

FCC Test Report

Product Name	Wireless Motherboard
Model No	TA80TA1
FCC ID.	WL6-TABC8TA1

Applicant	ELITEGROUP COMPUTER SYSTEMS CO., LTD.
Address	No.239, Sec. 2, Ti Ding Blvd., Taipei, Taiwan

Date of Receipt	Feb. 12, 2014
Issue Date	Feb. 26, 2014
Report No.	1420141R-RFUSP73V00
Report Version	V1.0



The test results relate only to the samples tested.

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This report must not be used to claim product endorsement by TAF or any agency of the U.S. Government.

Test Report Certification

Issue Date: Feb. 26, 2014

Report No.: 1420141R-RFUSP73V00



Product Name	Wireless Motherboard
Applicant	ELITEGROUP COMPUTER SYSTEMS CO., LTD.
Address	No.239, Sec. 2, Ti Ding Blvd., Taipei, Taiwan
Manufacturer	ELITEGROUP COMPUTER SYSTEMS CO., LTD.
Model No.	TA80TA1
FCC ID.	WL6-TABC8TA1
EUT Rated Voltage	DC 3.7V (Power by Battery)
EUT Test Voltage	AC 120V/60Hz
Trade Name	ECS
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.10: 2009, KDB 558074
Test Result	Complied

The test results relate only to the samples tested.

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Documented By :

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Tested By :

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(Engineer / Jack Hsu)

Approved By :

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(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Motherboard
Trade Name	ECS
Model No.	TA80TA1
FCC ID.	WL6-TABC8TA1
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW
Number of Channels	802.11b/g/n-20MHz: 11
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 72.2Mbps
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	PCB Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	JEM	13H130-JV8070	PCB Antenna	2.85 dBi for 2.4GHz
2	WGT	13H130-JV8050	PCB Antenna	1.77 dBi for 2.4GHz

Note: 1.The antenna of EUT is conform to FCC 15.203.

2.Only the higher gain antenna was tested and recorded in this report.

802.11b/g/n-20MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

Note:

1. The EUT is a Wireless Motherboard with a built-in 2.4GHz WLAN and Bluetooth transceiver, this report for WLAN
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps 、 802.11g is 6Mbps 、 802.11n(20M-BW) is 7.2Mbps .
4. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode:	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

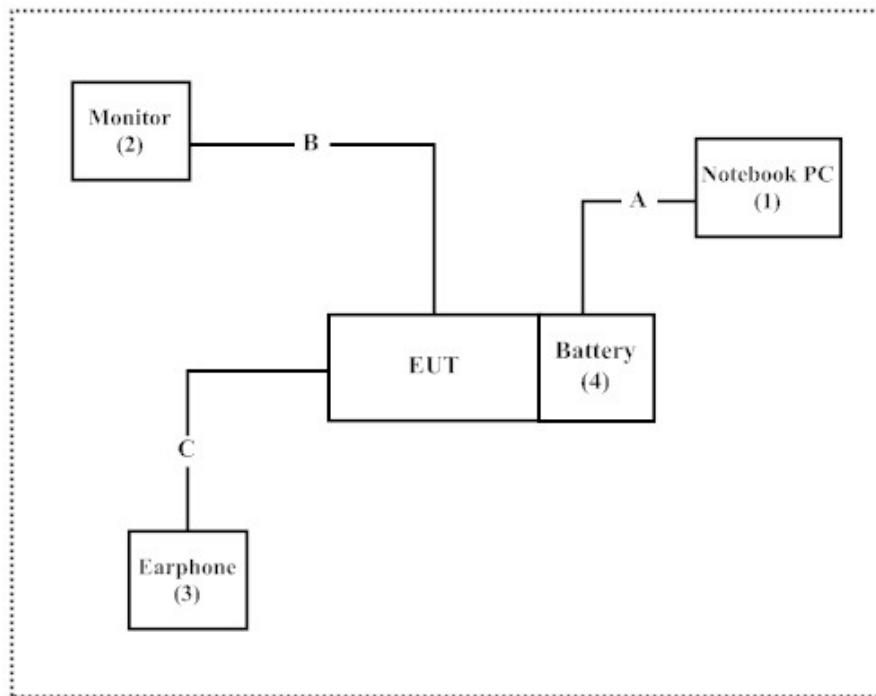
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	PPT	N/A
2	Monitor	DELL	ST2320LF	N/A
3	Earphone	PCHOME	N/A	N/A
4	Battery	TCL	13H202-300320	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 1.0m
B	HDMI Cable	Shielded, 1.8m
C	Earphone Cable	Non-Shielded, 2m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute program “adb.exe V1.0.29” on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press “OK” to start the continuous Transmit.
- (5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from

Quietek Corporation's Web Site: <http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site:

<http://www.quietek.com/>

Site Description: File on
Federal Communications Commission
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Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation

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Taiwan, R.O.C.
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E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

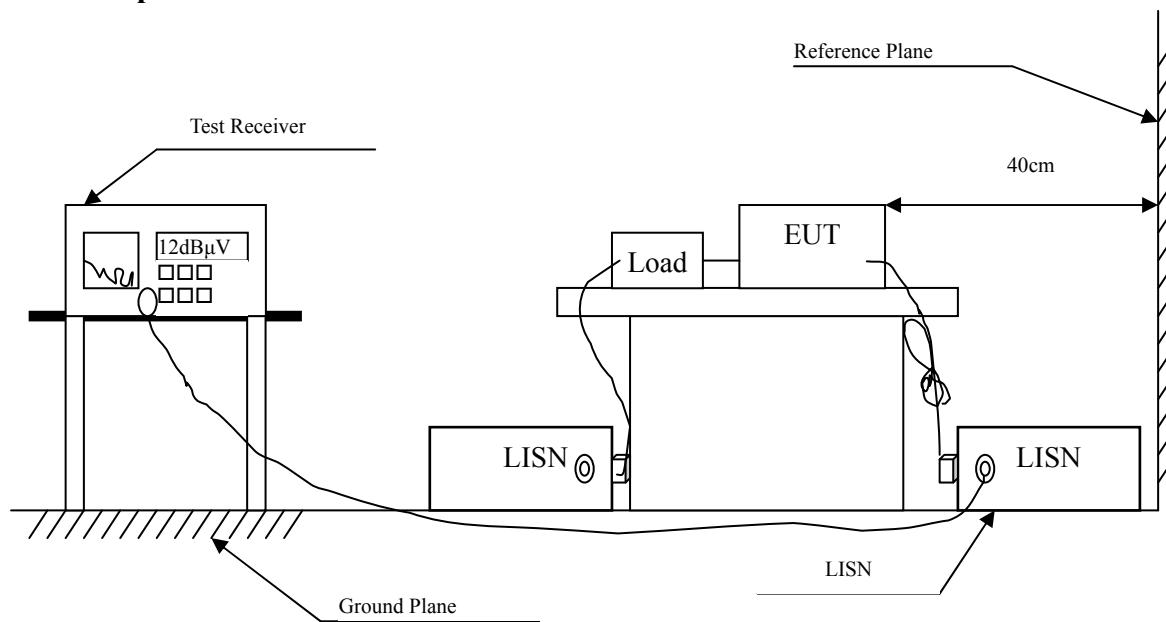
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2014	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2014	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar., 2013	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2014	
	No.1 Shielded Room				

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBμV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Wireless Motherboard
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB μ V	dB μ V	dB	dB μ V
Line 1					
Quasi-Peak					
0.162	9.548	42.130	51.678	-13.979	65.657
0.388	9.587	35.520	45.107	-14.093	59.200
0.806	9.596	25.620	35.216	-20.784	56.000
1.509	9.638	26.290	35.928	-20.072	56.000
2.912	9.700	20.370	30.070	-25.930	56.000
14.920	10.160	21.790	31.950	-28.050	60.000
Average					
0.162	9.548	31.970	41.518	-14.139	55.657
0.388	9.587	28.520	38.107	-11.093	49.200
0.806	9.596	18.990	28.586	-17.414	46.000
1.509	9.638	18.400	28.038	-17.962	46.000
2.912	9.700	11.720	21.420	-24.580	46.000
14.920	10.160	7.300	17.460	-32.540	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Wireless Motherboard
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB μ V	dB μ V	dB	dB μ V
Line 2					
Quasi-Peak					
0.166	9.587	39.790	49.377	-16.166	65.543
0.197	9.589	35.690	45.279	-19.378	64.657
0.384	9.597	35.600	45.197	-14.117	59.314
0.873	9.619	27.200	36.819	-19.181	56.000
11.974	10.070	14.230	24.300	-35.700	60.000
15.045	10.230	13.250	23.480	-36.520	60.000
Average					
0.166	9.587	30.970	40.557	-14.986	55.543
0.197	9.589	26.920	36.509	-18.148	54.657
0.384	9.597	28.410	38.007	-11.307	49.314
0.873	9.619	20.420	30.039	-15.961	46.000
11.974	10.070	-0.600	9.470	-40.530	50.000
15.045	10.230	2.300	12.530	-37.470	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

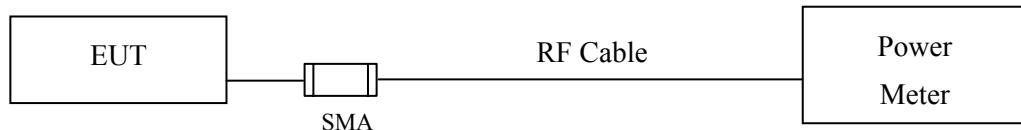
3.1. Test Equipment

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Power Meter	Anritsu	ML2495A/6K00003357	May, 2013
X Power Sensor	Anritsu	MA2411B/0738448	Jun., 2013

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Procedure

The EUT was tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 9.1.3 PKPM1 Peak power meter method.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : Wireless Motherboard
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11			
		Measurement Level (dBm)						
01	2412	11.91	--	--	--	15.19	<30dBm	Pass
06	2437	12.17	11.97	11.82	11.63	15.41	<30dBm	Pass
11	2462	14.27	--	--	--	17.45	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Product : Wireless Motherboard
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54			
		Measurement Level (dBm)										
01	2412	15.61	--	--	--	--	--	--	--	24.15	<30dBm	Pass
06	2437	16.61	16.48	16.33	16.19	16.05	15.91	15.77	15.63	24.17	<30dBm	Pass
11	2462	15.92	--	--	--	--	--	--	--	23.82	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Product : Wireless Motherboard
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2			
		Measurement Level (dBm)										
01	2412	16.54	--	--	--	--	--	--	--	24.36	<30dBm	Pass
06	2437	16.54	16.39	16.22	16.06	15.90	15.74	15.58	15.42	24.18	<30dBm	Pass
11	2462	16.53	--	--	--	--	--	--	--	24.06	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

4. Radiated Emission

4.1. Test Equipment

The following test equipment are used during the radiated emission test:

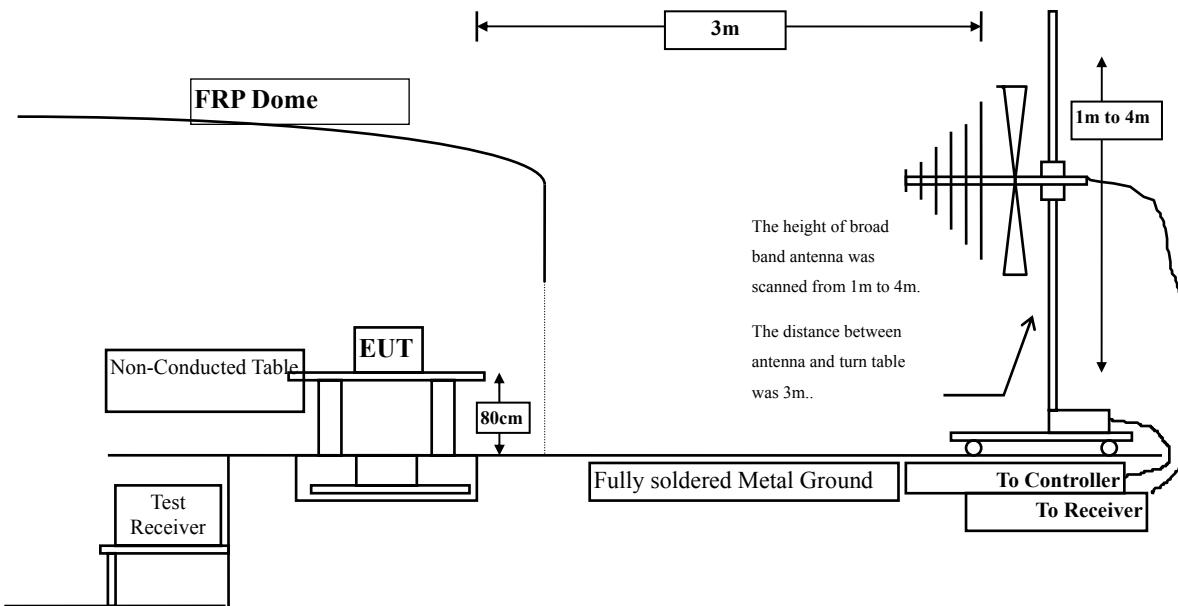
Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	QuiTek	QTK-CABLE/ CAB5	Feb., 2014
	X	Controller	QuiTek	QTK-CONTROLLER/CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

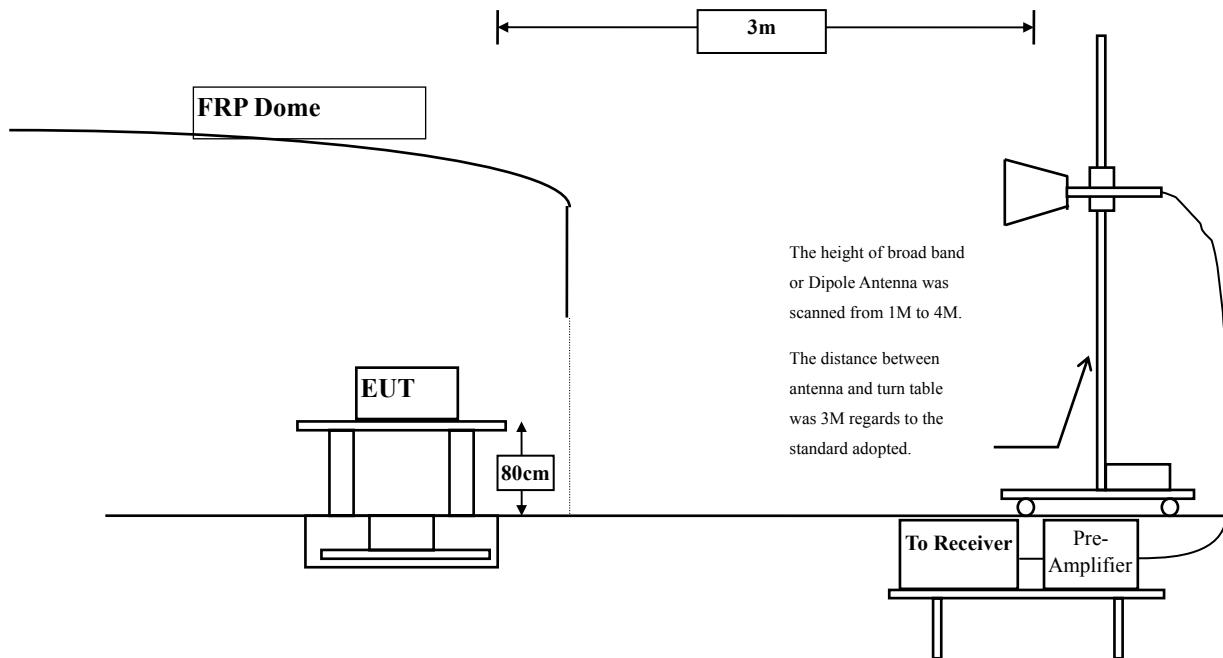
2. The test instruments marked with “X” are used to measure the final test results.

4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dB μ V/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009 and tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2009 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The frequency range from 9kHz to 10th harmonics is checked.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : Wireless Motherboard
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
------------------	-------------------------	--------------------------------	--------------------------------------	--------------	-----------------------

Horizontal

Peak Detector:

4824.000	3.261	37.150	40.411	-33.589	74.000
7236.000	10.650	36.590	47.240	-26.760	74.000
9648.000	13.337	36.150	49.486	-24.514	74.000

Average Detector:

--

Vertical

Peak Detector:

4824.000	6.421	42.590	49.011	-24.989	74.000
7236.000	11.495	36.590	48.085	-25.915	74.000
9648.000	13.807	36.980	50.786	-23.214	74.000

Average Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Motherboard
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
4874.000	3.038	37.480	40.517	-33.483	74.000
7311.000	11.795	37.150	48.944	-25.056	74.000
9748.000	12.635	37.150	49.785	-24.215	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	43.260	49.071	-24.929	74.000
7311.000	12.630	37.150	49.779	-24.221	74.000
9748.000	13.126	36.540	49.666	-24.334	74.000

Average Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Motherboard
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
------------------	-------------------------	--------------------------------	--------------------------------------	--------------	-----------------------

Horizontal

Peak Detector:

4924.000	2.858	37.190	40.047	-33.953	74.000
7386.000	12.127	36.190	48.318	-25.682	74.000
9848.000	12.852	37.150	50.003	-23.997	74.000

Average Detector:

--

Vertical

Peak Detector:

4924.000	5.521	43.590	49.110	-24.890	74.000
7386.000	13.254	37.140	50.394	-23.606	74.000
9848.000	13.367	36.560	49.927	-24.073	74.000

Average Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Motherboard
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
------------------	-------------------------	--------------------------------	--------------------------------------	--------------	-----------------------

Horizontal

Peak Detector:

4824.000	3.261	40.150	43.411	-30.589	74.000
7236.000	10.650	37.590	48.240	-25.760	74.000
9648.000	13.337	37.150	50.486	-23.514	74.000

Average Detector:

--

Vertical

Peak Detector:

4824.000	6.421	51.260	57.681	-16.319	74.000
7236.000	11.495	36.590	48.085	-25.915	74.000
9648.000	13.807	37.120	50.926	-23.074	74.000

Average Detector:

4824.000	6.421	34.120	40.541	-13.459	54.000
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Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Motherboard
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
------------------	-------------------------	--------------------------------	--------------------------------------	--------------	-----------------------

Horizontal

Peak Detector:

4874.000	3.038	41.590	44.627	-29.373	74.000
7311.000	11.795	37.150	48.944	-25.056	74.000
9748.000	12.635	37.560	50.195	-23.805	74.000

Average Detector:

--

Peak Detector:

4874.000	5.812	52.260	58.071	-15.929	74.000
7311.000	12.630	37.490	50.119	-23.881	74.000
9748.000	13.126	37.250	50.376	-23.624	74.000

Average Detector:

4874.000	5.812	35.260	41.071	-12.929	54.000
----------	-------	--------	--------	---------	--------

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Motherboard
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
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Horizontal

Peak Detector:

4924.000	2.858	42.150	45.007	-28.993	74.000
7386.000	12.127	37.180	49.308	-24.692	74.000
9848.000	12.852	37.140	49.993	-24.007	74.000

Average Detector:

--

Vertical

Peak Detector:

4924.000	5.521	52.690	58.210	-15.790	74.000
7386.000	13.254	37.590	50.844	-23.156	74.000
9848.000	13.367	36.590	49.957	-24.043	74.000

Average Detector:

4924.000	5.521	36.150	41.670	-12.330	54.000
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Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Motherboard
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2412MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB μ V	dB μ V/m	dB	dB μ V/m

Horizontal

Peak Detector:

4824.000	3.261	42.560	45.821	-28.179	74.000
7236.000	10.650	37.150	47.800	-26.200	74.000
9648.000	13.337	36.560	49.896	-24.104	74.000
					74.000

Average Detector:

--

Vertical

Peak Detector:

4824.000	6.421	52.690	59.111	-14.889	74.000
7236.000	11.495	37.590	49.085	-24.915	74.000
9648.000	13.807	36.500	50.306	-23.694	74.000

Average Detector:

4824.000	6.421	35.690	42.111	-11.889	54.000
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Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Motherboard
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
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Horizontal

Peak Detector:

4874.000	3.038	42.690	45.727	-28.273	74.000
7311.000	11.795	37.150	48.944	-25.056	74.000
9748.000	12.635	36.590	49.225	-24.775	74.000

Average Detector:

--

Vertical

Peak Detector:

4874.000	5.812	53.150	58.961	-15.039	74.000
7311.000	12.630	38.150	50.779	-23.221	74.000
9748.000	13.126	36.530	49.656	-24.344	74.000

Average Detector:

4874.000	5.812	35.120	40.931	-13.069	54.000
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Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Motherboard
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
------------------	-------------------------	--------------------------------	--------------------------------------	--------------	-----------------------

Horizontal

Peak Detector:

4924.000	2.858	42.560	45.417	-28.583	74.000
7386.000	12.127	37.150	49.278	-24.722	74.000
9848.000	12.852	37.210	50.063	-23.937	74.000

Average Detector:

--

Vertical

Peak Detector:

4924.000	5.521	52.190	57.710	-16.290	74.000
7386.000	13.254	37.560	50.814	-23.186	74.000
9848.000	13.367	37.150	50.517	-23.483	74.000

Average Detector:

4924.000	5.521	34.150	39.670	-14.330	54.000
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Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Motherboard
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)

Frequency MHz	Correct Factor	Reading dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
111.480	-7.489	40.695	33.207	-10.293	43.500
307.420	-4.120	41.575	37.455	-8.545	46.000
464.560	2.914	30.693	33.607	-12.393	46.000
693.480	3.608	34.601	38.209	-7.791	46.000
864.200	6.329	33.306	39.635	-6.365	46.000
974.780	7.039	33.162	40.201	-13.799	54.000
Vertical					
130.880	-3.777	39.983	36.205	-7.295	43.500
299.660	-4.061	39.131	35.070	-10.930	46.000
499.480	-0.199	36.179	35.979	-10.021	46.000
666.320	-0.951	32.793	31.842	-14.158	46.000
800.180	2.637	30.088	32.725	-13.275	46.000
955.380	2.956	33.001	35.957	-10.043	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Wireless Motherboard
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
125.060	-7.335	44.722	37.387	-6.113	43.500
256.980	-5.424	42.343	36.919	-9.081	46.000
400.540	0.942	38.262	39.204	-6.796	46.000
600.360	3.472	30.605	34.077	-11.923	46.000
800.180	6.417	31.444	37.861	-8.139	46.000
926.280	6.832	32.357	39.189	-6.811	46.000
Vertical					
132.820	-3.932	37.800	33.868	-9.632	43.500
297.720	-4.356	39.063	34.707	-11.293	46.000
499.480	-0.199	36.606	36.406	-9.594	46.000
666.320	-0.951	34.004	33.053	-12.947	46.000
798.240	2.629	28.971	31.599	-14.401	46.000
932.100	3.430	27.179	30.609	-15.391	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Wireless Motherboard
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
152.220	-7.926	44.896	36.970	-6.530	43.500
295.780	-4.747	43.654	38.907	-7.093	46.000
431.580	0.757	29.749	30.506	-15.494	46.000
689.600	3.642	33.613	37.255	-8.745	46.000
858.380	6.685	30.628	37.313	-8.687	46.000
947.620	6.971	31.199	38.170	-7.830	46.000
Vertical					
123.120	-3.630	39.634	36.004	-7.496	43.500
299.660	-4.061	38.120	34.059	-11.941	46.000
499.480	-0.199	28.931	28.731	-17.269	46.000
666.320	-0.951	32.522	31.571	-14.429	46.000
800.180	2.637	26.922	29.559	-16.441	46.000
965.080	3.832	26.072	29.904	-24.096	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss -Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

5. RF antenna conducted test

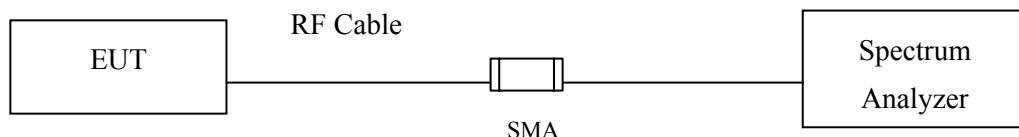
5.1. Test Equipment

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with "X" are used to measure the final test results.

5.2. Test Setup

RF antenna Conducted Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.4. Test Procedure

The EUT was tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

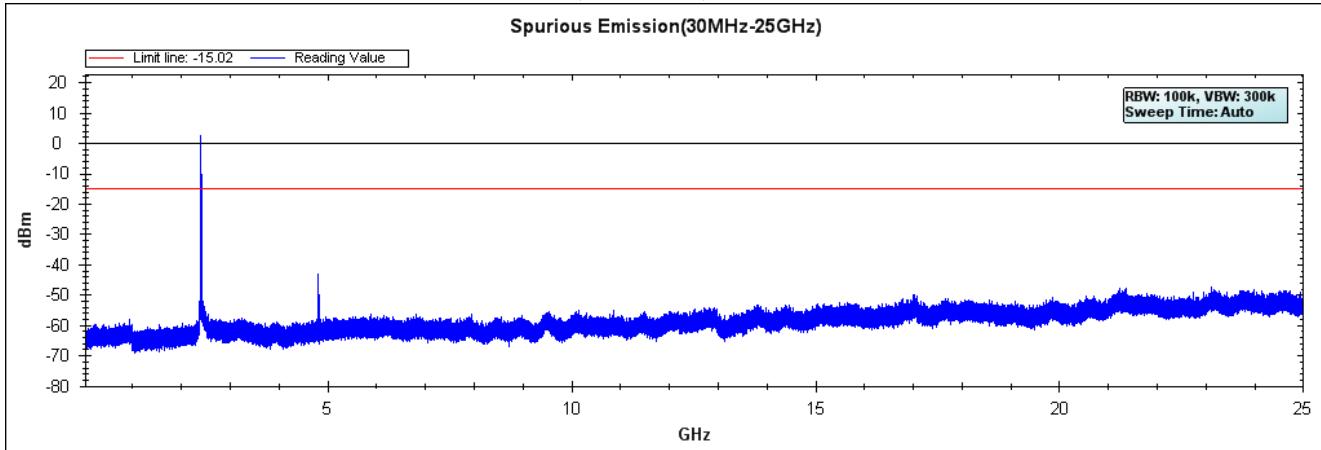
5.5. Uncertainty

The measurement uncertainty
Conducted is defined as $\pm 1.27\text{dB}$

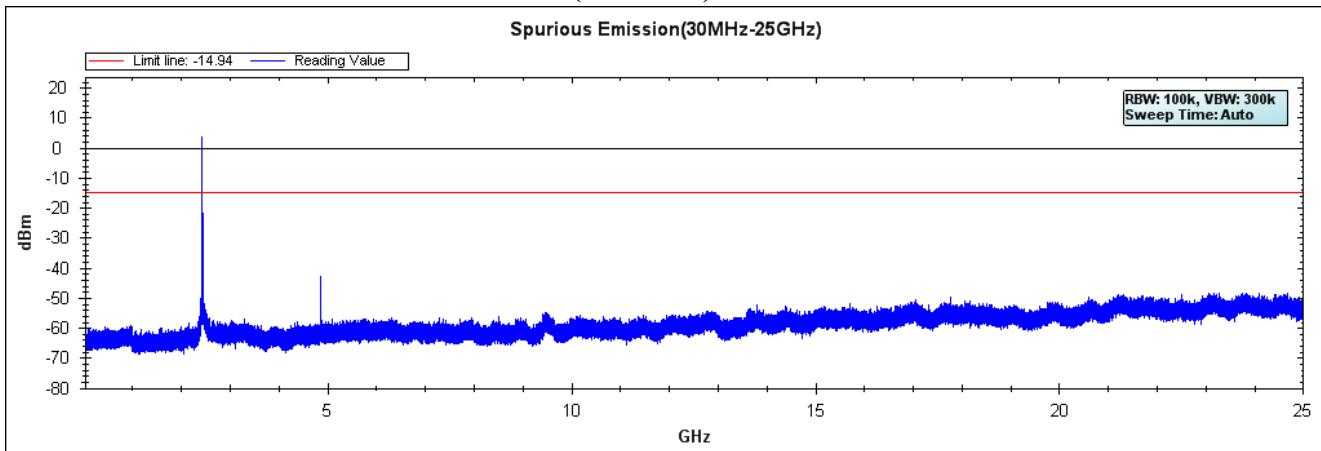
5.6. Test Result of RF antenna conducted test

Product : Wireless Motherboard
Test Item : RF antenna conducted test
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

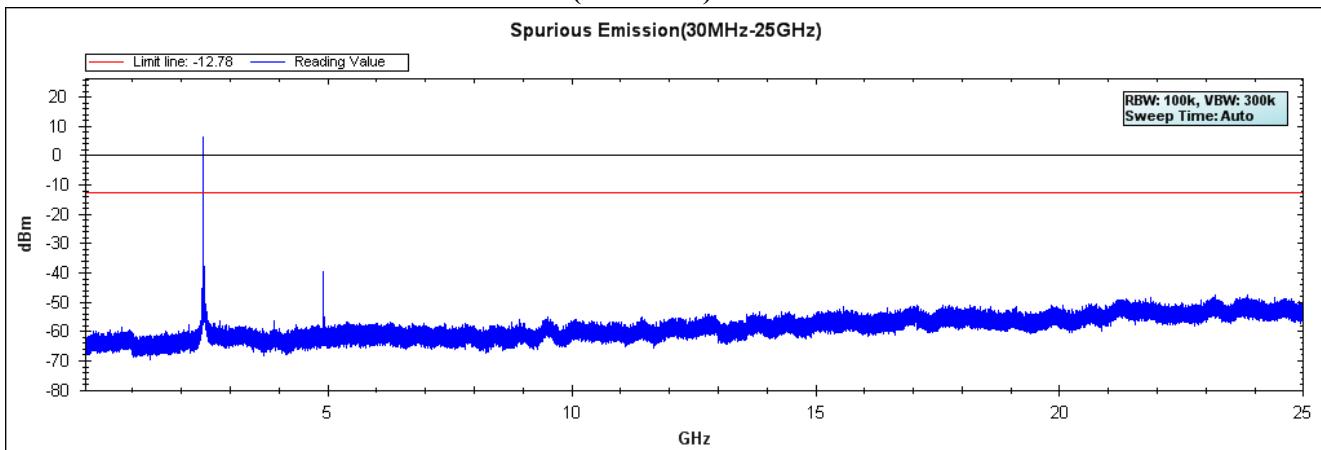
Channel 01 (2412MHz) 30MHz-25GHz



Channel 06 (2437MHz) 30MHz-25GHz



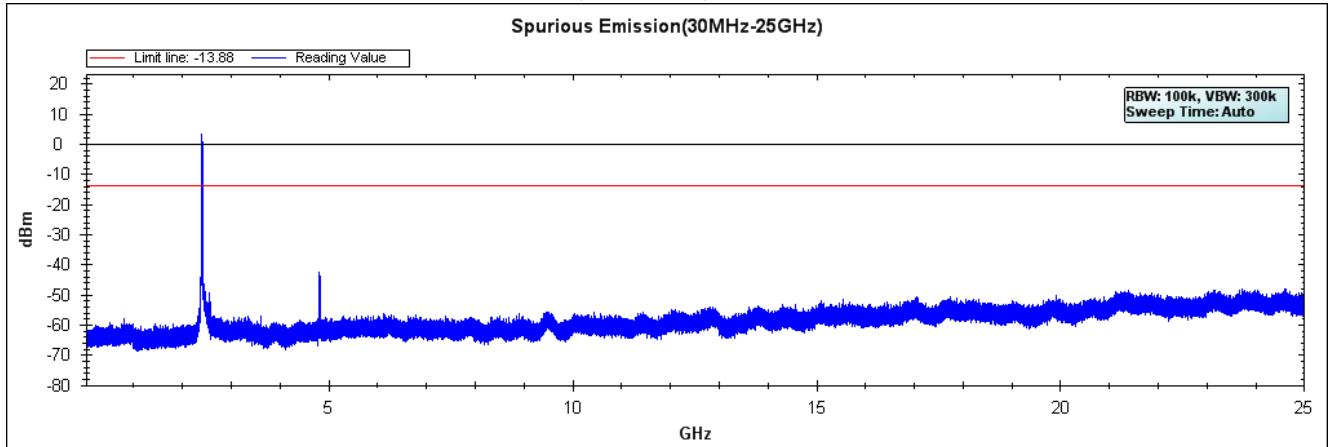
Channel 62 (2462MHz) 30MHz-25GHz



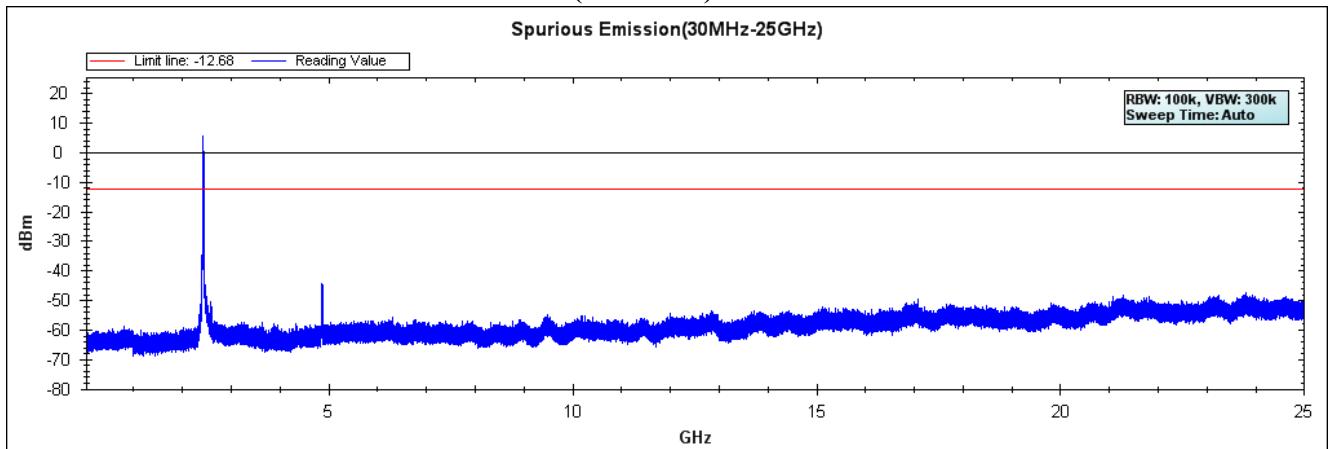
Note: The above test pattern is synthesized by multiple of the frequency range.

Product : Wireless Motherboard
Test Item : RF Antenna Conducted Spurious
Test Site : No.3 OATS
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

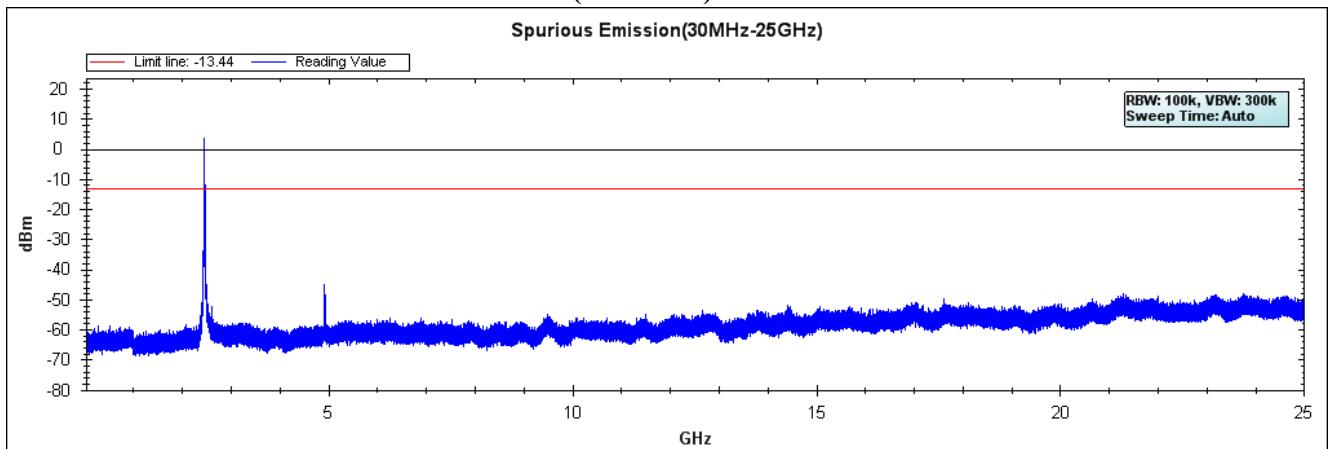
Channel 01 (2412MHz) 30MHz-25GHz



Channel 06 (2437MHz) 30MHz-25GHz



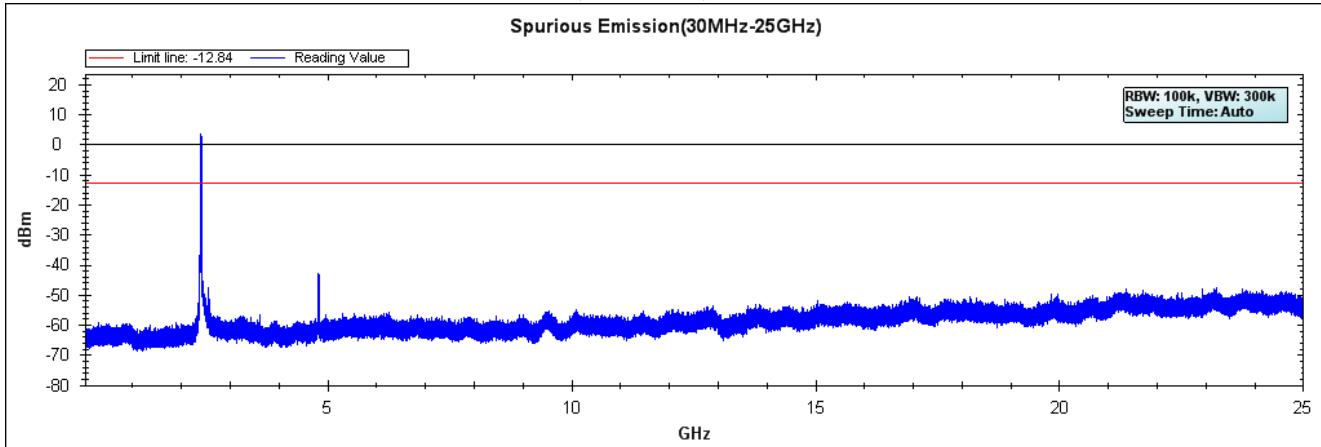
Channel 11 (2462MHz) 30MHz-25GHz



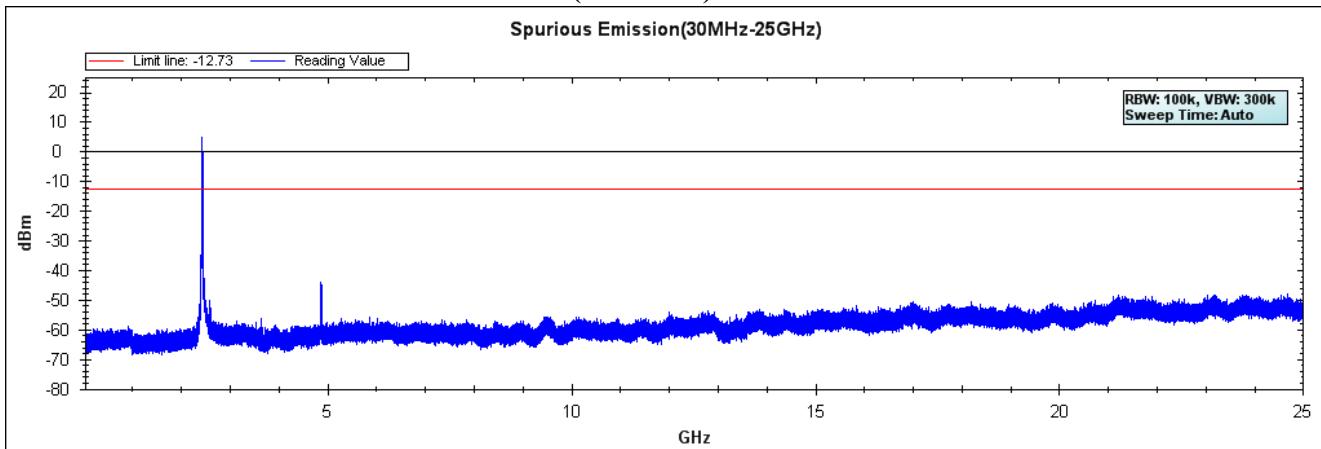
Note: The above test pattern is synthesized by multiple of the frequency range.

Product : Wireless Motherboard
Test Item : RF Antenna Conducted Spurious
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

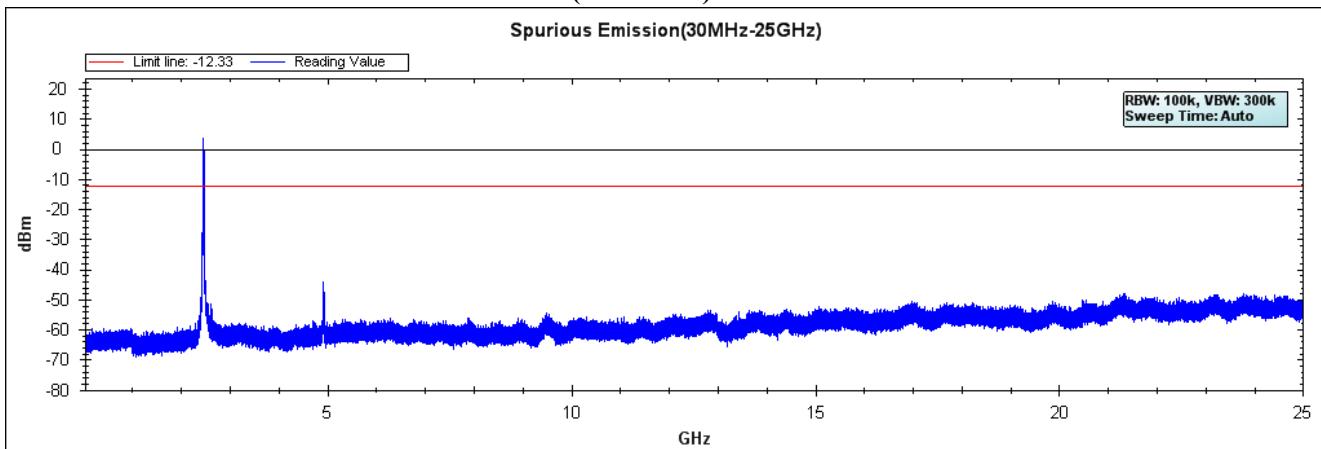
Channel 01 (2412MHz) 30MHz-25GHz



Channel 06 (2437MHz) 30MHz-25GHz



Channel 11 (2462MHz) 30MHz-25GHz



Note: The above test pattern is synthesized by multiple of the frequency range.

6. Band Edge

6.1. Test Equipment

RF Radiated Measurement:

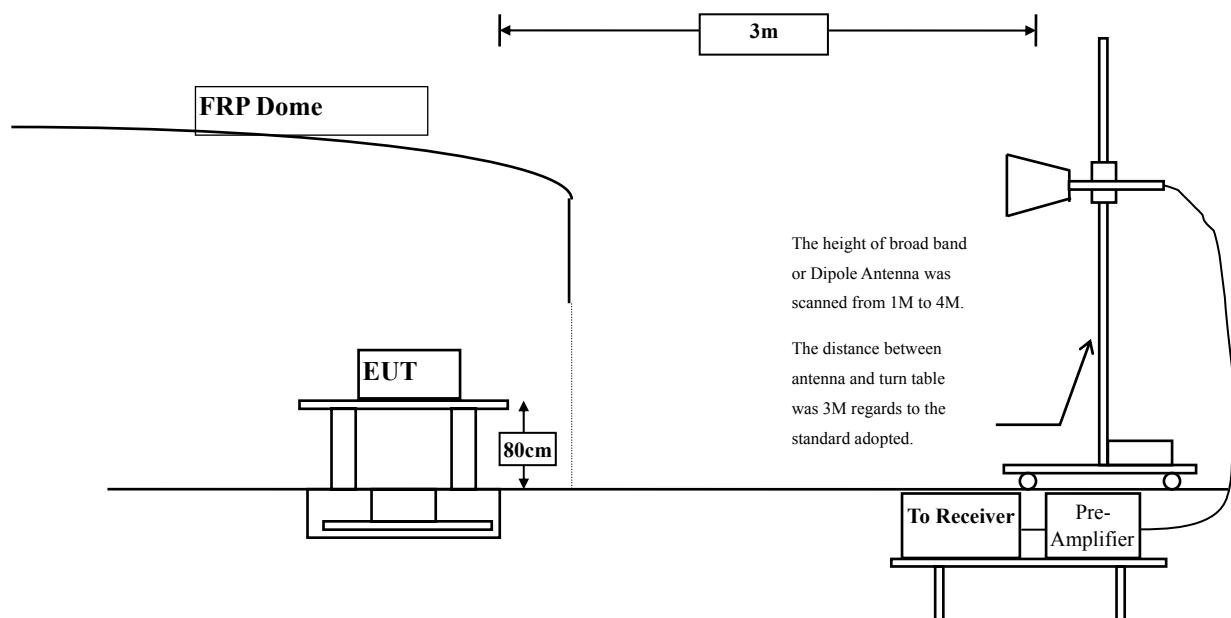
The following test equipments are used during the band edge tests:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Site # 3	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	X Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X Coaxial Cable	QuiTek	QTK-CABLE/ CAB5	Feb., 2014
	X Controller	QuiTek	QTK-CONTROLLER/ CTRL3	N/A
X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All instruments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

6.2. Test Setup

RF Radiated Measurement:



6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2009 on radiated measurement.

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

6.6. Test Result of Band Edge

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
01 (Peak)	2387.400	31.499	26.516	58.015	74.00	54.00	Pass
01 (Peak)	2390.000	31.509	24.833	56.342	74.00	54.00	Pass
01 (Peak)	2400.000	31.561	24.351	55.912	--	--	Pass
01 (Peak)	2413.000	31.646	49.613	81.259	--	--	Pass
01 (Average)	2390.000	31.509	14.009	45.518	74.00	54.00	Pass
01 (Average)	2400.000	31.561	13.982	45.543	--	--	Pass
01 (Average)	2412.800	31.645	44.444	76.088	--	--	Pass

Figure Channel 01:

Horizontal (Peak)

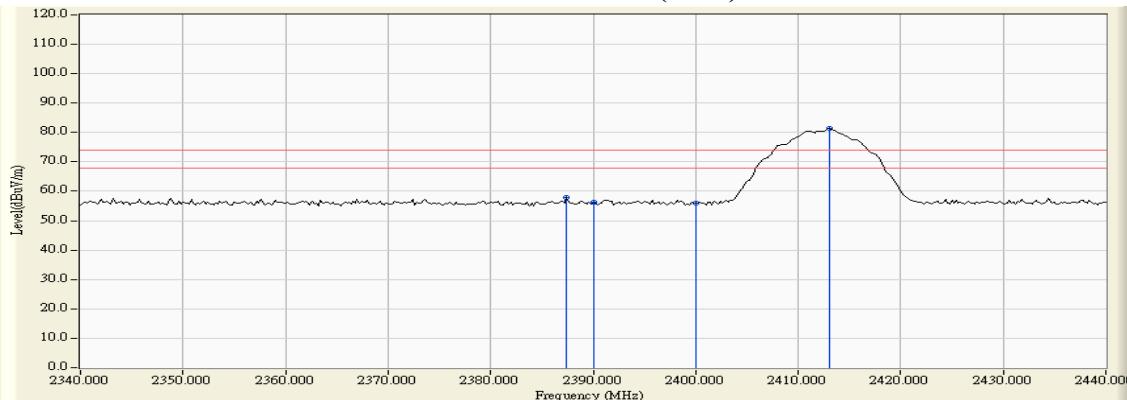
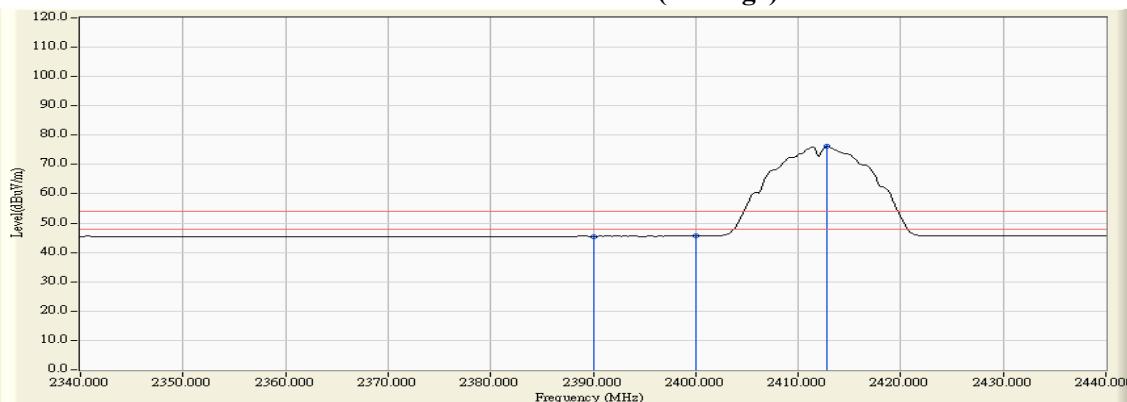


Figure Channel 01:

Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
01 (Peak)	2389.400	30.918	25.294	56.212	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	23.324	54.239	74.00	54.00	Pass
01 (Peak)	2400.000	30.912	23.646	54.558	--	--	Pass
01 (Peak)	2413.000	30.956	52.151	83.107	--	--	Pass
01 (Average)	2390.000	30.915	14.394	45.309	74.00	54.00	Pass
01 (Average)	2400.000	30.912	14.036	44.948	--	--	Pass
01 (Average)	2412.800	30.955	49.188	80.143	--	--	Pass

Figure Channel 01:

Vertical (Peak)

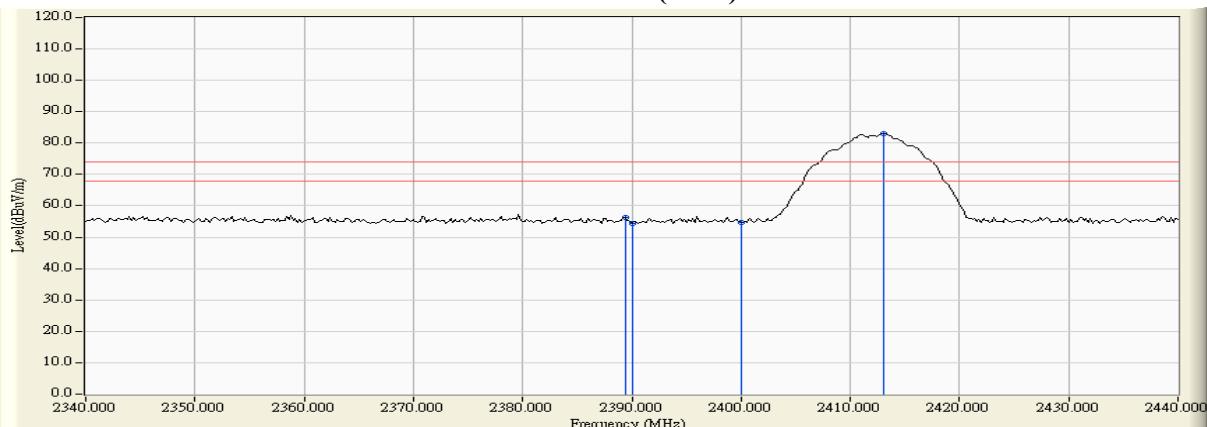
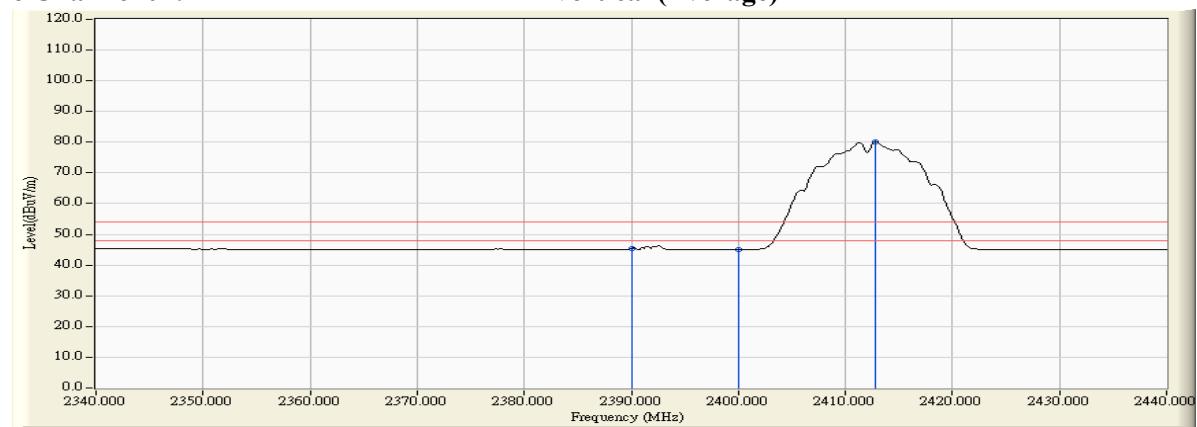


Figure Channel 01:

Vertical (Average)



Note: 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
 4. “*”, means this data is the worst emission level.
 5. Measurement Level = Reading Level + Correct Factor.
 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
11 (Peak)	2463.100	32.028	51.888	83.916	--	--	Pass
11 (Peak)	2483.500	32.182	25.625	57.807	74.00	54.00	Pass
11 (Average)	2461.300	32.014	47.797	79.811	--	--	Pass
11 (Average)	2483.500	32.182	14.027	46.209	74.00	54.00	Pass

Figure Channel 11:

Horizontal (Peak)

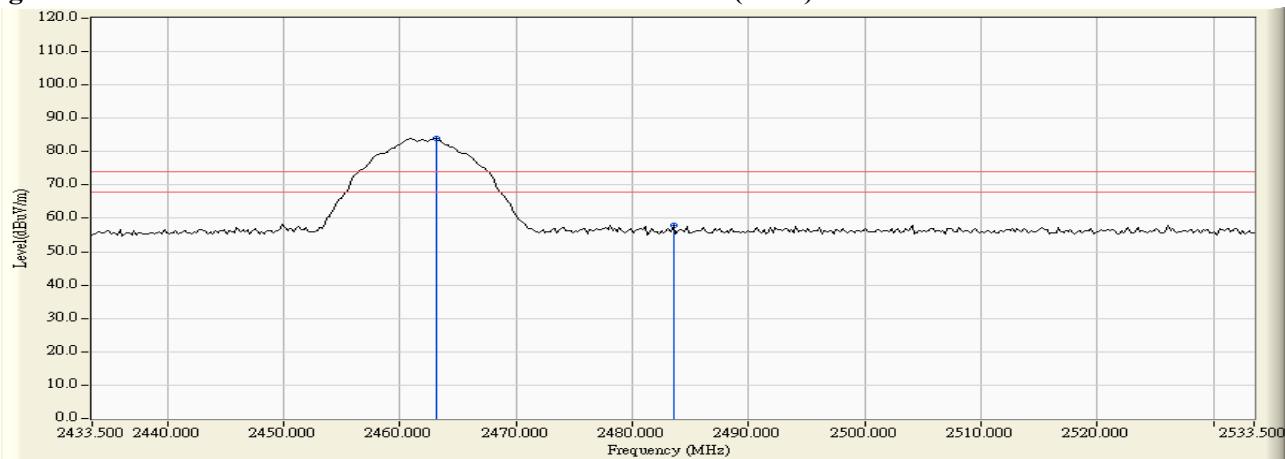
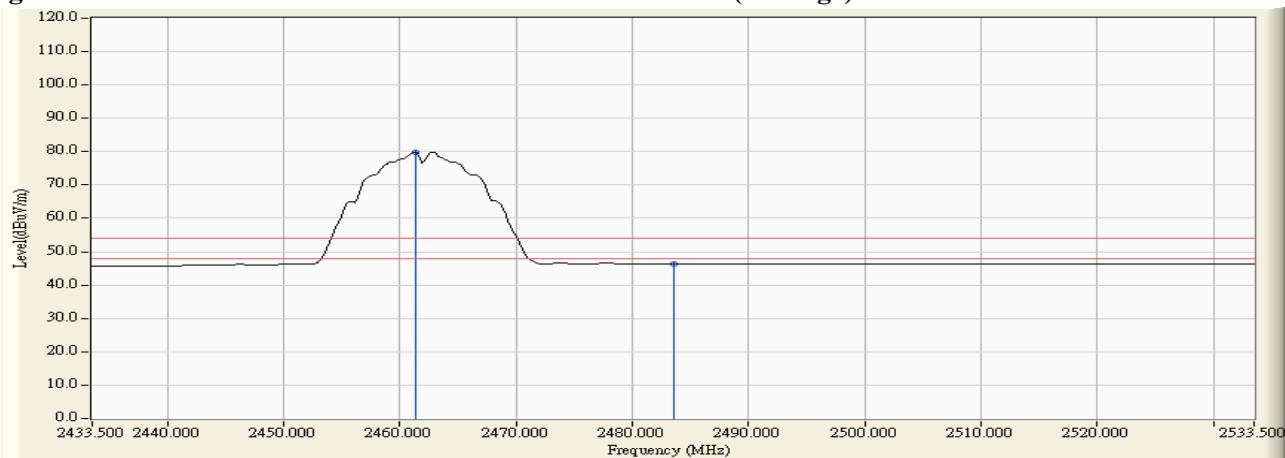


Figure Channel 11:

Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
11 (Peak)	2462.900	31.296	55.708	87.004	--	--	Pass
11 (Peak)	2483.500	31.435	24.728	56.163	74.00	54.00	Pass
11 (Peak)	2484.700	31.444	26.073	57.516	74.00	54.00	Pass
11 (Average)	2461.100	31.285	51.455	82.739	--	--	Pass
11 (Average)	2483.500	31.435	14.046	45.481	74.00	54.00	Pass

Figure Channel 11:

Vertical (Peak)

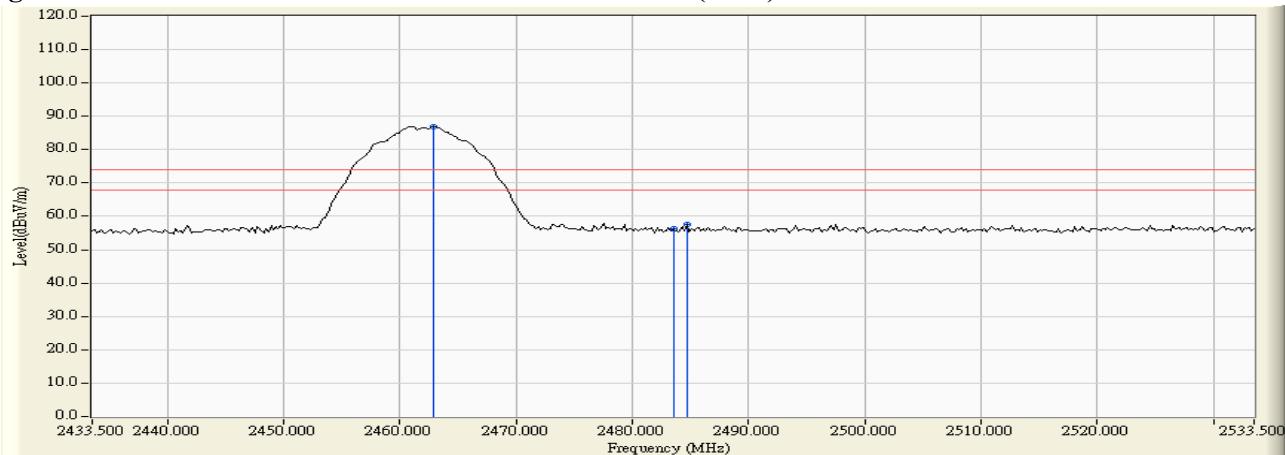


Figure Channel 11:

Vertical (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
01 (Peak)	2390.000	31.509	25.141	56.650	74.00	54.00	Pass
01 (Peak)	2400.000	31.561	26.954	58.515	--	--	Pass
01 (Peak)	2412.200	31.640	55.896	87.536	--	--	Pass
01(Average)	2390.000	31.509	14.077	45.586	74.00	54.00	Pass
01(Average)	2400.000	31.561	14.550	46.111	--	--	Pass
01(Average)	2413.000	31.646	41.467	73.113	--	--	Pass

Figure Channel 01:

Horizontal (Peak)

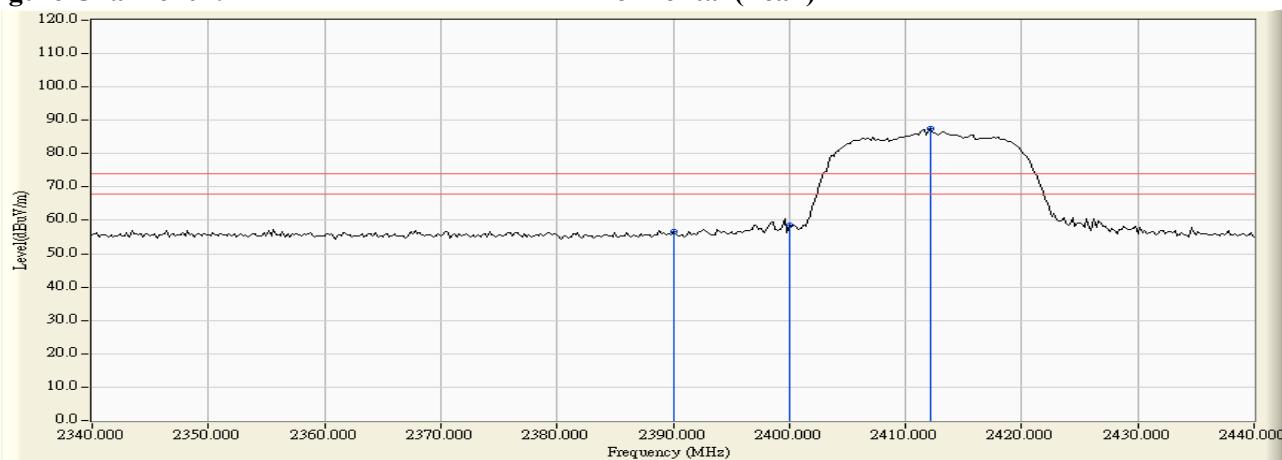
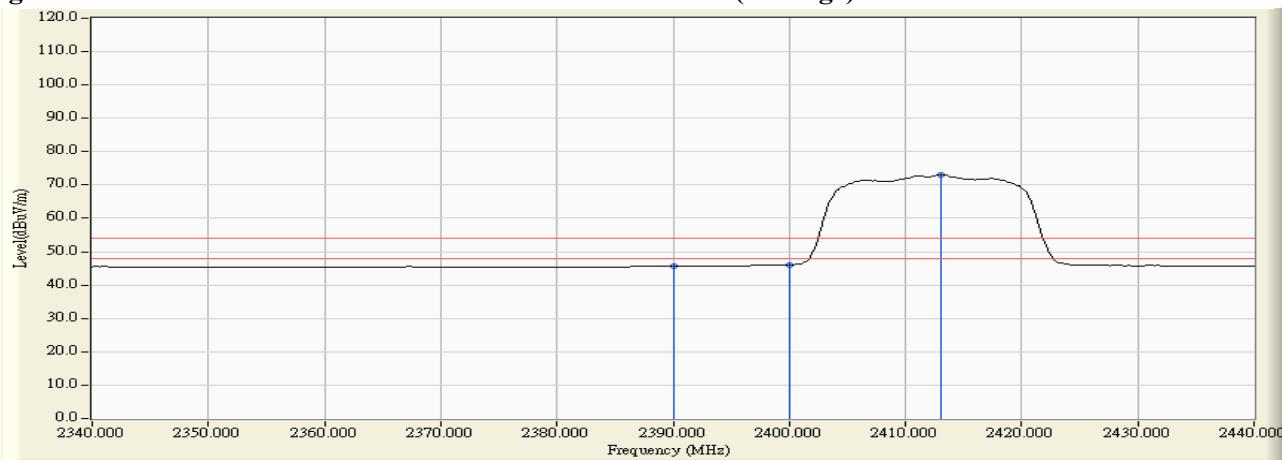


Figure Channel 01:

Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
01 (Peak)	2386.000	30.934	26.650	57.584	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	24.366	55.281	74.00	54.00	Pass
01 (Peak)	2400.000	30.912	32.248	63.160	--	--	Pass
01 (Peak)	2413.200	30.957	60.218	91.175	--	--	Pass
01 (Average)	2390.000	30.915	14.135	45.050	74.00	54.00	Pass
01 (Average)	2400.000	30.912	15.221	46.133	--	--	Pass
01 (Average)	2413.000	30.956	45.492	76.448	--	--	Pass

Figure Channel 01:

Vertical (Peak)

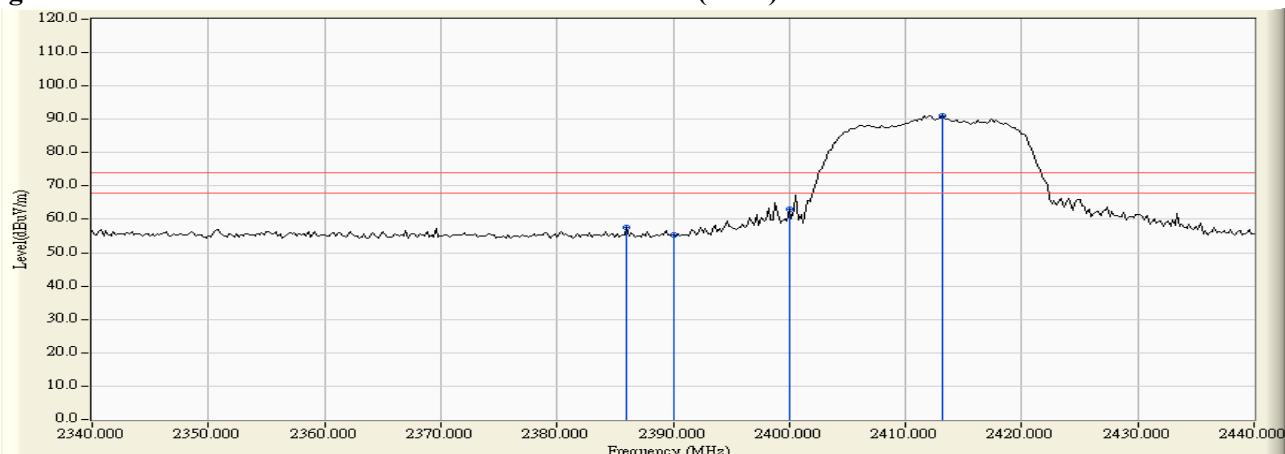
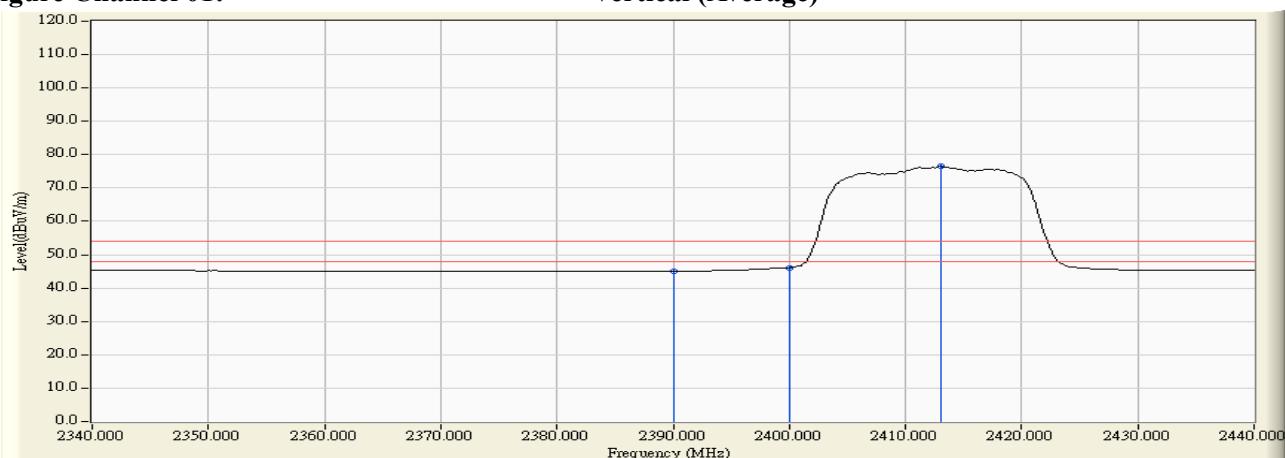


Figure Channel 01:

Vertical (Average)



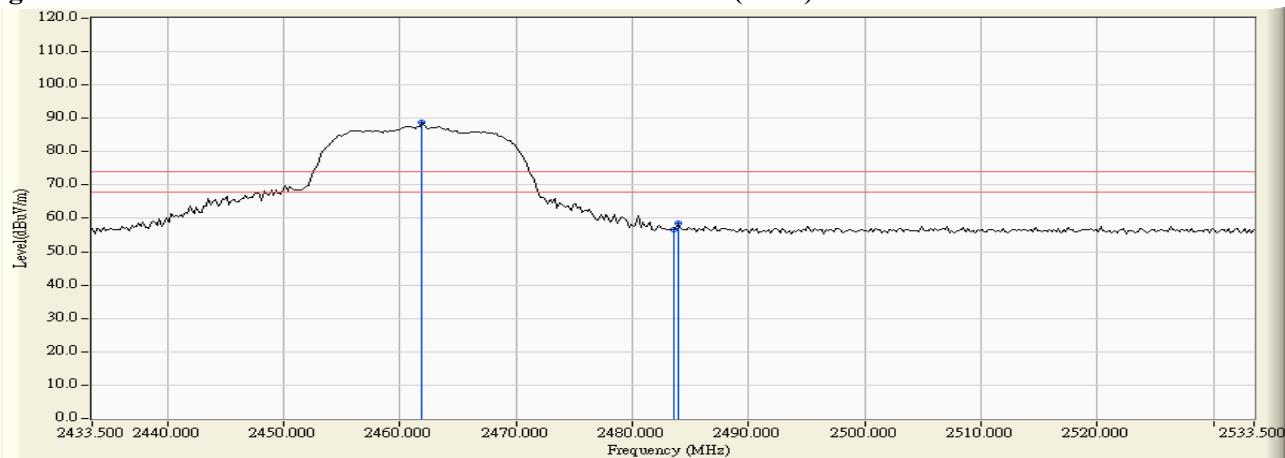
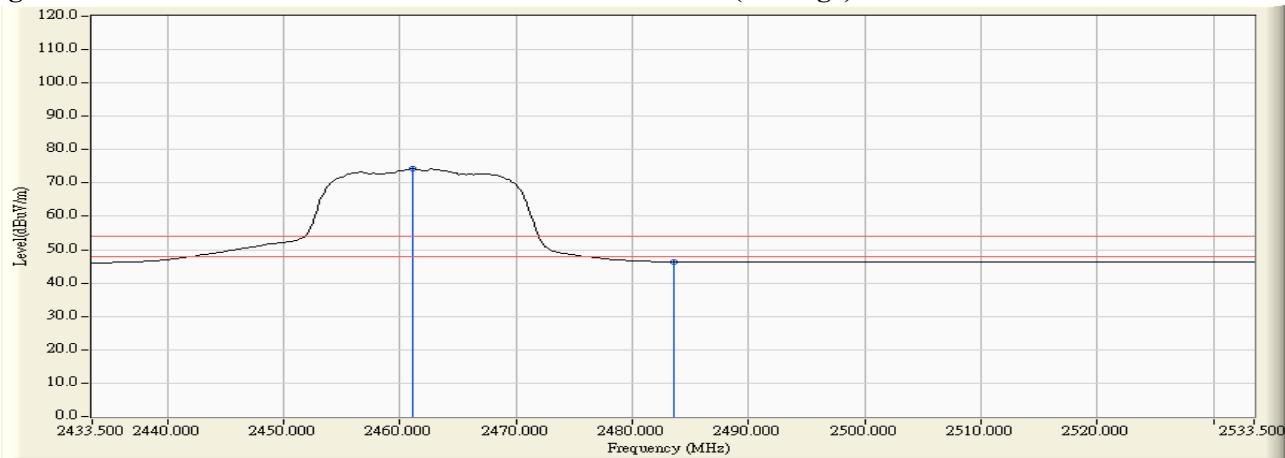
Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
11 (Peak)	2461.900	32.018	56.708	88.727	--	--	Pass
11 (Peak)	2483.500	32.182	24.439	56.621	74.00	54.00	Pass
11 (Peak)	2483.900	32.185	26.294	58.479	74.00	54.00	Pass
11 (Average)	2461.100	32.013	42.222	74.235	--	--	Pass
11 (Average)	2483.500	32.182	14.169	46.351	74.00	54.00	Pass

Figure Channel 11:
Horizontal (Peak)

Figure Channel 11:
Horizontal (Average)


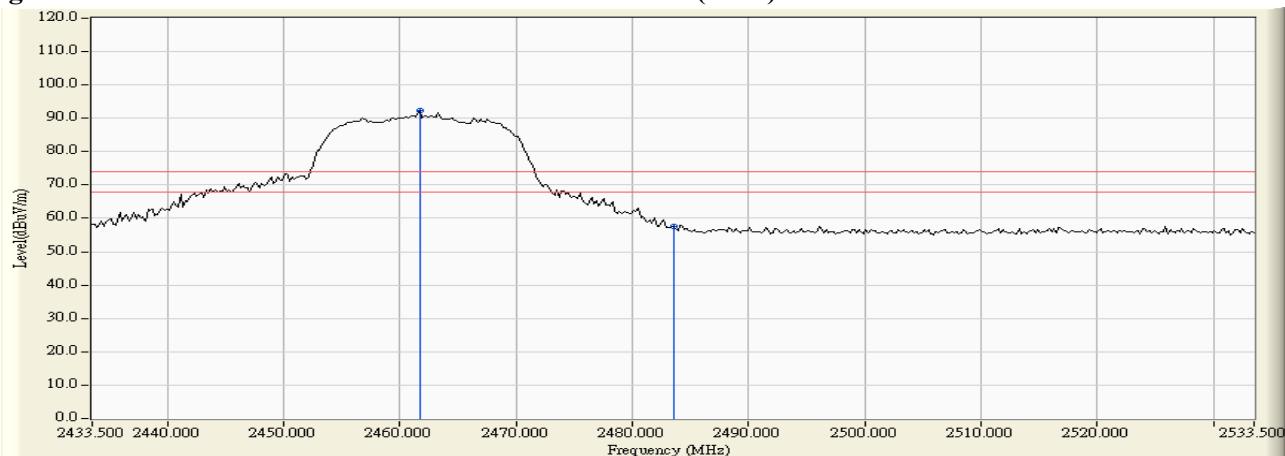
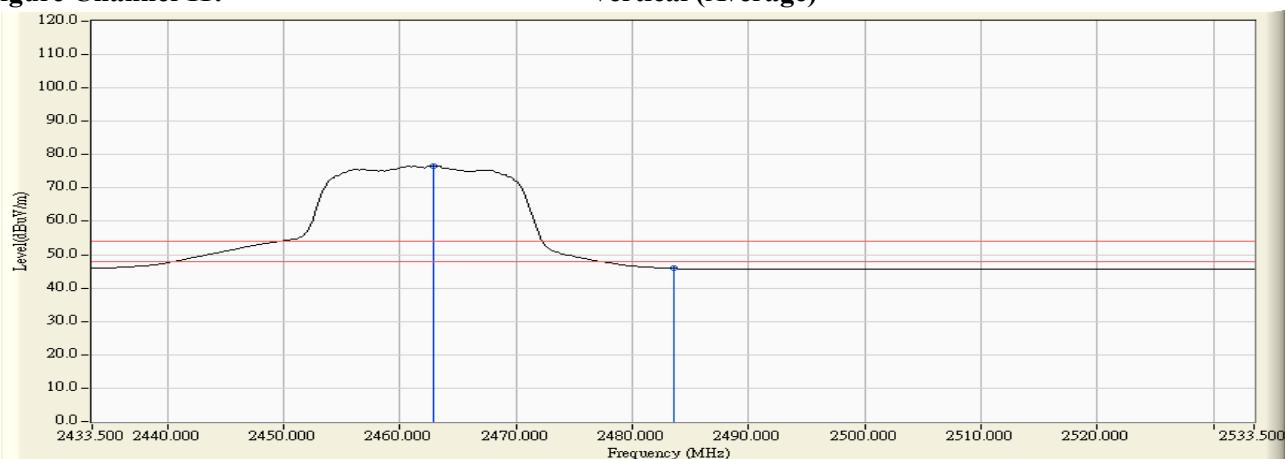
Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
11 (Peak)	2461.700	31.288	60.969	92.257	--	--	Pass
11 (Peak)	2483.500	31.435	26.082	57.517	74.00	54.00	Pass
11 (Average)	2462.900	31.296	45.356	76.652	--	--	Pass
11 (Average)	2483.500	31.435	14.442	45.877	74.00	54.00	Pass

Figure Channel 11:
Vertical (Peak)

Figure Channel 11:
Vertical (Average)


Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
01 (Peak)	2390.000	31.509	25.443	56.952	74.00	54.00	Pass
01 (Peak)	2400.000	31.561	30.093	61.654	--	--	Pass
01 (Peak)	2412.600	31.642	56.364	88.007	--	--	Pass
01 (Average)	2390.000	31.509	14.109	45.618	74.00	54.00	Pass
01 (Average)	2400.000	31.561	14.453	46.014	--	--	Pass
01 (Average)	2413.000	31.646	41.567	73.213	--	--	Pass

Figure Channel 01:

Horizontal (Peak)

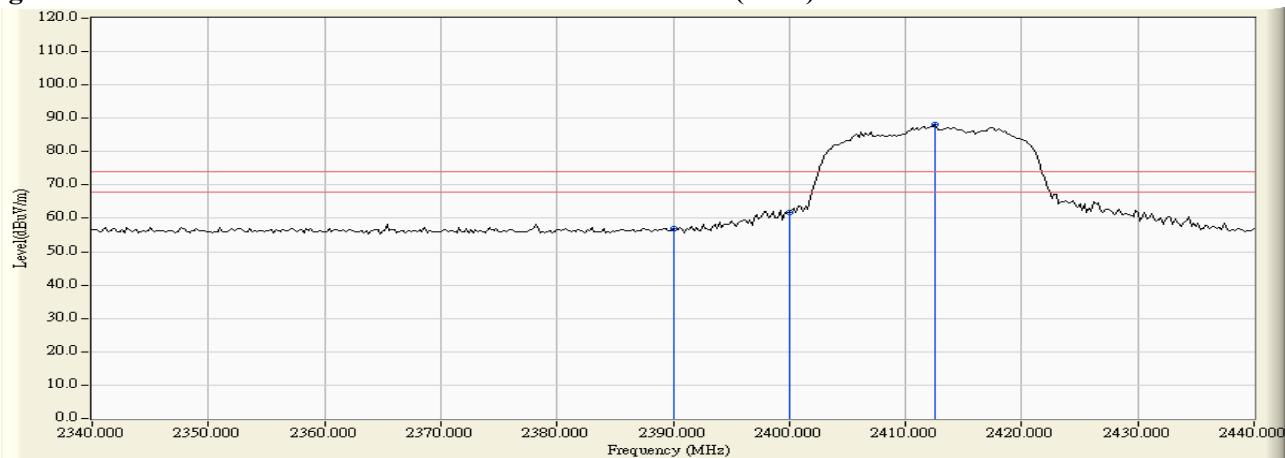
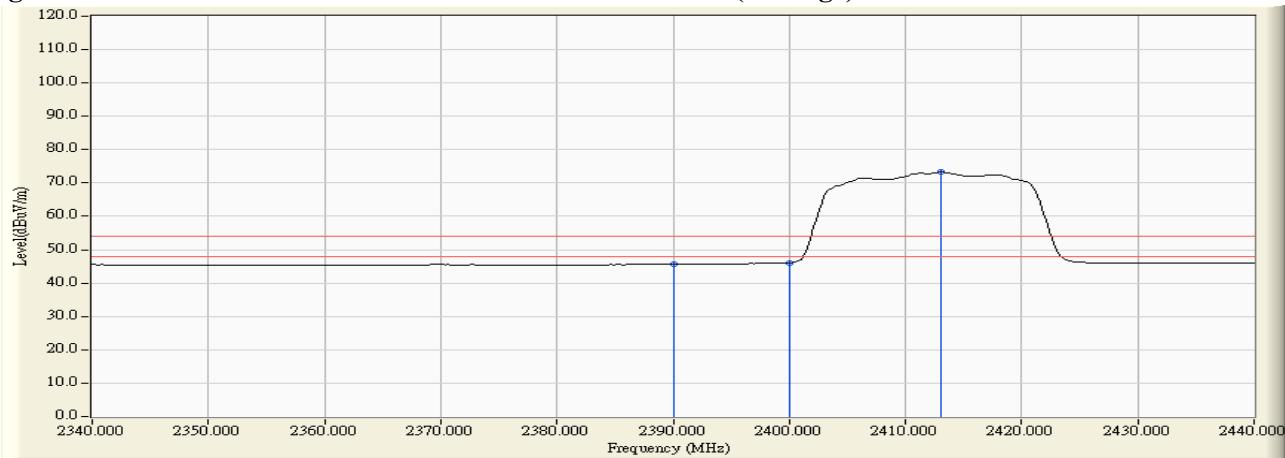


Figure Channel 01:

Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
01 (Peak)	2390.000	30.915	25.557	56.472	74.00	54.00	Pass
01 (Peak)	2400.000	30.912	32.587	63.499	--	--	Pass
01 (Peak)	2412.800	30.955	60.239	91.194	--	--	Pass
01 (Average)	2390.000	30.915	14.164	45.079	74.00	54.00	Pass
01 (Average)	2400.000	30.912	14.827	45.739	--	--	Pass
01 (Average)	2413.200	30.957	44.506	75.463	--	--	Pass

Figure Channel 01:

Vertical (Peak)

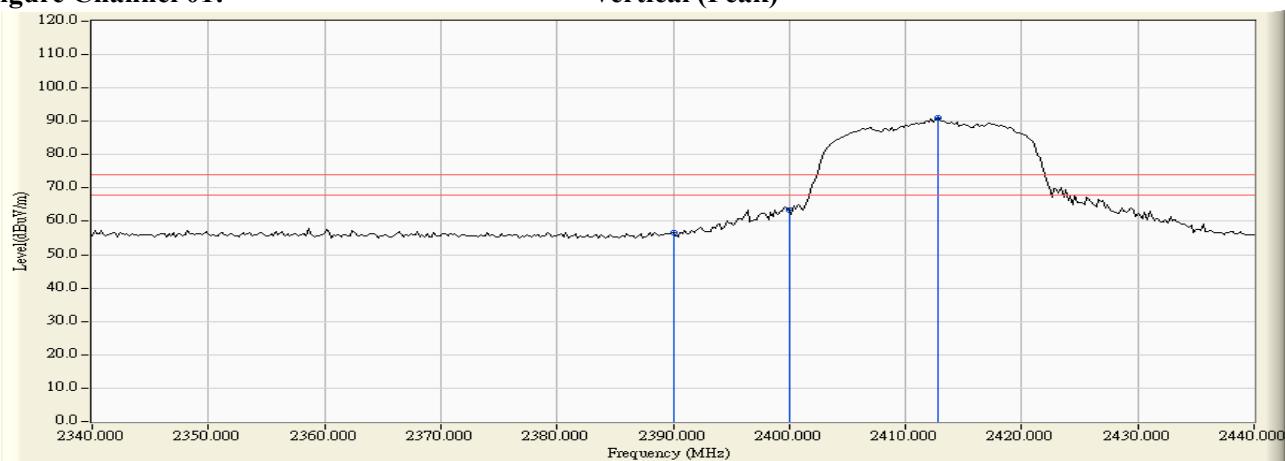
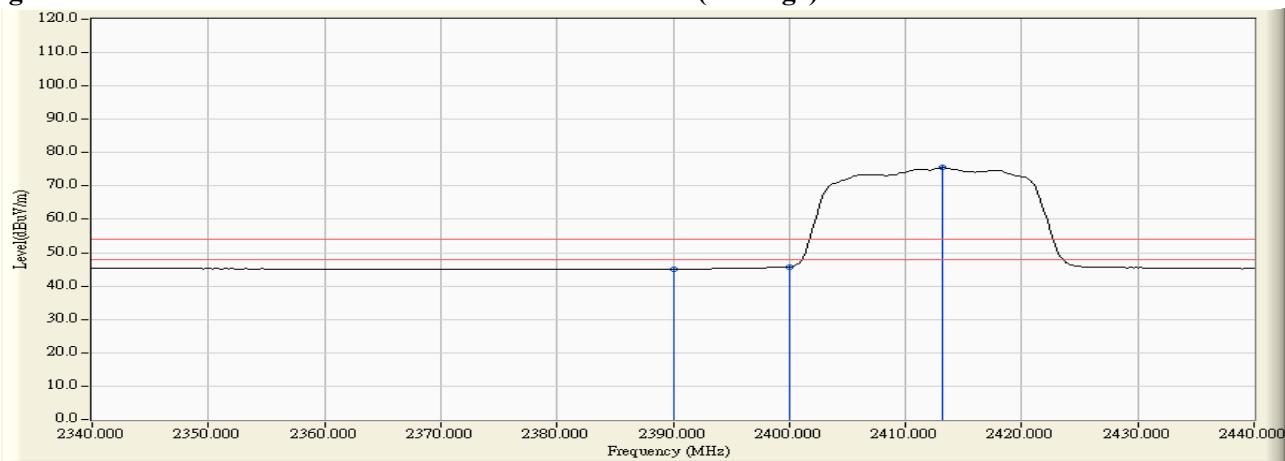


Figure Channel 01:

Vertical (Average)



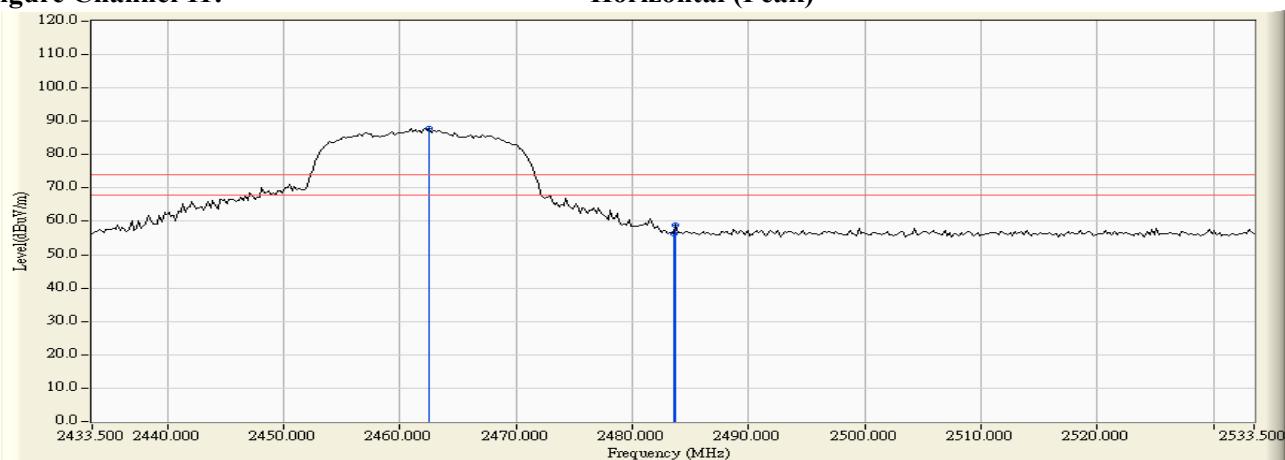
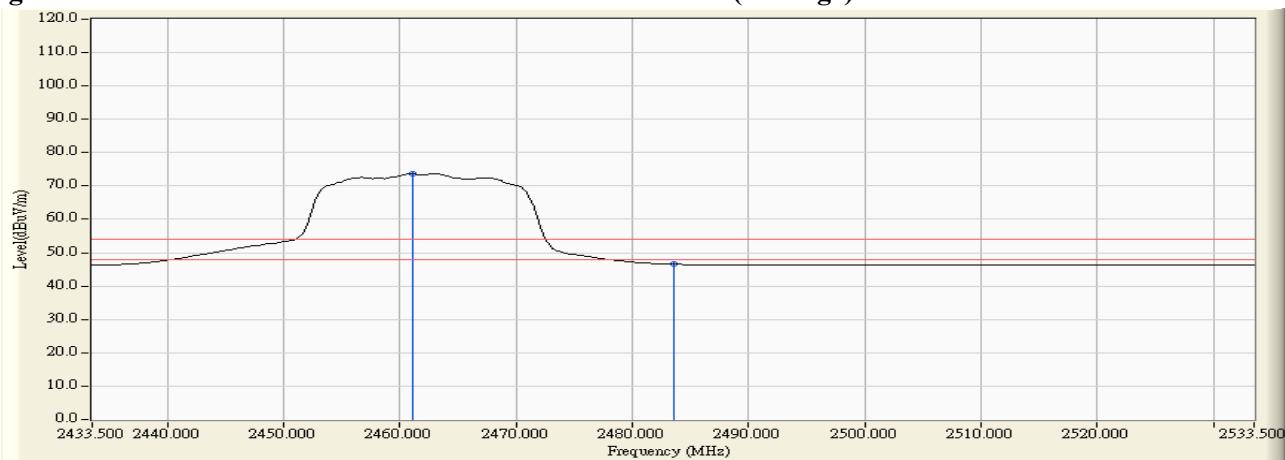
Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
11 (Peak)	2462.500	32.023	55.873	87.896	--	--	Pass
11 (Peak)	2483.500	32.182	24.062	56.244	74.00	54.00	Pass
11 (Peak)	2483.700	32.183	26.638	58.822	74.00	54.00	Pass
11 (Average)	2461.100	32.013	41.676	73.689	--	--	Pass
11 (Average)	2483.500	32.182	14.359	46.541	74.00	54.00	Pass

Figure Channel 11:
Horizontal (Peak)

Figure Channel 11:
Horizontal (Average)


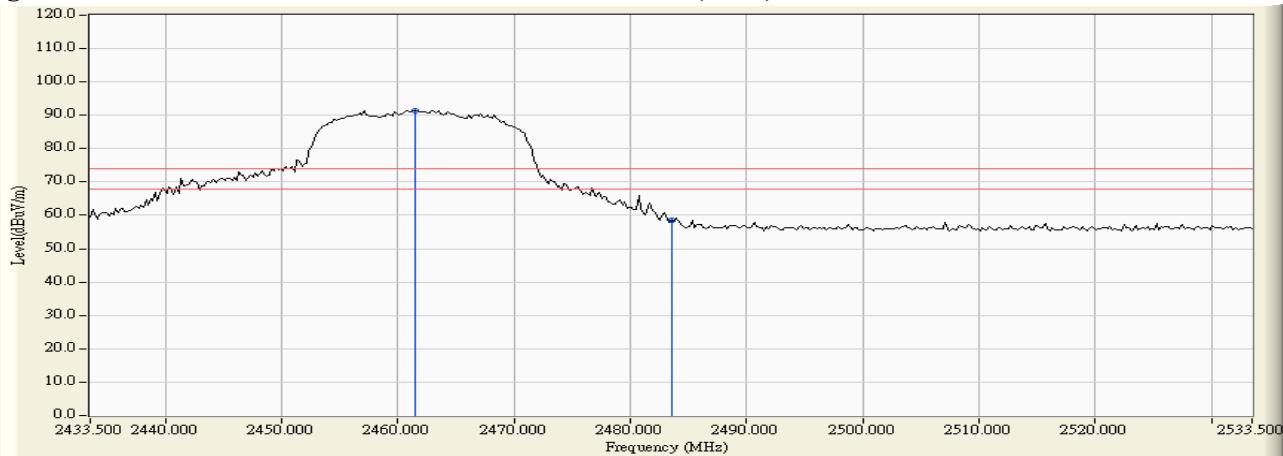
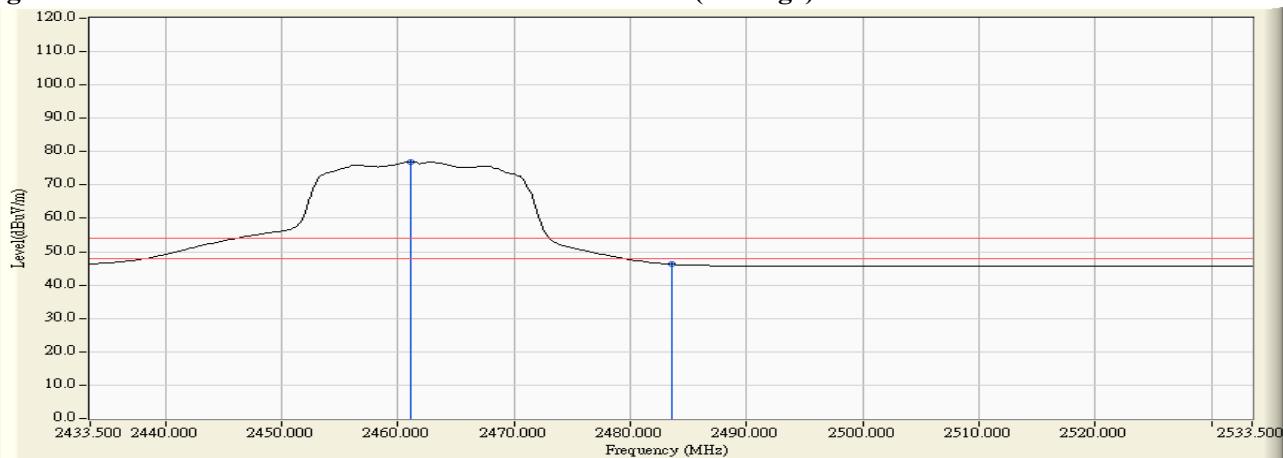
Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Motherboard
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
11 (Peak)	2461.500	31.287	60.239	91.526	--	--	Pass
11 (Peak)	2483.500	31.435	27.218	58.653	74.00	54.00	Pass
11 (Average)	2461.100	31.285	45.627	76.911	--	--	Pass
11 (Average)	2483.500	31.435	14.840	46.275	74.00	54.00	Pass

Figure Channel 11:
Vertical (Peak)

Figure Channel 11:
Vertical (Average)


Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

7. Occupied Bandwidth

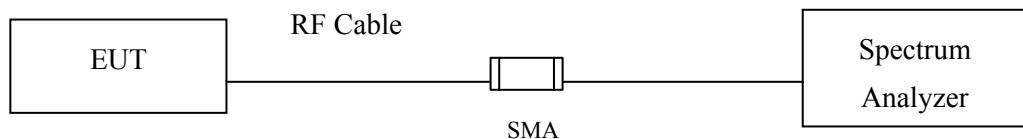
7.1. Test Equipment

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

7.2. Test Setup



7.3. Limits

The minimum bandwidth shall be at least 500 kHz.

7.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

7.5. Uncertainty

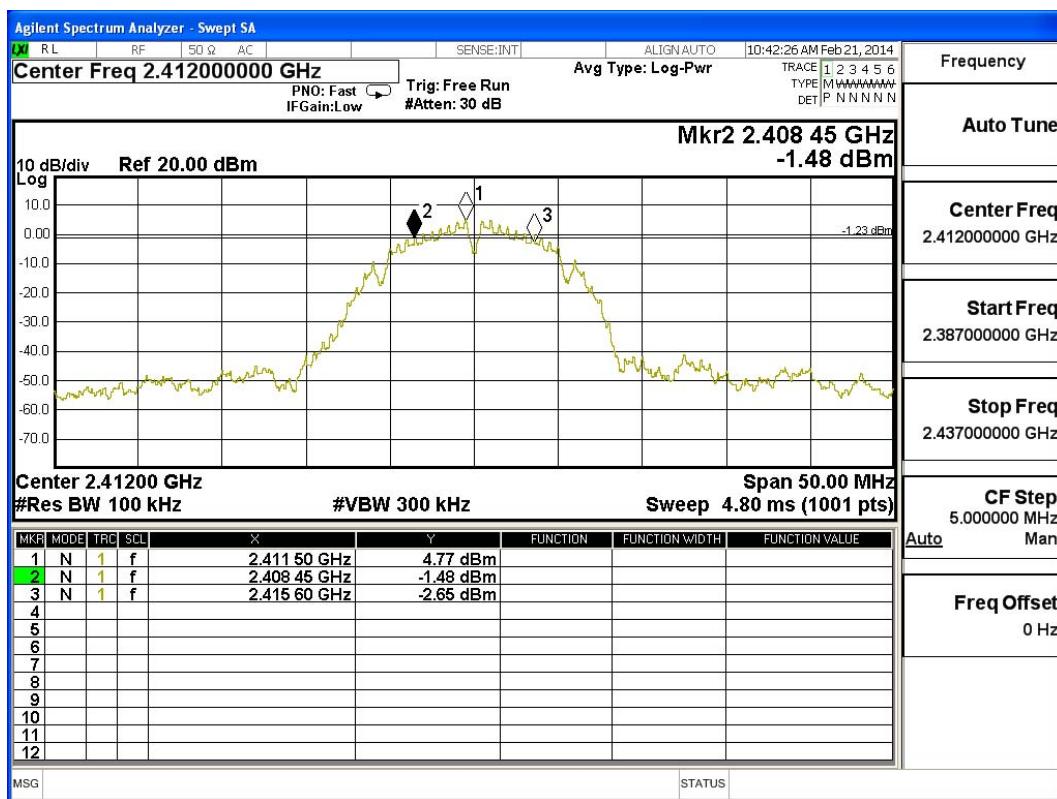
± 150Hz

7.6. Test Result of Occupied Bandwidth

Product : Wireless Motherboard
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412	7150	>500	Pass

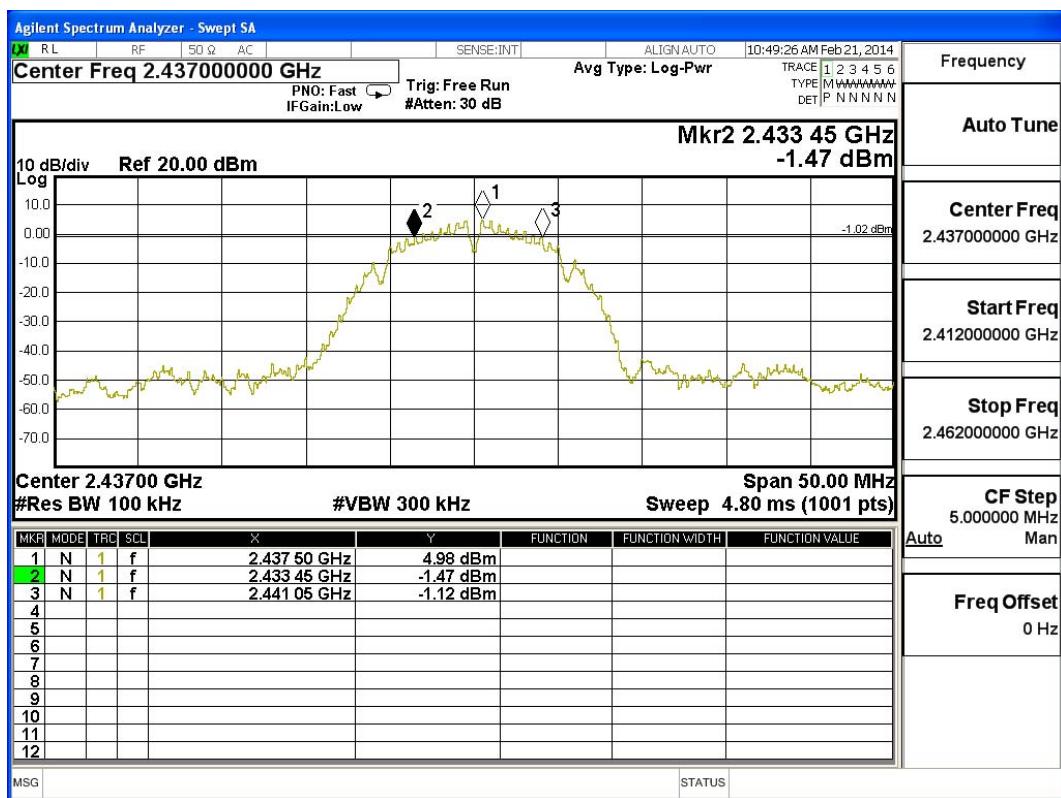
Figure Channel 1:



Product : Wireless Motherboard
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437	7600	>500	Pass

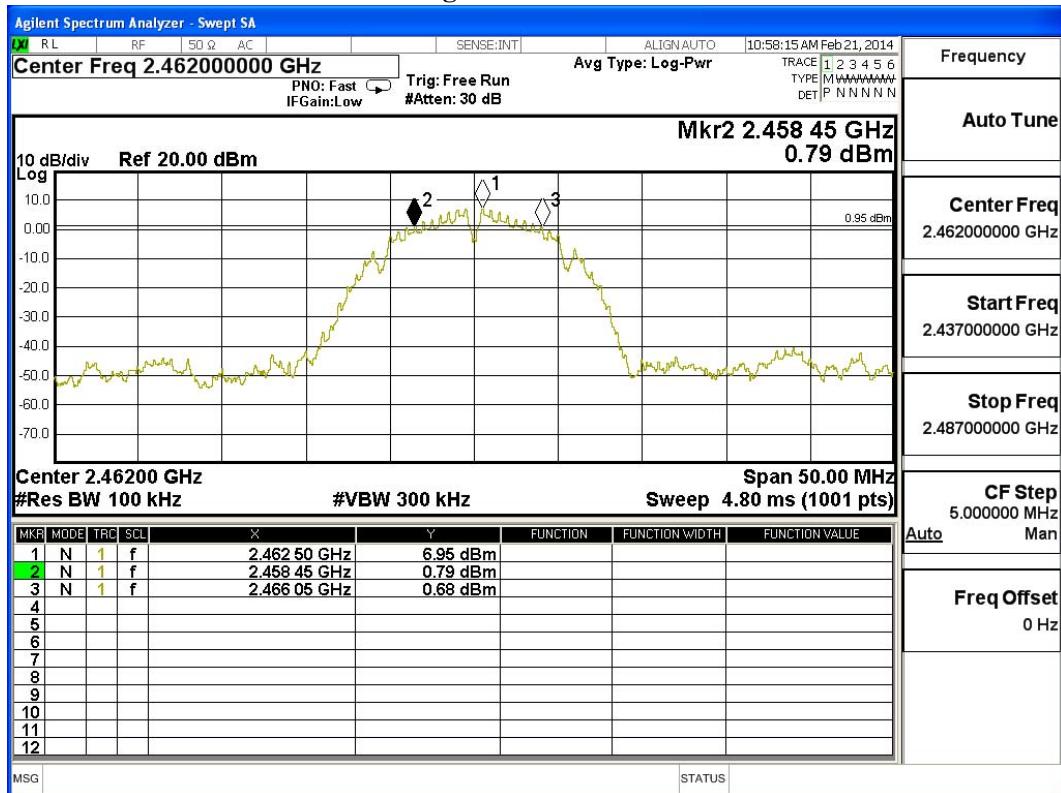
Figure Channel 6:



Product : Wireless Motherboard
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462	7600	>500	Pass

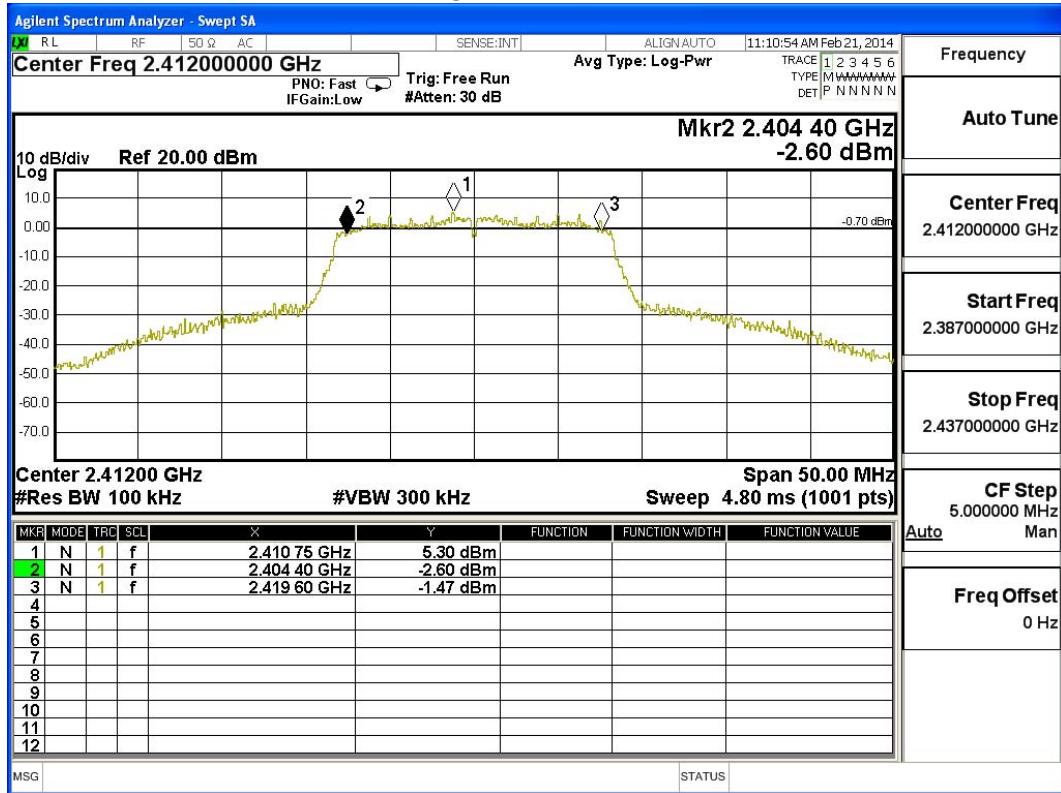
Figure Channel 11:



Product : Wireless Motherboard
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412	15200	>500	Pass

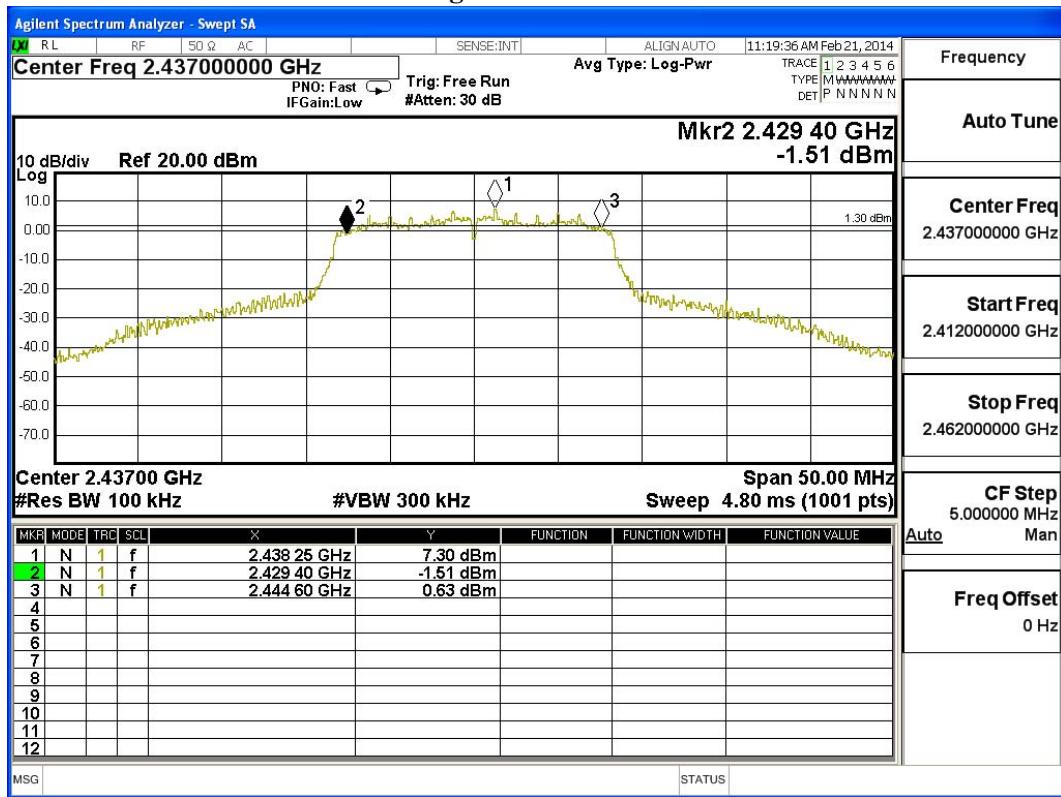
Figure Channel 1:



Product : Wireless Motherboard
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437	15200	>500	Pass

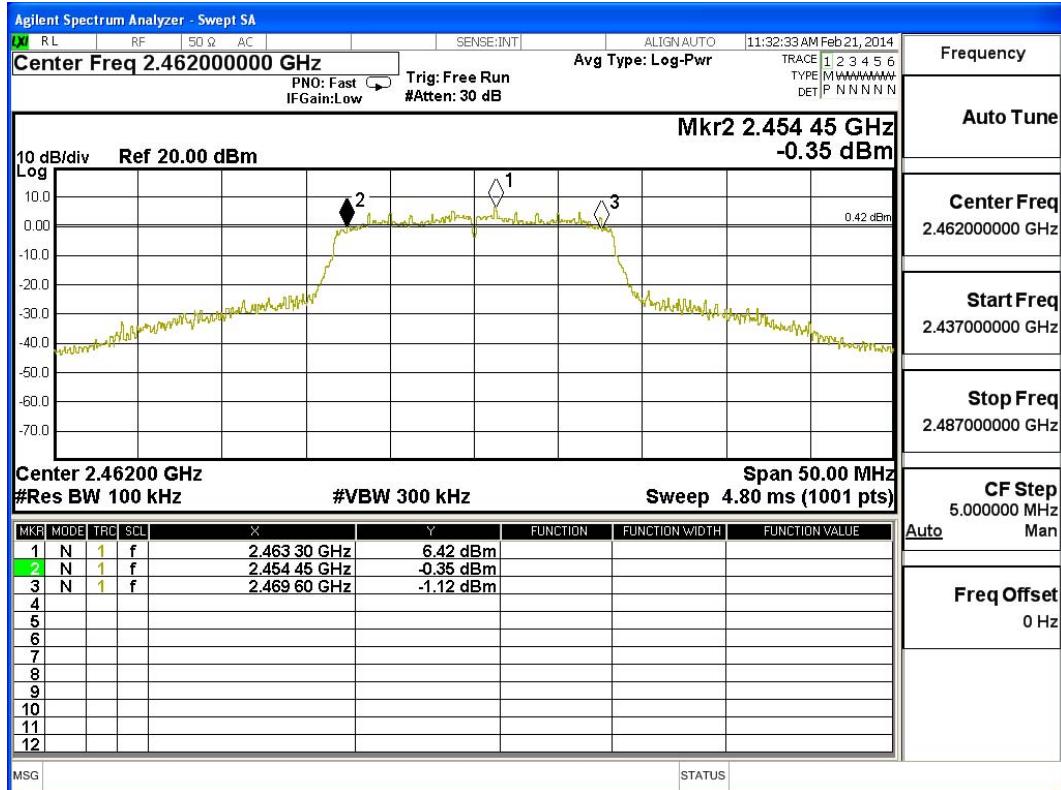
Figure Channel 6:



Product : Wireless Motherboard
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462	15150	>500	Pass

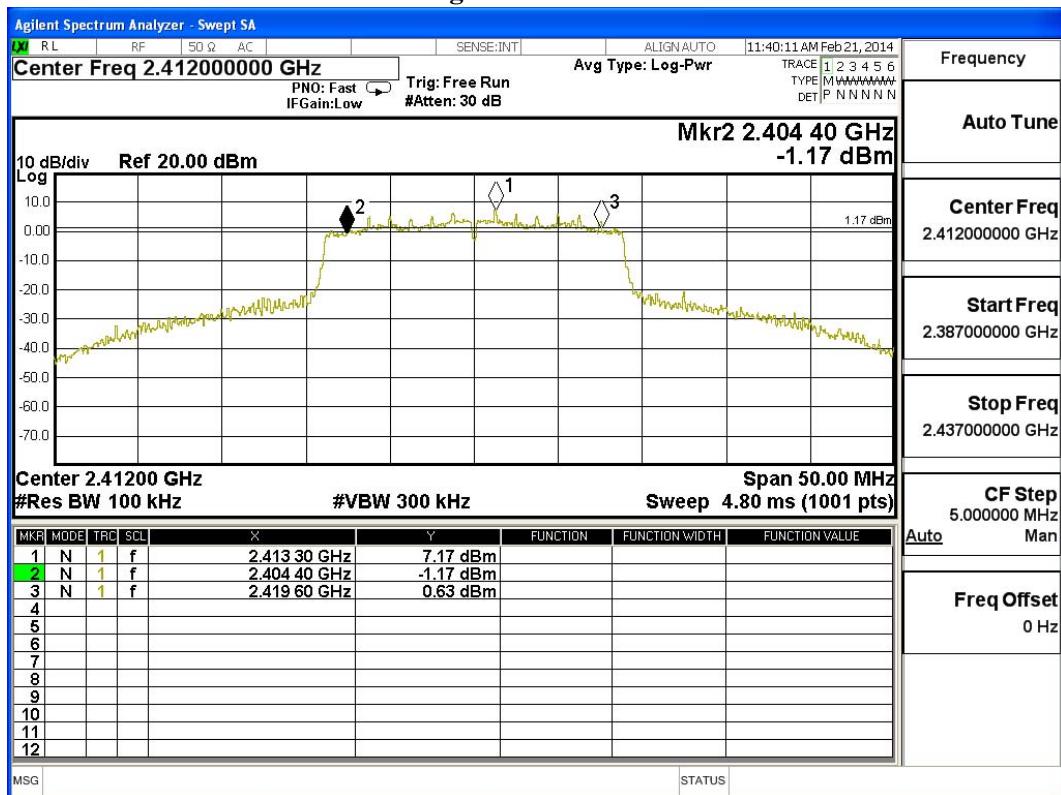
Figure Channel 11:



Product : Wireless Motherboard
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412	15200	>500	Pass

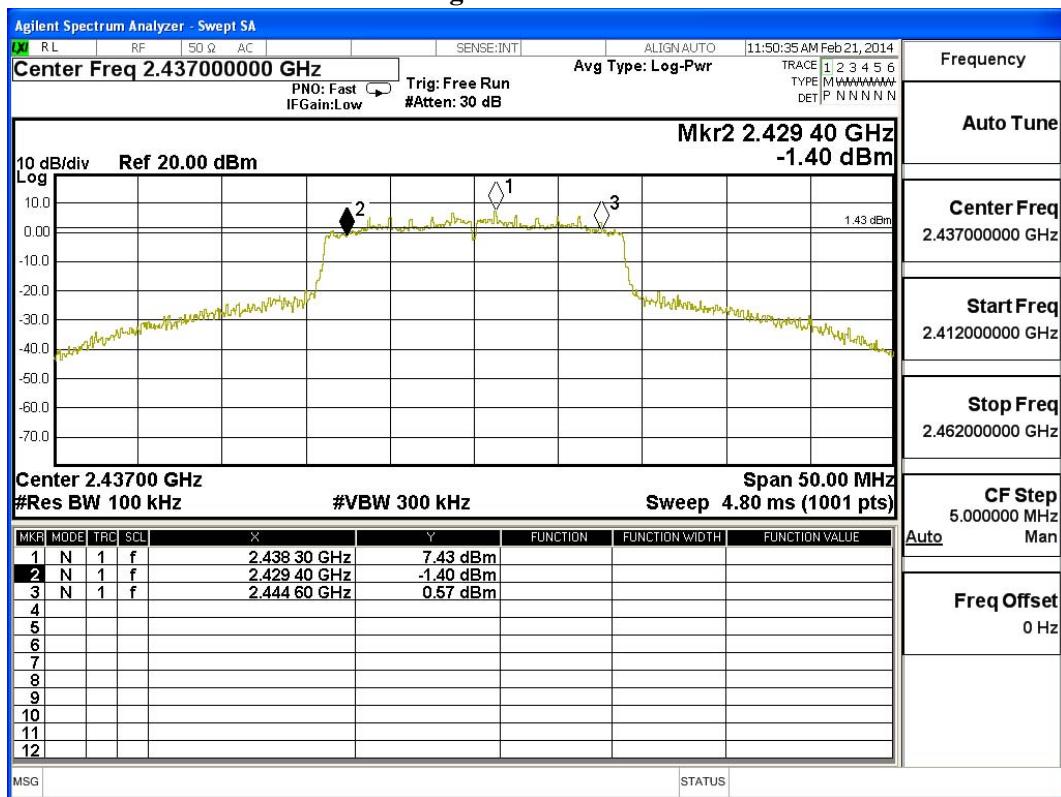
Figure Channel 1:



Product : Wireless Motherboard
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437	15200	>500	Pass

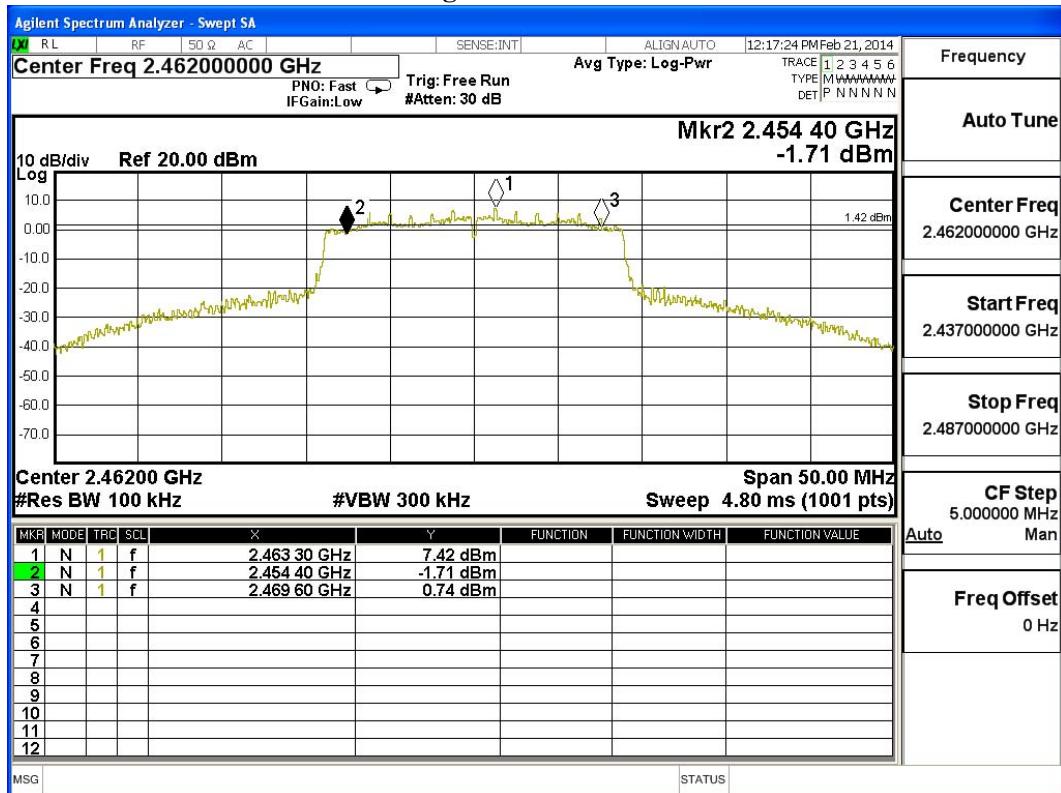
Figure Channel 6:



Product : Wireless Motherboard
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462	15200	>500	Pass

Figure Channel 11:



8. Power Density

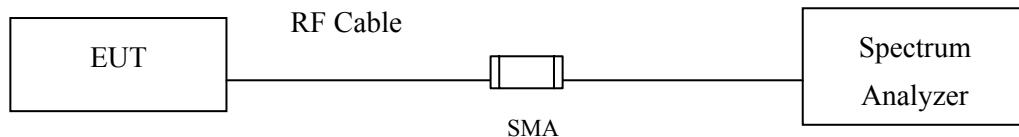
8.1. Test Equipment

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

8.2. Test Setup



8.3. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2009; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The maximum power spectral density using KDB 558074 section 10.2 PKPSD (peak PSD) method.

8.5. Uncertainty

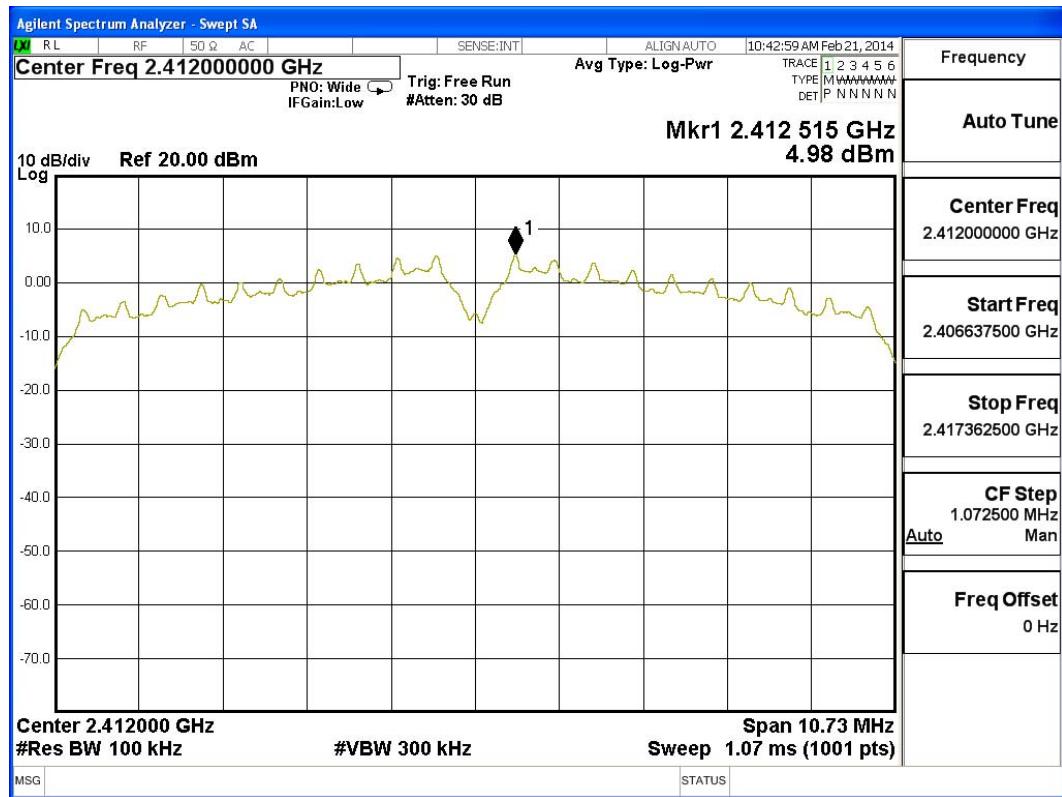
± 1.27 dB

8.6. Test Result of Power Density

Product : Wireless Motherboard
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2412	4.980	< 8dBm	Pass

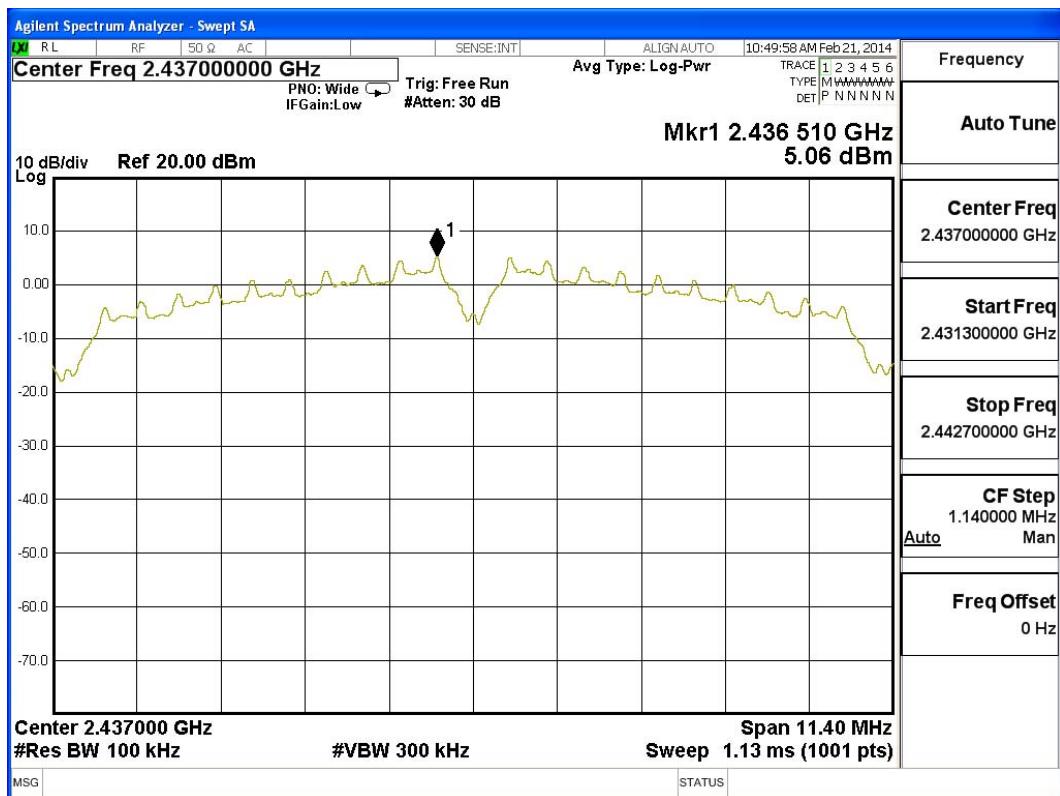
Figure Channel 1:



Product : Wireless Motherboard
 Test Item : Power Density Data
 Test Site : No.3OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6	2437	5.060	< 8dBm	Pass

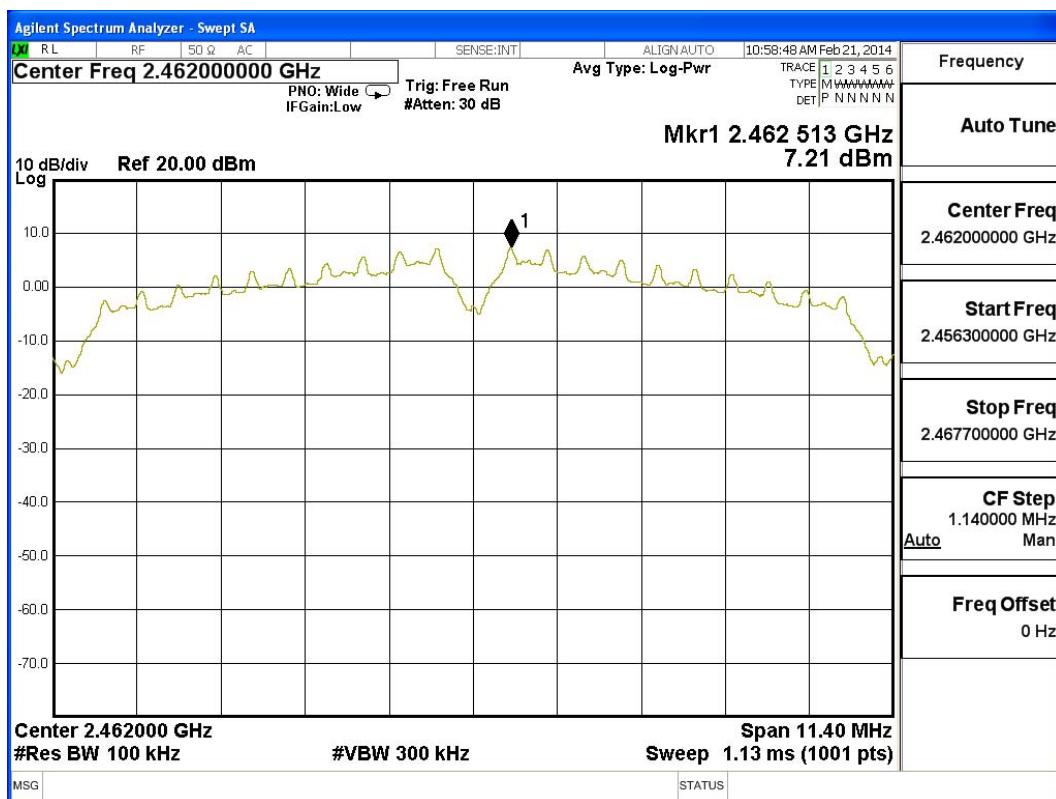
Figure Channel 6:



Product : Wireless Motherboard
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11	2462	7.210	< 8dBm	Pass

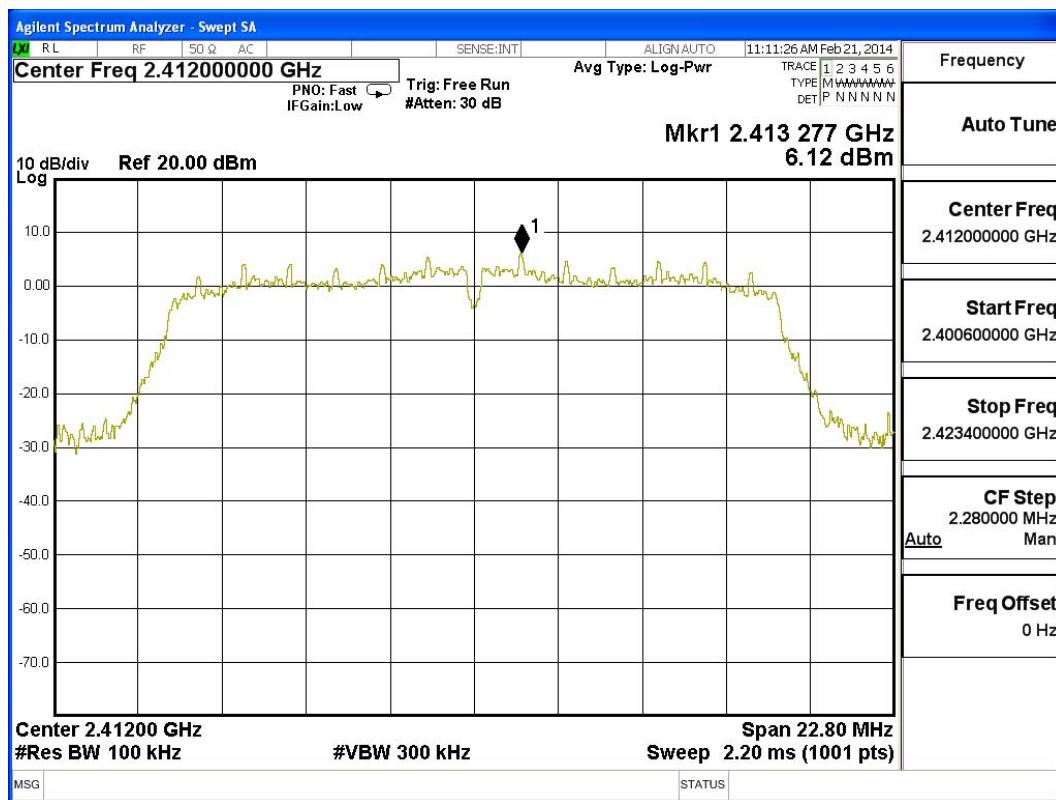
Figure Channel 11:



Product : Wireless Motherboard
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2412	6.120	< 8dBm	Pass

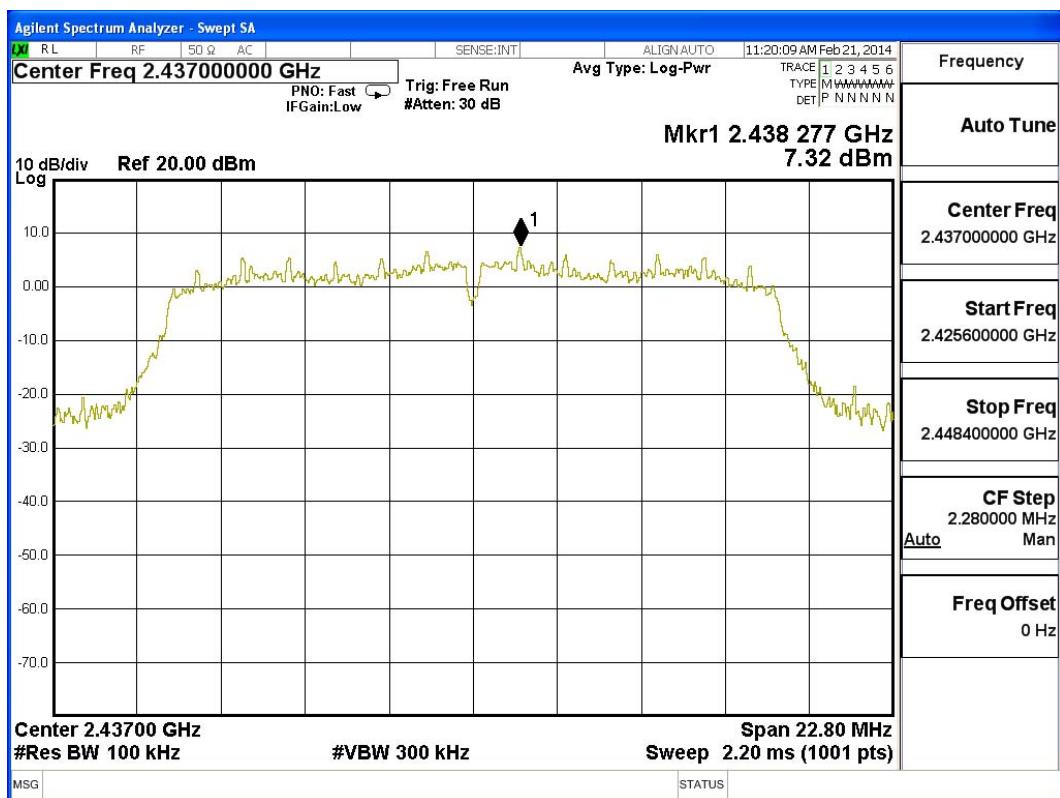
Figure Channel 1:



Product : Wireless Motherboard
 Test Item : Power Density Data
 Test Site : No.3OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6	2437	7.320	< 8dBm	Pass

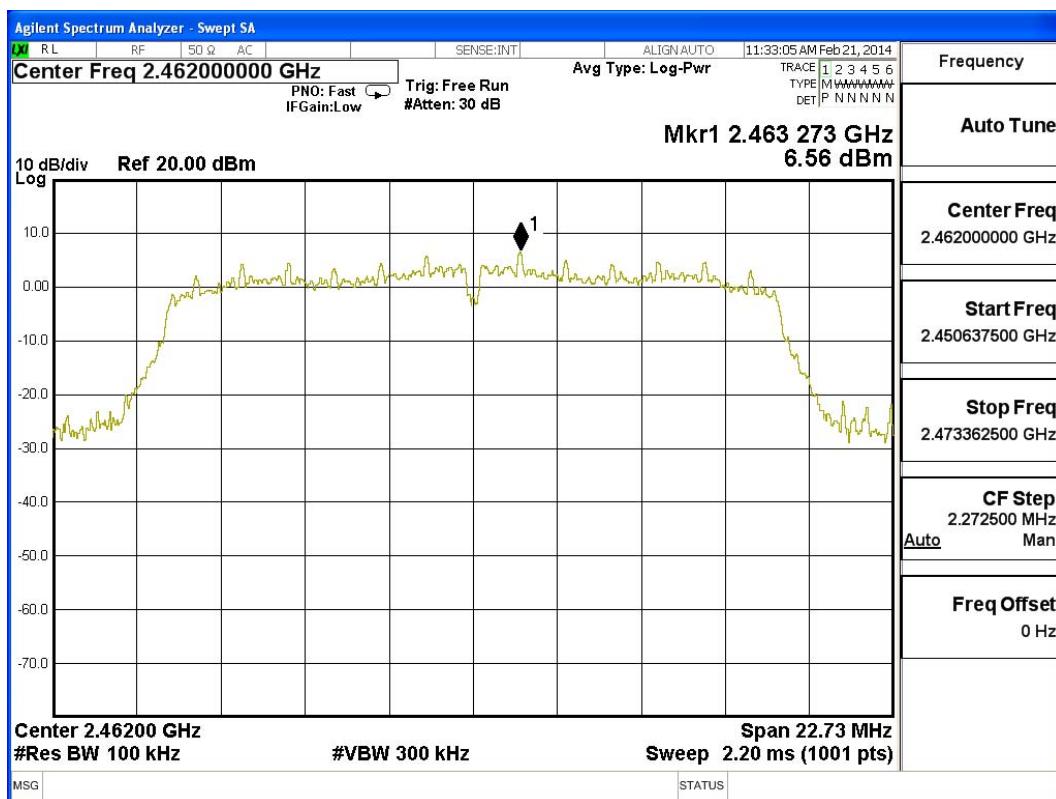
Figure Channel 6:



Product : Wireless Motherboard
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11	2462	6.560	< 8dBm	Pass

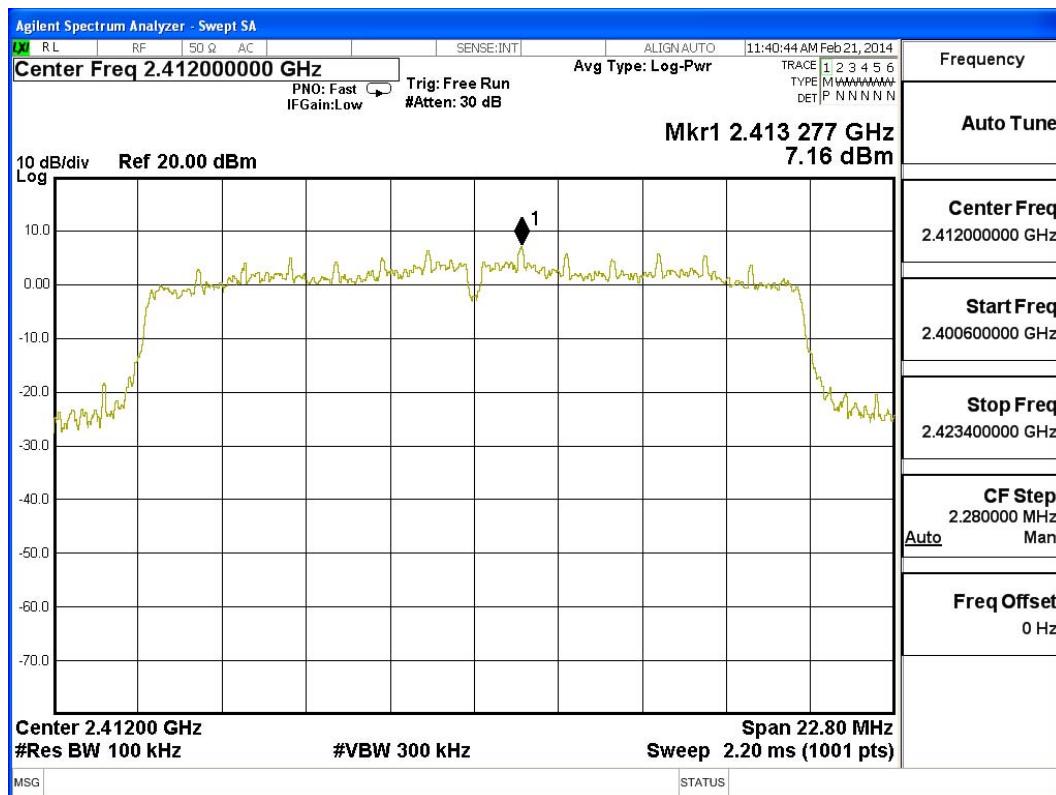
Figure Channel 11:



Product : Wireless Motherboard
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2412	7.160	< 8dBm	Pass

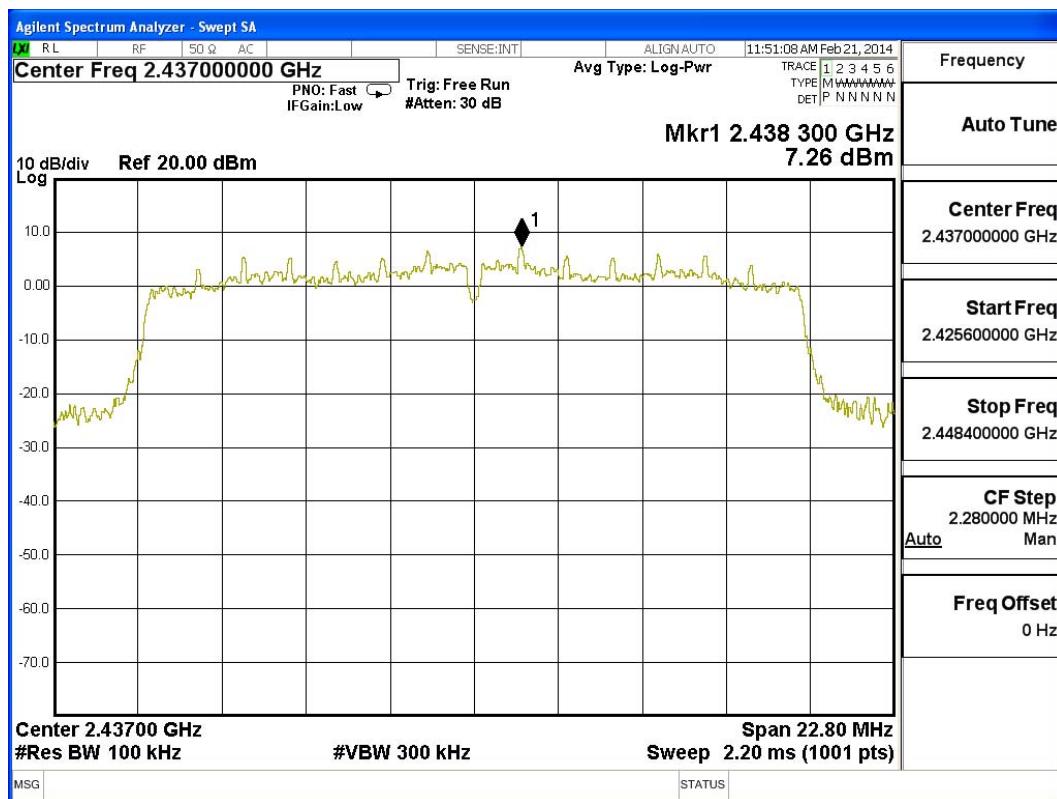
Figure Channel 1:



Product : Wireless Motherboard
 Test Item : Power Density Data
 Test Site : No.3OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6	2437	7.260	< 8dBm	Pass

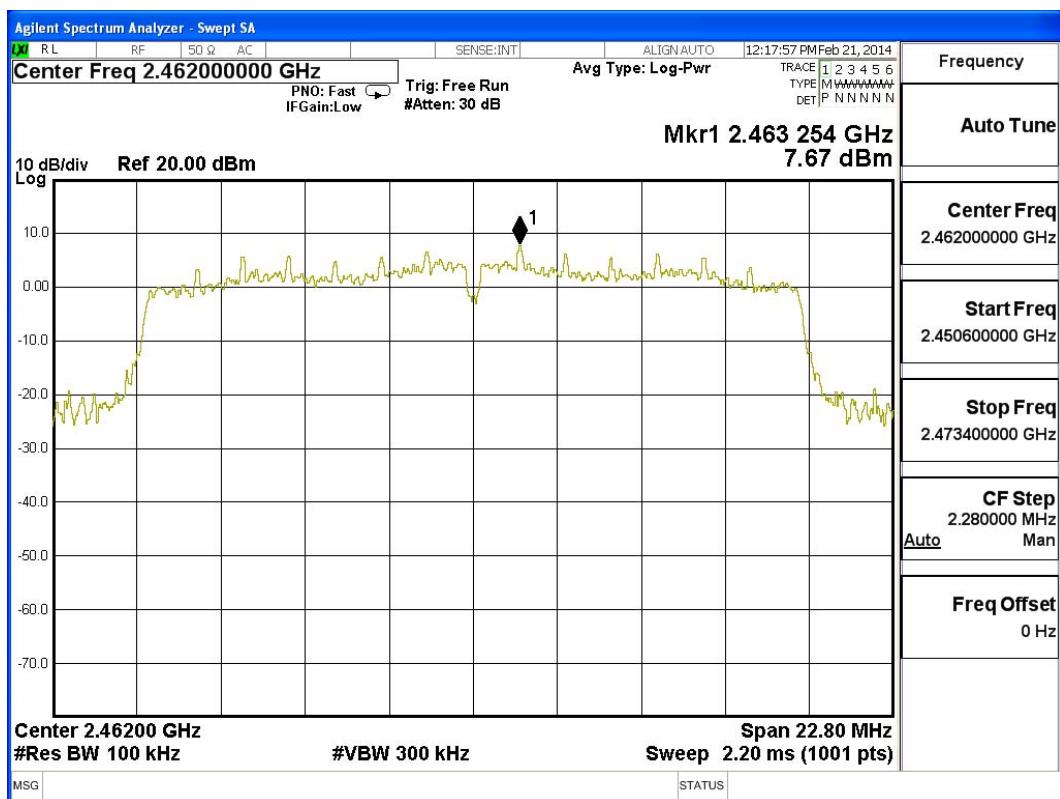
Figure Channel 6:



Product : Wireless Motherboard
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11	2462	7.670	< 8dBm	Pass

Figure Channel 11:



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs