

FCC Test Report

Product Name	Gateway
Model No	PSC02-2/PSC01-2
FCC ID.	RHHPSC02

Applicant	Philio Technology Corporation
Address	8F.,No.653-2,Zhongzheng Rd., Xinzhuang Dist., New Taipei City 24257,Taiwan(R.O.C)

Date of Receipt	May 20, 2014
Issue Date	Jul. 02, 2014
Report No.	1450472R-RFUSP26V00
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issue Date: Jul. 02, 2014

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Product Name	Gateway
Applicant	Philio Technology Corporation
Address	8F.,No.653-2,Zhongzheng Rd., Xinzhuang Dist., New Taipei City 24257,Taiwan(R.O.C)
Manufacturer	Philio Technology Corporation
Model No.	PSC02-2/PSC01-2
FCC ID.	RHHPSC02
EUT Rated Voltage	DC 5V(Power by Adapter)
EUT Test Voltage	DC 5V(Power by Adapter)
Trade Name	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2014 ANSI C63.10: 2009, KDB 558074
Test Result	Complied

Documented By : Jinn Chen
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Tested By : Vincent chu
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Approved By : 
(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	Gateway
Trade Name	
Model No.	PSC02-2/PSC01-2
FCC ID.	RHHPSC02
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	Monopole Antenna
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto
USB to Power Cable	Shielded, 1m
Power Adapter	MFR: ENERTRONIX, M/N: EXA1102UA Input: 100-240V, 47-63Hz, 0.5A Output: 5Vdc ---1A

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Philio	N/A	Monopole	0.34 dBi for 2.4 GHz

Note:

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

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 Gateway with a built-in 2.4GHz WLAN and Z-Wave transceiver, this report for WLAN.
2. The EUT is including two models. The different is PSC01 not support battery to supply voltage.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. 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 and 802.11n(20M-BW) is 7.2Mbps)
5. 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.
6. 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)

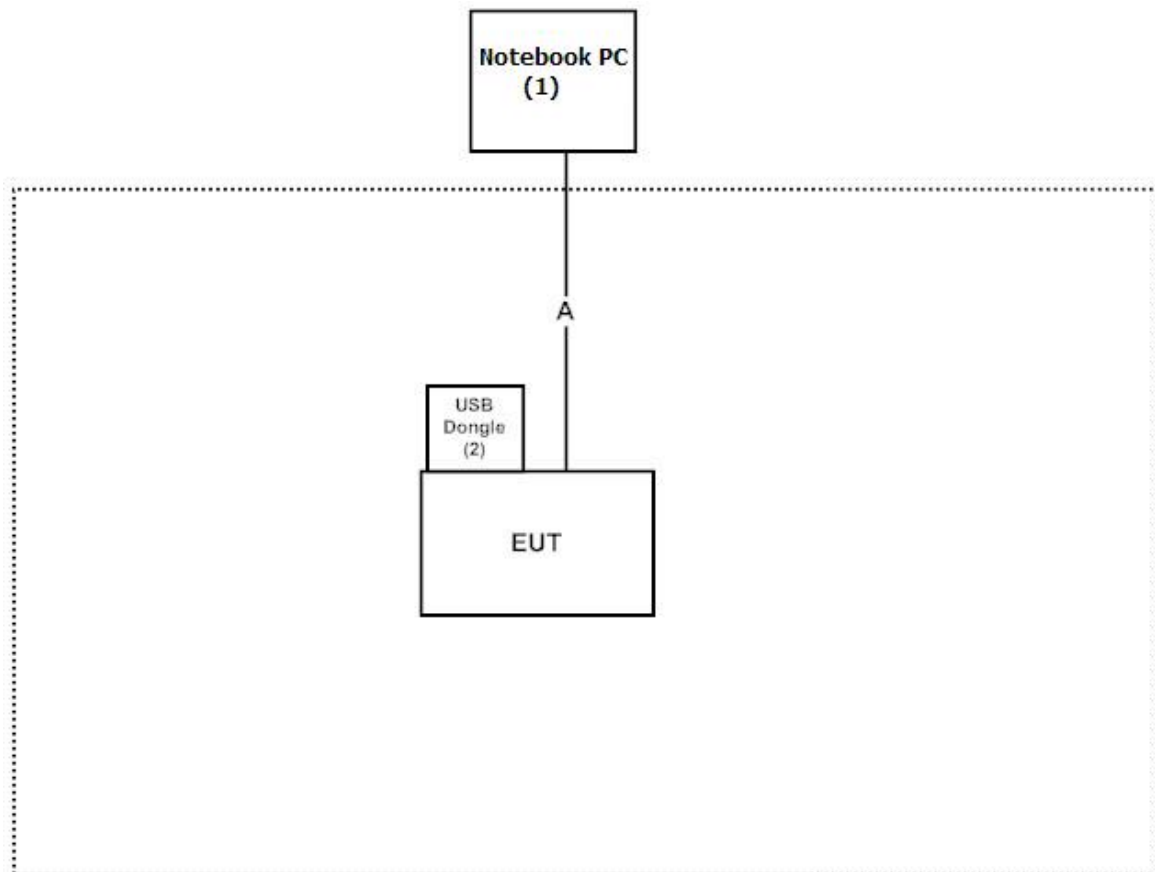
1.3. Tested System Details

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	Non-Shielded, 0.8m
2. USB Dongle	Transcend	JFV30	N/A	N/A

Signal Cable Type	Signal cable Description
A. RJ45 Cable	Non-shielded, 1.5m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute software “PuTTY (V0.63)” 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
FCC Engineering Laboratory
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Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation
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Linkou Dist. New Taipei City 24451,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

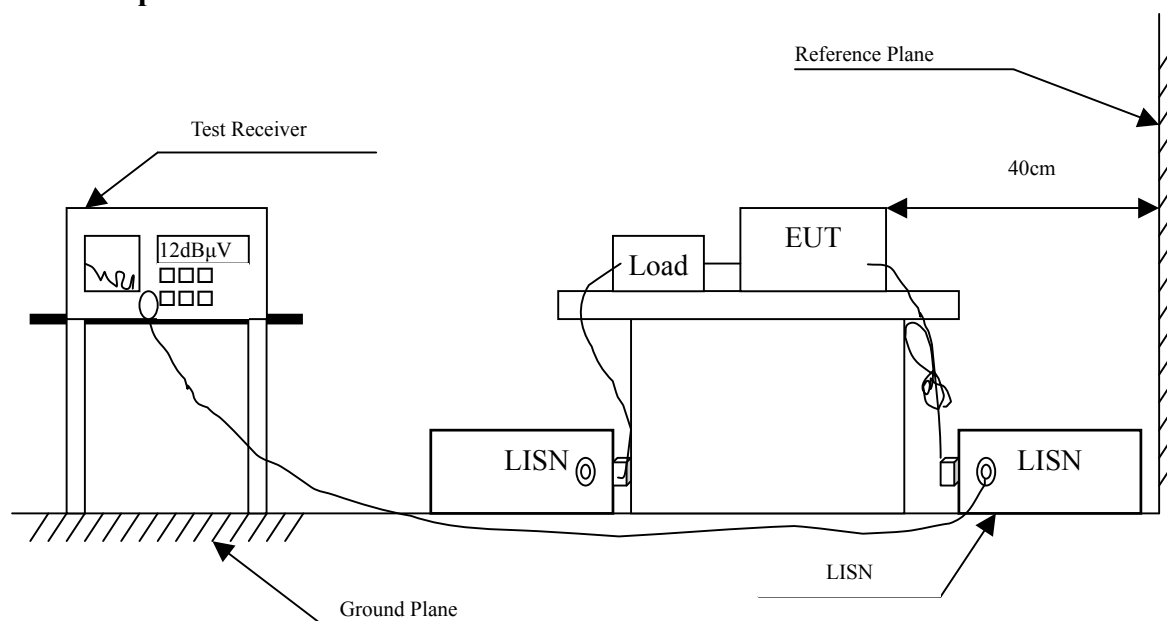
2.1. Test Equipment

	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, 2014	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 : Gateway
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV	Margin dB	Limit dBμV
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 : Gateway
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBμV
	dB	dBμV	dBμV		
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

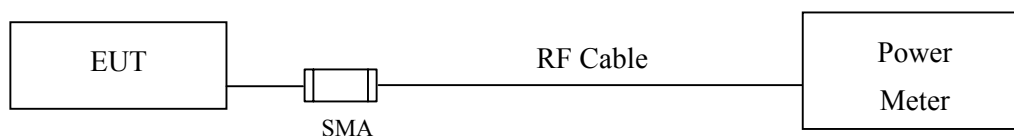
3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2014
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2014

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 : Gateway
 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	1		
		Measurement Level (dBm)						
01	2412	2.72	--	--	--	5.38	<30dBm	Pass
06	2437	2.50	2.44	2.35	2.21	5.04	<30dBm	Pass
11	2462	2.90	--	--	--	5.53	<30dBm	Pass

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

Product : Gateway
 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	6		
		Measurement Level (dBm)										
01	2412	4.54	--	--	--	--	--	--	--	11.62	<30dBm	Pass
06	2437	4.50	4.41	4.31	4.26	4.19	4.02	3.92	3.85	11.44	<30dBm	Pass
11	2462	4.53	--	--	--	--	--	--	--	11.48	<30dBm	Pass

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

Product : Gateway
 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	7.2		
		Measurement Level (dBm)										
01	2412	3.12	--	--	--	--	--	--	--	10.01	<30dBm	Pass
06	2437	3.88	3.72	3.64	3.55	3.42	3.34	3.25	3.11	10.89	<30dBm	Pass
11	2462	4.03	--	--	--	--	--	--	--	11.11	<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:

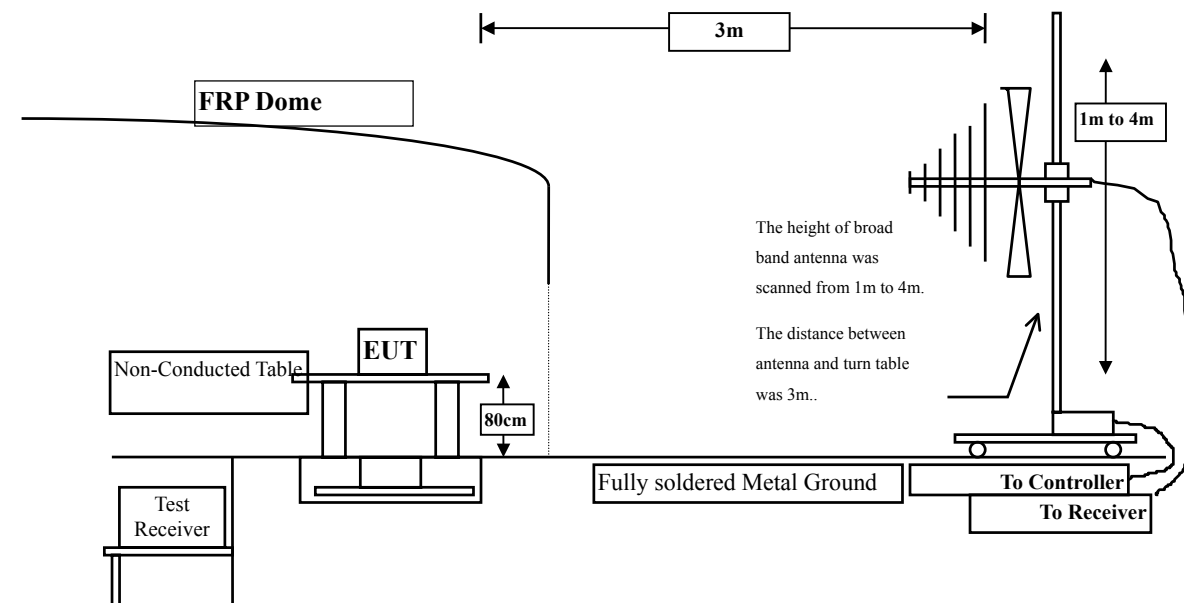
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2014
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2014
	X	Pre-Amplifier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

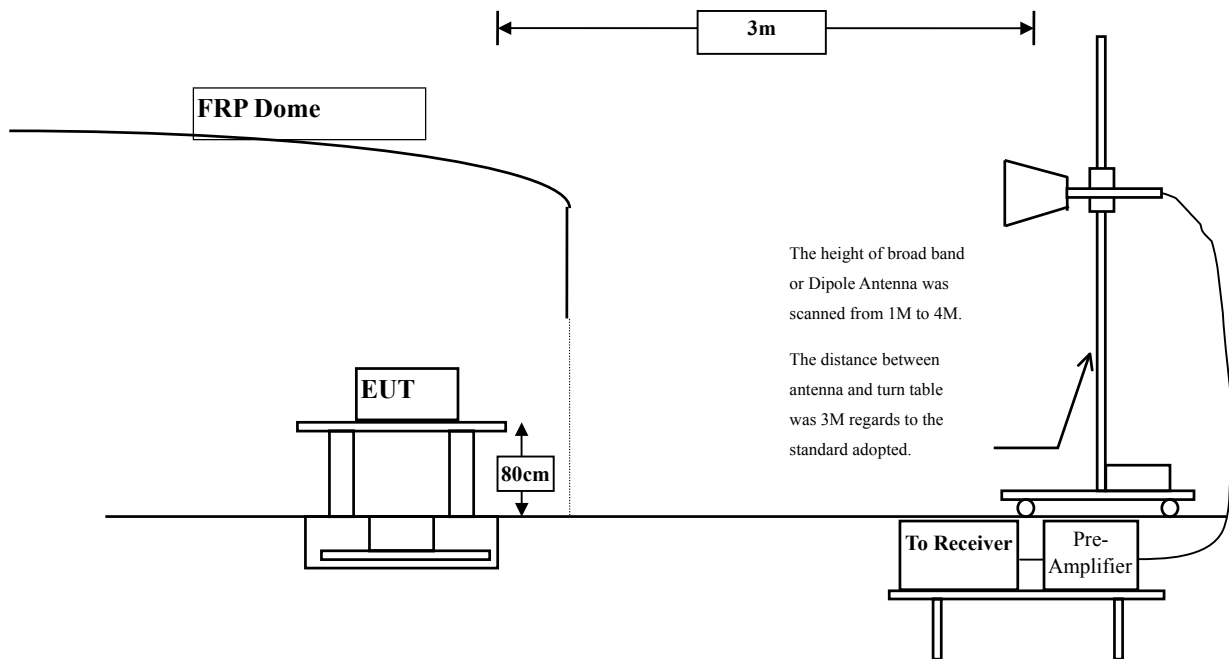
2. The test instruments marked with "X" are used to measure the final test results.

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 (dBμV/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 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 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 : Gateway
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	57.970	61.231	-12.769	74.000
7236.000	10.650	38.670	49.320	-24.680	74.000
9648.000	13.337	36.640	49.976	-24.024	74.000
Average Detector:					
4824.000	3.261	48.950	52.211	-1.789	54.000
Vertical					
Peak Detector:					
4824.000	6.421	46.200	52.621	-21.379	74.000
7236.000	11.495	38.130	49.625	-24.375	74.000
9648.000	13.807	36.360	50.166	-23.834	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 : Gateway
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
Peak Detector:					
4874.000	3.038	51.650	54.687	-19.313	74.000
7311.000	11.795	35.860	47.654	-26.346	74.000
9748.000	12.635	36.060	48.695	-25.305	74.000
Average Detector:					
4874.000	3.038	49.020	52.057	-1.943	54.000
Vertical					
Peak Detector:					
4874.000	5.812	46.860	52.671	-21.329	74.000
7311.000	12.630	34.930	47.559	-26.441	74.000
9748.000	13.126	35.750	48.876	-25.124	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 : Gateway
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

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

Horizontal

Peak Detector:

4924.000	2.858	51.130	53.987	-20.013	74.000
7386.000	12.127	35.100	47.228	-26.772	74.000
9848.000	12.852	35.720	48.573	-25.427	74.000

Average Detector:

--

Vertical

Peak Detector:

4924.000	5.521	47.770	53.290	-20.710	74.000
7386.000	13.254	35.660	48.914	-25.086	74.000
9848.000	13.367	35.820	49.187	-24.813	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 : Gateway
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
Peak Detector:					
4824.000	3.261	53.840	57.101	-16.899	74.000
7236.000	10.650	44.560	55.210	-18.790	74.000
9648.000	13.337	36.290	49.626	-24.374	74.000
Average Detector:					
4824.000	3.261	39.640	42.901	-11.099	54.000
7236.000	10.650	29.130	39.780	-14.220	54.000
Vertical					
Peak Detector:					
4824.000	6.421	50.300	56.721	-17.279	74.000
7236.000	11.495	43.410	54.905	-19.095	74.000
9648.000	13.807	36.310	50.116	-23.884	74.000
Average Detector:					
4824.000	6.421	35.930	42.351	-11.649	54.000
7236.000	11.495	28.340	39.835	-14.165	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 : Gateway
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
Peak Detector:					
4874.000	3.038	54.520	57.557	-16.443	74.000
7311.000	11.795	43.280	55.074	-18.926	74.000
9748.000	12.635	36.220	48.855	-25.145	74.000
Average Detector:					
4874.000	3.038	40.110	43.147	-10.853	54.000
7311.000	11.795	27.860	39.654	-14.346	54.000
Peak Detector:					
4874.000	5.812	50.580	56.391	-17.609	74.000
7311.000	12.630	42.980	55.609	-18.391	74.000
9748.000	13.126	36.280	49.406	-24.594	74.000
Average Detector:					
4874.000	5.812	36.280	42.091	-11.909	54.000
7311.000	12.630	27.800	40.429	-13.571	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 : Gateway
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
Peak Detector:					
4924.000	2.858	56.510	59.367	-14.633	74.000
7386.000	12.127	41.870	53.998	-20.002	74.000
9848.000	12.852	36.540	49.393	-24.607	74.000
Average Detector:					
4924.000	2.858	42.560	45.417	-8.583	54.000
Vertical					
Peak Detector:					
4924.000	5.521	52.070	57.590	-16.410	74.000
7386.000	13.254	40.000	53.254	-20.746	74.000
9848.000	13.367	35.610	48.977	-25.023	74.000
Average Detector:					
4924.000	5.521	37.590	43.110	-10.890	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 : Gateway
 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	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
Peak Detector:					
4824.000	3.261	51.520	54.781	-19.219	74.000
7236.000	10.650	42.300	52.950	-21.050	74.000
9648.000	13.337	36.100	49.436	-24.564	74.000
Average Detector:					
4824.000	3.261	36.290	39.551	-14.449	54.000
Vertical					
Peak Detector:					
4824.000	6.421	47.550	53.971	-20.029	74.000
7236.000	11.495	41.930	53.425	-20.575	74.000
9648.000	13.807	35.670	49.476	-24.524	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 : Gateway
 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	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4874.000	3.038	53.640	56.677	-17.323	74.000
7311.000	11.795	41.860	53.654	-20.346	74.000
9748.000	12.635	36.510	49.145	-24.855	74.000
Average Detector:					
4874.000	3.038	38.110	41.147	-12.853	54.000
Vertical					
Peak Detector:					
4874.000	5.812	48.140	53.951	-20.049	74.000
7311.000	12.630	41.230	53.859	-20.141	74.000
9748.000	13.126	35.820	48.946	-25.054	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 : Gateway
 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 dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal					
Peak Detector:					
4924.000	2.858	56.700	59.557	-14.443	74.000
7386.000	12.127	41.590	53.718	-20.282	74.000
9848.000	12.852	35.790	48.643	-25.357	74.000
Average Detector:					
4924.000	2.858	41.780	44.637	-9.363	54.000
Vertical					
Peak Detector:					
4924.000	5.521	51.710	57.230	-16.770	74.000
7386.000	13.254	39.440	52.694	-21.306	74.000
9848.000	13.367	35.950	49.317	-24.683	74.000
Average Detector:					
4924.000	5.521	36.690	42.210	-11.790	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 : Gateway
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
198.780	-9.958	44.678	34.720	-8.780	43.500
381.140	1.386	36.701	38.087	-7.913	46.000
480.080	1.870	35.945	37.815	-8.185	46.000
544.100	4.373	32.049	36.422	-9.578	46.000
625.580	1.419	31.441	32.861	-13.139	46.000
751.680	4.332	30.482	34.814	-11.186	46.000
Vertical					
249.220	-5.096	43.540	38.444	-7.556	46.000
336.520	-1.999	40.347	38.348	-7.652	46.000
408.300	-4.445	39.458	35.013	-10.987	46.000
499.480	-0.199	34.103	33.903	-12.097	46.000
600.360	1.302	38.103	39.405	-6.595	46.000
840.920	2.284	32.619	34.903	-11.097	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 : Gateway
 Test Item : General 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 dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal					
198.780	-9.958	47.212	37.254	-6.246	43.500
311.300	-4.651	39.528	34.877	-11.123	46.000
398.600	0.879	40.200	41.079	-4.921	46.000
499.480	1.991	33.994	35.984	-10.016	46.000
714.820	3.801	31.345	35.146	-10.854	46.000
840.920	6.064	30.879	36.943	-9.057	46.000
Vertical					
291.900	-5.272	47.025	41.753	-4.247	46.000
390.840	-0.768	35.054	34.286	-11.714	46.000
520.820	1.078	33.363	34.440	-11.560	46.000
600.360	1.302	38.081	39.383	-6.617	46.000
666.320	-0.951	38.932	37.981	-8.019	46.000
840.920	2.284	31.509	33.793	-12.207	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 : Gateway
 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	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
291.900	-5.202	46.889	41.687	-4.313	46.000
472.320	2.932	25.300	28.232	-17.768	46.000
546.040	4.386	30.710	35.096	-10.904	46.000
720.640	3.826	29.897	33.723	-12.277	46.000
776.900	5.167	32.080	37.247	-8.753	46.000
840.920	6.064	29.437	35.501	-10.499	46.000
Vertical					
249.220	-5.096	44.578	39.482	-6.518	46.000
291.900	-5.272	45.546	40.274	-5.726	46.000
381.140	0.816	34.728	35.544	-10.456	46.000
480.080	-3.390	34.562	31.172	-14.828	46.000
600.360	1.302	37.939	39.241	-6.759	46.000
714.820	-1.629	35.406	33.777	-12.223	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.

5. RF antenna conducted test

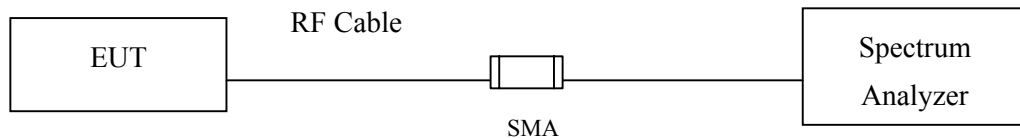
5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2014
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2014
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

- 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

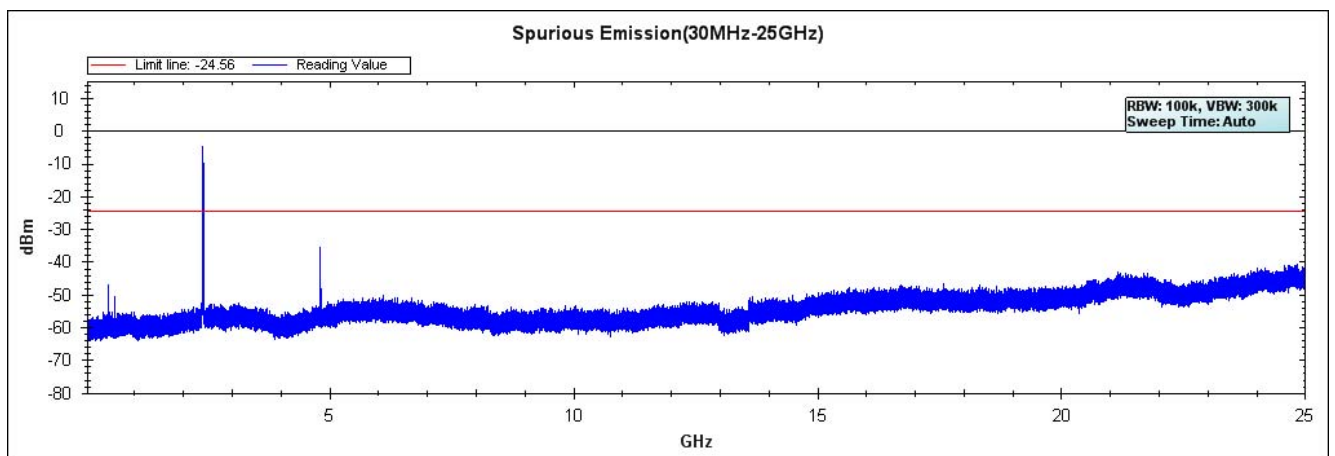
The measurement uncertainty

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

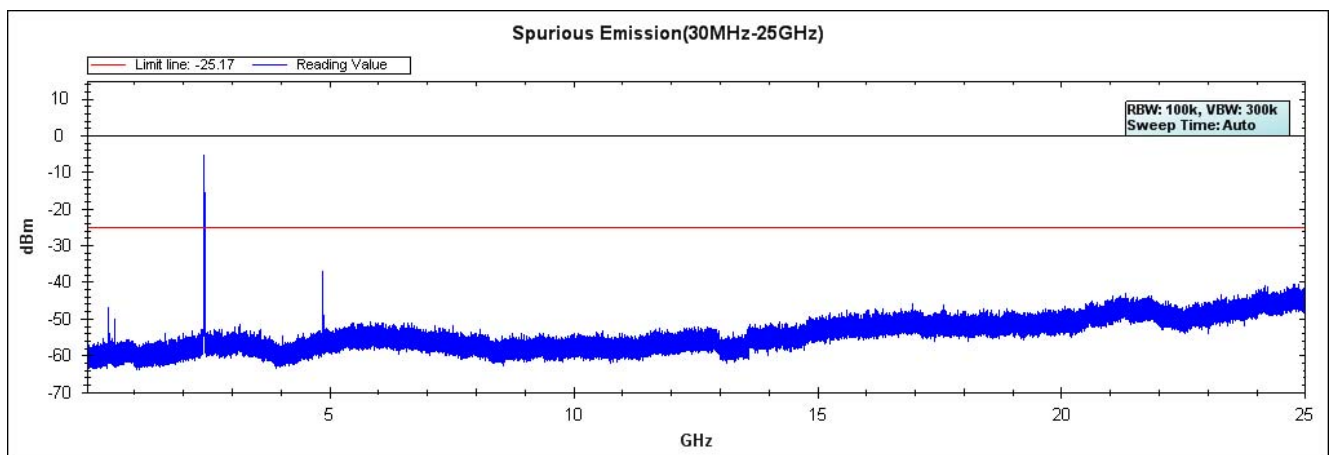
5.6. Test Result of RF antenna conducted test

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

Channel 01 (2412MHz)

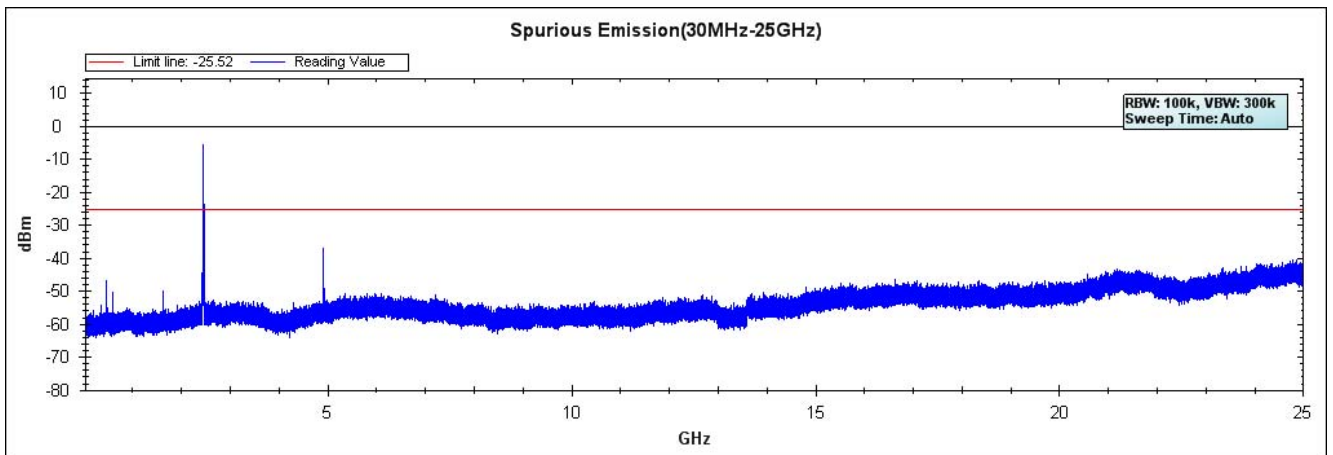


Channel 06 (2437MHz)



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

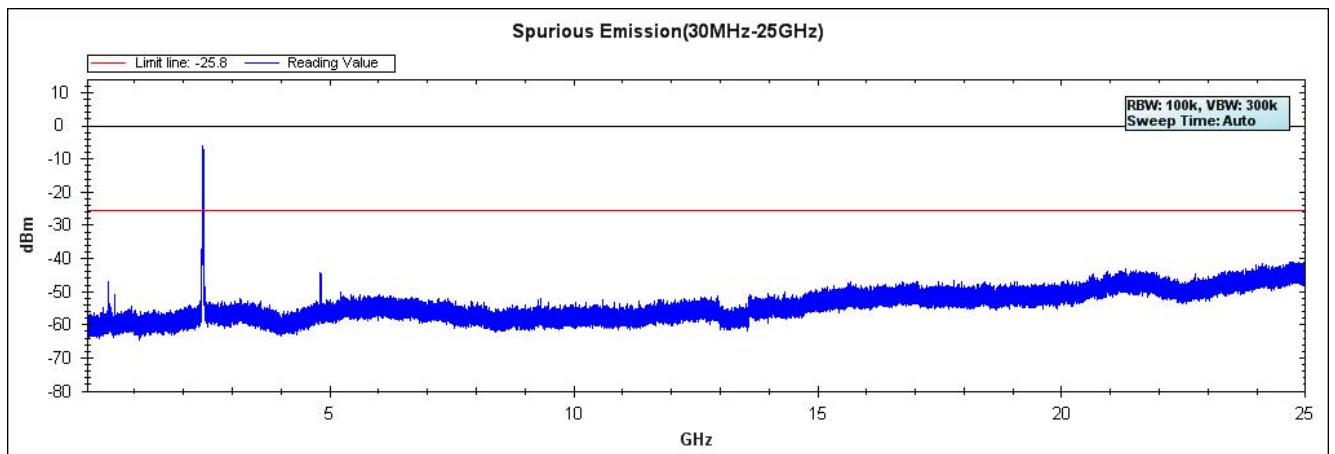
Channel 11 (2462MHz)



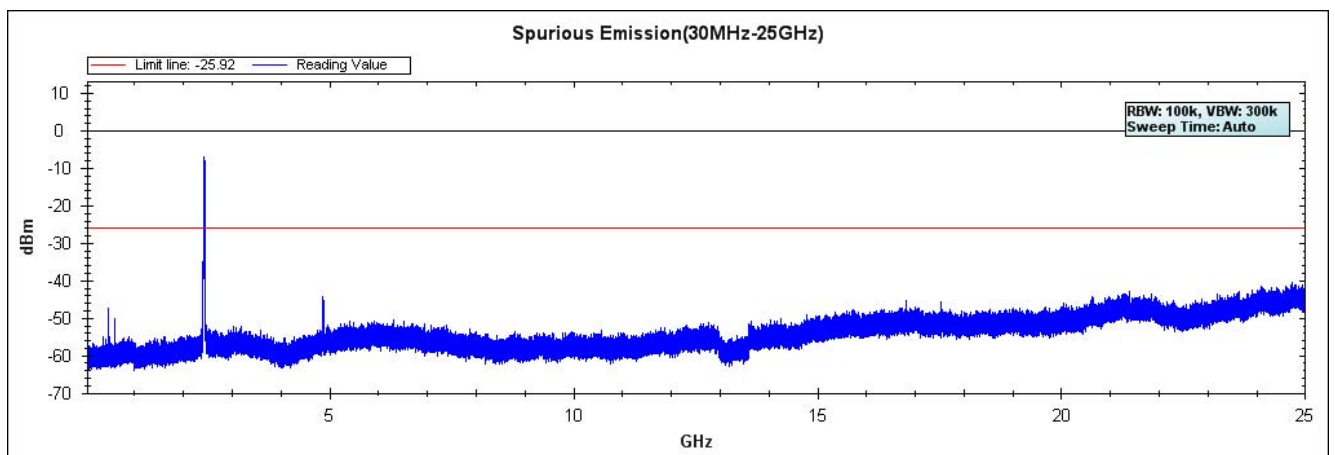
Note: The above test pattern is synthesized by multiple of the frequency range.

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

Channel 01 (2412MHz)

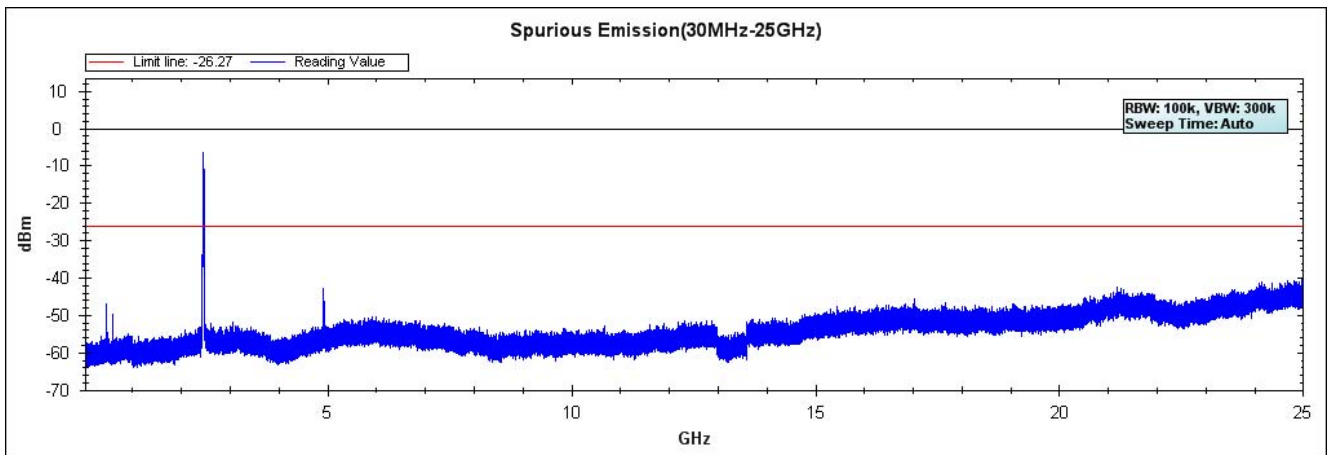


Channel 06 (2437MHz)



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

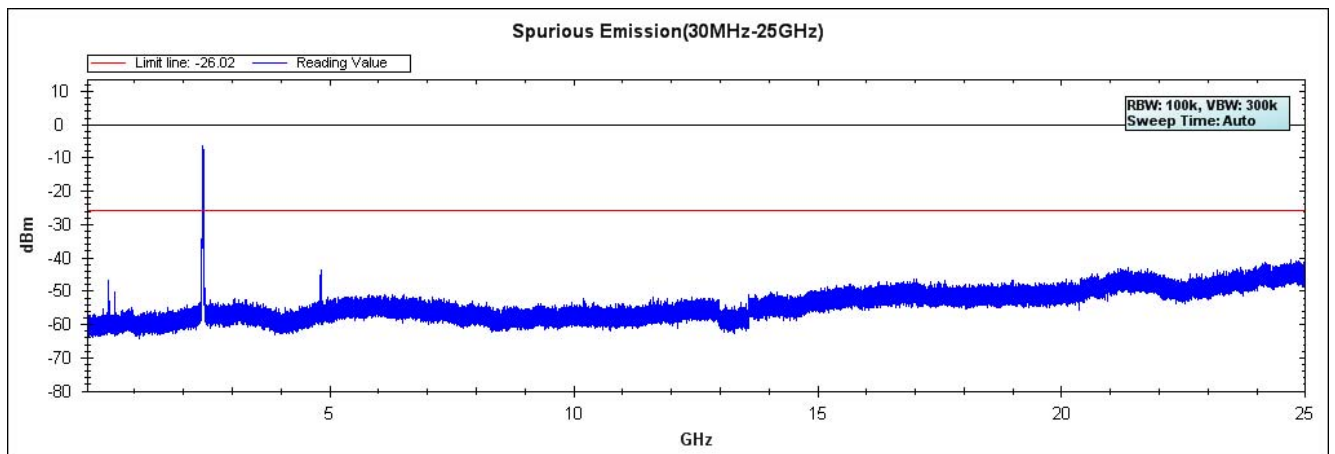
Channel 11 (2462MHz)



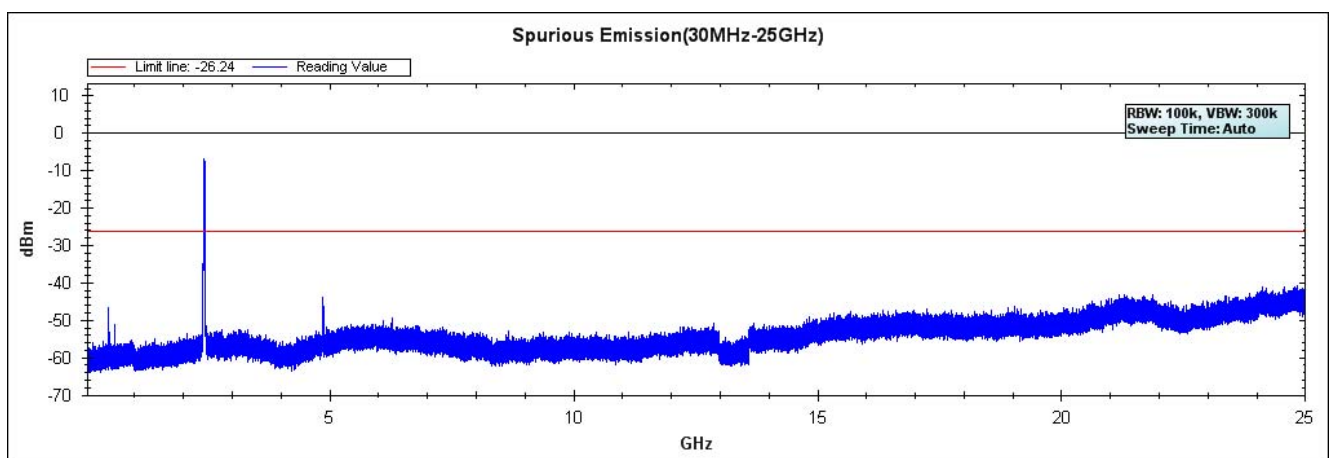
Note: The above test pattern is synthesized by multiple of the frequency range.

Product : Gateway
 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)

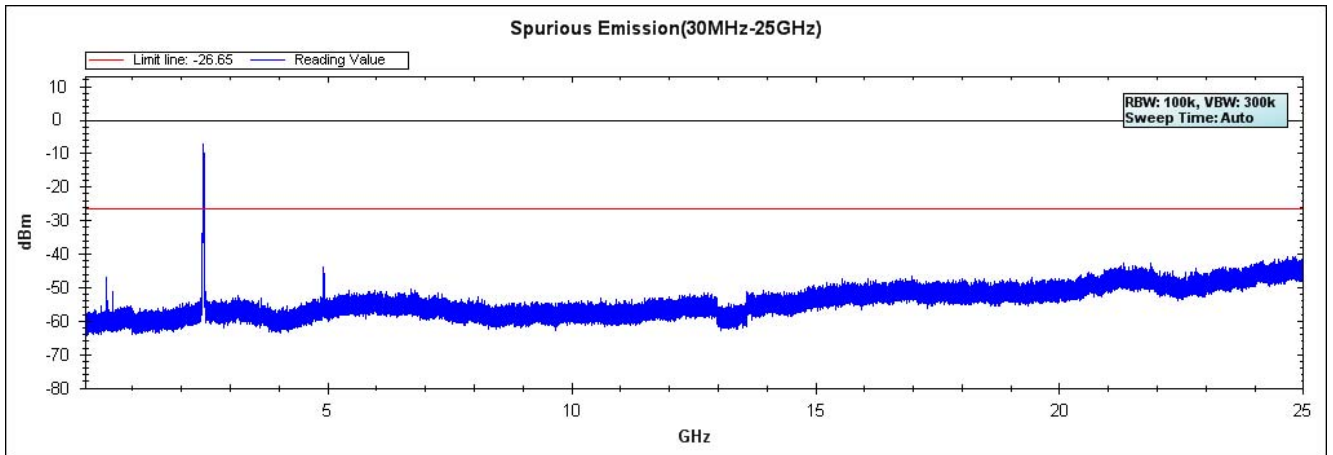


Channel 06 (2437MHz)



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

Channel 11 (2462MHz)



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

6. Band Edge

6.1. Test Equipment

RF Radiated Measurement:

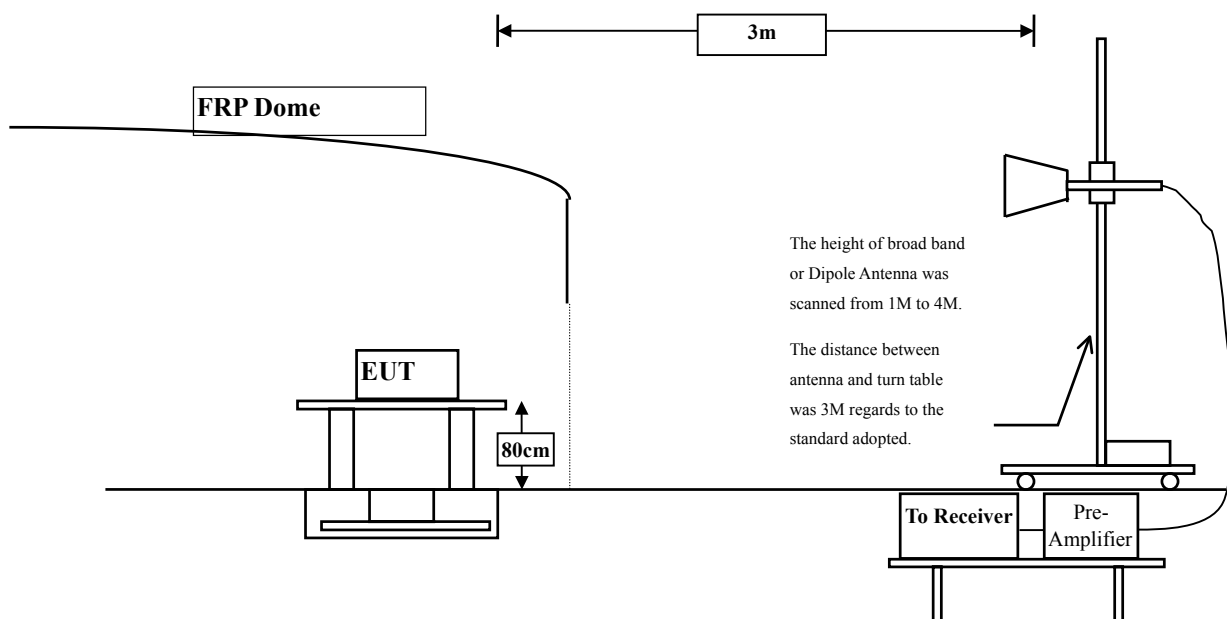
The following test equipments are used during the band edge tests:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2014
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2014
		Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2014
	X	Controller	Quietek	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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2387.000	31.497	26.862	58.359	74.00	54.00	Pass
01 (Peak)	2390.000	31.509	24.487	55.996	74.00	54.00	Pass
01 (Peak)	2400.000	31.561	36.207	67.768	--	--	--
01 (Peak)	2413.200	31.647	67.182	98.829	--	--	--
01 (Average)	2387.200	31.498	15.758	47.256	74.00	54.00	Pass
01 (Average)	2390.000	31.509	12.440	43.949	74.00	54.00	Pass
01 (Average)	2400.000	31.561	30.754	62.315	--	--	--
01 (Average)	2409.600	31.622	63.406	95.028	--	--	--

Figure Channel 01:

Horizontal (Peak)

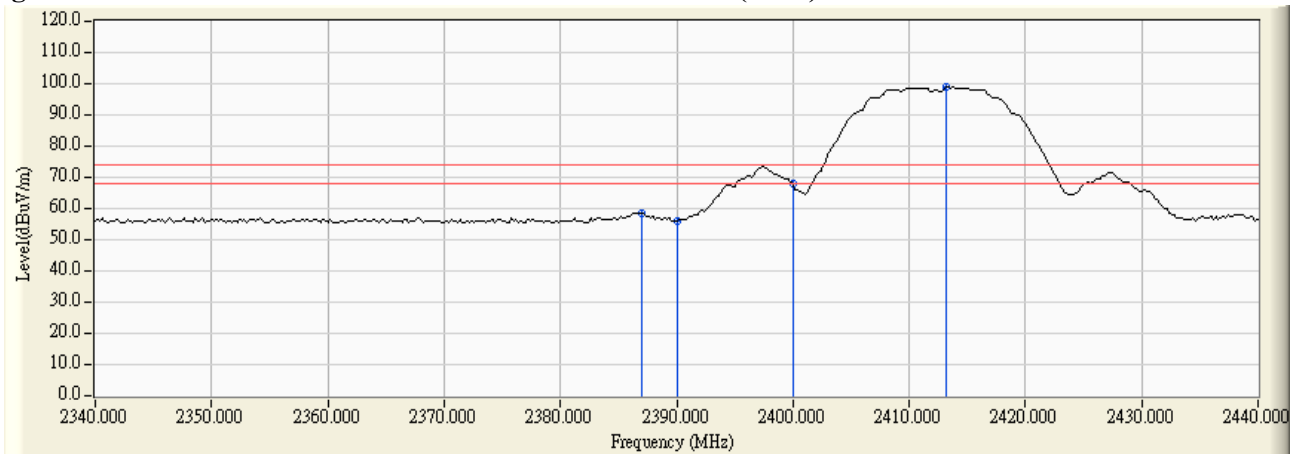
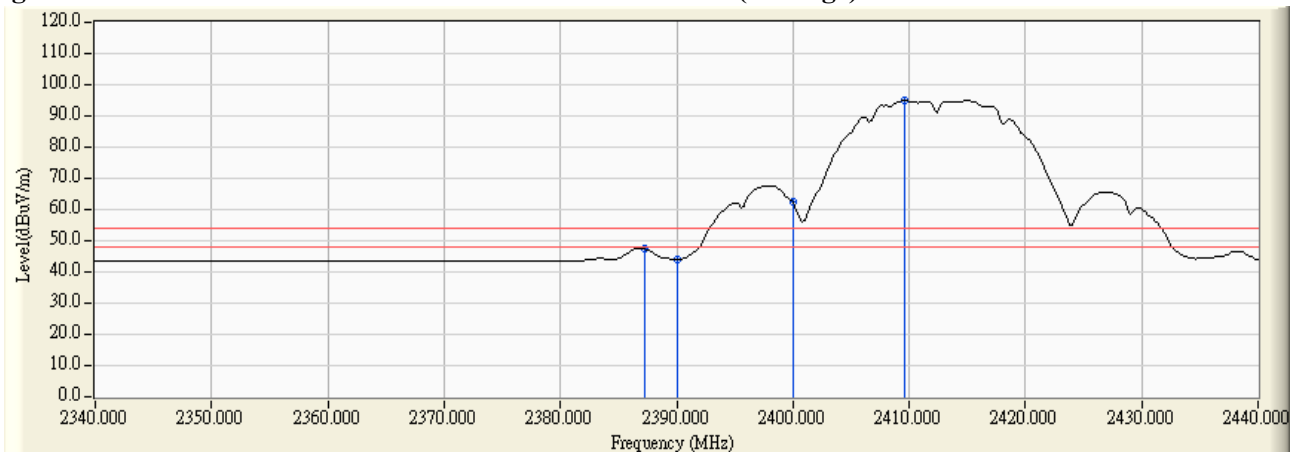


Figure Channel 01:

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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2386.200	30.933	27.036	57.969	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	24.576	55.491	74.00	54.00	Pass
01 (Peak)	2400.000	30.912	36.966	67.878	--	--	--
01 (Peak)	2413.400	30.959	67.970	98.929	--	--	--
01 (Average)	2387.200	30.928	16.355	47.283	74.00	54.00	Pass
01 (Average)	2390.000	30.915	12.610	43.525	74.00	54.00	Pass
01 (Average)	2400.000	30.912	31.808	62.720	--	--	--
01 (Average)	2409.600	30.939	64.529	95.468	--	--	--

Figure Channel 01:

Vertical (Peak)

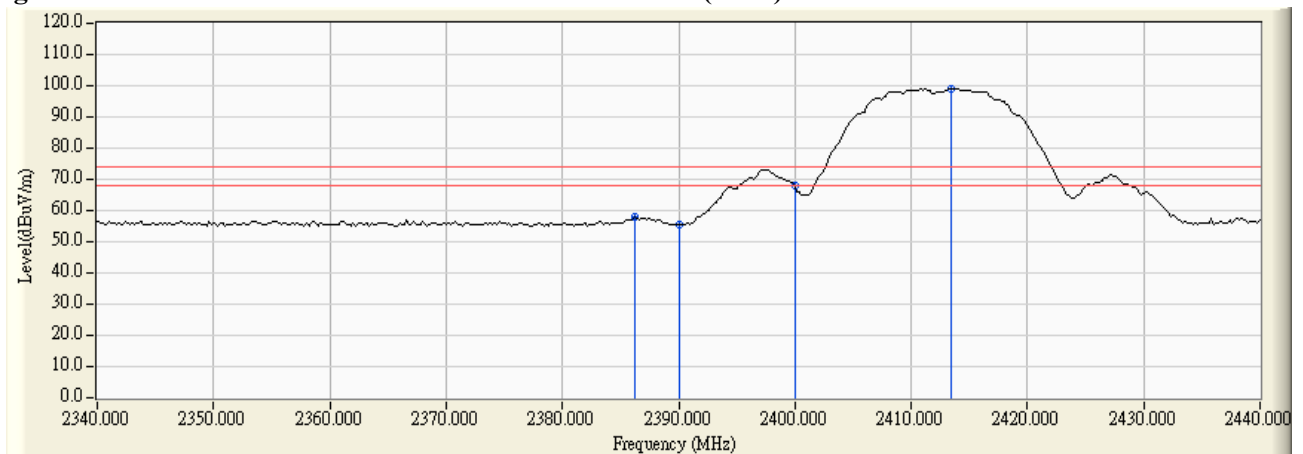
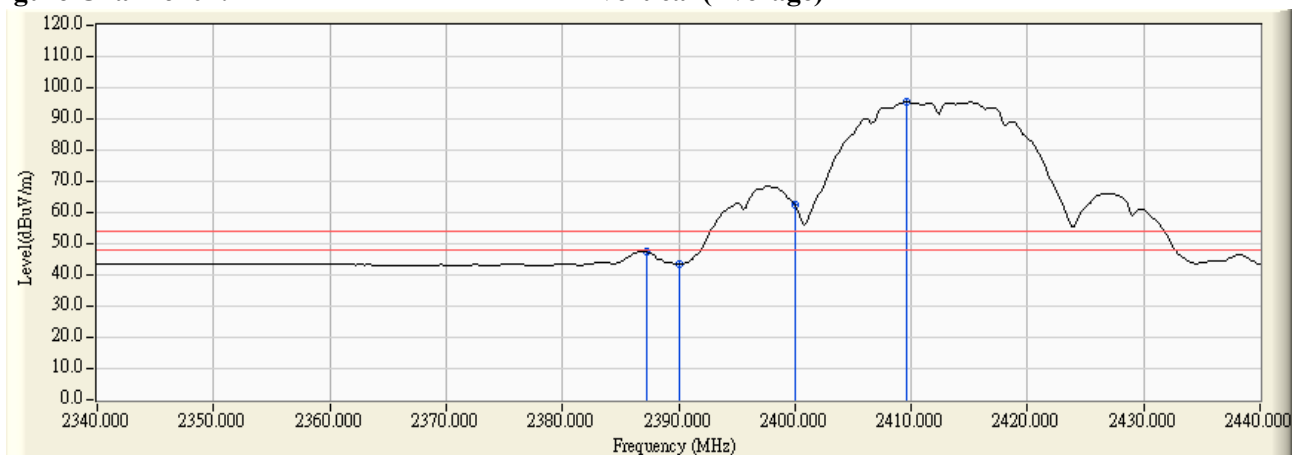


Figure Channel 01:

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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2460.900	32.011	66.044	98.055	--	--	Pass
11 (Peak)	2483.500	32.182	25.239	57.421	74.00	54.00	Pass
11 (Peak)	2487.700	32.213	26.734	58.948	74.00	54.00	Pass
11 (Average)	2459.500	32.001	60.991	92.991	--	--	Pass
11 (Average)	2483.500	32.182	12.157	44.339	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

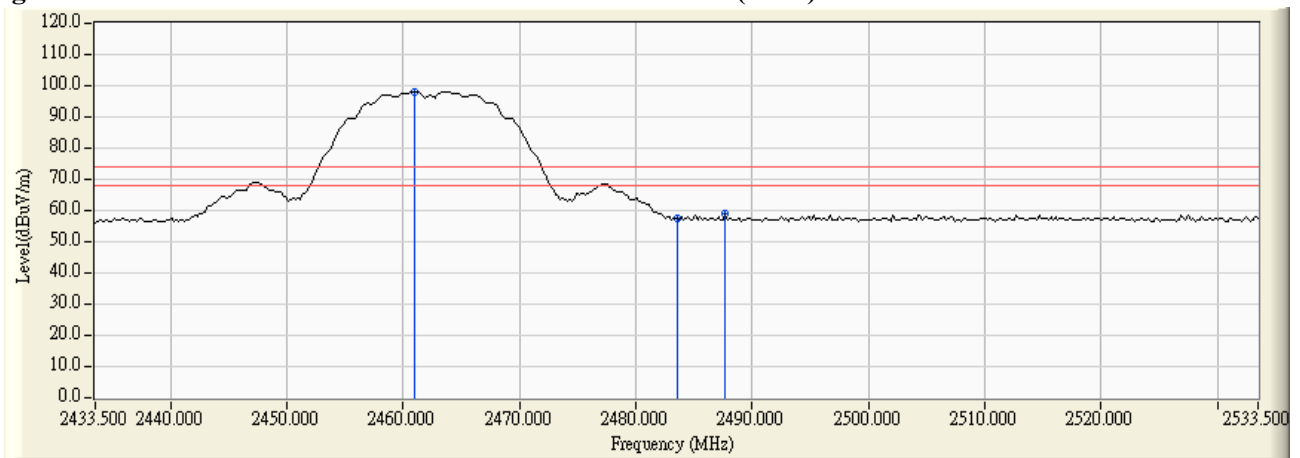
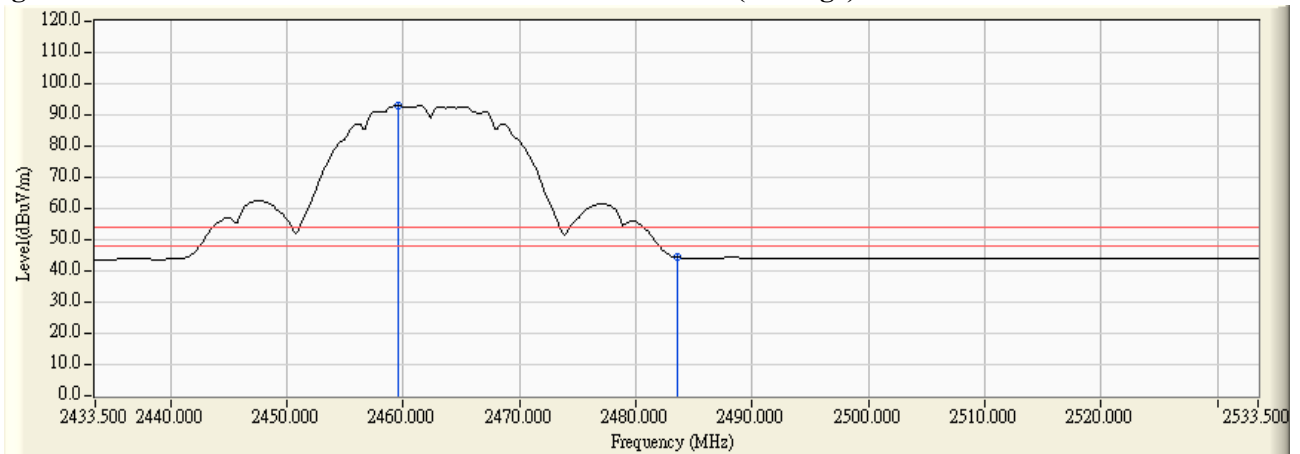


Figure Channel 11: Horizontal (Average)



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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2461.300	31.286	65.949	97.235	--	--	Pass
11 (Peak)	2483.500	31.435	24.130	55.565	74.00	54.00	Pass
11 (Peak)	2491.100	31.487	25.442	56.929	74.00	54.00	
11 (Average)	2459.500	31.273	62.455	93.728	--	--	Pass
11 (Average)	2483.500	31.435	12.360	43.795	74.00	54.00	Pass

Figure Channel 11: Vertical (Peak)

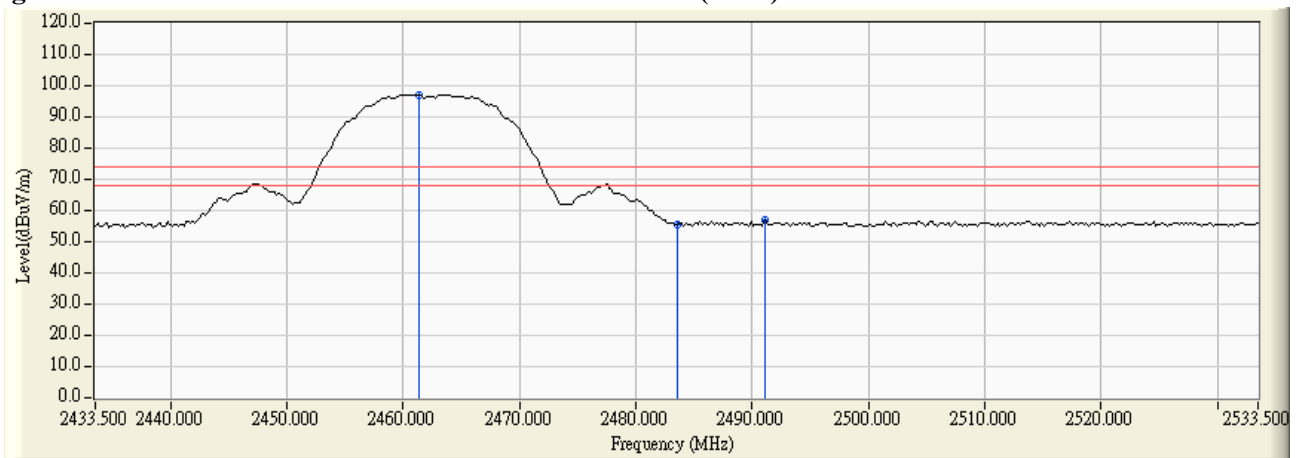


Figure Channel 11: Vertical (Average)



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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2390.000	33.739	36.834	70.573	74.00	54.00	Pass
01 (Peak)	2400.000	33.752	45.636	79.387	--	--	--
01 (Peak)	2411.000	33.769	67.529	101.298	--	--	--
01 (Average)	2390.000	33.739	18.262	52.001	74.00	54.00	Pass
01 (Average)	2400.000	33.752	31.147	64.898	--	--	--
01 (Average)	2411.000	33.769	58.614	92.383	--	--	--

Figure Channel 01: Horizontal (Peak)

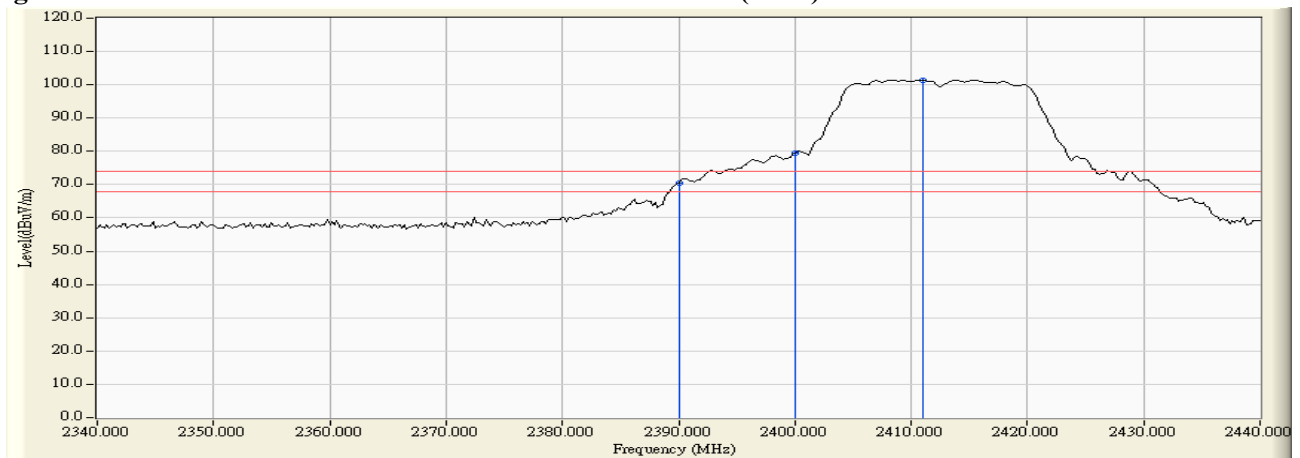
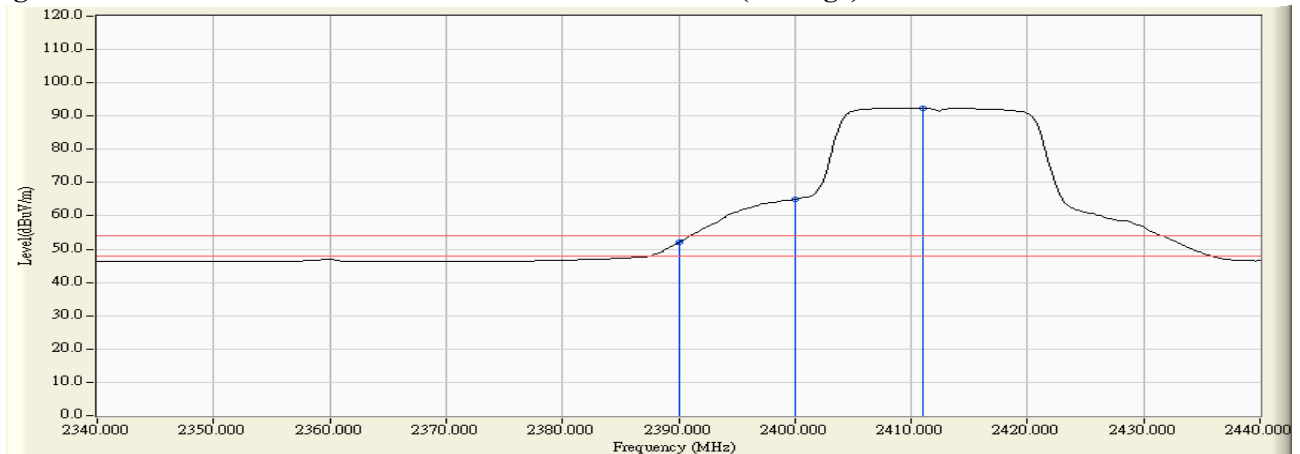


Figure Channel 01: Horizontal (Average)



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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2390.000	32.267	38.700	70.967	74.00	54.00	Pass
01 (Peak)	2400.000	32.241	47.243	79.484	--	--	--
01 (Peak)	2413.800	32.257	69.780	102.037	--	--	--
01 (Average)	2390.000	32.267	19.150	51.417	74.00	54.00	Pass
01 (Average)	2400.000	32.241	32.495	64.736	--	--	--
01 (Average)	2414.200	32.259	60.628	92.887	--	--	--

Figure Channel 01:

Vertical (Peak)

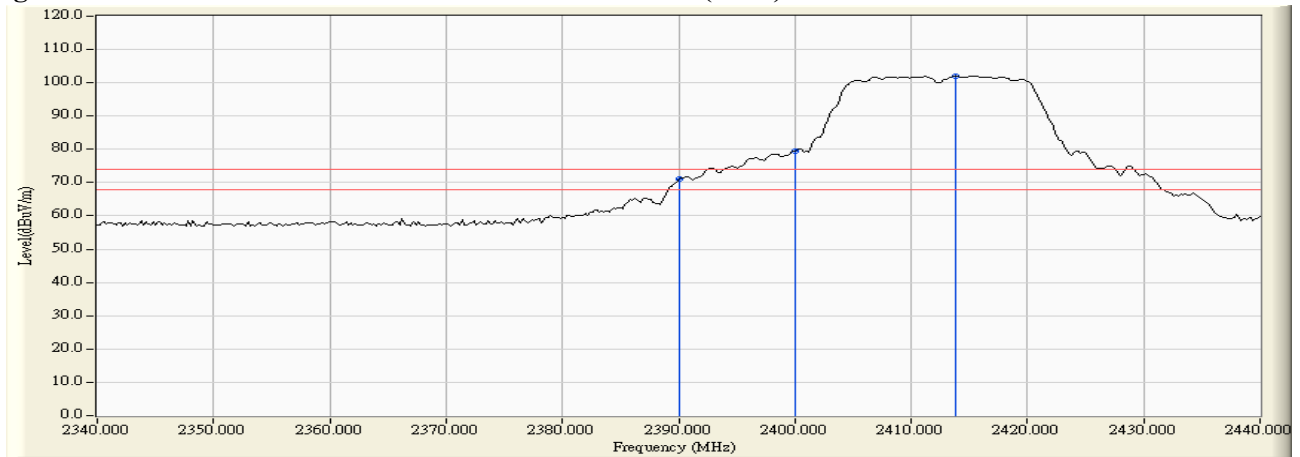
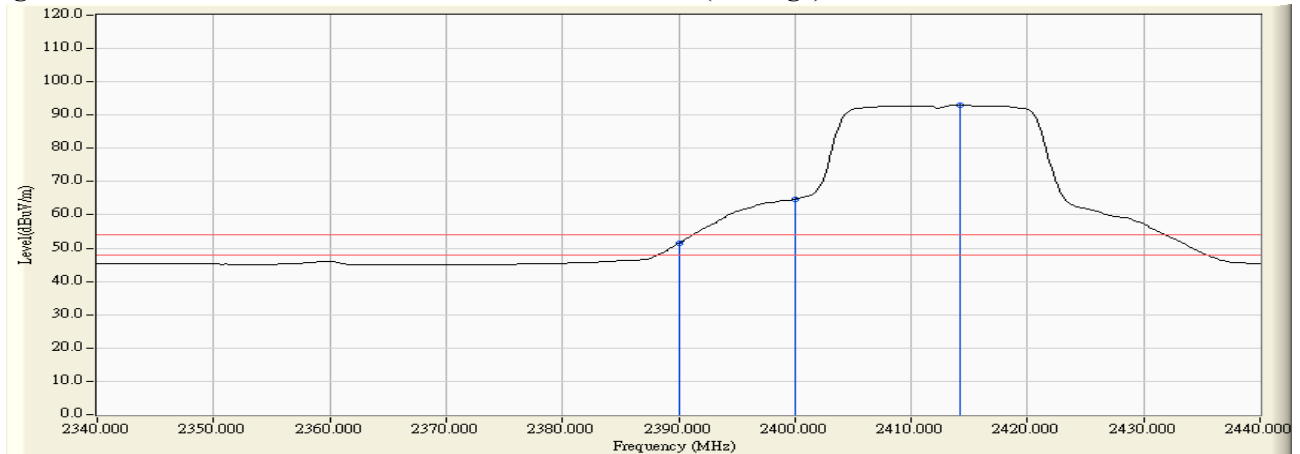


Figure Channel 01:

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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2458.300	33.883	66.974	100.857	--	--	Pass
11 (Peak)	2483.500	33.951	32.609	66.559	74.00	54.00	Pass
11 (Peak)	2484.700	33.954	33.913	67.866	74.00	54.00	Pass
11 (Average)	2458.900	33.885	57.772	91.657	--	--	Pass
11 (Average)	2483.500	33.951	17.091	51.041	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

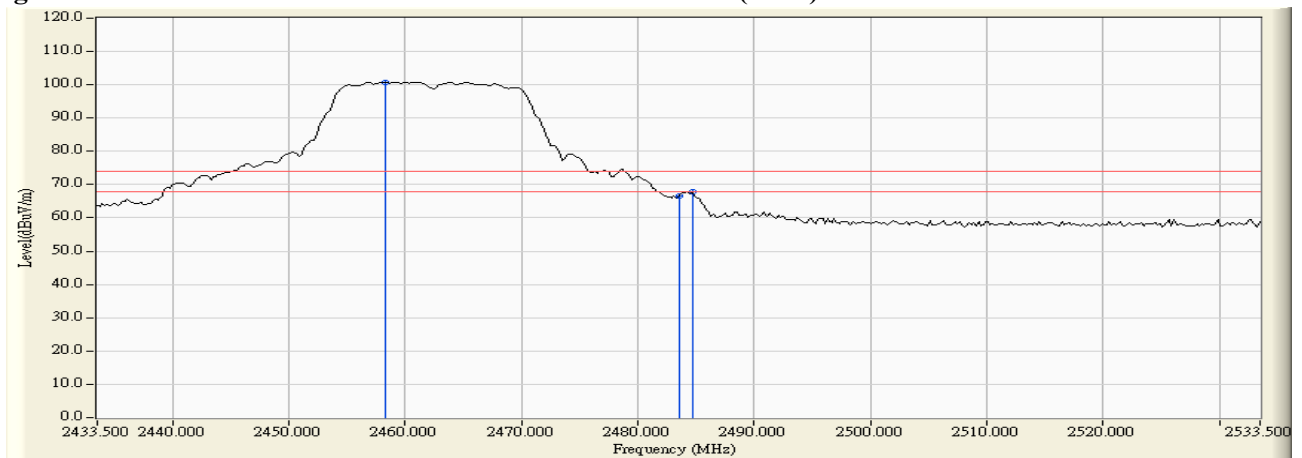
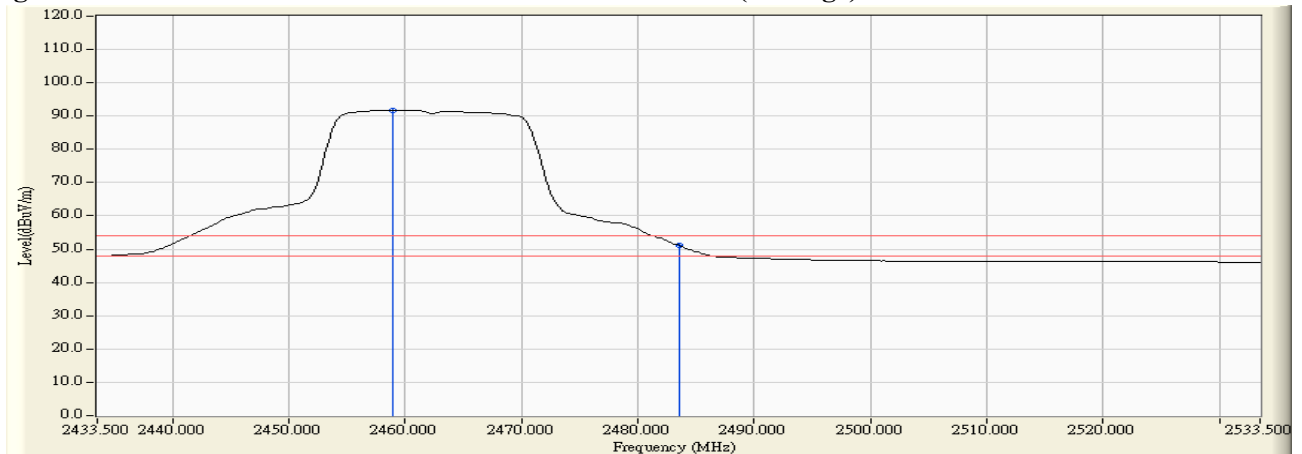


Figure Channel 11: Horizontal (Average)



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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2456.900	32.456	68.526	100.982	--	--	Pass
11 (Peak)	2483.500	32.586	34.340	66.925	74.00	54.00	Pass
11 (Peak)	2484.100	32.588	35.774	68.362	74.00	54.00	
11 (Average)	2457.500	32.459	59.577	92.036	--	--	Pass
11 (Average)	2483.500	32.586	19.138	51.723	74.00	54.00	Pass

Figure Channel 11: Vertical (Peak)

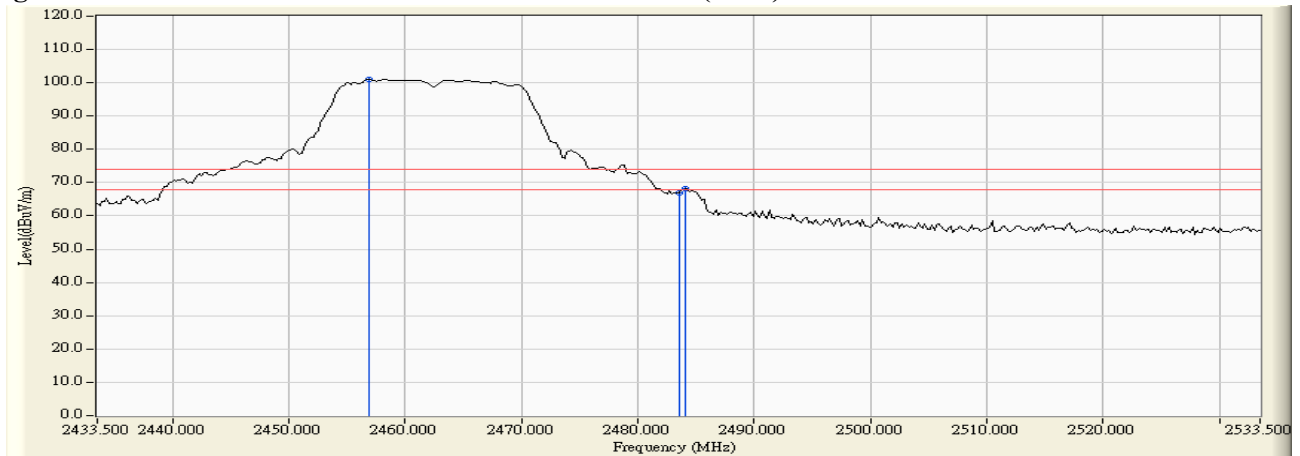
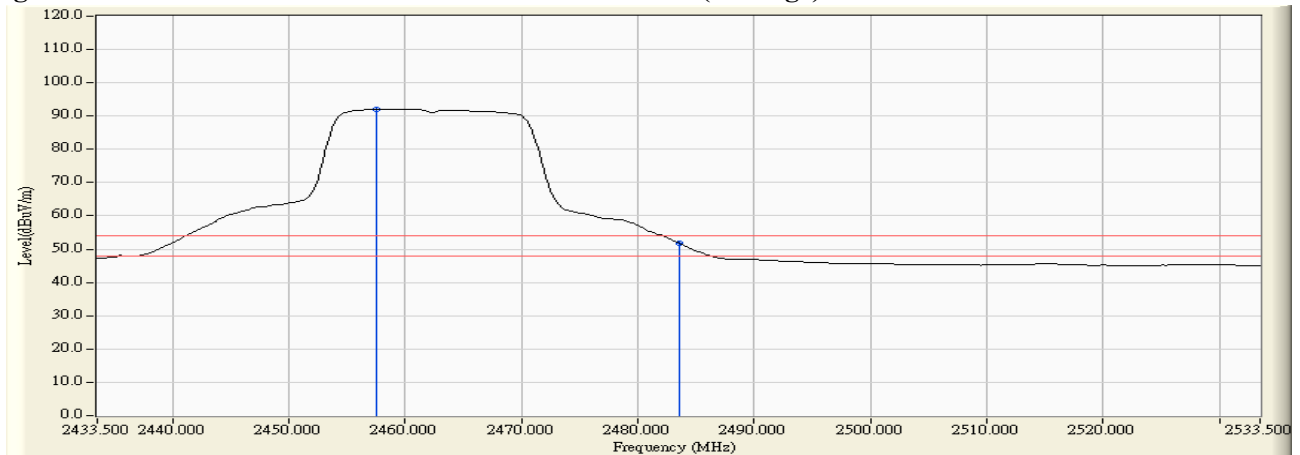


Figure Channel 11: Vertical (Average)



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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2390.000	33.739	38.610	72.349	74.00	54.00	Pass
01 (Peak)	2400.000	33.752	43.175	76.926	--	--	--
01 (Peak)	2409.200	33.766	66.980	100.746	--	--	--
01 (Average)	2390.000	33.739	19.166	52.905	74.00	54.00	Pass
01 (Average)	2400.000	33.752	28.447	62.198	--	--	--
01 (Average)	2409.200	33.766	57.415	91.181	--	--	--

Figure Channel 01: Horizontal (Peak)

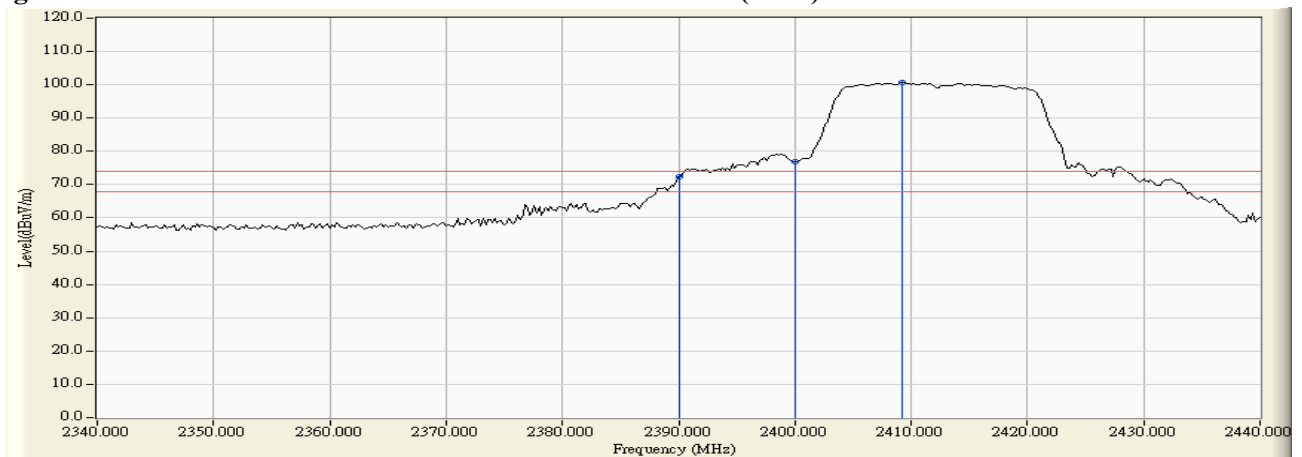
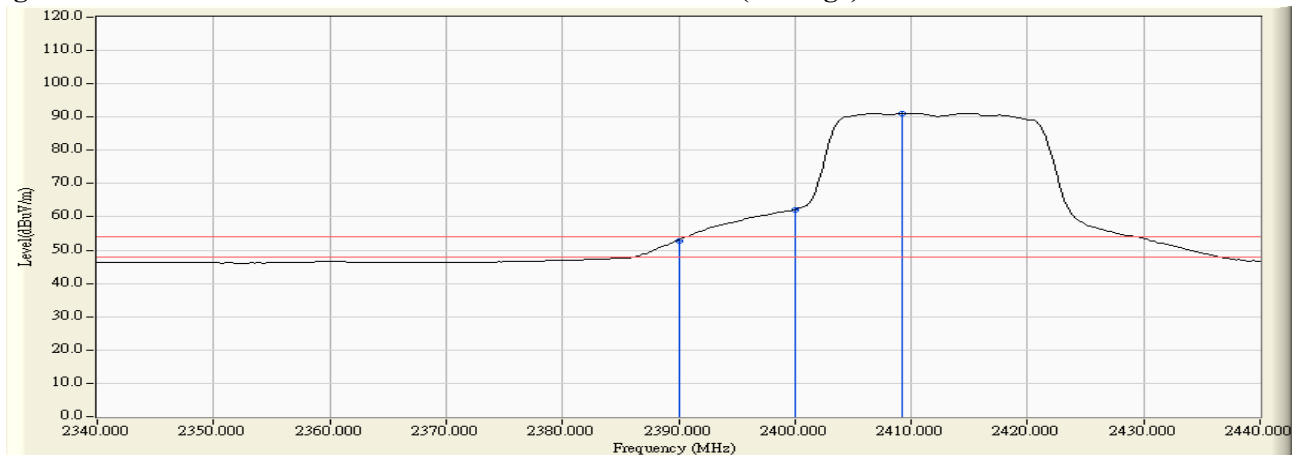


Figure Channel 01: Horizontal (Average)



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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2390.000	32.267	40.652	72.919	74.00	54.00	Pass
01 (Peak)	2400.000	32.241	44.239	76.480	--	--	--
01 (Peak)	2409.200	32.244	68.730	100.974	--	--	--
01 (Average)	2390.000	32.267	19.991	52.258	74.00	54.00	Pass
01 (Average)	2400.000	32.241	29.391	61.632	--	--	--
01 (Average)	2415.400	32.264	59.122	91.386	--	--	--

Figure Channel 01:

Vertical (Peak)

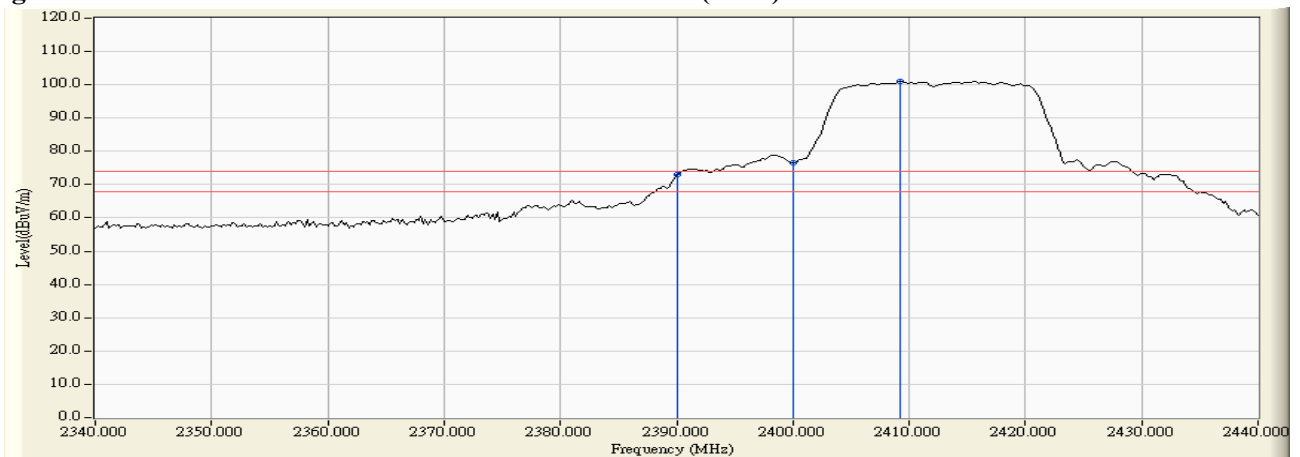
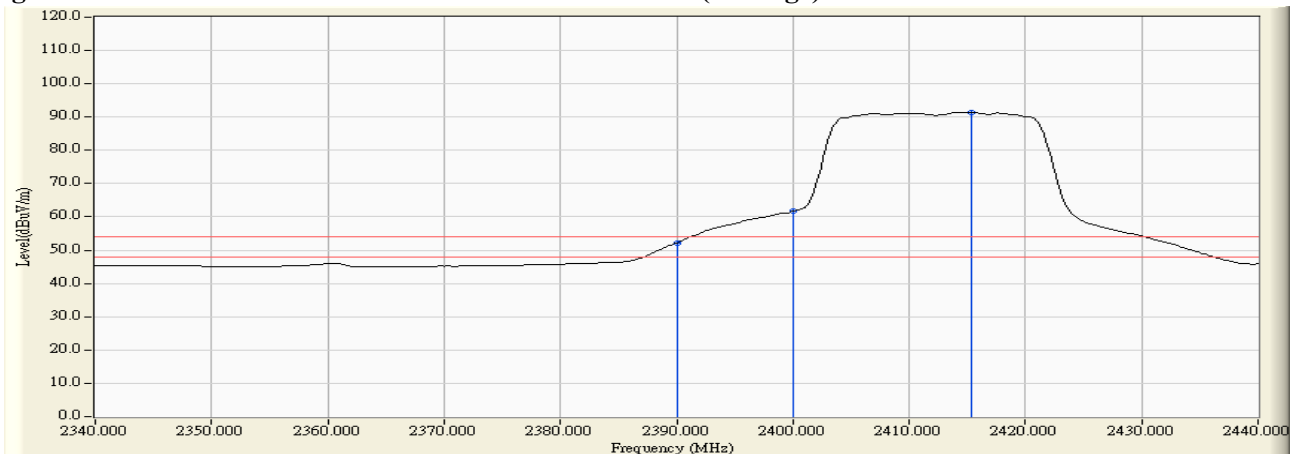


Figure Channel 01:

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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2459.100	33.886	66.937	100.822	--	--	Pass
11 (Peak)	2483.500	33.951	37.731	71.681	74.00	54.00	Pass
11 (Average)	2459.100	33.886	57.371	91.256	--	--	Pass
11 (Average)	2483.500	33.951	18.463	52.413	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

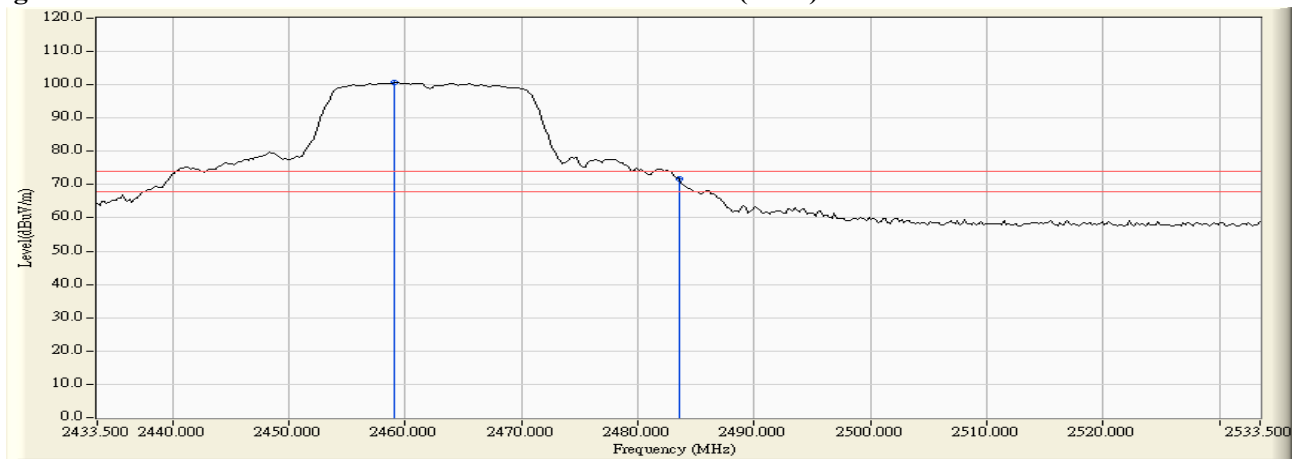
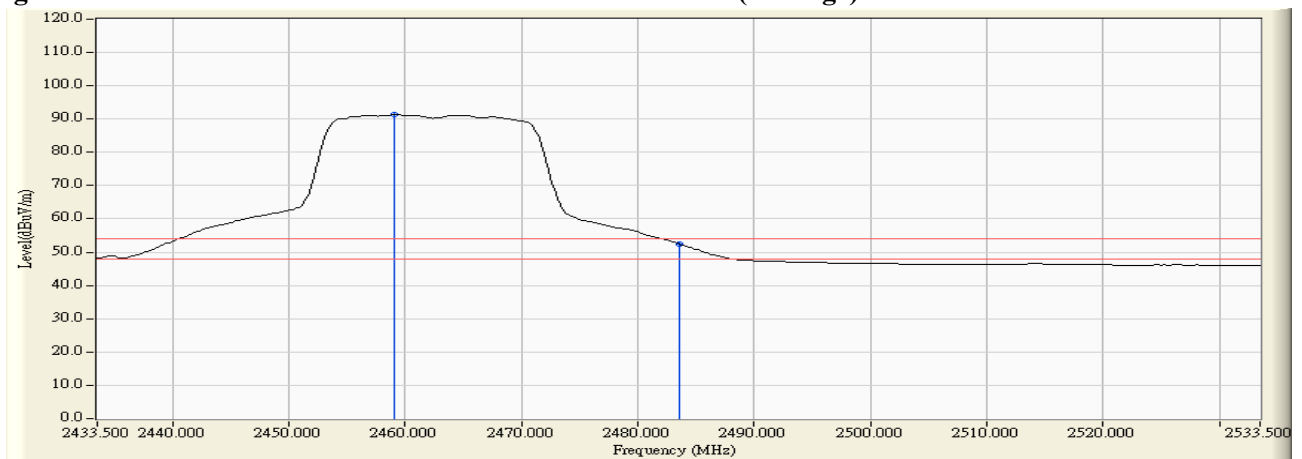


Figure Channel 11: Horizontal (Average)



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 : Gateway
 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 (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2459.300	32.468	68.617	101.084	--	--	Pass
11 (Peak)	2483.500	32.586	39.904	72.489	74.00	54.00	Pass
11 (Average)	2459.100	32.467	59.011	91.477	--	--	Pass
11 (Average)	2483.500	32.586	20.242	52.827	74.00	54.00	Pass

Figure Channel 11: Vertical (Peak)

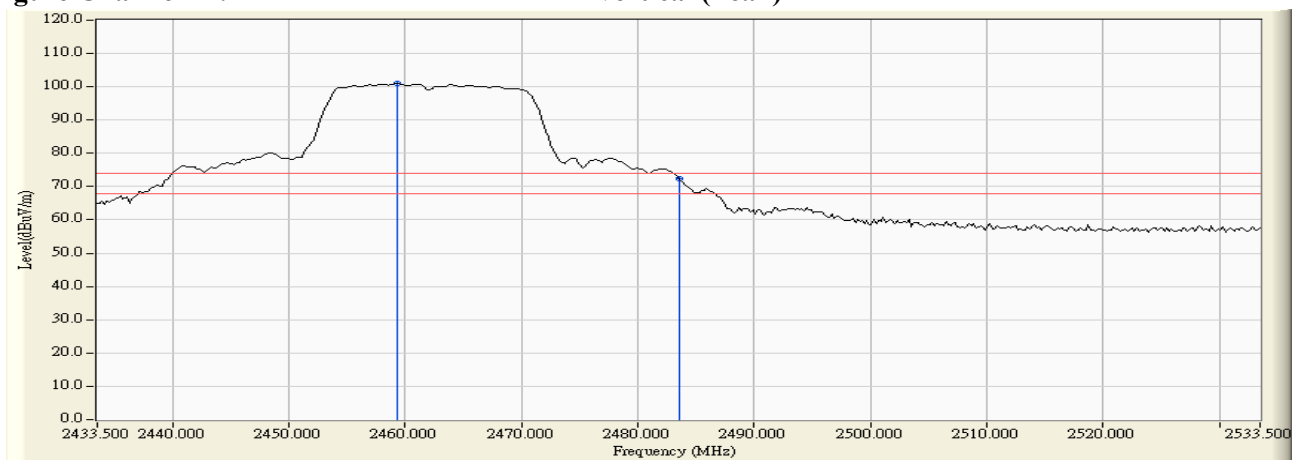
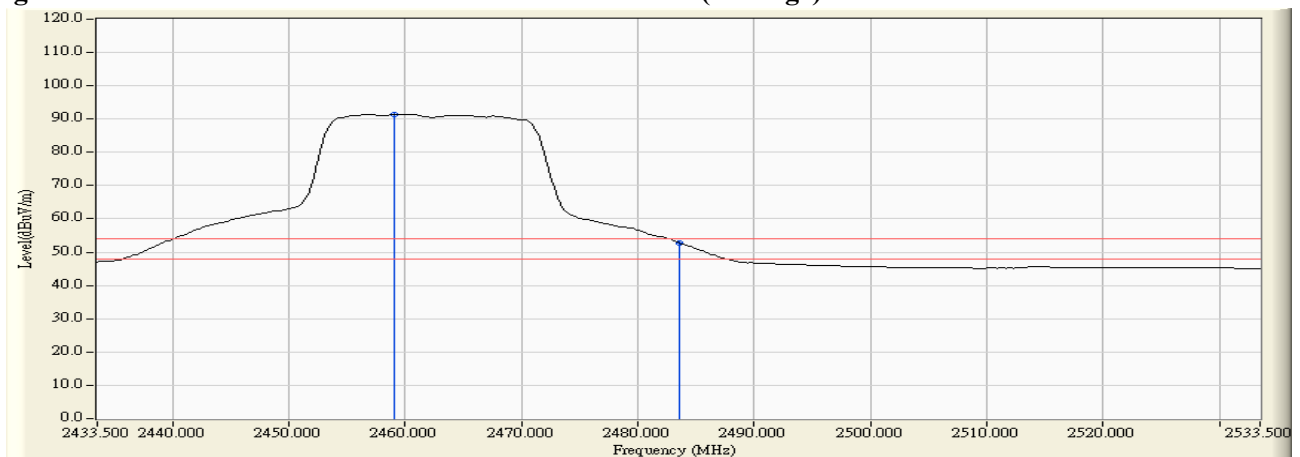


Figure Channel 11: Vertical (Average)



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

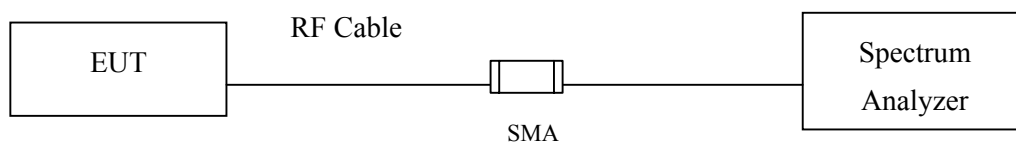
7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2014
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2014
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

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

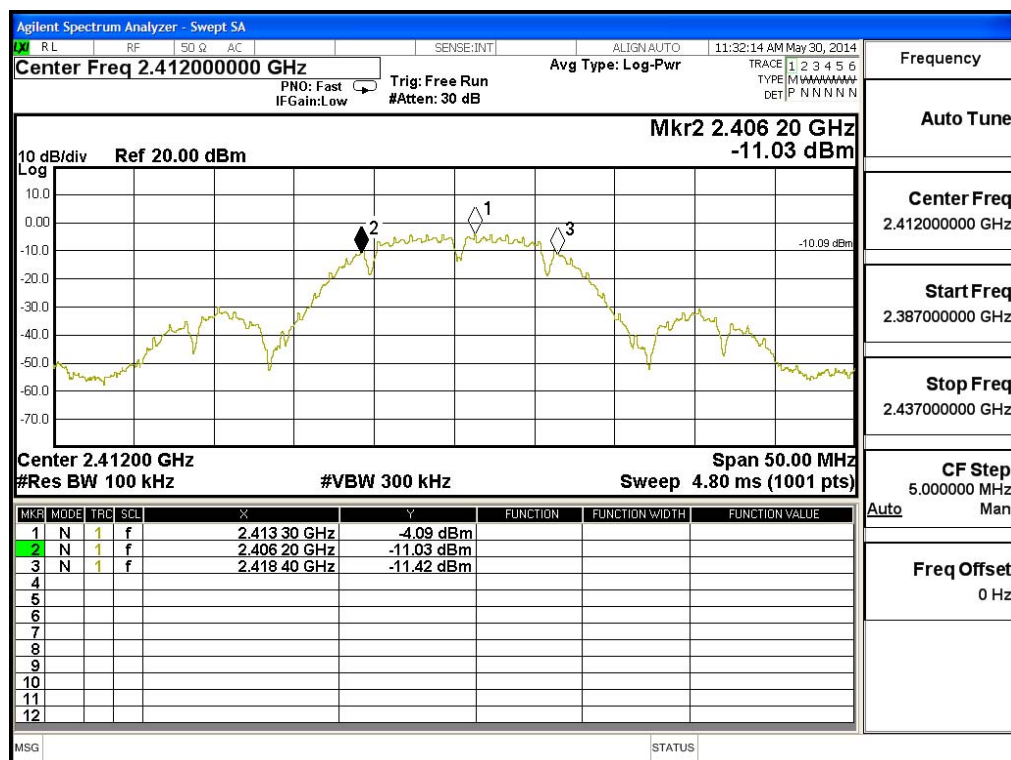
$\pm 150\text{Hz}$

7.6. Test Result of Occupied Bandwidth

Product : Gateway
 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	12200	>500	Pass

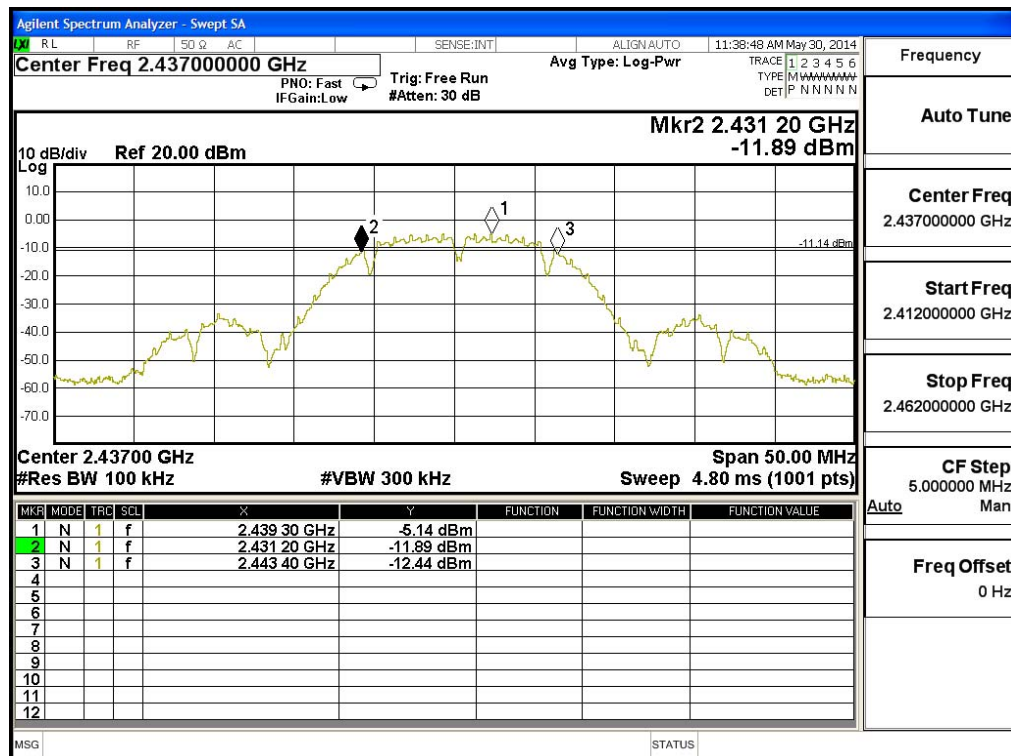
Figure Channel 1:



Product : Gateway
 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	12200	>500	Pass

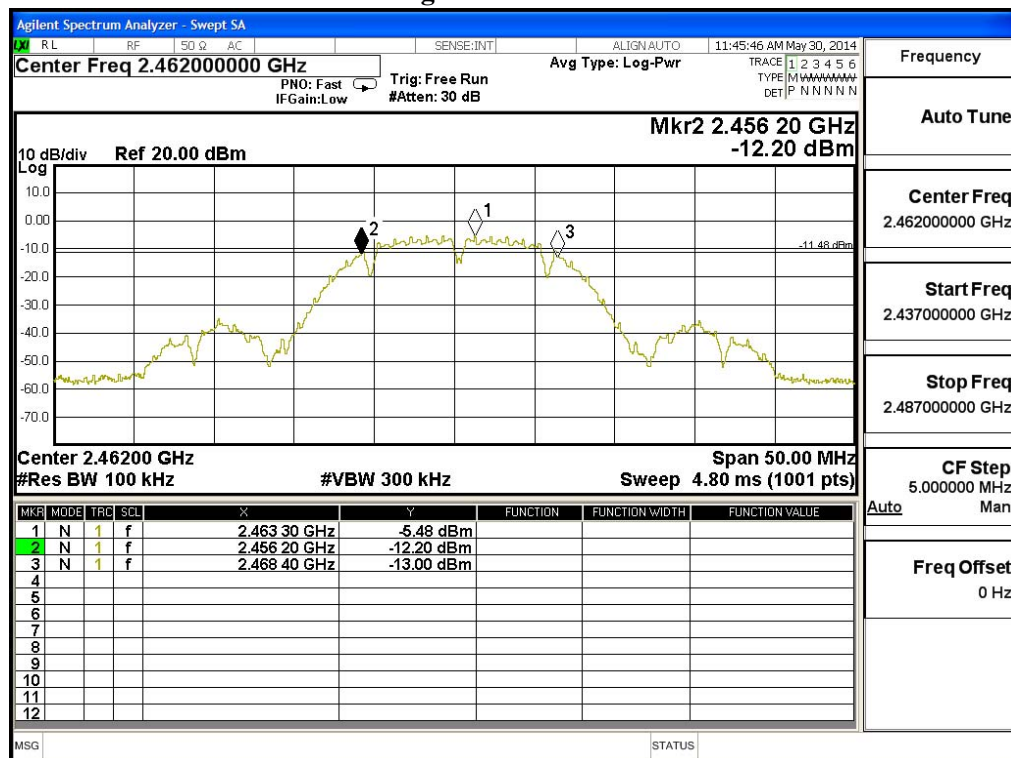
Figure Channel 6:



Product : Gateway
 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	12200	>500	Pass

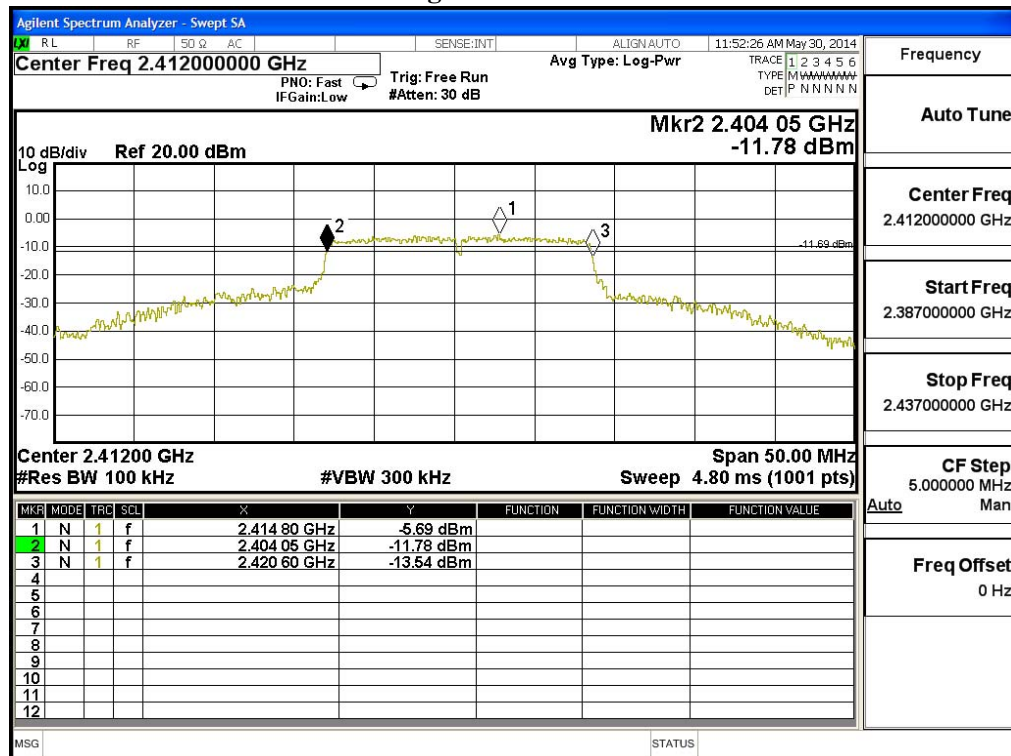
Figure Channel 11:



Product : Gateway
 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	16550	>500	Pass

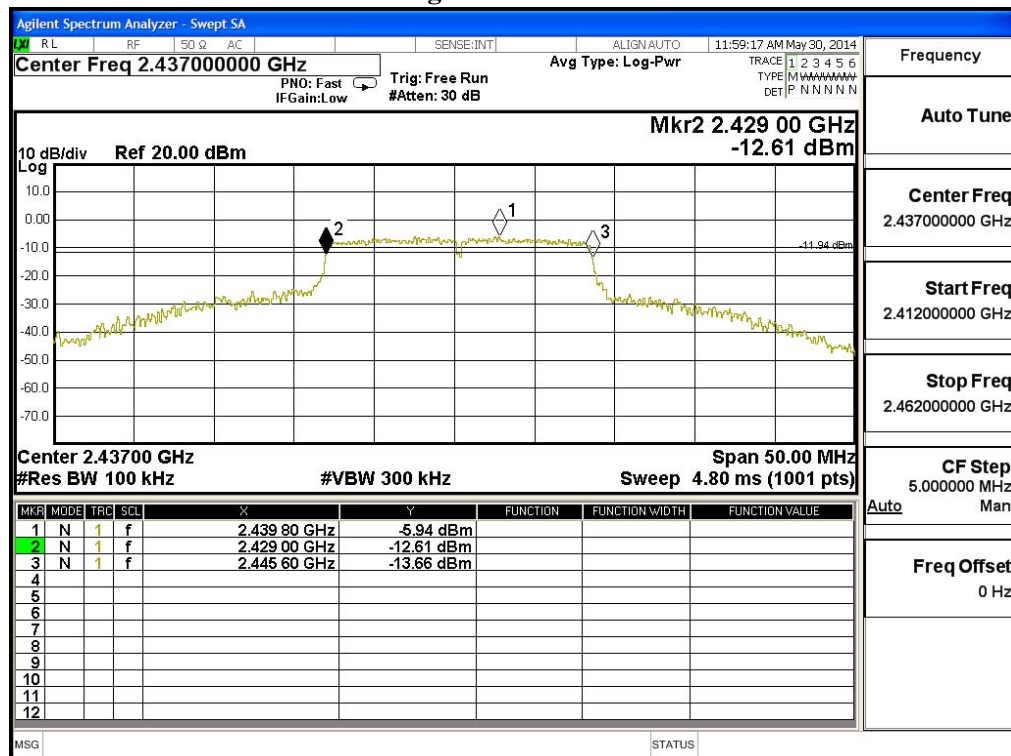
Figure Channel 1:



Product : Gateway
 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	16600	>500	Pass

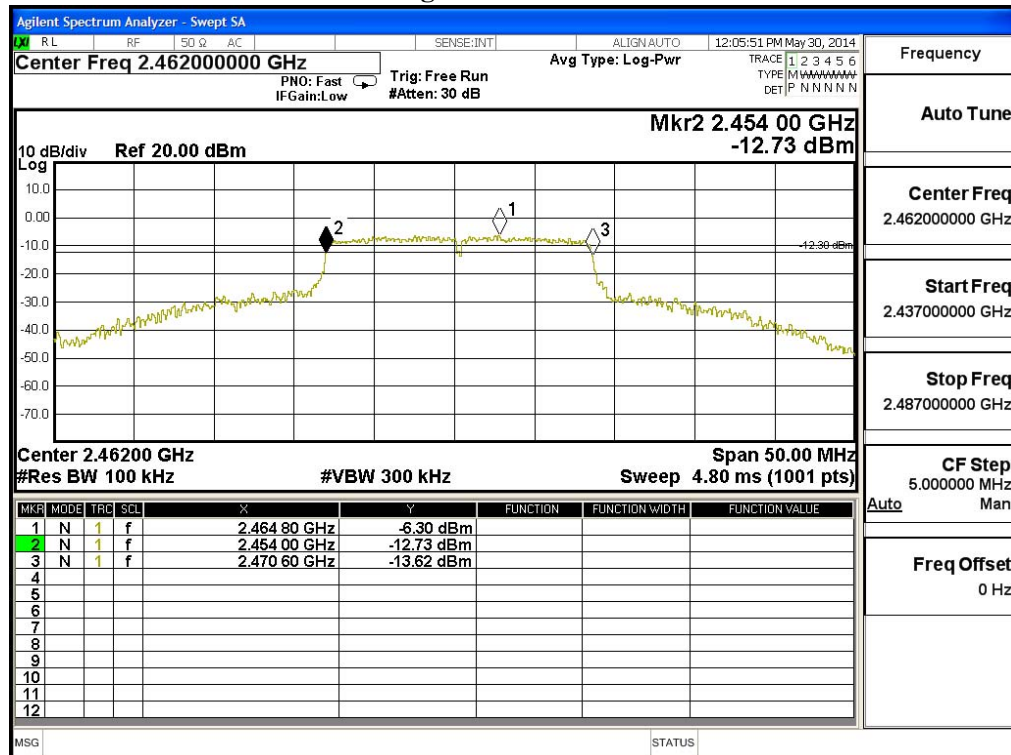
Figure Channel 6:



Product : Gateway
 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	16600	>500	Pass

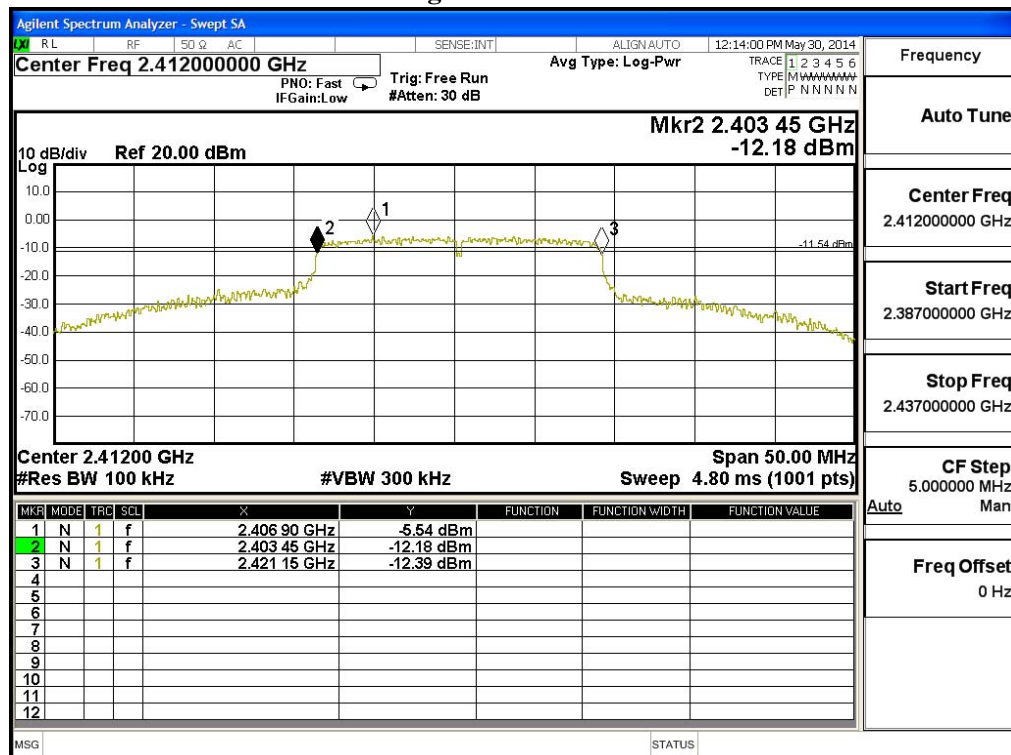
Figure Channel 11:



Product : Gateway
 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	17700	>500	Pass

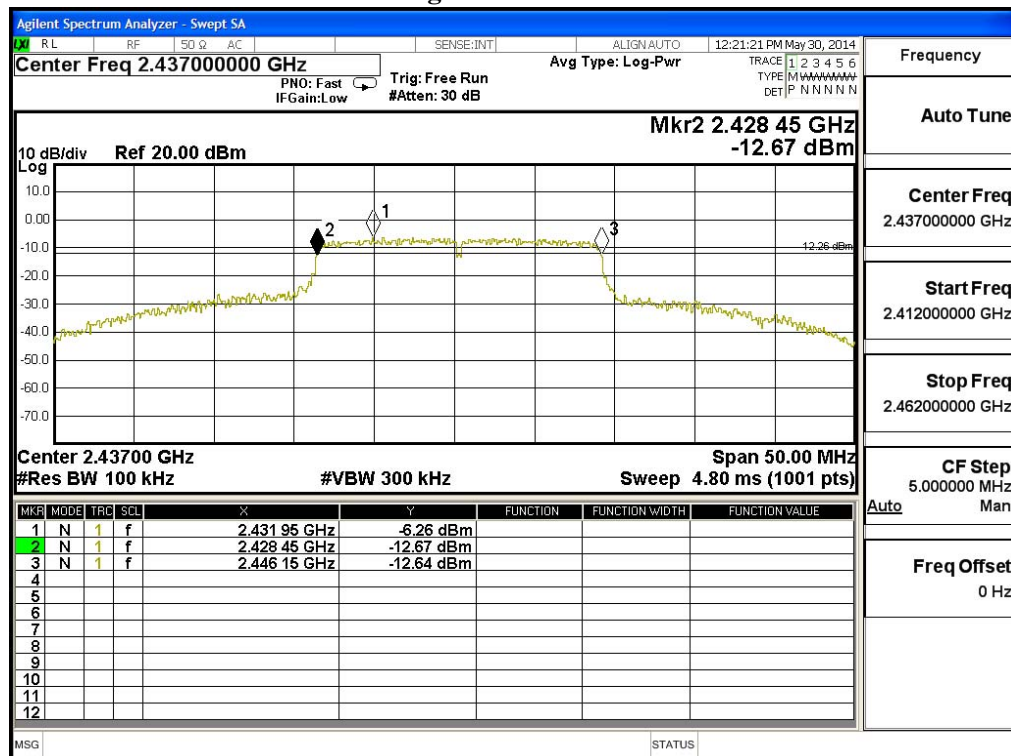
Figure Channel 1:



Product : Gateway
 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	17700	>500	Pass

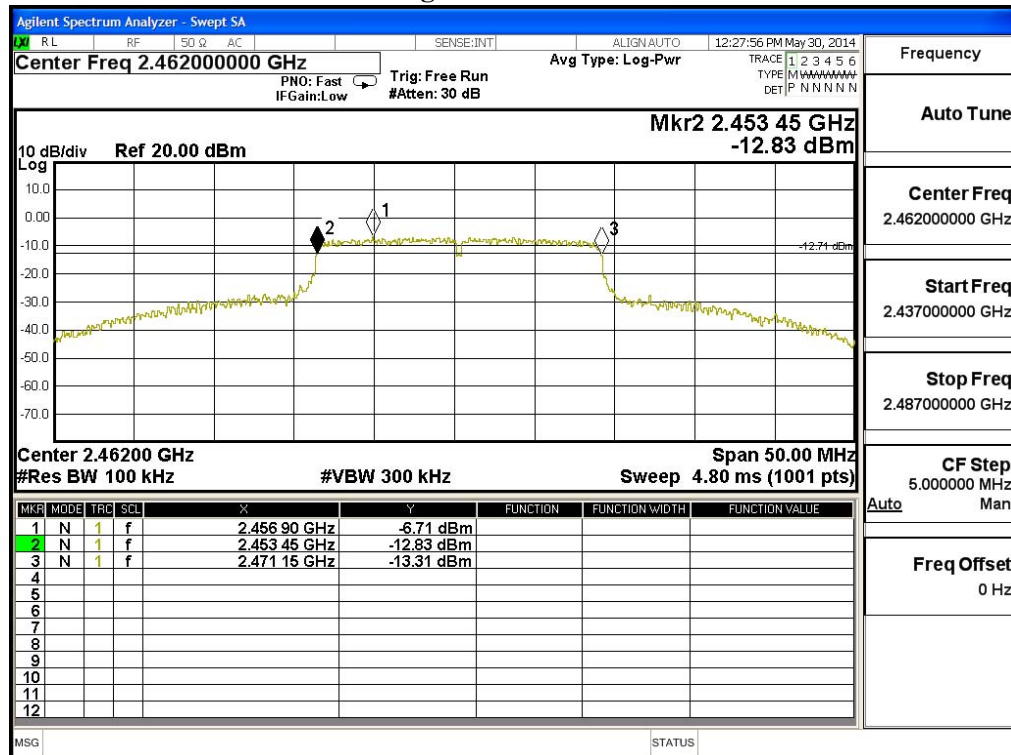
Figure Channel 6:



Product : Gateway
 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	17700	>500	Pass

Figure Channel 11:



8. Power Density

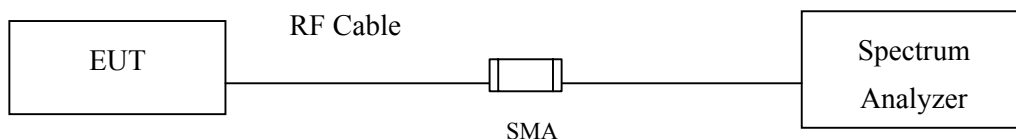
8.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2014
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2014
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

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 : Gateway
 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	-4.560	< 8dBm	Pass

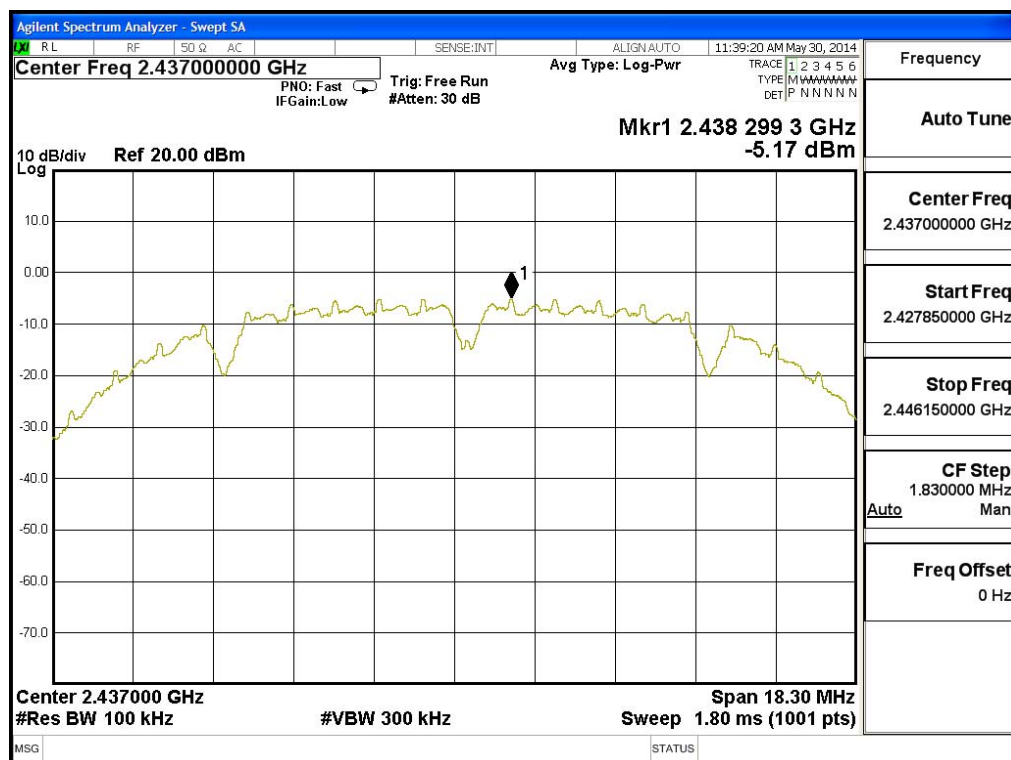
Figure Channel 1:



Product : Gateway
 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	-5.170	< 8dBm	Pass

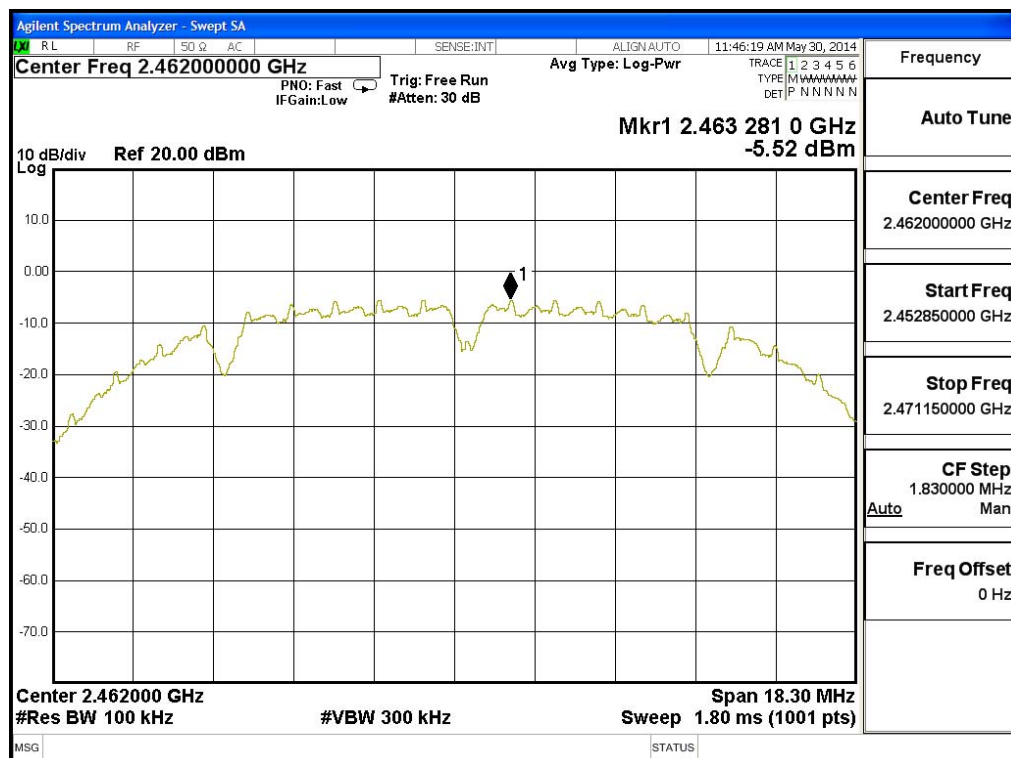
Figure Channel 6:



Product : Gateway
 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	-5.520	< 8dBm	Pass

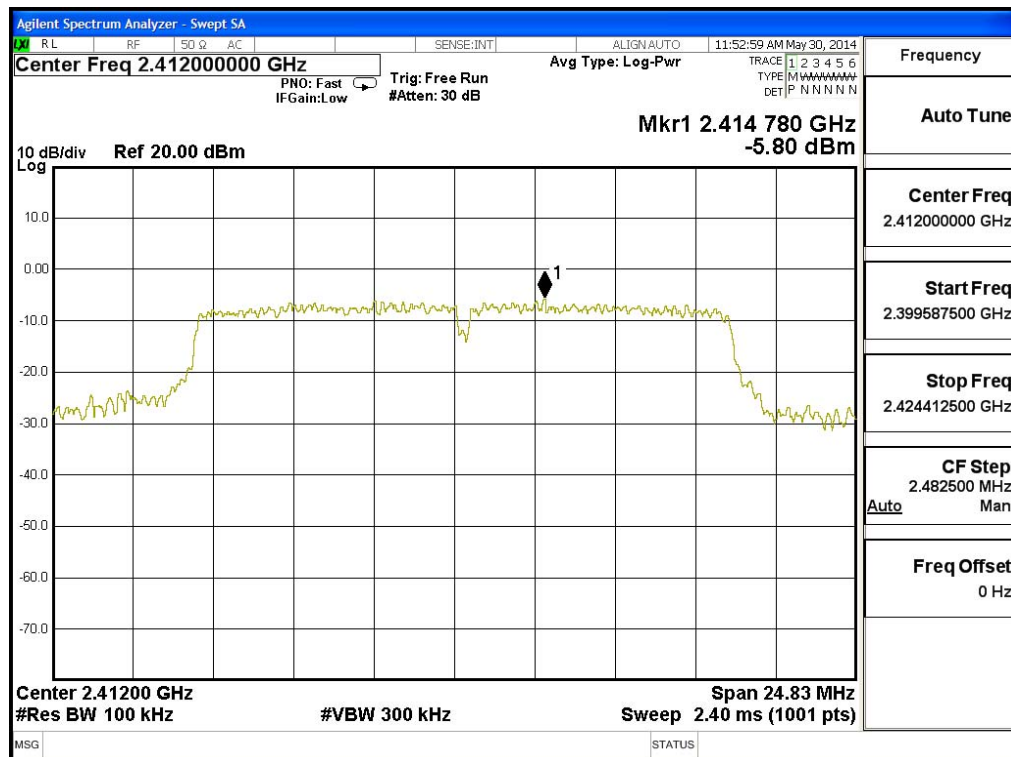
Figure Channel 11:



Product : Gateway
 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	-5.800	< 8dBm	Pass

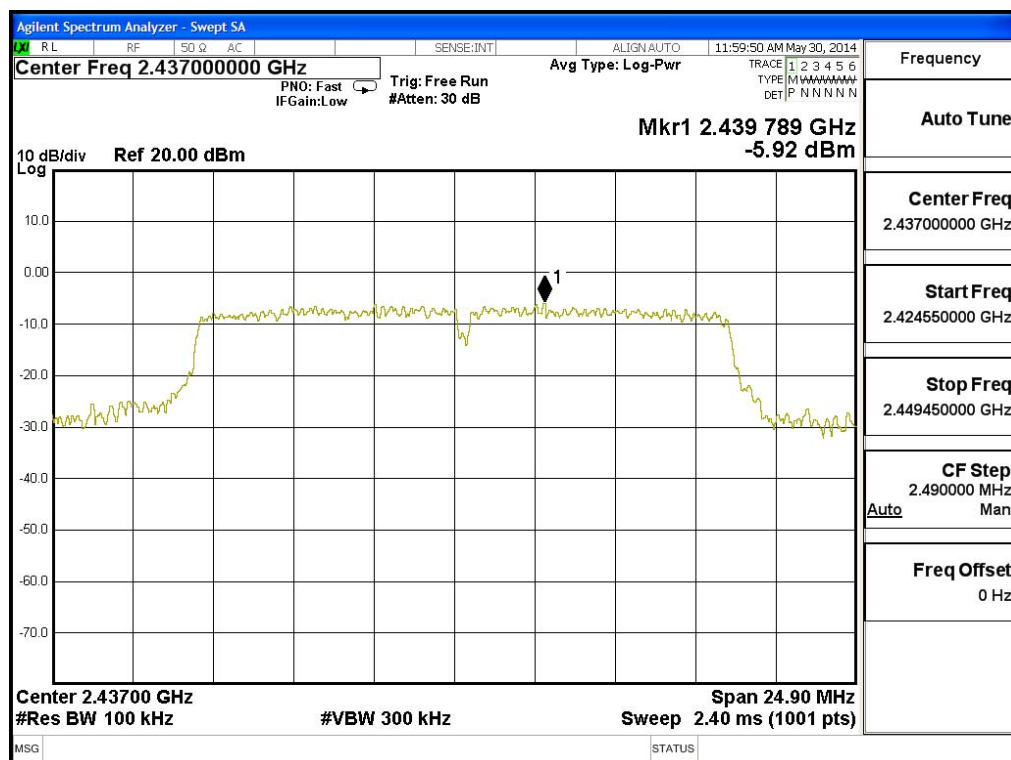
Figure Channel 1:



Product : Gateway
 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	-5.920	< 8dBm	Pass

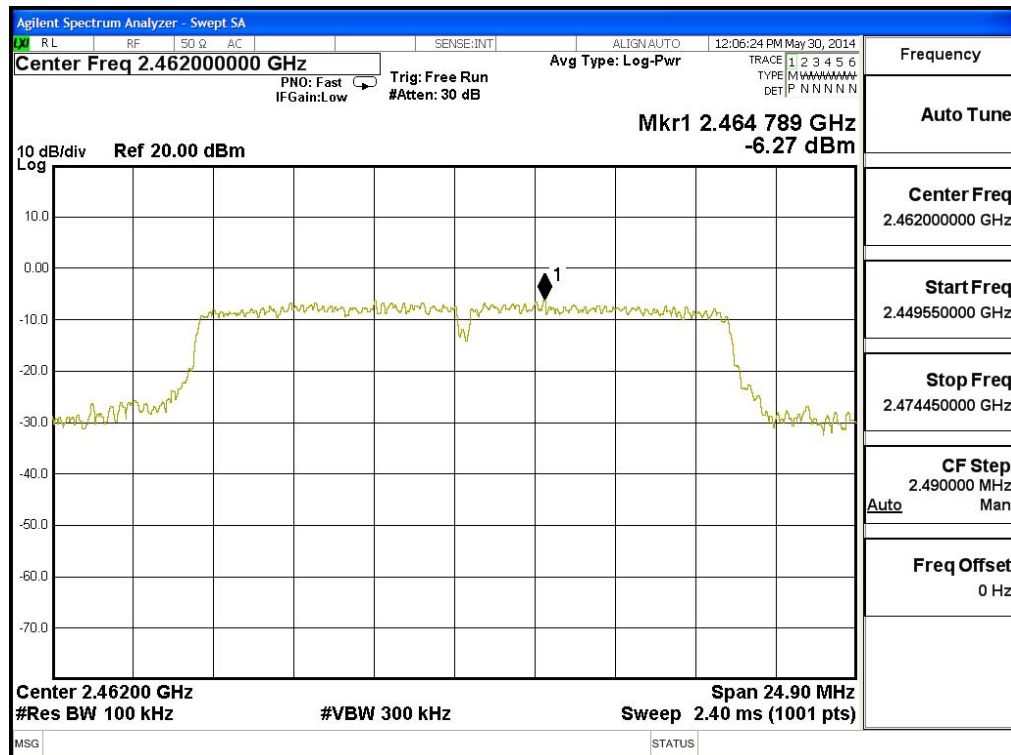
Figure Channel 6:



Product : Gateway
 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	-6.270	< 8dBm	Pass

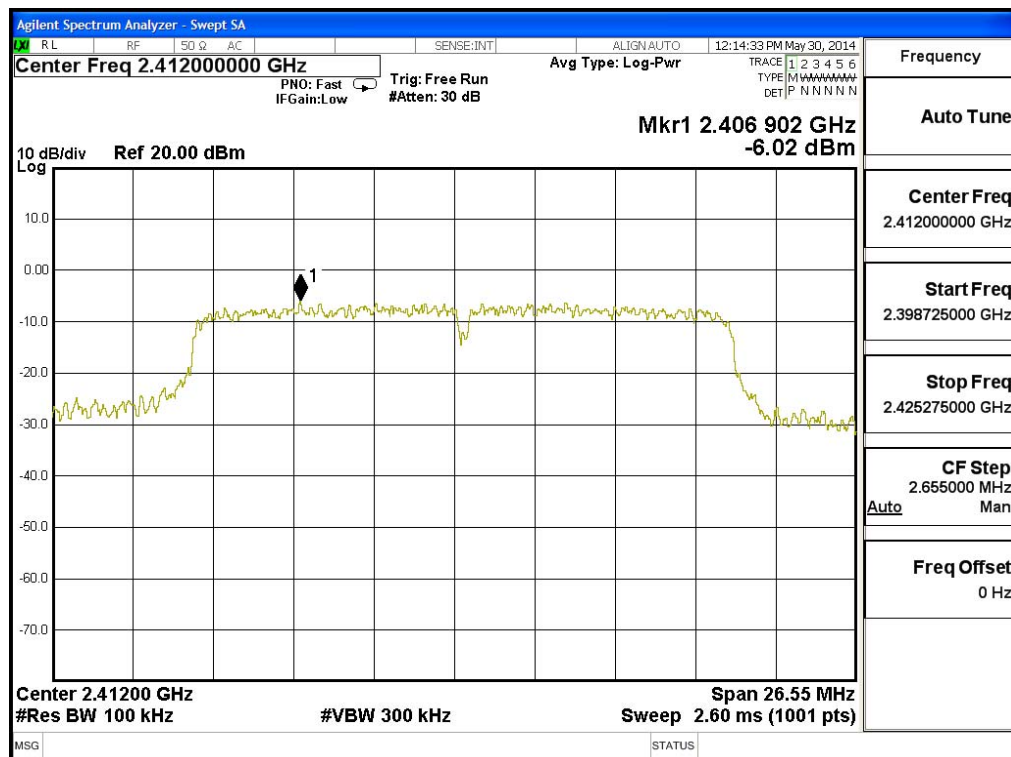
Figure Channel 11:



Product : Gateway
 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	-6.020	< 8dBm	Pass

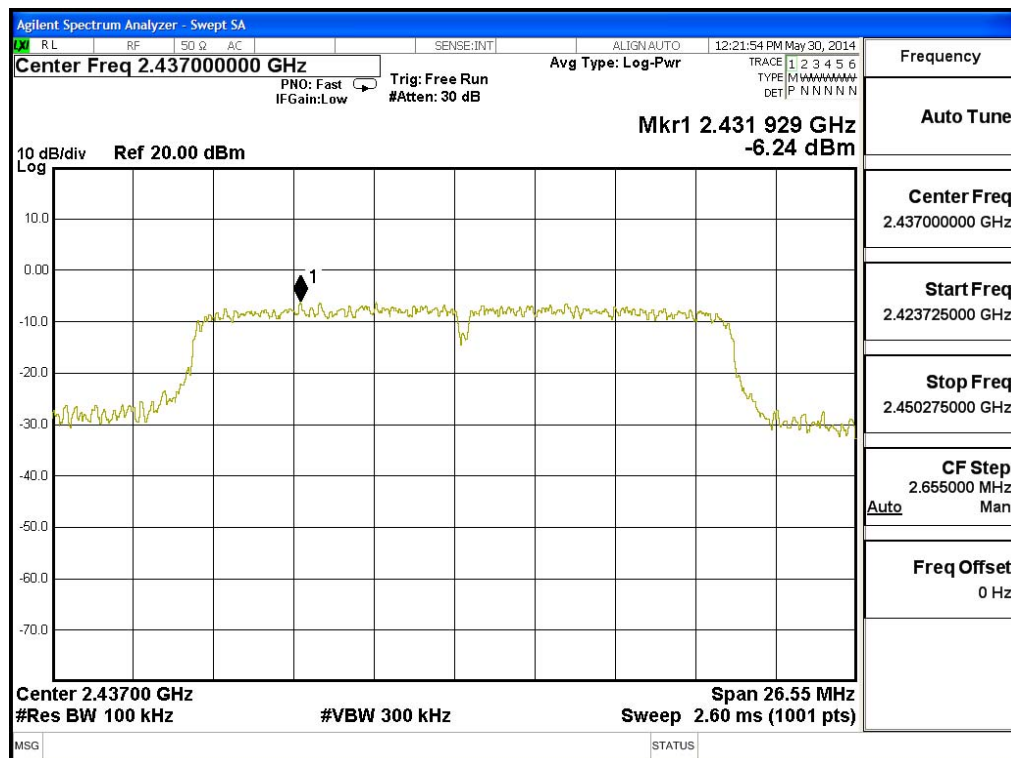
Figure Channel 1:



Product : Gateway
 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	-6.240	< 8dBm	Pass

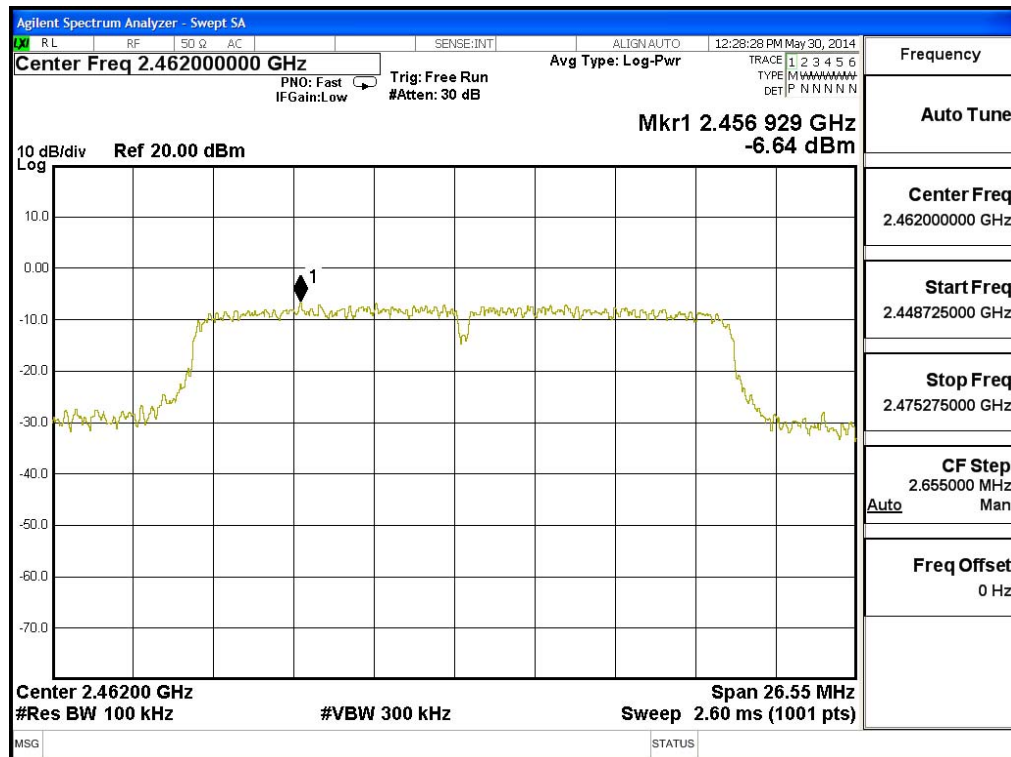
Figure Channel 6:



Product : Gateway
 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	-6.650	< 8dBm	Pass

Figure Channel 11:



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.