FCC Test Report

Product Name	WiFi Module
Model No	ComXS-320
FCC ID.	XB7-COMXS320

Applicant	ACTIA I+ME GmbH
Address	Dresdenstrasse 17/18, D-38124 Braunschweig, Germany

Date of Receipt	Feb. 07, 2017
Issue Date	Mar. 24, 2017
Report No.	1720095R-RFUSP02V00
Report Version	V1.0

Testing Laboratory
3023

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: Mar. 24, 2017
Report No.: 1720095R-RFUSP02V00

Product Name	WiFi Module
Applicant	ACTIA I+ME GmbH
Address	Dresdenstrasse 17/18, D-38124 Braunschweig, Germany
Manufacturer	ACTIA I+ME GmbH
Model No.	ComXS-320
EUT Rated Voltage	DC 3.3V
EUT Test Voltage	DC 3.3V
Trade Name	ACTIA
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2015 ANSI C63.4: 2014, ANSI C63.10: 2013 KDB 558074 D01 DTS Meas Guidance v03r05
Test Result	Complied

Documented By : Rita Huang

(Senior Adm. Specialist / Rita Huang)

Tested By : Vic Chen

(Engineer / Vic Chen)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	WiFi Module
Trade Name	ACTIA
Model No.	ComXS-320
FCC ID.	XB7-COMXS320
Frequency Range	802.11b/g/n-20MHz:2412-2462MHz,802.11n-40MHz:2422-2452MHz
Number of Channels	802.11b/g/n-20MHz: 11, n-40MHz: 7
Data Speed	802.11b: 1-11Mbps, 802.11a/g: 6-54Mbps, 802.11n: up to 300Mbps
Type of Modulation	802.11b:DSSS, DBPSK, DQPSK, CCK 802.11g/n: OFDM, BPSK, QPSK, 16QAM, 64QAM
Antenna Type	Chip Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	ACTIA	Laird MAF95029	Chip Antenna	2 dBi for 2.4GHz

Note:

1. The antenna of EUT conforms 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		

802.11n-40MHz (2.4G Band) Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
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		

Note:

1. This device is a WiFi Module with a built-in WLAN transceiver.
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 14.4Mbps and, 802.11n(40M-BW) is 30Mbps).
4. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report. (802.11b/g is chain A)
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-20BW_14.4Mbps)
	Mode 4: Transmit - (802.11n-40BW_30Mbps)

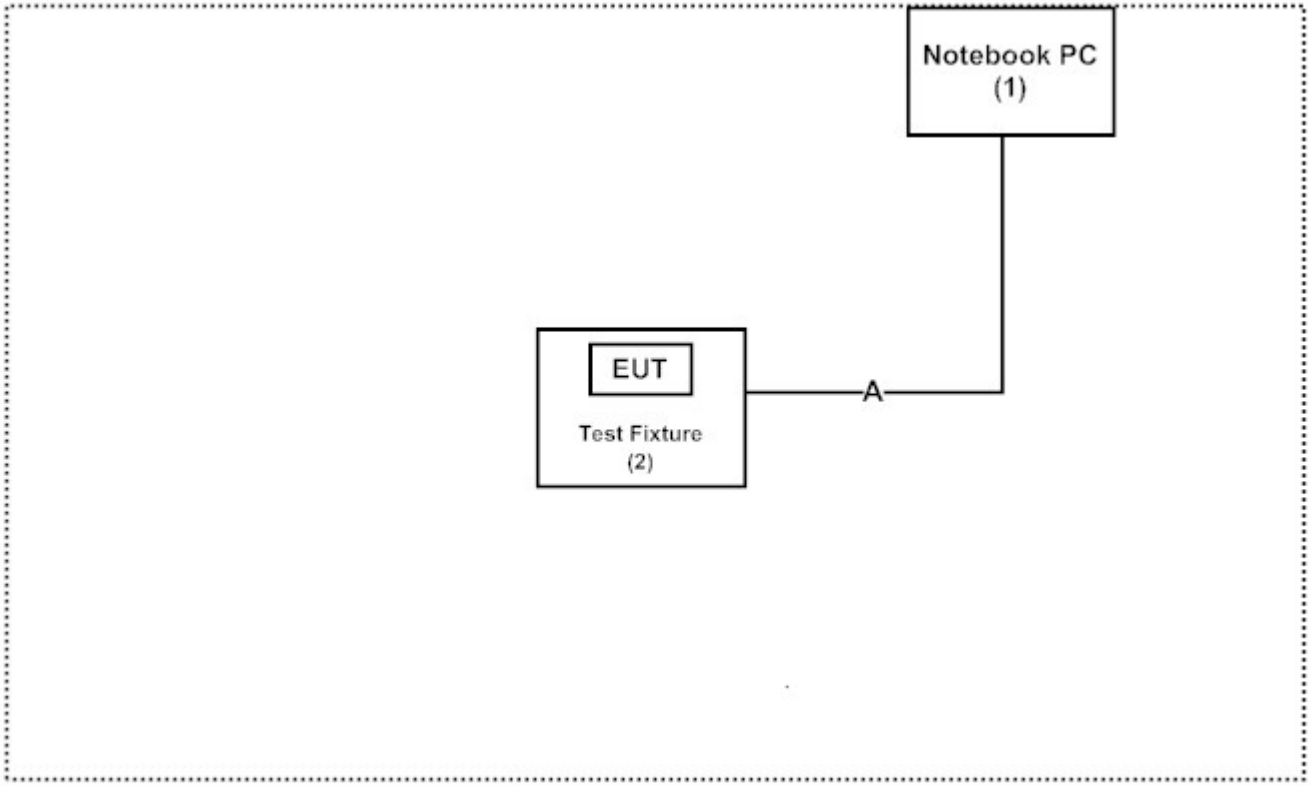
1.3. Tested System Details

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	Lenovo	N/A	N/A	Non-Shielded, 0.8m
(2)	Test Fixture	embedded wireless	N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Non-Shielded, 1.9m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

(1) Setup the EUT as shown on 1.4
(2) Execute “Art-gui V1.1” program on the Notebook PC.
(3) Configure the test mode, the test channel, and the data rate.
(4) Start the continuous transmission.
(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 DEKRA Testing and Certification Co., Ltd. Web Site:
http://www.dekra.com.tw/english/about/certificates.aspx?bval=5
The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw/index_en.aspx

Site Description: Accredited by TAF
Accredited Number: 3023

Site Name: DEKRA Testing and Certification Co., Ltd
Site Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW1014

1.7. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2016/11/28	2017/11/27
X	Spectrum Analyzer	Agilent	N9010A	MY48030495	2016/7/22	2017/7/21
X	Power Meter	Anritsu	ML2495A	6K00003357	2016/6/23	2017/6/22
X	Pulse power sensor	Anritsu	MA2411B	0846193	2016/6/23	2017/6/22
X	EMI Test Receiver	R&S	ESCS 30	100369	2016/10/13	2017/10/12
X	LISN	R&S	ESH3-Z5	836679/017	2017/1/18	2018/1/17
X	LISN	R&S	ENV216	100097	2017/1/18	2018/1/17
X	Coaxial Cable	QTK(Arnist)	RG 400	LC018-RG	2016/6/25	2017/6/24

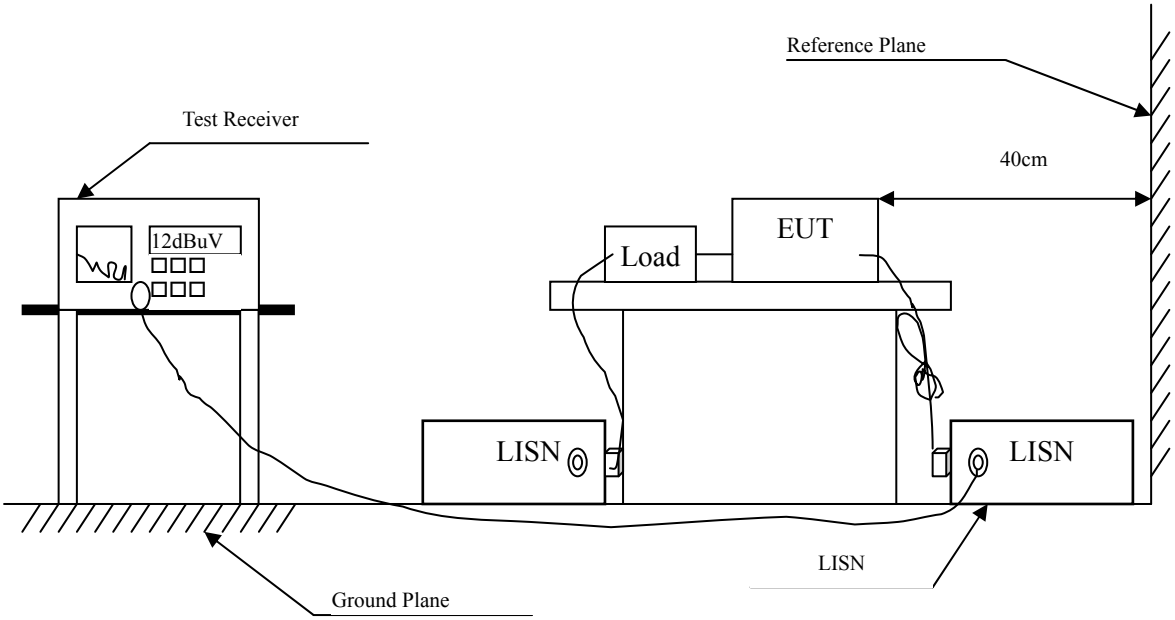
For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSP40	100170	2017/1/18	2018/1/17
	Loop Antenna	Teseq	HLA6121	37133	2017/3/18	2018/3/17
X	Bi-Log Antenna	Schaffner Chase	CBL6112B	2707	2016/6/11	2017/6/10
X	Horn Antenna	ETS-Lindgren	3117	00135205	2016/4/6	2017/4/5
	Horn Antenna	Schwarzbeck	BBHA9170	209	2016/4/14	2017/4/13
X	Pre-Amplifier	QTK	AP/0100A	CHM/0901069	2016/6/23	2017/6/22
X	Pre-Amplifier	EMCI	EMC012630SE	980210	2017/1/26	2018/1/24
	Pre-Amplifier	NARDA WE	DBL-1840N506	013	2016/9/30	2017/9/29
X	Filter	MicroTRON	BRM50701	019	2016/11/2	2017/11/1
	Filter	Microwave Circuits	N0257881	36681	2017/1/3	2018/1/2
X	EMI Test Receiver	R&S	ESR26	101385	2016/9/29	2017/9/28
X	Coaxial Cable	QTK(Arnist)	SUCOFLEX 106	L1606-015C	2016/6/23	2017/6/22
X	EMI Test Receiver	R&S	ESCS 30	838251/001	2016/7/21	2017/7/20
X	Coaxial Cable	QTK(Arnist)	RG 214	LC003-RG	2016/6/16	2017/6/15
X	Coaxial signal switch	Anritsu	MP59B	6201415889	2016/6/16	2017/6/15

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version: QuieTek EMI 2.0 V2.1.113.

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) 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

2.3. 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 C63.4: 2014 on conducted measurement.

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

2.4. Uncertainty

± 2.26 dB

2.5. Test Result of Conducted Emission

Product : WiFi Module
Test Item : Conducted Emission Test
Power Line : Line 1
Test Date : 2017/03/15
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.158	9.747	29.670	39.416	-26.355	65.771
0.177	9.757	31.680	41.438	-23.791	65.229
0.263	9.753	33.540	43.293	-19.478	62.771
0.412	9.723	25.440	35.163	-23.351	58.514
0.904	9.738	25.030	34.768	-21.232	56.000
10.630	9.885	25.130	35.015	-24.985	60.000
Average					
0.158	9.747	8.140	17.886	-37.885	55.771
0.177	9.757	11.150	20.908	-34.321	55.229
0.263	9.753	18.290	28.043	-24.728	52.771
0.412	9.723	13.530	23.253	-25.261	48.514
0.904	9.738	12.710	22.448	-23.552	46.000
10.630	9.885	16.480	26.365	-23.635	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 : WiFi Module
Test Item : Conducted Emission Test
Power Line : Line 2
Test Date : 2017/03/15
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2437MHz)

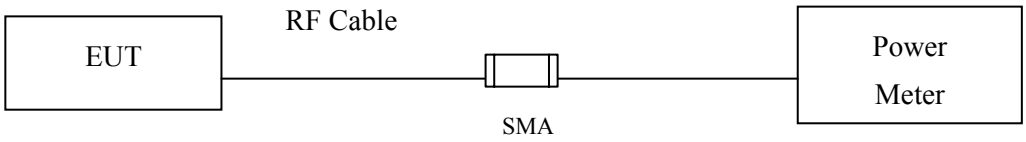
Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.228	9.747	29.800	39.547	-24.224	63.771
0.271	9.748	39.000	48.748	-13.795	62.543
0.463	9.764	34.120	43.884	-13.173	57.057
0.900	9.845	30.270	40.115	-15.885	56.000
4.142	9.888	26.440	36.328	-19.672	56.000
7.533	9.913	27.050	36.963	-23.037	60.000
Average					
0.228	9.747	11.320	21.067	-32.704	53.771
0.271	9.748	28.140	37.888	-14.655	52.543
0.463	9.764	21.960	31.724	-15.333	47.057
0.900	9.845	17.560	27.405	-18.595	46.000
4.142	9.888	14.130	24.018	-21.982	46.000
7.533	9.913	17.870	27.783	-22.217	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. Maximum Conducted Power

3.1. Test Setup



3.2. Limits

The maximum average power shall be less 1 Watt. (Section 15.247 (b)(3))

3.3. Test Procedure

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 9.1.2 PKPM1 Peak power meter method.

3.4. Uncertainty

± 1.19 dB

3.5. Test Result of Maximum Conducted Power

Product : WiFi Module
Test Item : Maximum Conducted Power
Test Site : No.3 OATS
Test Date : 2017/03/15
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	19.32	--	--	--	21.47	<30dBm	Pass
06	2437	19.62	19.51	19.39	19.24	21.88	<30dBm	Pass
11	2462	18.88	--	--	--	21.27	<30dBm	Pass

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

Product : WiFi Module
Test Item : Maximum Conducted Power
Test Site : No.3 OATS
Test Date : 2017/03/15
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	14.82	--	--	--	--	--	--	--	23.52	<30dBm	Pass
06	2437	15.78	15.66	15.53	15.41	15.27	15.19	15.08	14.97	23.77	<30dBm	Pass
11	2462	14.83	--	--	--	--	--	--	--	23.54	<30dBm	Pass

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

Product : WiFi Module
Test Item : Maximum Conducted Power
Test Site : No.3 OATS
Test Date : 2017/03/15
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps)

CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		14.4	28.9	43.3	57.8	86.7	115.6	130	144.4	14.4
		Measurement Level (dBm)								
01	2412	13.88	--	--	--	--	--	--	--	23.09
06	2437	14.62	14.51	14.42	14.29	14.15	14.06	13.94	13.85	23.49
11	2462	13.51	--	--	--	--	--	--	--	23.18

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

CHAIN B

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		14.4	28.9	43.3	57.8	86.7	115.6	130	144.4	14.4
		Measurement Level (dBm)								
01	2412	13.42	--	--	--	--	--	--	--	23.98
06	2437	13.12	13.01	12.92	12.81	12.66	12.54	12.43	12.28	23.88
11	2462	12.55	--	--	--	--	--	--	--	23.72

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

CHAIN A+B

Channel	Frequency (MHz)	Data Rata (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
1	2412	14.4	23.09	23.98	26.57	<30dBm	Pass
6	2437	14.4	23.49	23.88	26.70	<30dBm	Pass
11	2462	14.4	23.18	23.72	26.47	<30dBm	Pass

Note: Peak Power Output Value (dBm) = 10*LOG (Chain A (mW)+ Chain B (mW))

Product : WiFi Module
Test Item : Maximum Conducted Power
Test Site : No.3 OATS
Test Date : 2017/03/15
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps)

CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		30	60	90	120	180	240	270	300	30
		Measurement Level (dBm)								
3	2422	11.88	--	--	--	--	--	--	--	22.04
6	2437	12.8	12.66	12.55	12.41	12.25	12.13	12.07	11.95	22.66
9	2452	11.33	--	--	--	--	--	--	--	22.17

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

CHAIN B

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		30	60	90	120	180	240	270	300	30
		Measurement Level (dBm)								
3	2422	11.35	--	--	--	--	--	--	--	22.51
6	2437	11.44	11.32	11.24	11.12	11.02	10.88	10.81	10.69	23.01
9	2452	9.81	--	--	--	--	--	--	--	21.67

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

CHAIN A+B

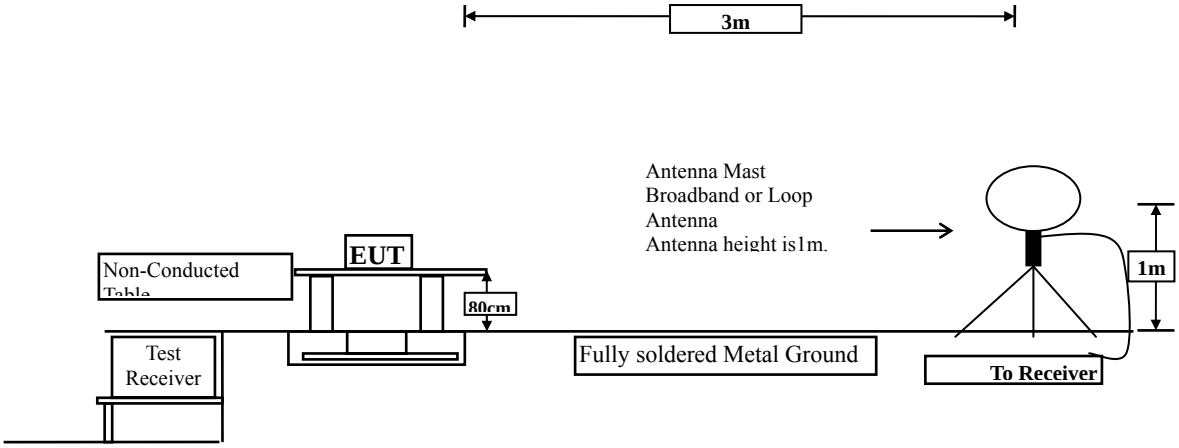
Channel	Frequency (MHz)	Data Rata (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
3	2422	30	22.04	22.51	25.29	<30dBm	Pass
6	2437	30	22.66	23.01	25.85	<30dBm	Pass
9	2452	30	22.17	21.67	24.94	<30dBm	Pass

Note: Peak Power Output Value (dBm) = 10*LOG (Chain A (mW)+ Chain B (mW))

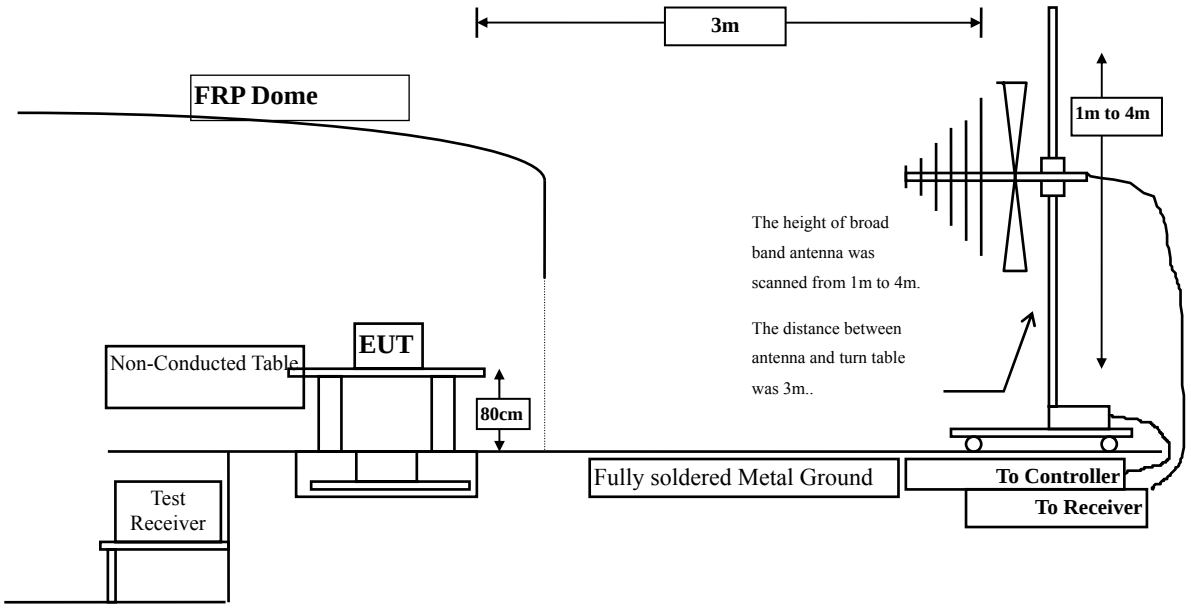
4. Radiated Emission

4.1. Test Setup

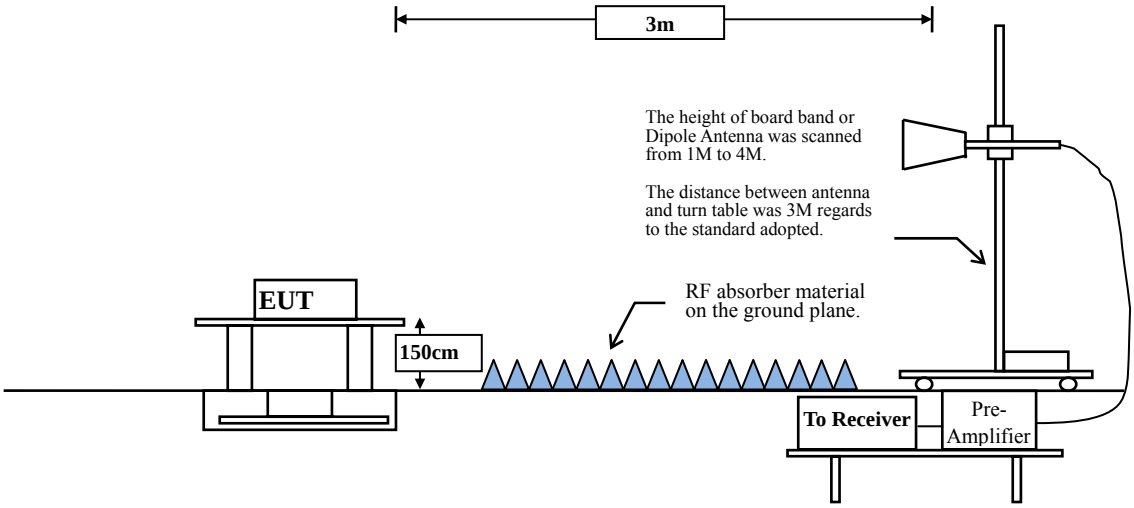
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. 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 (dBuV/m) = 20 log E field strength (uV/m)

4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 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: 2013 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 measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

4.4. Uncertainty

± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Radiated Emission

Product : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	2.428	38.636	41.065	-32.935	74.000
7236.000	9.177	39.952	49.129	-24.871	74.000
9648.000	10.019	37.230	47.250	-26.750	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4824.000	2.836	38.603	41.440	-32.560	74.000
7236.000	9.676	39.430	49.106	-24.894	74.000
9648.000	10.556	35.993	46.550	-27.450	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	2.076	38.845	40.922	-33.078	74.000
7311.000	9.512	42.218	51.730	-22.270	74.000
9748.000	9.630	35.730	45.360	-28.640	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4874.000	2.532	39.773	42.305	-31.695	74.000
7311.000	10.089	43.200	53.289	-20.711	74.000
9748.000	10.266	36.998	47.265	-26.735	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal Peak Detector:					
4924.000	2.191	39.282	41.473	-32.527	74.000
7386.000	10.373	39.158	49.532	-24.468	74.000
9848.000	9.964	36.642	46.606	-27.394	74.000
Average Detector:					
--					
Vertical Peak Detector:					
4924.000	2.805	38.747	41.552	-32.448	74.000
7386.000	11.180	39.025	50.205	-23.795	74.000
9848.000	10.801	36.864	47.665	-26.335	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	2.428	39.129	41.558	-32.442	74.000
7236.000	9.177	40.725	49.902	-24.098	74.000
9648.000	10.019	36.343	46.363	-27.637	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4824.000	2.836	38.503	41.340	-32.660	74.000
7236.000	9.676	39.733	49.409	-24.591	74.000
9648.000	10.556	36.596	47.153	-26.847	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	:	WiFi Module
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/03/16
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	2.076	38.700	40.777	-33.223	74.000
7311.000	9.512	41.204	50.716	-23.284	74.000
9748.000	9.630	35.944	45.574	-28.426	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4874.000	2.532	38.474	41.006	-32.994	74.000
7311.000	10.089	41.943	52.032	-21.968	74.000
9748.000	10.266	35.939	46.206	-27.794	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal Peak Detector:					
4924.000	2.191	38.296	40.487	-33.513	74.000
7386.000	10.373	40.182	50.556	-23.444	74.000
9848.000	9.964	36.354	46.318	-27.682	74.000
Average Detector:					
--					
Vertical Peak Detector:					
4924.000	2.805	38.440	41.245	-32.755	74.000
7386.000	11.180	39.751	50.931	-23.069	74.000
9848.000	10.801	36.410	47.211	-26.789	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2412MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	2.428	41.778	44.207	-29.793	74.000
7236.000	9.177	42.640	51.817	-22.183	74.000
9648.000	10.019	36.548	46.568	-27.432	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4824.000	2.836	38.849	41.686	-32.314	74.000
7236.000	9.676	42.213	51.889	-22.111	74.000
9648.000	10.556	36.546	47.103	-26.897	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	2.076	42.668	44.745	-29.255	74.000
7311.000	9.512	43.445	52.957	-21.043	74.000
9748.000	9.630	35.634	45.264	-28.736	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4874.000	2.532	38.870	41.402	-32.598	74.000
7311.000	10.089	43.583	53.672	-20.328	74.000
9748.000	10.266	36.491	46.758	-27.242	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2462 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal Peak Detector:					
4924.000	2.191	40.747	42.938	-31.062	74.000
7386.000	10.373	43.345	53.719	-20.281	74.000
9848.000	9.964	36.407	46.371	-27.629	74.000
Average Detector:					
--					
Vertical Peak Detector:					
4924.000	2.805	38.568	41.373	-32.627	74.000
7386.000	11.180	42.295	53.475	-20.525	74.000
9848.000	10.801	36.477	47.278	-26.722	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2422MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4844.000	2.280	38.486	40.767	-33.233	74.000
7266.000	9.106	36.463	45.569	-28.431	74.000
9688.000	9.663	35.484	45.147	-28.853	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4844.000	2.707	38.846	41.554	-32.446	74.000
7266.000	9.626	36.591	46.217	-27.783	74.000
9688.000	10.284	35.930	46.214	-27.786	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	2.076	38.823	40.900	-33.100	74.000
7311.000	9.512	36.442	45.954	-28.046	74.000
9748.000	9.630	35.632	45.262	-28.738	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	2.532	38.615	41.147	-32.853	74.000
7311.000	10.089	36.220	46.309	-27.691	74.000
9748.000	10.266	36.054	46.321	-27.679	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 : WiFi Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2452 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal Peak Detector:					
4904.000	2.000	38.962	40.963	-33.037	74.000
7356.000	10.308	35.756	46.064	-27.936	74.000
9808.000	9.850	35.687	45.537	-28.463	74.000
Average Detector:					
--					
Vertical Peak Detector:					
4904.000	2.513	38.631	41.145	-32.855	74.000
7356.000	11.022	35.640	46.662	-27.338	74.000
9808.000	10.512	35.603	46.115	-27.885	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 : WiFi Module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
64.920	-12.587	43.432	30.845	-9.155	40.000
142.520	-7.627	42.548	34.921	-8.579	43.500
390.840	0.962	33.002	33.964	-12.036	46.000
586.780	3.246	31.991	35.237	-10.763	46.000
780.780	5.259	37.705	42.964	-3.036	46.000
875.840	5.816	35.689	41.505	-4.495	46.000
Vertical					
101.780	-5.570	43.997	38.426	-5.074	43.500
194.900	-5.673	34.591	28.918	-14.582	43.500
381.140	0.816	29.162	29.978	-16.022	46.000
608.120	2.175	29.454	31.629	-14.371	46.000
782.720	2.757	33.615	36.372	-9.628	46.000
951.500	3.083	29.541	32.624	-13.376	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 : WiFi Module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
39.700	-3.625	35.834	32.209	-7.791	40.000
142.520	-7.627	40.419	32.792	-10.708	43.500
373.380	0.873	33.399	34.272	-11.728	46.000
586.780	3.246	32.173	35.419	-10.581	46.000
782.720	5.387	37.340	42.727	-3.273	46.000
951.500	6.993	34.828	41.821	-4.179	46.000
Vertical					
107.600	-4.027	42.826	38.799	-4.701	43.500
179.380	-0.824	31.815	30.991	-12.509	43.500
379.200	0.881	29.413	30.294	-15.706	46.000
612.000	1.943	28.969	30.911	-15.089	46.000
780.780	2.769	34.357	37.126	-8.874	46.000
941.800	3.460	30.143	33.603	-12.397	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	:	WiFi Module
Test Item	:	General Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/03/16
Test Mode	:	Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
111.480	-7.489	42.407	34.919	-8.581	43.500
243.400	-6.546	38.715	32.169	-13.831	46.000
359.800	-0.226	33.588	33.362	-12.638	46.000
600.360	3.472	31.967	35.439	-10.561	46.000
782.720	5.387	37.384	42.771	-3.229	46.000
875.840	5.816	35.678	41.494	-4.506	46.000
Vertical					
109.540	-3.507	40.974	37.466	-6.034	43.500
383.080	0.195	29.489	29.684	-16.316	46.000
524.700	1.130	30.494	31.624	-14.376	46.000
685.720	2.254	28.685	30.939	-15.061	46.000
782.720	2.757	32.734	35.491	-10.509	46.000
928.220	3.640	29.602	33.242	-12.758	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 : WiFi Module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/03/16
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
37.760	-2.539	33.883	31.345	-8.655	40.000
144.460	-7.703	42.468	34.765	-8.735	43.500
390.840	0.962	35.996	36.958	-9.042	46.000
588.720	3.289	31.497	34.786	-11.214	46.000
780.780	5.259	37.509	42.768	-3.232	46.000
926.280	6.832	32.764	39.596	-6.404	46.000
Vertical					
107.600	-4.027	41.628	37.601	-5.899	43.500
175.500	-1.842	33.785	31.943	-11.557	43.500
346.220	-0.527	30.756	30.229	-15.771	46.000
540.220	2.169	29.347	31.516	-14.484	46.000
782.720	2.757	32.490	35.247	-10.753	46.000
932.100	3.430	30.094	33.524	-12.476	46.000

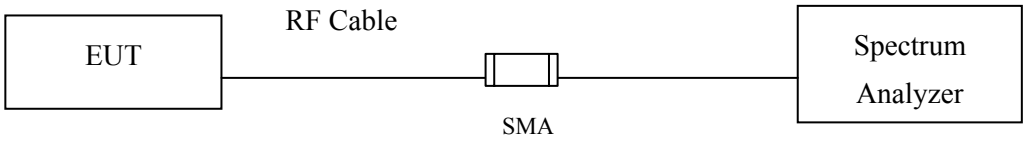
Note:

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 Setup

RF antenna Conducted Measurement:



5.2. 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)).

5.3. 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.

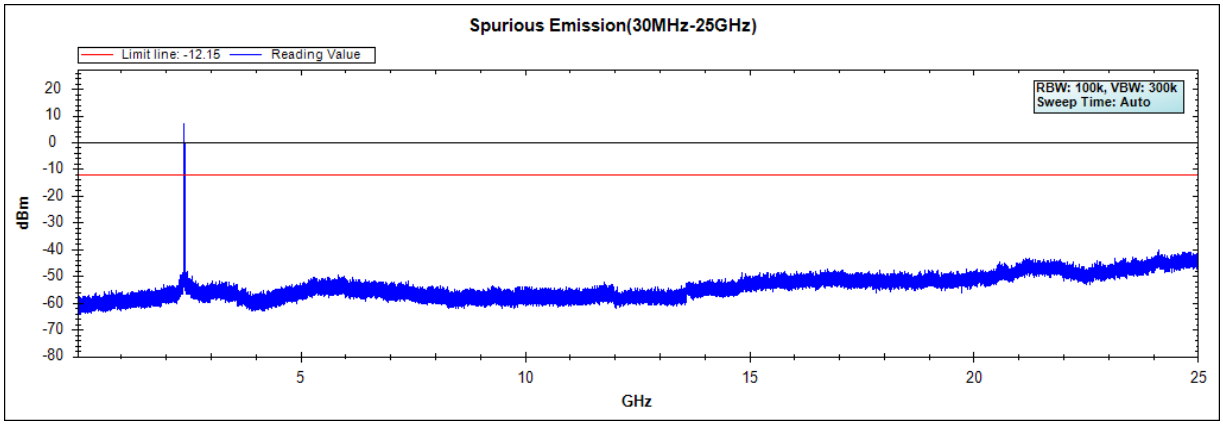
5.4. Uncertainty

The measurement uncertainty
Conducted is defined as ± 1.20dB

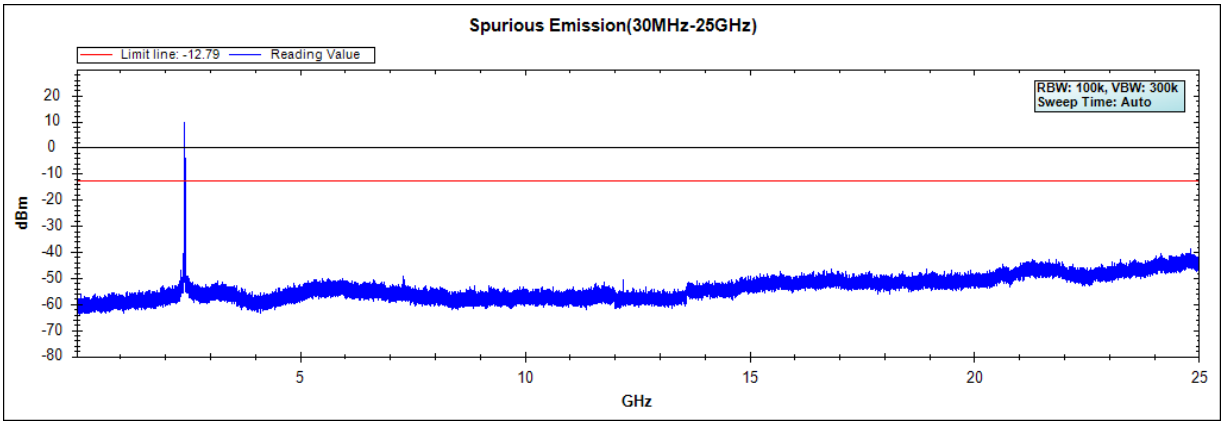
5.5. Test Result of RF antenna conducted test

Product	:	WiFi Module
Test Item	:	RF antenna conducted test
Test Site	:	No.3 OATS
Test Date	:	2017/03/16
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

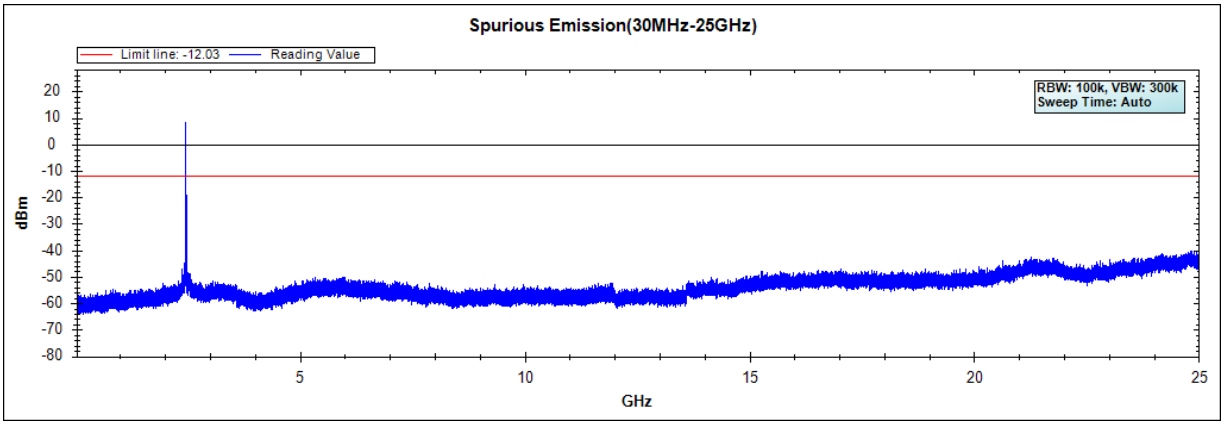
Channel 01 (2412MHz) 30MHz-25GHz



Channel 06 (2437MHz) 30MHz -25GHz



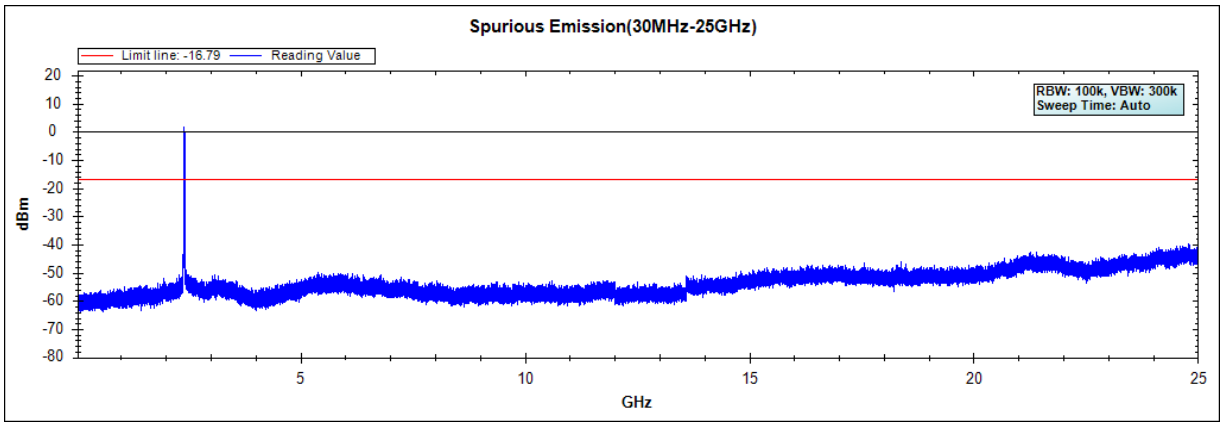
Channel 11 (2462MHz) 30MHz -25GHz



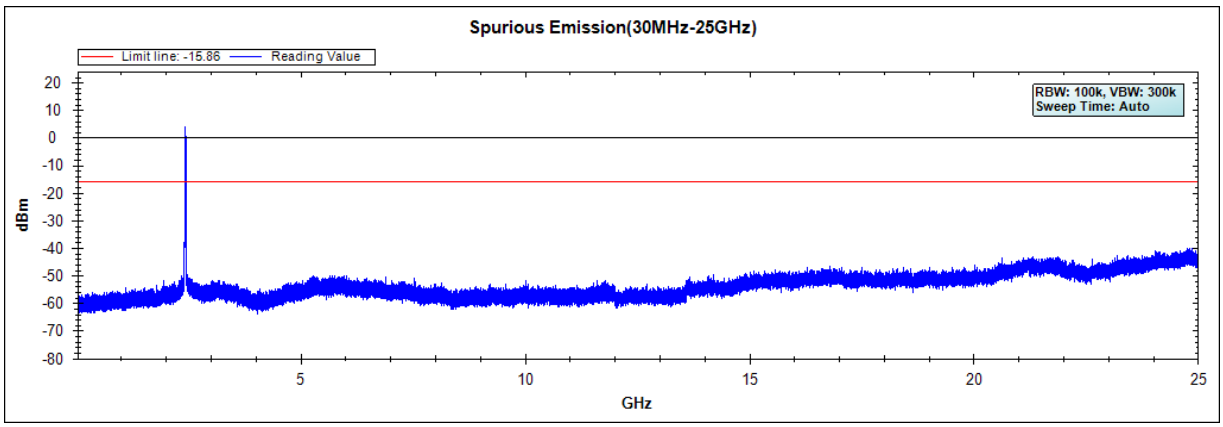
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	WiFi Module
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Date	:	2017/03/16
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)

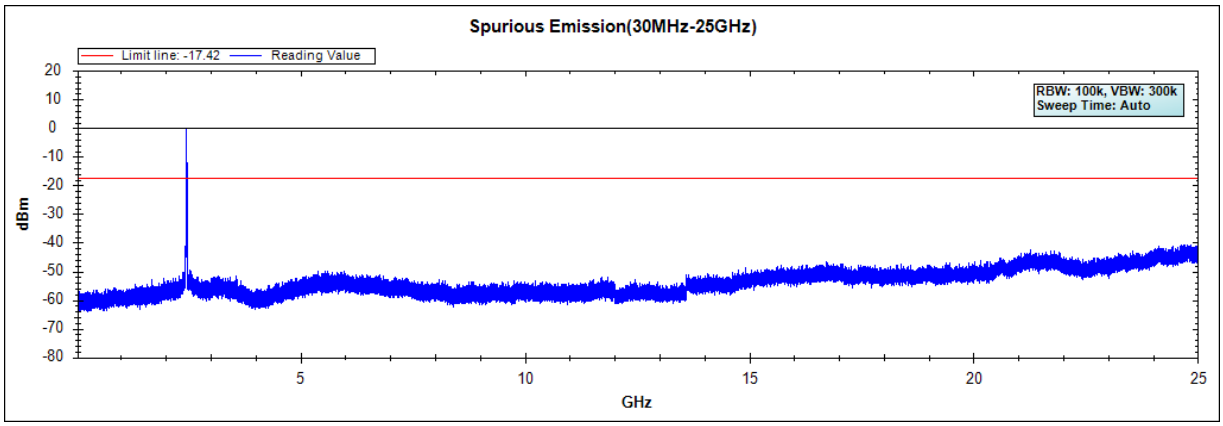
Channel 01 (2412MHz) 30MHz -25GHz



Channel 06 (2437MHz) 30MHz -25GHz



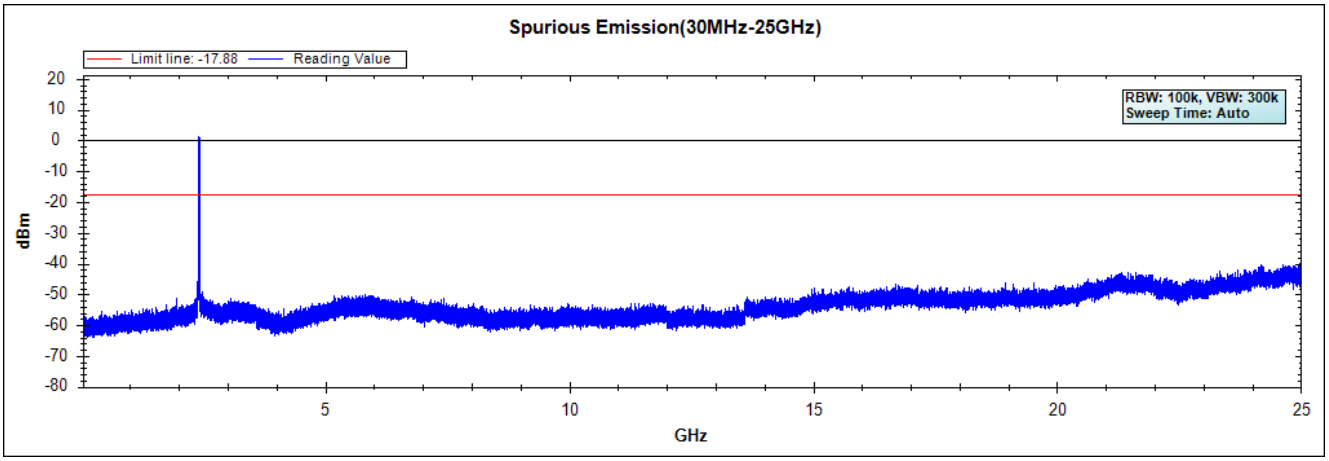
Channel 11 (2462MHz) 30MHz -25GHz



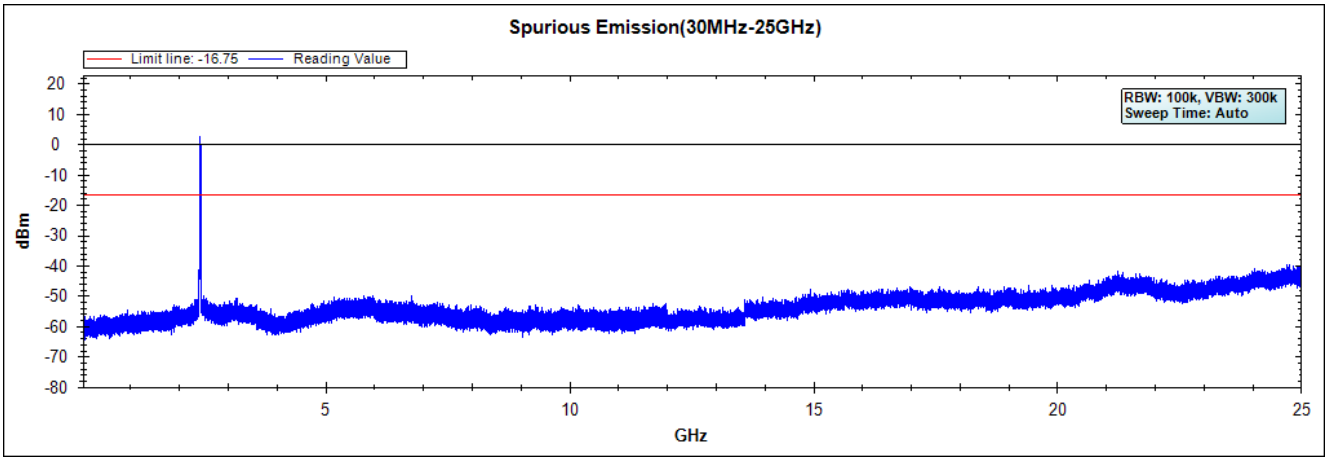
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	WiFi Module
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Date	:	2017/03/16
Test Mode	:	Mode 3: Transmit - (802.11n-20BW_14.4Mbps)

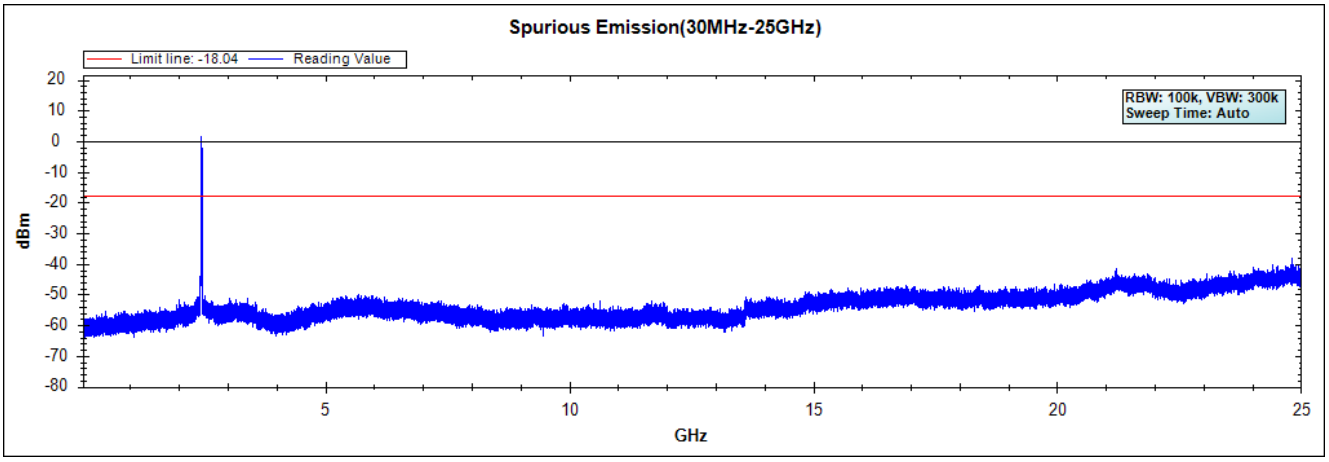
Channel 01 (2412MHz) 30MHz -25GHz-Chain A



Channel 06 (2437MHz) 30MHz -25GHz-Chain A

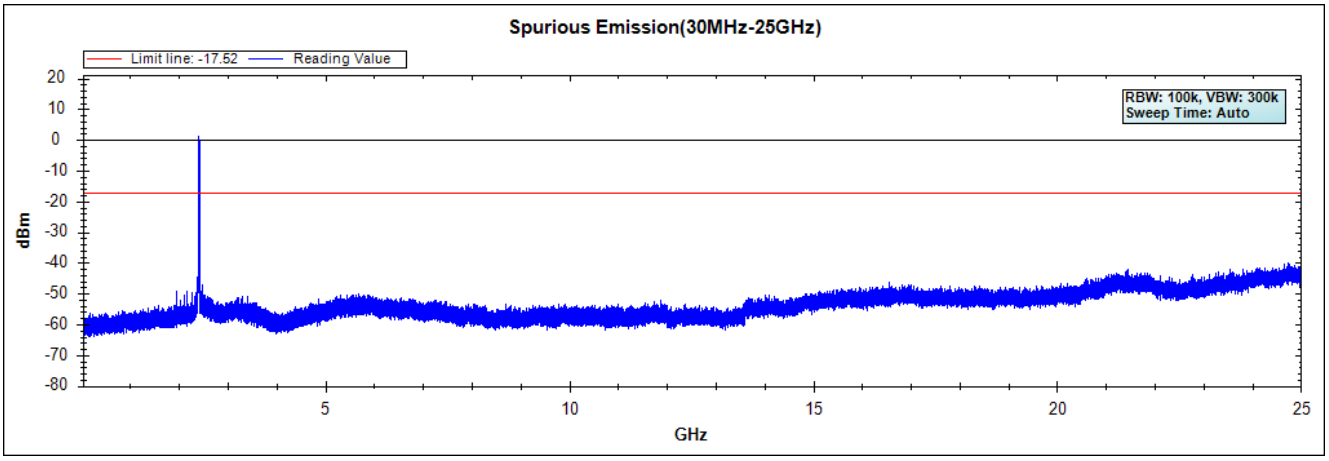


Channel 11 (2462MHz) 30MHz -25GHz-Chain A

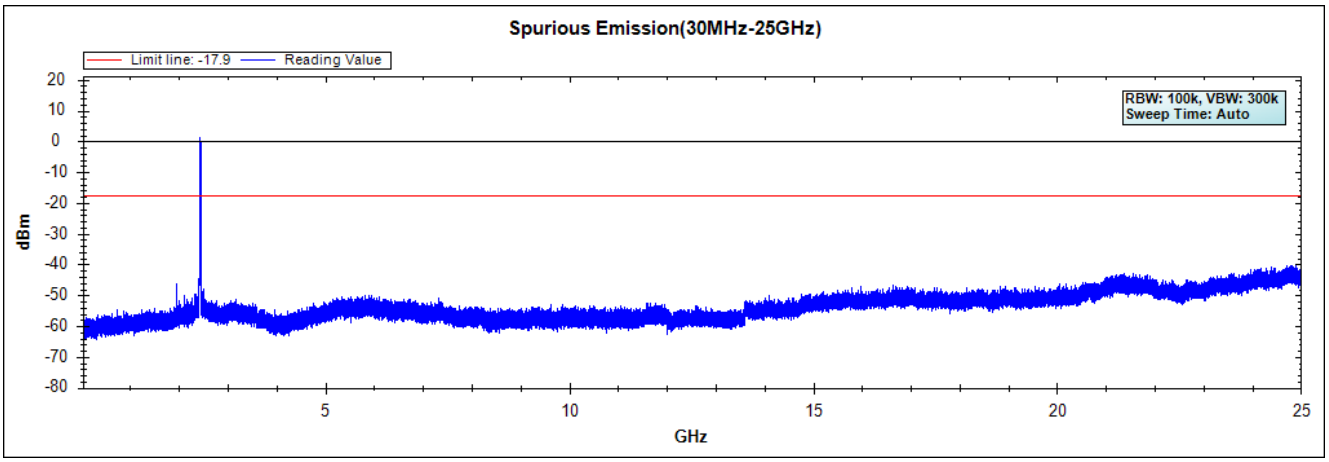


Note: The above test pattern is synthesized by multiple of the frequency range.

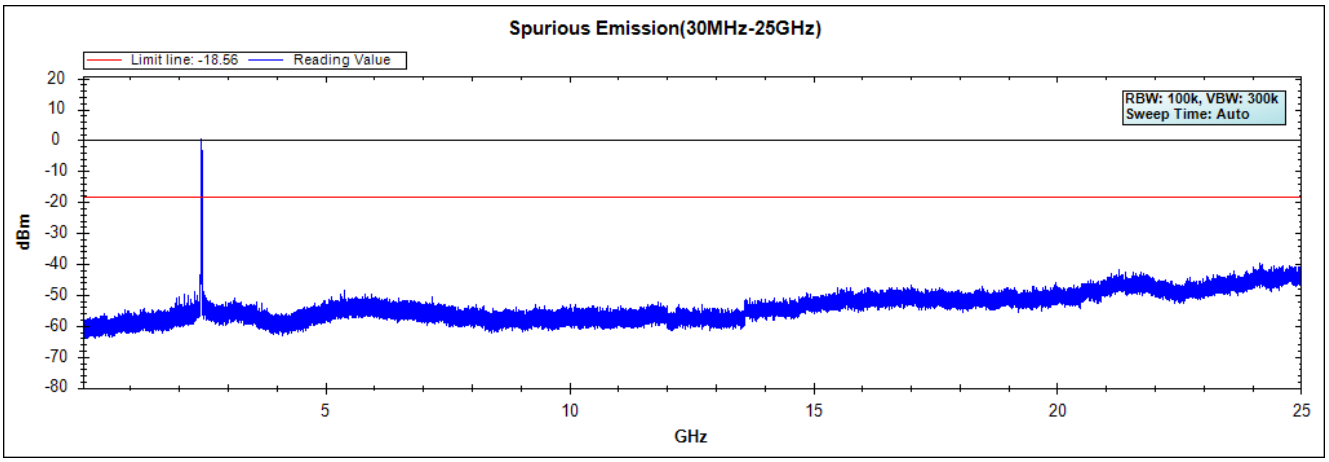
Channel 01 (2412MHz) 30MHz -25GHz-Chain B



Channel 06 (2437MHz) 30MHz -25GHz-Chain B



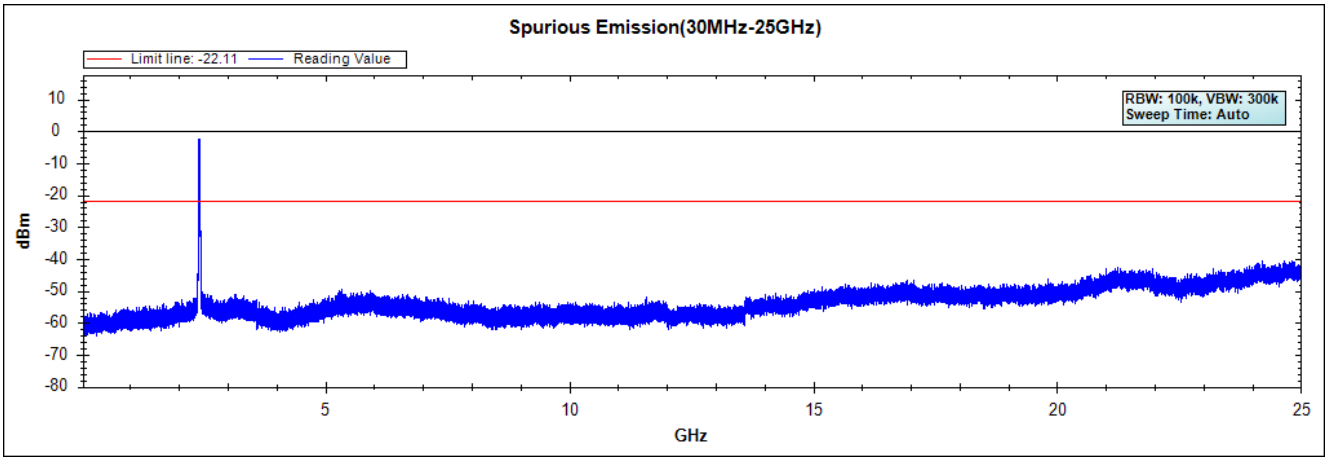
Channel 11 (2462MHz) 30MHz -25GHz-Chain B



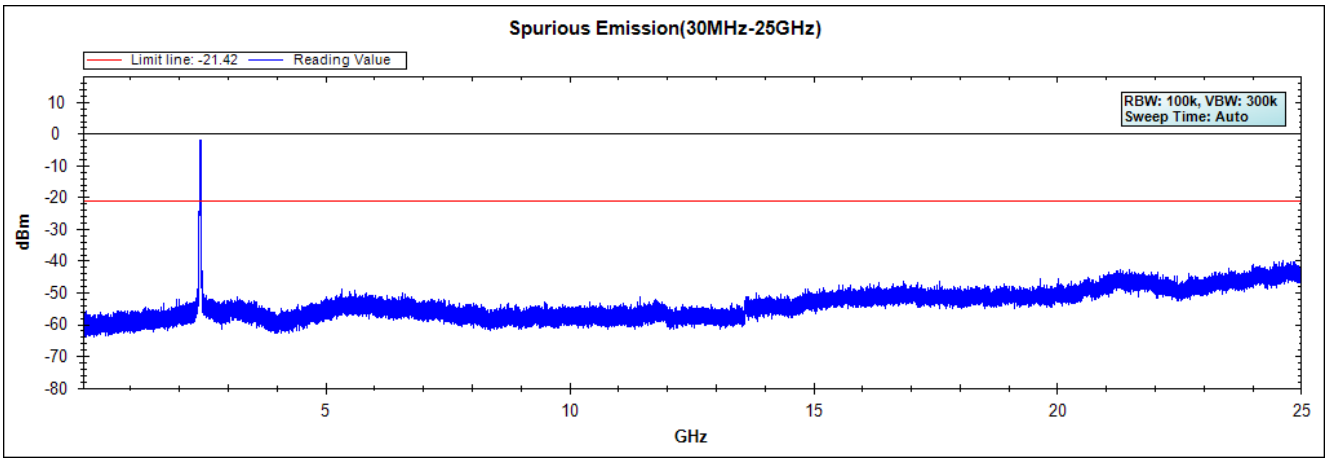
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	WiFi Module
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Date	:	2017/03/16
Test Mode	:	Mode 4: Transmit - (802.11n-40BW_30Mbps)

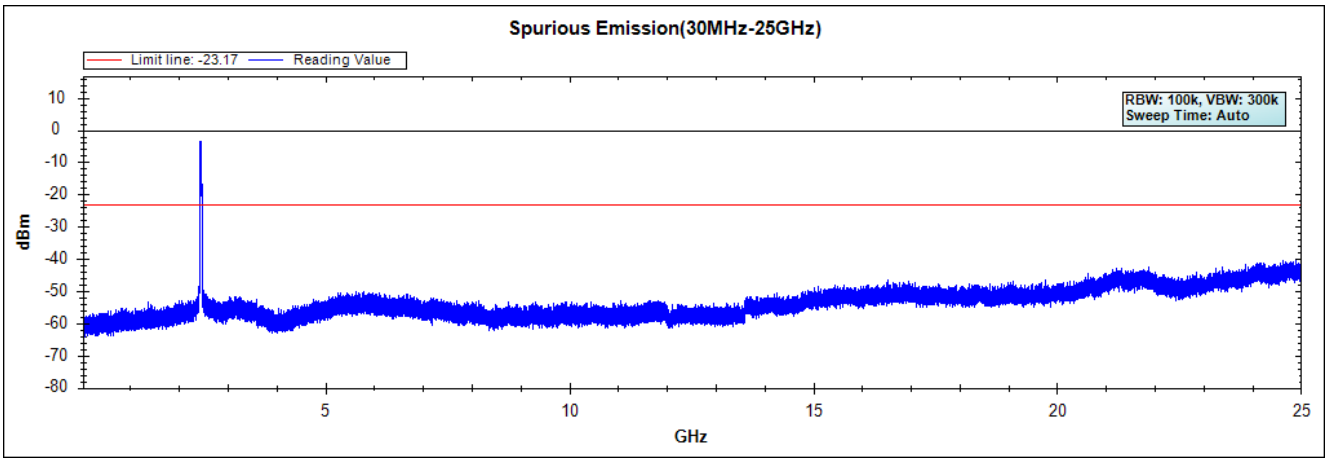
Channel 03 (2422MHz) 30MHz -25GHz-Chain A



Channel 06 (2437MHz) 30MHz -25GHz-Chain A

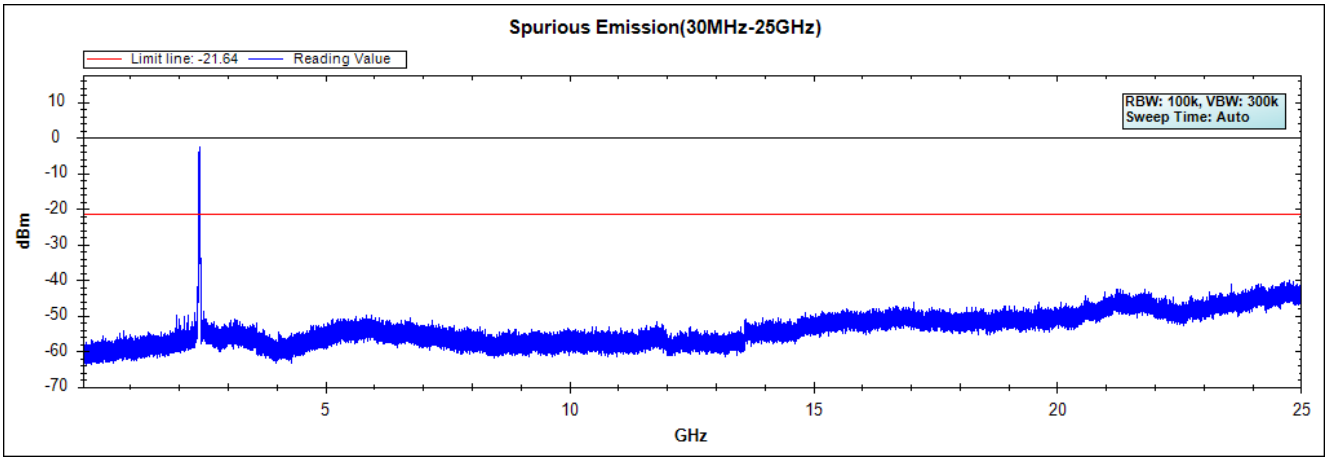


Channel 09 (2452MHz) 30MHz -25GHz-Chain A

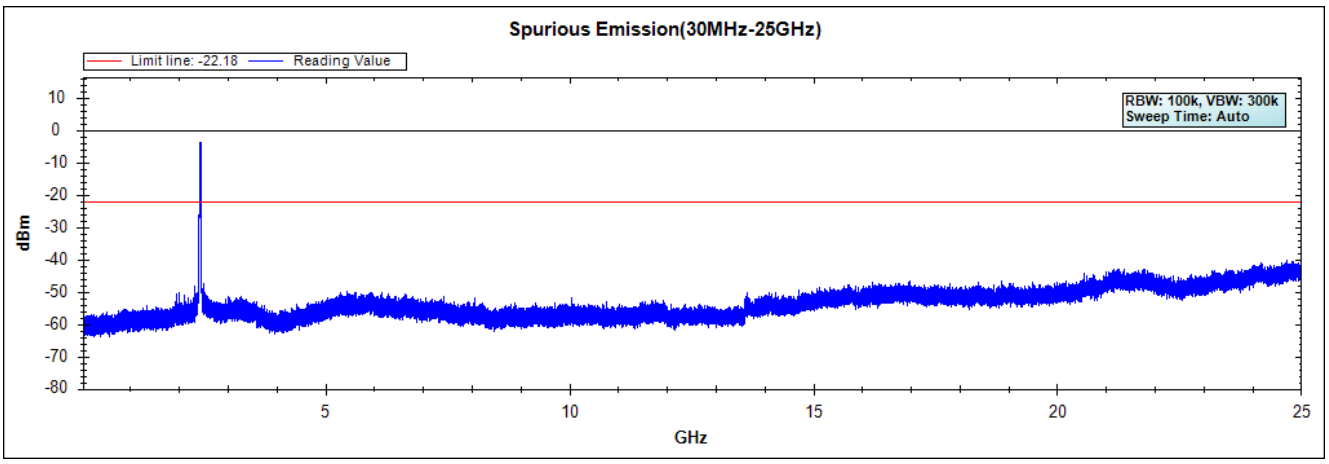


Note: The above test pattern is synthesized by multiple of the frequency range.

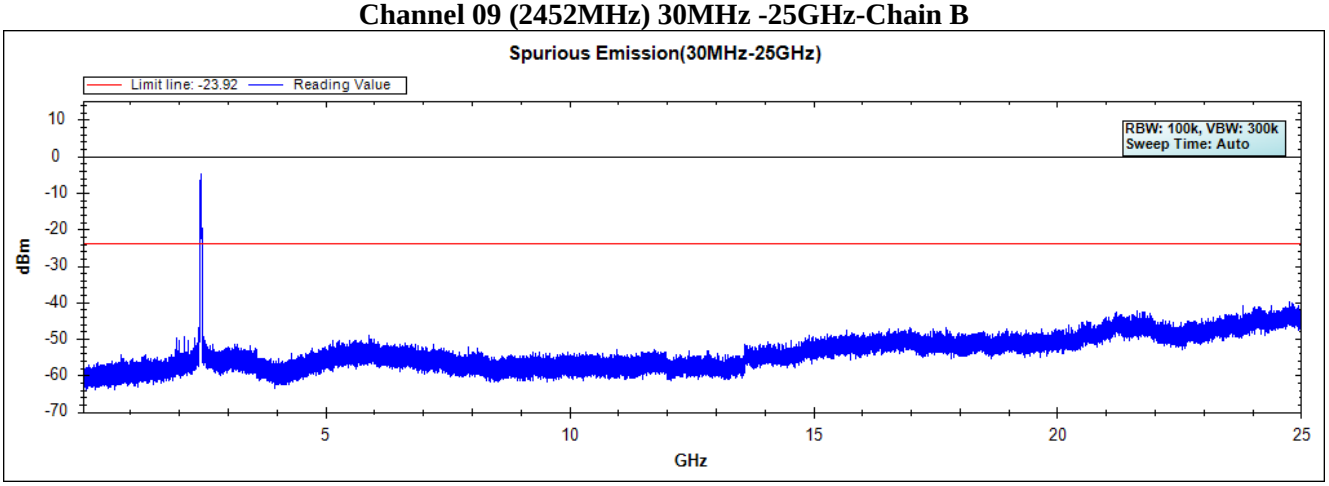
Channel 03 (2422MHz) 30MHz -25GHz-Chain B



Channel 06 (2437MHz) 30MHz -25GHz-Chain B



Channel 09 (2452MHz) 30MHz -25GHz-Chain B

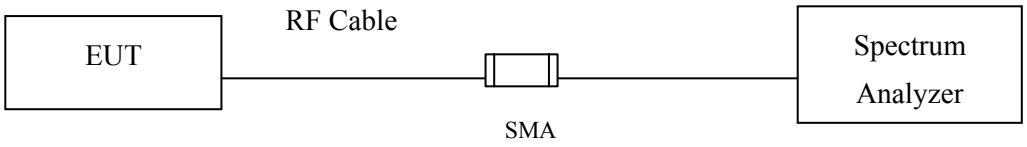


Note: The above test pattern is synthesized by multiple of the frequency range.

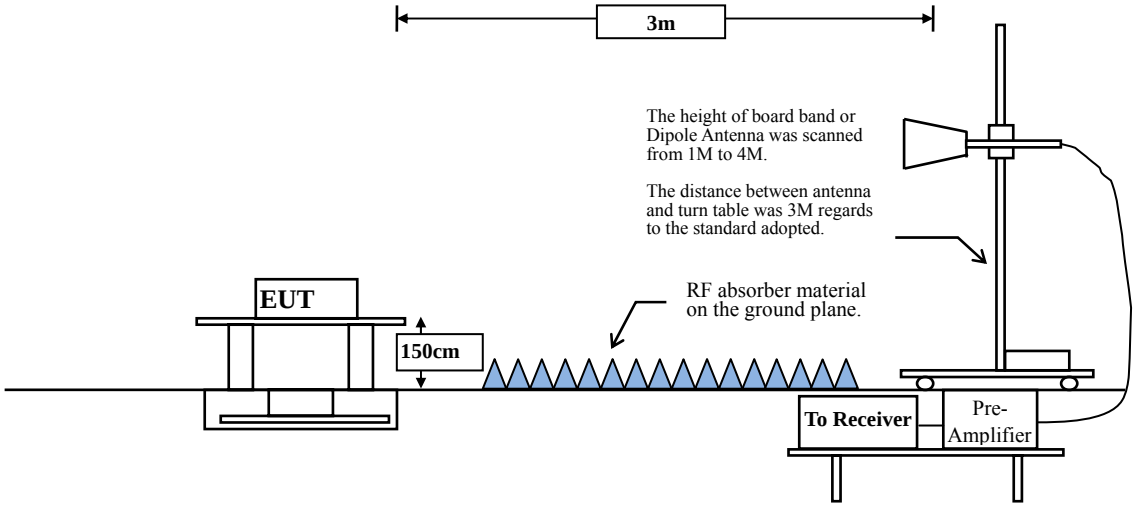
6. Band Edge

6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:



6.2. 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.

6.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 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 1.5 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 C63.10:2013 on radiated measurement.

6.4. Uncertainty

± 4.08 dB above 1GHz
± 4.22 dB below 1GHz

6.5. Test Result of Band Edge

Product : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

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	-2.687	62.483	59.796	74.00	54.00	Pass
01 (Peak)	2397.200	-2.664	74.078	71.414	--	--	--
01 (Peak)	2400.000	-2.660	70.279	67.619	--	--	--
01 (Peak)	2413.200	-2.643	113.749	111.106	--	--	--
01 (Average)	2390.000	-2.687	53.548	50.861	74.00	54.00	Pass
01 (Average)	2397.400	-2.664	69.442	66.778	--	--	--
01 (Average)	2400.000	-2.660	62.551	59.891	--	--	--
01 (Average)	2414.600	-2.643	109.486	106.843	--	--	--

Figure Channel 01: Horizontal (Peak)

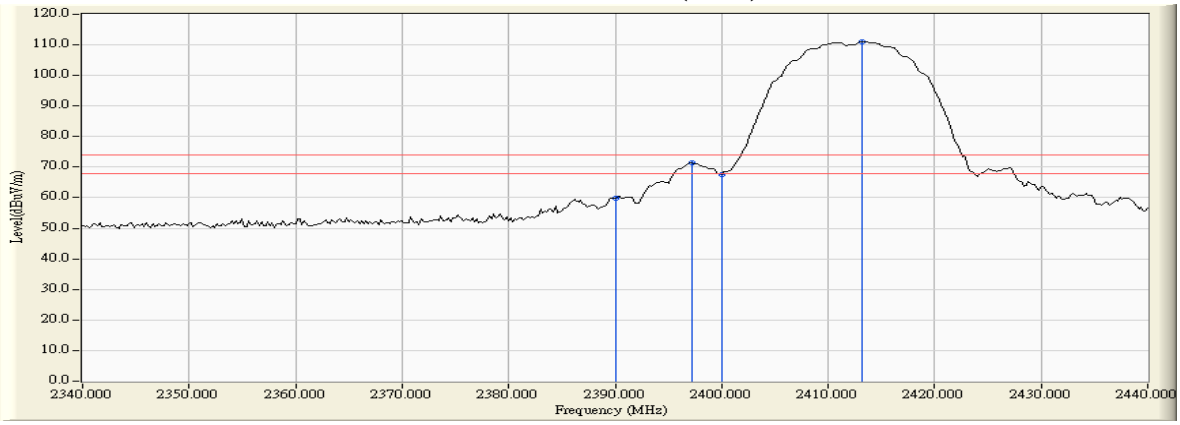
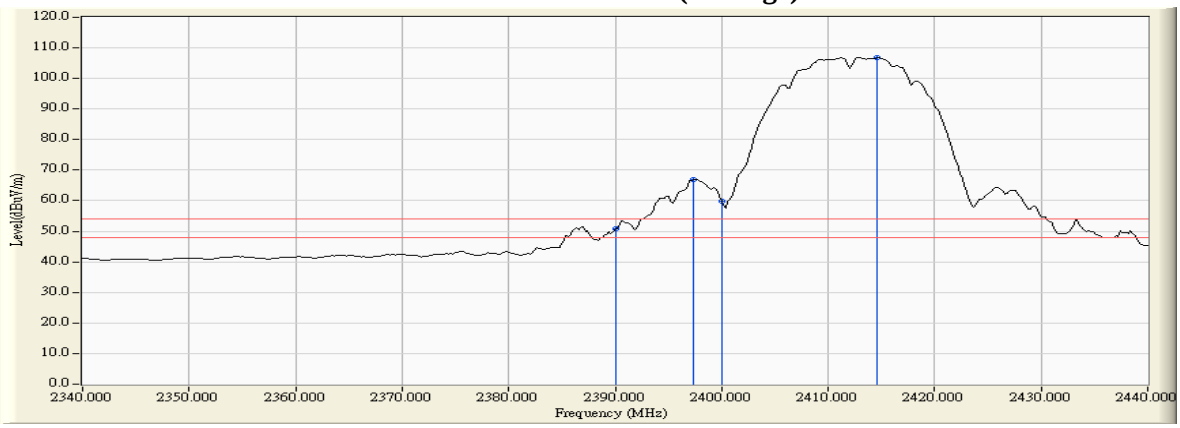


Figure Channel 01: Horizontal (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

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)	2389.200	-4.156	55.940	51.784	74.00	54.00	Pass
01 (Peak)	2390.000	-4.159	54.662	50.503	74.00	54.00	Pass
01 (Peak)	2397.400	-4.171	63.938	59.766	--	--	--
01 (Peak)	2400.000	-4.171	61.492	57.321	--	--	--
01 (Peak)	2413.200	-4.164	107.063	102.900	--	--	--
01 (Average)	2390.000	-4.159	44.665	40.506	74.00	54.00	Pass
01 (Average)	2397.400	-4.171	58.483	54.311	--	--	--
01 (Average)	2400.000	-4.171	52.800	48.629	--	--	--
01 (Average)	2414.800	-4.160	102.894	98.735	--	--	--

Figure Channel 01: Vertical (Peak)

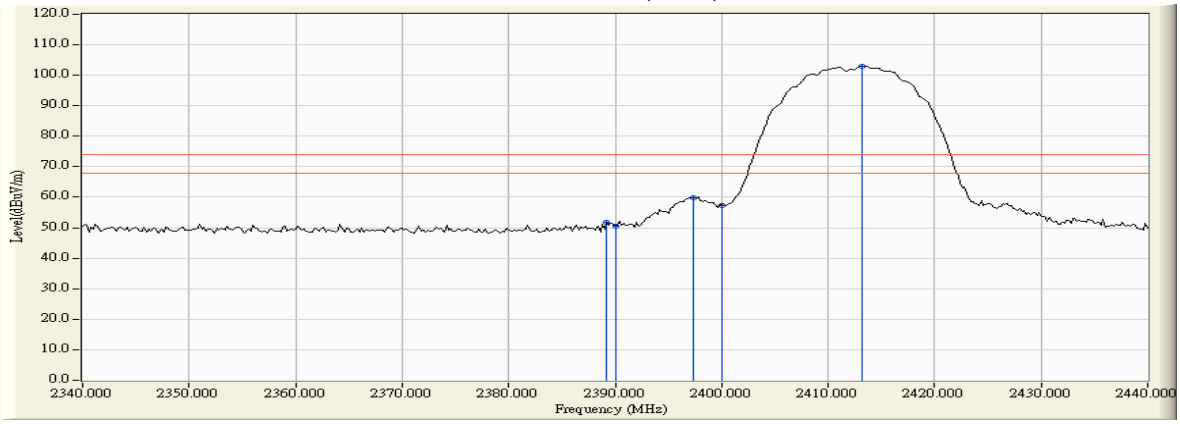
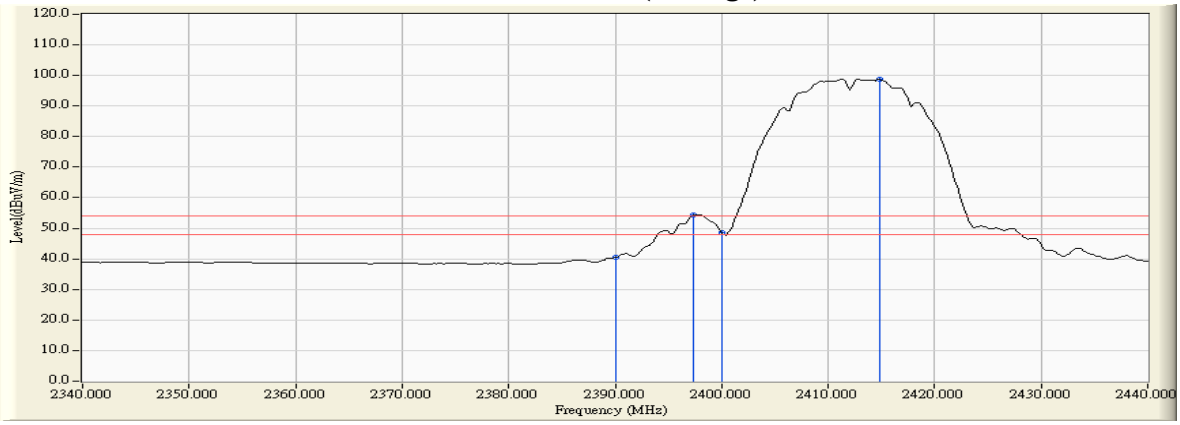


Figure Channel 01: Vertical (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

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)	2463.100	-2.622	113.162	110.540	--	--	--
11 (Peak)	2483.500	-2.601	58.262	55.660	74.00	54.00	Pass
11 (Peak)	2484.700	-2.600	59.901	57.300	74.00	54.00	Pass
11 (Average)	2461.100	-2.623	108.653	106.030	--	--	--
11 (Average)	2483.500	-2.601	50.395	47.793	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

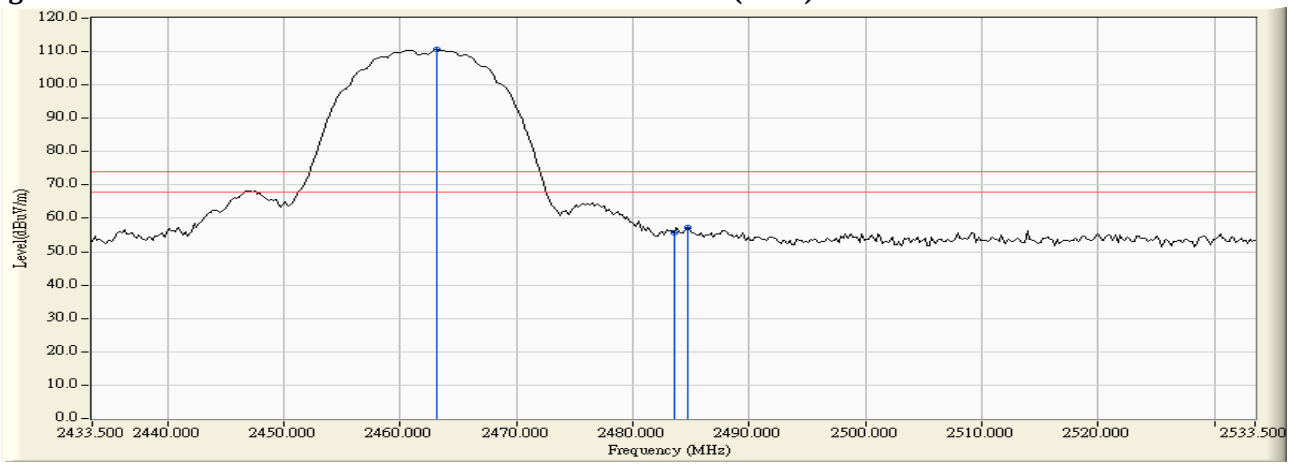


Figure Channel 11: Horizontal (Average)

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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

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)	2463.100	-4.031	103.446	99.415	--	--	--
11 (Peak)	2483.500	-3.966	53.802	49.835	74.00	54.00	Pass
11 (Average)	2461.300	-4.037	99.406	95.369	--	--	--
11 (Average)	2483.500	-3.966	43.269	39.302	74.00	54.00	Pass

Figure Channel 11: Vertical (Peak)

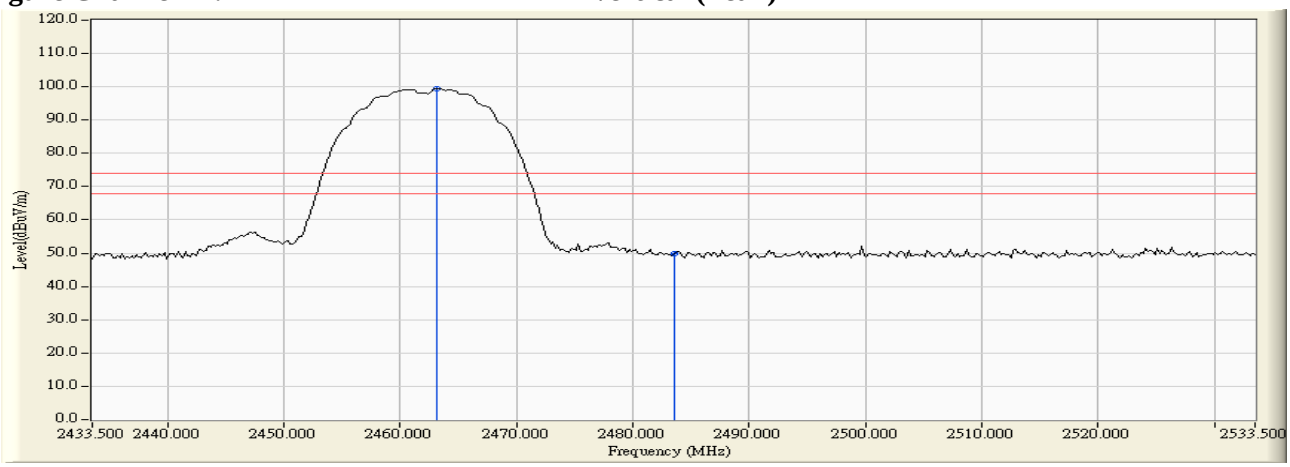
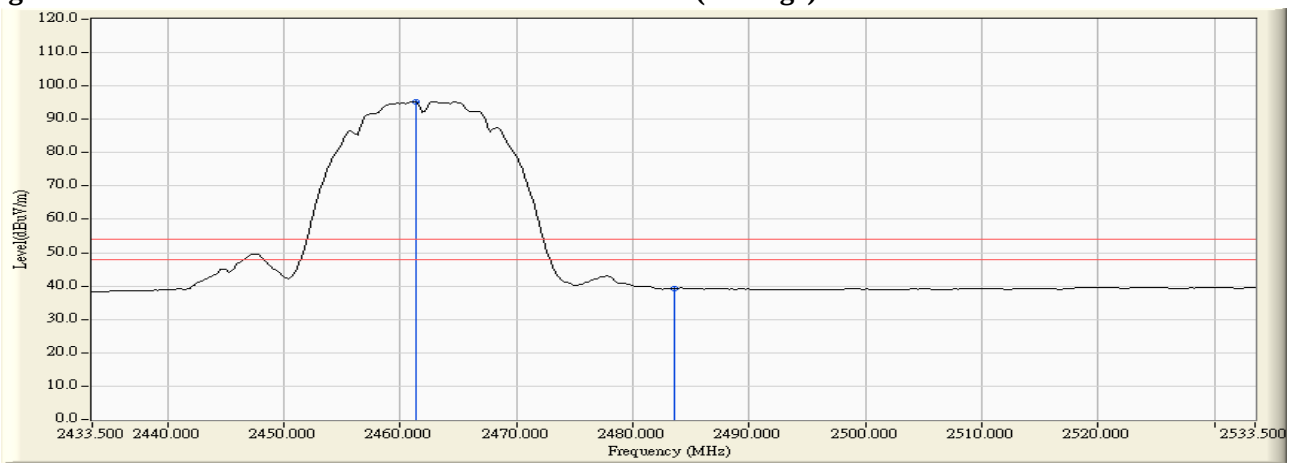


Figure Channel 11: Vertical (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

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	-2.687	72.055	69.368	74.00	54.00	Pass
01 (Peak)	2400.000	-2.660	88.598	85.938	--	--	--
01 (Peak)	2413.800	-2.643	111.757	109.114	--	--	--
01(Average)	2390.000	-2.687	54.993	52.306	74.00	54.00	Pass
01(Average)	2400.000	-2.660	66.631	63.971	--	--	--
01(Average)	2417.200	-2.642	100.364	97.722	--	--	--

Figure Channel 01: Horizontal (Peak)

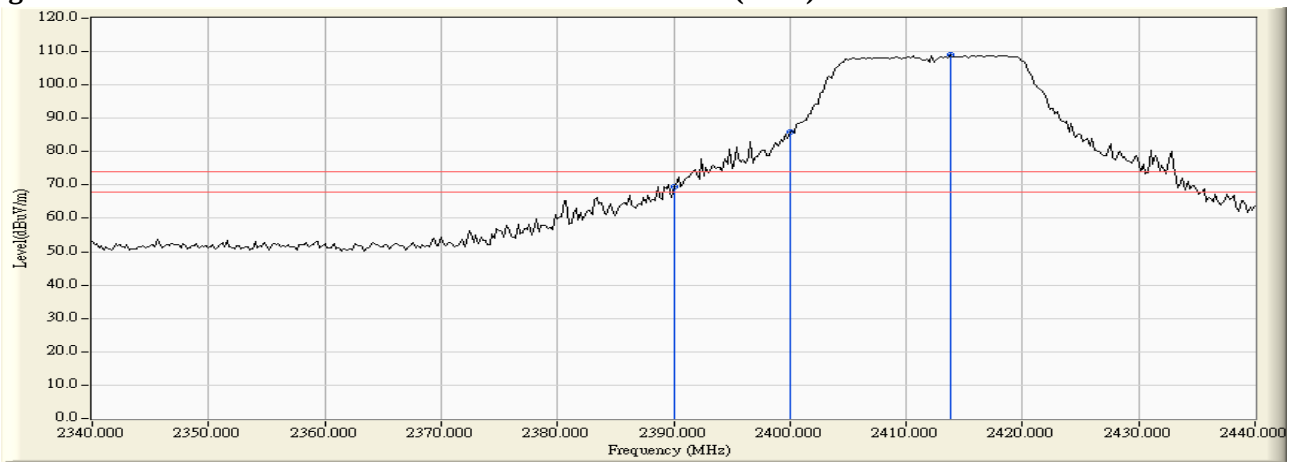
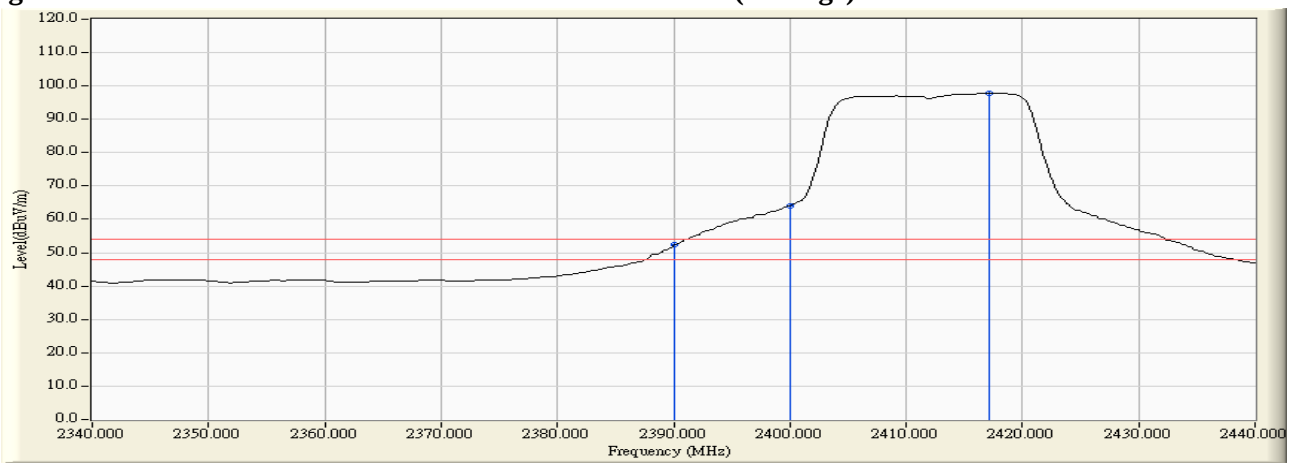


Figure Channel 01: Horizontal (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

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	-4.159	59.845	55.686	74.00	54.00	Pass
01 (Peak)	2400.000	-4.171	77.090	72.919	--	--	--
01 (Peak)	2418.400	-4.151	103.779	99.628	--	--	--
01 (Average)	2390.000	-4.159	42.656	38.497	74.00	54.00	Pass
01 (Average)	2400.000	-4.171	53.902	49.731	--	--	--
01 (Average)	2418.000	-4.152	91.175	87.023	--	--	--

Figure Channel 01: Vertical (Peak)

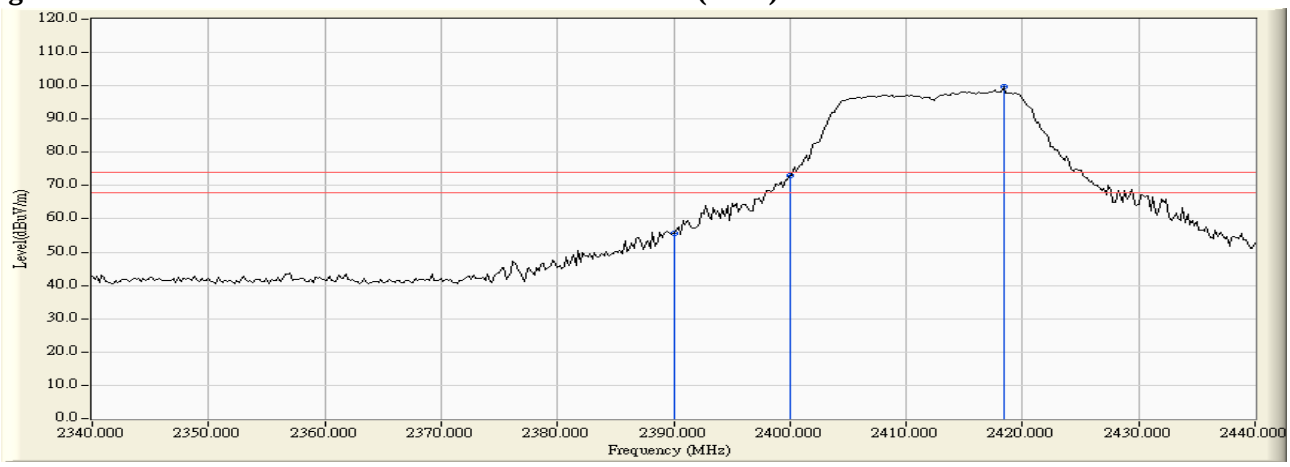
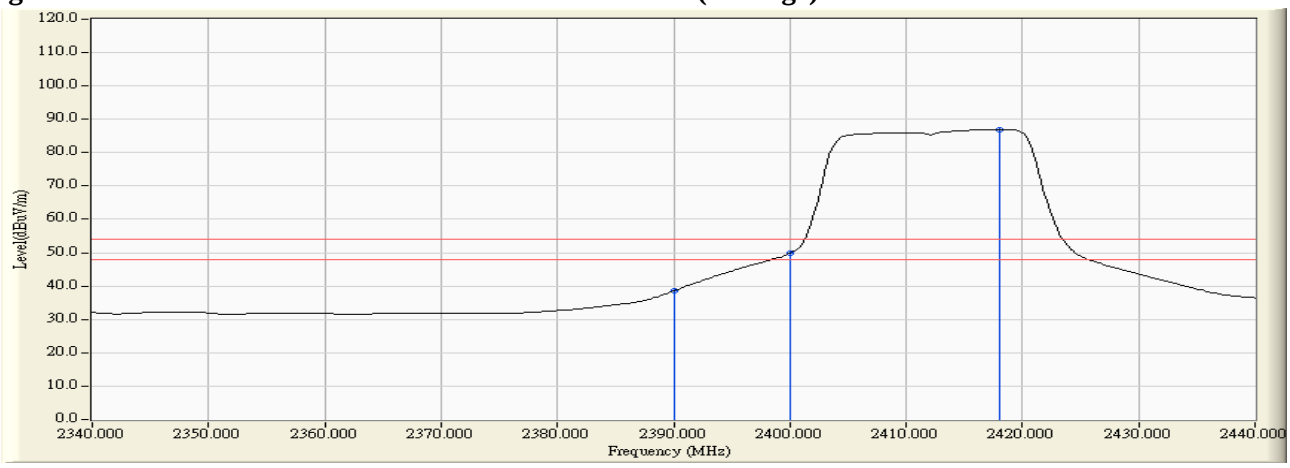


Figure Channel 01: Vertical (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

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)	2465.300	-2.619	112.424	109.805	--	--	--
11 (Peak)	2483.500	-2.601	74.363	71.761	74.00	54.00	Pass
11 (Average)	2467.100	-2.618	100.529	97.911	--	--	--
11 (Average)	2483.500	-2.601	54.549	51.947	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

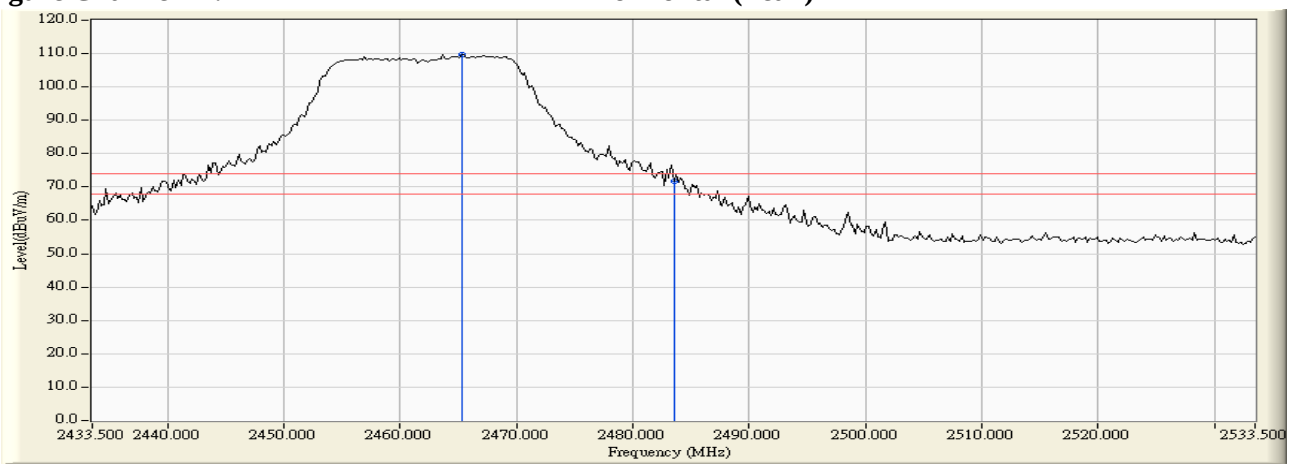
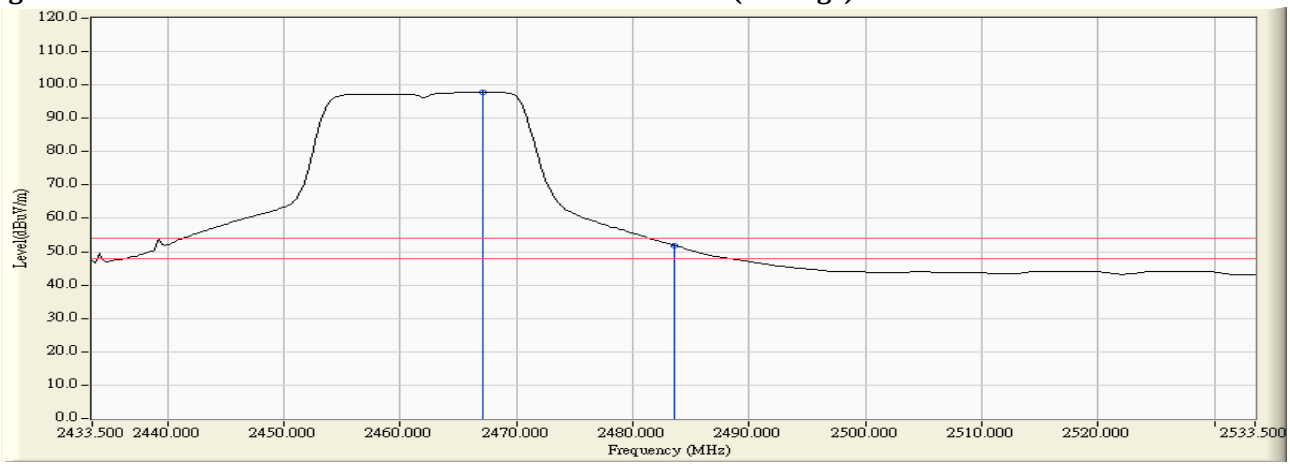


Figure Channel 11: Horizontal (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

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)	2456.100	-4.052	103.479	99.427	--	--	--
11 (Peak)	2483.500	-3.966	65.811	61.844	74.00	54.00	Pass
11 (Average)	2459.100	-4.043	92.209	88.166	--	--	--
11 (Average)	2483.500	-3.966	43.801	39.834	74.00	54.00	Pass

Figure Channel 11: Vertical (Peak)

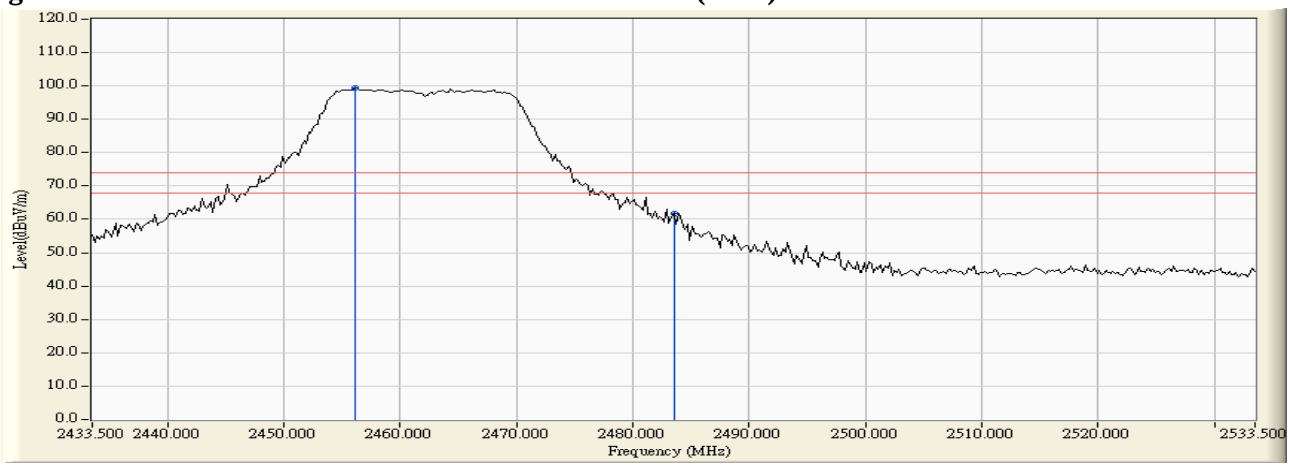
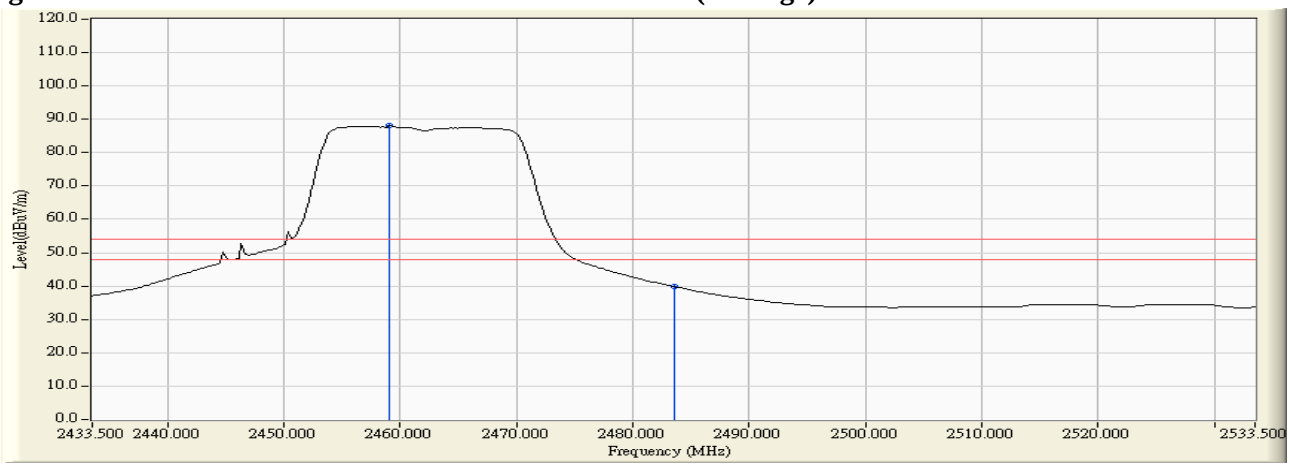


Figure Channel 11: Vertical (Average)



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	:	WiFi Module
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Date	:	2017/03/20
Test Mode	:	Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2412MHz)

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	-2.687	73.403	70.716	74.00	54.00	Pass
01 (Peak)	2400.000	-2.660	88.199	85.539	--	--	--
01 (Peak)	2413.800	-2.643	113.889	111.246	--	--	--
01 (Average)	2390.000	-2.687	55.612	52.925	74.00	54.00	Pass
01 (Average)	2400.000	-2.660	66.363	63.703	--	--	--
01 (Average)	2416.800	-2.642	98.721	96.079	--	--	--

Figure Channel 01: Horizontal (Peak)

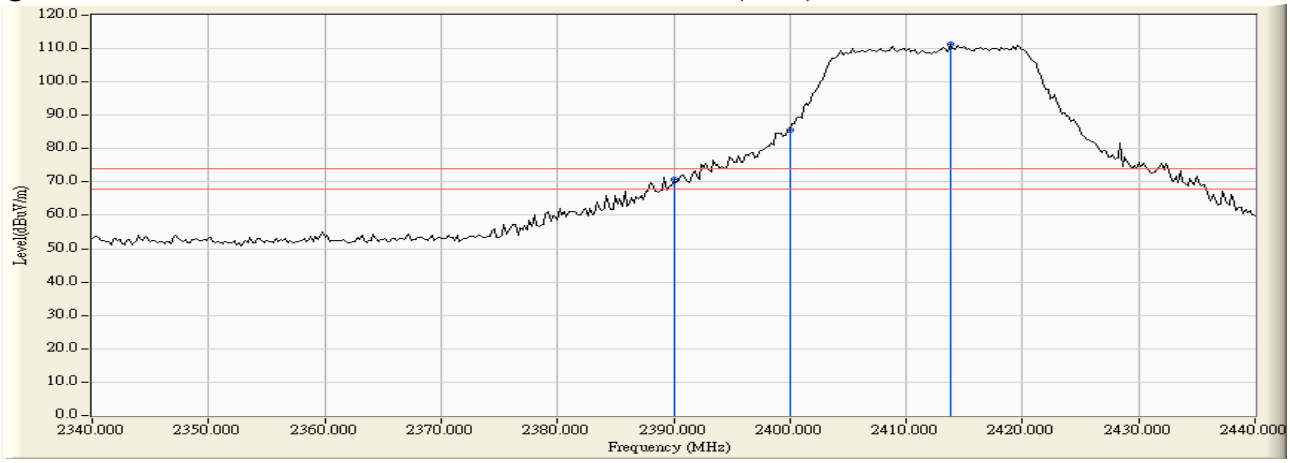
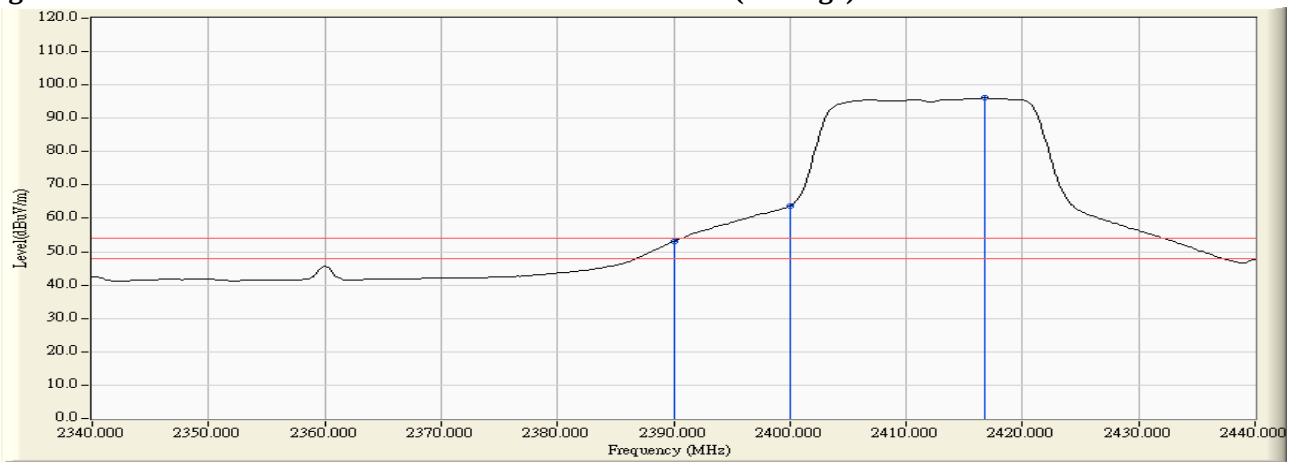


Figure Channel 01: Horizontal (Average)



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	:	WiFi Module
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Date	:	2017/03/20
Test Mode	:	Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2412MHz)

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	-4.159	64.969	60.810	74.00	54.00	Pass
01 (Peak)	2400.000	-4.171	82.913	78.742	--	--	--
01 (Peak)	2416.600	-4.155	106.767	102.612	--	--	--
01 (Average)	2390.000	-4.159	47.618	43.459	74.00	54.00	Pass
01 (Average)	2400.000	-4.171	57.578	53.407	--	--	--
01 (Average)	2416.400	-4.156	91.267	87.111	--	--	--

Figure Channel 01: Vertical (Peak)

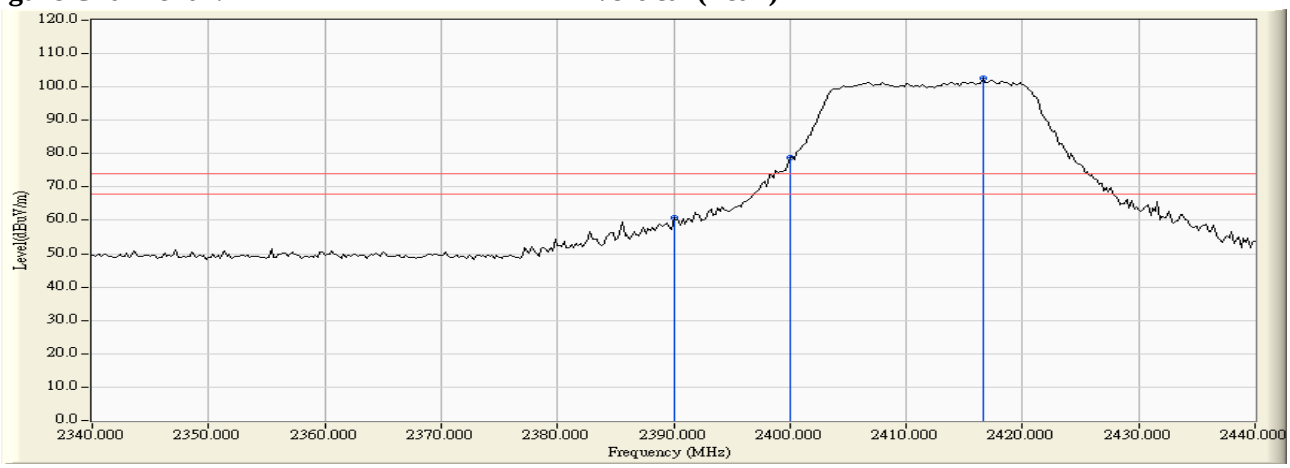
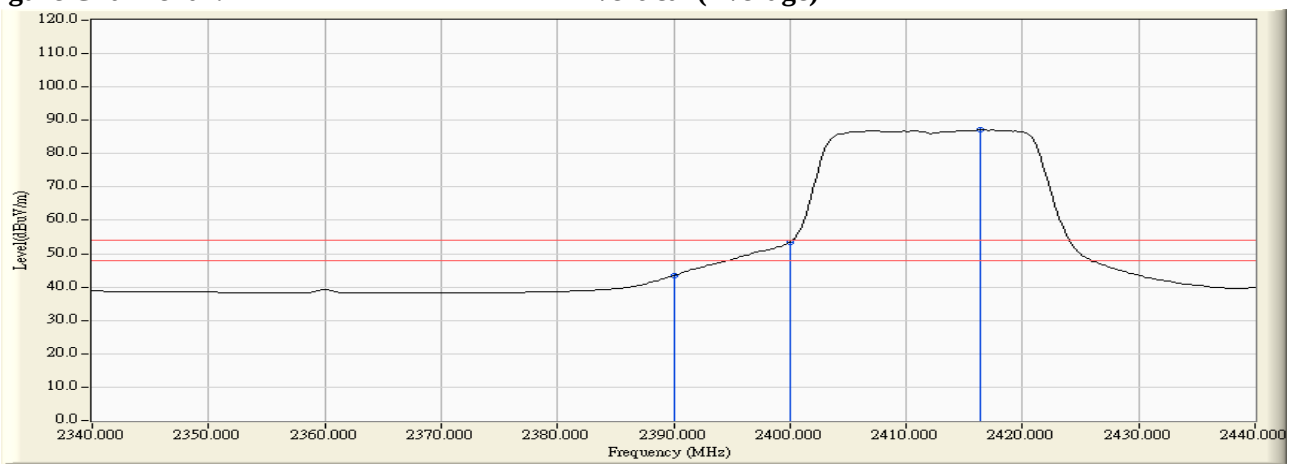


Figure Channel 01: Vertical (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2462MHz)

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)	2466.100	-2.618	114.255	111.636	--	--	--
11 (Peak)	2483.500	-2.601	73.196	70.594	74.00	54.00	Pass
11 (Peak)	2484.500	-2.601	74.360	71.759	74.00	54.00	Pass
11 (Average)	2468.500	-2.617	99.253	96.637	--	--	--
11 (Average)	2483.500	-2.601	56.215	53.613	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

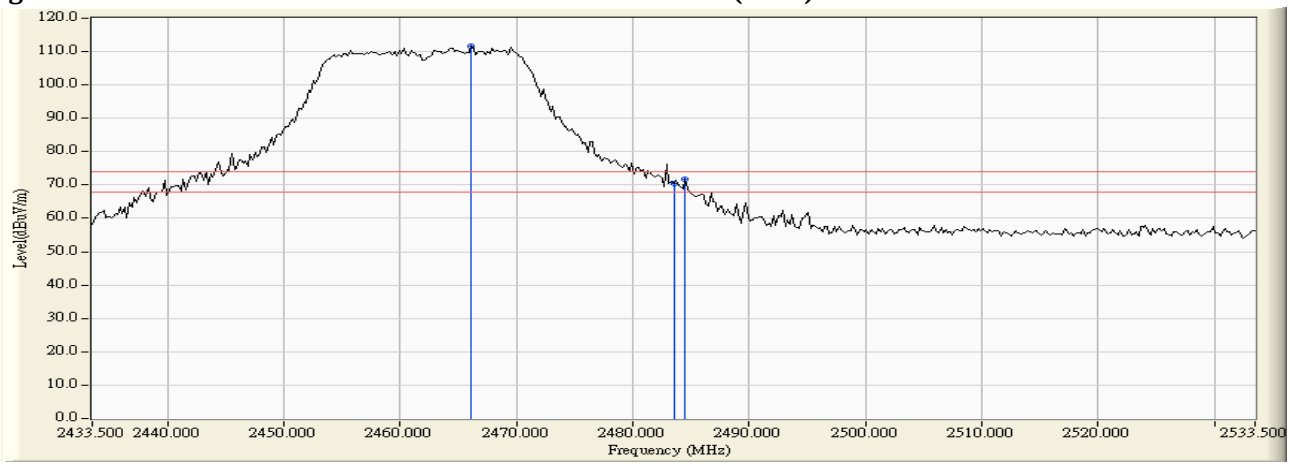
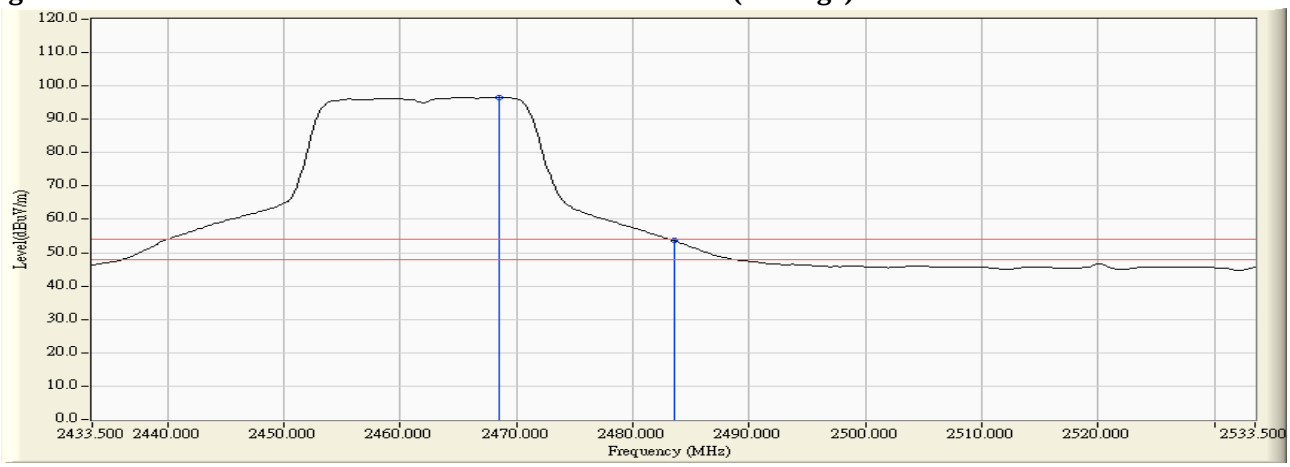


Figure Channel 11: Horizontal (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2462MHz)

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)	2468.700	-4.014	105.464	101.450	--	--	--
11 (Peak)	2483.500	-3.966	59.725	55.758	74.00	54.00	Pass
11 (Average)	2466.900	-4.019	90.187	86.168	--	--	--
11 (Average)	2483.500	-3.966	44.152	40.185	74.00	54.00	Pass

Figure Channel 11: Vertical (Peak)

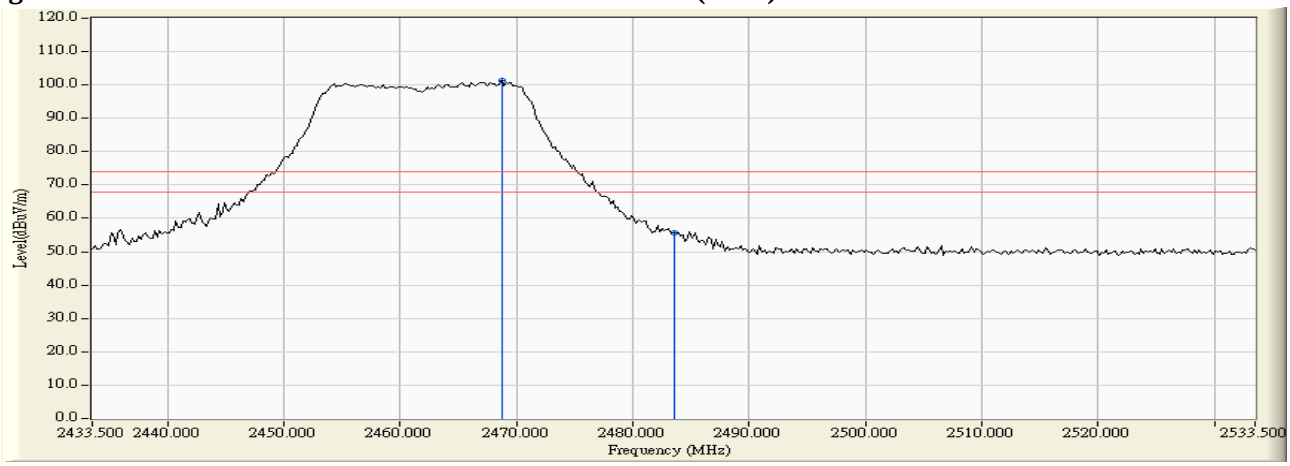
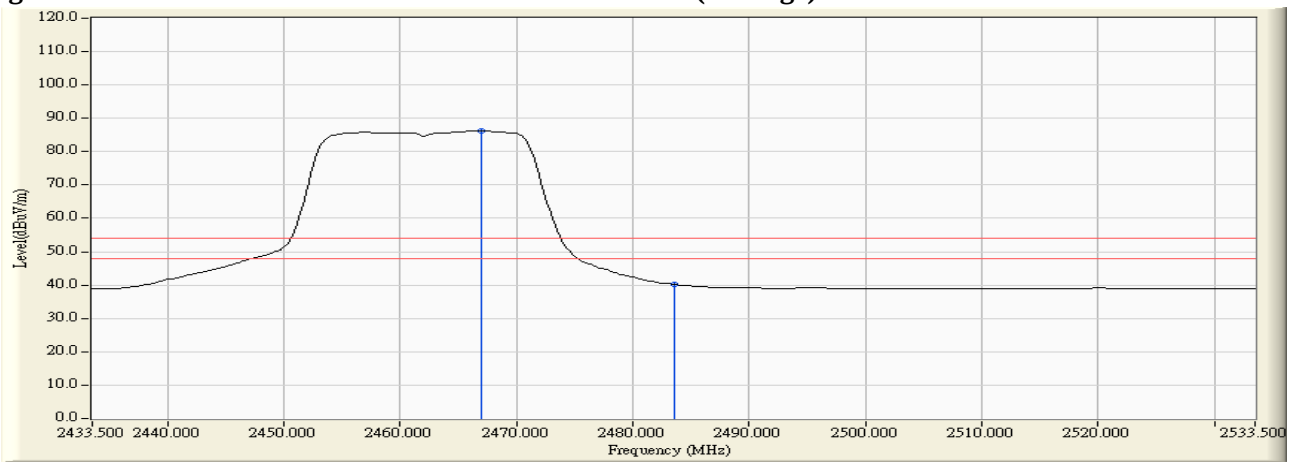


Figure Channel 11: Vertical (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2422MHz)

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
03 (Peak)	2390.000	-2.687	70.943	68.256	74.00	54.00	Pass
03 (Peak)	2400.000	-2.660	87.914	85.254	--	--	--
03 (Peak)	2437.000	-2.637	108.665	106.028	--	--	--
03 (Average)	2390.000	-2.687	55.155	52.468	74.00	54.00	Pass
03 (Average)	2400.000	-2.660	59.722	57.062	--	--	--
03 (Average)	2437.400	-2.637	92.127	89.490	--	--	--

Figure Channel 03: Horizontal (Peak)

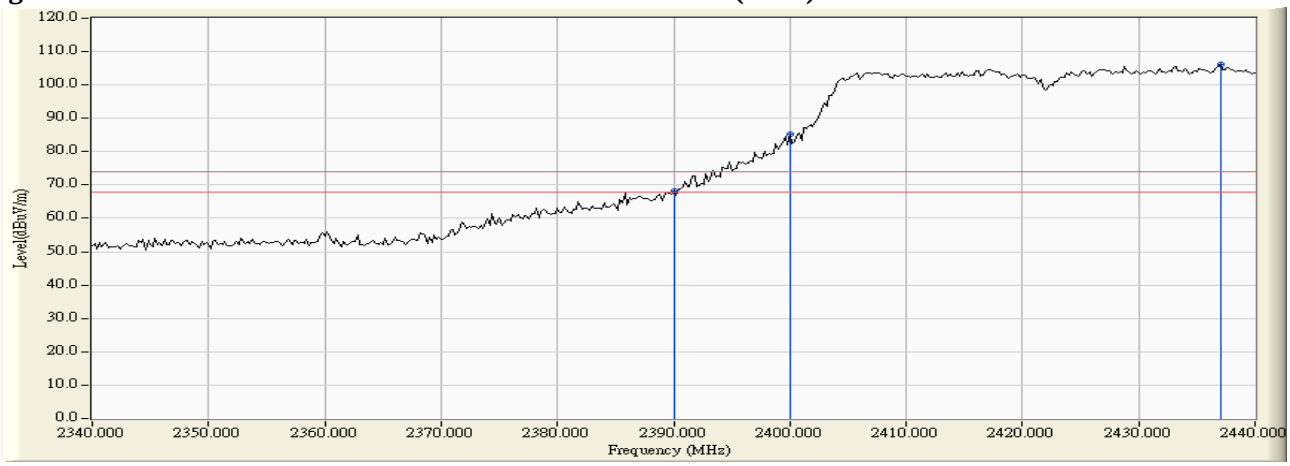
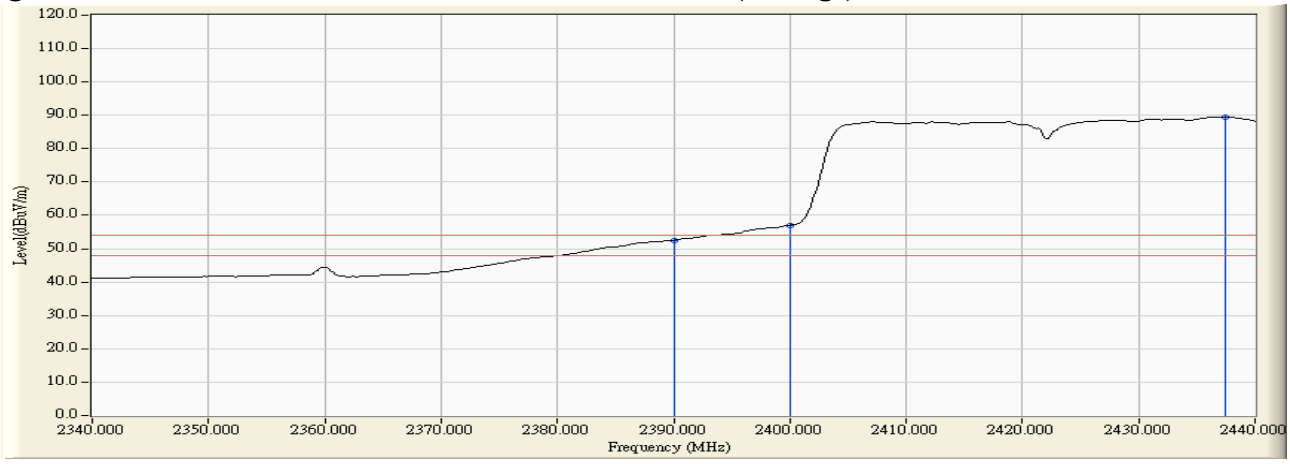


Figure Channel 03: Horizontal (Average)



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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2422MHz)

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
03 (Peak)	2390.000	-4.159	63.975	59.816	74.00	54.00	Pass
03 (Peak)	2400.000	-4.171	78.281	74.110	--	--	--
03 (Peak)	2434.600	-4.112	100.152	96.040	--	--	--
03 (Average)	2390.000	-4.159	47.468	43.309	74.00	54.00	Pass
03 (Average)	2400.000	-4.171	52.035	47.864	74.00	54.00	Pass
03 (Average)	2435.000	-4.111	84.471	80.360	--	--	--

Figure Channel 03: Vertical (Peak)

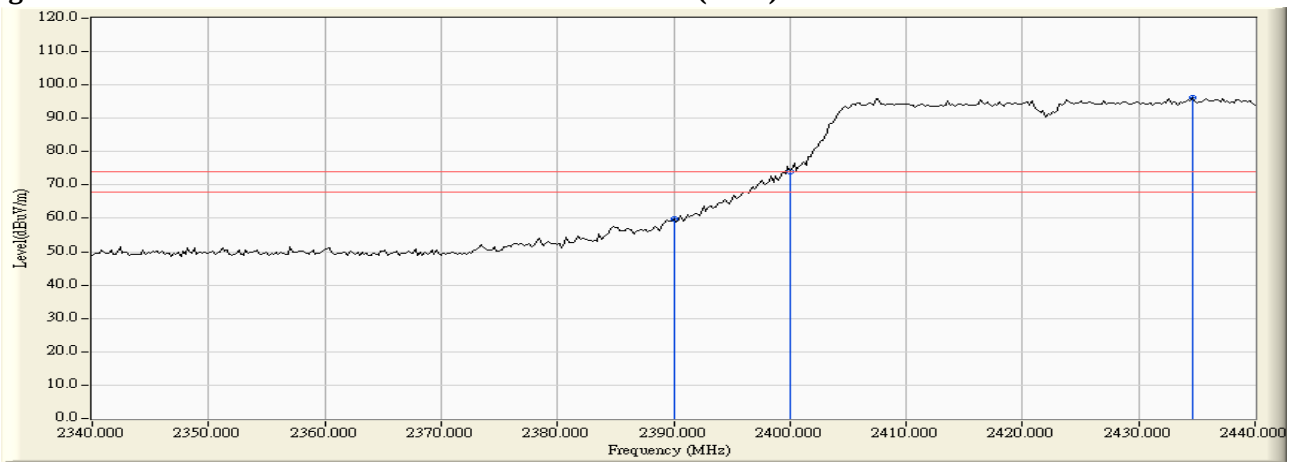
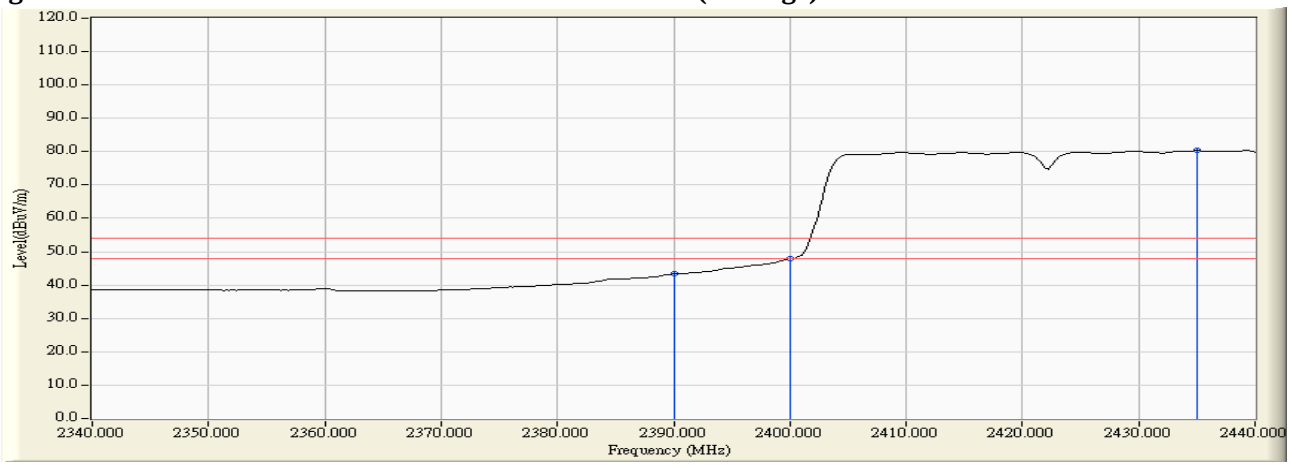


Figure Channel 03: Vertical (Average)



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.

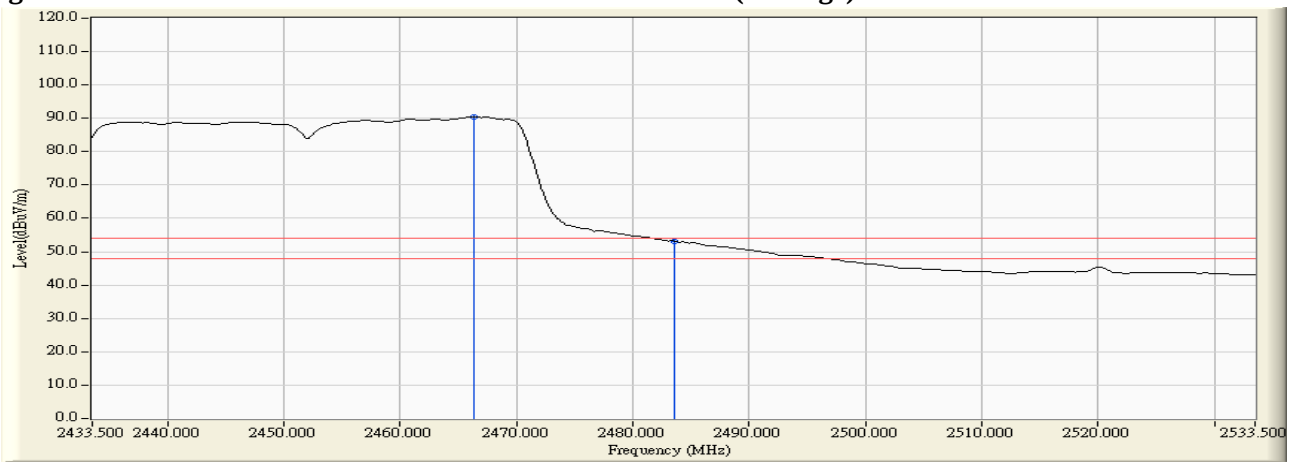
Product : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2452MHz)

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
09 (Peak)	2466.900	-2.618	109.563	106.945	--	--	--
09 (Peak)	2483.500	-2.601	74.826	72.224	74.00	54.00	Pass
09 (Average)	2466.300	-2.618	92.978	90.360	--	--	--
09 (Average)	2483.500	-2.601	55.711	53.109	74.00	54.00	Pass

Figure Channel 09: Horizontal (Peak)

Figure Channel 09: 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 : WiFi Module
Test Item : Band Edge
Test Site : No.3 OATS
Test Date : 2017/03/20
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2452MHz)

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
09 (Peak)	2463.500	-4.030	100.913	96.883	--	--	--
09 (Peak)	2483.500	-3.966	64.190	60.223	74.00	54.00	Pass
09 (Average)	2439.500	-4.100	85.099	80.999	--	--	--
09 (Average)	2483.500	-3.966	45.576	41.609	74.00	54.00	Pass

Figure Channel 09: Vertical (Peak)

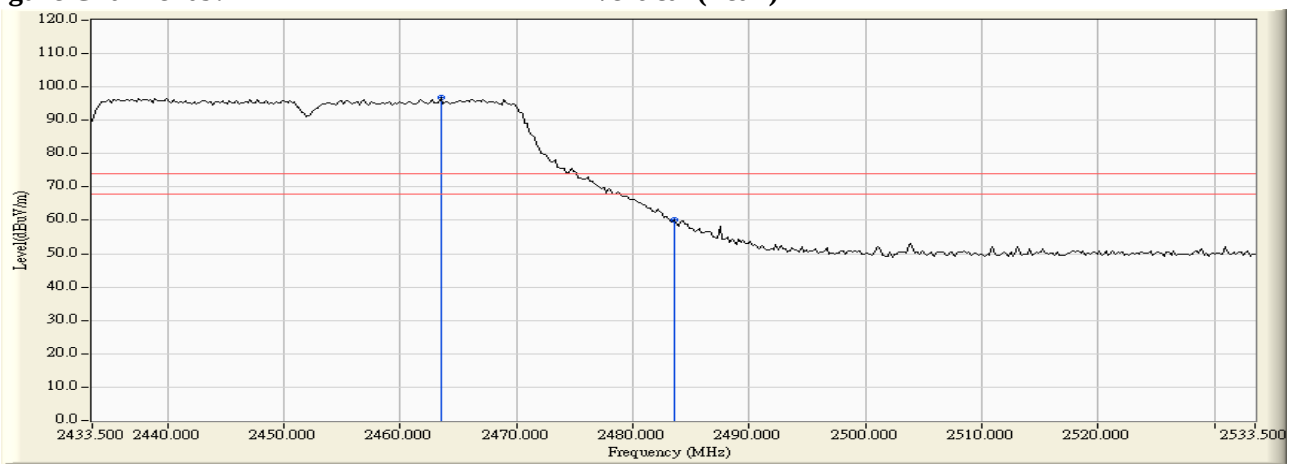
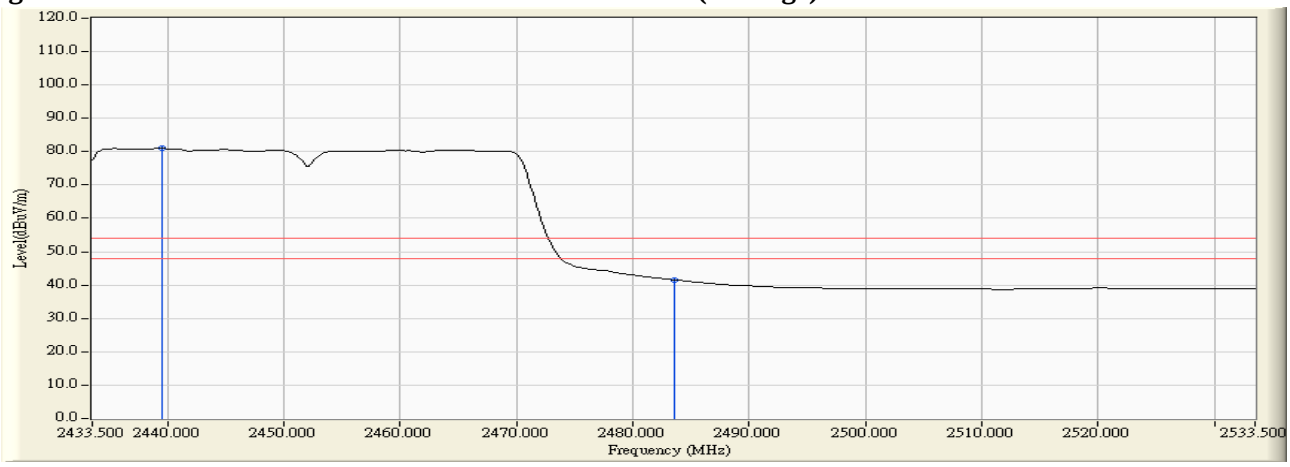


Figure Channel 09: Vertical (Average)

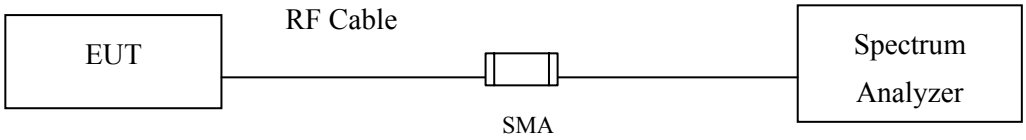


Note:

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. 6dB Bandwidth

7.1. Test Setup



7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 1-5% of the emission bandwidth, VBW≥3*RBW

7.4. Uncertainty

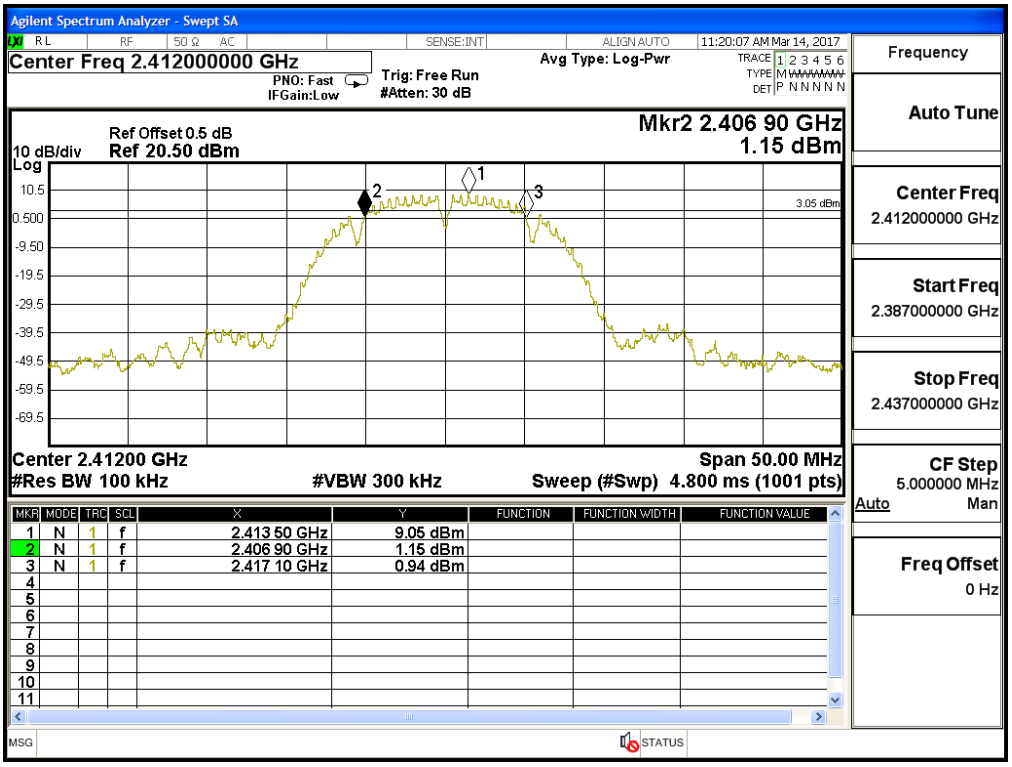
± 283Hz

7.5. Test Result of 6dB Bandwidth

Product : WiFi Module
Test Item : 6dB 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	2412.00	10200	>500	Pass

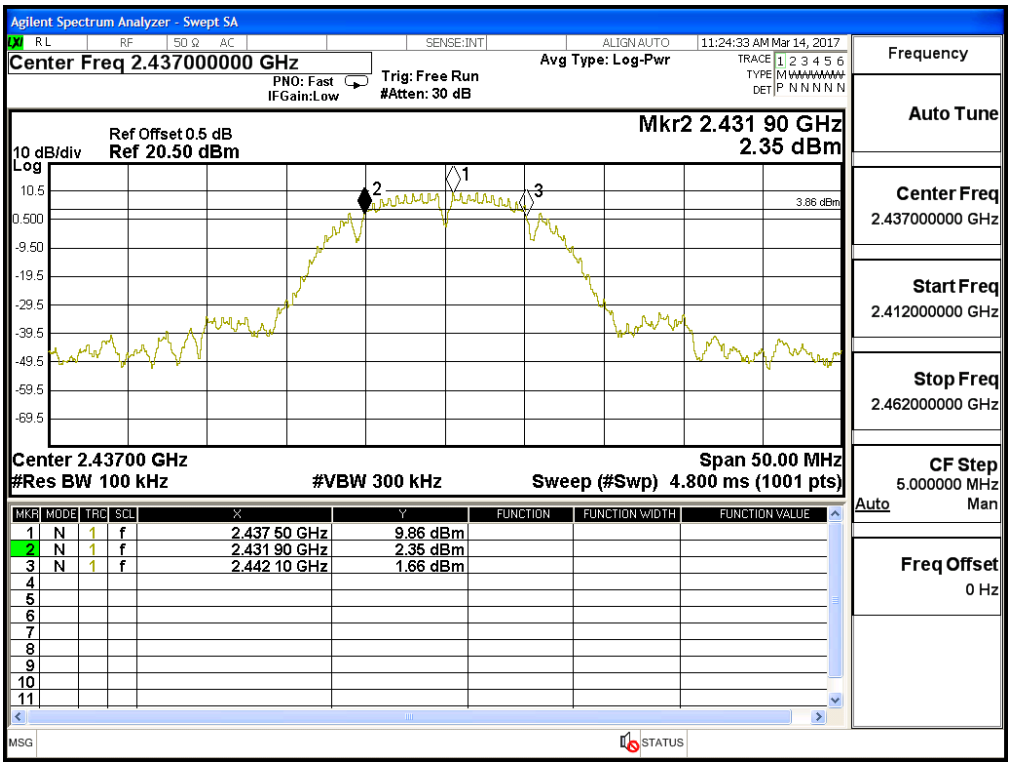
Figure Channel 1:



Product : WiFi Module
Test Item : 6dB 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	2437.00	10200	>500	Pass

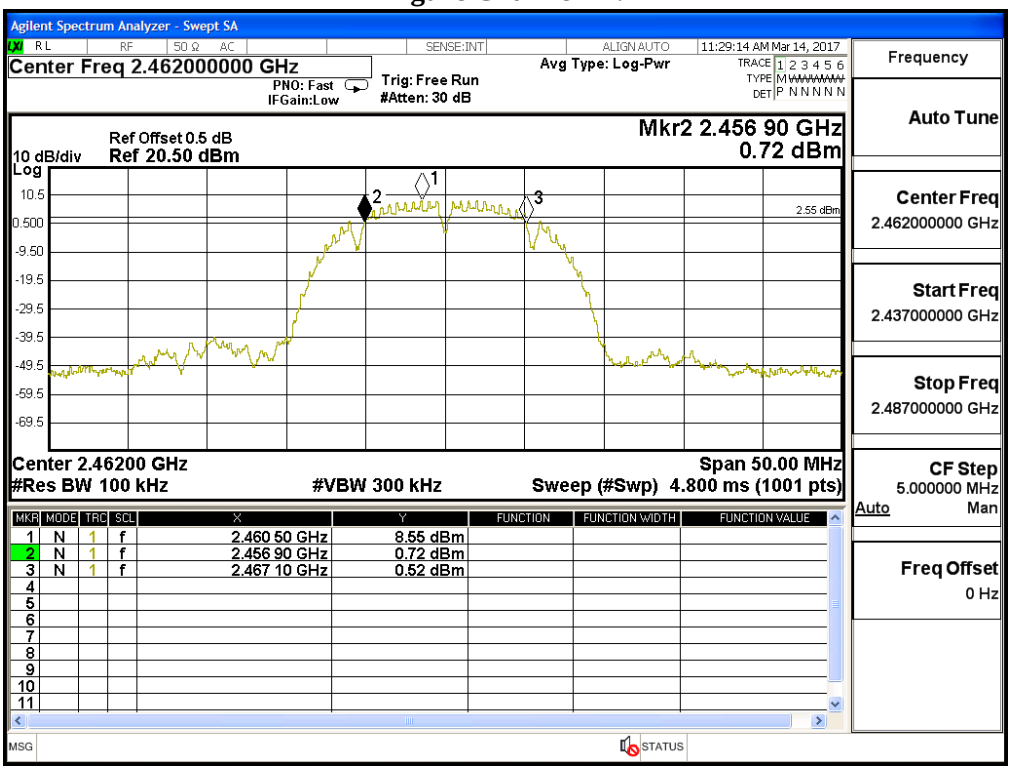
Figure Channel 6:



Product : WiFi Module
Test Item : 6dB 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	2462.00	10200	>500	Pass

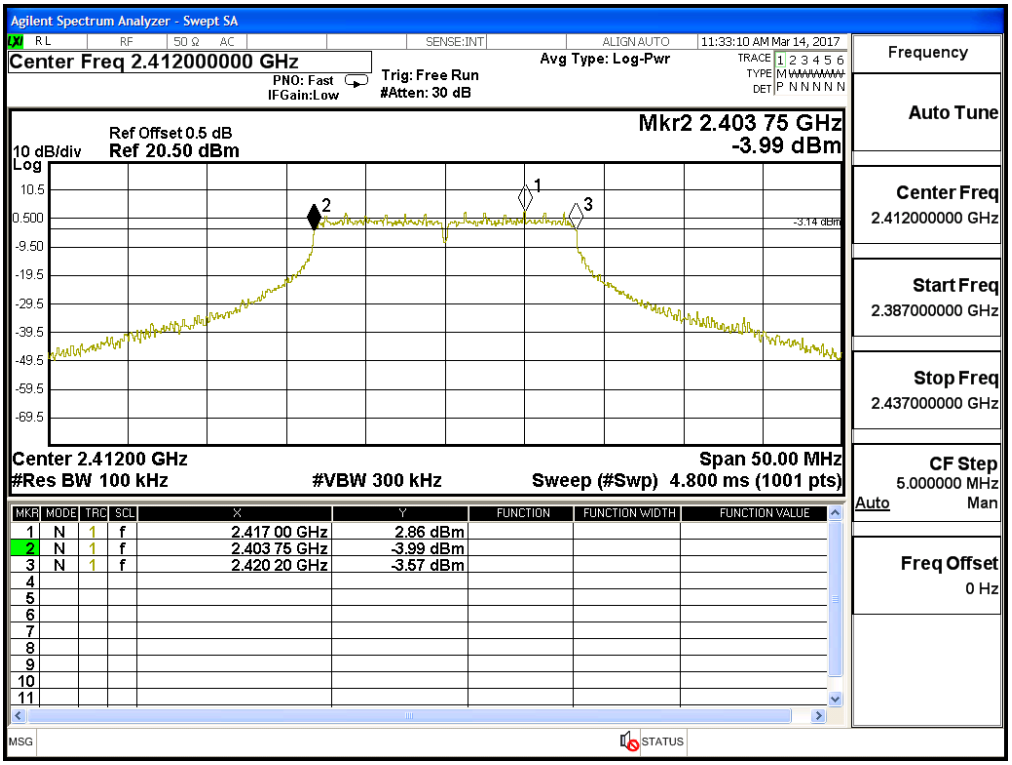
Figure Channel 11:



Product : WiFi Module
Test Item : 6dB 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	2412.00	16450	>500	Pass

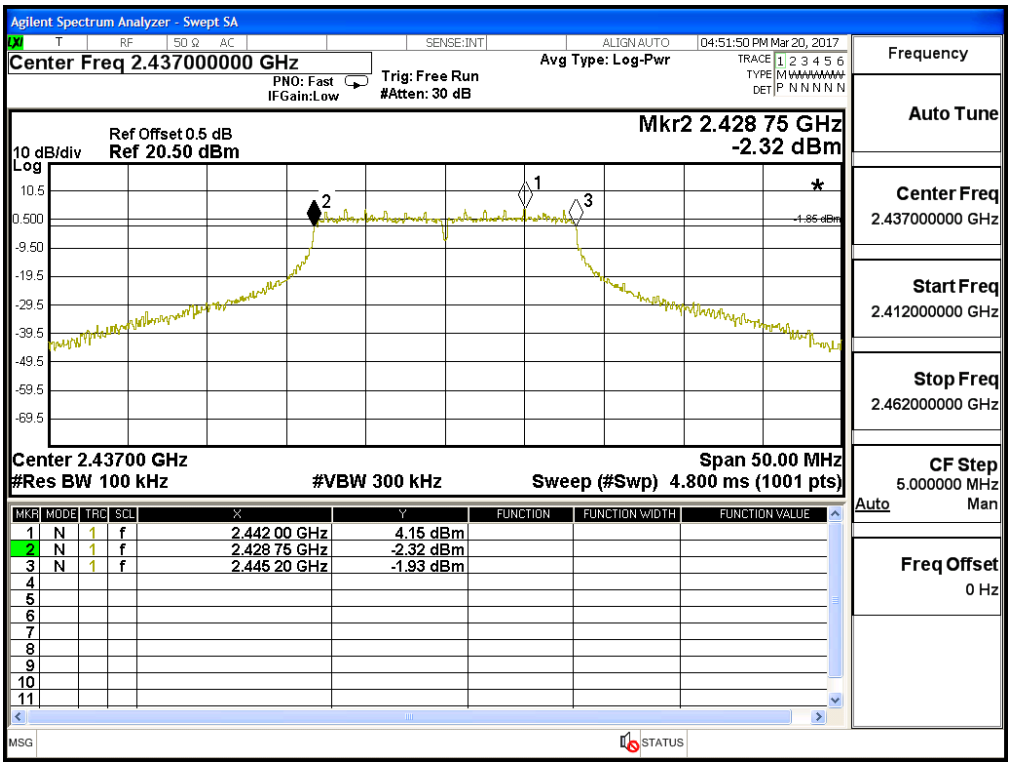
Figure Channel 1:



Product : WiFi Module
Test Item : 6dB 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	2437.00	16350	>500	Pass

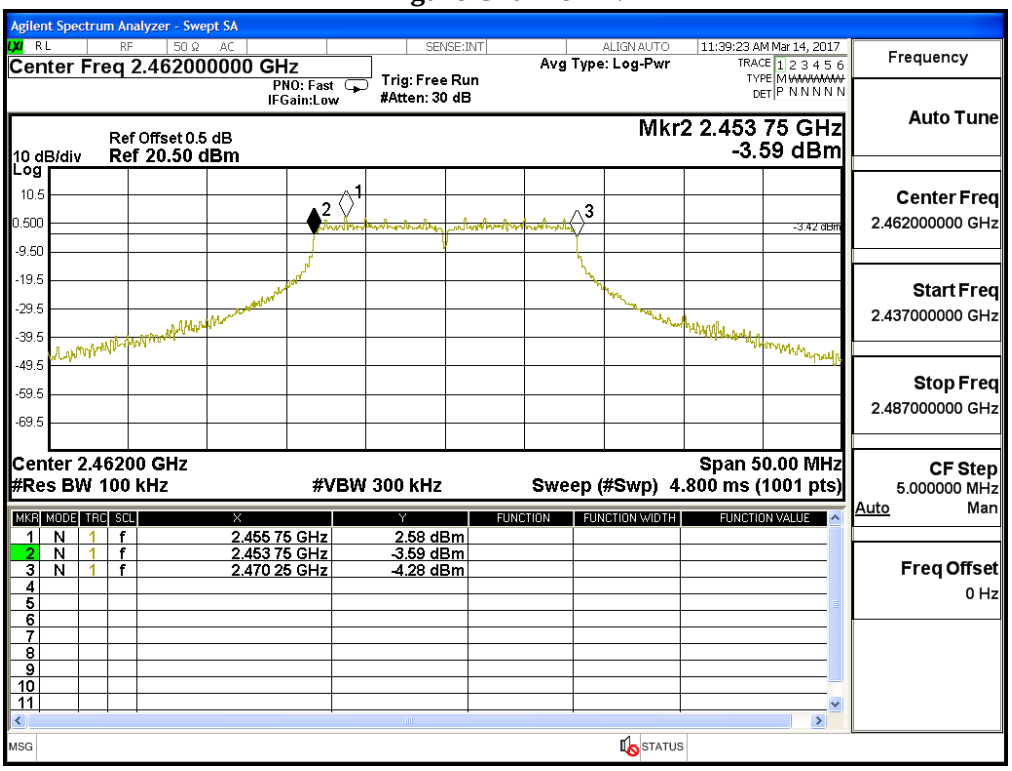
Figure Channel 6:



Product : WiFi Module
Test Item : 6dB 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	2462.00	16500	>500	Pass

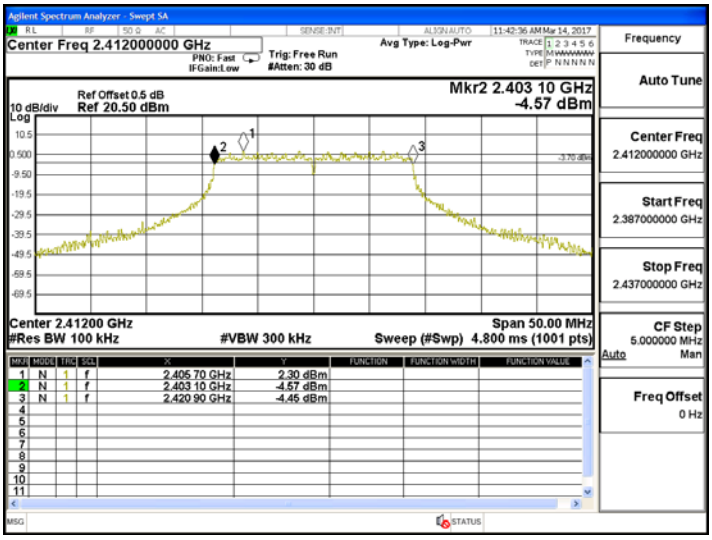
Figure Channel 11:



Product : WiFi Module
Test Item : 6dB Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2412MHz)

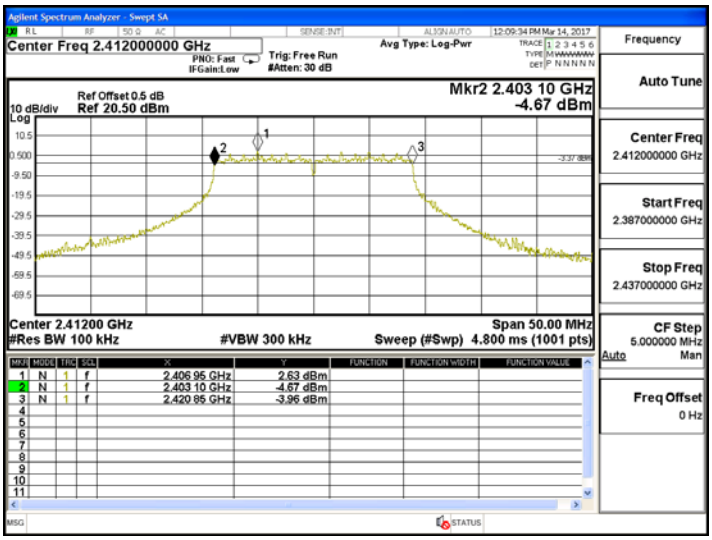
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412.00	17800	>500	Pass

Figure Channel 1: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412.00	17750	>500	Pass

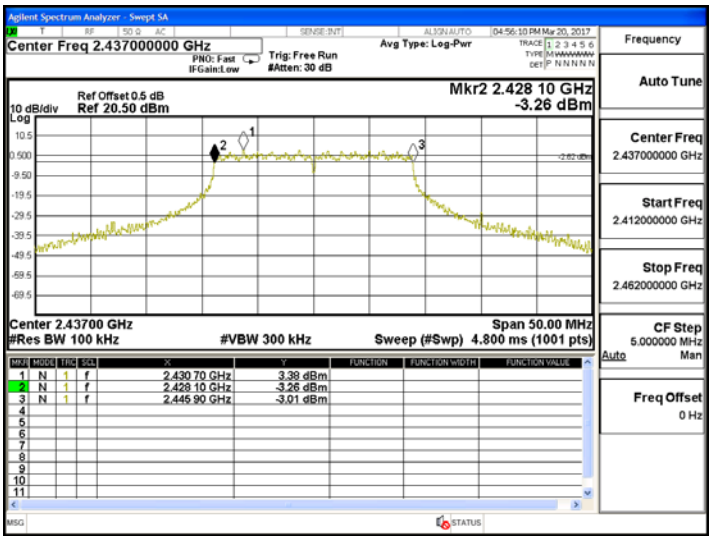
Figure Channel 1: (Chain B)



Product : WiFi Module
Test Item : 6dB Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2437MHz)

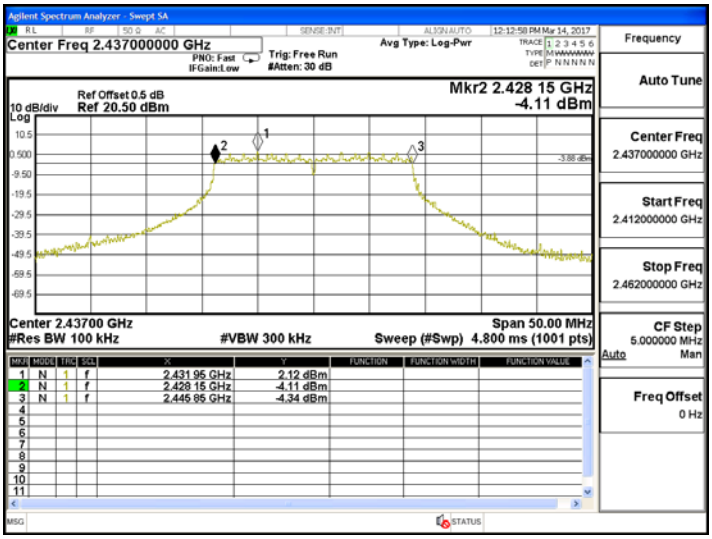
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	17800	>500	Pass

Figure Channel 6: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	17700	>500	Pass

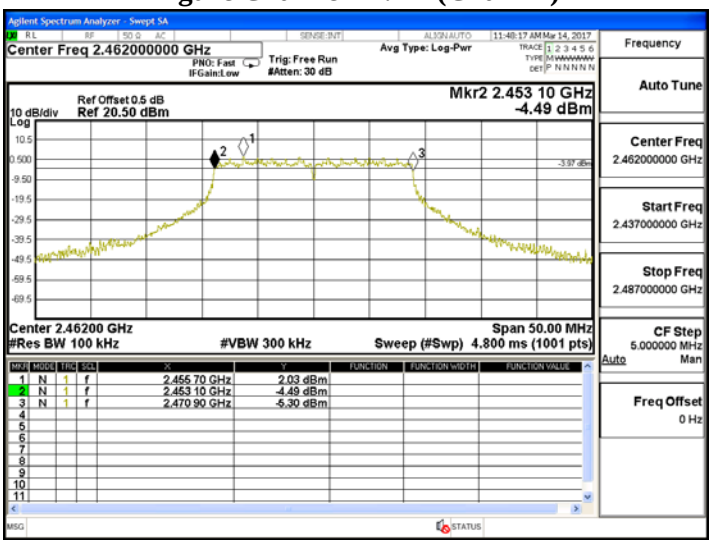
Figure Channel 6: (Chain B)



Product : WiFi Module
Test Item : 6dB Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2462MHz)

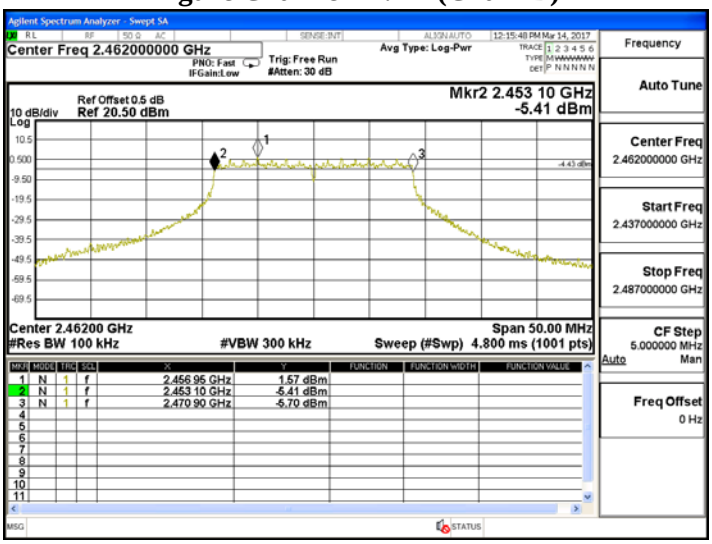
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462.00	17800	>500	Pass

Figure Channel 11: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462.00	17800	>500	Pass

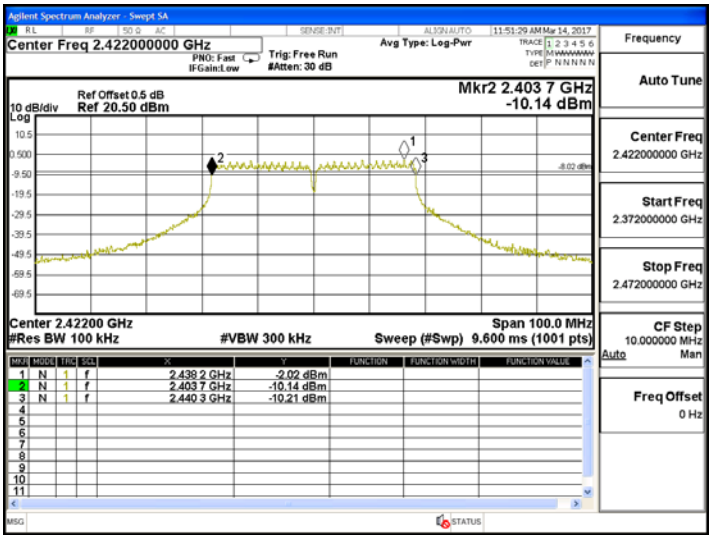
Figure Channel 11: (Chain B)



Product : WiFi Module
Test Item : 6dB Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2422MHz)

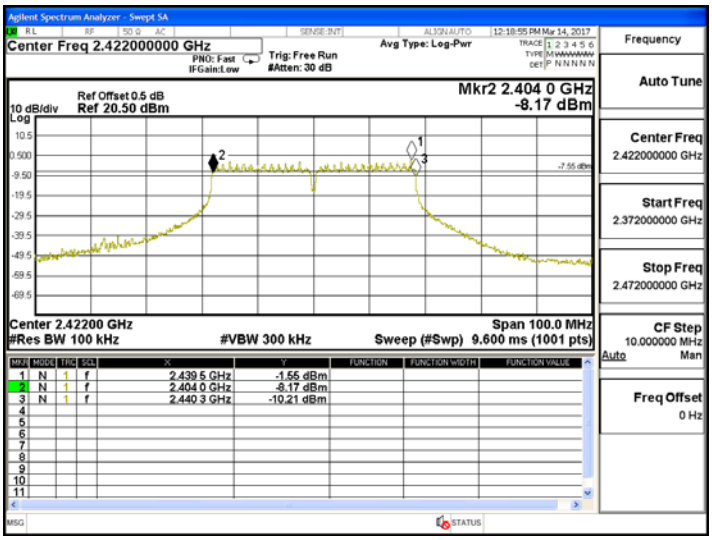
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
3	2422.00	36600	>500	Pass

Figure Channel 3: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
3	2422.00	36300	>500	Pass

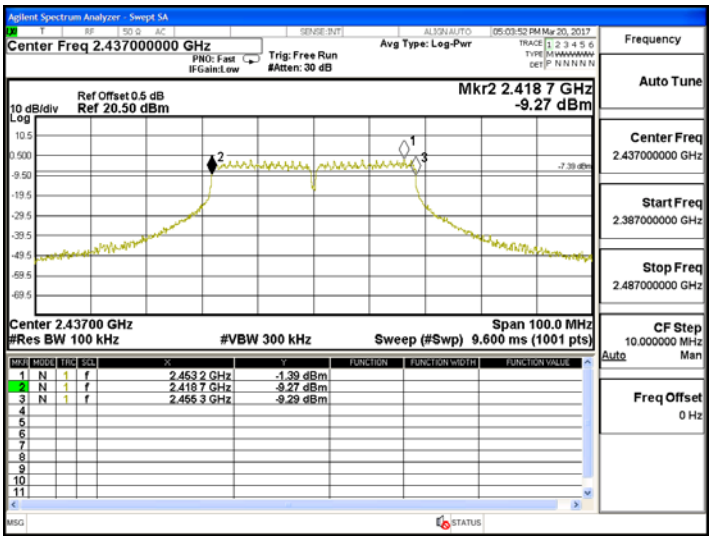
Figure Channel 3: (Chain B)



Product : WiFi Module
Test Item : 6dB Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2437MHz)

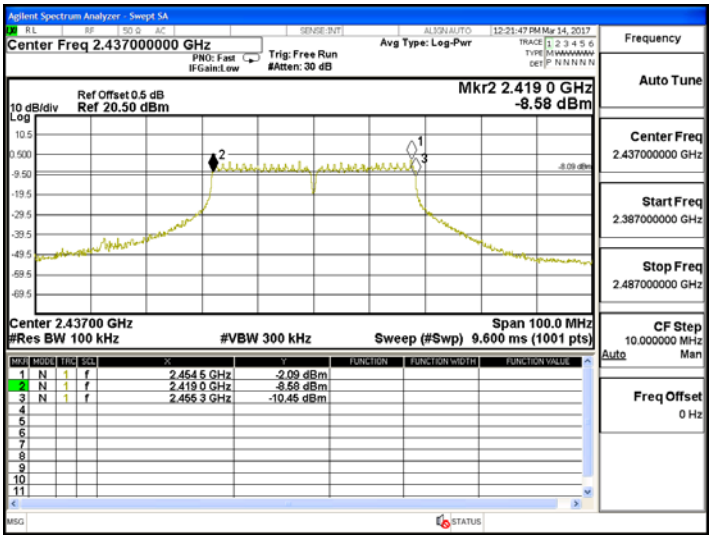
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	36600	>500	Pass

Figure Channel 6: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	36300	>500	Pass

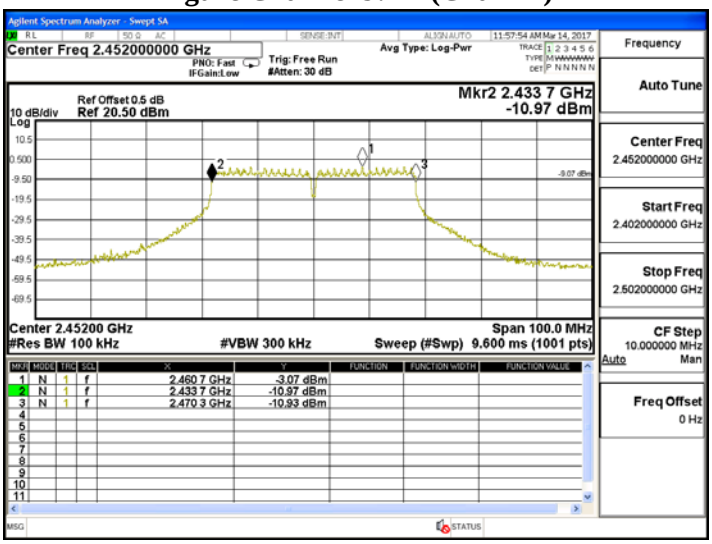
Figure Channel 6: (Chain B)



Product : WiFi Module
Test Item : 6dB Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2452MHz)

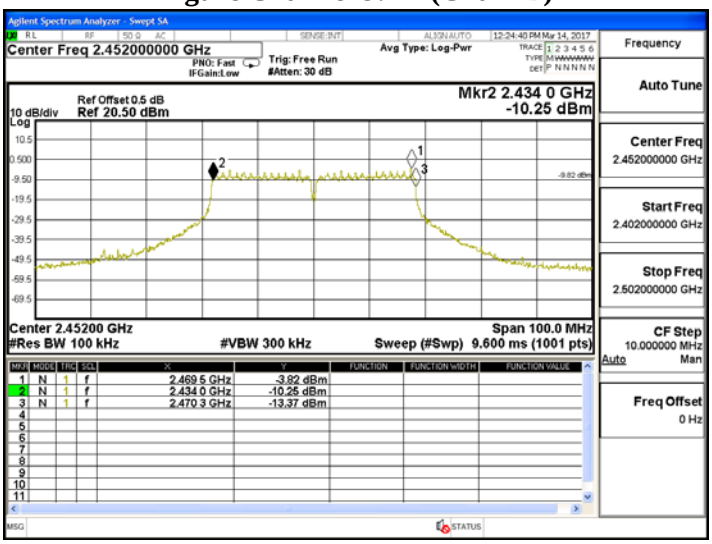
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
9	2452.00	36600	>500	Pass

Figure Channel 9: (Chain A)



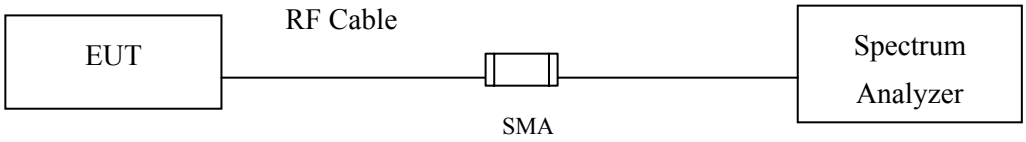
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
9	2452.00	36300	>500	Pass

Figure Channel 9: (Chain B)



8. Power Density

8.1. Test Setup



8.2. Limits

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

8.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013; 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.

8.4. Uncertainty

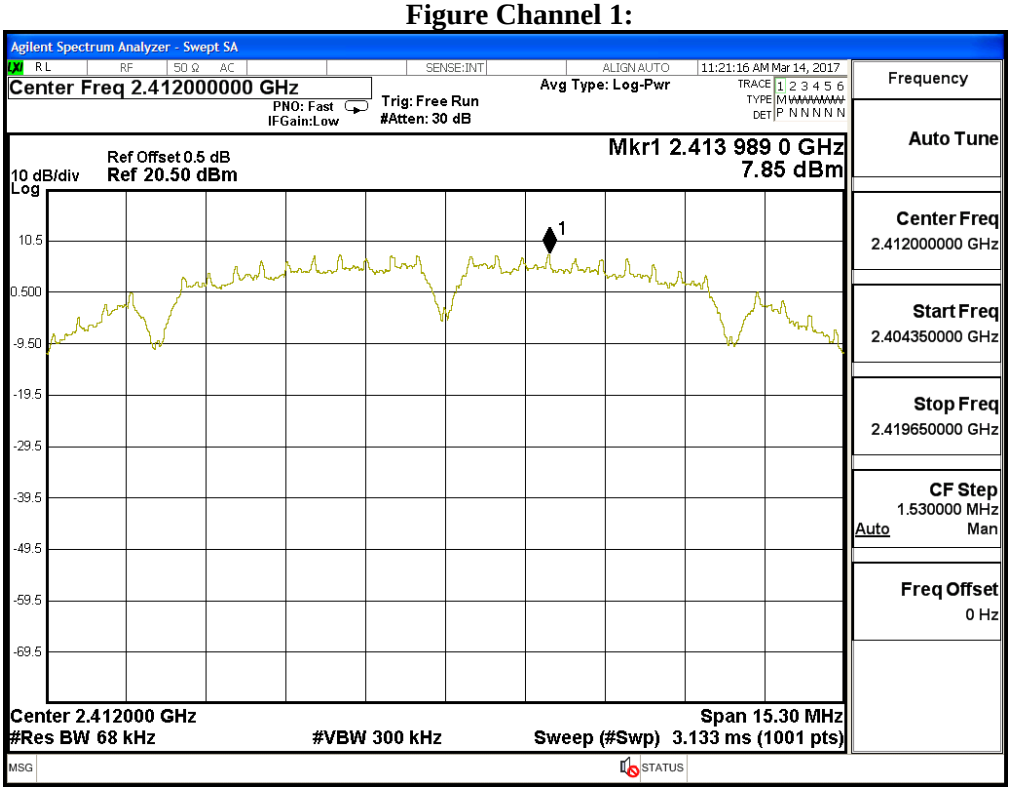
± 1.20 dB

8.5. Test Result of Power Density

Product : WiFi Module
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	7.850	≦8dBm	Pass

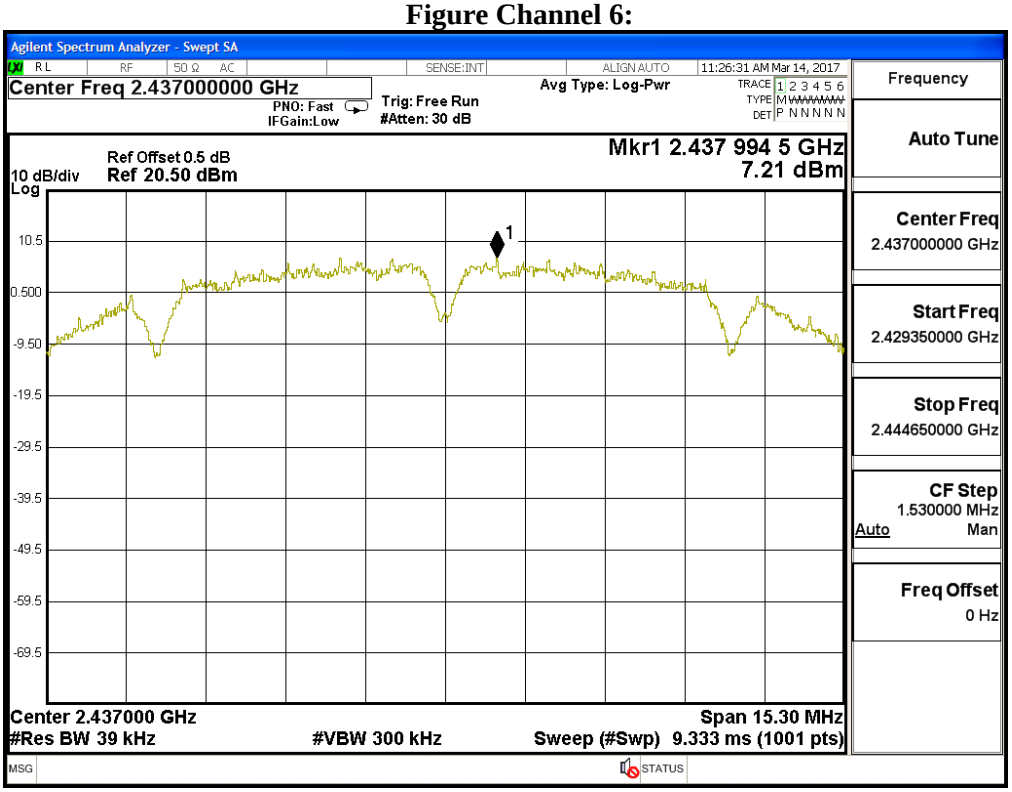
Figure Channel 1:



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

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
6	2437	7.210	≦8dBm	Pass

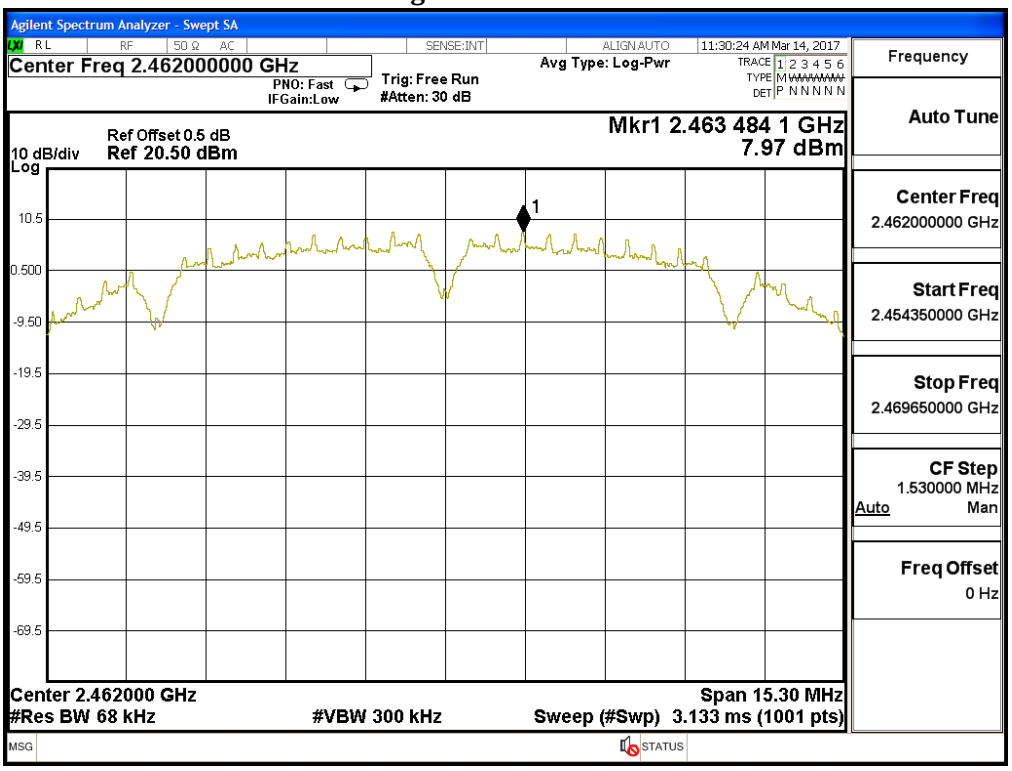
Figure Channel 6:



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

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
11	2462	7.970	≦8dBm	Pass

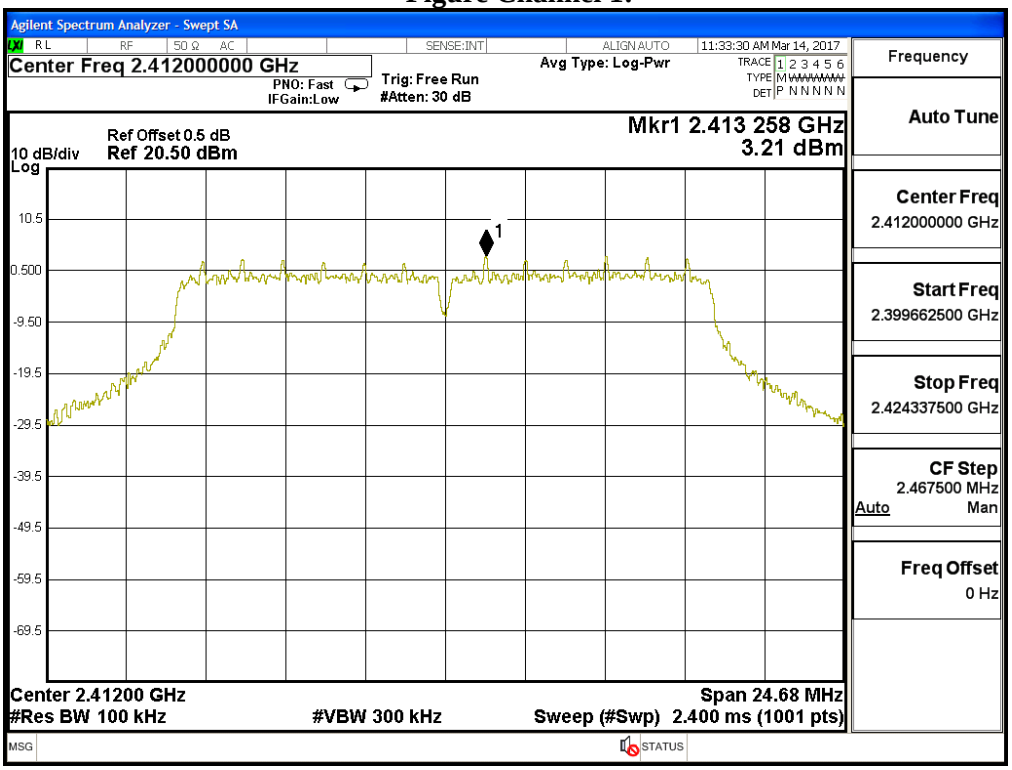
Figure Channel 11:



Product : WiFi Module
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	3.210	≦8dBm	Pass

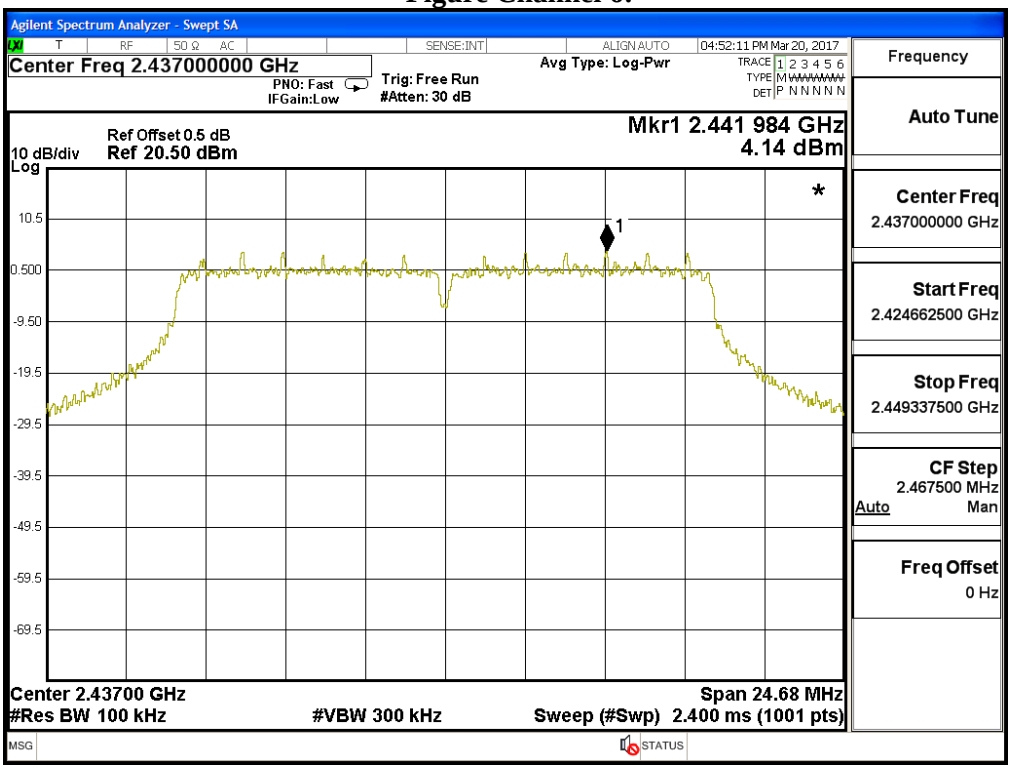
Figure Channel 1:



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

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
6	2437	4.140	≦8dBm	Pass

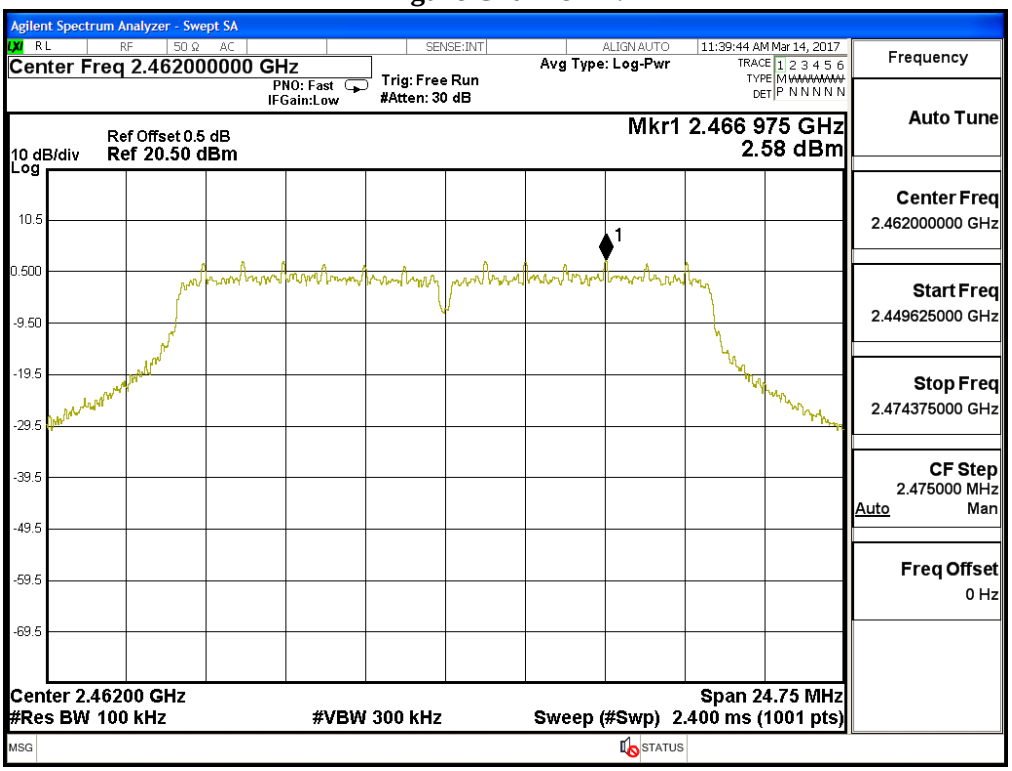
Figure Channel 6:



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

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
11	2462	2.580	≦8dBm	Pass

Figure Channel 11:



Product : WiFi Module
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2412MHz)

CHAIN	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)1	Limit	Result
A	2.120	5.130	≦8dBm	Pass
B	2.480	5.490	≦8dBm	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 1: (Chain A)

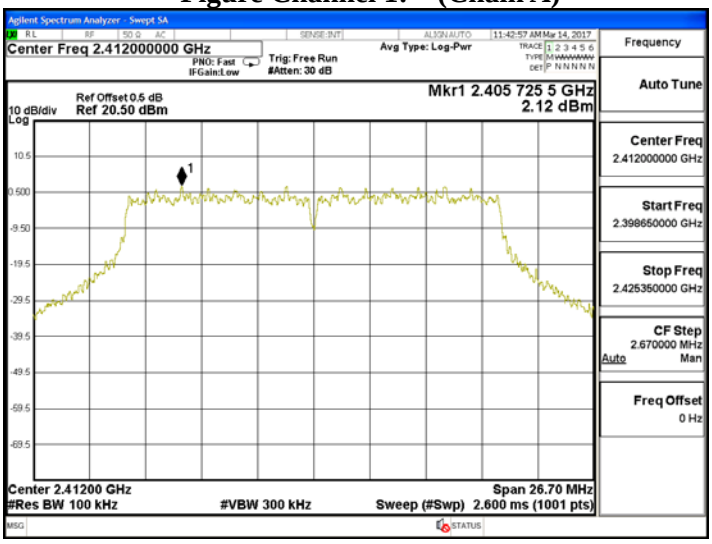
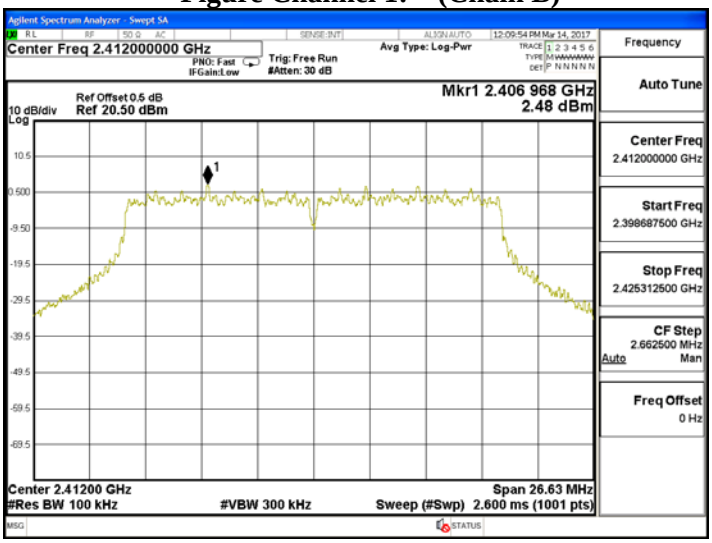


Figure Channel 1: (Chain B)



Product : WiFi Module
Test Item : Power Density Data
Test Site : No.3OATS
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2437MHz)

CHAIN	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)1	Limit	Result
A	3.250	6.260	≦8dBm	Pass
B	2.100	5.110	≦8dBm	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 6: (Chain A)

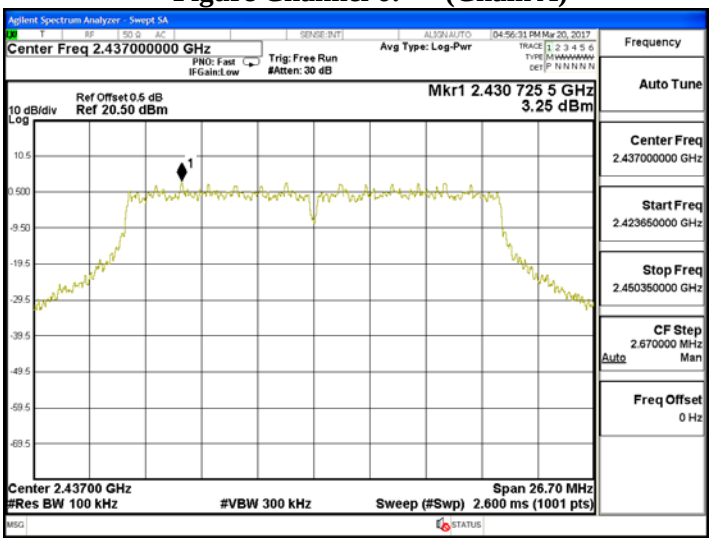
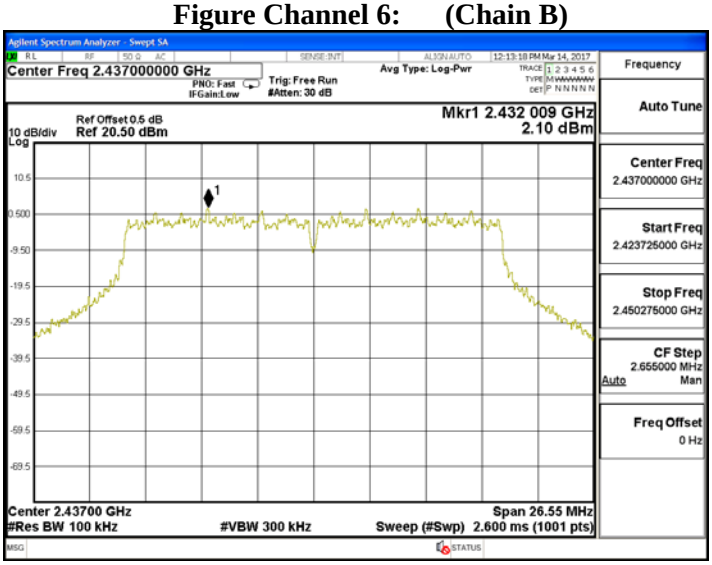


Figure Channel 6: (Chain B)



Product : WiFi Module
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit - (802.11n-20BW_14.4Mbps) (2462MHz)

CHAIN	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)1	Limit	Result
A	1.960	4.970	≦8dBm	Pass
B	1.440	4.450	≦8dBm	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 11: (Chain A)

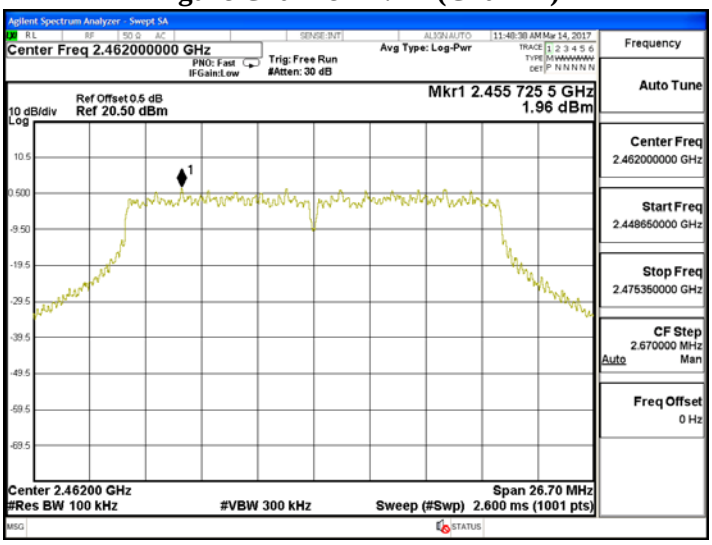
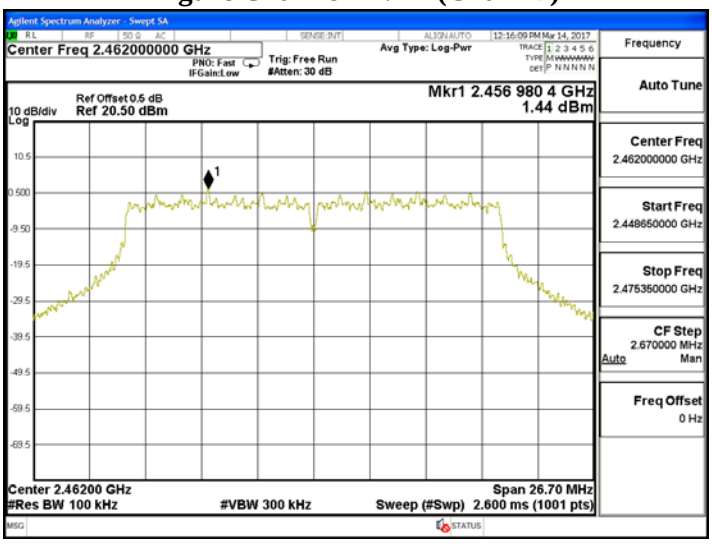


Figure Channel 11: (Chain B)



Product : WiFi Module
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2422MHz)

CHAIN	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)1	Limit	Result
A	-2.110	0.900	≦8dBm	Pass
B	-1.640	1.370	≦8dBm	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 3: (Chain A)

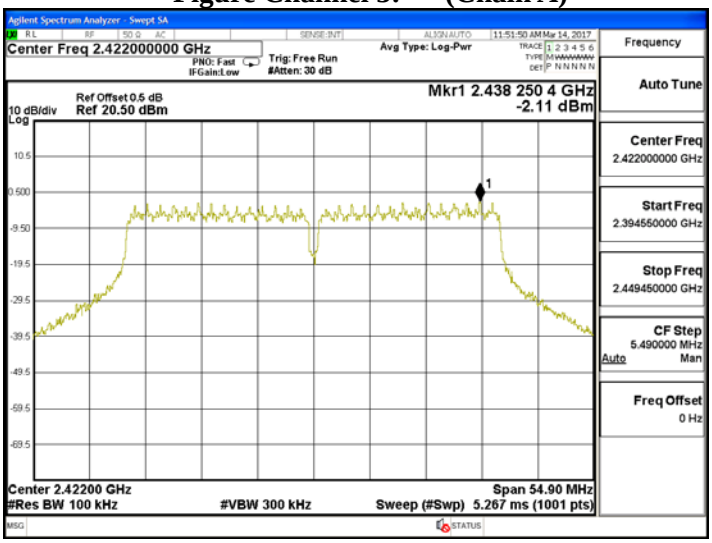
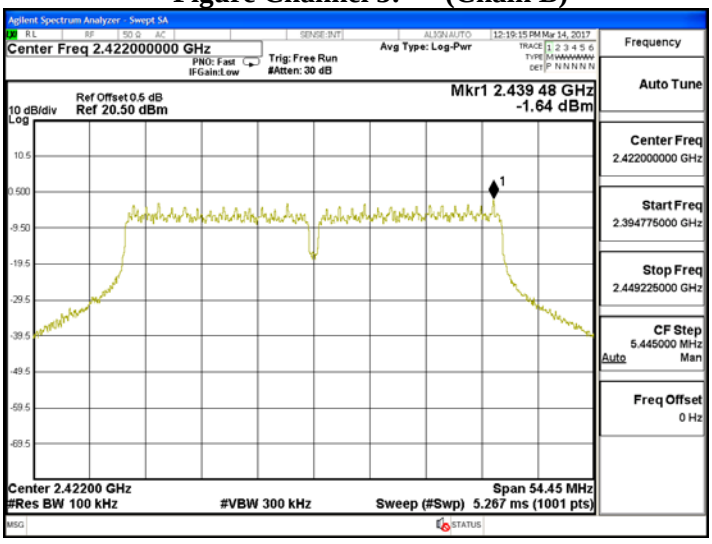


Figure Channel 3: (Chain B)



Product : WiFi Module
Test Item : Power Density Data
Test Site : No.3OATS
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2437MHz)

CHAIN	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)1	Limit	Result
A	-1.420	1.590	≦8dBm	Pass
B	-2.180	0.830	≦8dBm	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 6: (Chain A)

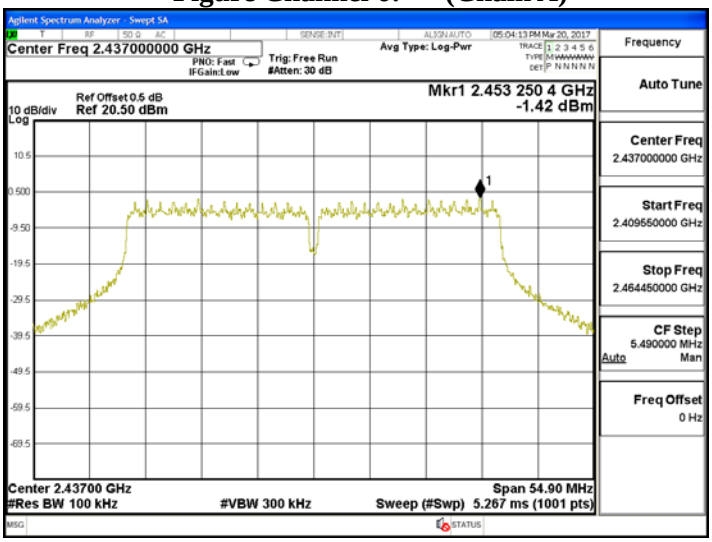
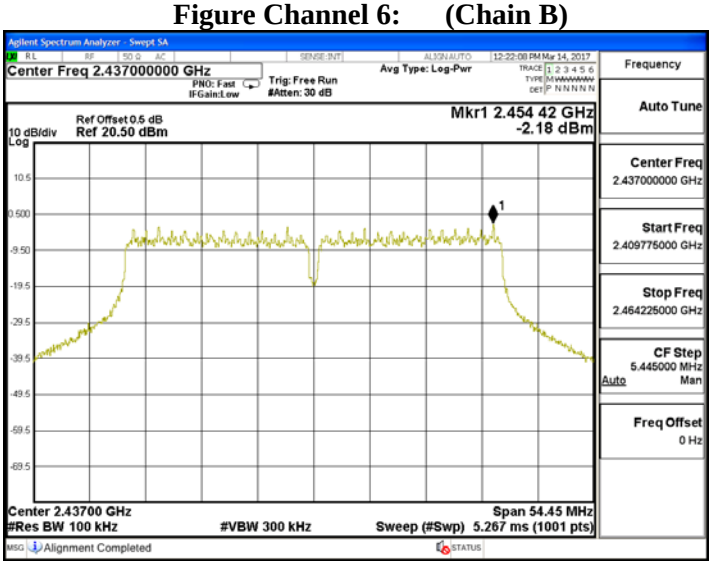


Figure Channel 6: (Chain B)



Product : WiFi Module
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 4: Transmit - (802.11n-40BW_30Mbps) (2452MHz)

CHAIN	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)1	Limit	Result
A	-3.170	-0.160	≦8dBm	Pass
B	-3.920	-0.910	≦8dBm	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 9: (Chain A)

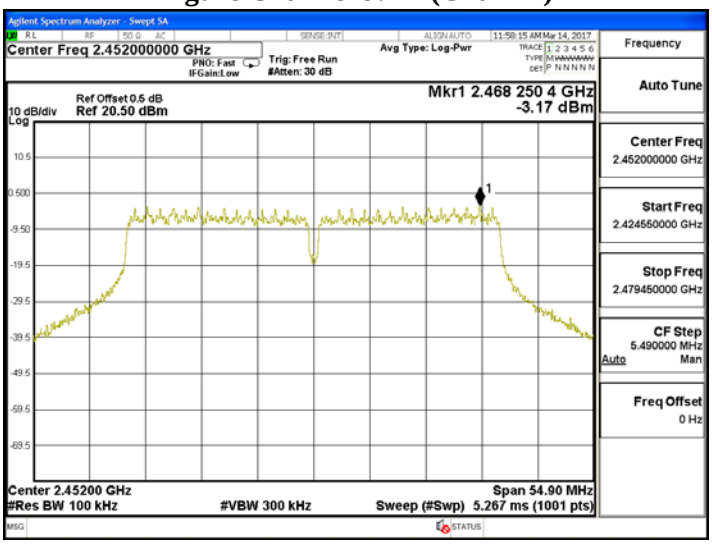
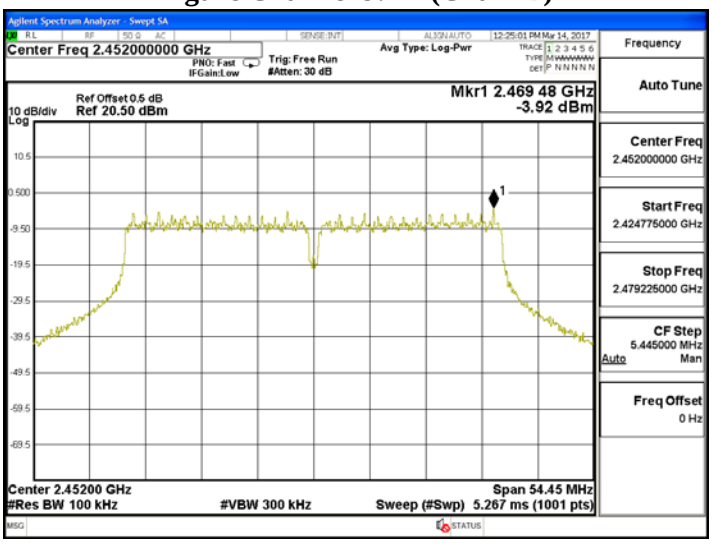


Figure Channel 9: (Chain B)



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs