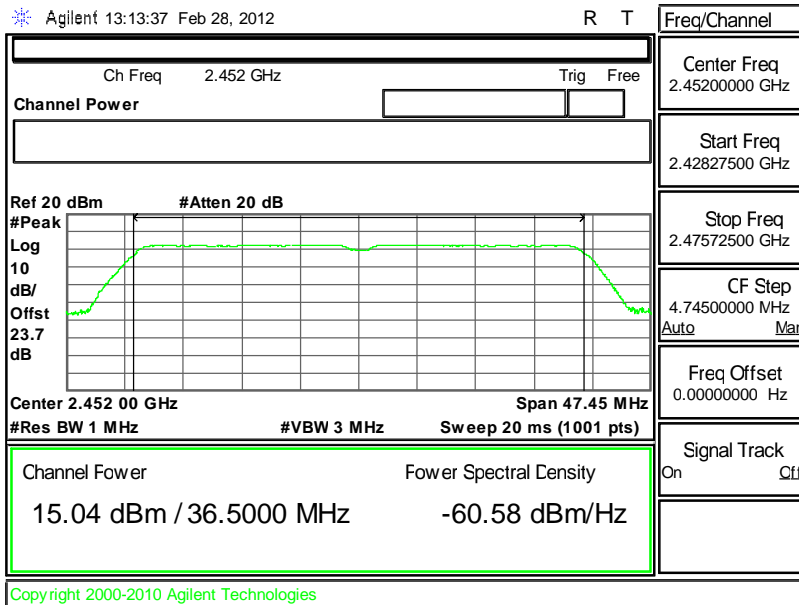
Mode 11: Output Power Plot on 802.11g/n (BW 40MHz) channel

06



Mode 12: Output Power Plot on 802.11g/n (BW 40MHz) channel

09



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

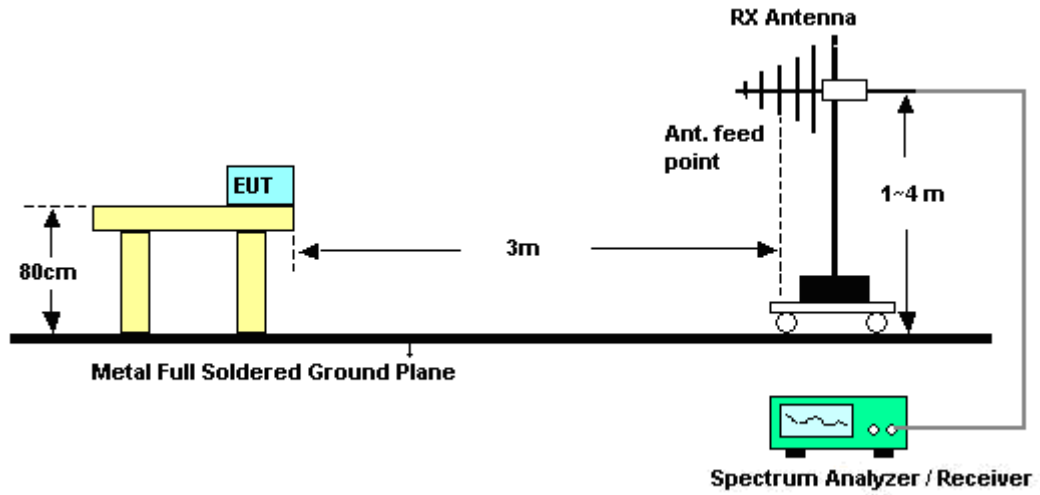
See list of measuring instruments of this test report.

3.3.3 Test Procedures

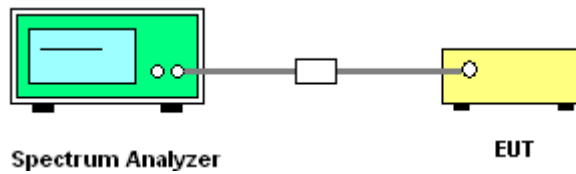
1. The testing follows the guidelines in ANSI C63.4-2003 and the Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01.
2. Conducted emission test: Set RBW = 100 KHz, Video bandwidth (VBW) \geq RBW. Out of the authorized frequency band emissions must be at least 20 dB lower 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 :	21~24°C
Test Band :	802.11b	Relative Humidity :	58~60%
Test Channel :	01	Test Engineer :	Kyle Jhuang

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
2377.26	49.4	-24.6	74	45.33	32.03	5.99	33.95	116	167	Peak
2377.26	37.11	-16.89	54	33.04	32.03	5.99	33.95	116	167	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
2361.49	44.76	-29.24	74	40.71	32.01	5.99	33.95	138	231	Peak
2361.49	32.88	-21.12	54	28.83	32.01	5.99	33.95	138	231	Average

Test Mode :	Mode 3	Temperature :	21~24°C
Test Band :	802.11b	Relative Humidity :	58~60%
Test Channel :	11	Test Engineer :	Kyle Jhuang

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
2490.5	46.57	-27.43	74	42.19	32.2	6.18	34	110	181	Peak
2490.5	32.69	-21.31	54	28.31	32.2	6.18	34	110	181	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	45.11	-28.89	74	40.75	32.18	6.18	34	177	204	Peak
2483.5	32.4	-21.6	54	28.04	32.18	6.18	34	177	204	Average



Test Mode :	Mode 4	Temperature :	21~24°C
Test Band :	802.11g	Relative Humidity :	58~60%
Test Channel :	01	Test Engineer :	Kyle Jhuang

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
2388.66	54.9	-19.1	74	50.77	32.06	6.03	33.96	117	168	Peak
2388.66	36.3	-17.7	54	32.17	32.06	6.03	33.96	117	168	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	53.74	-20.26	74	49.61	32.06	6.03	33.96	170	236	Peak
2388.66	35.77	-18.23	54	31.64	32.06	6.03	33.96	170	236	Average

Test Mode :	Mode 6	Temperature :	21~24°C
Test Band :	802.11g	Relative Humidity :	58~60%
Test Channel :	11	Test Engineer :	Kyle Jhuang

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	59.26	-14.74	74	54.9	32.18	6.18	34	109	180	Peak
2483.5	38.3	-15.7	54	33.94	32.18	6.18	34	109	180	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	57.06	-16.94	74	52.7	32.18	6.18	34	175	203	Peak
2483.5	37.04	-16.96	54	32.68	32.18	6.18	34	175	203	Average



Test Mode :	Mode 7	Temperature :	21~24°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	58~60%
Test Channel :	01	Test Engineer :	Kyle Jhuang

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
2389.99	55.3	-18.7	74	51.17	32.06	6.03	33.96	117	167	Peak
2389.99	37.89	-16.11	54	33.76	32.06	6.03	33.96	117	167	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
2389.99	54.41	-19.59	74	50.28	32.06	6.03	33.96	169	239	Peak
2389.99	37.23	-16.77	54	33.1	32.06	6.03	33.96	169	239	Average

Test Mode :	Mode 9	Temperature :	21~24°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	58~60%
Test Channel :	11	Test Engineer :	Kyle Jhuang

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
2485.18	62.28	-11.72	74	57.92	32.18	6.18	34	109	181	Peak
2485.18	39.16	-14.84	54	34.8	32.18	6.18	34	109	181	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
2485.18	60.72	-13.28	74	56.36	32.18	6.18	34	175	203	Peak
2485.18	38.64	-15.36	54	34.28	32.18	6.18	34	175	203	Average



Test Mode :	Mode 10	Temperature :	21~24°C
Test Band :	802.11g/n (BW 40MHz)	Relative Humidity :	58~60%
Test Channel :	03	Test Engineer :	Kyle Jhuang

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	52.96	-21.04	74	48.83	32.06	6.03	33.96	182	164	Peak
2389.42	40.32	-13.68	54	36.19	32.06	6.03	33.96	182	164	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	51.11	-22.89	74	46.98	32.06	6.03	33.96	166	242	Peak
2389.61	37.91	-16.09	54	33.78	32.06	6.03	33.96	166	242	Average

Test Mode :	Mode 12	Temperature :	21~24°C
Test Band :	802.11g/n (BW 40MHz)	Relative Humidity :	58~60%
Test Channel :	09	Test Engineer :	Kyle Jhuang

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
2488.22	63	-11	74	58.62	32.2	6.18	34	109	177	Peak
2488.22	43.32	-10.68	54	38.94	32.2	6.18	34	109	177	Average

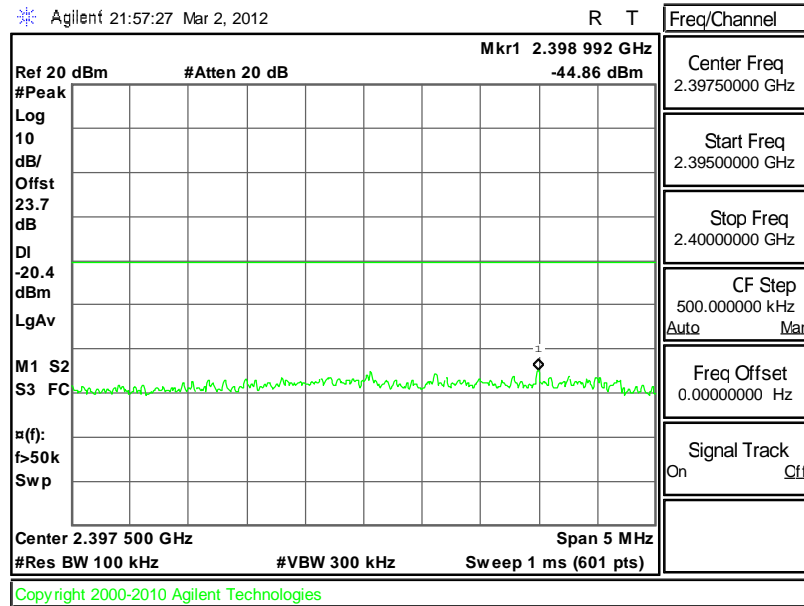
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2488.22	59.85	-14.15	74	55.47	32.2	6.18	34	174	222	Peak
2488.22	40.42	-13.58	54	36.04	32.2	6.18	34	174	222	Average



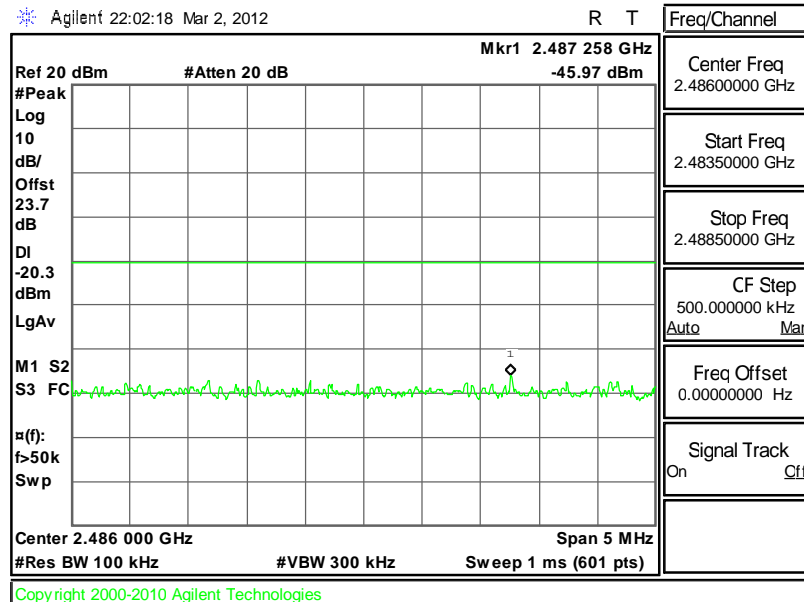
3.3.6 Test Plots of Conducted Band Edges

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 :	Reece Li

Low Band Edge Plot on 802.11b Channel 01



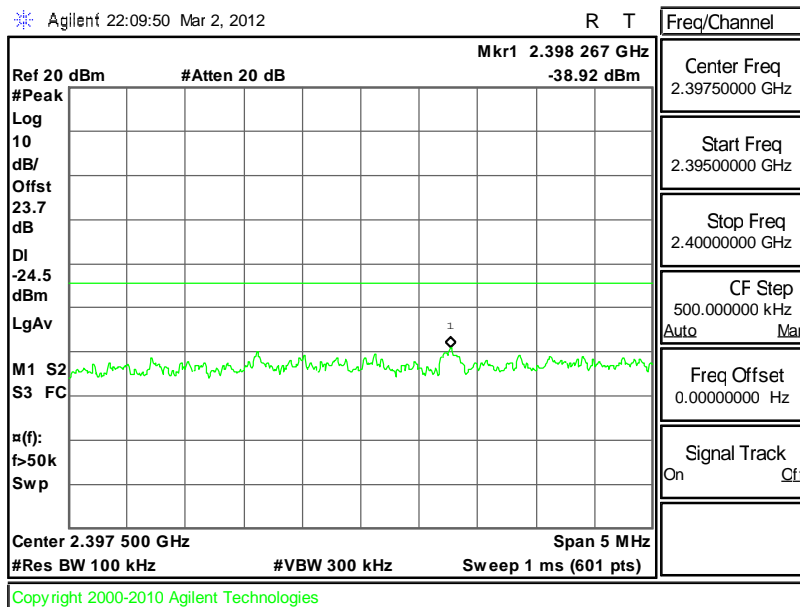
High Band Edge Plot on 802.11b Channel 11



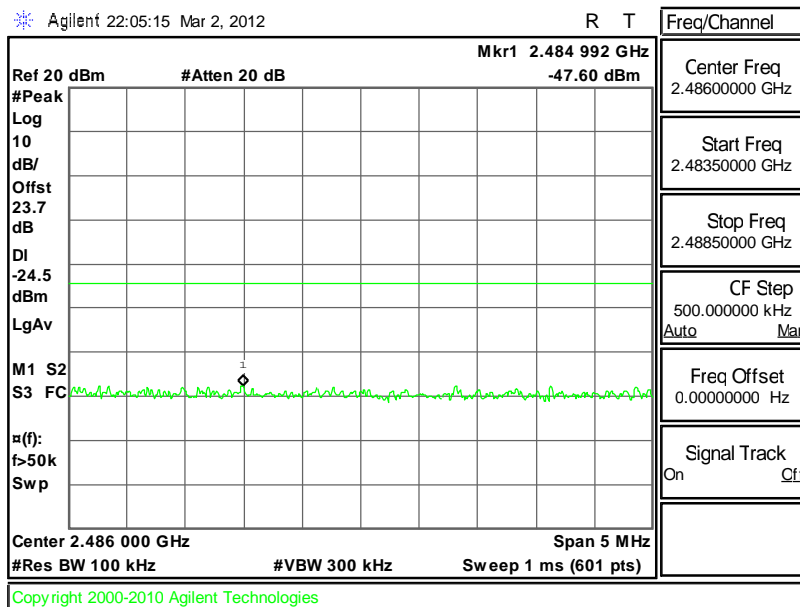


Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Reece Li

Low Band Edge Plot on 802.11g Channel 01



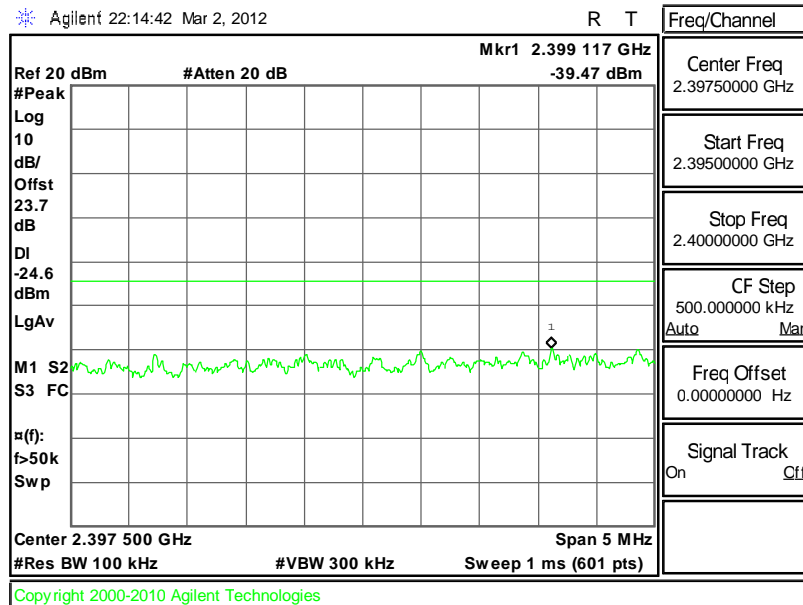
High Band Edge Plot on 802.11g Channel 11



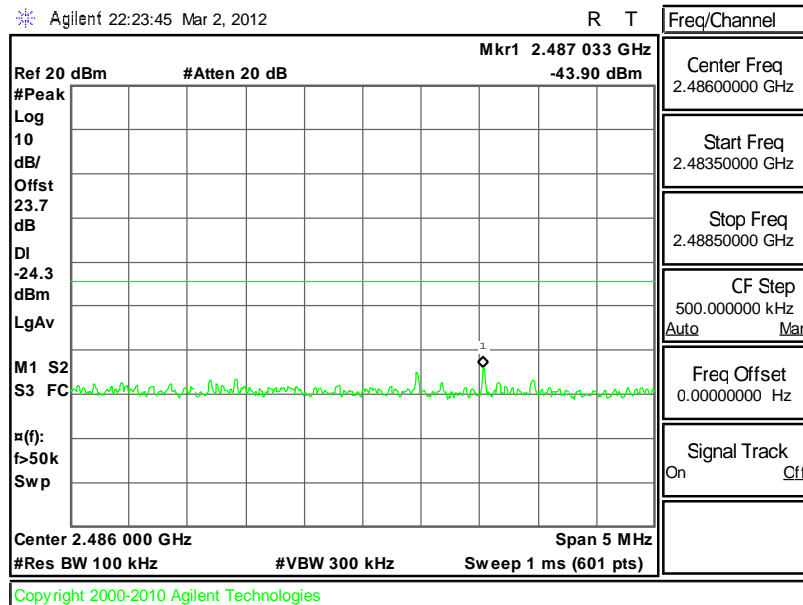


Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Reece Li

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



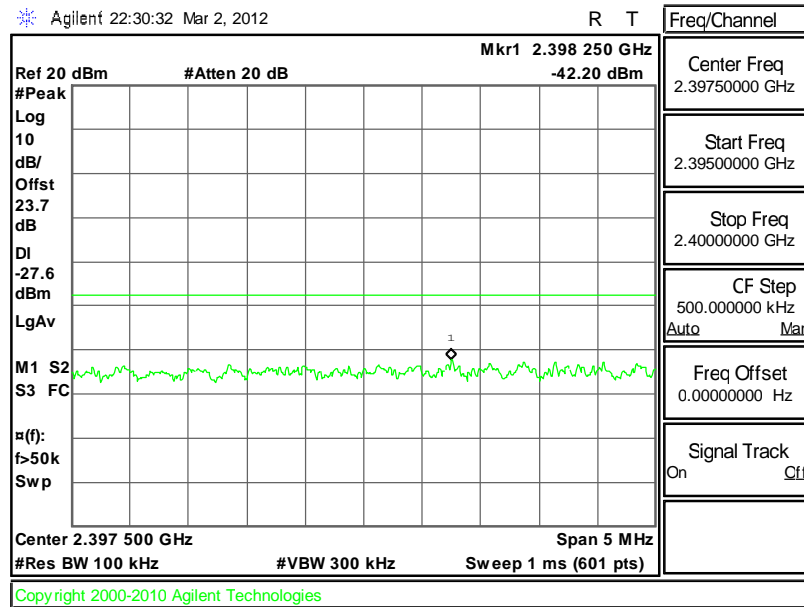
High Band Edge Plot on 802.11g/n (BW 20MHz) Channel 11



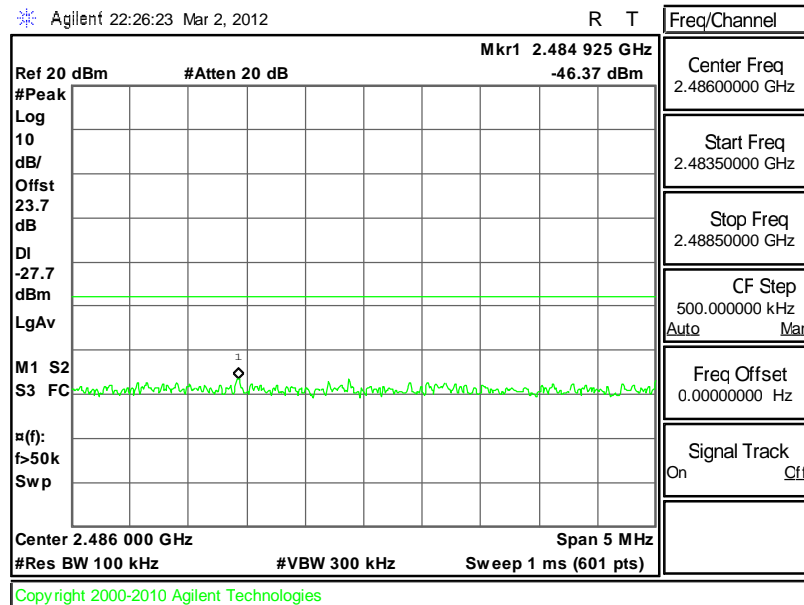


Test Mode :	Mode 10 and 12	Temperature :	24~26°C
Test Band :	802.11g/n (BW 40MHz)	Relative Humidity :	50~53%
Test Channel :	03 and 09	Test Engineer :	Reece Li

Low Band Edge Plot on 802.11g/n (BW 40MHz) Channel 03



High Band Edge Plot on 802.11g/n (BW 40MHz) Channel 09



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.

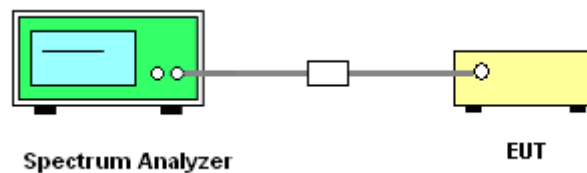
3.4.2 Measuring Instruments

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

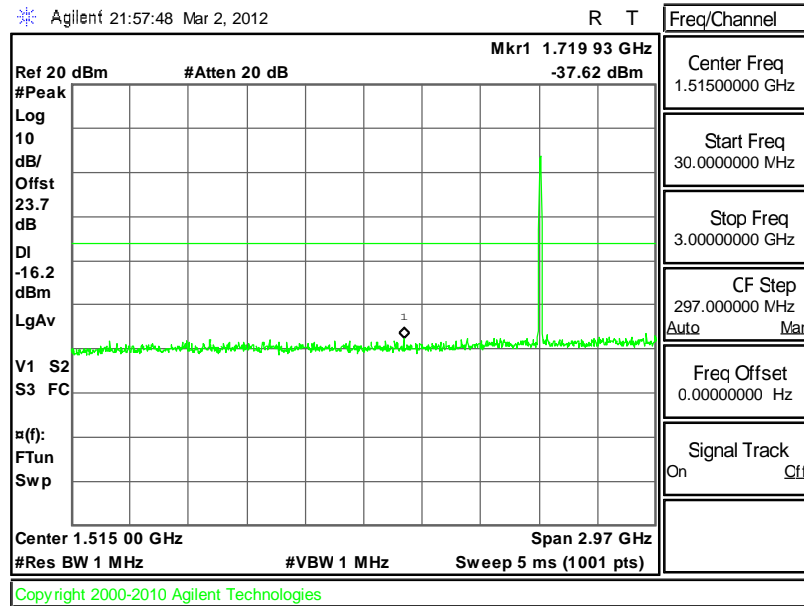




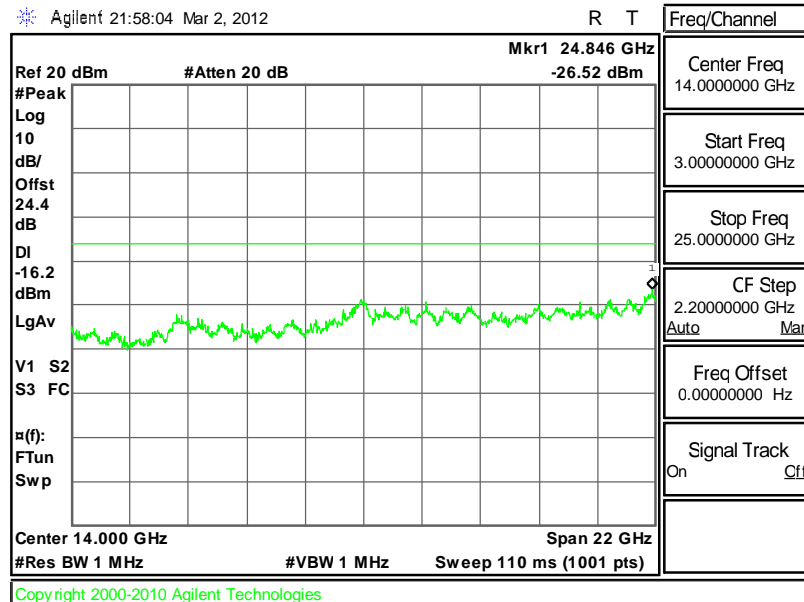
3.4.5 Test Plots of Spurious Emission

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

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



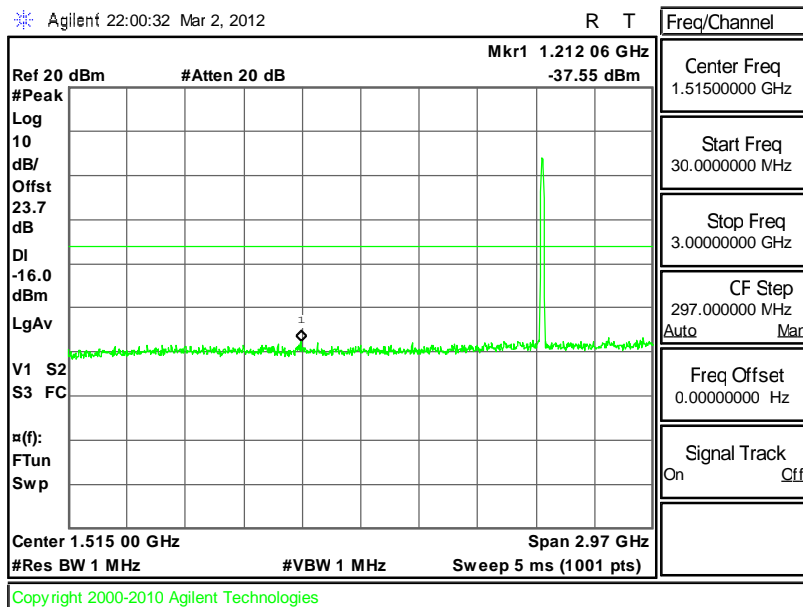
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



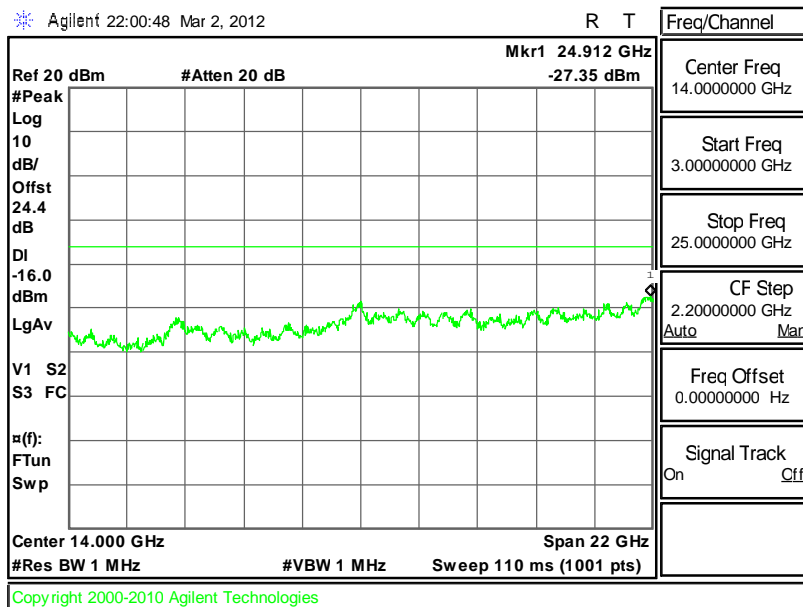


Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



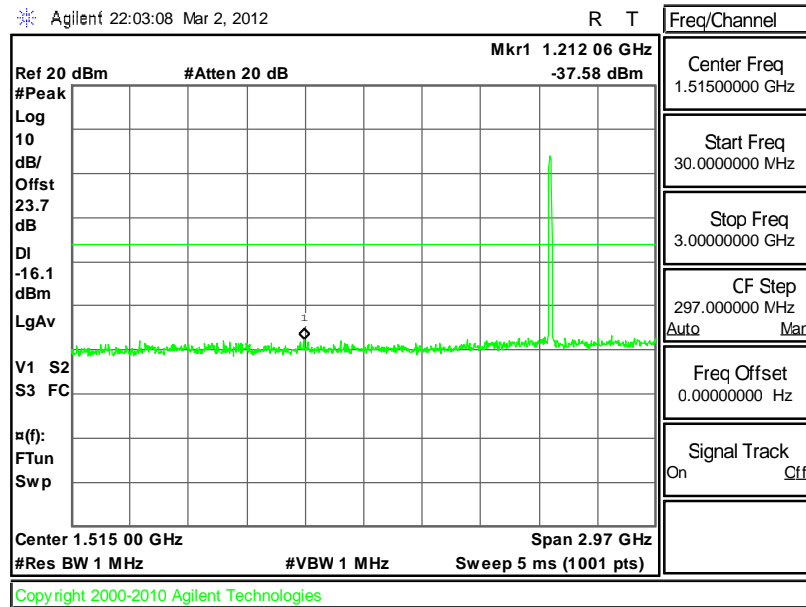
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



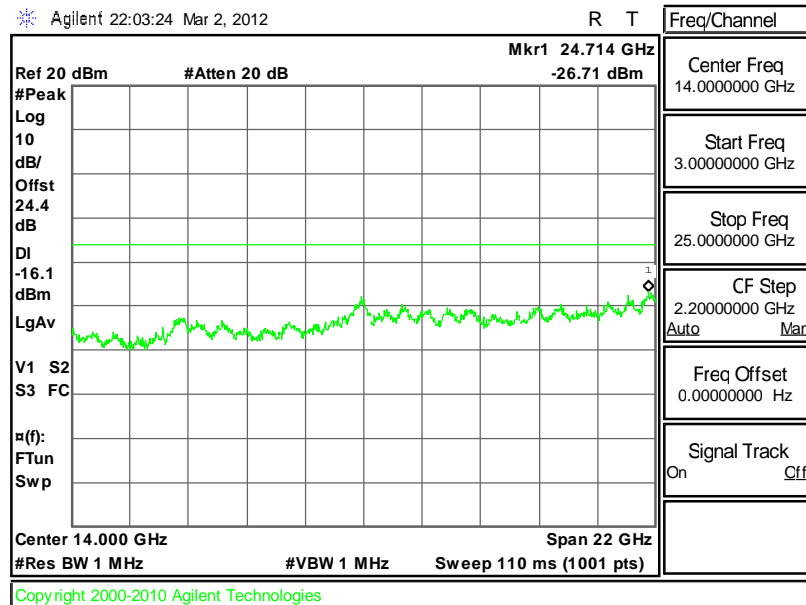


Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



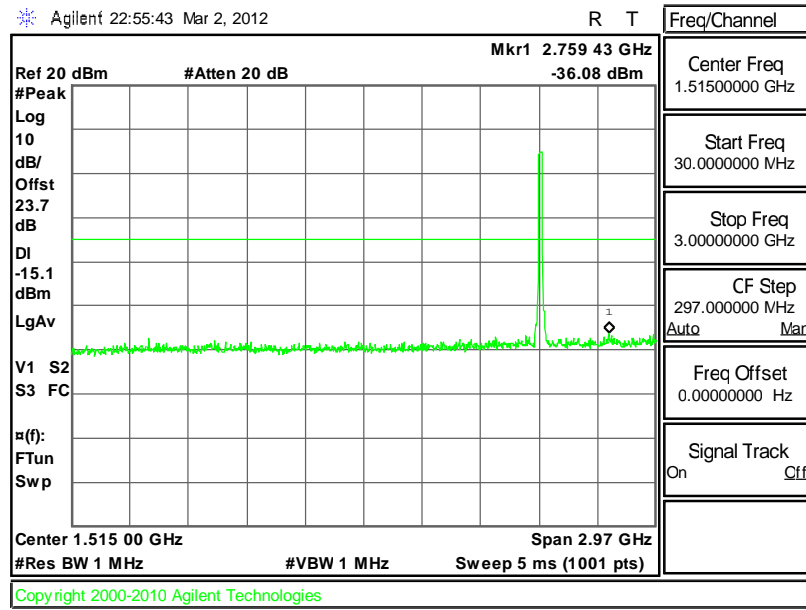
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



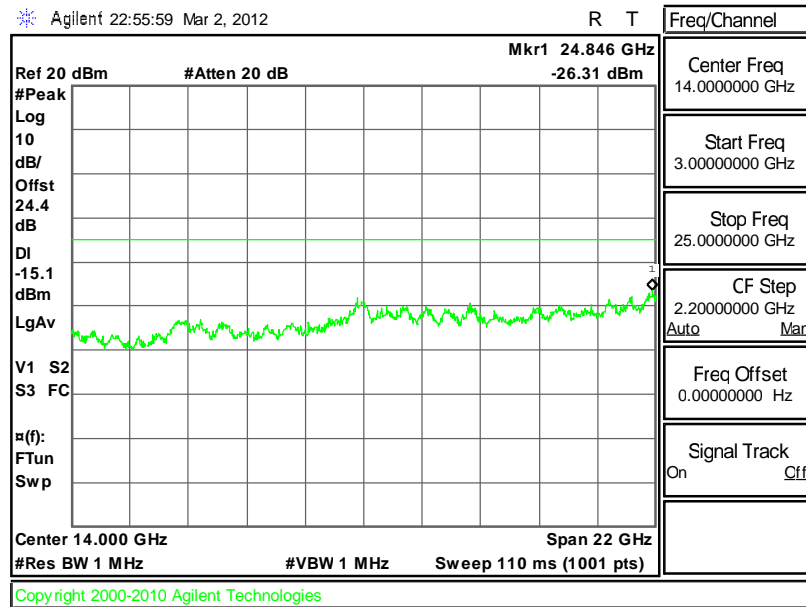


Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



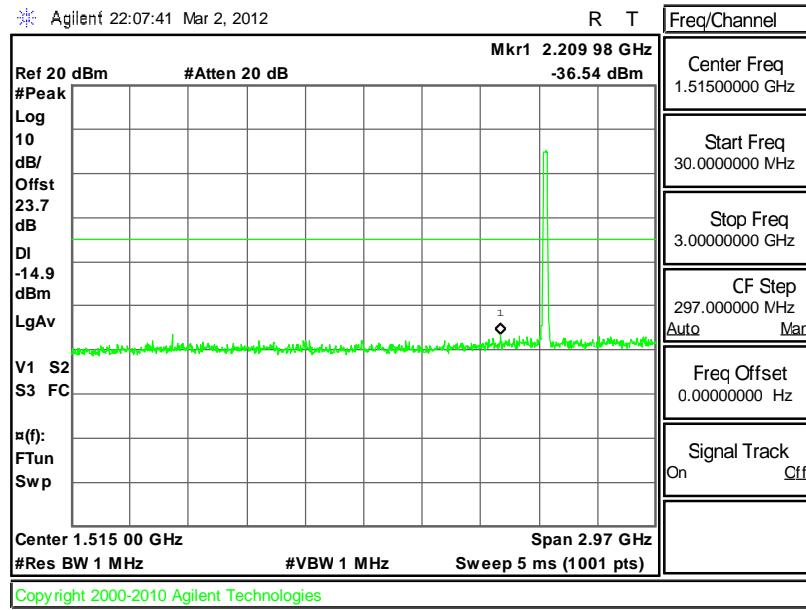
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



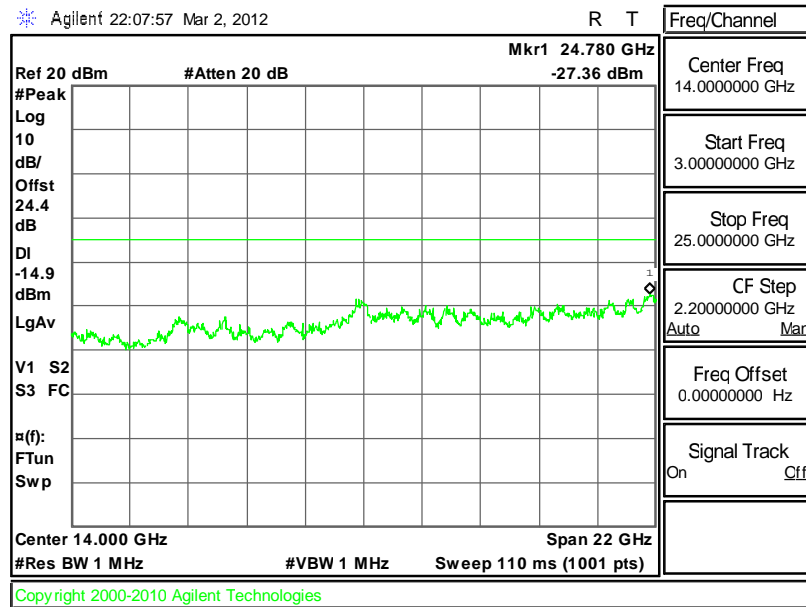


Test Mode :	Mode 5	Temperature :	24~26
Test Band :	802.11g	Relative Humidity :	50~53
Test Channel :	06	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



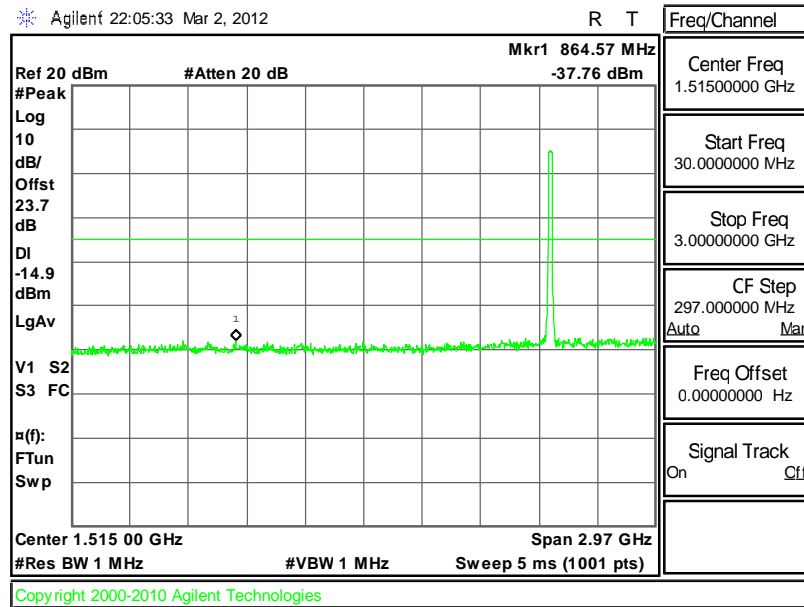
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



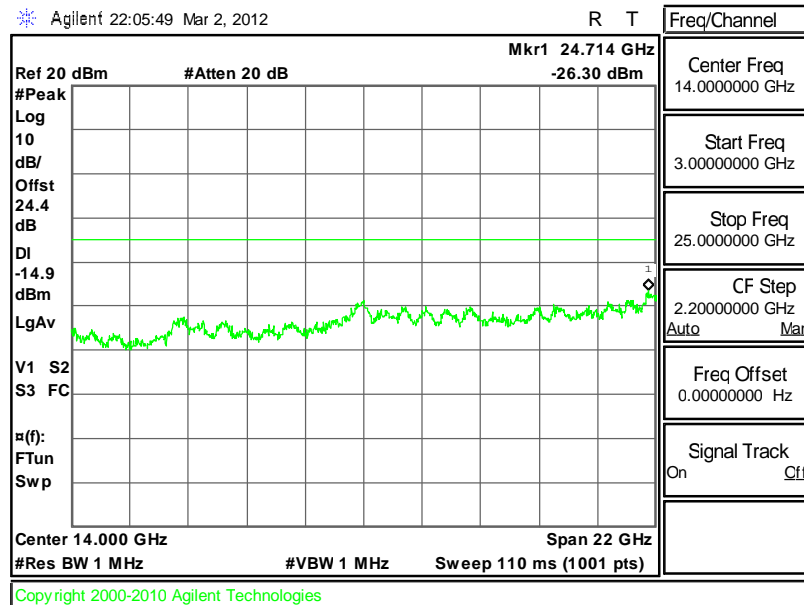


Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



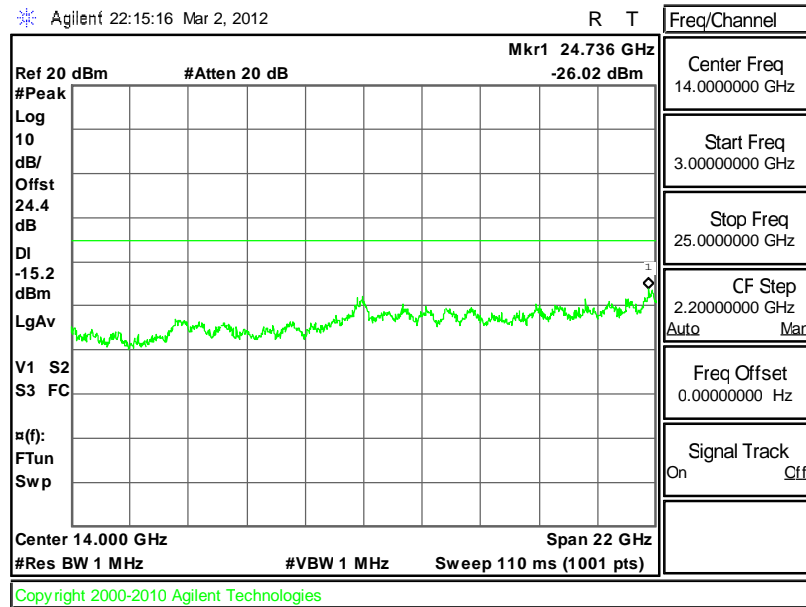
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



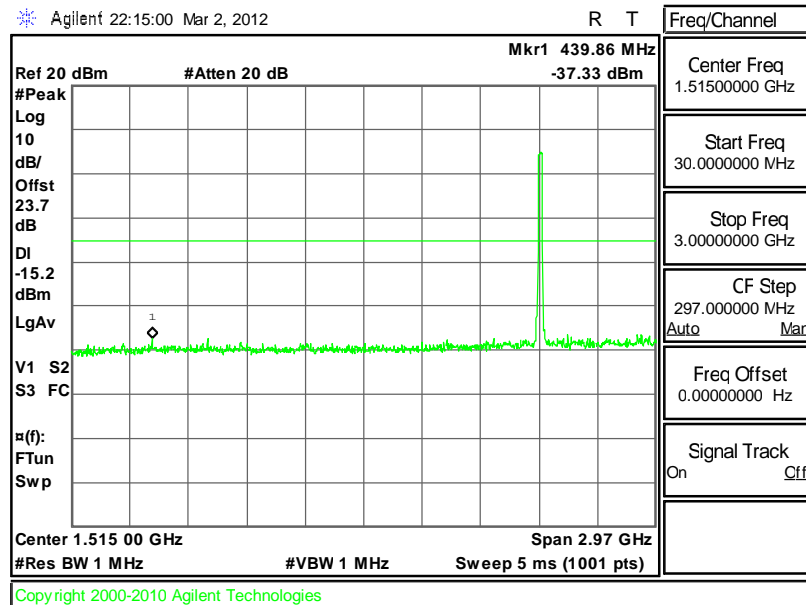


Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



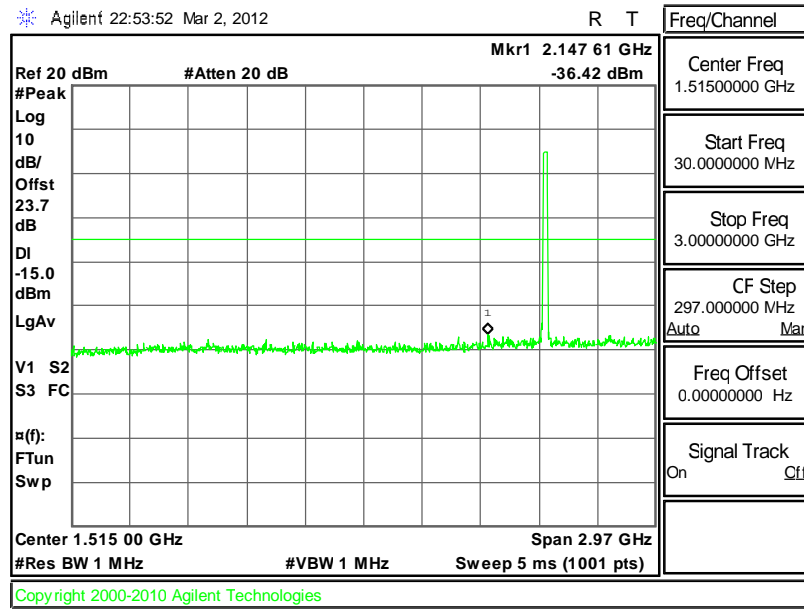
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



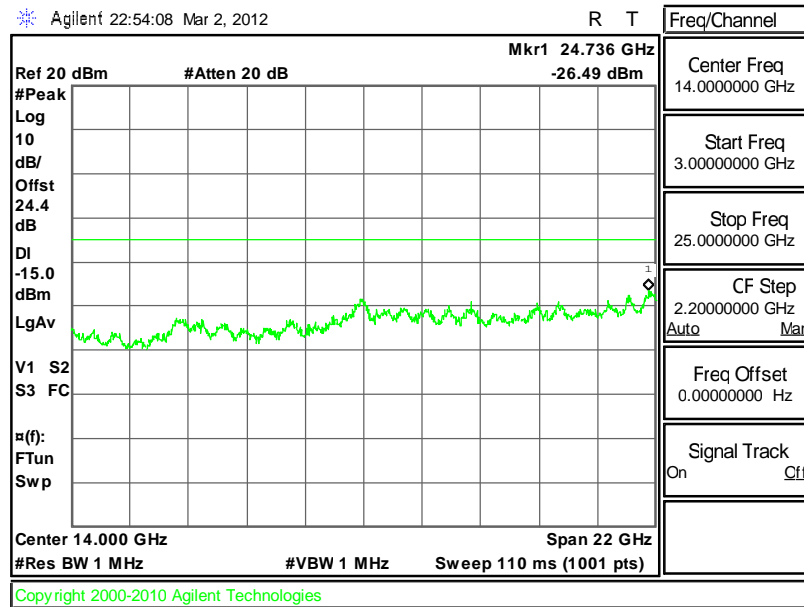


Test Mode :	Mode 8	Temperature :	24~26°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



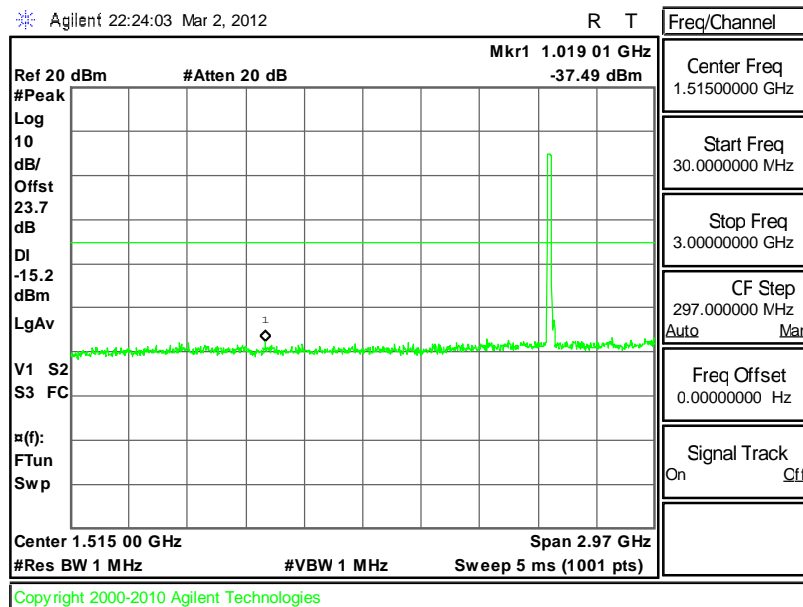
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



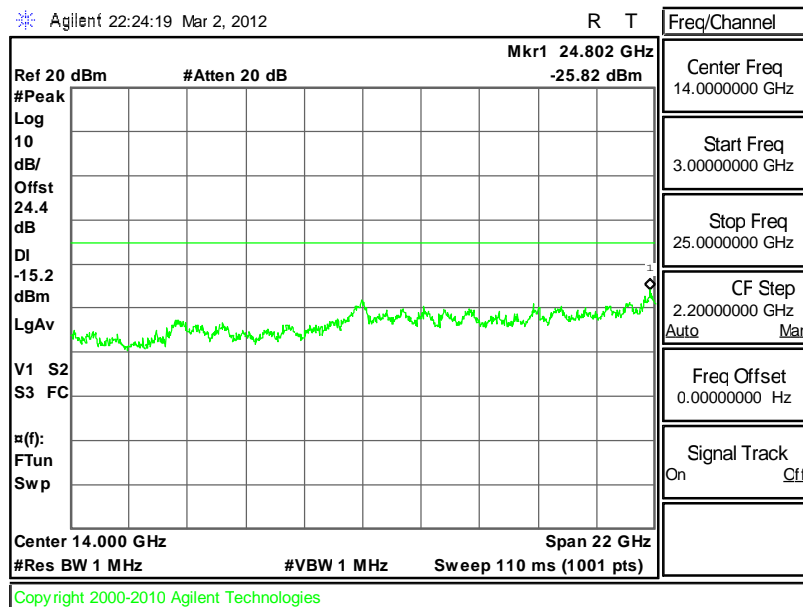


Test Mode :	Mode 9	Temperature :	24~26°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



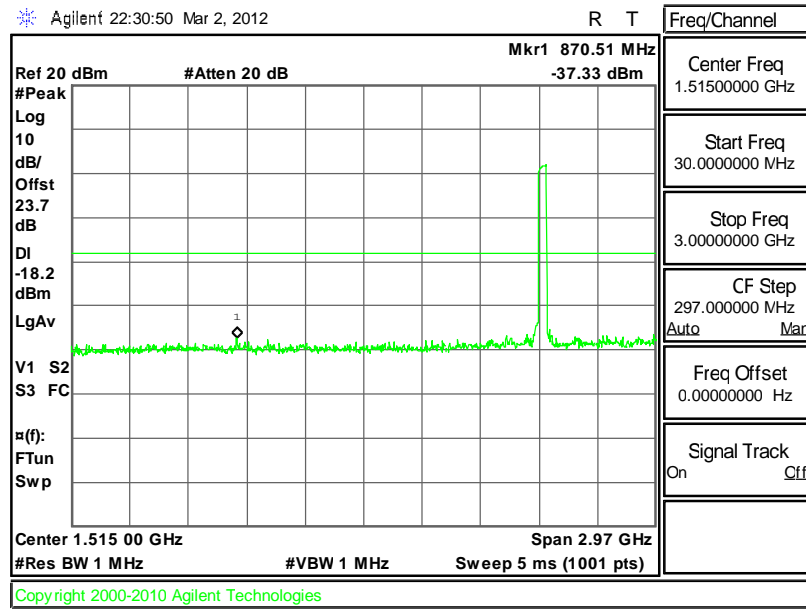
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



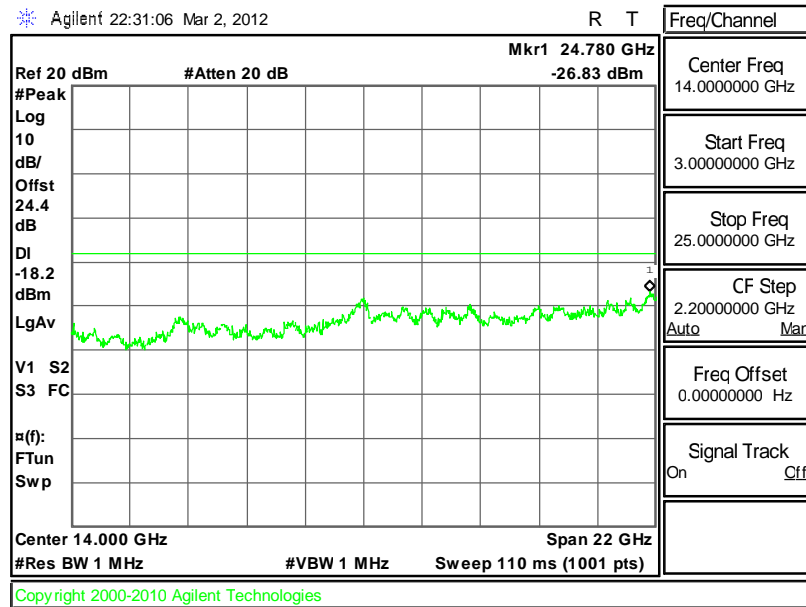


Test Mode :	Mode 10	Temperature :	24~26°C
Test Band :	802.11g/n (BW 40MHz)	Relative Humidity :	50~53%
Test Channel :	03	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



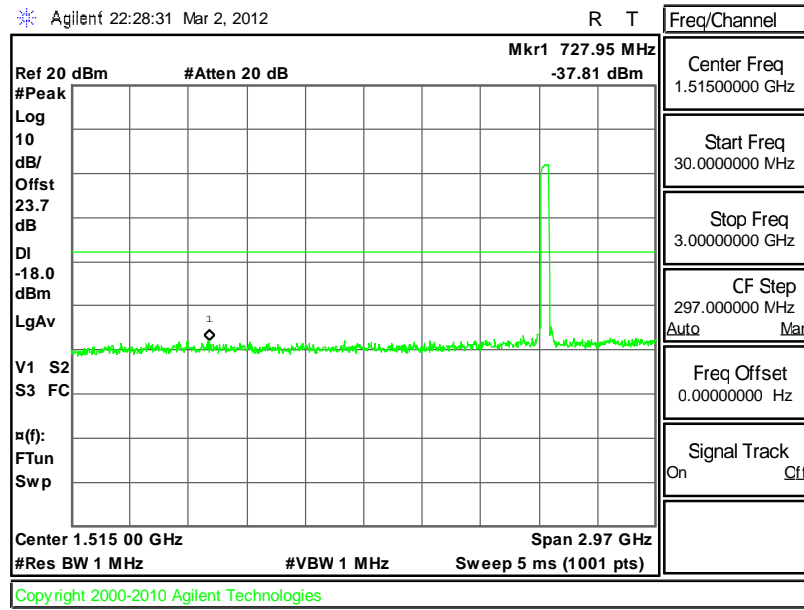
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



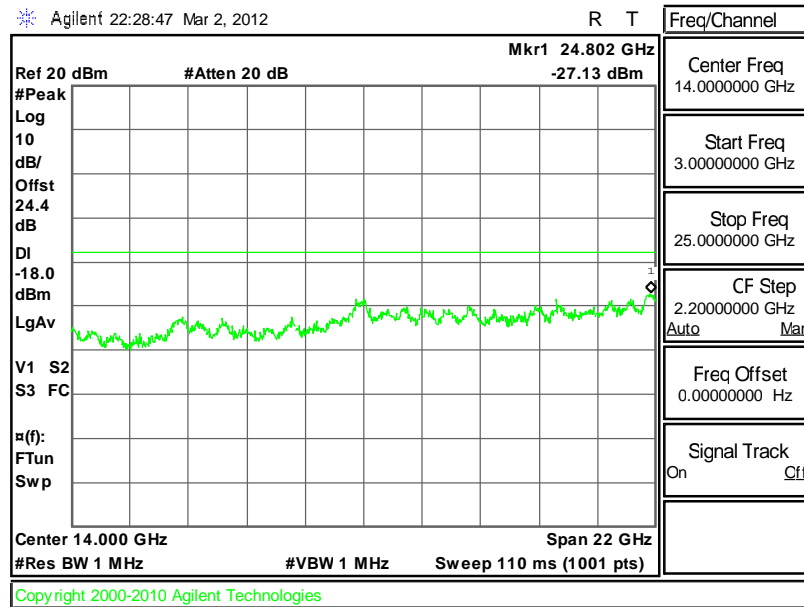


Test Mode :	Mode 11	Temperature :	24~26°C
Test Band :	802.11g/n (BW 40MHz)	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



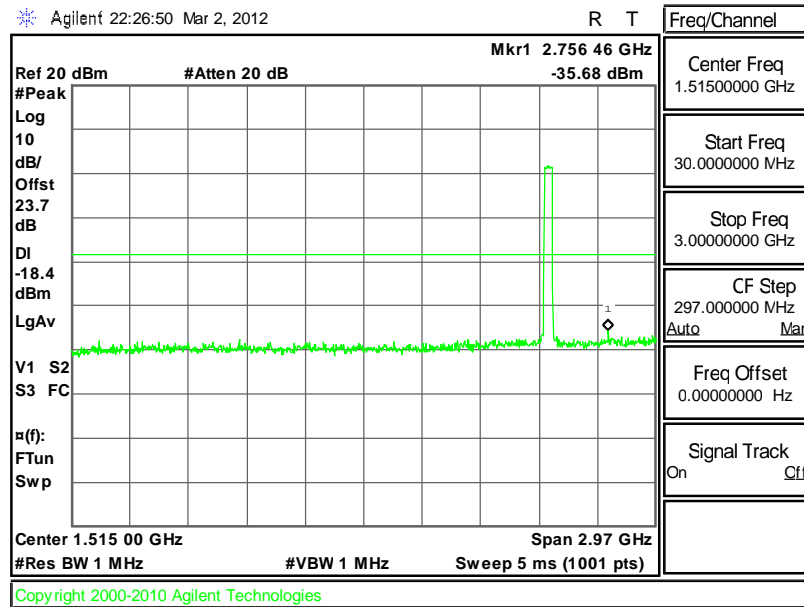
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



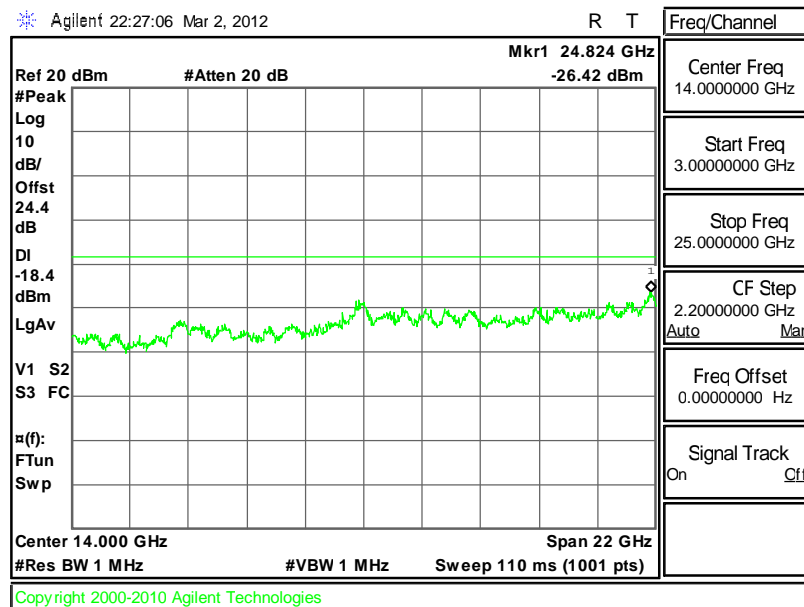


Test Mode :	Mode 12	Temperature :	24~26°C
Test Band :	802.11g/n (BW 40MHz)	Relative Humidity :	50~53%
Test Channel :	09	Test Engineer :	Reece Li

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

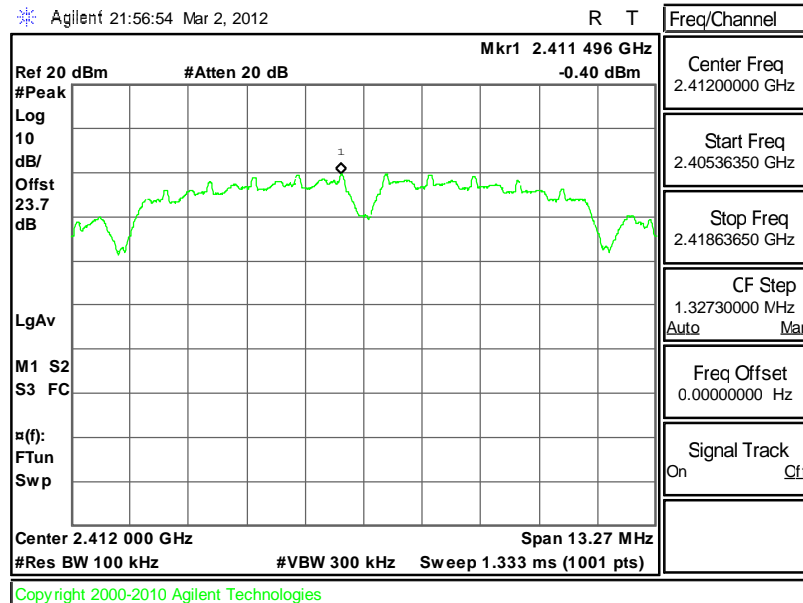
Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	-0.40	-15.60	8	Pass
06	2437	-0.35	-15.55	8	Pass
11	2462	-0.26	-15.46	8	Pass

Note:

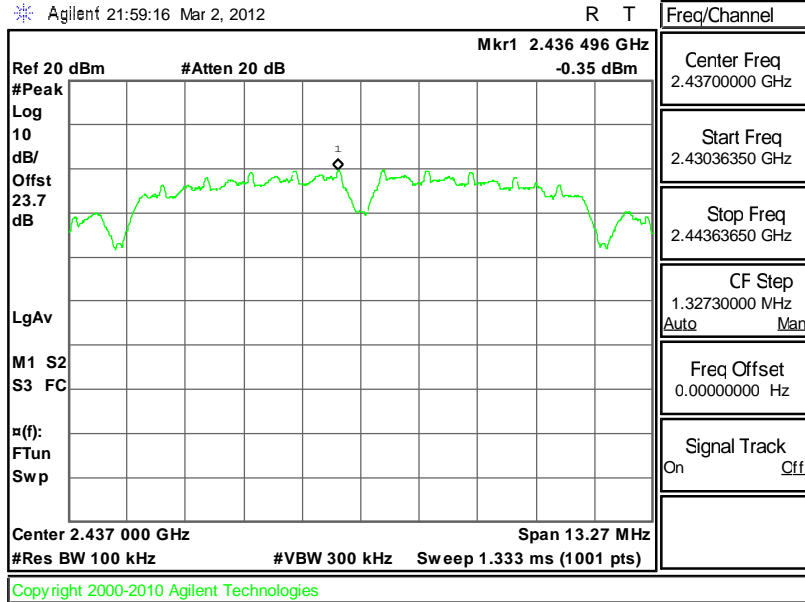
1. Measured power density (dBm) has offset with cable loss.
2. BWCF (dB) = 10 log (3k/100k) = -15.2 dB
3. Power Density/ 3kHz (dBm)= Measured power density/ 100KHz (dBm) + BWCF (dB)

Mode 1 : PSD Plot on 802.11b Channel 01

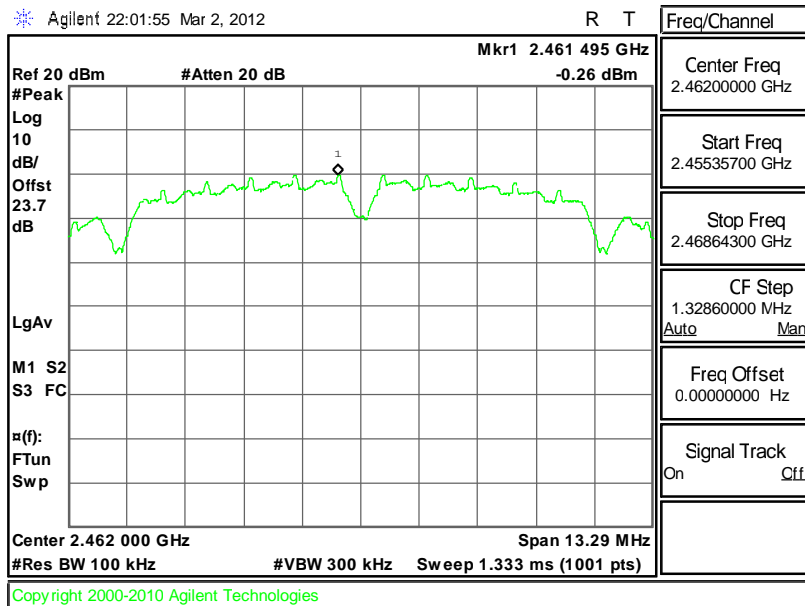




Mode 2 : PSD Plot on 802.11b Channel 06



Mode 3 : PSD Plot on 802.11b Channel 11





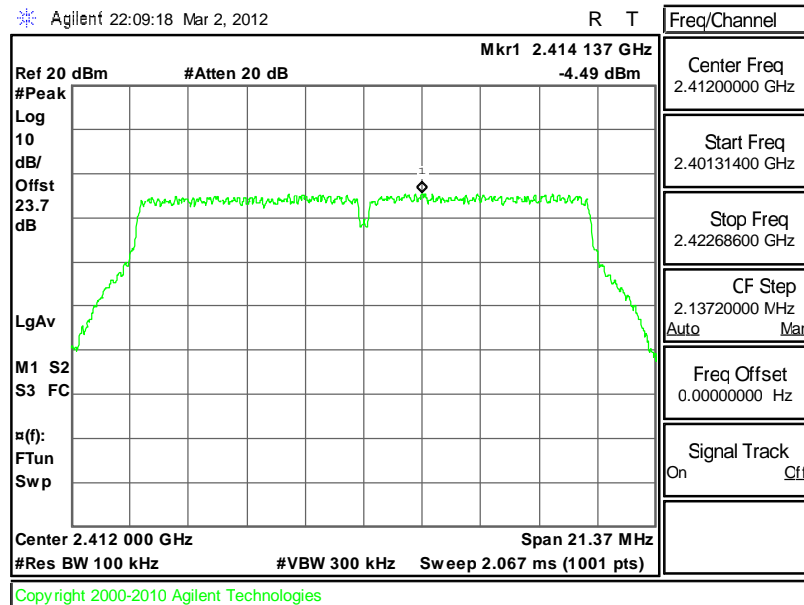
Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	-4.49	-19.69	8	Pass
06	2437	-4.65	-19.85	8	Pass
11	2462	-4.49	-19.69	8	Pass

Note:

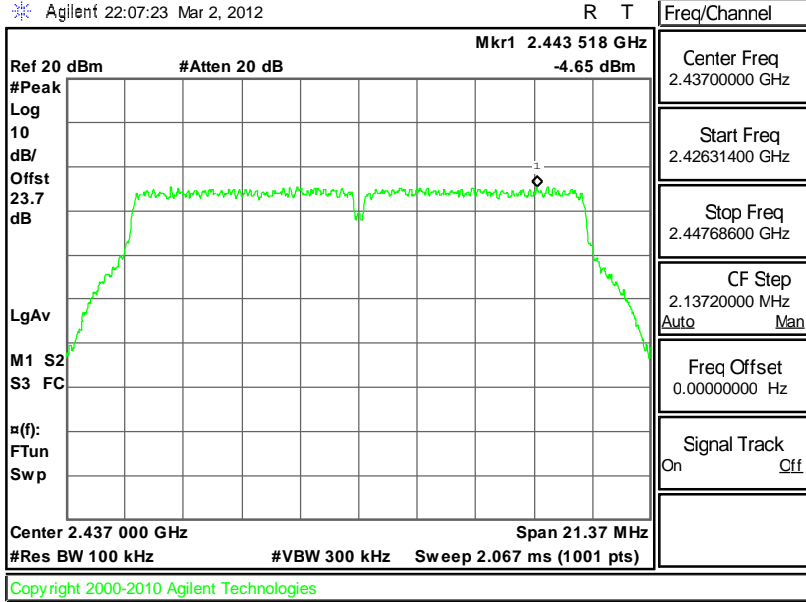
1. Measured power density (dBm) has offset with cable loss.
2. BWCF (dB) = $10 \log (3k/100k) = -15.2 \text{ dB}$
3. Power Density/ 3KHz (dBm) = Measured power density/ 100KHz (dBm) + BWCF (dB)

Mode 4 : PSD Plot on 802.11g Channel 01

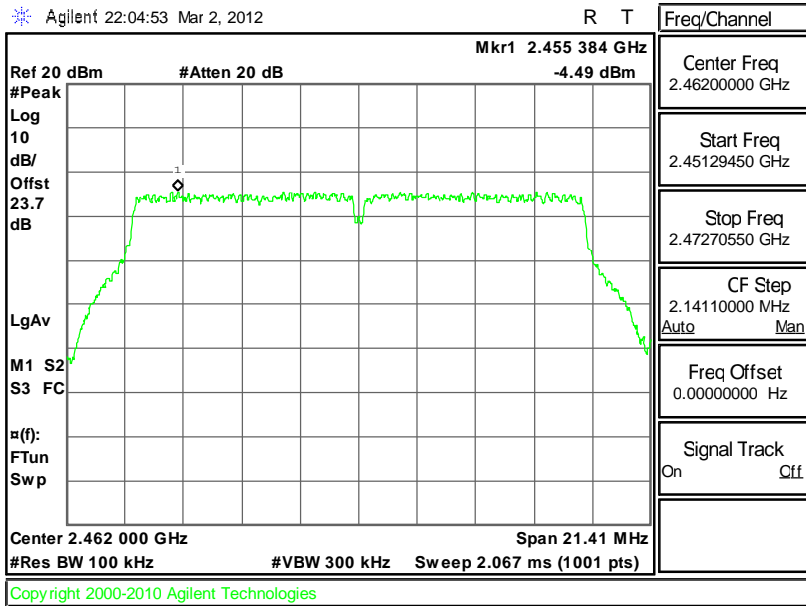




Mode 5 : PSD Plot on 802.11g Channel 06



Mode 6 : PSD Plot on 802.11g Channel 11





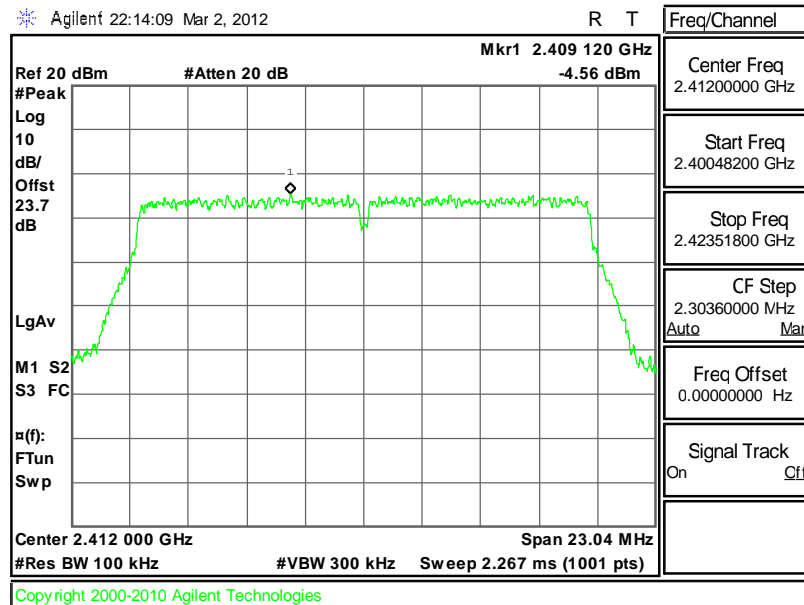
Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Reece Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g/n (BW 20MHz) Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	-4.56	-19.76	8	Pass
06	2437	-4.79	-19.99	8	Pass
11	2462	-4.30	-19.50	8	Pass

Note:

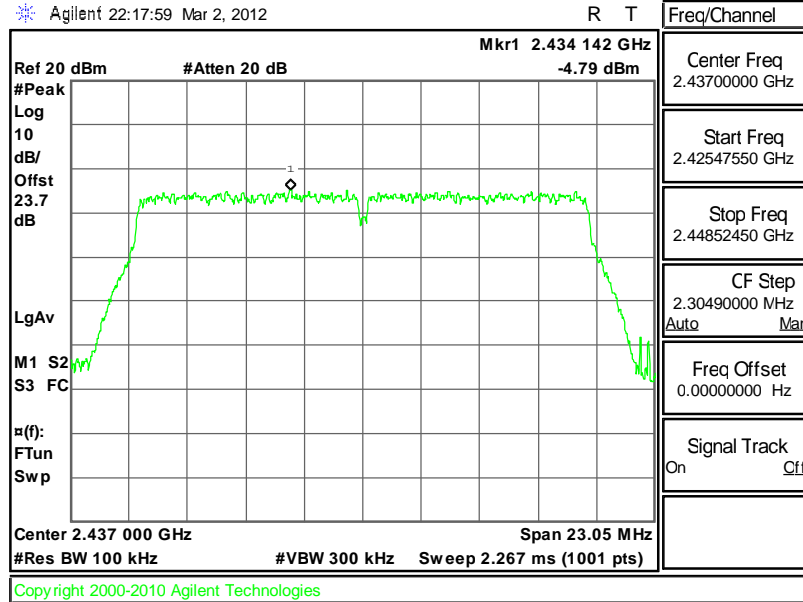
1. Measured power density (dBm) has offset with cable loss.
2. BWCF (dB) = $10 \log (3k/100k) = -15.2 \text{ dB}$
3. Power Density/ 3KHz (dBm) = Measured power density/ 100KHz (dBm) + BWCF (dB)

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

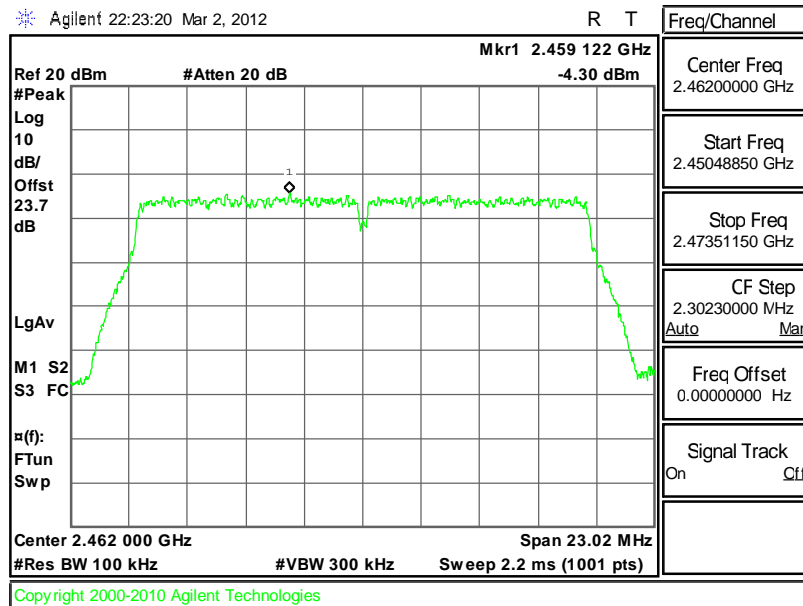




Mode 8 : PSD Plot on 802.11g/n (BW 20MHz) Channel 06



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





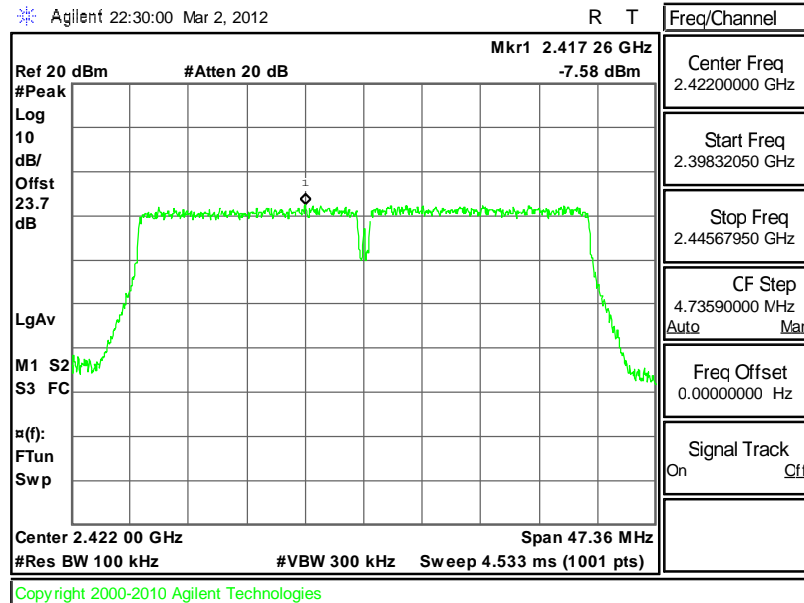
Test Mode :	Mode 10, 11, 12	Temperature :	24~26
Test Engineer :	Reece Li	Relative Humidity :	50~53

Channel	Frequency (MHz)	802.11g/n (BW 40MHz) Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
03	2422	-7.58	-22.78	8	Pass
06	2437	-7.11	-22.31	8	Pass
09	2452	-7.72	-22.92	8	Pass

Note:

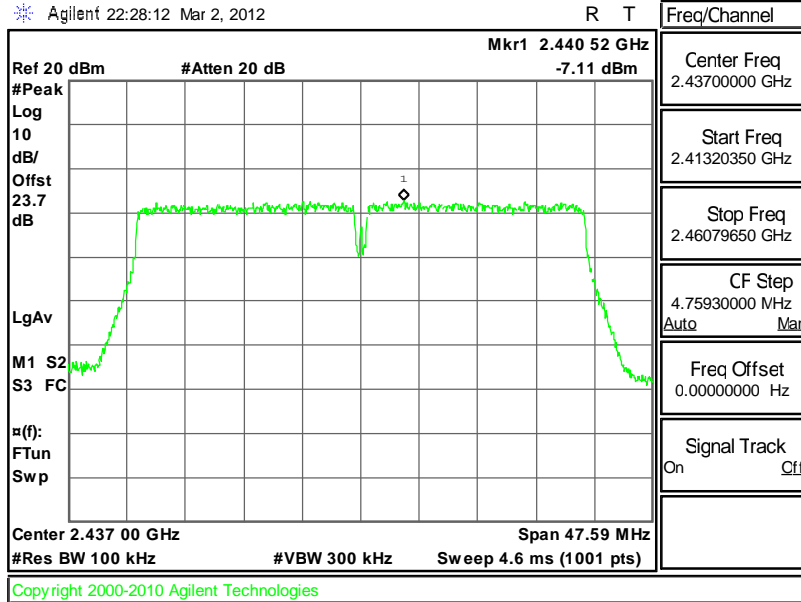
1. Measured power density (dBm) has offset with cable loss.
2. BWCF (dB) = $10 \log (3k/100k) = -15.2 \text{ dB}$
3. Power Density/ 3KHz (dBm)= Measured power density/ 100KHz (dBm) + BWCF (dB)

Mode 10 : PSD Plot on 802.11g/n (BW 40MHz) Channel 03

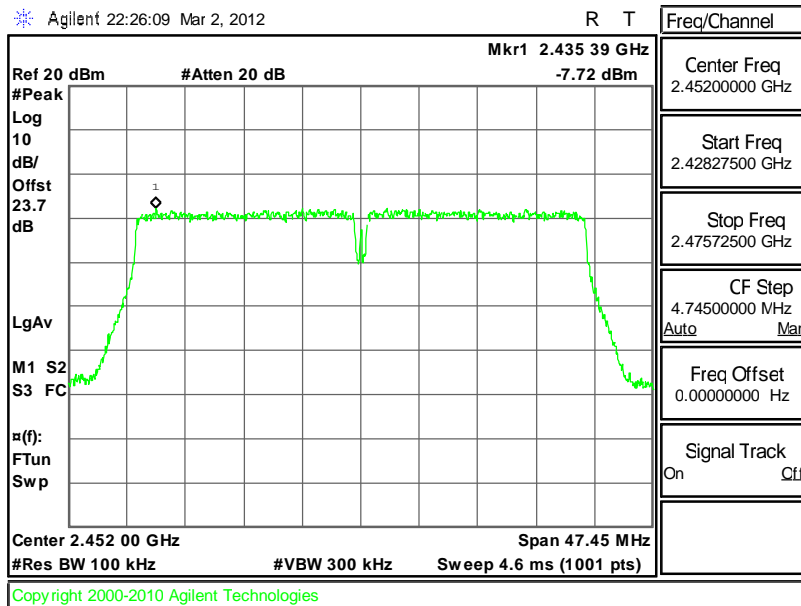




Mode 11 : PSD Plot on 802.11g/n (BW 40MHz) Channel 06



Mode 12 : PSD Plot on 802.11g/n (BW 40MHz) Channel 09



3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

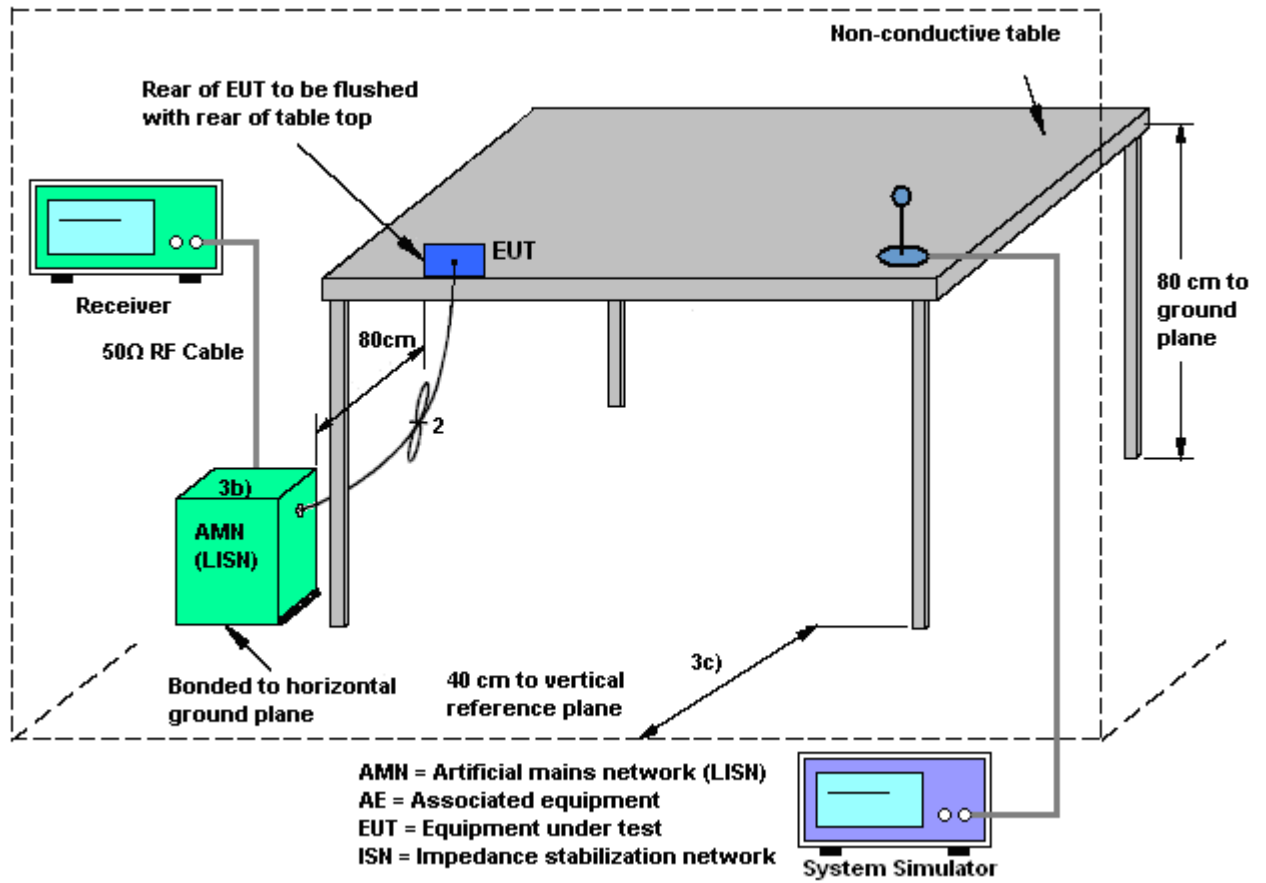
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

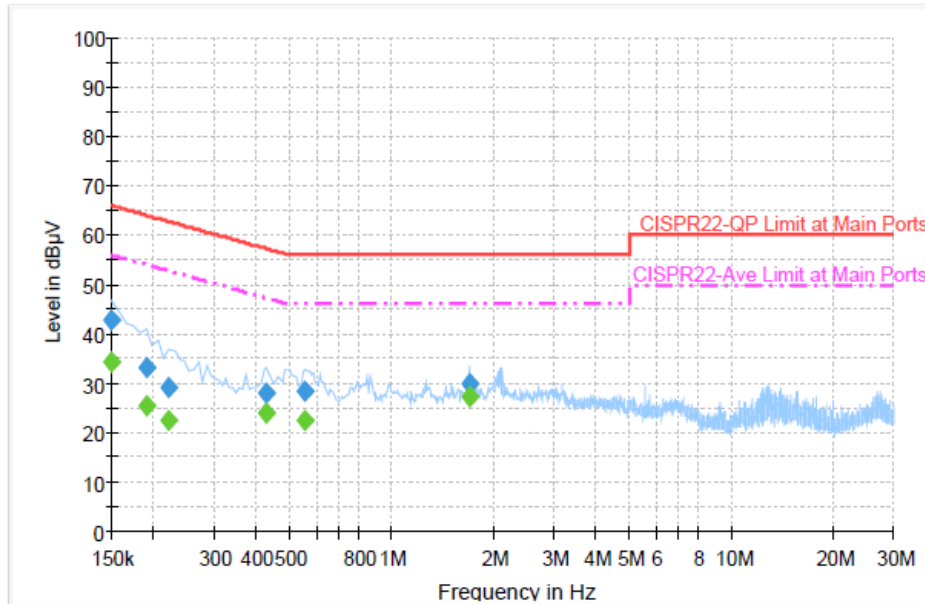
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~23°C
Test Engineer :	Hayden Wu	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band IV Idle + WLAN Link + USB Cable (Charging from Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : QuasiPeak

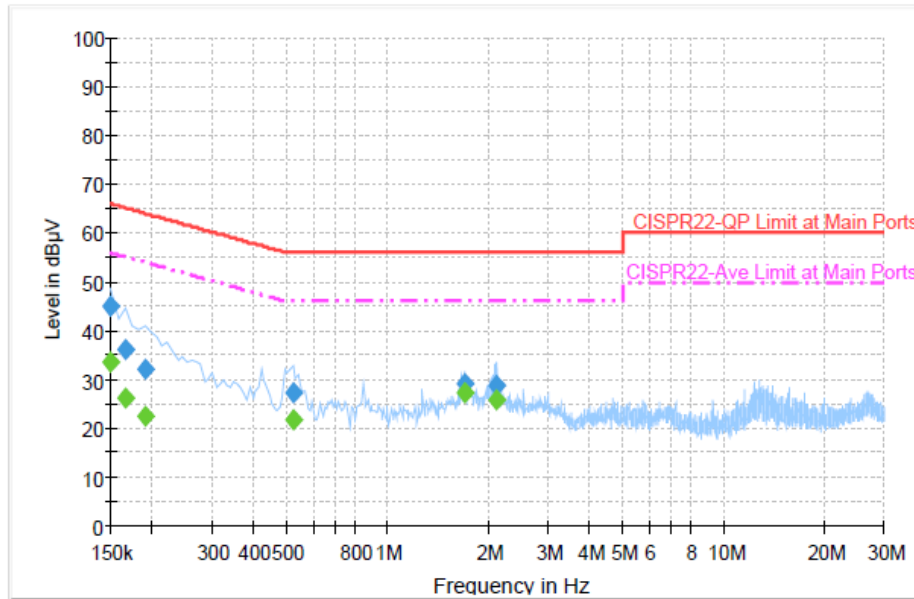
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	42.7	Off	L1	19.4	23.3	66.0
0.190000	33.2	Off	L1	19.4	30.8	64.0
0.222000	29.1	Off	L1	19.3	33.6	62.7
0.430000	28.2	Off	L1	19.4	29.1	57.3
0.558000	28.5	Off	L1	19.3	27.5	56.0
1.694000	30.0	Off	L1	19.4	26.0	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	34.4	Off	L1	19.4	21.6	56.0
0.190000	25.5	Off	L1	19.4	28.5	54.0
0.222000	22.5	Off	L1	19.3	30.2	52.7
0.430000	23.9	Off	L1	19.4	23.4	47.3
0.558000	22.6	Off	L1	19.3	23.4	46.0
1.694000	27.5	Off	L1	19.4	18.5	46.0



Test Mode :	Mode 1	Temperature :	22~23°C
Test Engineer :	Hayden Wu	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band IV Idle + WLAN Link + USB Cable (Charging from Notebook)		
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	44.8	Off	N	19.4	21.2	66.0
0.166000	36.0	Off	N	19.3	29.2	65.2
0.190000	32.0	Off	N	19.4	32.0	64.0
0.526000	27.3	Off	N	19.3	28.7	56.0
1.694000	29.3	Off	N	19.5	26.7	56.0
2.118000	28.7	Off	N	19.5	27.3	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	33.6	Off	N	19.4	22.4	56.0
0.166000	26.2	Off	N	19.3	29.0	55.2
0.190000	22.3	Off	N	19.4	31.7	54.0
0.526000	21.7	Off	N	19.3	24.3	46.0
1.694000	27.4	Off	N	19.5	18.6	46.0
2.118000	25.8	Off	N	19.5	20.2	46.0

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

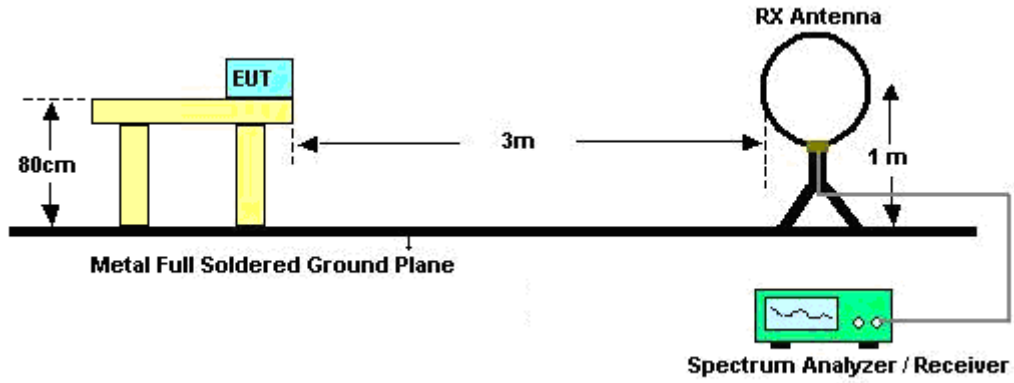
See list of measuring instruments of this test report.

3.7.3 Test Procedures

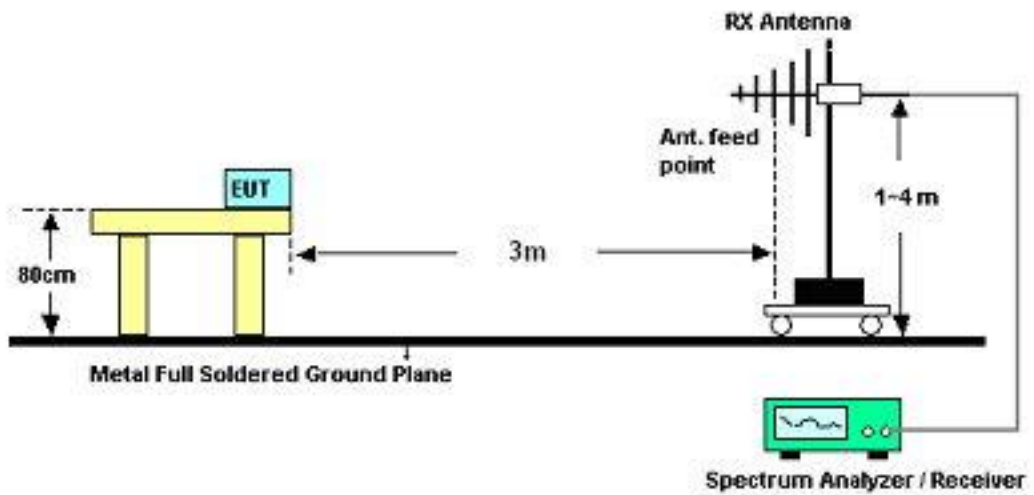
- Use the following spectrum analyzer settings:
 - Span shall wide enough to fully capture the emission being measured;
 - Set RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - Measurement above 18 GHz shall be extrapolated 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)
- 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.

3.7.4 Test Setup

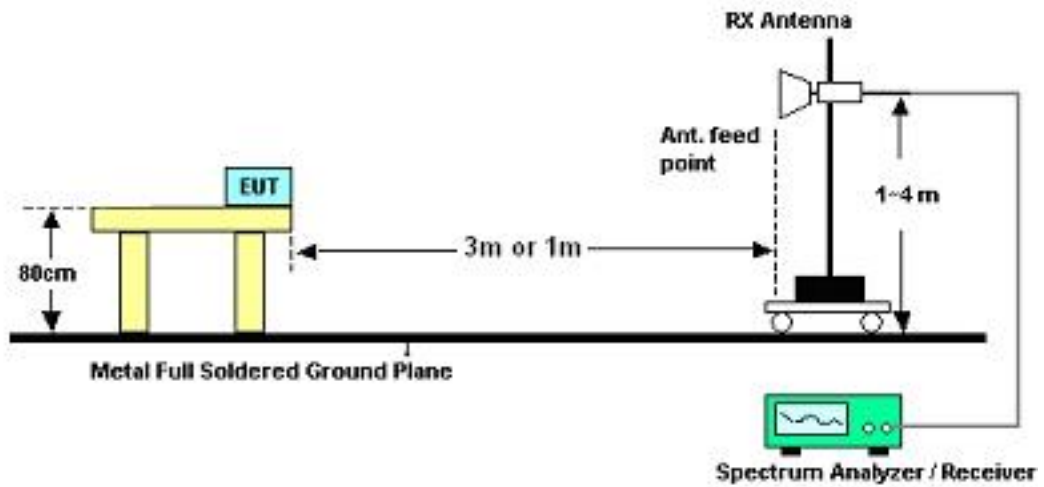
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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.

3.7.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	21~24°C
Test Channel :	01	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	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
2377.26	49.4	-24.6	74	45.33	32.03	5.99	33.95	116	167	Peak
2377.26	37.11	-16.89	54	33.04	32.03	5.99	33.95	116	167	Average
2412	95.39	-	-	91.21	32.08	6.07	33.97	116	167	Peak
2412	91.58	-	-	87.4	32.08	6.07	33.97	116	167	Average
2494	32.32	-21.68	54	27.94	32.2	6.18	34	116	167	Average
2494	45.48	-28.52	74	41.1	32.2	6.18	34	116	167	Peak
4824	46.35	-27.65	74	62.24	34.1	9.12	59.11	100	0	Peak

Test Mode :	Mode 1	Temperature :	21~24°C
Test Channel :	01	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	<ol style="list-style-type: none"> 2412 MHz is fundamental signal which can be ignored. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 92.75 dBuV/m - 20dB = 72.75 dBuV/m. 7236 MHz and 9648 MHz are 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
2361.49	32.88	-21.12	54	28.83	32.01	5.99	33.95	138	231	Average
2361.49	44.76	-29.24	74	40.71	32.01	5.99	33.95	138	231	Peak
2412	92.75	-	-	88.57	32.08	6.07	33.97	138	231	Peak
2412	89.38	-	-	85.2	32.08	6.07	33.97	138	231	Average
2492	32.19	-21.81	54	27.81	32.2	6.18	34	138	231	Average
2492	44.3	-29.7	74	39.92	32.2	6.18	34	138	231	Peak
4824	50.42	-23.58	74	66.31	34.1	9.12	59.11	100	0	Peak
7236	45.43	-27.32	72.75	57.81	35.7	10.03	58.11	100	0	Peak
9648	48.43	-24.32	72.75	59.48	36.62	11.99	59.66	100	0	Peak



Test Mode :	Mode 2	Temperature :	21~24°C
Test Channel :	06	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	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
2334	45.18	-28.82	74	41.21	31.96	5.95	33.94	180	173	Peak
2334	32.68	-21.32	54	28.71	31.96	5.95	33.94	180	173	Average
2437	94.92	-	-	90.69	32.1	6.11	33.98	180	173	Peak
2437	91.09	-	-	86.83	32.13	6.11	33.98	180	173	Average
2486	44.65	-29.35	74	40.29	32.18	6.18	34	180	173	Peak
2486	32.19	-21.81	54	27.83	32.18	6.18	34	180	173	Average
4874	44.71	-29.29	74	60.51	34.1	9.14	59.04	100	0	Peak

Test Mode :	Mode 2	Temperature :	21~24°C
Test Channel :	06	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	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
2380	44.5	-29.5	74	40.4	32.03	6.03	33.96	166	242	Peak
2380	32.75	-21.25	54	28.65	32.03	6.03	33.96	166	242	Average
2437	94.8	-	-	90.54	32.13	6.11	33.98	166	242	Peak
2437	90.88	-	-	86.62	32.13	6.11	33.98	166	242	Average
2486	44.29	-29.71	74	39.93	32.18	6.18	34	166	242	Peak
2486	32.14	-21.86	54	27.78	32.18	6.18	34	166	242	Average
4874	46.95	-27.05	74	62.75	34.1	9.14	59.04	100	0	Peak
7311	43.43	-30.57	74	55.8	35.7	10.06	58.13	100	0	Peak



Test Mode :	Mode 3	Temperature :	21~24°C
Test Channel :	11	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	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
2364	44.57	-29.43	74	40.52	32.01	5.99	33.95	110	181	Peak
2364	32.86	-21.14	54	28.81	32.01	5.99	33.95	110	181	Average
2462	99.39	-	-	95.09	32.15	6.14	33.99	110	181	Peak
2462	95.71	-	-	91.41	32.15	6.14	33.99	110	181	Average
2490.5	46.57	-27.43	74	42.19	32.2	6.18	34	110	181	Peak
2490.5	32.69	-21.31	54	28.31	32.2	6.18	34	110	181	Average

Test Mode :	Mode 3	Temperature :	21~24°C
Test Channel :	11	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	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
2318	45.61	-28.39	74	41.66	31.96	5.92	33.93	177	204	Peak
2318	32.84	-21.16	54	28.89	31.96	5.92	33.93	177	204	Average
2462	96.88	-	-	92.58	32.15	6.14	33.99	177	204	Peak
2462	93.01	-	-	88.71	32.15	6.14	33.99	177	204	Average
2483.5	45.11	-28.89	74	40.75	32.18	6.18	34	177	204	Peak
2483.5	32.4	-21.6	54	28.04	32.18	6.18	34	177	204	Average
4924	43.87	-30.13	74	59.58	34.1	9.15	58.96	100	0	Peak



Test Mode :	Mode 4	Temperature :	21~24°C
Test Channel :	01	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	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
2388.66	36.3	-17.7	54	32.17	32.06	6.03	33.96	117	168	Average
2388.66	54.9	-19.1	74	50.77	32.06	6.03	33.96	117	168	Peak
2412	87.23	-	-	83.05	32.08	6.07	33.97	117	168	Average
2412	96.31	-	-	92.13	32.08	6.07	33.97	117	168	Peak
2484	45.62	-28.38	74	41.26	32.18	6.18	34	117	168	Peak
2484	32.59	-21.41	54	28.23	32.18	6.18	34	117	168	Average

Test Mode :	Mode 4	Temperature :	21~24°C
Test Channel :	01	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
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
2388.66	35.77	-18.23	54	31.64	32.06	6.03	33.96	170	236	Average
2388.66	53.74	-20.26	74	49.61	32.06	6.03	33.96	170	236	Peak
2412	84.48	-	-	80.3	32.08	6.07	33.97	170	236	Average
2412	93.74	-	-	89.54	32.1	6.07	33.97	170	236	Peak
2492	45.34	-28.66	74	40.96	32.2	6.18	34	170	236	Peak
2492	32.3	-21.7	54	27.92	32.2	6.18	34	170	236	Average



Test Mode :	Mode 5	Temperature :	21~24°C
Test Channel :	06	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	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
2390	45.54	-28.46	74	41.41	32.06	6.03	33.96	184	182	Peak
2390	33.34	-20.66	54	29.21	32.06	6.03	33.96	184	182	Average
2437	97.86	-	-	93.63	32.1	6.11	33.98	184	182	Peak
2437	89.03	-	-	84.77	32.13	6.11	33.98	184	182	Average
2484	45.2	-28.8	74	40.84	32.18	6.18	34	184	182	Peak
2484	32.88	-21.12	54	28.52	32.18	6.18	34	184	182	Average

Test Mode :	Mode 5	Temperature :	21~24°C
Test Channel :	06	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	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
2374	44.28	-29.72	74	40.21	32.03	5.99	33.95	173	215	Peak
2374	32.59	-21.41	54	28.52	32.03	5.99	33.95	173	215	Average
2437	97.53	-	-	93.3	32.1	6.11	33.98	173	215	Peak
2437	88.55	-	-	84.29	32.13	6.11	33.98	173	215	Average
2484	45.53	-28.47	74	41.17	32.18	6.18	34	173	215	Peak
2484	32.64	-21.36	54	28.28	32.18	6.18	34	173	215	Average



Test Mode :	Mode 6	Temperature :	21~24°C
Test Channel :	11	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	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
2388	44.64	-29.36	74	40.51	32.06	6.03	33.96	109	180	Peak
2388	32.97	-21.03	54	28.84	32.06	6.03	33.96	109	180	Average
2462	100.8	-	-	96.5	32.15	6.14	33.99	109	180	Peak
2462	91.86	-	-	87.56	32.15	6.14	33.99	109	180	Average
2483.5	59.26	-14.74	74	54.9	32.18	6.18	34	109	180	Peak
2483.5	38.3	-15.7	54	33.94	32.18	6.18	34	109	180	Average

Test Mode :	Mode 6	Temperature :	21~24°C
Test Channel :	11	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	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
2390	44.48	-29.52	74	40.35	32.06	6.03	33.96	175	203	Peak
2390	32.89	-21.11	54	28.76	32.06	6.03	33.96	175	203	Average
2462	98.52	-	-	94.22	32.15	6.14	33.99	175	203	Peak
2462	89.51	-	-	85.21	32.15	6.14	33.99	175	203	Average
2483.5	57.06	-16.94	74	52.7	32.18	6.18	34	175	203	Peak
2483.5	37.04	-16.96	54	32.68	32.18	6.18	34	175	203	Average



Test Mode :	Mode 7	Temperature :	21~24°C
Test Channel :	01	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	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
2389.99	55.3	-18.7	74	51.17	32.06	6.03	33.96	117	167	Peak
2389.99	37.89	-16.11	54	33.76	32.06	6.03	33.96	117	167	Average
2412	95.93	-	-	91.75	32.08	6.07	33.97	117	167	Peak
2412	87.15	-	-	82.97	32.08	6.07	33.97	117	167	Average
2492	32.96	-21.04	54	28.58	32.2	6.18	34	117	167	Average
2492	43.85	-30.15	74	39.47	32.2	6.18	34	117	167	Peak
4824	45.67	-28.33	74	61.56	34.1	9.12	59.11	100	0	Peak
7236	45.15	-30.78	75.93	57.53	35.7	10.03	58.11	100	0	Peak

Test Mode :	Mode 7	Temperature :	21~24°C
Test Channel :	01	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz and 9648 MHz are 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
2389.99	54.41	-19.59	74	50.28	32.06	6.03	33.96	169	239	Peak
2389.99	37.23	-16.77	54	33.1	32.06	6.03	33.96	169	239	Average
2412	94.61	-	-	90.41	32.1	6.07	33.97	169	239	Peak
2412	84.97	-	-	80.79	32.08	6.07	33.97	169	239	Average
2500	32.81	-21.19	54	28.43	32.2	6.18	34	169	239	Average
2500	45.08	-28.92	74	40.7	32.2	6.18	34	169	239	Peak
4824	50.8	-23.2	74	66.69	34.1	9.12	59.11	100	0	Peak
7236	51.57	-23.04	74.61	63.95	35.7	10.03	58.11	100	0	Peak
9648	47.46	-27.15	74.61	58.54	36.59	11.99	59.66	100	0	Peak



Test Mode :	Mode 8	Temperature :	21~24°C
Test Channel :	06	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	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
2340	44.95	-29.05	74	40.96	31.98	5.95	33.94	184	181	Peak
2340	32.37	-21.63	54	28.38	31.98	5.95	33.94	184	181	Average
2437	97.7	-	-	93.47	32.1	6.11	33.98	184	181	Peak
2437	87.85	-	-	83.59	32.13	6.11	33.98	184	181	Average
2484	44.67	-29.33	74	40.31	32.18	6.18	34	184	181	Peak
2484	32.52	-21.48	54	28.16	32.18	6.18	34	184	181	Average
4874	43.15	-30.85	74	58.95	34.1	9.14	59.04	100	0	Peak
7311	44.83	-29.17	74	57.21	35.7	10.06	58.14	100	0	Peak

Test Mode :	Mode 8	Temperature :	21~24°C
Test Channel :	06	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. 9648 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
2390	44.05	-29.95	74	39.92	32.06	6.03	33.96	173	215	Peak
2390	32.46	-21.54	54	28.33	32.06	6.03	33.96	173	215	Average
2437	97.25	-	-	93.02	32.1	6.11	33.98	173	215	Peak
2437	87.82	-	-	83.56	32.13	6.11	33.98	173	215	Average
2486	44.8	-29.2	74	40.44	32.18	6.18	34	173	215	Peak
2486	32.45	-21.55	54	28.09	32.18	6.18	34	173	215	Average
4874	46.57	-27.43	74	62.38	34.1	9.13	59.04	100	0	Peak
7311	47.72	-26.28	74	60.09	35.7	10.06	58.13	100	0	Peak
9748	47.32	-29.93	77.25	58.29	36.74	11.94	59.65	100	0	Peak



Test Mode :	Mode 9	Temperature :	21~24°C
Test Channel :	11	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	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
2390	44.81	-29.19	74	40.68	32.06	6.03	33.96	109	181	Peak
2390	32.58	-21.42	54	28.45	32.06	6.03	33.96	109	181	Average
2462	100.76	-	-	96.46	32.15	6.14	33.99	109	181	Peak
2462	91.38	-	-	87.08	32.15	6.14	33.99	109	181	Average
2485.18	62.28	-11.72	74	57.92	32.18	6.18	34	109	181	Peak
2485.18	39.16	-14.84	54	34.8	32.18	6.18	34	109	181	Average
7386	43.84	-30.16	74	56.21	35.7	10.1	58.17	100	0	Peak

Test Mode :	Mode 9	Temperature :	21~24°C
Test Channel :	11	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	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
2380	45.01	-28.99	74	40.91	32.03	6.03	33.96	175	203	Peak
2380	32.54	-21.46	54	28.44	32.03	6.03	33.96	175	203	Average
2462	98.02	-	-	93.72	32.15	6.14	33.99	175	203	Peak
2462	88.83	-	-	84.53	32.15	6.14	33.99	175	203	Average
2485.18	60.72	-13.28	74	56.36	32.18	6.18	34	175	203	Peak
2485.18	38.64	-15.36	54	34.28	32.18	6.18	34	175	203	Average
7386	46.32	-27.68	74	58.69	35.7	10.1	58.17	100	0	Peak



Test Mode :	Mode 10	Temperature :	21~24°C
Test Channel :	03	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	2422 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
2389.42	52.96	-21.04	74	48.83	32.06	6.03	33.96	182	164	Peak
2389.42	40.32	-13.68	54	36.19	32.06	6.03	33.96	182	164	Average
2422	94.6	-	-	90.37	32.1	6.11	33.98	182	164	Peak
2422	85.55	-	-	81.35	32.1	6.07	33.97	182	164	Average
2484	34.32	-19.68	54	29.96	32.18	6.18	34	182	164	Average
2484	50.22	-23.78	74	45.86	32.18	6.18	34	182	164	Peak

Test Mode :	Mode 10	Temperature :	21~24°C
Test Channel :	03	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	2422 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
2389.61	51.11	-22.89	74	46.98	32.06	6.03	33.96	166	242	Peak
2389.61	37.91	-16.09	54	33.78	32.06	6.03	33.96	166	242	Average
2422	93.16	-	-	88.9	32.13	6.11	33.98	166	242	Peak
2422	83.89	-	-	79.69	32.1	6.07	33.97	166	242	Average
2484	33.32	-20.68	54	28.96	32.18	6.18	34	166	242	Average
2484	48.28	-25.72	74	43.92	32.18	6.18	34	166	242	Peak
4844	46.76	-27.24	74	62.63	34.1	9.12	59.09	100	0	Peak
7266	46.64	-27.36	74	59.02	35.7	10.04	58.12	100	0	Peak



Test Mode :	Mode 11	Temperature :	21~24°C
Test Channel :	06	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	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
2382	49.21	-24.79	74	45.11	32.03	6.03	33.96	111	182	Peak
2382	34.67	-19.33	54	30.57	32.03	6.03	33.96	111	182	Average
2437	96.87	-	-	92.61	32.13	6.11	33.98	111	182	Peak
2437	87.79	-	-	83.53	32.13	6.11	33.98	111	182	Average
2484	56.58	-17.42	74	52.22	32.18	6.18	34	111	182	Peak
2484	35.91	-18.09	54	31.55	32.18	6.18	34	111	182	Average

Test Mode :	Mode 11	Temperature :	21~24°C
Test Channel :	06	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	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
2388	47.75	-26.25	74	43.62	32.06	6.03	33.96	173	231	Peak
2388	33.82	-20.18	54	29.69	32.06	6.03	33.96	173	231	Average
2437	95.05	-	-	90.79	32.13	6.11	33.98	173	231	Peak
2437	85.93	-	-	81.67	32.13	6.11	33.98	173	231	Average
2484	54.02	-19.98	74	49.66	32.18	6.18	34	173	231	Peak
2484	34.25	-19.75	54	29.89	32.18	6.18	34	173	231	Average
4874	44.85	-29.15	74	60.68	34.1	9.13	59.06	100	0	Peak



Test Mode :	Mode 12	Temperature :	21~24°C
Test Channel :	09	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	2452 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
30.81	20.78	-19.22	40	32.42	19.28	0.54	31.46	-	-	Peak
150.69	24.45	-19.05	43.5	43.6	11.2	1.21	31.56	-	-	Peak
296.22	34.07	-11.93	46	50.41	13.25	1.74	31.33	100	12	Peak
307.7	32.51	-13.49	46	48.54	13.51	1.79	31.33	-	-	Peak
478.5	29.01	-16.99	46	40.06	17.64	2.37	31.06	-	-	Peak
663.3	27.15	-18.85	46	34.84	20.3	2.87	30.86	-	-	Peak
2356	45.42	-28.58	74	41.4	32.01	5.95	33.94	109	177	Peak
2356	33.03	-20.97	54	29.01	32.01	5.95	33.94	109	177	Average
2452	98.19	-	-	93.89	32.15	6.14	33.99	109	177	Peak
2452	89.13	-	-	84.87	32.13	6.11	33.98	109	177	Average
2488.22	63	-11	74	58.62	32.2	6.18	34	109	177	Peak
2488.22	43.32	-10.68	54	38.94	32.2	6.18	34	109	177	Average



Test Mode :	Mode 12	Temperature :	21~24°C
Test Channel :	09	Relative Humidity :	58~60%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	2452 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	25.93	-14.07	40	36.86	20	0.53	31.46	-	-	Peak
150.69	23	-20.5	43.5	42.15	11.2	1.21	31.56	-	-	Peak
295.41	28.51	-17.49	46	44.85	13.25	1.74	31.33	-	-	Peak
304.2	28.02	-17.98	46	44.14	13.43	1.78	31.33	-	-	Peak
663.3	33.72	-12.28	46	41.41	20.3	2.87	30.86	100	37	Peak
833.4	28.08	-17.92	46	33.13	22.43	3.23	30.71	-	-	Peak
2350	45.19	-28.81	74	41.2	31.98	5.95	33.94	174	222	Peak
2350	32.94	-21.06	54	28.95	31.98	5.95	33.94	174	222	Average
2452	96.55	-	-	92.25	32.15	6.14	33.99	174	222	Peak
2452	87.24	-	-	82.98	32.13	6.11	33.98	174	222	Average
2488.22	59.85	-14.15	74	55.47	32.2	6.18	34	174	222	Peak
2488.22	40.42	-13.58	54	36.04	32.2	6.18	34	174	222	Average



3.8 Antenna Requirements

3.8.1 Standard Applicable

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

3.8.2 Antenna Connected Construction

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

3.8.3 Antenna Gain

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



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	Apr. 03, 2011	Feb. 28, 2012~ Mar. 02, 2012	Apr. 02, 2012	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	Feb. 29, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	Feb. 29, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	Feb. 29, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	Feb. 29, 2012	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117591	N/A	Oct. 21, 2011	Feb. 29, 2012	Oct. 20, 2012	Conduction (CO05-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz ~ 26.5GHz	Nov. 23, 2011	Mar. 17, 2012	Nov. 22, 2012	Radiation (03CH06-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz ~ 40GHz	Oct. 27, 2011	Mar. 17, 2012	Oct. 26, 2012	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz ~ 1000MHz	May 10, 2011	Mar. 17, 2012	May 09, 2012	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz ~ 2GHz	Oct. 22, 2011	Mar. 17, 2012	Oct. 21, 2012	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Aug. 01, 2011	Mar. 17, 2012	Jul. 31, 2012	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917025 1	15GHz ~ 40GHz	Oct. 21, 2011	Mar. 17, 2012	Oct. 20, 2012	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz ~ 26.5GHz	Apr. 14, 2011	Mar. 17, 2012	Apr. 13, 2012	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz ~ 1GHz	Apr. 14, 2011	Mar. 17, 2012	Apr. 13, 2012	Radiation (03CH06-HY)
Pre Amplifier	EMCI	EMC05184 5	SN980048	1GHz ~ 18GHz	Jul. 18, 2011	Mar. 17, 2012	Jul. 17, 2012	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz ~ 30MHz	Jul. 29, 2010	Mar. 17, 2012	Jul. 28, 2012	Radiation (03CH06-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
Combined Standard Uncertainty $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26		

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP220933-01 as below.