

FCC Test Report

Product Name	802.11a/b/g/n 2T2R Wireless Lan USB Module
Model No	WN4508R
FCC ID.	PPQ-WN4508R

Applicant	Lite-On Technology Corp.
Address	4F, 90, Chien 1 Road, Chung Ho, New Taipei City 235, Taiwan, R.O.C.

Date of Receipt	Aug. 23, 2013
Issue Date	Sep. 24, 2013
Report No.	138472R-RFUSP28V01
Report Version	V1.0



The test results relate only to the samples tested.

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Test Report Certification

Issue Date: Sep. 24, 2013

Report No.: 138472R-RFUSP28V01



Product Name	802.11a/b/g/n 2T2R Wireless Lan USB Module
Applicant	Lite-On Technology Corp.
Address	4F, 90, Chien 1 Road, Chung Ho, New Taipei City 235, Taiwan, R.O.C.
Manufacturer	Lite-On Technology (Changzhou) CO., LTD
Model No.	WN4508R
FCC ID.	PPQ-WN4508R
EUT Rated Voltage	DC 3.3V
EUT Test Voltage	AC 120V/60Hz
Trade Name	LITE-ON
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.4: 2003, ANSI C63.10: 2009, KDB 558074
Test Result	Complied

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Documented By :

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Tested By :

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(Engineer / Vincent Chu)

Approved By :

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(Manager / Vincent Lin)

TABLE OF CONTENTS

	Description	Page
1.	GENERAL INFORMATION	5
1.1.	EUT Description.....	5
1.2.	Operational Description	8
1.3.	Tested System Details.....	9
1.4.	Configuration of Tested System	9
1.5.	EUT Exercise Software	9
1.6.	Test Facility	10
2.	Conducted Emission.....	11
2.1.	Test Equipment.....	11
2.2.	Test Setup	11
2.3.	Limits	12
2.4.	Test Procedure	12
2.5.	Uncertainty	12
2.6.	Test Result of Conducted Emission.....	13
3.	Peak Power Output	17
3.1.	Test Equipment.....	17
3.2.	Test Setup	17
3.3.	Limits	18
3.4.	Test Procedure	18
3.5.	Uncertainty	18
3.6.	Test Result of Peak Power Output.....	19
4.	Radiated Emission.....	26
4.1.	Test Equipment.....	26
4.2.	Test Setup	27
4.3.	Limits	28
4.4.	Test Procedure	29
4.5.	Uncertainty	29
4.6.	Test Result of Radiated Emission.....	30
5.	RF antenna conducted test.....	57
5.1.	Test Equipment.....	57
5.2.	Test Setup	57
5.3.	Limits	57
5.4.	Test Procedure	58
5.5.	Uncertainty	58
5.6.	Test Result of RF antenna conducted test.....	59
6.	Band Edge	78
6.1.	Test Equipment.....	78
6.2.	Test Setup	79
6.3.	Limits	79
6.4.	Test Procedure	80
6.5.	Uncertainty	80
6.6.	Test Result of Band Edge	81

7.	Occupied Bandwidth	107
7.1.	Test Equipment.....	107
7.2.	Test Setup	107
7.3.	Limits	107
7.4.	Test Procedure	107
7.5.	Uncertainty	107
7.6.	Test Result of Occupied Bandwidth	108
8.	Power Density	139
8.1.	Test Equipment.....	139
8.2.	Test Setup	139
8.3.	Limits	139
8.4.	Test Procedure	139
8.5.	Uncertainty	139
8.6.	Test Result of Power Density	140
9.	EMI Reduction Method During Compliance Testing	171

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	802.11a/b/g/n 2T2R Wireless Lan USB Module
Trade Name	LITE-ON
Model No.	WN4508R
FCC ID.	PPQ-WN4508R
Frequency Range	802.11b/g/n-20MHz:2412-2462MHz,802.11n-40MHz:2422-2452MHz 802.11a/n-20MHz:5745-5825MHz ,802.11n-40MHz:5755-5795MHz
Number of Channels	802.11b/g/n-20MHz: 11, n-40MHz: 7 802.11a/n-20MHz: 5, n-40MHz: 2
Data Speed	802.11b: 1-11Mbps, 802.11a/g: 6-54Mbps, 802.11n: up to 300Mbps
Channel separation	802.11b/g/n-20MHz: 5 MHz, 802.11a/n-20MHz: 20MHz 802.11n-40MHz: 40MHz
Type of Modulation	802.11b:DSSS, DBPSK, DQPSK, CCK 802.11a/g/n: OFDM, BPSK, QPSK, 16QAM, 64QAM
Antenna Type	PIFA
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Auden	151727-20 (Main)	PIFA	5.44dBi for 2.4GHz
		151727-20 (Aux)		5.85dBi for 5725-5825GHz
2	HONG LIN	290-20031 (Main)	PIFA	1.42dBi for 2.4GHz
		290-20031 (Aux)		1.57dBi for 5725-5825GHz

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

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

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

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

802.11a/n-20MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 149:	5745 MHz	Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz
Channel 165:	5825 MHz						

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

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 3:	2422 MHz	Channel 4:	2427 MHz	Channel 5:	2432 MHz	Channel 6:	2437 MHz
Channel 7:	2442 MHz	Channel 8:	2447 MHz	Channel 9:	2452 MHz		

802.11n-40MHz (5G Band) Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency
Channel 151:	5755 MHz	Channel 159:	5795 MHz

Note:

1. This device is a 802.11a/b/g/n 2T2R Wireless Lan USB Module, with a built-in 2.4GHz and 5GHz band 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 is chain A 、 802.11g is chain A 、 802.11a is chain A)
5. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11a/b/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 - 802.11a 6Mbps
	Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band)
	Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)
	Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)
	Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

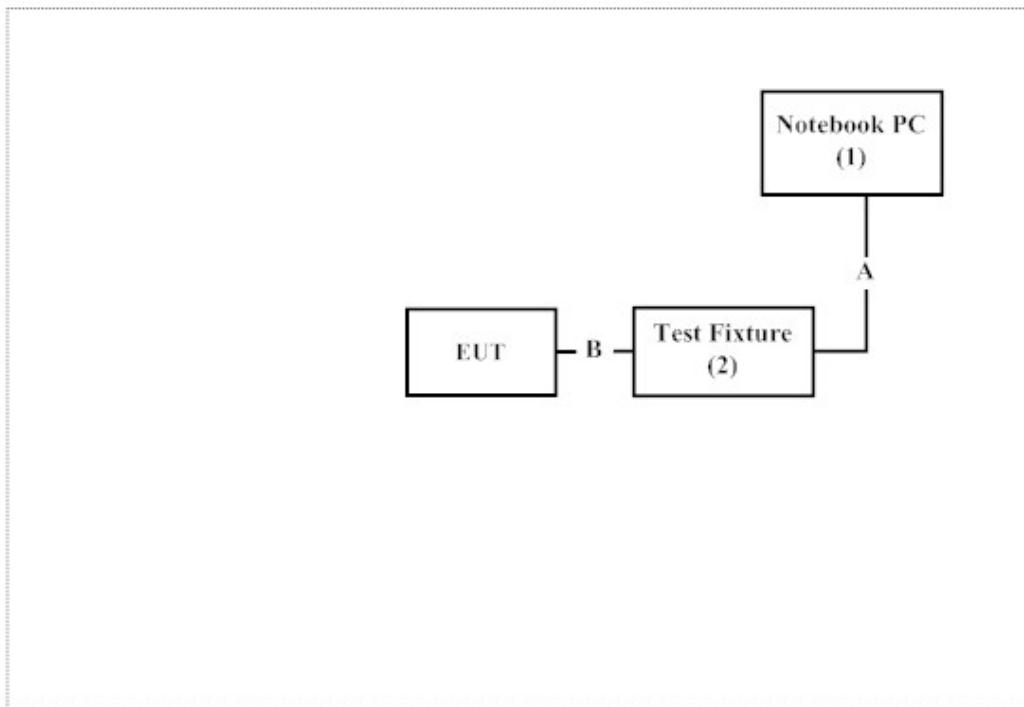
1.3. Tested System Details

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

Product	Manufacturer	Model No.	Serial No.	Power Cord
(1) Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m
(2) Test Fixture	LITE-ON	N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded 0.3m
B	Signal Cable	Non-Shielded, 0.1m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute program “QA Test V1.0.4.0” on the EUT.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press “OK” to start the continuous Transmit.
- (5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

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

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : <http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

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FCC Engineering Laboratory
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Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation
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FCC Accreditation Number: TW1014

2. Conducted Emission

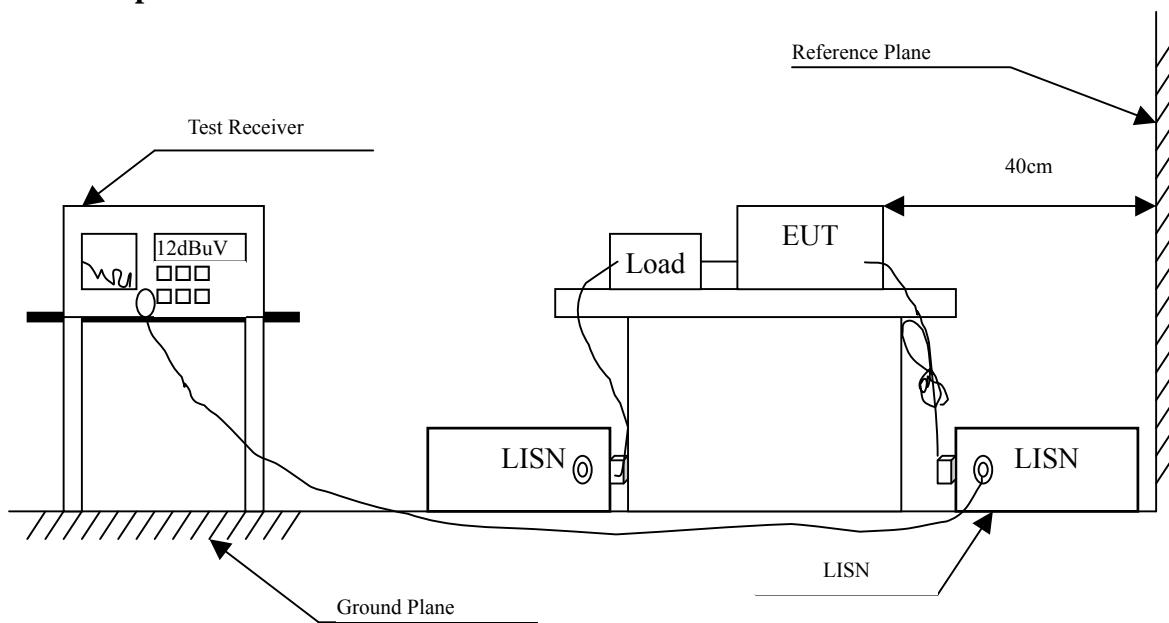
2.1. Test Equipment

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

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

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. 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

2.4. Test Procedure

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

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

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

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band) (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.185	9.698	31.670	41.368	-23.632	65.000
0.279	9.702	31.060	40.762	-21.552	62.314
0.654	9.719	22.890	32.609	-23.391	56.000
0.849	9.728	18.630	28.358	-27.642	56.000
1.627	9.774	15.100	24.874	-31.126	56.000
19.681	9.910	5.790	15.700	-44.300	60.000
Average					
0.185	9.698	15.550	25.248	-29.752	55.000
0.279	9.702	23.910	33.612	-18.702	52.314
0.654	9.719	11.030	20.749	-25.251	46.000
0.849	9.728	11.930	21.658	-24.342	46.000
1.627	9.774	7.990	17.764	-28.236	46.000
19.681	9.910	-0.090	9.820	-40.180	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band) (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.162	9.677	37.900	47.577	-18.080	65.657
0.193	9.678	35.040	44.718	-20.053	64.771
0.228	9.680	30.720	40.400	-23.371	63.771
0.615	9.698	28.610	38.308	-17.692	56.000
0.728	9.713	23.870	33.582	-22.418	56.000
1.177	9.733	17.150	26.883	-29.117	56.000
Average					
0.162	9.677	20.970	30.647	-25.010	55.657
0.193	9.678	19.950	29.628	-25.143	54.771
0.228	9.680	17.980	27.660	-26.111	53.771
0.615	9.698	15.610	25.308	-20.692	46.000
0.728	9.713	11.860	21.572	-24.428	46.000
1.177	9.733	11.410	21.143	-24.857	46.000

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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band) (5755MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.150	9.696	38.260	47.956	-18.044	66.000
0.295	9.703	34.500	44.203	-17.654	61.857
0.455	9.710	20.720	30.430	-26.856	57.286
0.599	9.717	21.990	31.707	-24.293	56.000
0.966	9.734	13.590	23.324	-32.676	56.000
8.681	9.870	12.810	22.680	-37.320	60.000
Average					
0.150	9.696	20.190	29.886	-26.114	56.000
0.295	9.703	32.170	41.873	-9.984	51.857
0.455	9.710	5.170	14.880	-32.406	47.286
0.599	9.717	16.090	25.807	-20.193	46.000
0.966	9.734	6.500	16.234	-29.766	46.000
8.681	9.870	6.650	16.520	-33.480	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band) (5755MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.158	9.677	39.120	48.797	-16.974	65.771
0.232	9.680	31.250	40.930	-22.727	63.657
0.279	9.682	33.280	42.962	-19.352	62.314
0.615	9.698	29.440	39.138	-16.862	56.000
0.740	9.713	22.620	32.333	-23.667	56.000
8.220	9.870	11.030	20.900	-39.100	60.000
Average					
0.158	9.677	22.100	31.777	-23.994	55.771
0.232	9.680	21.150	30.830	-22.827	53.657
0.279	9.682	27.290	36.972	-15.342	52.314
0.615	9.698	15.860	25.558	-20.442	46.000
0.740	9.713	12.180	21.893	-24.107	46.000
8.220	9.870	5.430	15.300	-34.700	50.000

Note:

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

3. Peak Power Output

3.1. Test Equipment

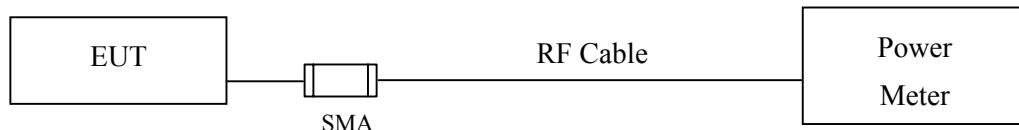
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2013
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2013
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note:

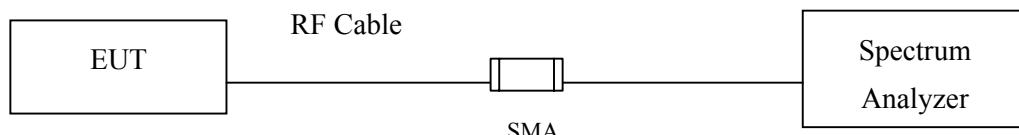
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

Average Power For different Data Rate (Mbps)



Peak Power Measurement



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Procedure

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

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps

CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11			
		Measurement Level (dBm)						
01	2412	16.22	--	--	--	18.46	<30dBm	Pass
06	2437	16.17	16.09	16.01	15.93	18.31	<30dBm	Pass
11	2462	16.14	--	--	--	18.22	<30dBm	Pass

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	Required Limit	Result
		1	2	5.5	11			
		Measurement Level (dBm)						
01	2412	15.98	--	--	--	18.22	<30dBm	Pass
06	2437	15.88	15.81	15.74	15.67	18.18	<30dBm	Pass
11	2462	15.86	--	--	--	18.03	<30dBm	Pass

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps

CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54			
		Measurement Level (dBm)										
01	2412	14.02	--	--	--	--	--	--	--	23.16	<30dBm	Pass
06	2437	14.13	14.07	14.01	13.95	13.89	13.83	13.77	13.71	23.65	<30dBm	Pass
11	2462	14.19	--	--	--	--	--	--	--	23.53	<30dBm	Pass

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	Required Limit	Result
		6	9	12	18	24	36	48	54			
		Measurement Level (dBm)										
01	2412	13.89	--	--	--	--	--	--	--	22.88	<30dBm	Pass
06	2437	13.76	13.68	13.6	13.52	13.44	13.36	13.28	13.2	22.98	<30dBm	Pass
11	2462	13.72	--	--	--	--	--	--	--	22.92	<30dBm	Pass

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps

CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54			
		Measurement Level (dBm)										
149	5745	13.88	--	--	--	--	--	--	--	22.05	<30dBm	Pass
157	5785	14.16	14.05	13.94	13.83	13.72	13.61	13.5	13.39	22.58	<30dBm	Pass
165	5825	14.02	--	--	--	--	--	--	--	22.45	<30dBm	Pass

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	Required Limit	Result
		6	9	12	18	24	36	48	54			
		Measurement Level (dBm)										
149	5745	13.78	--	--	--	--	--	--	--	21.56	<30dBm	Pass
157	5785	13.89	13.78	13.67	13.56	13.45	13.34	13.23	13.12	21.62	<30dBm	Pass
165	5825	13.87	--	--	--	--	--	--	--	21.58	<30dBm	Pass

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band)

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	
		Measurement Level (dBm)								
01	2412	12.96	--	--	--	--	--	--	--	21.92
06	2437	13.27	13.12	12.97	12.82	12.67	12.52	12.37	12.22	22.09
11	2462	12.92	--	--	--	--	--	--	--	21.98

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	
		Measurement Level (dBm)								
01	2412	12.76	--	--	--	--	--	--	--	20.91
06	2437	12.89	12.81	12.73	12.65	12.57	12.49	12.41	12.33	20.74
11	2462	12.9	--	--	--	--	--	--	--	20.88

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	21.92	20.91	24.45	<30dBm	Pass
6	2437	14.4	22.09	20.74	24.48	<30dBm	Pass
11	2462	14.4	21.98	20.88	24.48	<30dBm	Pass

Note: Peak Power Output Value (dBm) = $10 \times \log (\text{Chain A (mW)} + \text{Chain B (mW)})$

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)

CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		30	60	90	120	180	240	270	300	
		Measurement Level (dBm)								
3	2422	13.11	--	--	--	--	--	--	--	21.66
6	2437	13.27	13.15	13.03	12.91	12.79	12.67	12.55	12.43	21.80
9	2452	13.05	--	--	--	--	--	--	--	21.69

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	
		Measurement Level (dBm)								
3	2422	13.07	--	--	--	--	--	--	--	20.87
6	2437	12.88	12.79	12.7	12.61	12.52	12.43	12.34	12.25	20.70
9	2452	13.01	--	--	--	--	--	--	--	20.62

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

CHAIN A+B

Channel	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
3	2422	30	21.66	20.87	24.29	<30dBm	Pass
6	2437	30	21.80	20.70	24.30	<30dBm	Pass
9	2452	30	21.69	20.62	24.20	<30dBm	Pass

Note: Peak Power Output Value (dBm) = $10 \times \log (\text{Chain A (mW)} + \text{Chain B (mW)})$

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

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	
		Measurement Level (dBm)								
149	5745	13.95	--	--	--	--	--	--	--	21.99
157	5785	13.57	13.48	13.39	13.3	13.21	13.12	13.03	12.94	21.72
165	5825	13.95	--	--	--	--	--	--	--	22.09

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	
		Measurement Level (dBm)								
149	5745	13.91	--	--	--	--	--	--	--	21.59
157	5785	13.91	13.85	13.79	13.73	13.67	13.61	13.55	13.49	21.74
165	5825	13.52	--	--	--	--	--	--	--	21.35

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
149	5745	14.4	21.99	21.59	24.80	<30dBm	Pass
157	5785	14.4	21.72	21.74	24.74	<30dBm	Pass
165	5825	14.4	22.09	21.35	24.75	<30dBm	Pass

Note: Peak Power Output Value (dBm) = $10 \times \log (\text{Chain A (mW)} + \text{Chain B (mW)})$

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		30	60	90	120	180	240	270	300	
		Measurement Level (dBm)								
151	5755	13.81	--	--	--	--	--	--	--	21.92
159	5795	13.85	13.79	13.73	13.67	13.61	13.55	13.49	13.43	21.79

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	
		Measurement Level (dBm)								
151	5755	13.66	--	--	--	--	--	--	--	21.38
159	5795	13.52	13.47	13.42	13.37	13.32	13.27	13.22	13.17	21.37

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
151	5755	30	21.92	21.38	24.67	<30dBm	Pass
159	5795	30	21.79	21.37	24.60	<30dBm	Pass

Note: Peak Power Output Value (dBm) = $10 \times \log (\text{Chain A (mW}) + \text{Chain B (mW)})$

4. Radiated Emission

4.1. Test Equipment

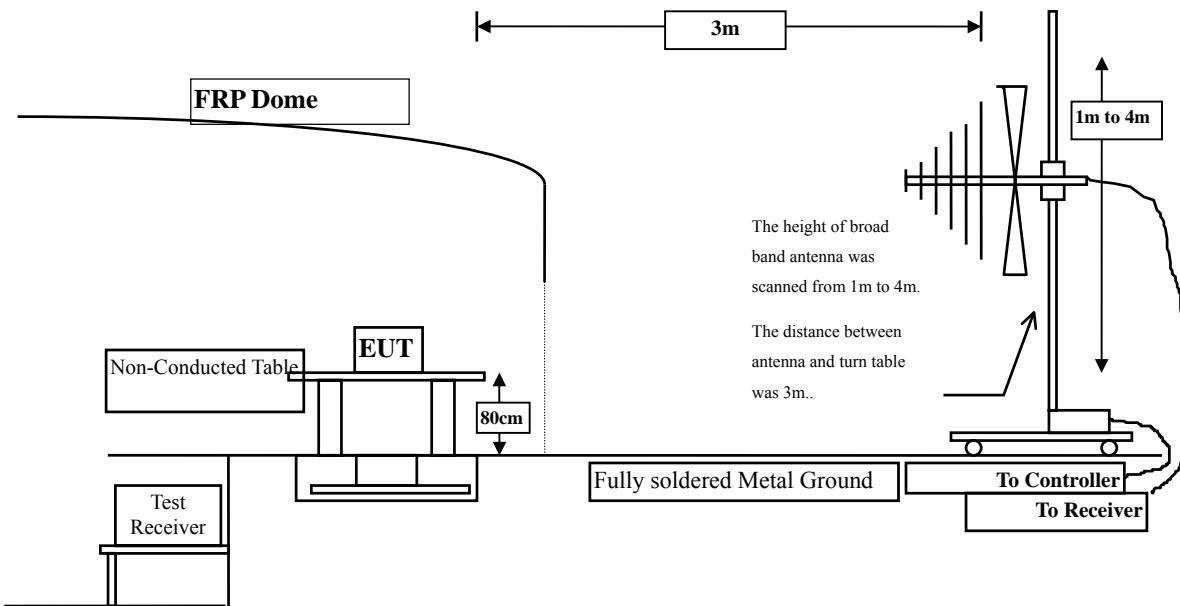
The following test equipment are used during the radiated emission test:

Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2013
	X	Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2013
	X	Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2013
	X	Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

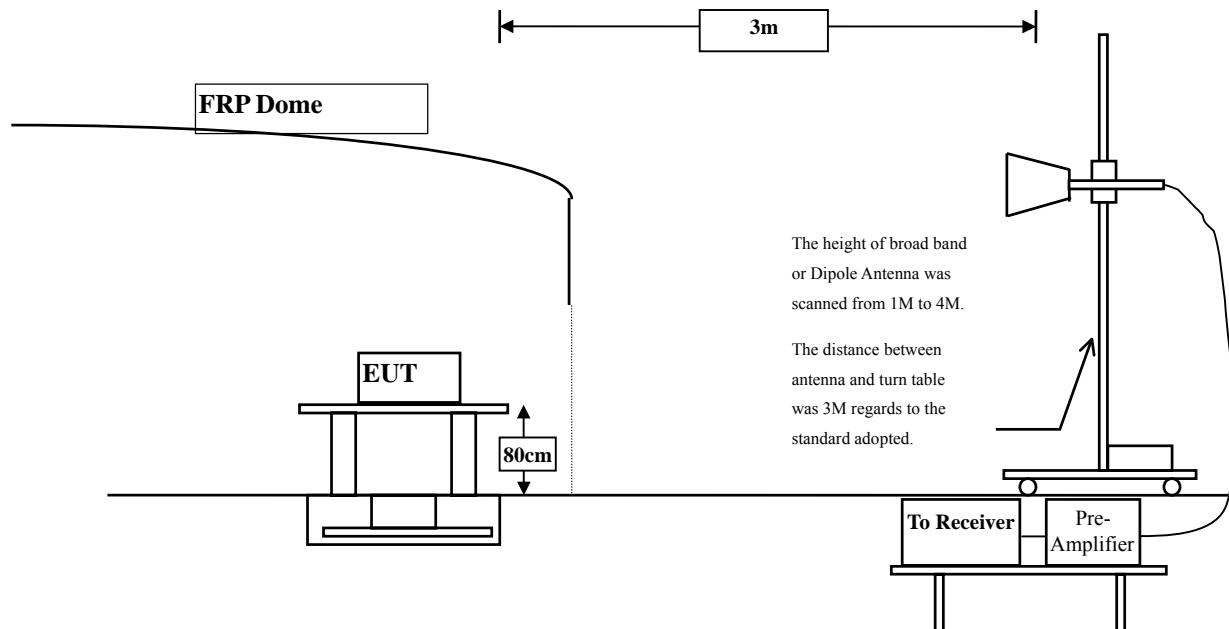
Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with "X" are used to measure the final test results.

4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.3. Limits

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

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

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

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

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

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

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

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

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

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

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

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 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	3.261	44.960	48.221	-25.779	74.000
7236.000	10.650	37.260	47.910	-26.090	74.000
9648.000	13.337	37.680	51.016	-22.984	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4824.000	6.421	41.260	47.681	-26.319	74.000
7236.000	11.495	38.205	49.700	-24.300	74.000
9648.000	13.807	36.150	49.956	-24.044	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 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	3.038	43.260	46.297	-27.703	74.000
7311.000	11.795	37.590	49.384	-24.616	74.000
9748.000	12.635	37.260	49.895	-24.105	74.000

Average

Detector:

--

Vertical

Peak Detector:

4874.000	5.812	41.260	47.071	-26.929	74.000
7311.000	12.630	36.890	49.519	-24.481	74.000
9748.000	13.126	37.590	50.716	-23.284	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 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	2.858	42.560	45.417	-28.583	74.000
7386.000	12.127	37.480	49.608	-24.392	74.000
9848.000	12.852	37.420	50.273	-23.727	74.000

Average

Detector:

--

Vertical

Peak Detector:

4924.000	5.521	41.090	46.610	-27.390	74.000
7386.000	13.254	37.590	50.844	-23.156	74.000
9848.000	13.367	37.990	51.357	-22.643	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 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	3.261	42.290	45.551	-28.449	74.000
7236.000	10.650	37.560	48.210	-25.790	74.000
9648.000	13.337	37.290	50.626	-23.374	74.000

Average

Detector:

--

Vertical

Peak Detector:

4824.000	6.421	41.290	47.711	-26.289	74.000
7236.000	11.495	38.560	50.055	-23.945	74.000
9648.000	13.807	36.120	49.926	-24.074	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps (2437 MHz)

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

Horizontal

Peak Detector:

4874.000	3.038	42.950	45.987	-28.013	74.000
7311.000	11.795	38.250	50.044	-23.956	74.000
9748.000	12.635	37.260	49.895	-24.105	74.000

Average

Detector:

--

Vertical

Peak Detector:

4874.000	5.812	42.570	48.381	-25.619	74.000
7311.000	12.630	38.150	50.779	-23.221	74.000
9748.000	13.126	37.590	50.716	-23.284	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 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	2.858	42.590	45.447	-28.553	74.000
7386.000	12.127	37.980	50.108	-23.892	74.000
9848.000	12.852	38.560	51.413	-22.587	74.000

Average

Detector:

--

Vertical

Peak Detector:

4924.000	5.521	40.690	46.210	-27.790	74.000
7386.000	13.254	37.510	50.764	-23.236	74.000
9848.000	13.367	38.510	51.877	-22.123	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5745 MHz)

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

Horizontal
Peak Detector:

11490.000	17.106	36.150	53.257	-20.743	74.000
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Average
Detector:

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Vertical
Peak Detector:

11490.000	18.034	35.230	53.265	-20.735	74.000
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Average
Detector:

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Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5785 MHz)

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

Horizontal
Peak Detector:

11570.000	16.809	36.290	53.099	-20.901	74.000
-----------	--------	--------	--------	---------	--------

Average
Detector:

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Vertical
Peak Detector:

11570.000	17.698	36.190	53.888	-20.112	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5825 MHz)

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

Horizontal

Peak Detector:

11650.000	16.158	36.120	52.278	-21.722	74.000
-----------	--------	--------	--------	---------	--------

Average

Detector:

--

Vertical

Peak Detector:

11650.000	17.274	36.120	53.395	-20.605	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band) (2412MHz)

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

Horizontal

Peak Detector:

4824.000	3.261	45.620	48.881	-25.119	74.000
7236.000	10.650	38.150	48.800	-25.200	74.000
9648.000	13.337	38.250	51.586	-22.414	74.000

Average

Detector:

--

Vertical

Peak Detector:

4824.000	6.421	43.260	49.681	-24.319	74.000
7236.000	11.495	38.260	49.755	-24.245	74.000
9648.000	13.807	38.290	52.096	-21.904	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band) (2437 MHz)

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

Horizontal

Peak Detector:

4874.000	3.038	43.150	46.187	-27.813	74.000
7311.000	11.795	38.260	50.054	-23.946	74.000
9748.000	12.635	36.120	48.755	-25.245	74.000

Average

Detector:

--

Vertical

Peak Detector:

4874.000	5.812	42.560	48.371	-25.629	74.000
7311.000	12.630	37.590	50.219	-23.781	74.000
9748.000	13.126	37.590	50.716	-23.284	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band) (2462 MHz)

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

Horizontal

Peak Detector:

4924.000	2.858	42.290	45.147	-28.853	74.000
7386.000	12.127	38.150	50.278	-23.722	74.000
9848.000	12.852	38.140	50.993	-23.007	74.000

Average

Detector:

--

Vertical

Peak Detector:

4824.000	6.421	42.150	48.571	-25.429	74.000
7386.000	13.254	36.150	49.404	-24.596	74.000
9848.000	13.367	38.290	51.657	-22.343	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band) (2422MHz)

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

Horizontal

Peak Detector:

4844.000	3.171	43.260	46.431	-27.569	74.000
7266.000	11.162	37.260	48.422	-25.578	74.000
9688.000	12.964	38.150	51.115	-22.885	74.000

Average

Detector:

--

Vertical

Peak Detector:

4844.000	6.178	42.060	48.238	-25.762	74.000
7266.000	11.982	37.150	49.132	-24.868	74.000
9688.000	13.507	38.050	51.558	-22.442	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band) (2437 MHz)

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

Horizontal

Peak Detector:

4874.000	3.038	42.590	45.627	-28.373	74.000
7311.000	11.795	37.590	49.384	-24.616	74.000
9748.000	12.635	38.050	50.685	-23.315	74.000

Average

Detector:

--

Vertical

Peak Detector:

4874.000	5.812	42.150	47.961	-26.039	74.000
7311.000	12.630	37.050	49.679	-24.321	74.000
9748.000	13.126	38.590	51.716	-22.284	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band) (2452 MHz)

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

Horizontal

Peak Detector:

4904.000	2.914	42.560	45.475	-28.525	74.000
7356.000	11.995	37.590	49.584	-24.416	74.000
9808.000	12.475	37.480	49.955	-24.045	74.000

Average

Detector:

--

Vertical

Peak Detector:

4904.000	5.530	42.890	48.421	-25.579	74.000
7356.000	13.005	37.560	50.564	-23.436	74.000
9808.000	12.901	38.010	50.911	-23.089	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band) (5745MHz)

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

Horizontal

Peak Detector:

11490.000	17.106	36.780	53.887	-20.113	74.000
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Average

Detector:

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Vertical

Peak Detector:

11490.000	18.034	35.820	53.855	-20.145	74.000
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Average

Detector:

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Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band) (5785 MHz)

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

Horizontal
Peak Detector:

11570.000	16.809	36.320	53.129	-20.871	74.000
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Average
Detector:

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Vertical
Peak Detector:

11570.000	17.698	36.140	53.838	-20.162	74.000
-----------	--------	--------	--------	---------	--------

Average
Detector:

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Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band) (5825 MHz)

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

Horizontal
Peak Detector:

11650.000	16.158	36.260	52.418	-21.582	74.000
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Average
Detector:

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Vertical
Peak Detector:

11650.000	17.274	36.450	53.725	-20.275	74.000
-----------	--------	--------	--------	---------	--------

Average
Detector:

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Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band) (5755MHz)

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

Horizontal

Peak Detector:

11510.000	17.124	36.540	53.664	-20.336	74.000
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Average

Detector:

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Vertical

Peak Detector:

11510.000	18.081	35.830	53.911	-20.089	74.000
-----------	--------	--------	--------	---------	--------

Average

Detector:

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Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band) (5795 MHz)

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

Horizontal
Peak Detector:

11590.000	16.701	36.150	52.850	-21.150	74.000
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Average
Detector:

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Vertical
Peak Detector:

11590.000	17.567	36.120	53.686	-20.314	74.000
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Average
Detector:

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Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 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					
361.740	-1.549	29.455	27.906	-18.094	46.000
480.080	-0.329	32.637	32.308	-13.692	46.000
563.500	1.555	32.319	33.874	-12.126	46.000
664.380	2.062	30.395	32.457	-13.543	46.000
780.780	4.230	28.463	32.693	-13.307	46.000
901.060	5.591	26.513	32.104	-13.896	46.000
Vertical					
229.820	-8.512	43.560	35.048	-10.952	46.000
383.080	-2.184	32.375	30.191	-15.809	46.000
515.000	-1.090	27.339	26.249	-19.751	46.000
612.000	-1.631	33.052	31.421	-14.579	46.000
780.780	3.060	27.511	30.571	-15.429	46.000
928.220	6.203	29.252	35.455	-10.545	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
249.220	-6.014	39.655	33.641	-12.359	46.000
480.080	-0.329	32.845	32.516	-13.484	46.000
612.000	3.819	27.767	31.586	-14.414	46.000
728.400	3.452	29.464	32.916	-13.084	46.000
840.920	5.191	28.538	33.729	-12.271	46.000
932.100	6.922	25.281	32.203	-13.797	46.000
Vertical					
268.620	-8.842	38.178	29.336	-16.664	46.000
460.680	-3.221	30.347	27.126	-18.874	46.000
625.580	-2.600	31.350	28.750	-17.250	46.000
769.140	2.923	26.555	29.478	-16.522	46.000
842.860	3.074	26.094	29.168	-16.832	46.000
922.400	5.534	31.502	37.036	-8.964	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5785MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
268.620	-4.942	38.497	33.555	-12.445	46.000
359.800	-1.680	30.642	28.962	-17.038	46.000
458.740	0.833	27.532	28.365	-17.635	46.000
600.360	3.977	27.821	31.798	-14.202	46.000
780.780	4.230	28.846	33.076	-12.924	46.000
918.520	6.396	24.986	31.382	-14.618	46.000
Vertical					
109.540	-0.418	36.442	36.024	-7.476	43.500
208.480	-7.792	43.078	35.285	-8.215	43.500
336.520	-4.630	38.008	33.378	-12.622	46.000
668.260	-1.694	24.640	22.946	-23.054	46.000
844.800	3.181	27.282	30.463	-15.537	46.000
982.540	2.885	32.433	35.318	-18.682	54.000

Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
119.240	-9.621	40.935	31.314	-12.186	43.500
268.620	-4.942	37.208	32.266	-13.734	46.000
480.080	-0.329	35.233	34.904	-11.096	46.000
600.360	3.977	27.056	31.033	-14.967	46.000
749.740	3.320	27.757	31.077	-14.923	46.000
910.760	6.164	25.249	31.414	-14.586	46.000
Vertical					
307.420	-6.821	37.022	30.201	-15.799	46.000
460.680	-3.221	31.091	27.870	-18.130	46.000
612.000	-1.631	30.429	28.798	-17.202	46.000
769.140	2.923	26.349	29.272	-16.728	46.000
901.060	3.331	29.197	32.528	-13.472	46.000
970.900	7.302	31.261	38.563	-15.437	54.000

Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
105.660	-6.673	34.282	27.609	-15.891	43.500
229.820	-8.162	45.671	37.509	-8.491	46.000
476.200	-0.252	33.452	33.200	-12.800	46.000
644.980	1.552	28.050	29.602	-16.398	46.000
780.780	4.230	29.174	33.404	-12.596	46.000
918.520	6.396	26.343	32.739	-13.261	46.000
Vertical					
175.500	-8.257	42.016	33.758	-9.742	43.500
307.420	-6.821	36.377	29.556	-16.444	46.000
458.740	-3.887	30.437	26.550	-19.450	46.000
625.580	-2.600	31.149	28.549	-17.451	46.000
749.740	2.510	25.919	28.429	-17.571	46.000
883.600	2.566	26.914	29.479	-16.521	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band) (5785 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
134.760	-10.298	43.883	33.585	-9.915	43.500
266.680	-4.963	38.954	33.991	-12.009	46.000
408.300	-2.866	27.554	24.688	-21.312	46.000
612.000	3.819	28.781	32.600	-13.400	46.000
749.740	3.320	28.339	31.659	-14.341	46.000
889.420	6.262	24.388	30.650	-15.350	46.000
Vertical					
266.680	-8.213	38.726	30.513	-15.487	46.000
363.680	-2.393	25.690	23.297	-22.703	46.000
530.520	-0.517	28.460	27.943	-18.057	46.000
664.380	-1.918	36.690	34.772	-11.228	46.000
844.800	3.181	26.341	29.522	-16.478	46.000
951.500	6.621	29.971	36.592	-9.408	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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band) (5755MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
202.660	-10.889	45.145	34.256	-9.244	43.500
286.080	-4.687	34.803	30.116	-15.884	46.000
383.080	-1.164	28.830	27.666	-18.334	46.000
612.000	3.819	28.174	31.993	-14.007	46.000
767.200	4.235	26.087	30.322	-15.678	46.000
924.340	6.240	24.433	30.673	-15.327	46.000
Vertical					
167.740	-8.239	42.683	34.444	-9.056	43.500
305.480	-6.809	36.753	29.944	-16.056	46.000
460.680	-3.221	31.656	28.435	-17.565	46.000
625.580	-2.600	31.031	28.431	-17.569	46.000
780.780	3.060	26.230	29.290	-16.710	46.000
984.480	3.049	30.315	33.364	-20.636	54.000

Note:

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

5. RF antenna conducted test

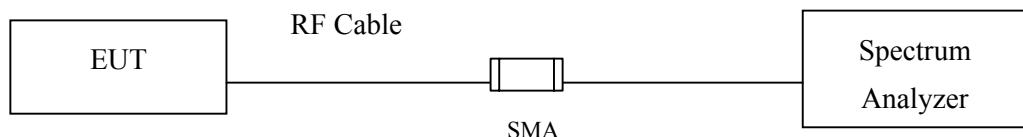
5.1. Test Equipment

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

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

5.2. Test Setup

RF antenna Conducted Measurement:



5.3. Limits

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

5.4. Test Procedure

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

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

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

5.5. Uncertainty

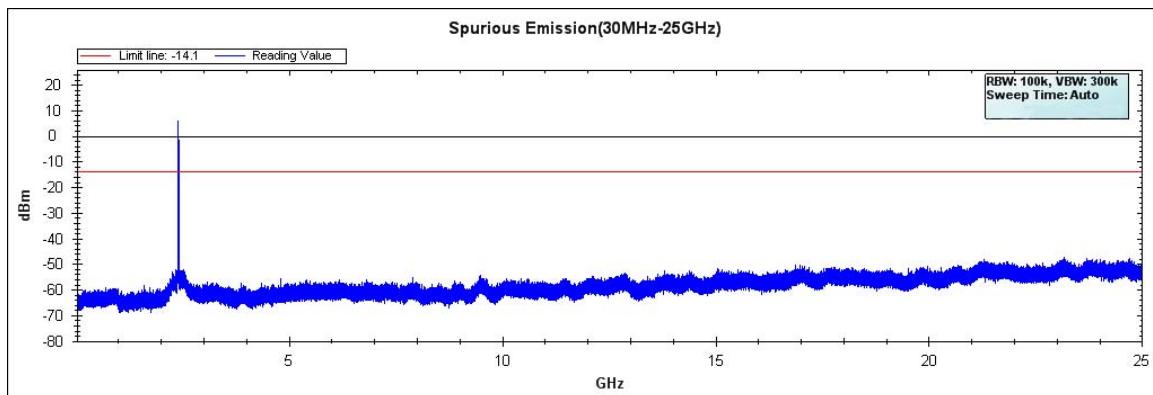
The measurement uncertainty

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

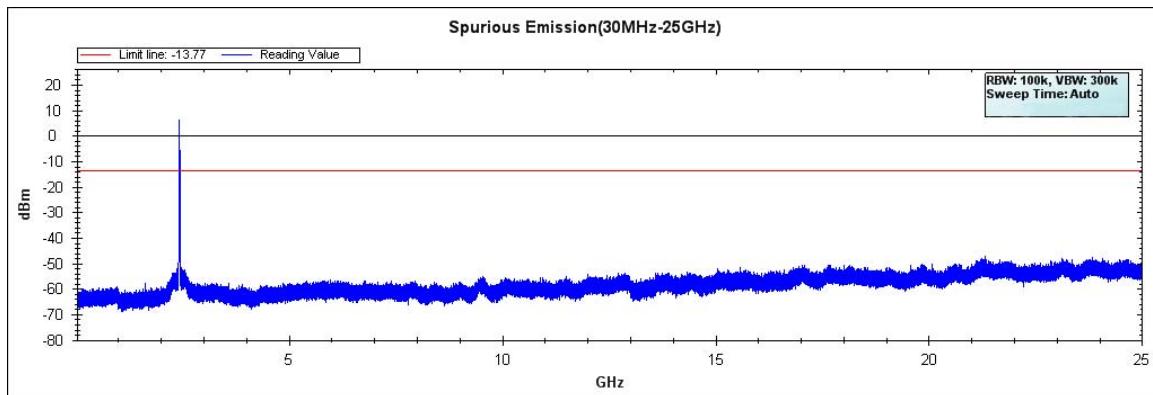
5.6. Test Result of RF antenna conducted test

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
Test Item : RF antenna conducted test
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - 802.11b 1Mbps

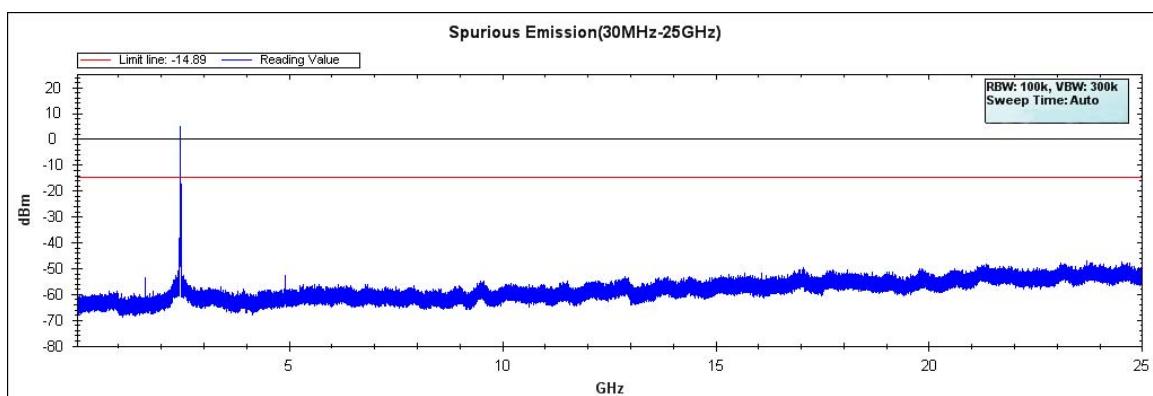
Channel 01 (2412MHz) 30MHz-25GHz



Channel 06 (2437MHz) 30MHz -25GHz

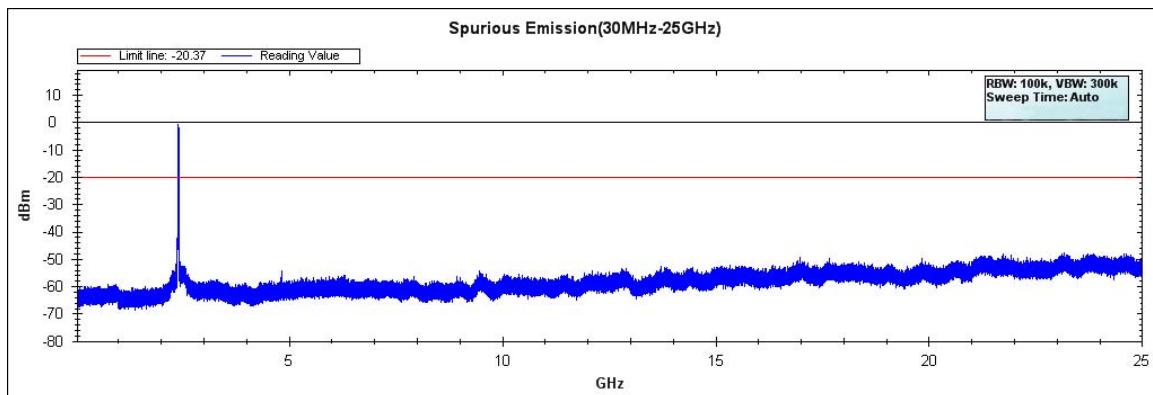


Channel 11 (2462MHz) 30MHz -25GHz

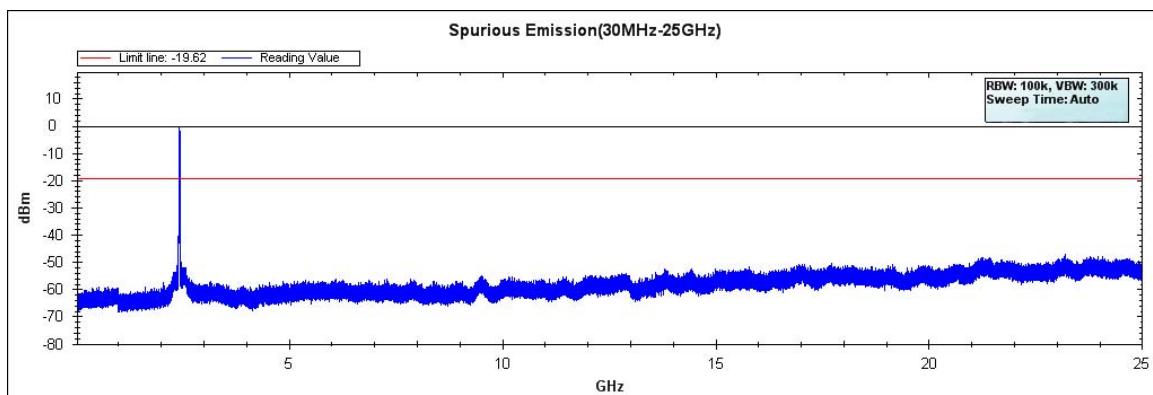


Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps

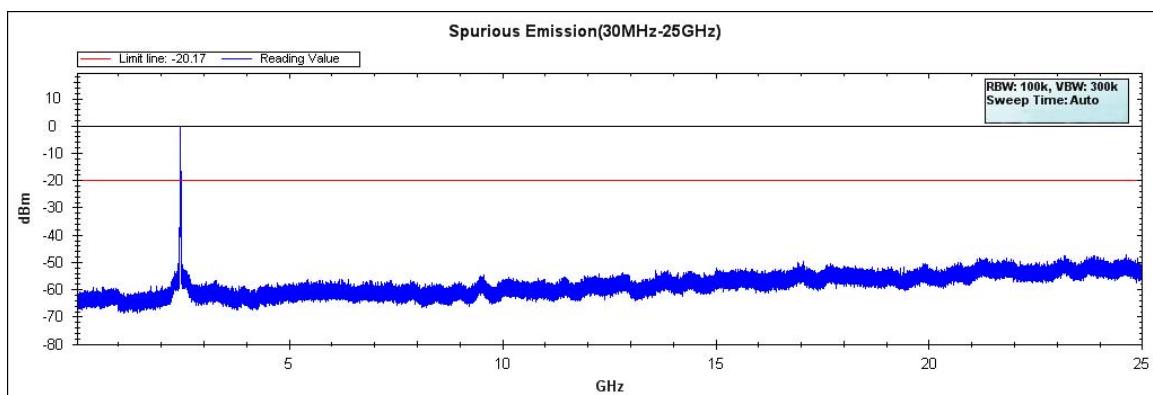
Channel 01 (2412MHz) 30MHz -25GHz



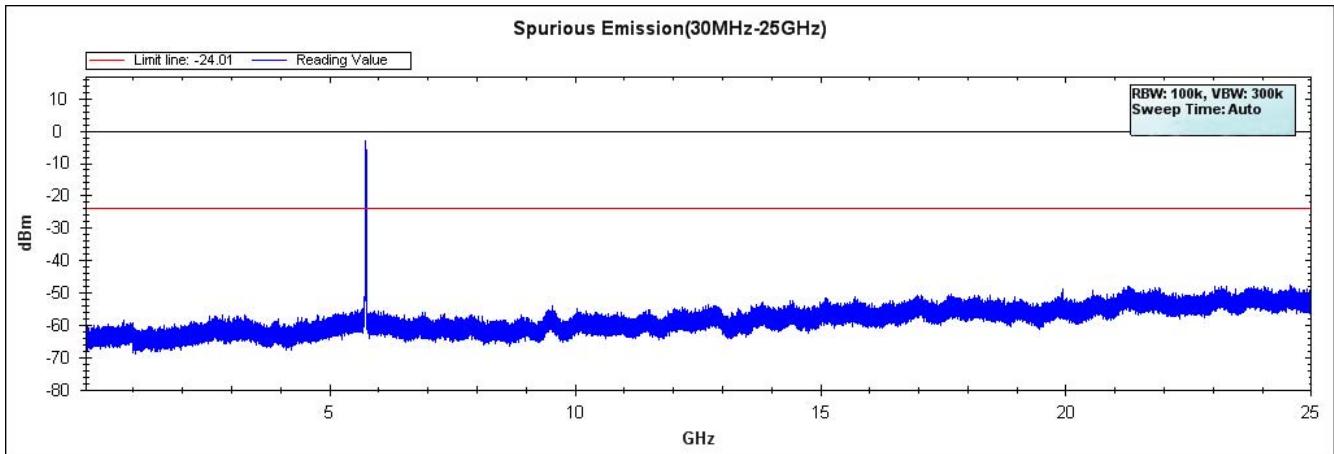
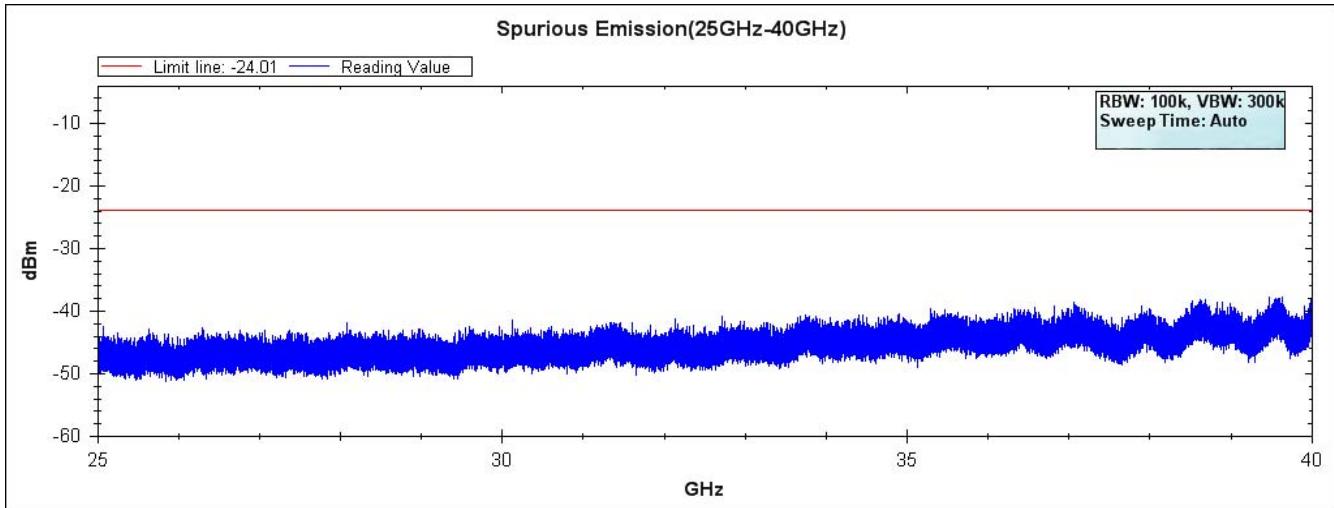
Channel 06 (2437MHz) 30MHz -25GHz



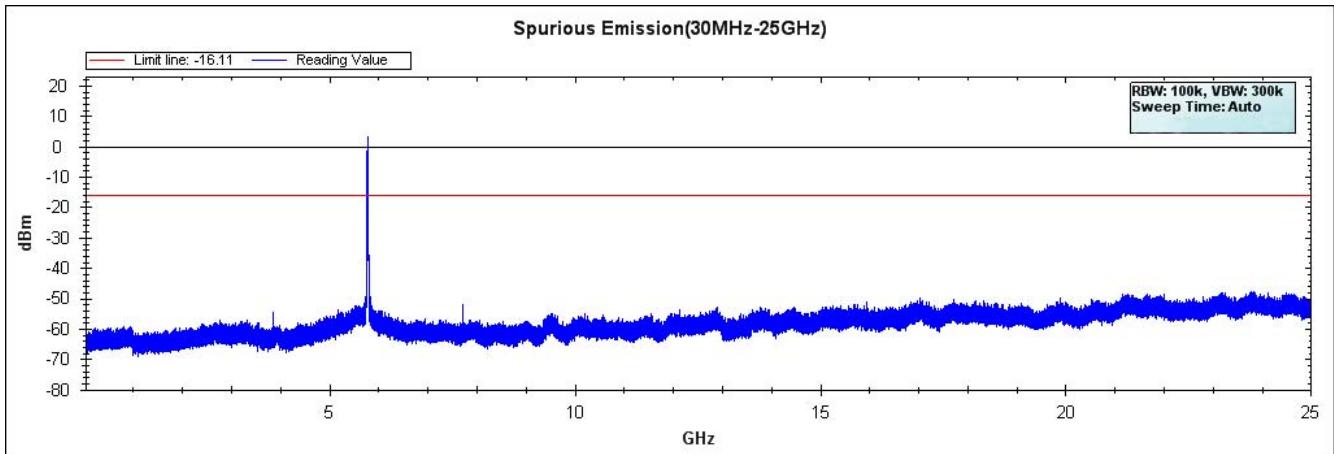
Channel 11 (2462MHz) 30MHz -25GHz



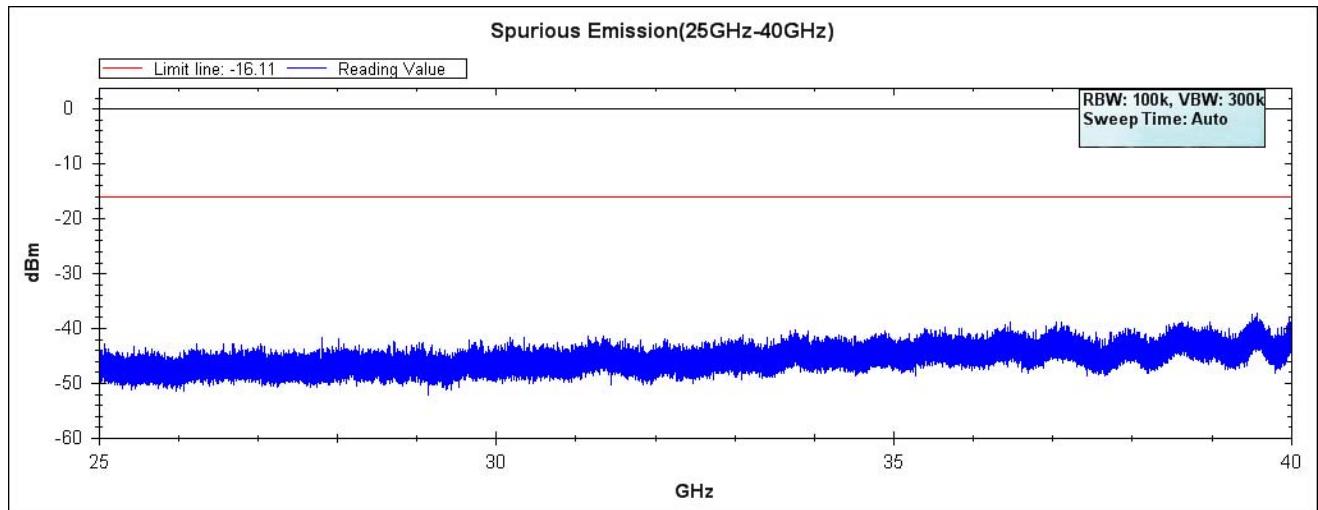
Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
Test Item : RF Antenna Conducted Spurious
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit - 802.11a 6Mbps

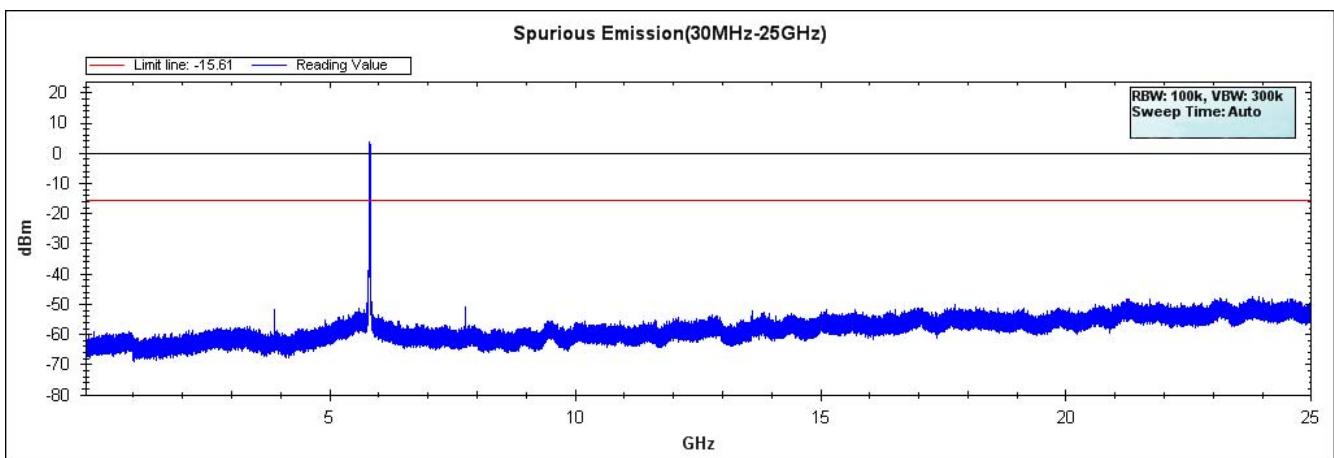
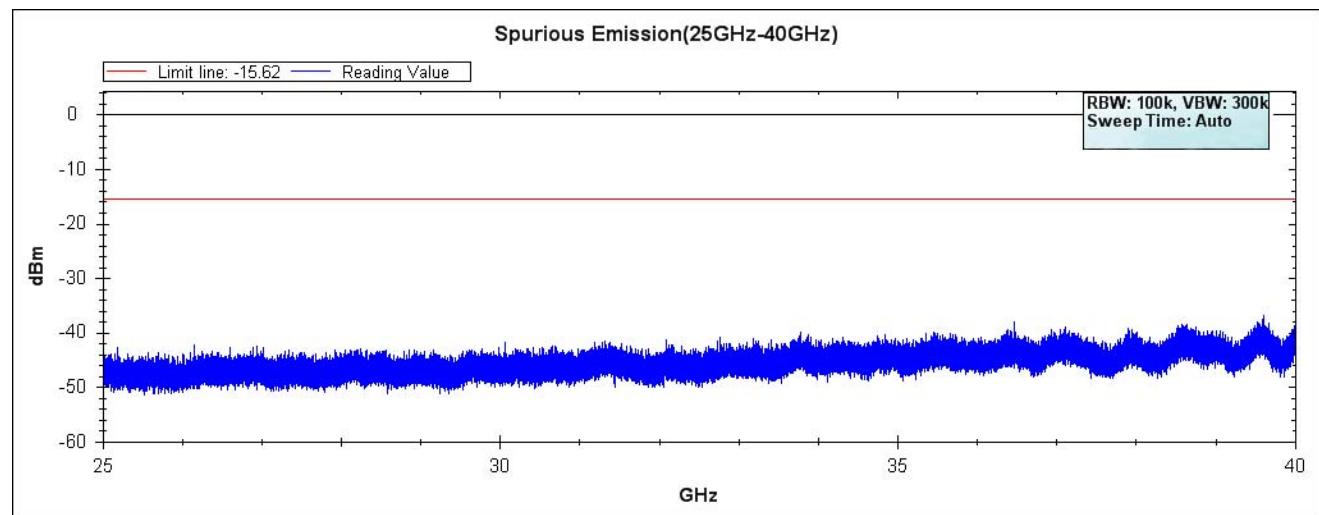
Channel 149 (5745MHz) 30MHz -25GHz**Channel 149 (5745MHz) 25GHz -40GHz**

Channel 157 (5785MHz) 30MHz -25GHz



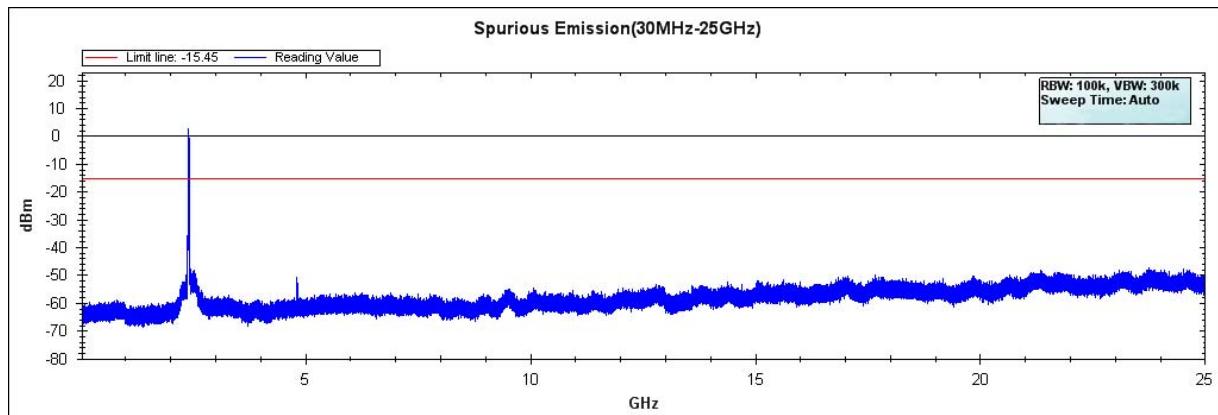
Channel 157 (5785MHz) 25GHz -40GHz



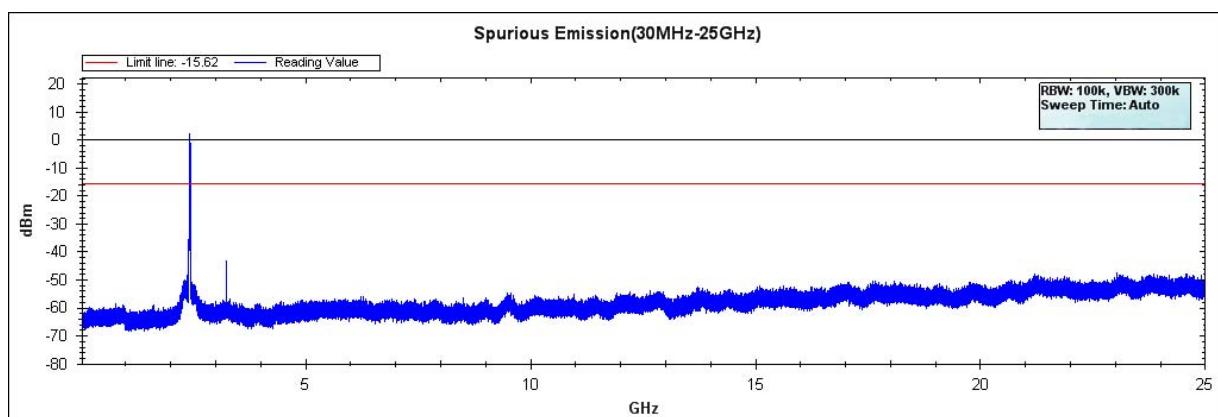
Channel 165 (5825MHz) 30MHz -25GHz**Channel 165 (5825MHz) 25GHz -40GHz**

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
Test Item : RF Antenna Conducted Spurious
Test Site : No.3 OATS
Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band)

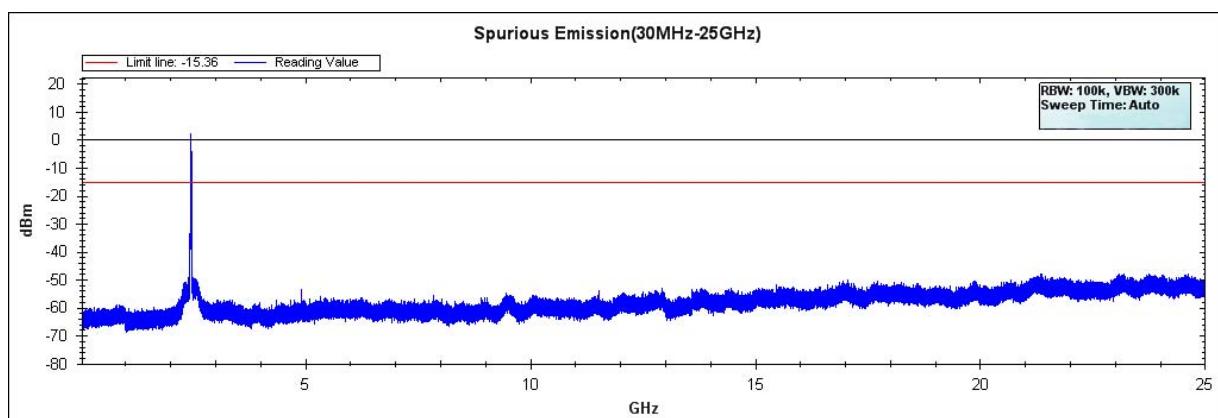
Channel 01 (2412MHz) 30MHz -25GHz-Chain A

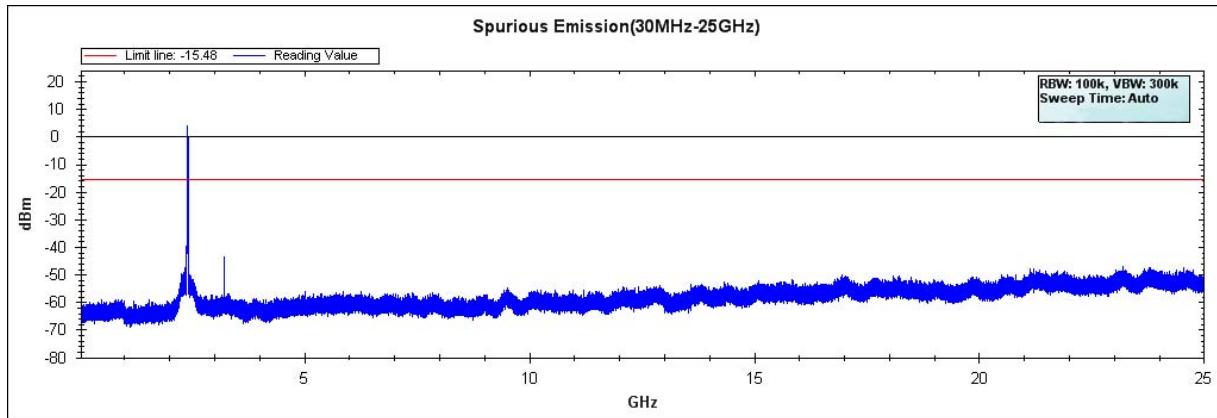
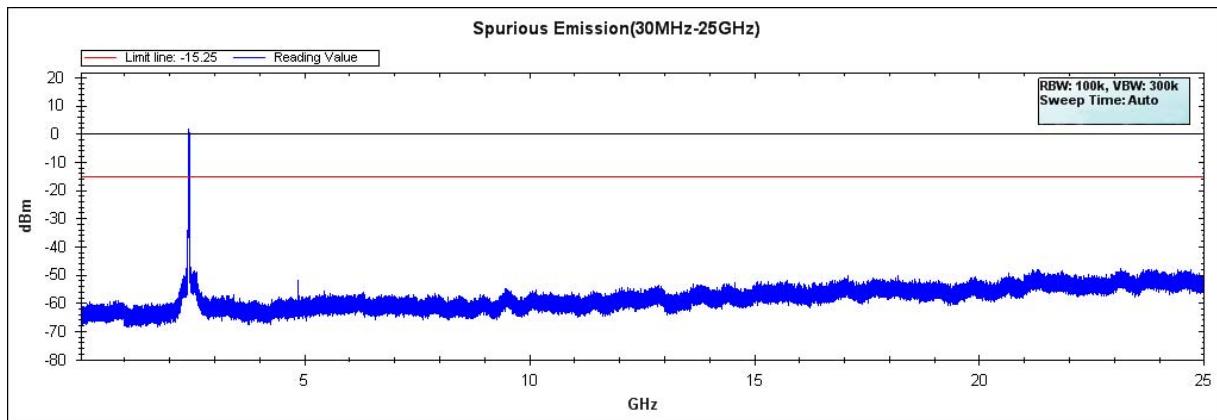
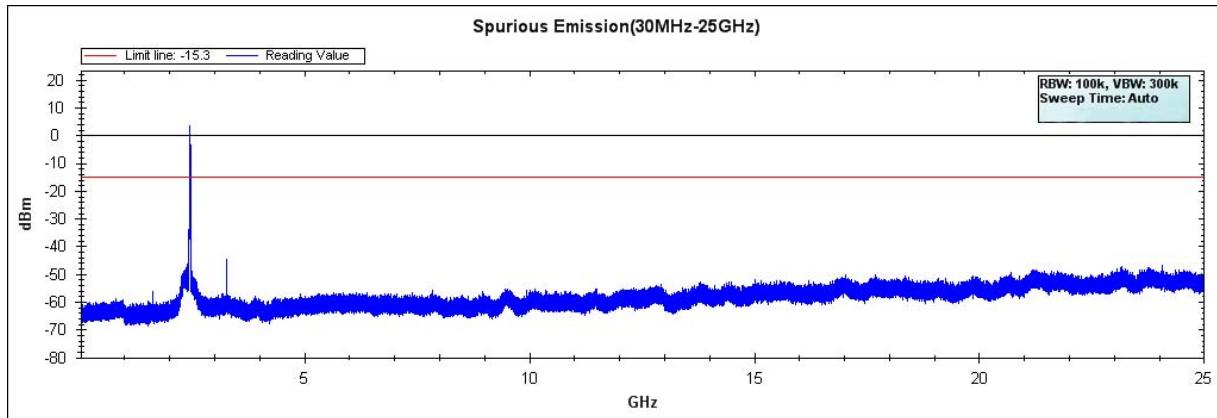


Channel 06 (2437MHz) 30MHz -25GHz-Chain A



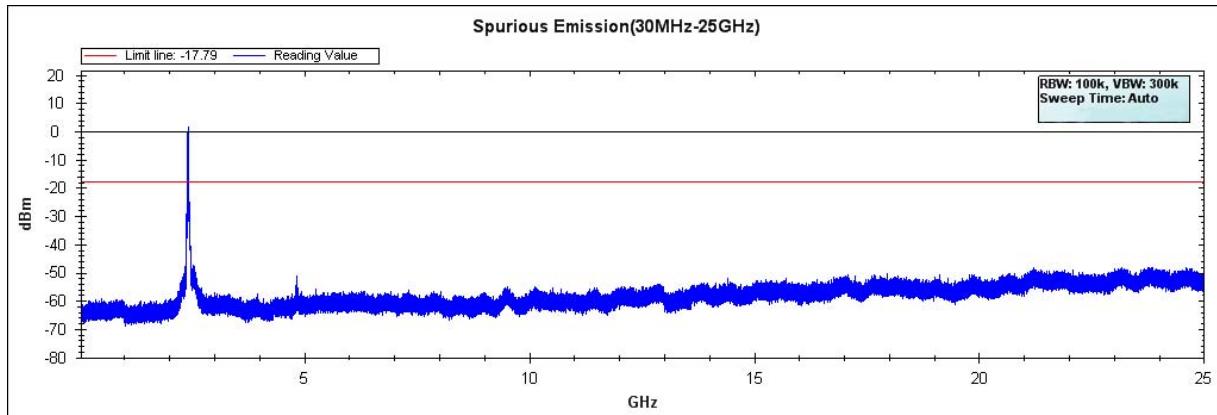
Channel 11 (2462MHz) 30MHz -25GHz-Chain A



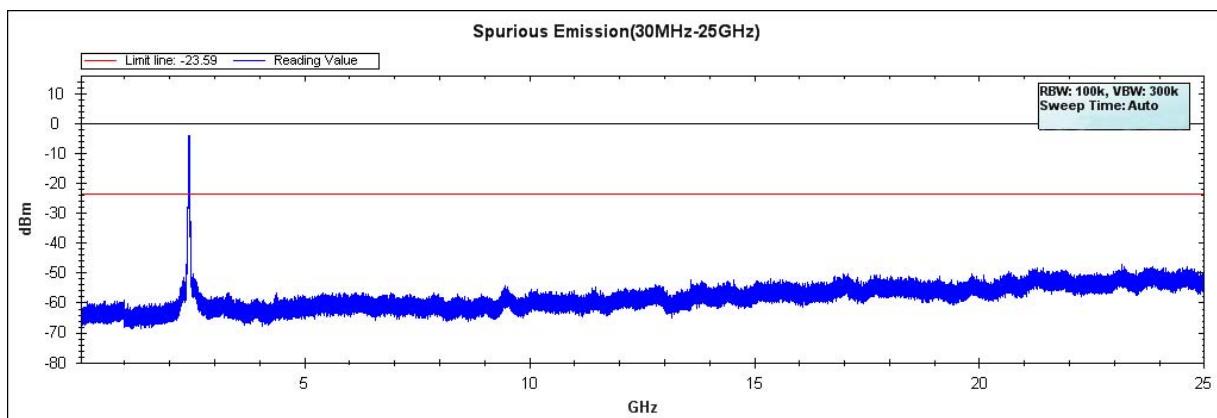
Channel 01 (2412MHz) 30MHz -25GHz-Chain B**Channel 06 (2437MHz) 30MHz -25GHz-Chain B****Channel 11 (2462MHz) 30MHz -25GHz-Chain B**

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
Test Item : RF Antenna Conducted Spurious
Test Site : No.3 OATS
Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)

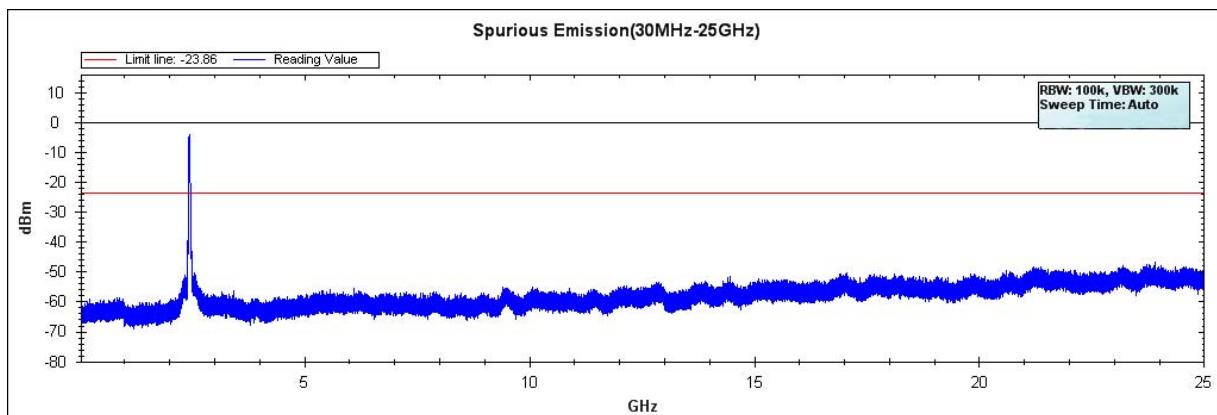
Channel 03 (2422MHz) 30MHz -25GHz-Chain A

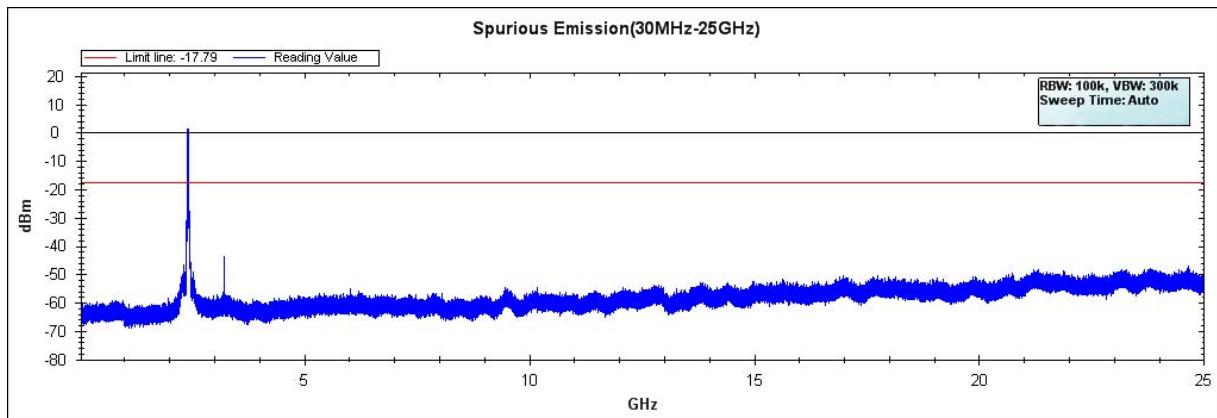
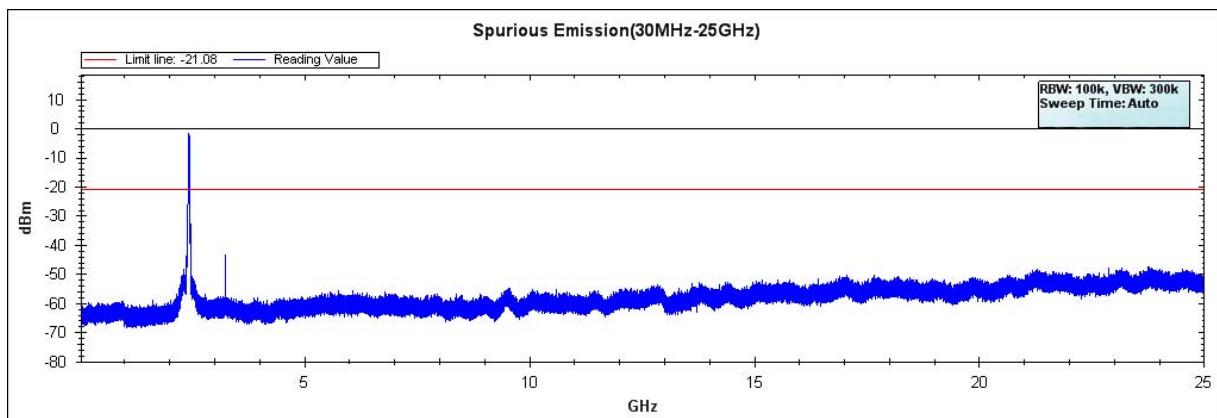
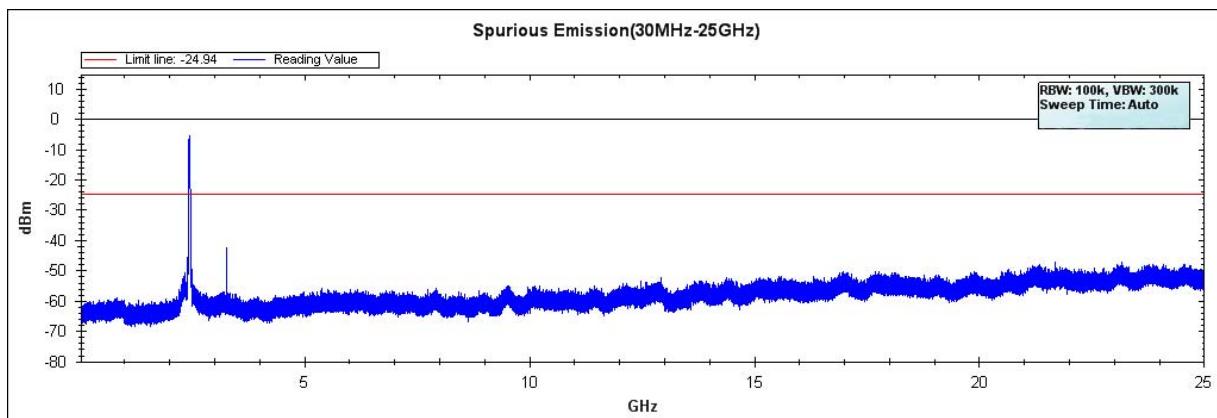


Channel 06 (2437MHz) 30MHz -25GHz-Chain A

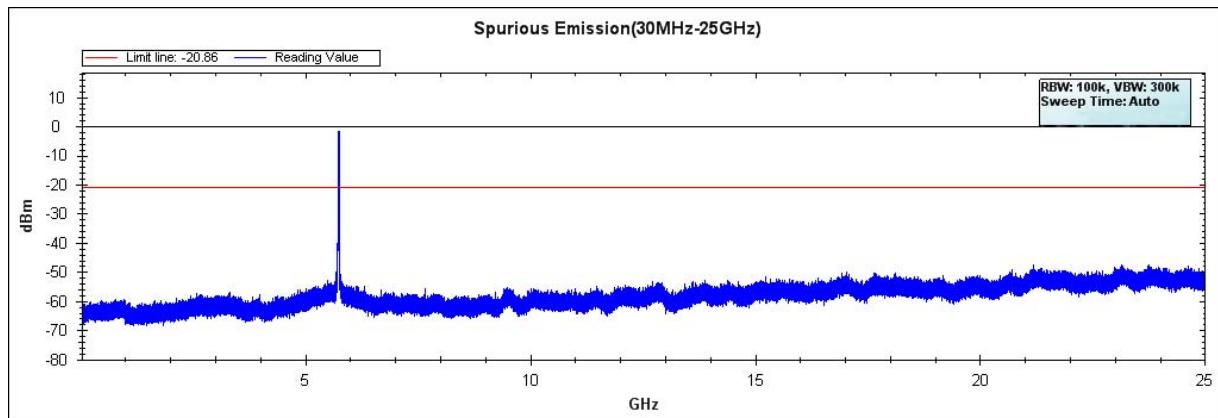
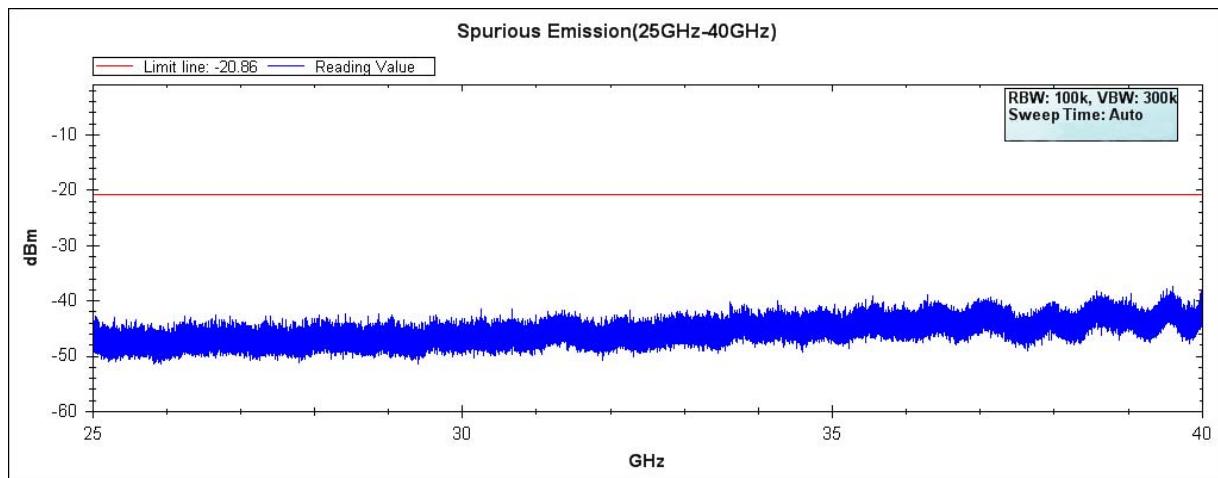


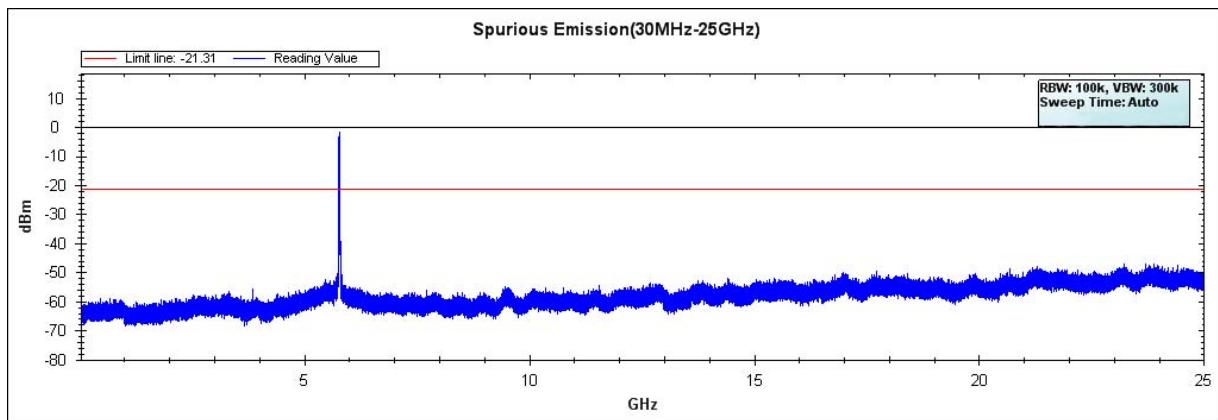
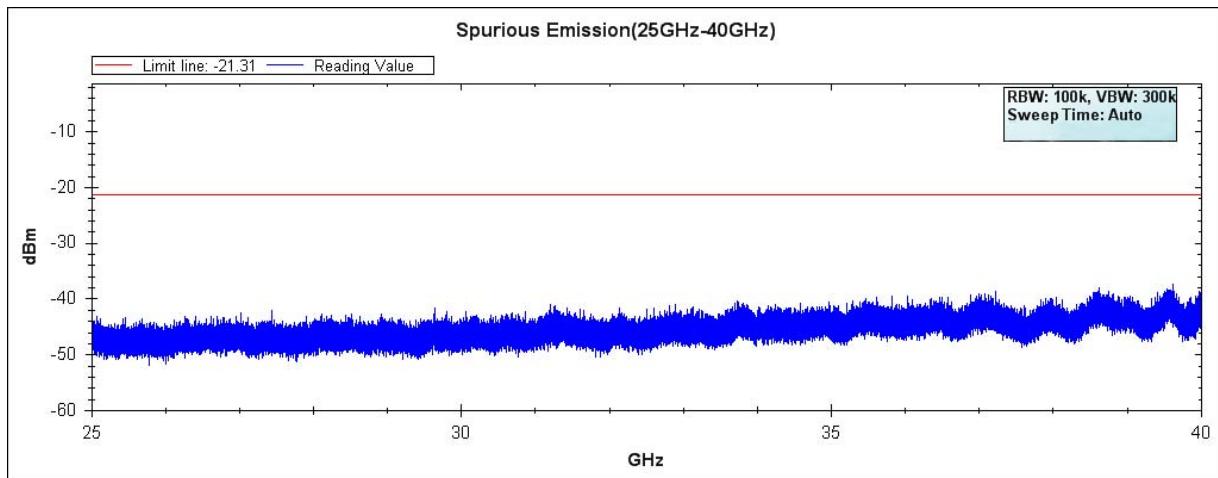
Channel 09 (2452MHz) 30MHz -25GHz-Chain A

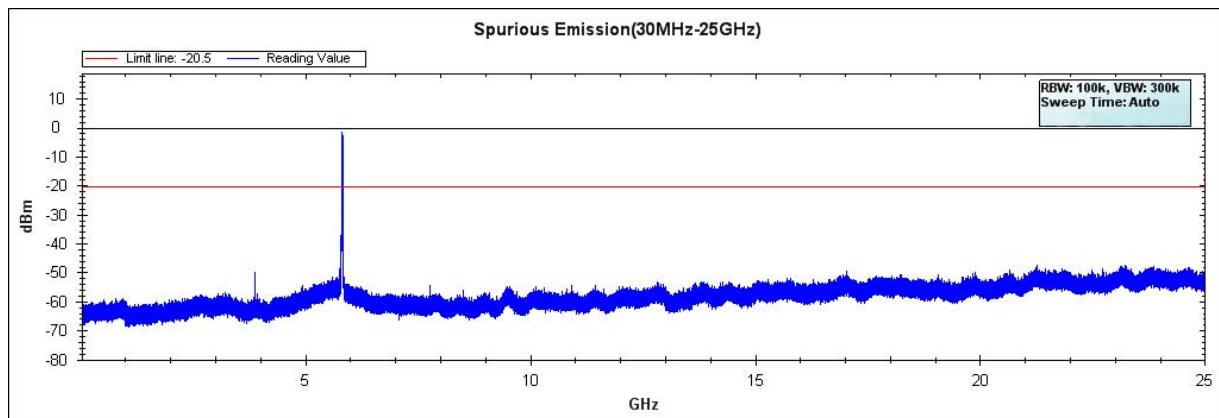
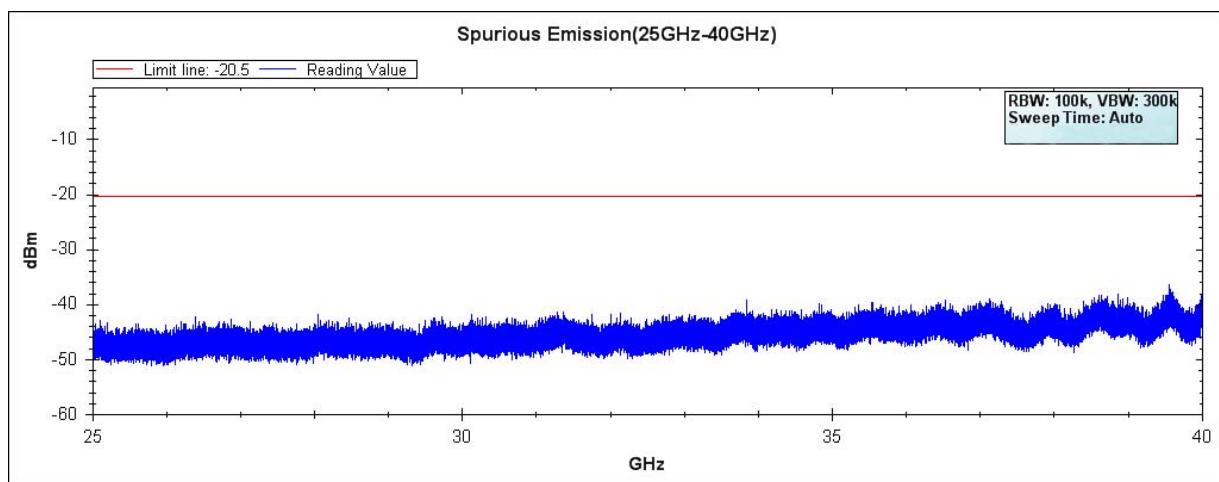


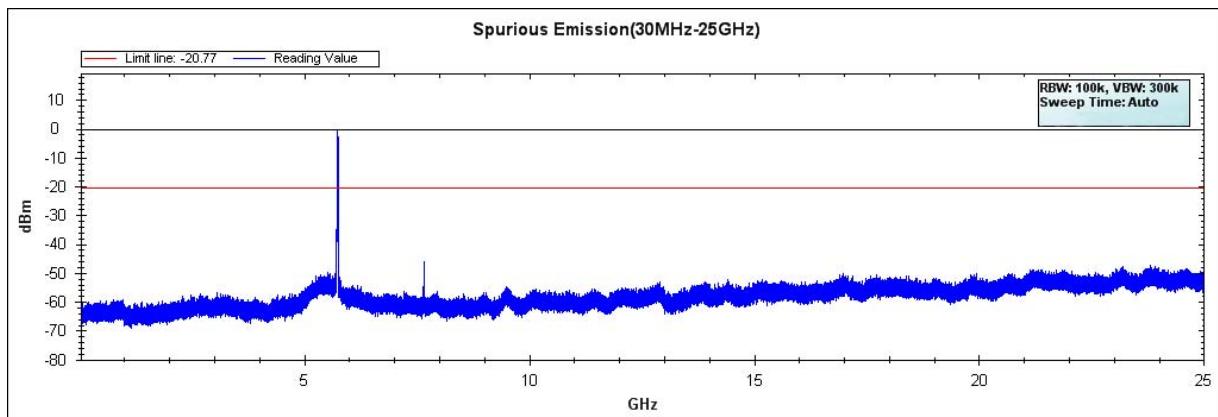
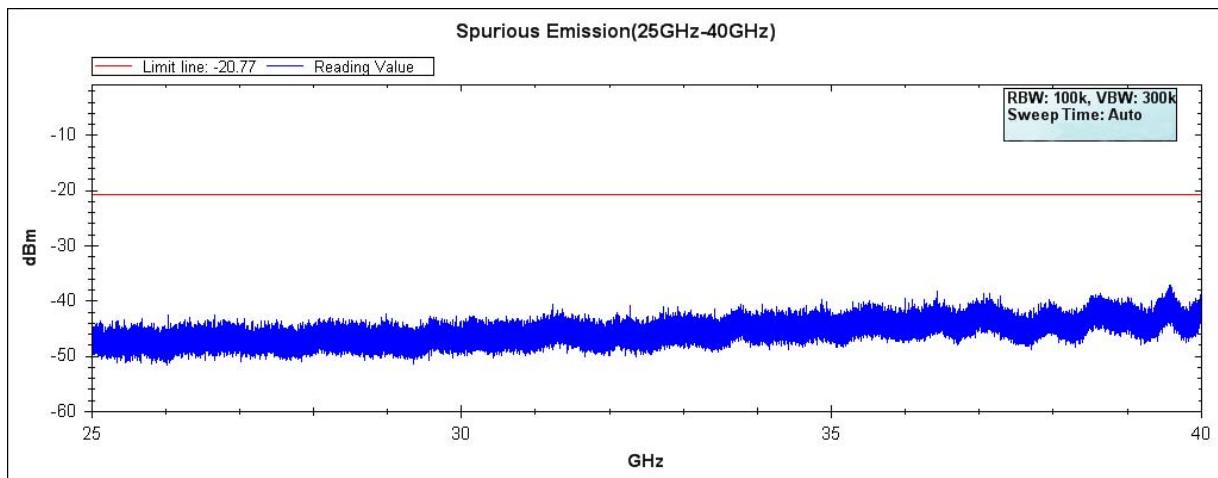
Channel 03 (2422MHz) 30MHz -25GHz-Chain B**Channel 06 (2437MHz) 30MHz -25GHz-Chain B****Channel 09 (2452MHz) 30MHz -25GHz-Chain B**

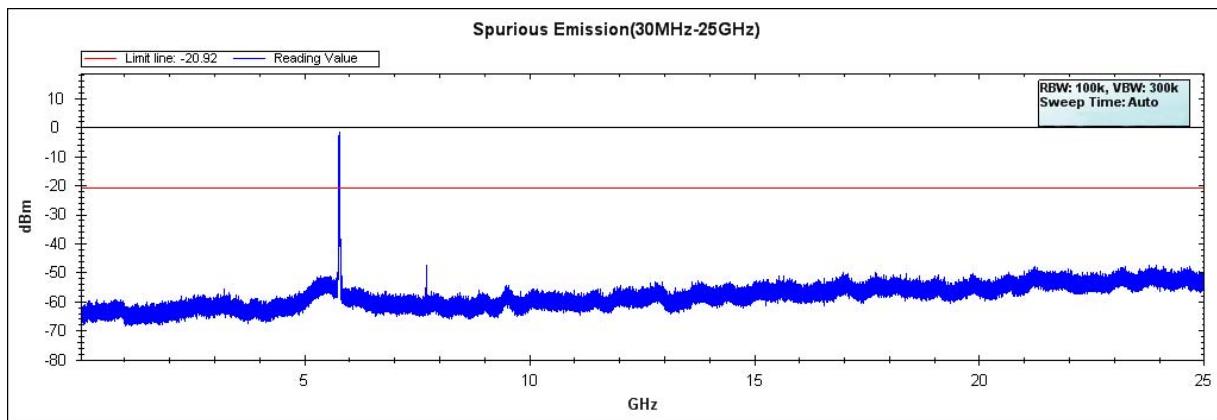
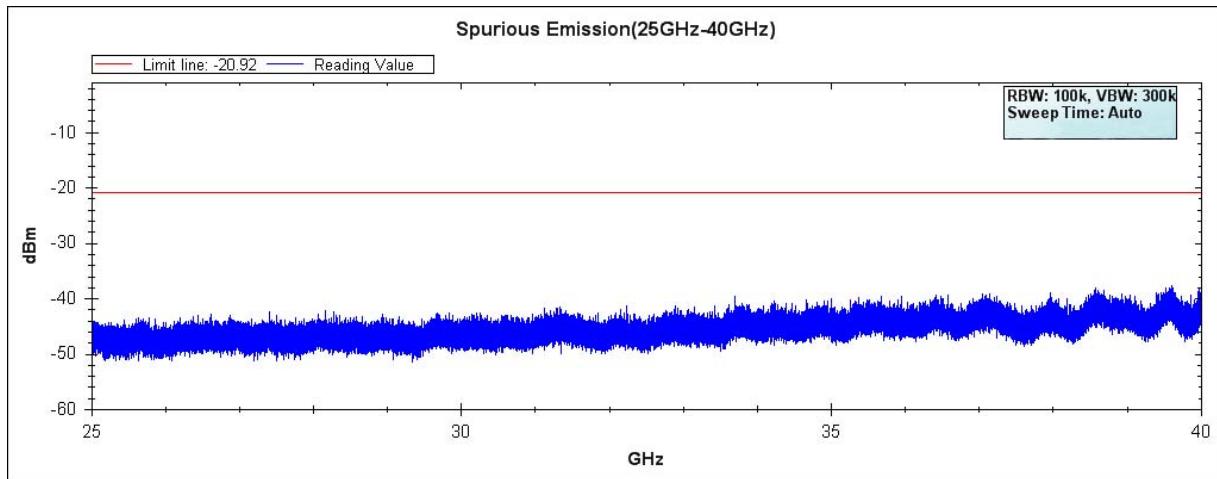
Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
Test Item : RF Antenna Conducted Spurious
Test Site : No.3 OATS
Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

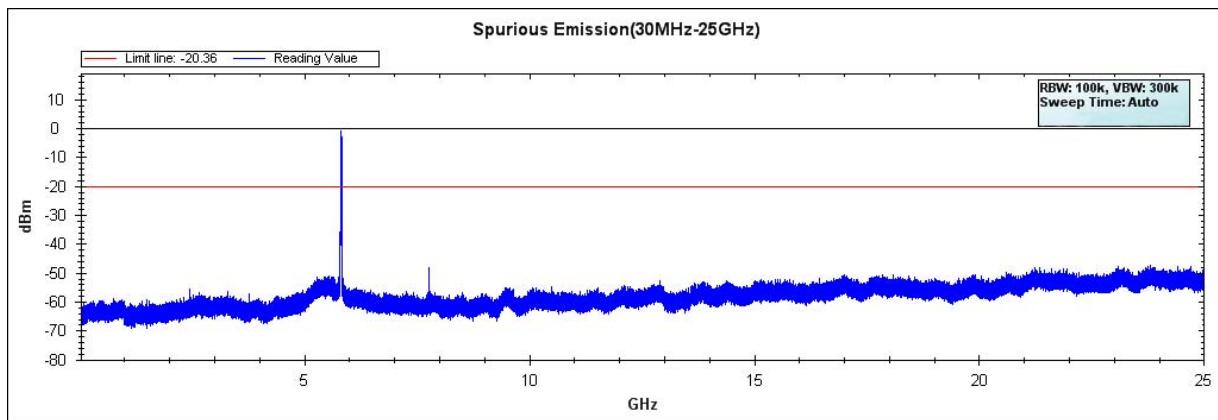
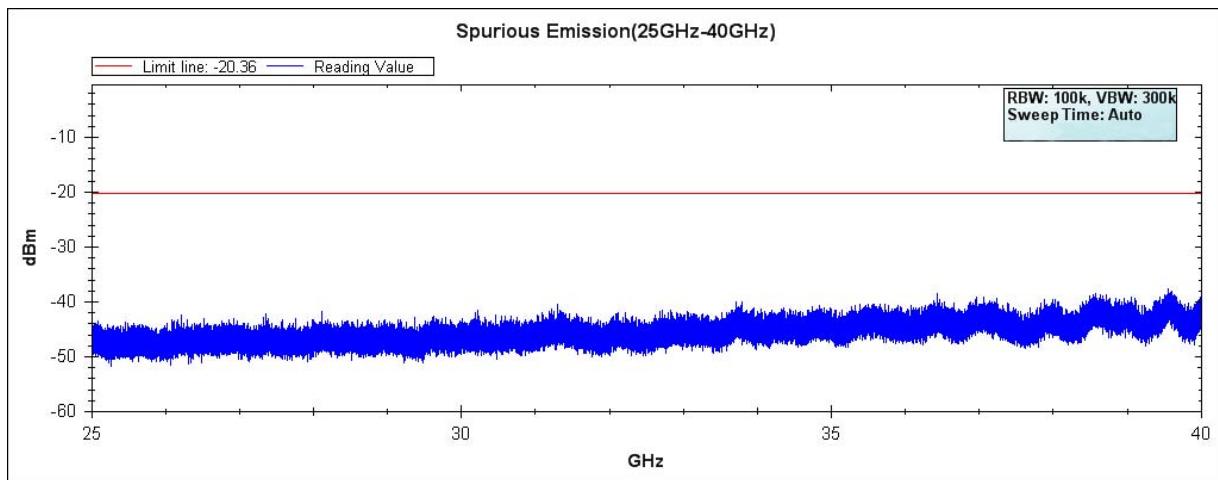
Channel 149 (5745MHz) 30MHz -25GHz-Chain A**Channel 149 (5745MHz) 25GHz -40GHz-Chain A**

Channel 157 (5785MHz) 30MHz -25GHz-Chain A**Channel 157 (5785MHz) 25GHz -40GHz-Chain A**

Channel 165 (5825MHz) 30MHz -25GHz-Chain A**Channel 165 (5825MHz) 25GHz -40GHz-Chain A**

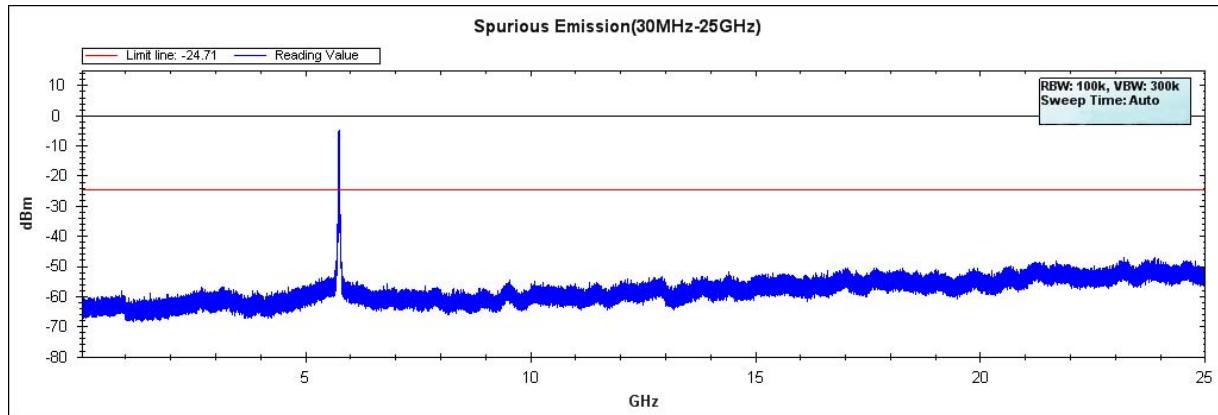
Channel 149 (5745MHz) 30MHz -25GHz-Chain B**Channel 149 (5745MHz) 25GHz -40GHz-Chain B**

Channel 157 (5785MHz) 30MHz -25GHz-Chain B**Channel 157 (5785MHz) 25GHz -40GHz-Chain B**

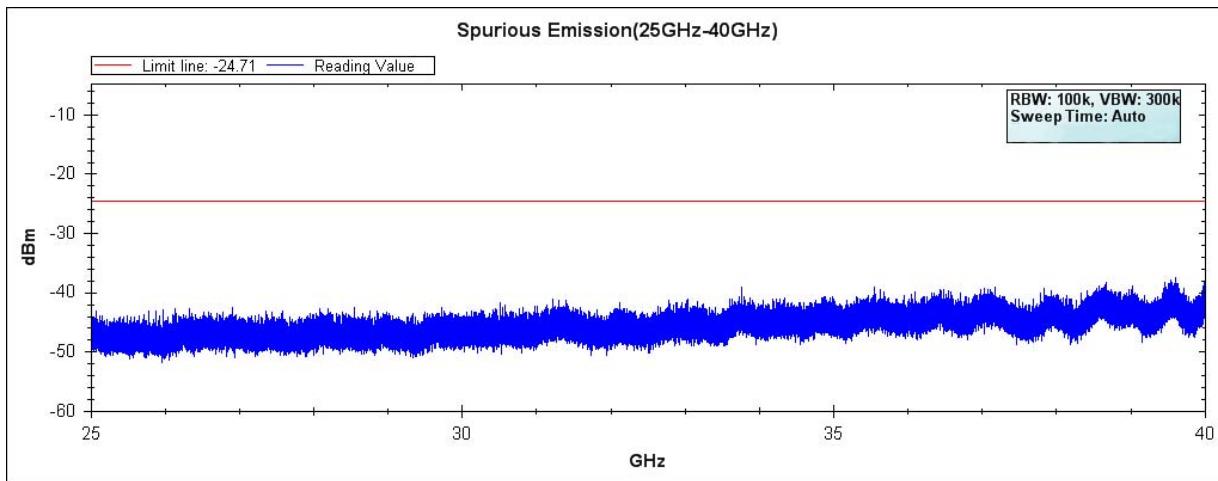
Channel 165 (5825MHz) 30MHz -25GHz-Chain B**Channel 165 (5825MHz) 25GHz -40GHz-Chain B**

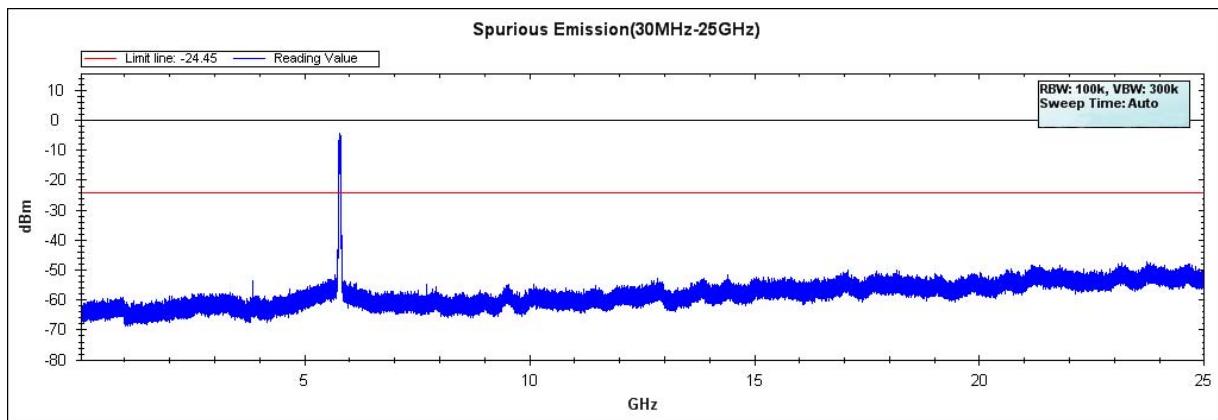
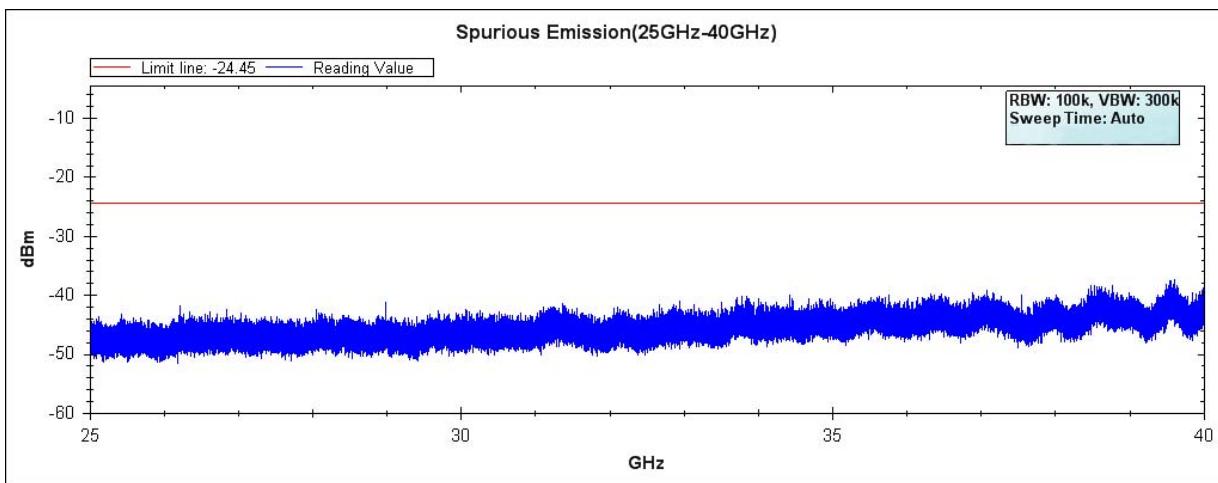
Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
Test Item : RF Antenna Conducted Spurious
Test Site : No.3 OATS
Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

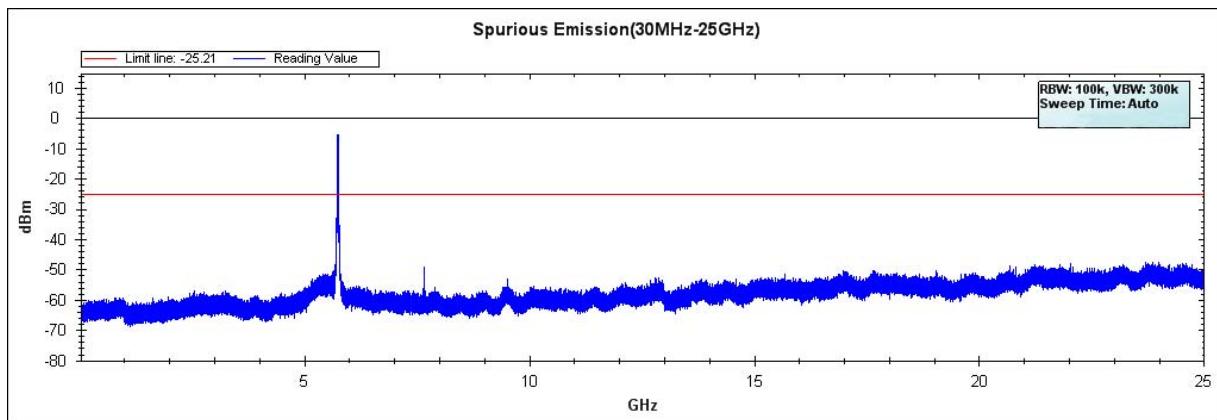
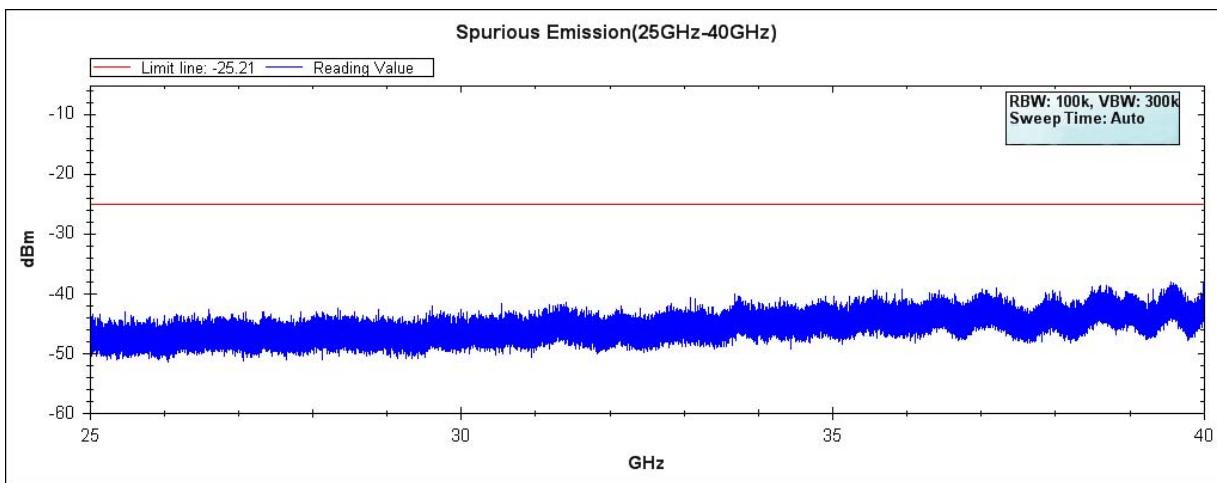
Channel 151 (5755MHz) 30MHz -25GHz-Chain A

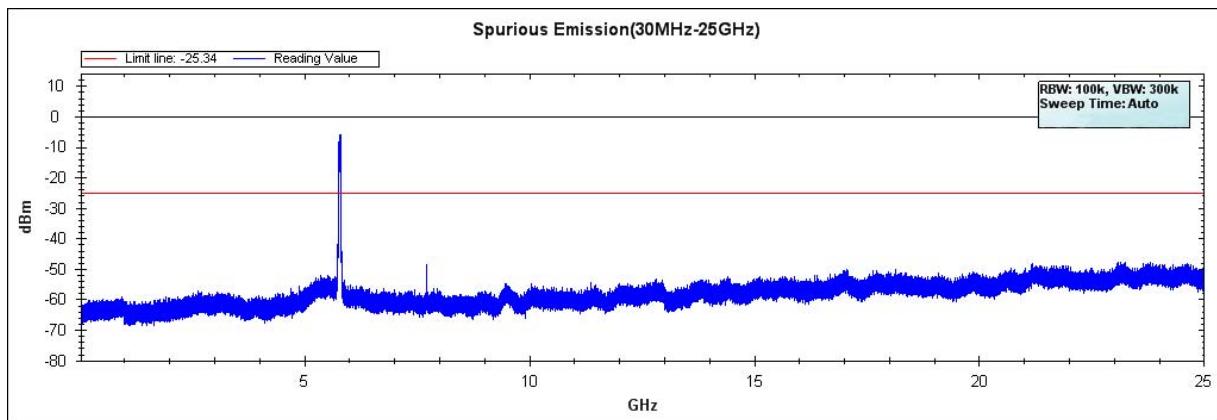
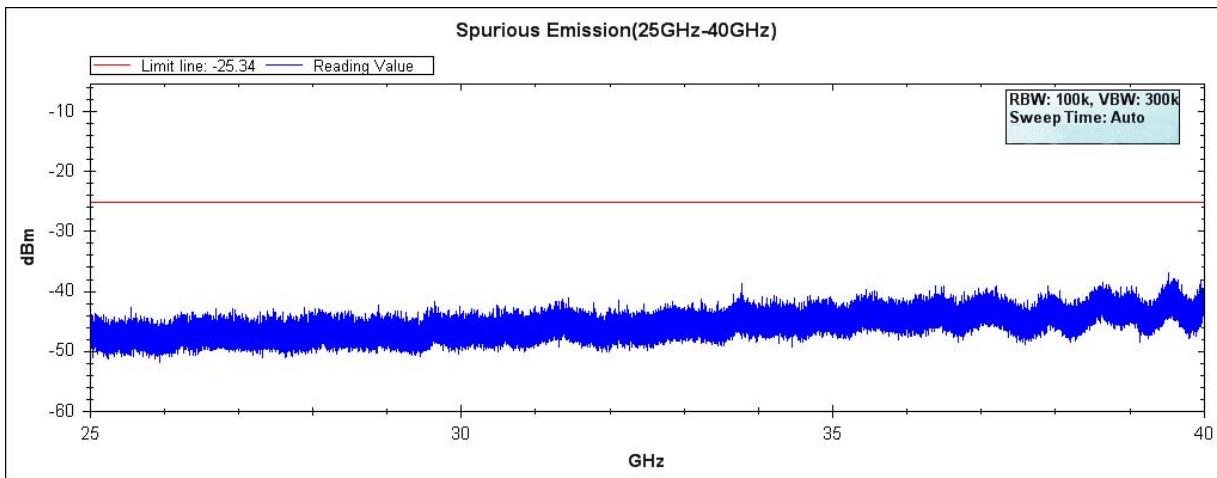


Channel 151 (5755MHz) 25GHz -40GHz-Chain A



Channel 159 (5795MHz) 30MHz -25GHz-Chain A**Channel 159 (5795MHz) 25GHz -40GHz-Chain A**

Channel 151 (5755MHz) 30MHz -25GHz-Chain B**Channel 151 (5755MHz) 25GHz -40GHz-Chain B**

Channel 159 (5795MHz) 30MHz -25GHz-Chain B**Channel 159 (5795MHz) 25GHz -40GHz-Chain B**

6. Band Edge

6.1. Test Equipment

RF Conducted Measurement

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

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

Note:

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

RF Radiated Measurement:

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

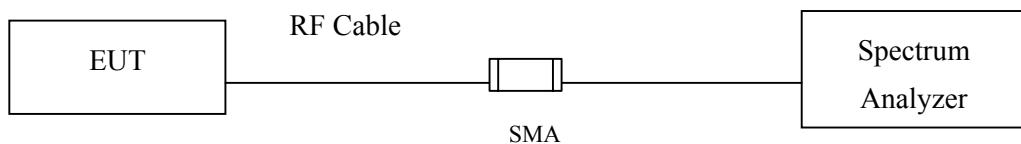
Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2013
	X Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2013
	Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2013
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X Coaxial Cable	QuiTek	QTK-CABLE/ CAB5	Feb., 2013
	X Controller	QuiTek	QTK-CONTROLLER/ CTRL3	N/A
	X Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note:

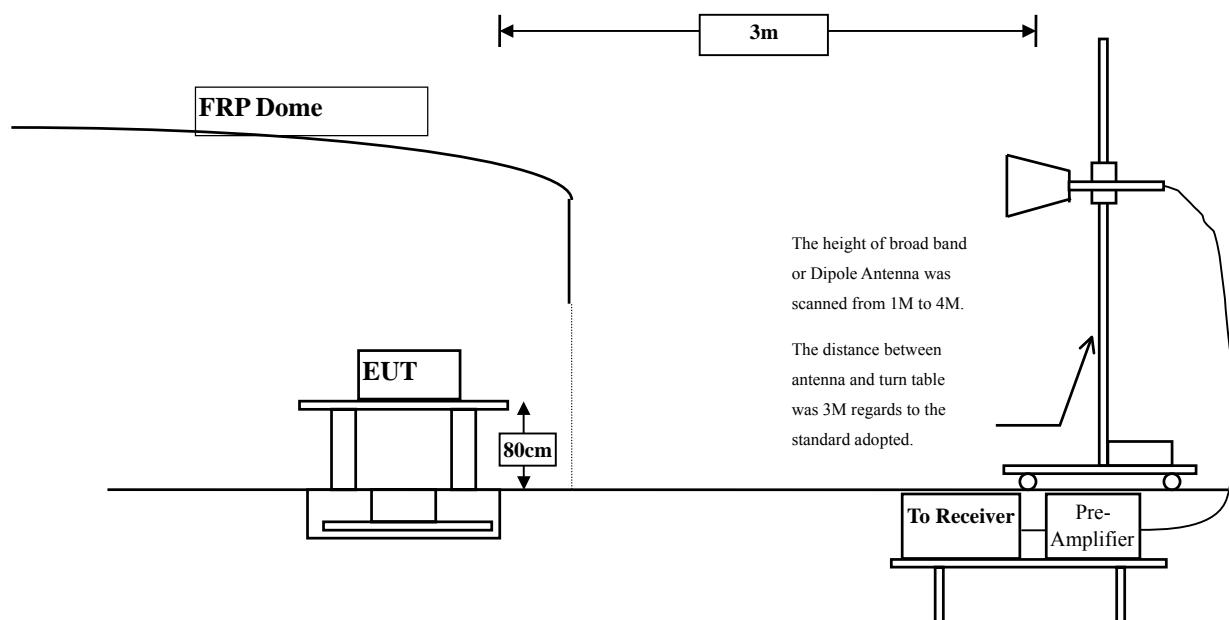
1. All instruments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

6.2. Test Setup

RF Conducted Measurement



RF Radiated Measurement:



6.3. Limits

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

6.4. Test Procedure

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

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

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

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

6.6. Test Result of Band Edge

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2390.000	31.509	24.519	56.028	74.00	54.00	Pass
01 (Peak)	2413.000	31.646	72.996	104.642	--	--	Pass
01 (Average)	2390.000	31.509	12.945	44.454	74.00	54.00	Pass
01 (Average)	2414.800	31.660	69.504	101.164	--	--	Pass

Figure Channel 01:

Horizontal (Peak)

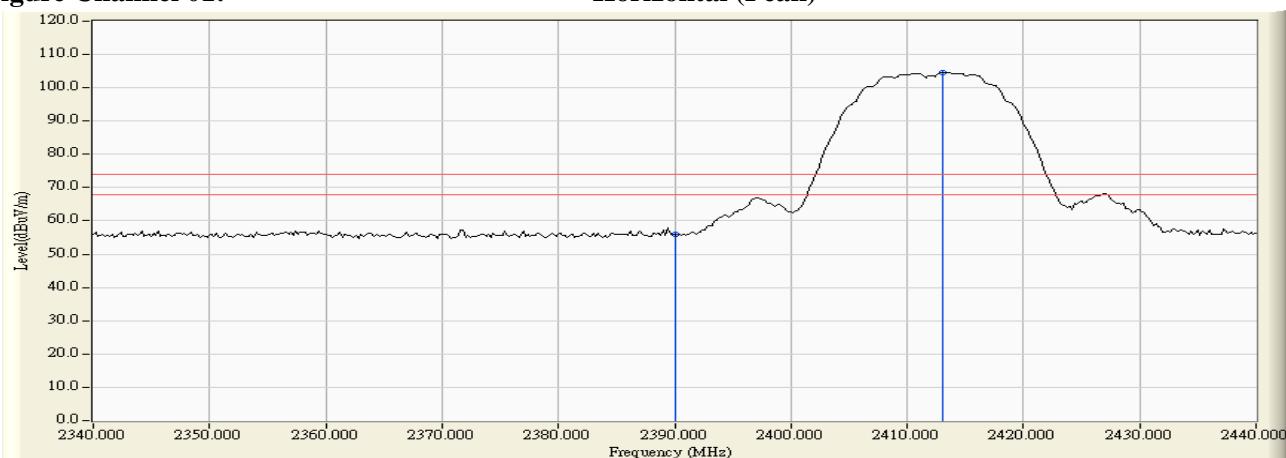
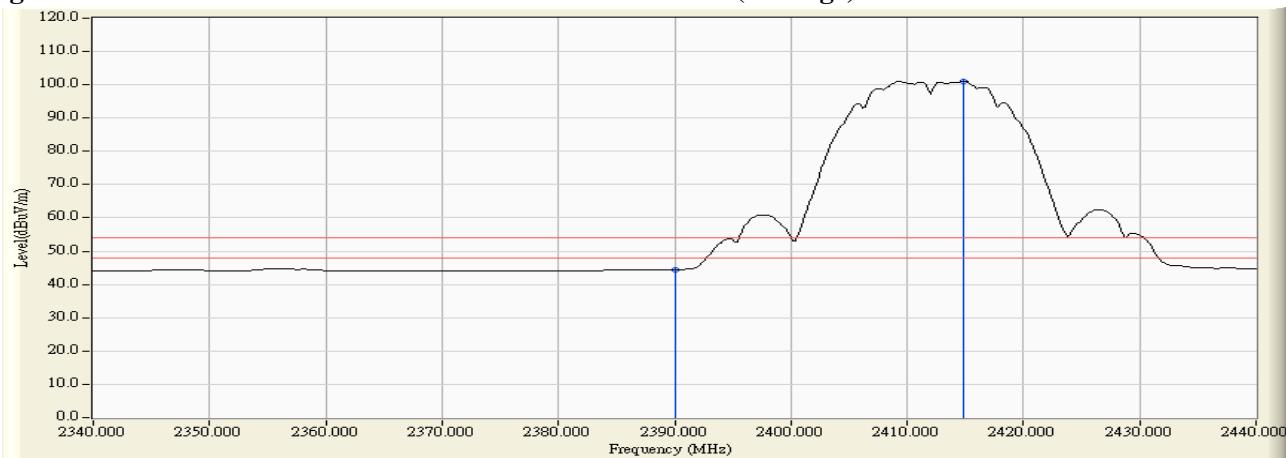


Figure Channel 01:

Horizontal (Average)



Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2390.000	30.915	23.509	54.424	74.00	54.00	Pass
01 (Peak)	2413.000	30.956	66.003	96.959	--	--	Pass
01 (Average)	2390.000	30.915	12.271	43.186	74.00	54.00	Pass
01 (Average)	2414.800	30.968	62.539	93.507	--	--	Pass

Figure Channel 01:

Vertical (Peak)

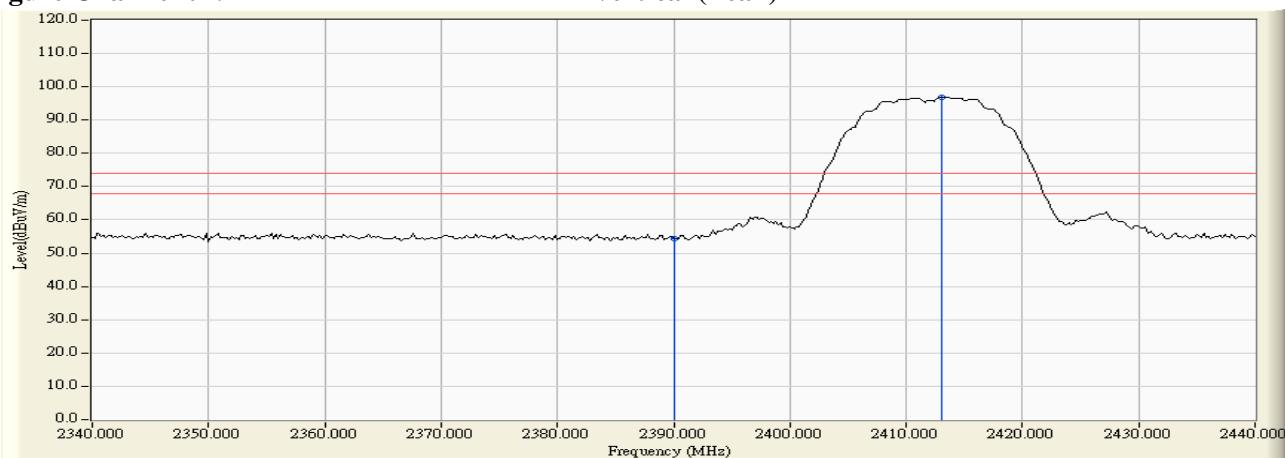
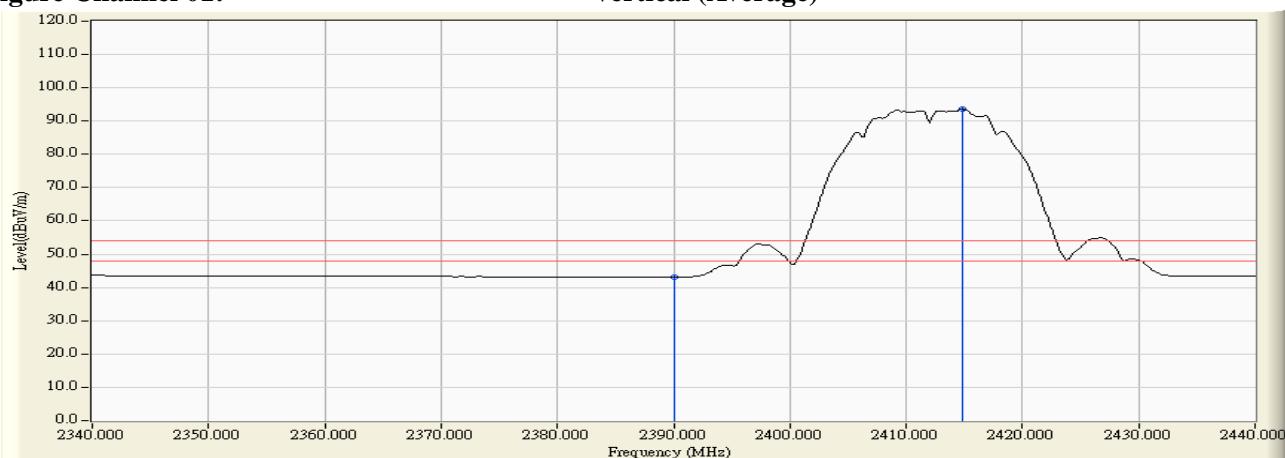


Figure Channel 01:

Vertical (Average)



Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2462.900	32.026	75.320	107.346	--	--	Pass
11 (Peak)	2483.500	32.182	25.946	58.128	74.00	54.00	Pass
11 (Average)	2464.700	32.039	70.506	102.546	--	--	Pass
11 (Average)	2483.500	32.182	13.867	46.049	74.00	54.00	Pass

Figure Channel 11:

Horizontal (Peak)

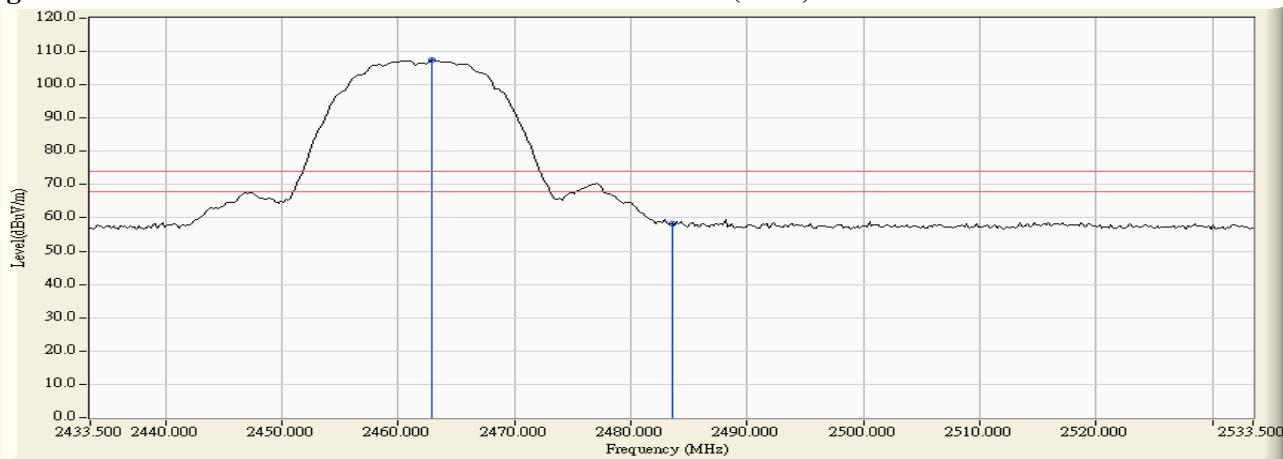
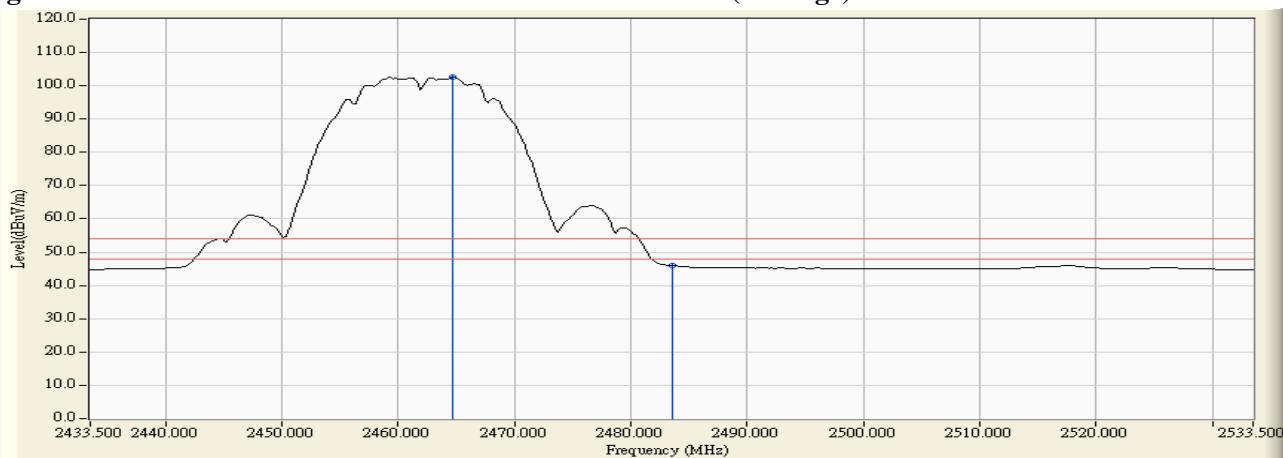


Figure Channel 11:

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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2462.900	31.296	65.885	97.181	--	--	Pass
11 (Peak)	2483.500	31.435	23.731	55.166	74.00	54.00	Pass
11 (Peak)	2485.100	31.446	25.833	57.279	74.00	54.00	
11 (Average)	2464.700	31.308	61.311	92.620	--	--	Pass
11 (Average)	2483.500	31.435	12.391	43.826	74.00	54.00	Pass

Figure Channel 11:

Vertical (Peak)

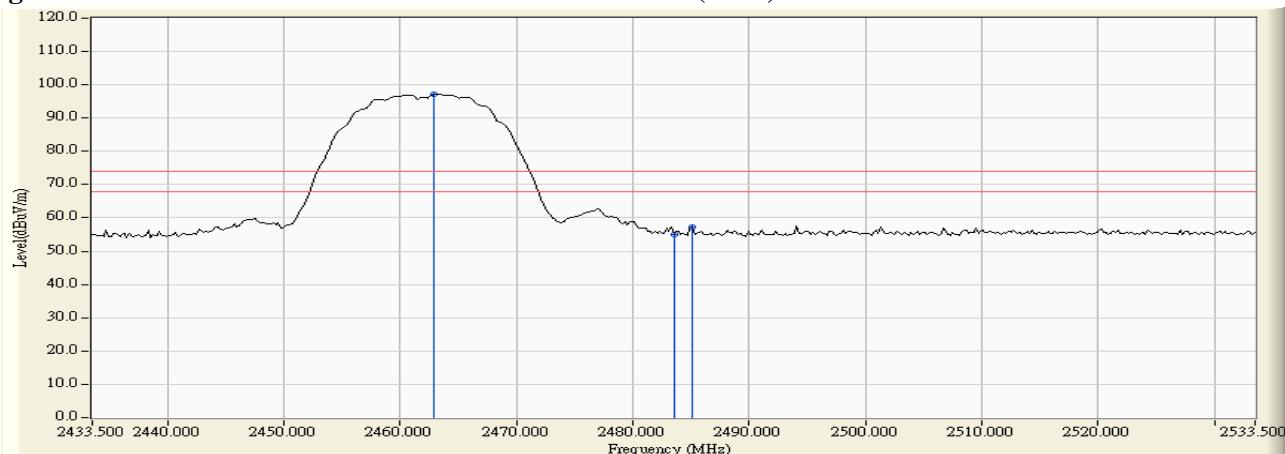
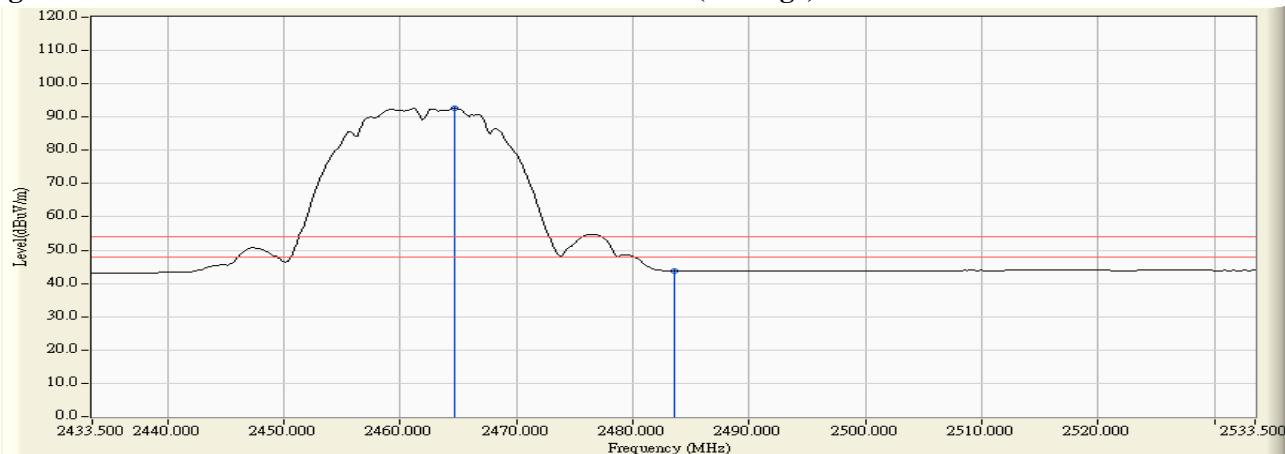


Figure Channel 11:

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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2389.800	31.508	32.200	63.708	74.00	54.00	Pass
01 (Peak)	2390.000	31.509	29.737	61.246	74.00	54.00	Pass
01 (Peak)	2407.200	31.606	74.957	106.563	--	--	Pass
01(Average)	2390.000	31.509	15.315	46.824	74.00	54.00	Pass
01(Average)	2415.600	31.665	58.168	89.834	--	--	Pass

Figure Channel 01:

Horizontal (Peak)

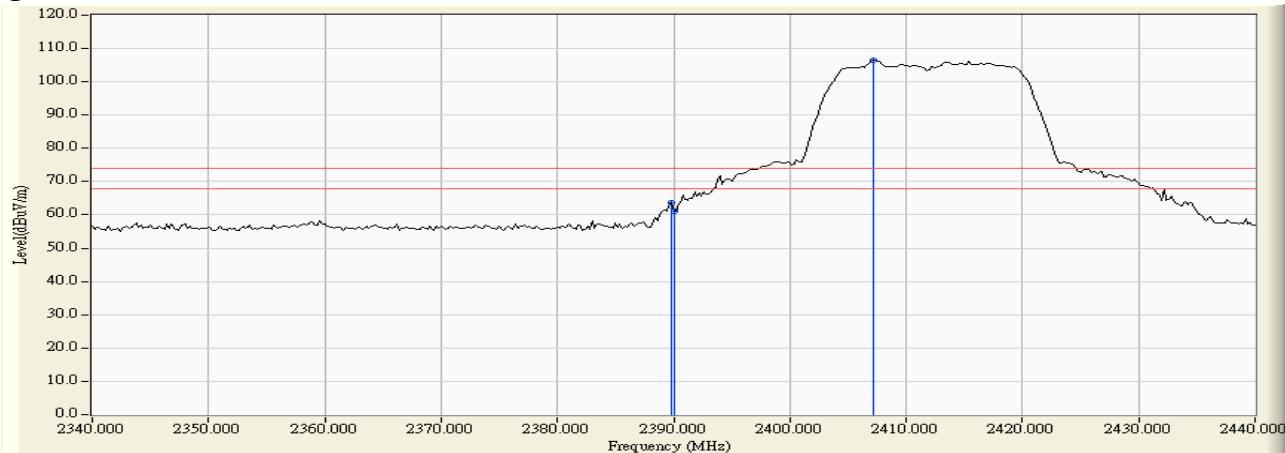
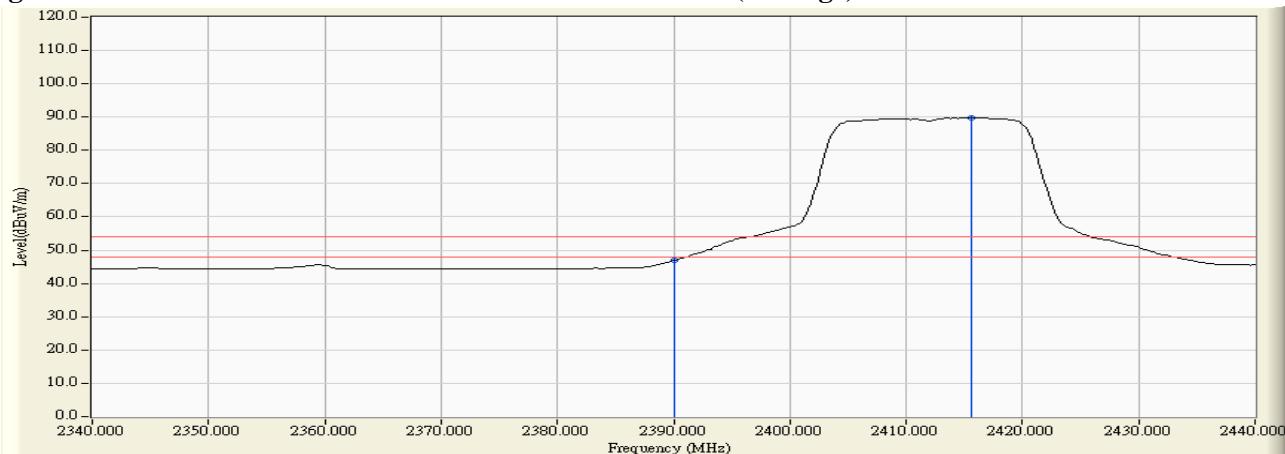


Figure Channel 01:

Horizontal (Average)



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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2389.000	30.920	26.679	57.599	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	25.595	56.510	74.00	54.00	Pass
01 (Peak)	2407.400	30.932	67.739	98.671	--	--	Pass
01 (Average)	2390.000	30.915	13.074	43.989	74.00	54.00	Pass
01 (Average)	2415.600	30.973	51.637	82.611	--	--	Pass

Figure Channel 01:

Vertical (Peak)

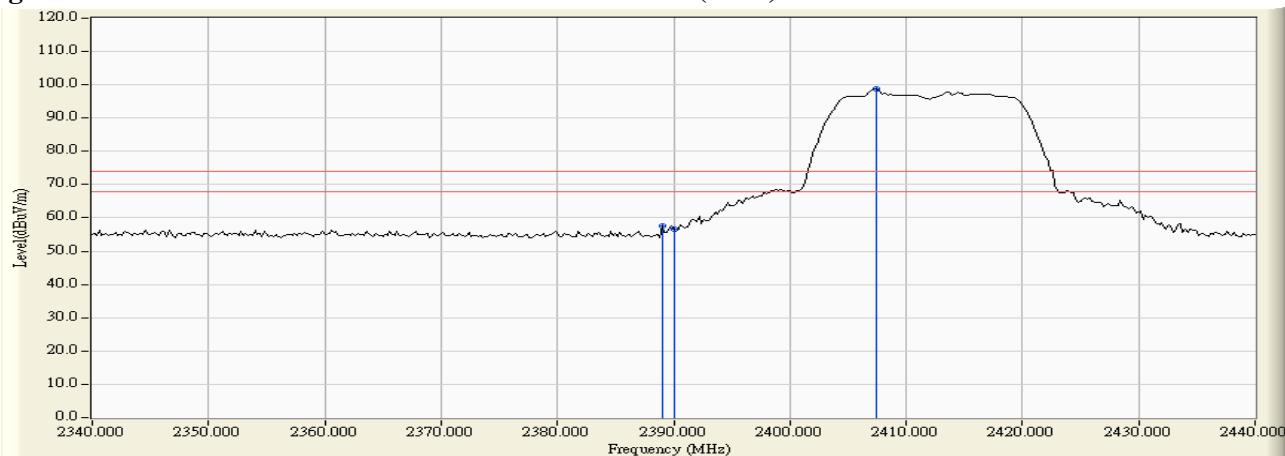
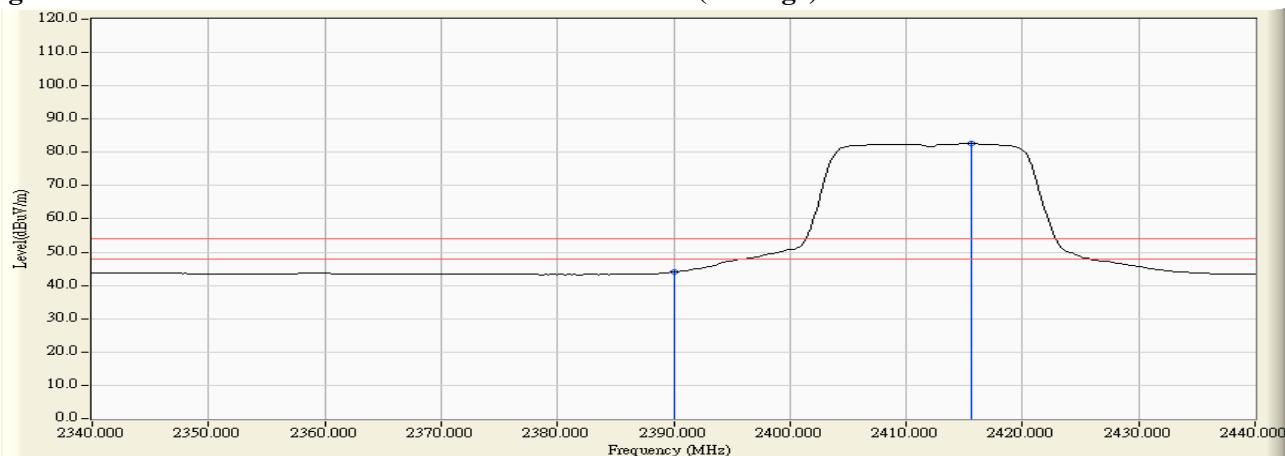


Figure Channel 01:

Vertical (Average)



Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2457.100	31.983	76.565	108.547	--	--	Pass
11 (Peak)	2483.500	32.182	36.024	68.206	74.00	54.00	Pass
11 (Average)	2463.700	32.032	59.401	91.433	--	--	Pass
11 (Average)	2483.500	32.182	16.285	48.467	74.00	54.00	Pass

Figure Channel 11:

Horizontal (Peak)

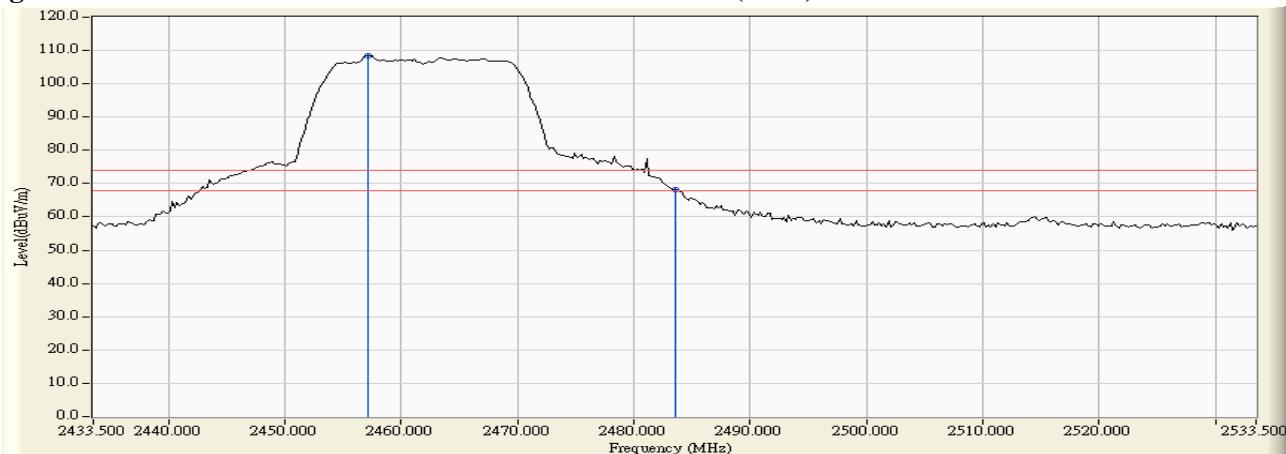
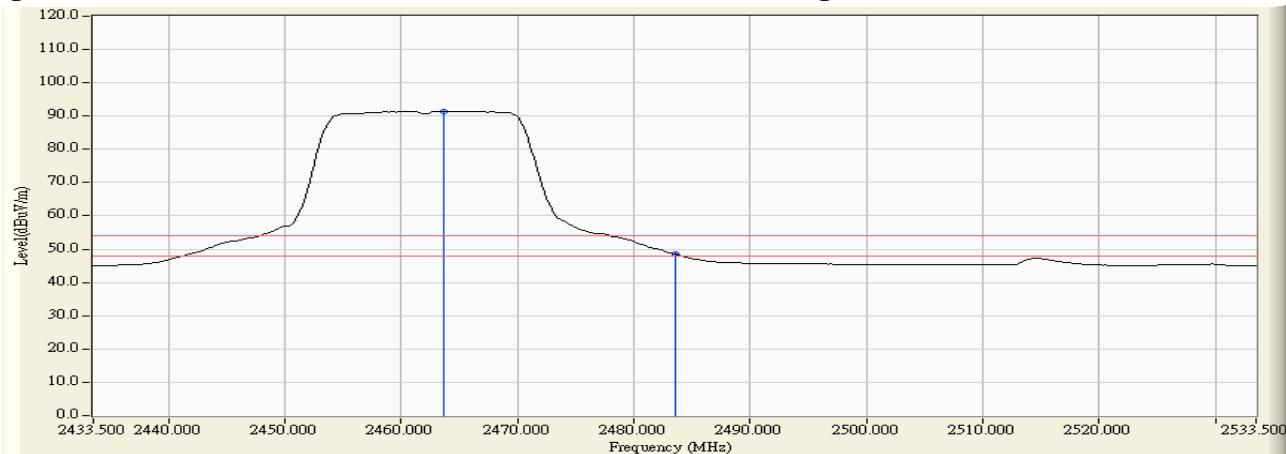


Figure Channel 11:

Horizontal (Average)



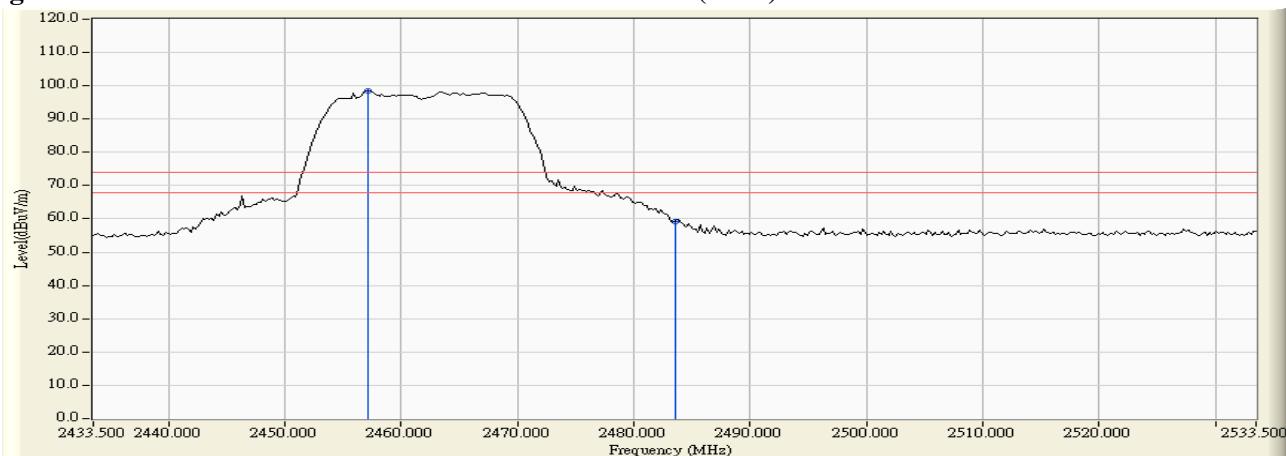
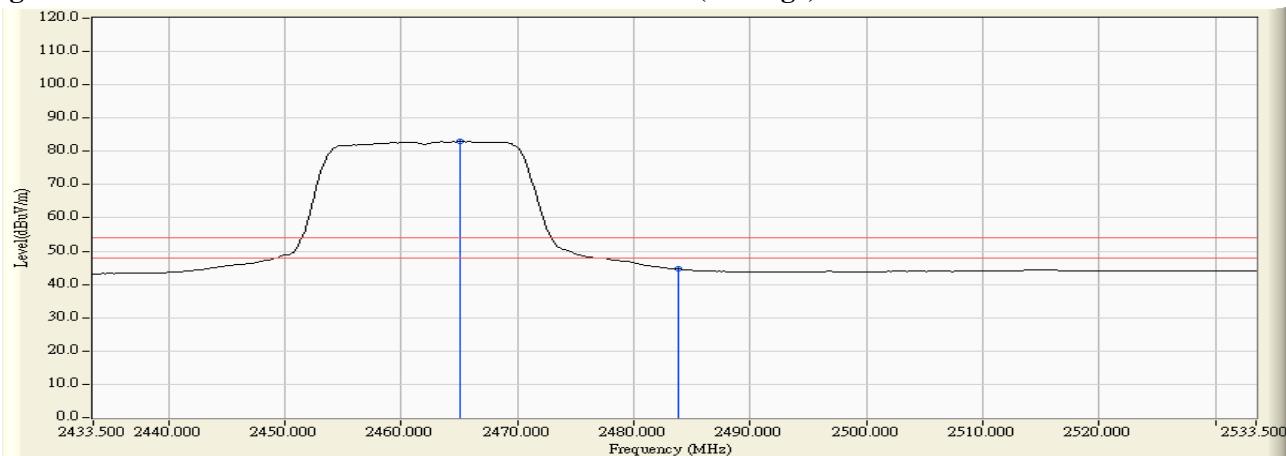
Note:

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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2457.100	31.257	67.336	98.593	--	--	Pass
11 (Peak)	2483.500	31.435	27.630	59.065	74.00	54.00	Pass
11 (Average)	2465.100	31.312	51.576	82.887	--	--	Pass
11 (Average)	2483.850	31.437	13.147	44.585	74.00	54.00	Pass

Figure Channel 11:
Vertical (Peak)

Figure Channel 11:
Vertical (Average)


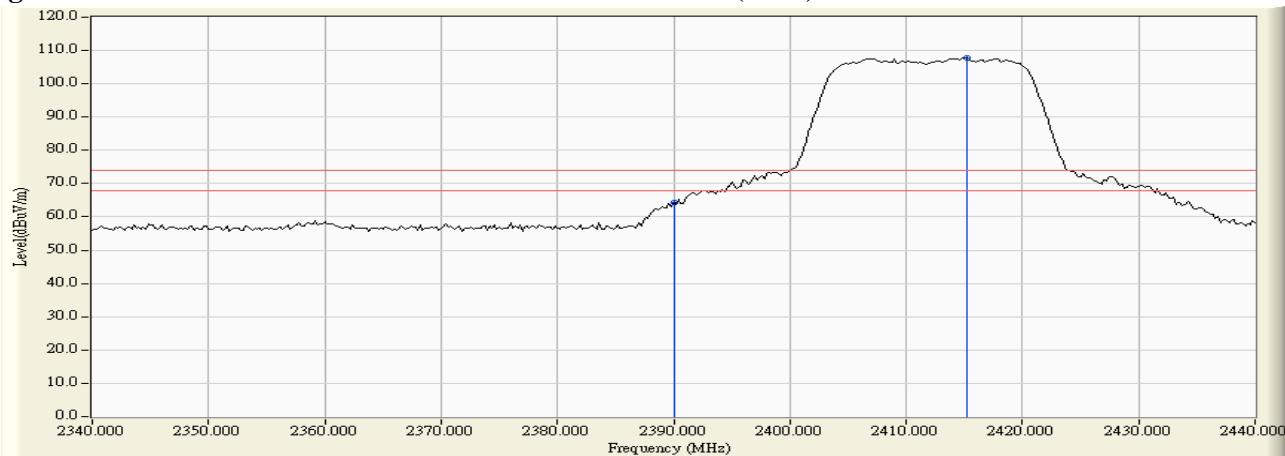
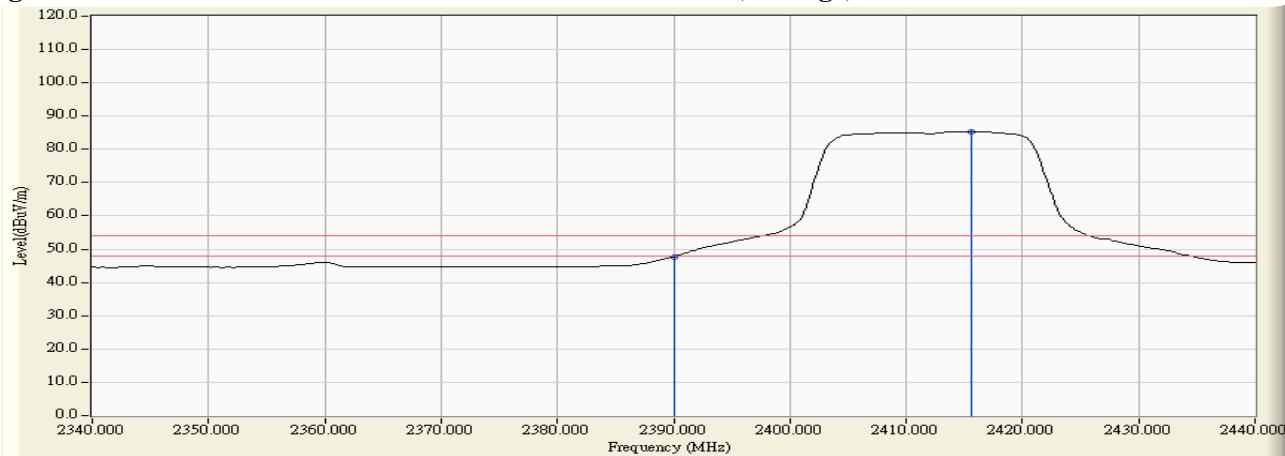
Note:

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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band)

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	31.509	32.799	64.308	74.00	54.00	Pass
01 (Peak)	2415.200	31.662	76.105	107.768	--	--	Pass
01 (Average)	2390.000	31.509	16.240	47.749	74.00	54.00	Pass
01 (Average)	2415.600	31.665	53.619	85.285	--	--	Pass

Figure Channel 01:
Horizontal (Peak)

Figure Channel 01:
Horizontal (Average)

Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band)

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	30.915	26.129	57.044	74.00	54.00	Pass
01 (Peak)	2415.000	30.970	66.921	97.891	--	--	Pass
01 (Average)	2390.000	30.915	12.920	43.835	74.00	54.00	Pass
01 (Average)	2416.000	30.977	46.268	77.244	--	--	Pass

Figure Channel 01:

Vertical (Peak)

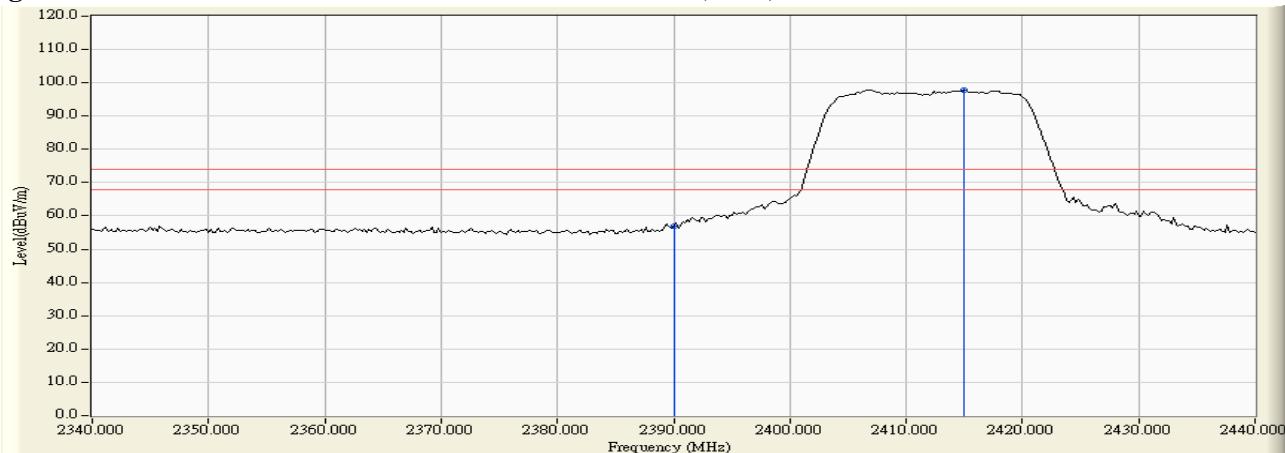
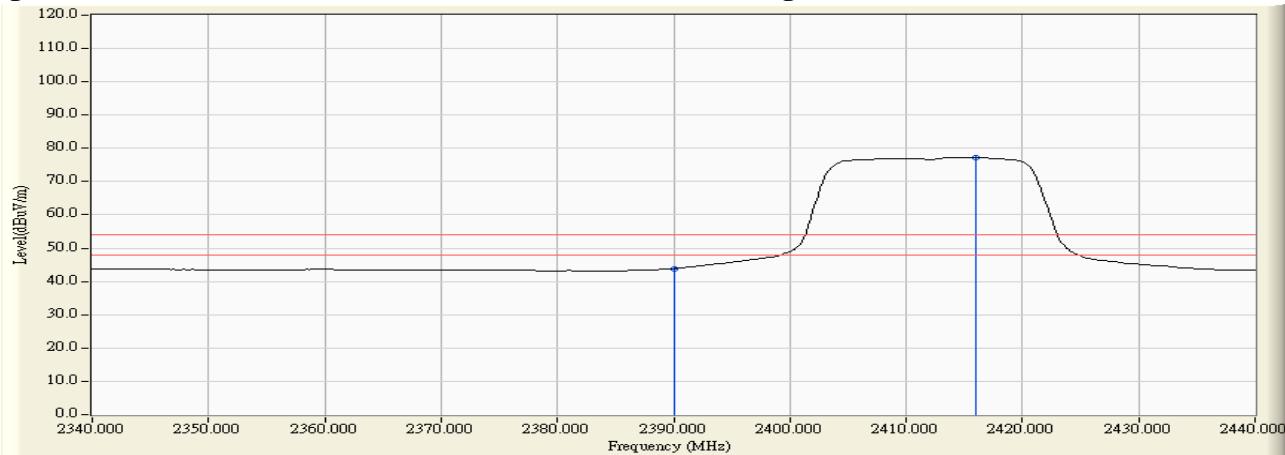


Figure Channel 01:

Vertical (Average)



Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band)

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)	2456.700	31.979	76.583	108.562	--	--	Pass
11 (Peak)	2483.500	32.182	32.872	65.054	74.00	54.00	Pass
11 (Average)	2460.900	32.011	53.626	85.637	--	--	Pass
11 (Average)	2483.500	32.182	15.940	48.122	74.00	54.00	Pass

Figure Channel 11:

Horizontal (Peak)

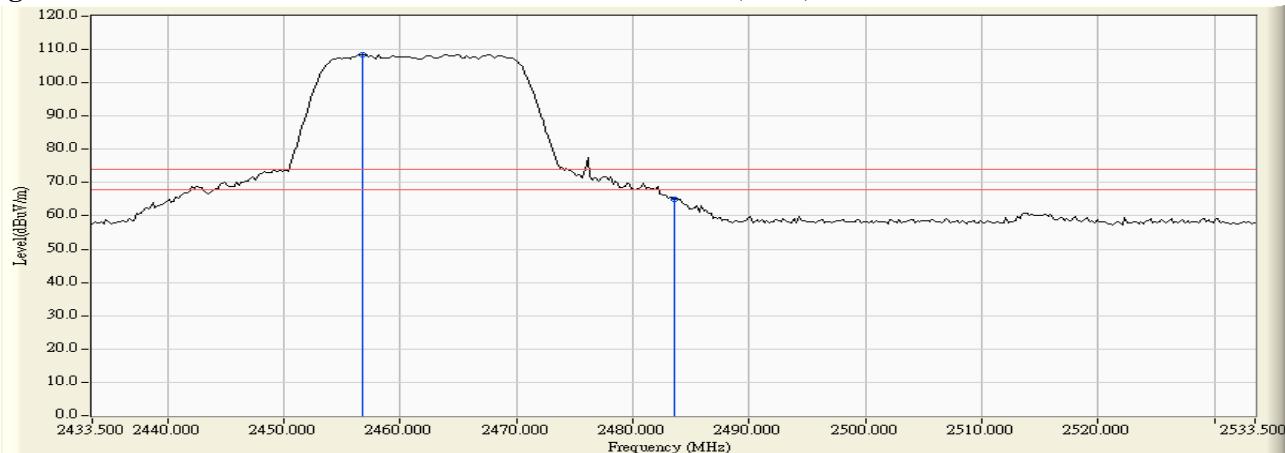
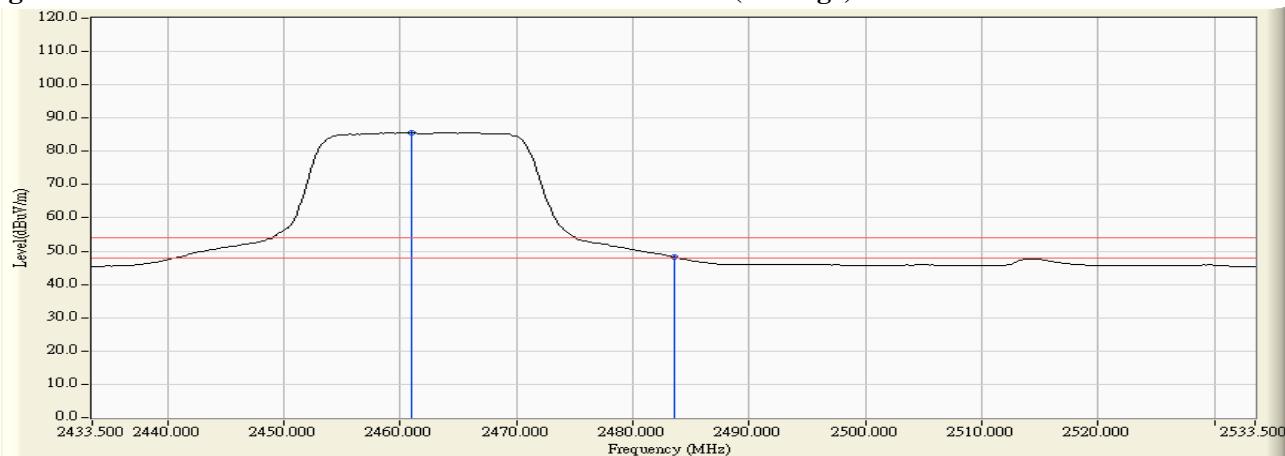


Figure Channel 11:

Horizontal (Average)



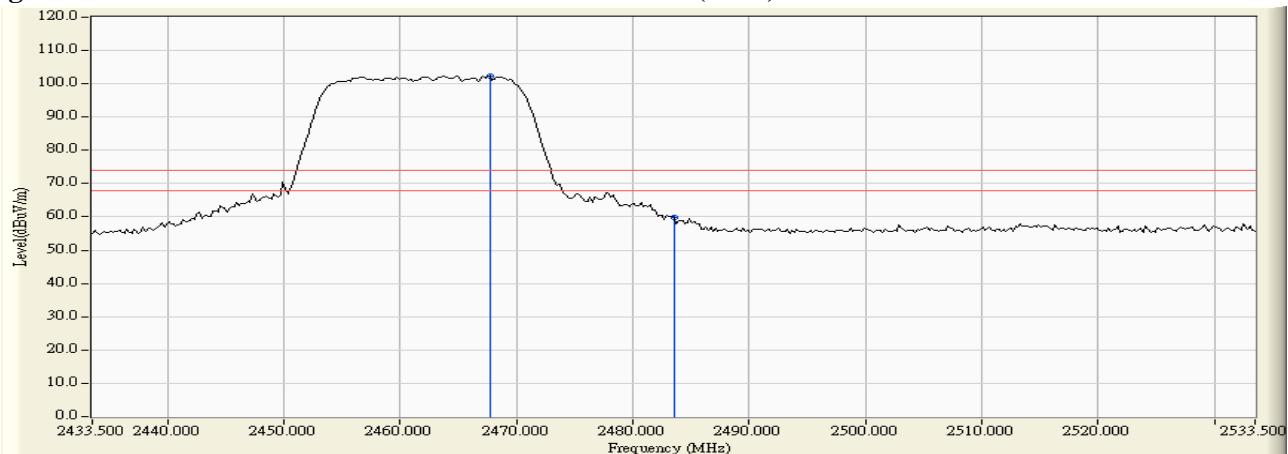
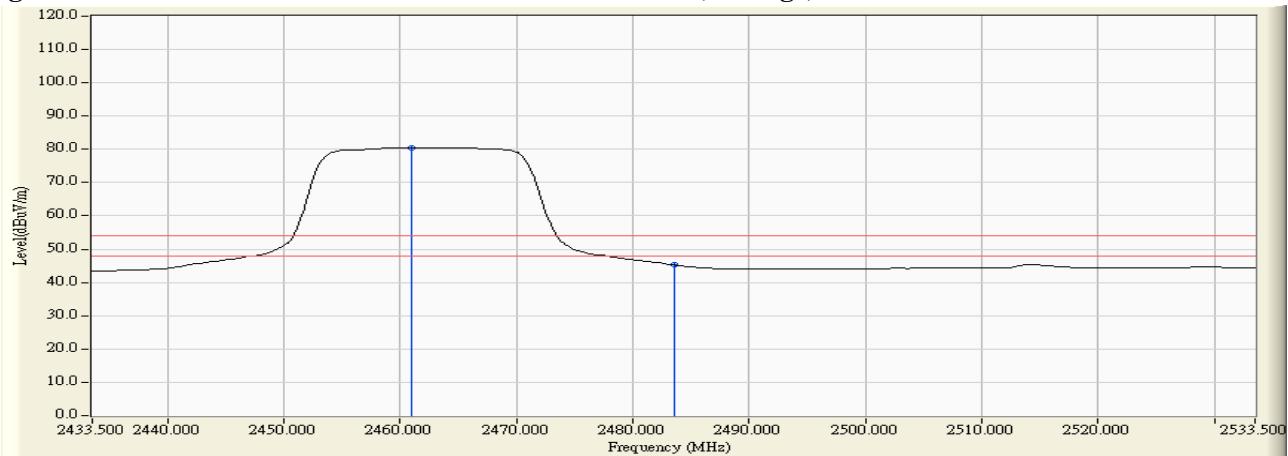
Note:

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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band)

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)	2467.700	31.329	70.941	102.270	--	--	--
11 (Peak)	2483.500	31.435	28.254	59.689	74.00	54.00	Pass
11 (Average)	2460.900	31.283	49.178	80.461	--	--	--
11 (Average)	2483.500	31.435	13.832	45.267	74.00	54.00	Pass

Figure Channel 11:
Vertical (Peak)

Figure Channel 11:
Vertical (Average)


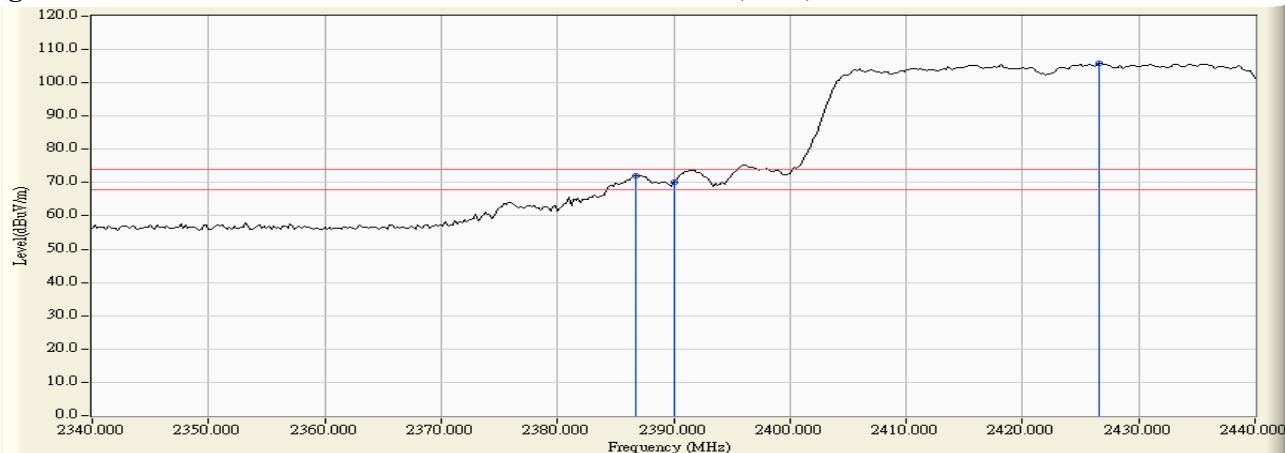
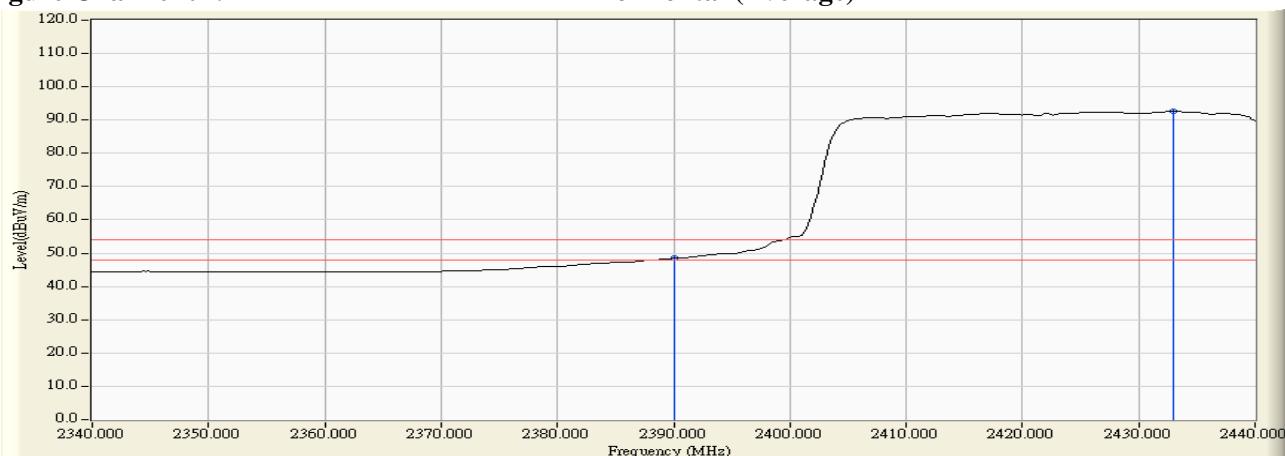
Note:

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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)

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)	2386.800	31.497	40.418	71.915	74.00	54.00	Pass
01 (Peak)	2390.000	31.509	38.587	70.096	74.00	54.00	Pass
01 (Peak)	2426.600	31.750	73.941	105.691	--	--	Pass
01 (Average)	2390.000	31.509	16.946	48.455	74.00	54.00	Pass
01 (Average)	2433.000	31.799	60.812	92.611	--	--	Pass

Figure Channel 01:
Horizontal (Peak)

Figure Channel 01:
Horizontal (Average)


Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)

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)	2387.000	30.929	35.896	66.825	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	35.116	66.031	74.00	54.00	Pass
01 (Peak)	2426.800	31.049	65.322	96.372	--	--	Pass
01 (Average)	2390.000	30.915	15.060	45.975	74.00	54.00	Pass
01 (Average)	2432.600	31.089	51.466	82.555	--	--	Pass

Figure Channel 01:

Vertical (Peak)

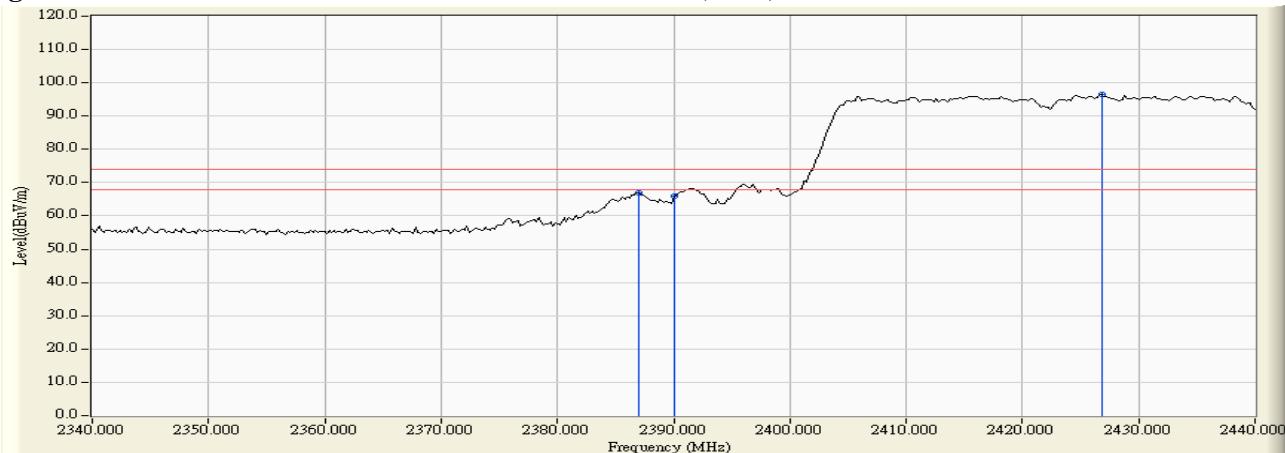
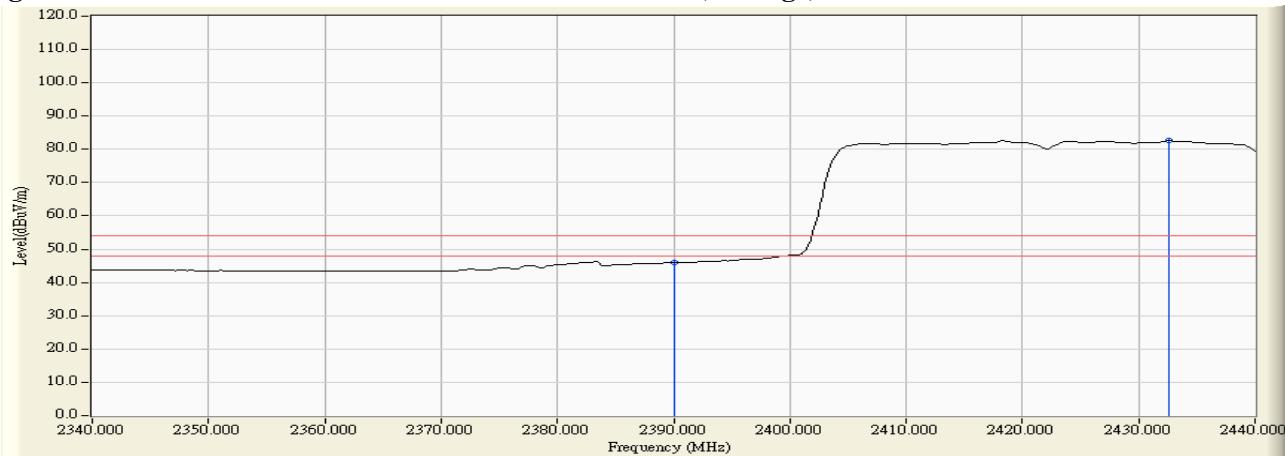


Figure Channel 01:

Vertical (Average)



Note:

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

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)

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
07 (Peak)	2456.700	31.979	73.986	105.965	--	--	Pass
07 (Peak)	2483.500	32.182	39.501	71.683	74.00	54.00	Pass
07 (Peak)	2485.500	32.197	41.306	73.503	74.00	54.00	Pass
07 (Average)	2462.500	32.023	60.316	92.339	--	--	Pass
07 (Average)	2483.500	32.182	16.405	48.587	74.00	54.00	Pass

Figure Channel 07:

Horizontal (Peak)

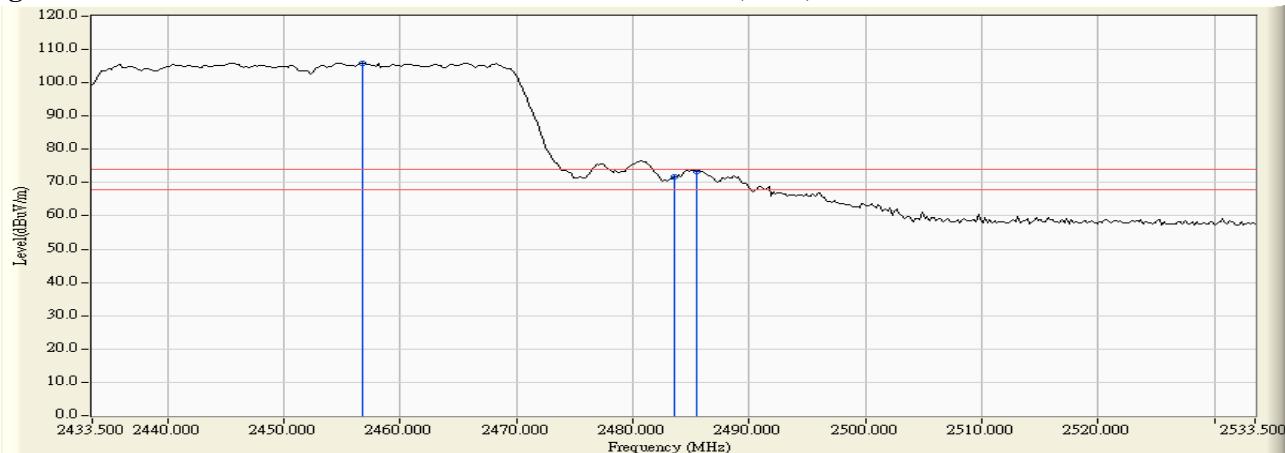
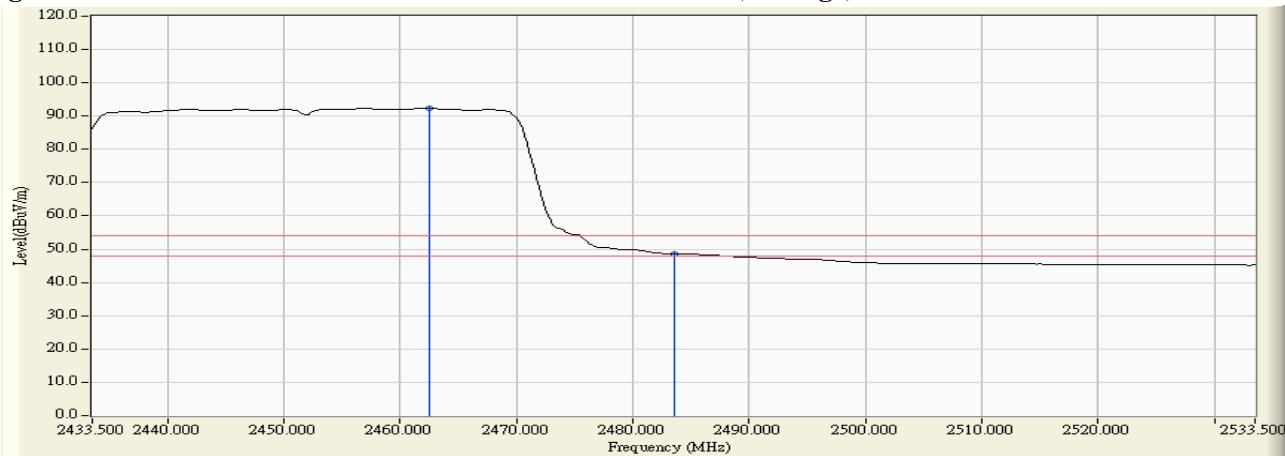


Figure Channel 07:

Horizontal (Average)



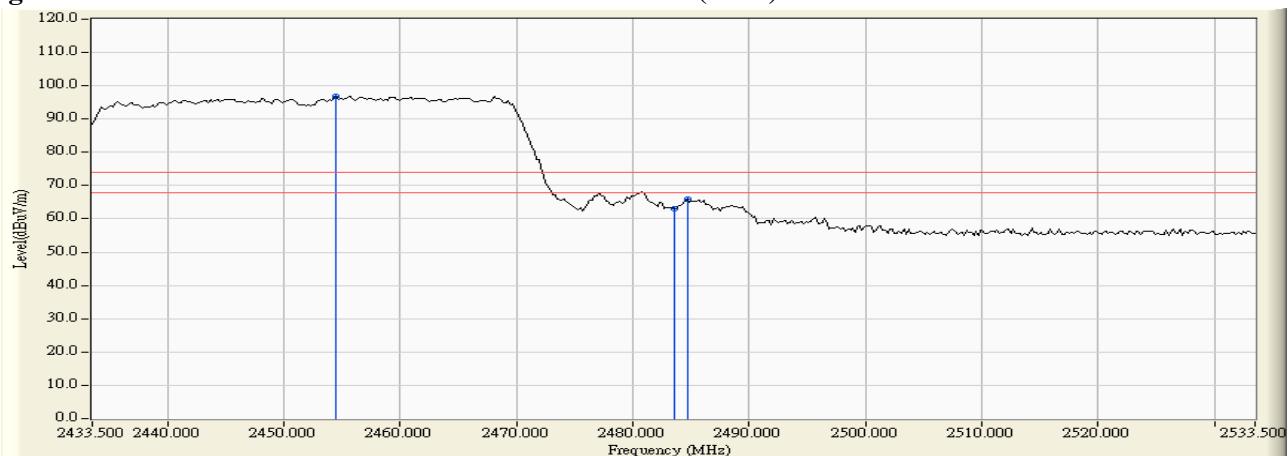
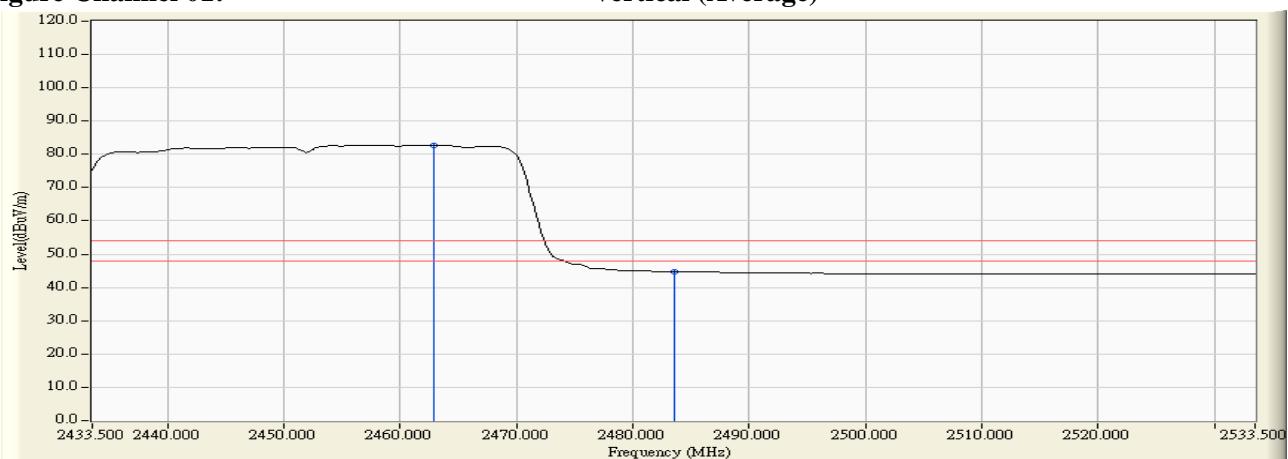
Note:

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 : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)

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
07 (Peak)	2454.500	31.238	65.687	96.926	--	--	Pass
07 (Peak)	2483.500	31.435	31.703	63.138	74.00	54.00	Pass
07 (Peak)	2484.700	31.444	34.378	65.821	74.00	54.00	Pass
07 (Average)	2462.900	31.296	51.522	82.818	--	--	Pass
07 (Average)	2483.500	31.435	13.329	44.764	74.00	54.00	Pass

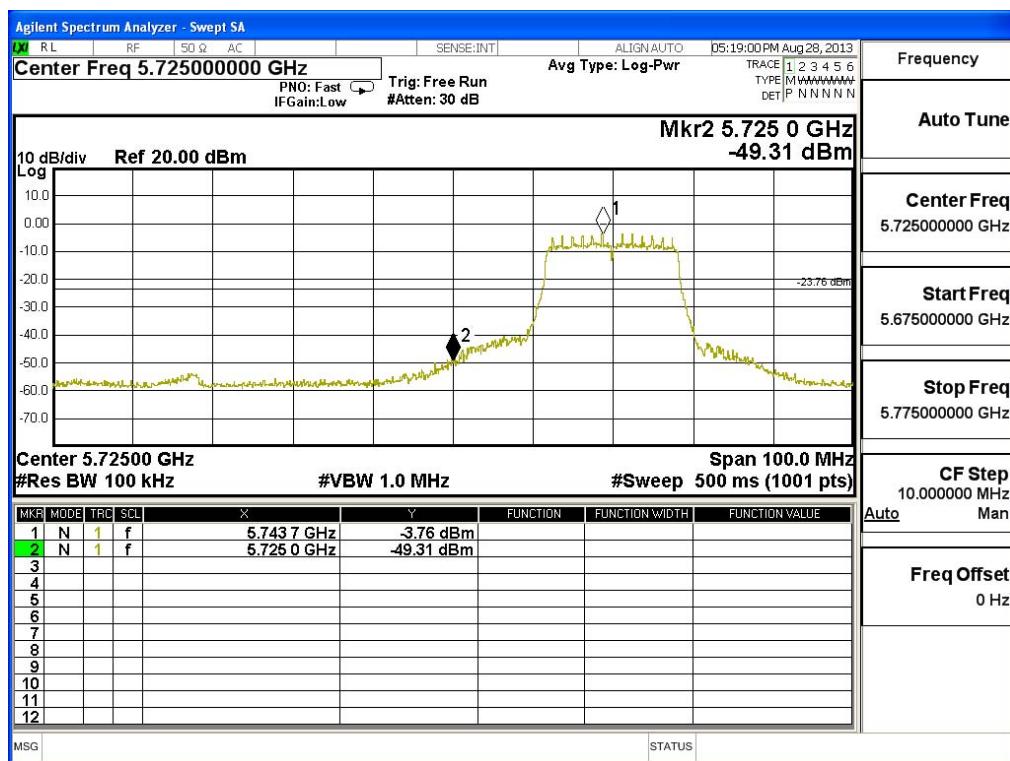
Figure Channel 07:
Vertical (Peak)

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.

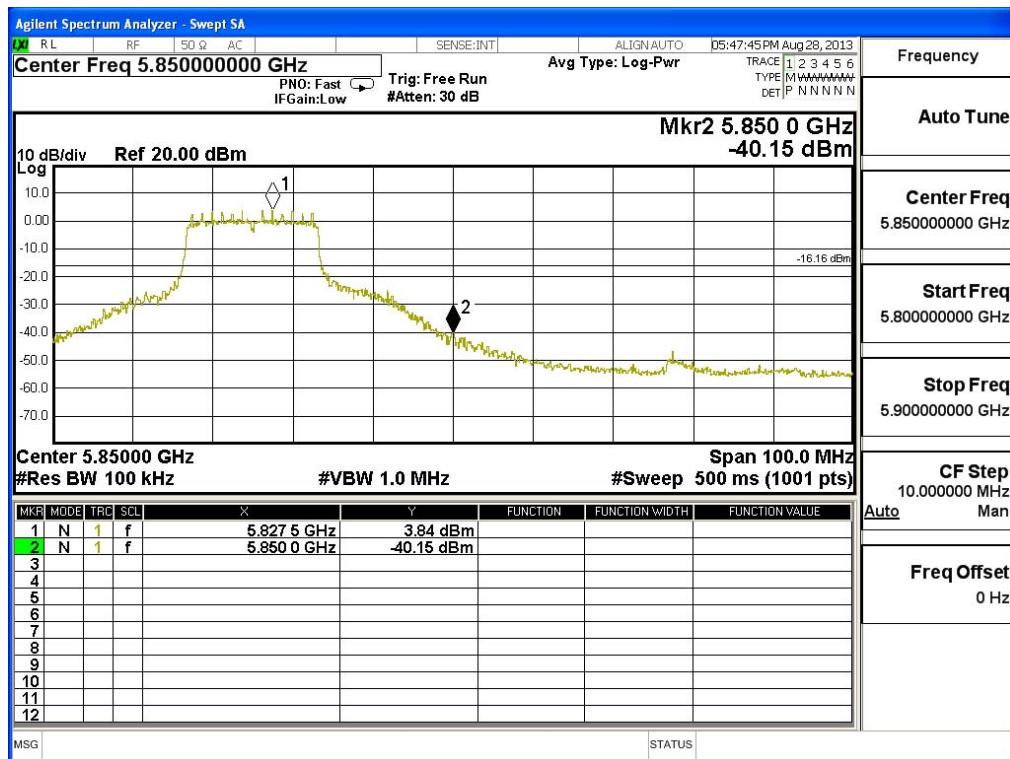
Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5745	45.55	>20	PASS



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5825	43.99	>20	PASS



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

Chain A

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5745	38.14	>20	PASS



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

Chain B

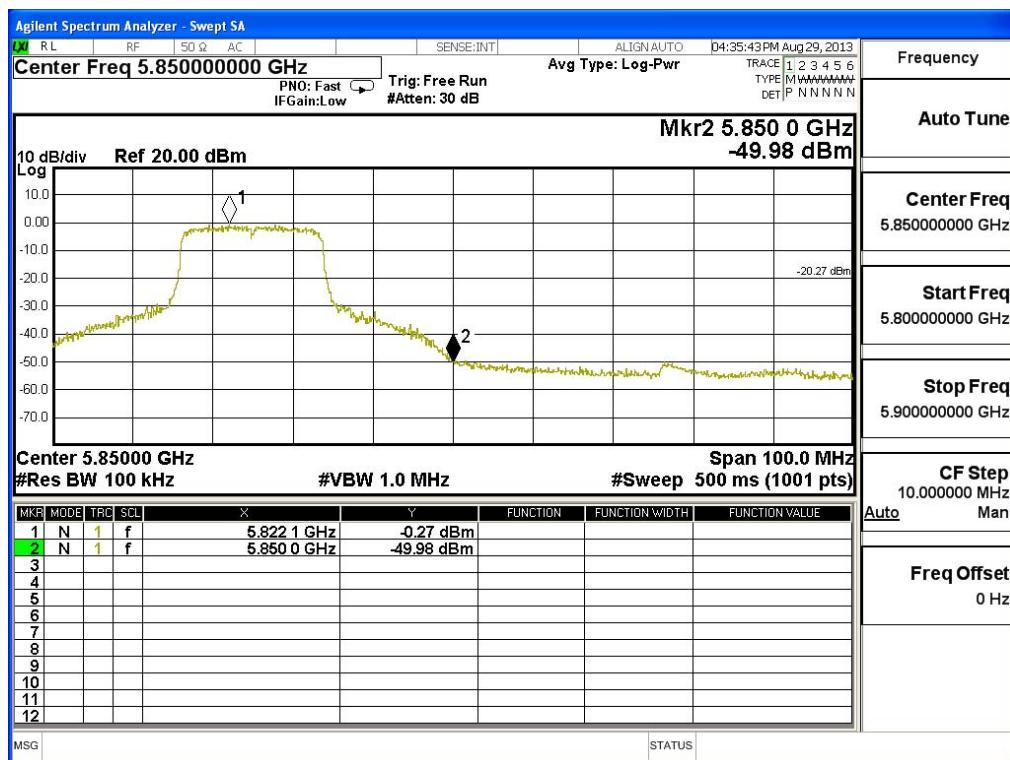
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5745	34.68	>20	PASS



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

Chain A

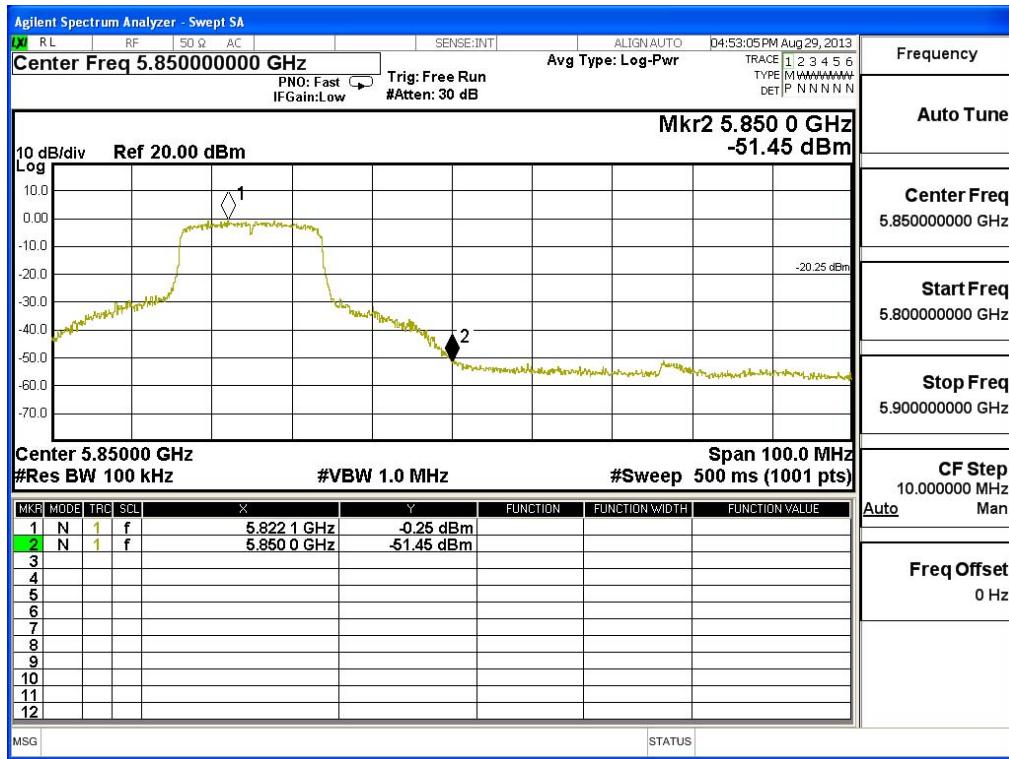
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5825	49.71	>20	PASS



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

Chain B

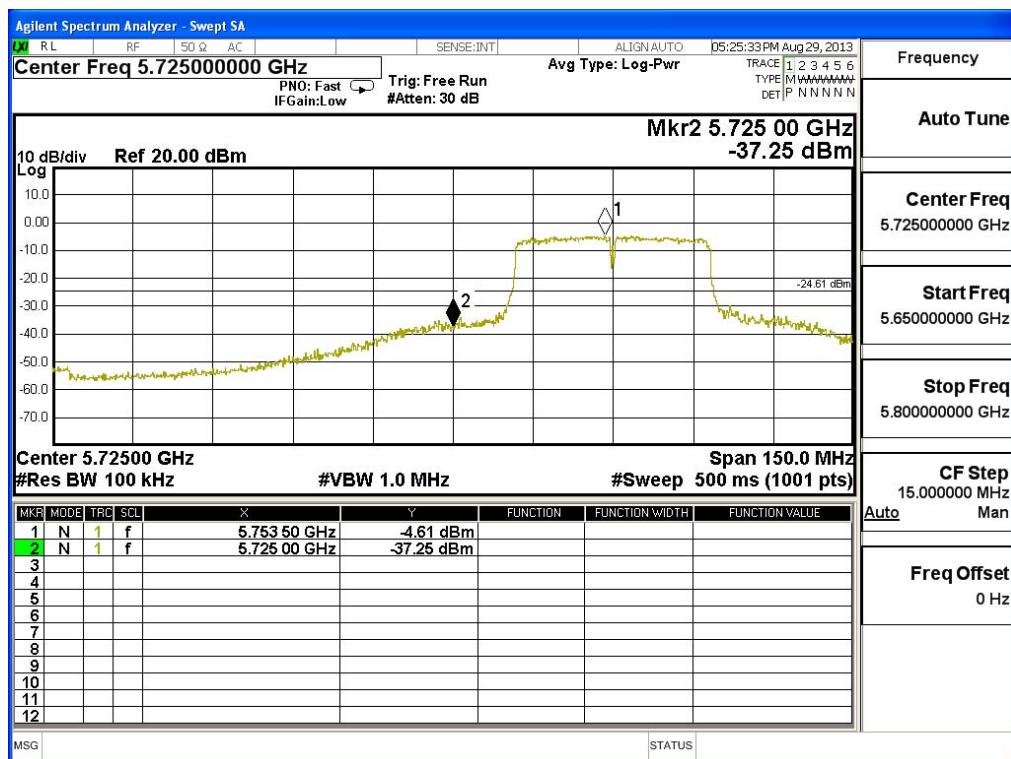
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5825	51.20	>20	PASS



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

Chain A

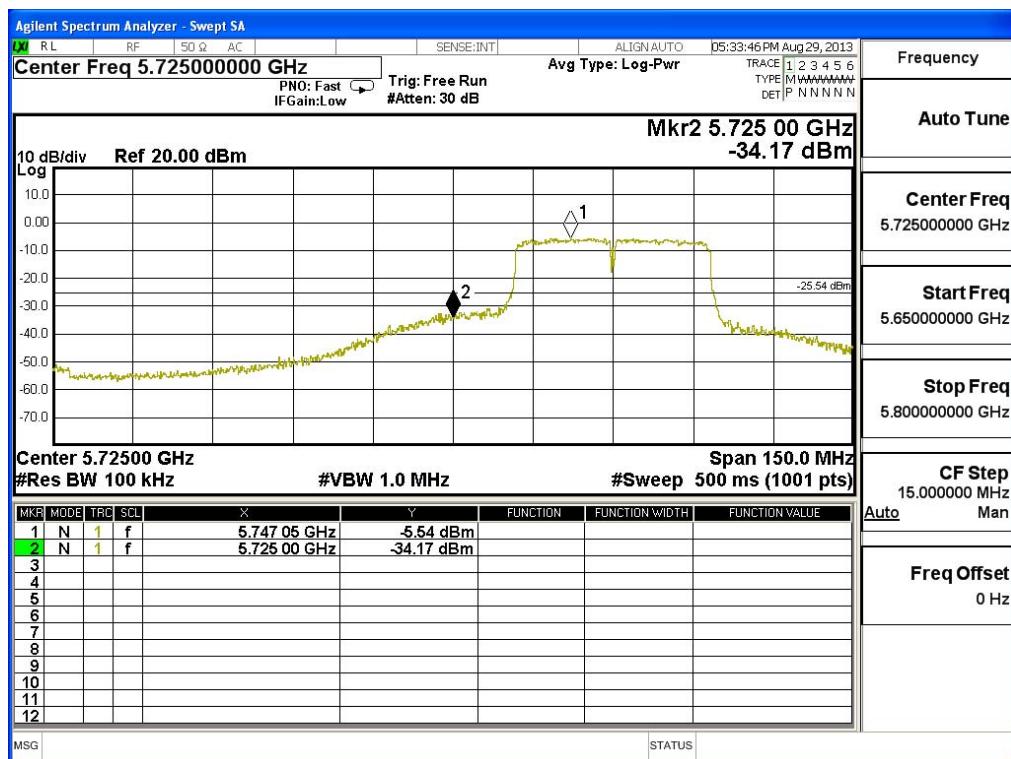
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5755	32.64	>20	PASS



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

Chain B

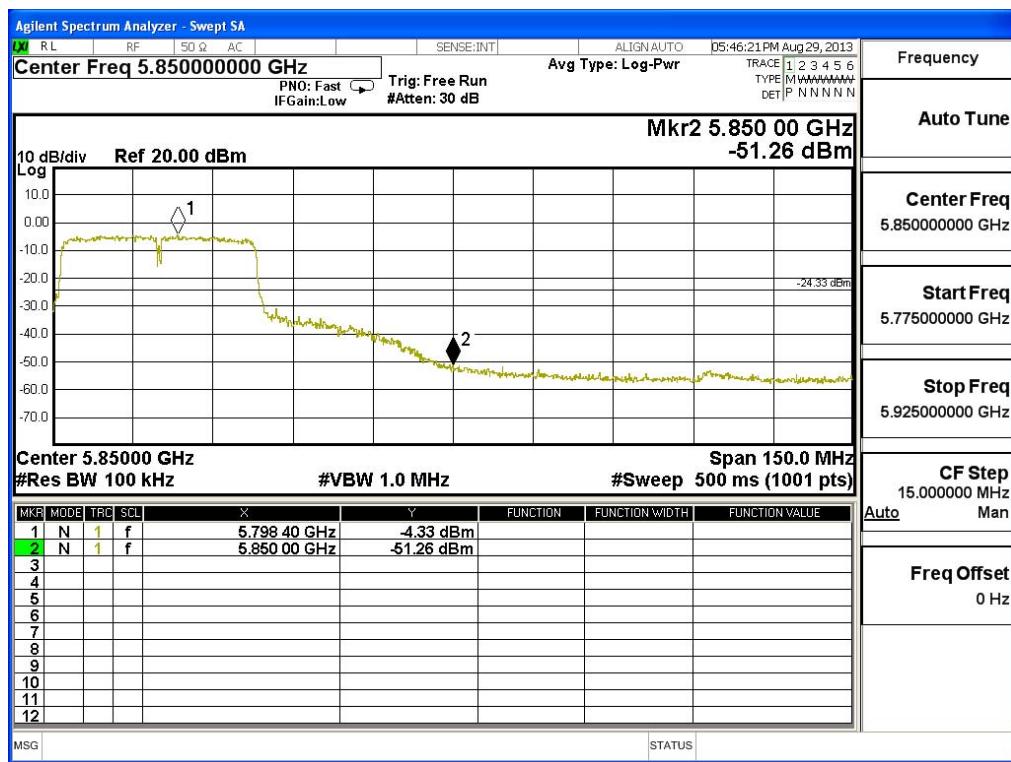
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5755	28.63	>20	PASS



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

Chain A

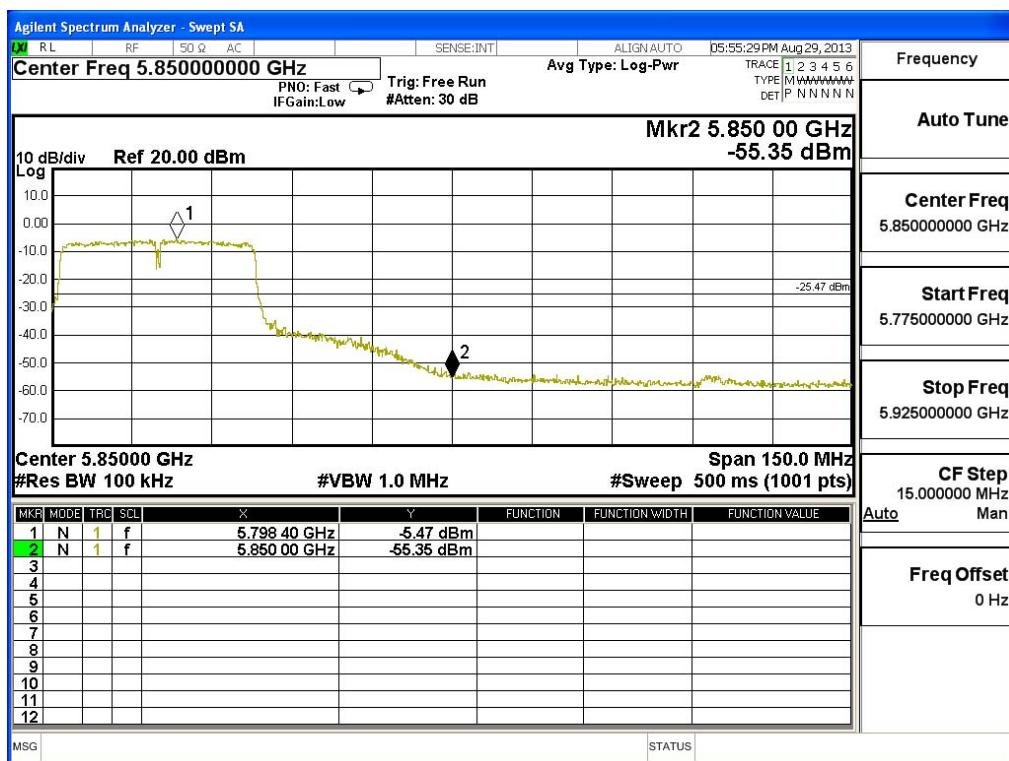
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5795	46.93	>20	PASS



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

Chain B

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5795	49.88	>20	PASS



7. Occupied Bandwidth

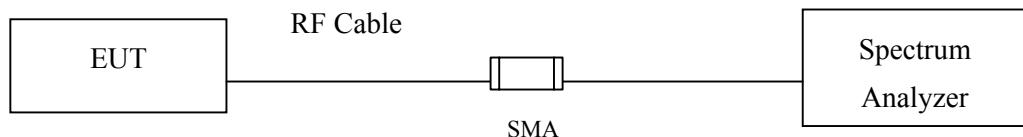
7.1. Test Equipment

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

Note:

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

7.2. Test Setup



7.3. Limits

The minimum bandwidth shall be at least 500 kHz.

7.4. Test Procedure

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

7.5. Uncertainty

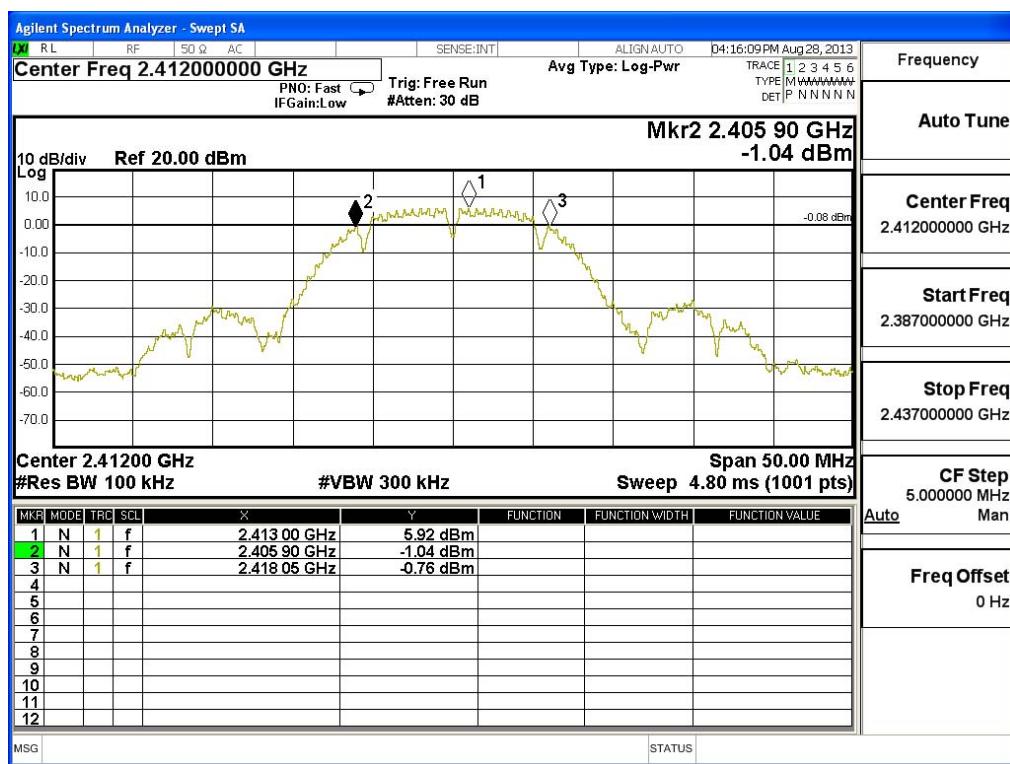
± 150Hz

7.6. Test Result of Occupied Bandwidth

Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412.00	12150	>500	Pass

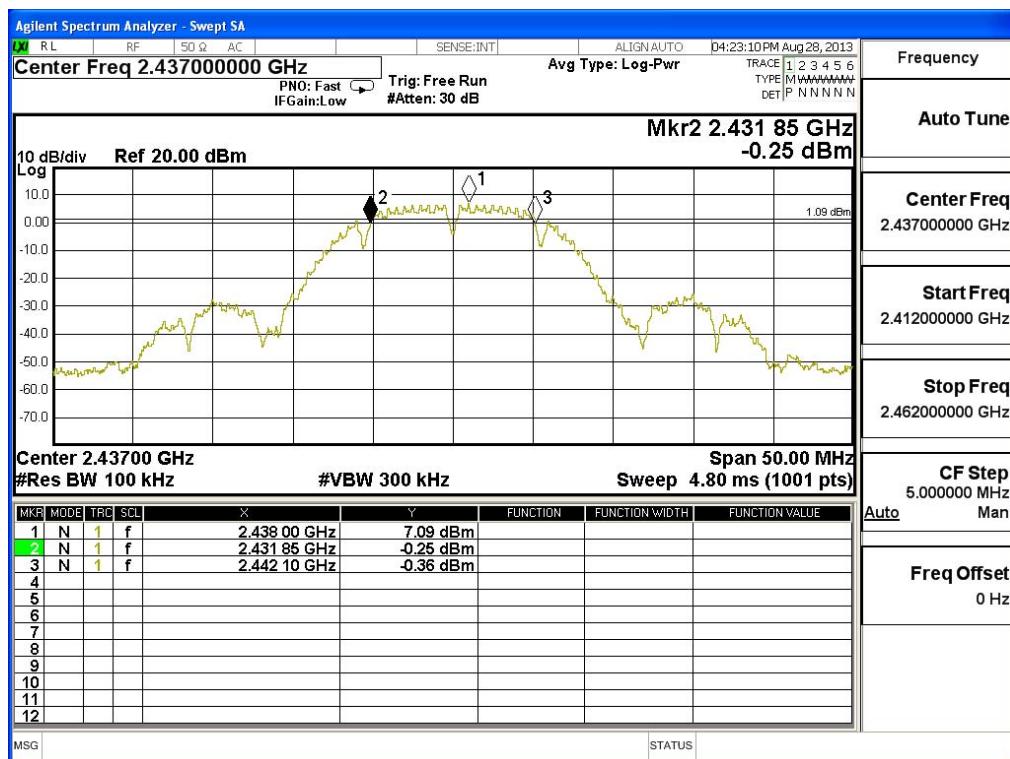
Figure Channel 1:



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	10250	>500	Pass

Figure Channel 6:



Product : 802.11a/b/g/n 2T2R Wireless Lan USB Module
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462.00	12150	>500	Pass

Figure Channel 11:

