

FCC

Test Report

Product Name	IEEE 802.11b/g/n USB Wireless module
Model No	DAW-NU109H
FCC ID.	KA2AWNU109HA1

Applicant	D-Link Corporation
Address	17595 Mt. Herrmann, Fountain Valley, California, United States.

Date of Receipt	Jul. 19, 2010
Issue Date	Jul. 30, 2010
Report No.	107272R-RFUSP28V01
Report Version	V1.0

The test results relate only to the samples tested.

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Test Report Certification

Issue Date: Jul. 30, 2010

Report No.: 107272R-RFUSP28V01



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200533-0

Product Name	IEEE 802.11b/g/n USB Wireless module
Applicant	D-Link Corporation
Address	17595 Mt. Herrmann, Fountain Valley, California, United States.
Manufacturer	AzureWave Technologies, Inc.
Model No.	DAW-NU109H
EUT Rated Voltage	DC 3.3V
EUT testing Voltage	AC 120V/60Hz
Trade Name	D-Link
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2009 ANSI C63.4: 2003
Test Result	Complied



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	IEEE 802.11b/g/n USB Wireless module
Trade Name	D-Link
Model No.	DAW-NU109H
FCC ID.	KA2AWNU109HA1
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW, 2422-2452MHz for 802.11n-40BW
Number of Channels	802.11b/g/n-20MHz: 11, n-40MHz: 7
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: 7.2-150Mbps
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/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.	Peak Gain
1	FAVORTRON	E773700193 (MAIN) E773700194 (AUX)	3.35dBi in 2.4GHz

Note: The antenna of EUT is conform to FCC 15.203

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

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

802.11n-40MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2422 MHz	Channel 02:	2427 MHz	Channel 03:	2432 MHz	Channel 04:	2437 MHz
Channel 05:	2442 MHz	Channel 06:	2447 MHz	Channel 07:	2452 MHz		

Note:

1. The EUT is an IEEE 802.11b/g/n USB Wireless module with a built-in 2.4GHz 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 7.2Mbps 、802.11n(40M-BW) is 15Mbps)
4. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

The EUT is an IEEE 802.11b/g/n USB Wireless module with 11 channels. This device provided four kinds of transmitting speed 1, 2, 5.5 and 11Mbps and the device of RF carrier is DBPSK, DQPSK and CCK (IEEE 802.11b). The device provided of eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11g).

The device provided of eight kinds of transmitting speed 7.2,14.4,21.7,28.9,43.3,57.8,65 and 72.2Mbps in 802.11n(20M-BW) mode and 15,30,45,60,90,120,135 and 150 Mbps (40M-BW) the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11n), The IEEE 802.11n is Single In, Single Out” (SISO) technology and two antennas to support 1(Transmit) * 1(Receive) MISO technology.

This IEEE 802.11b/g/n USB Wireless module, compliant with IEEE 802.11b and IEEE 802.11g/n, is a high-efficiency Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. Operation in 2.4GHz Direct Sequence Spread Spectrum (DSSS) and Orthogonal Frequency Division Multiplexing (OFDM) radio transmission, the IEEE 802.11b/g/n USB Wireless module Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any IEEE 802.11b and IEEE 802.11g/n network.

Test Mode:	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
	Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)

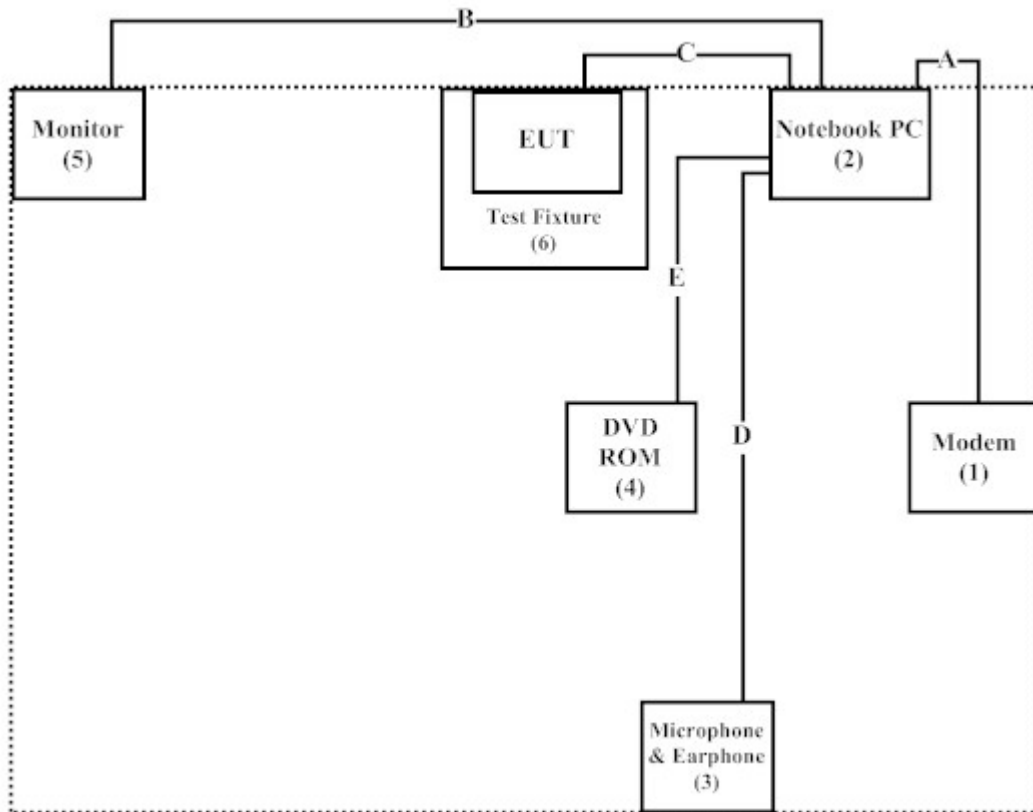
1.3. Tested System Details

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

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Modem	ACEEX	DM-1414	0102027539	Shielded, 1.8m
2	Notebook PC	DELL	PPT	N/A	N/A
3	Microphone & Earphone	Lobos	LB-EW020	N/A	N/A
4	DVD ROM	DELL	PD01S	N/A	N/A
5	Monitor	Dell	2407WFPb	CN-0FC255-46633 -67T-04GS	Shielded, 1.8m
6	Test Fixture	AzureWave	N/A	N/A	N/A

	Signal Cable Type	Signal cable Description
A	RS-232 Cable	Non-Shielded, 1.2m
B	VGA Cable	Shielded, 1.8m, with two ferrite cores bonded.
C	USB Cable	Shielded, 1.2m
D	Microphone & Earphone Cable	Non-Shielded, 2m
E	USB Cable	Non-Shielded, 0.6m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute "TELNET Ver1.0" on the EUT.
- (3) Configure the test mode, the test channel, and the data rate to start the continuous transmit
- (4) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

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

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

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



Accreditation on NVLAP
NVLAP Lab Code: 200533-0



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FCC Accreditation Number: TW1014



2. Conducted Emission

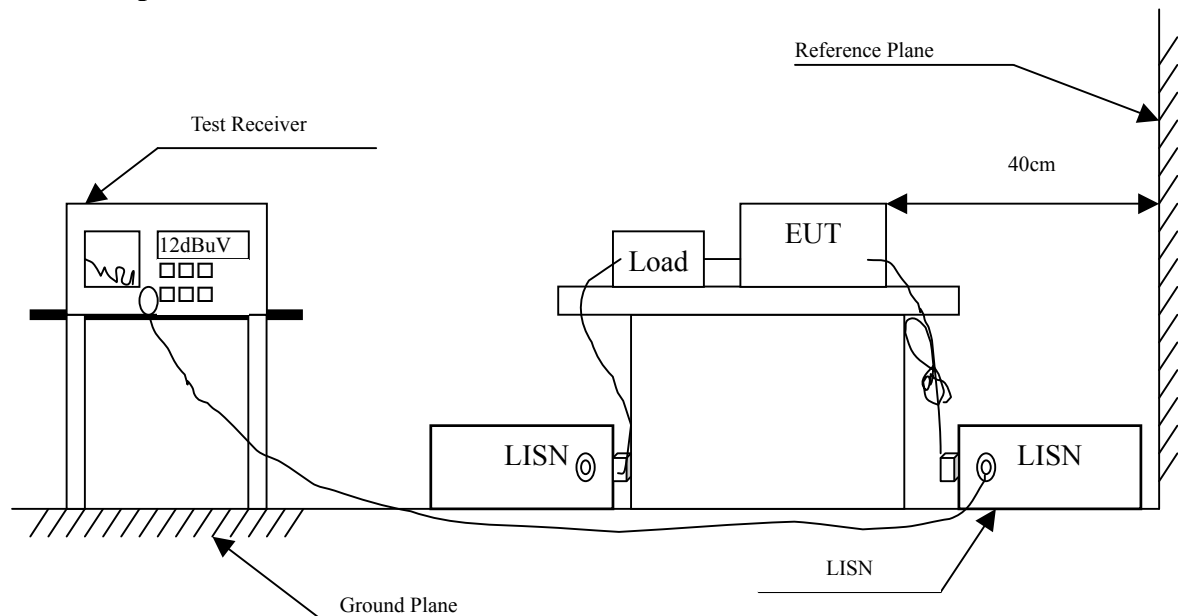
2.1. Test Equipment

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

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2010	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2010	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2010	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2010	
5	No.1 Shielded Room			N/A	

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 C63.4: 2003 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 1					
Quasi-Peak					
0.158	9.756	35.610	45.366	-20.405	65.771
0.185	9.719	35.800	45.519	-19.481	65.000
0.259	9.670	28.010	37.680	-25.206	62.886
1.396	9.670	13.470	23.140	-32.860	56.000
3.982	9.700	19.380	29.080	-26.920	56.000
4.584	9.700	20.730	30.430	-25.570	56.000
Average					
0.158	9.756	17.850	27.606	-28.165	55.771
0.185	9.719	24.860	34.579	-20.421	55.000
0.259	9.670	17.360	27.030	-25.856	52.886
1.396	9.670	7.770	17.440	-28.560	46.000
3.982	9.700	11.370	21.070	-24.930	46.000
4.584	9.700	9.650	19.350	-26.650	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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.173	9.739	36.920	46.659	-18.684	65.343
0.209	9.711	29.870	39.581	-24.733	64.314
0.279	9.667	28.930	38.597	-23.717	62.314
0.791	9.670	13.250	22.920	-33.080	56.000
3.298	9.690	15.690	25.380	-30.620	56.000
3.916	9.700	19.870	29.570	-26.430	56.000
Average					
0.173	9.739	31.890	41.629	-13.714	55.343
0.209	9.711	12.410	22.121	-32.193	54.314
0.279	9.667	13.140	22.807	-29.507	52.314
0.791	9.670	5.550	15.220	-30.780	46.000
3.298	9.690	11.750	21.440	-24.560	46.000
3.916	9.700	10.800	20.500	-25.500	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

3. Peak Power Output

3.1. Test Equipment

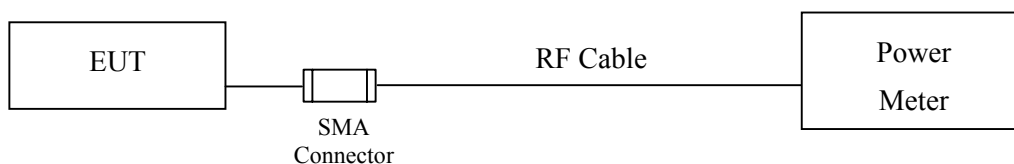
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2010
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2010
	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

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. The power combiner is used for measure 11n mode.

3.2. Test Setup

Conducted 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 Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No	Frequency (MHz)	Peak Power Output (dBm)						
		Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11			
01	2412	15.8	15.47	15.31	15.09	18.6	<30dBm	Pass
06	2437	15.83				18.52	<30dBm	Pass
11	2462	15.5	--	--	--	18.13	<30dBm	Pass

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

Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No	Frequency (MHz)	Peak Power Output (dBm)										
		Average Power								Peak Power	Required Limit	Result
		For different Data Rate (Mbps)										
		6	9	12	18	24	36	48	54	6		
01	2412	14.1	13.86	13.77	13.41	13.46	13.29	13.11	13.05	23.67	<30dBm	Pass
06	2437	14	--	--	--	--	--	--	--	23.6	<30dBm	Pass
11	2462	13.8	--	--	--	--	--	--	--	23.3	<30dBm	Pass

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

Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No	Frequency (MHz)	Peak Power Output (dBm)										
		Average Power								Peak Power	Required Limit	Result
		For different Data Rate (Mbps)										
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	7.2		
01	2412	12.06	11.91	11.92	11.82	11.7	11.63	11.52	11.49	21.93	<30dBm	Pass
06	2437	12.2	--	--	--	--	--	--	--	21.9	<30dBm	Pass
11	2462	12	--	--	--	--	--	--	--	21.8	<30dBm	Pass

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

Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)

Channel No	Frequency (MHz)	Peak Power Output (dBm)										
		Average Power								Peak Power	Required Limit	Result
		For different Data Rate (Mbps)										
		15	30	45	60	90	120	135	150	15		
01	2422	10.91	10.68	10.53	10.34	10.2	10.06	9.85	9.88	22.5	<30dBm	Pass
04	2437	10.88	--	--	--	--	--	--	--	22.51	<30dBm	Pass
07	2452	10.77	--	--	--	--	--	--	--	22.48	<30dBm	Pass

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

4. Radiated Emission

4.1. Test Equipment

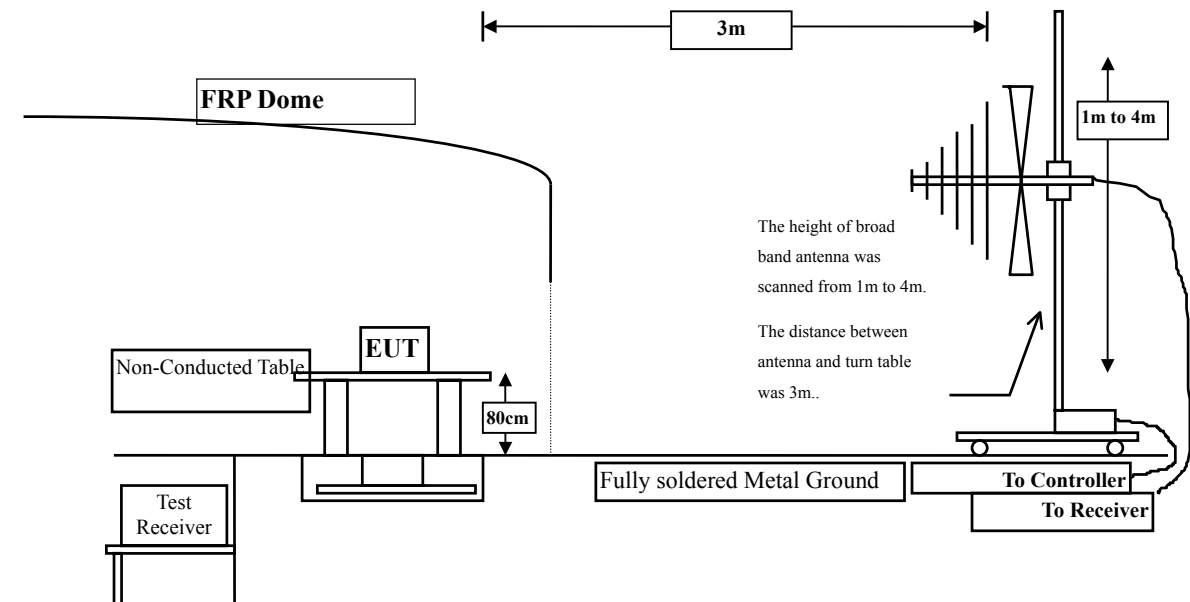
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2009
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2009
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2010
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2009
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2010
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2009
	X	Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2010
	X	Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

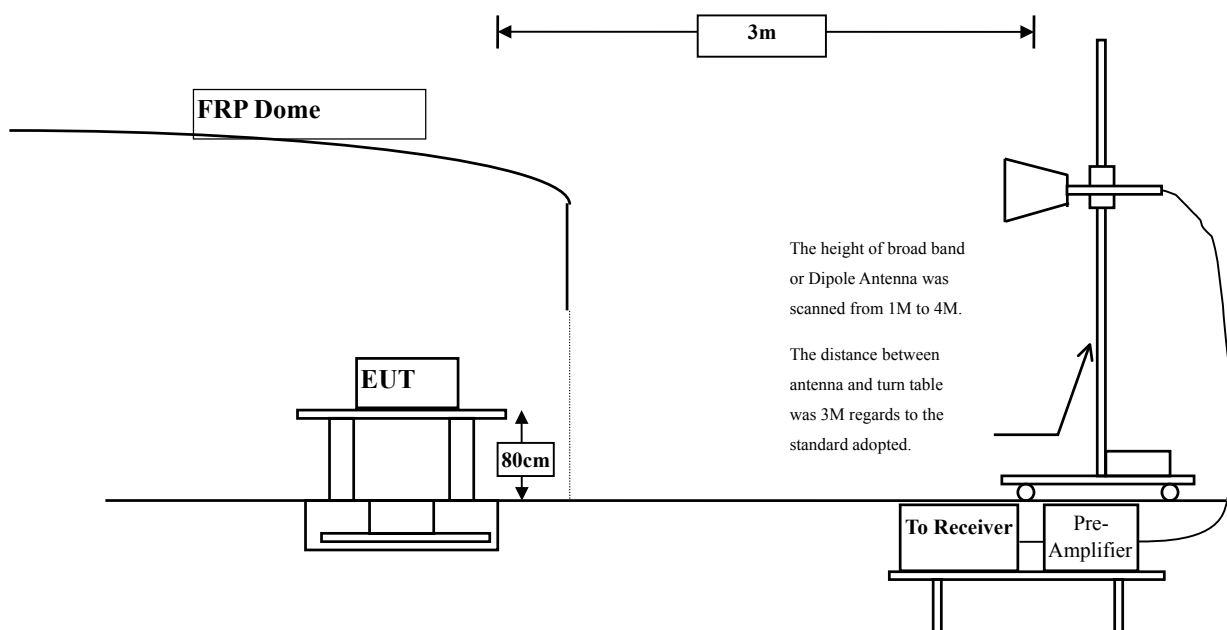
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

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	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

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

4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Mar. 2005 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 C63.4:2003 on radiated measurement.

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

Radiated emission measurements below 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 beamwidth of the antenna.

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

The frequency range from 30MHz to 10th harmonics is checked.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : IEEE 802.11b/g/n USB Wireless module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4824.000	0.428	46.030	46.459	-27.541	74.000
7236.000	7.177	44.000	51.177	-22.823	74.000
9648.000	8.019	37.970	45.990	-28.010	74.000
Average					
Detector:					
--					
Peak Detector:					
4824.000	0.836	47.240	48.077	-25.923	74.000
7236.000	7.676	42.840	50.516	-23.484	74.000
9648.000	8.556	37.430	45.987	-28.013	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	Db	dBuV/m
	Db	dBuV	dBuV/m		
Horizontal					
Peak Detector:					
4874.000	0.076	49.970	50.047	-23.953	74.000
7311.000	7.512	48.800	56.312	-17.688	74.000
9748.000	7.630	37.520	45.150	-28.850	74.000
Average					
Detector:					
7311.000	7.512	43.270	50.782	-3.218	54.000
Vertical					
Peak Detector:					
4874.000	0.532	53.740	54.272	-19.728	74.000
7311.000	8.089	37.520	45.609	-28.391	74.000
9748.000	8.266	38.760	47.027	-26.973	74.000
Average					
Detector:					
4874.000	0.532	51.090	51.622	-2.378	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Frequency MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	0.191	49.400	49.591	-24.409	74.000
7386.000	8.373	50.000	58.374	-15.626	74.000
9848.000	7.964	37.630	45.594	-28.406	74.000
Average Detector:					
7386.000	8.373	40.750	49.124	-4.876	54.000
Vertical					
Peak Detector:					
4924.000	0.191	50.090	50.281	-23.719	74.000
7386.000	8.373	44.140	52.514	-21.486	74.000
9848.000	7.964	38.400	46.364	-27.636	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	Db	dBuV/m
	Db	dBuV	dBuV/m		
Horizontal					
Peak Detector:					
4824.000	0.428	43.860	44.289	-29.711	74.000
7236.000	7.177	49.060	56.237	-17.763	74.000
9648.000	8.019	38.230	46.250	-27.750	74.000
Average					
Detector:					
7236.000	7.177	29.780	36.957	-17.043	54.000
Vertical					
Peak Detector:					
4824.000	0.836	44.880	45.717	-28.283	74.000
7236.000	7.676	45.670	53.346	-20.654	74.000
9648.000	8.556	37.420	45.977	-28.023	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	Db	dBuV/m
Horizontal					
Peak Detector:					
4874.000	0.076	50.800	50.877	-23.123	74.000
7311.000	7.512	56.410	63.922	-10.078	74.000
9748.000	7.630	37.650	45.280	-28.720	74.000
Average					
Detector:					
7311.000	7.512	36.710	44.222	-9.778	54.000
Vertical					
Peak Detector:					
4874.000	0.532	47.510	48.042	-25.958	74.000
7311.000	8.089	46.710	54.799	-19.201	74.000
9748.000	8.266	37.150	45.417	-28.583	74.000
Average					
Detector:					
7311.000	8.089	30.350	38.439	-15.561	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	0.191	47.760	47.951	-26.049	74.000
7386.000	8.373	51.740	60.114	-13.886	74.000
9848.000	7.964	37.470	45.434	-28.566	74.000
Average Detector:					
7386.000	8.373	37.770	46.144	-7.856	54.000
Vertical					
Peak Detector:					
4924.000	0.805	48.520	49.325	-24.675	74.000
7386.000	9.180	48.760	57.940	-16.060	74.000
9848.000	8.801	38.230	47.031	-26.969	74.000
Average Detector:					
7386.000	9.180	31.990	41.170	-12.830	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	Db	dBuV/m
Horizontal					
Peak Detector:					
4824.000	0.428	43.350	43.779	-30.221	74.000
7236.000	7.177	40.010	47.187	-26.813	74.000
9648.000	8.019	37.520	45.540	-28.460	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4824.000	0.836	43.090	43.927	-30.073	74.000
7236.000	7.676	39.390	47.066	-26.934	74.000
9648.000	8.556	37.290	45.847	-28.153	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	Db	dBuV	dBuV/m	Db	dBuV/m
Horizontal					
Peak Detector:					
4874.000	0.076	44.360	44.437	-9.563	54.000
7311.000	7.512	45.890	53.402	-0.598	54.000
9748.000	7.630	37.160	44.790	-9.210	54.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4874.000	0.532	44.230	44.762	-29.238	74.000
7311.000	8.089	42.530	50.619	-23.381	74.000
9748.000	8.266	37.970	46.237	-27.763	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	Db	dBuV/m
	Db	dBuV	dBuV/m		
Horizontal					
Peak Detector:					
4924.000	0.191	44.020	44.211	-29.789	74.000
7386.000	8.373	42.340	50.714	-23.286	74.000
9848.000	7.964	37.900	45.864	-28.136	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4924.000	0.805	45.750	46.555	-27.445	74.000
7386.000	9.180	41.940	51.120	-22.880	74.000
9848.000	8.801	37.600	46.401	-27.599	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2422MHz)

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

Horizontal

Peak Detector:

4844.000	0.280	41.350	41.631	-32.369	74.000
7266.000	7.106	41.660	48.766	-25.234	74.000
9688.000	7.663	37.370	45.033	-28.967	74.000

Average

Detector:

--

Vertical

Peak Detector:

4844.000	0.707	42.940	43.648	-30.352	74.000
7266.000	7.626	40.890	48.516	-25.484	74.000
9688.000	8.284	37.380	45.664	-28.336	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	0.076	42.530	42.607	-31.393	74.000
7311.000	7.512	45.030	52.542	-21.458	74.000
9748.000	7.630	37.460	45.090	-28.910	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4874.000	0.532	42.720	43.252	-30.748	74.000
7311.000	8.089	44.020	52.109	-21.891	74.000
9748.000	8.266	37.510	45.777	-28.223	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2452 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4904.000	0.000	43.150	43.151	-30.849	74.000
7356.000	8.308	44.330	52.638	-21.362	74.000
9808.000	7.850	37.670	45.520	-28.480	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4904.000	0.513	43.810	44.324	-29.676	74.000
7356.000	9.022	44.170	53.192	-20.808	74.000
9808.000	8.512	37.120	45.632	-28.368	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
59.100	-11.901	38.592	26.691	-13.309	40.000
284.140	-5.797	46.576	40.779	-5.221	46.000
344.280	-1.814	40.815	39.001	-6.999	46.000
398.600	0.879	36.888	37.767	-8.233	46.000
478.140	1.937	35.608	37.545	-8.455	46.000
699.300	2.956	33.062	36.018	-9.982	46.000
Vertical					
43.580	-10.919	42.349	31.430	-8.570	40.000
132.820	-3.932	36.833	32.901	-10.599	43.500
179.380	-0.824	34.957	34.133	-9.367	43.500
264.740	-5.071	35.097	30.027	-15.973	46.000
478.140	-3.423	36.120	32.697	-13.303	46.000
699.300	-0.024	42.244	42.220	-3.780	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
255.040	-5.409	41.721	36.312	-9.688	46.000
315.180	-4.628	46.701	42.073	-3.927	46.000
404.420	0.889	35.162	36.051	-9.949	46.000
480.080	1.870	36.365	38.235	-7.765	46.000
615.880	2.813	38.028	40.841	-5.159	46.000
676.020	2.841	33.688	36.530	-9.470	46.000
Vertical					
103.720	-5.090	37.238	32.147	-11.353	43.500
175.500	-1.842	36.226	34.384	-9.116	43.500
315.180	-4.108	40.217	36.109	-9.891	46.000
476.200	-3.462	36.643	33.181	-12.819	46.000
695.420	1.352	29.394	30.746	-15.254	46.000
928.220	3.640	23.698	27.338	-18.662	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
255.040	-5.409	44.700	39.291	-6.709	46.000
315.180	-4.628	46.373	41.745	-4.255	46.000
478.140	1.937	35.368	37.305	-8.695	46.000
615.880	2.813	36.691	39.504	-6.496	46.000
644.980	1.237	41.217	42.454	-3.546	46.000
705.120	2.774	34.855	37.629	-8.371	46.000
Vertical					
43.580	-10.919	40.811	29.892	-10.108	40.000
101.780	-5.570	40.185	34.614	-8.886	43.500
177.440	-1.248	35.494	34.246	-9.254	43.500
315.180	-4.108	39.780	35.672	-10.328	46.000
480.080	-3.390	36.034	32.644	-13.356	46.000
615.880	1.473	30.472	31.945	-14.055	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. “ * ”, 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 : IEEE 802.11b/g/n USB Wireless module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
37.760	-2.539	24.625	22.087	-17.913	40.000
239.520	-6.878	36.206	29.328	-16.672	46.000
346.220	-1.347	31.794	30.447	-15.553	46.000
431.580	0.757	32.113	32.870	-13.130	46.000
476.200	1.988	32.747	34.735	-11.265	46.000
714.820	3.801	25.089	28.890	-17.110	46.000
Vertical					
43.580	-10.919	38.251	27.332	-12.668	40.000
107.600	-4.027	37.949	33.922	-9.578	43.500
171.620	-3.691	37.585	33.894	-9.606	43.500
350.100	-1.278	31.556	30.278	-15.722	46.000
478.140	-3.423	33.473	30.050	-15.950	46.000
699.300	-0.024	29.764	29.740	-16.260	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. “ * ”, 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.

5. RF antenna conducted test

5.1. Test Equipment

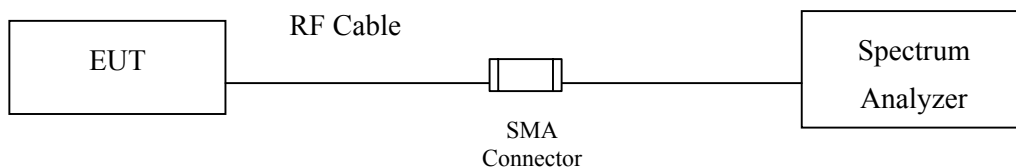
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2010
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2010
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2010
	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

- 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. The power combiner is used for measure 11n mode.

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 Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

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

5.5. Uncertainty

The measurement uncertainty

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

5.6. Test Result of RF antenna conducted test

Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : RF antenna conducted test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel 01 (2412MHz) 30-25GHz



Channel 06 (2437MHz) 30-25GHz



Channel 11 (2462MHz) 30-25GHz

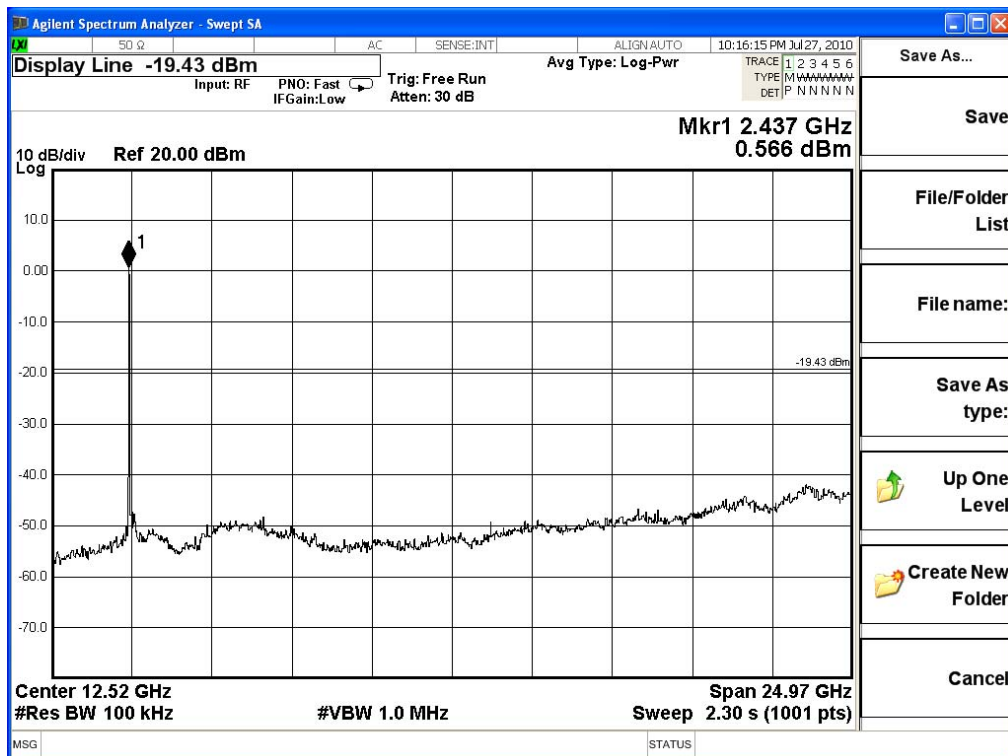


Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel 01 (2412MHz) 30-25GHz



Channel 06 (2437MHz) 30-25GHz



Channel 11 (2462MHz) 30-25GHz



Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel 01 (2412MHz) 30-25GHz



Channel 06 (2437MHz) 30-25GHz



Channel 11 (2462MHz) 30-25GHz

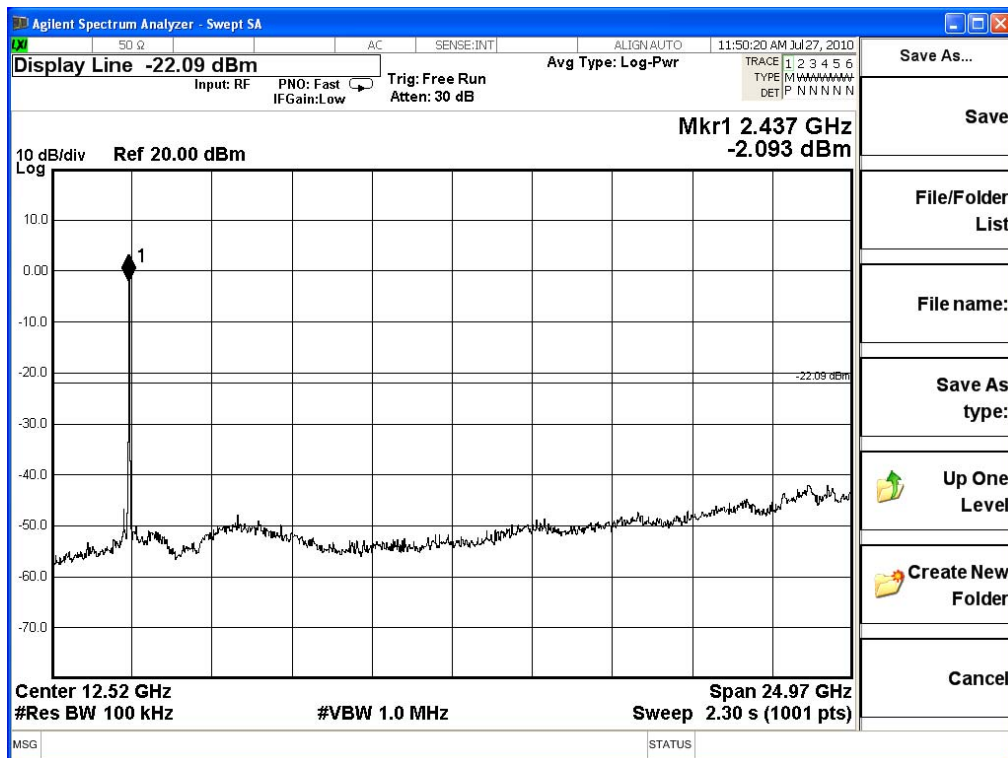


Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)

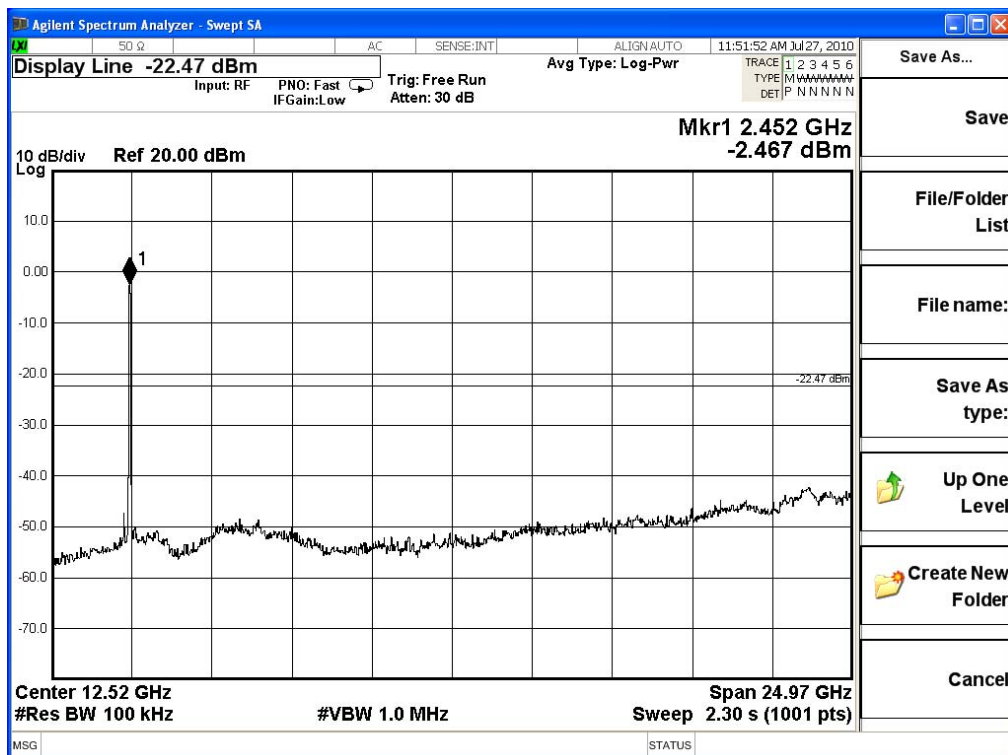
Channel 01 (2422MHz) 30-25GHz



Channel 04 (2437MHz) 30-25GHz



Channel 07 (2452MHz) 30-25GHz



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, 2010
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2010
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2010
	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

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. The power combiner is used for measure 11n mode.

RF Radiated Measurement:

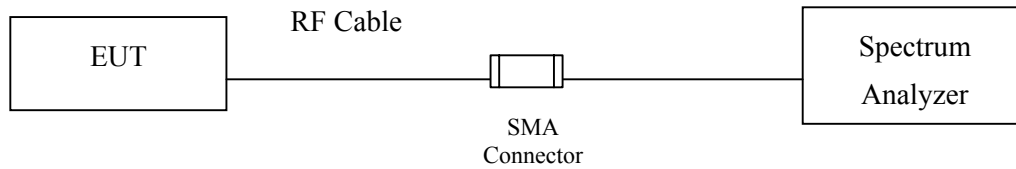
The following test equipments are used during the band edge tests:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2009
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2009
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2010
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2009
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2010
		Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2009
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2010
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

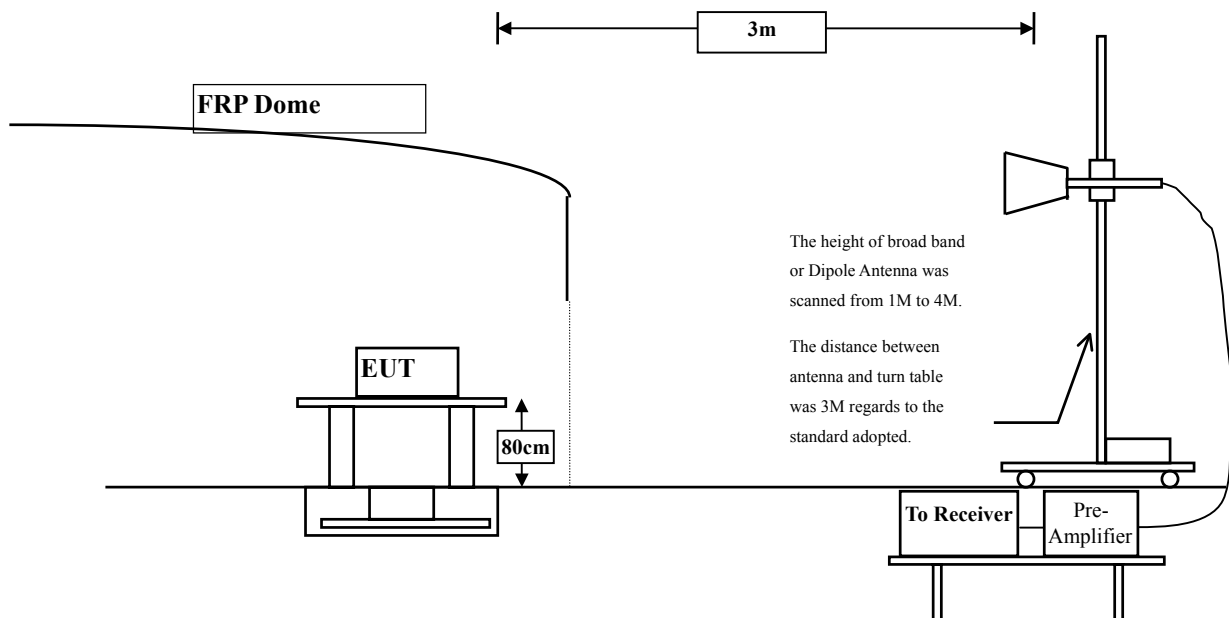
- Note:
1. All instruments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

6.2. Test Setup

RF 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 C63.4, 2003 and tested according to DTS test procedure of Mar. 2005 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 C63.4:2003 on radiated measurement.

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

6.6. Test Result of Band Edge

Product : IEEE 802.11b/g/n USB Wireless module
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2412	31.639	61.44	93.078	Peak
Horizontal	2412	31.639	56.83	88.468	Average
Vertical	2412	30.95	73.14	104.089	Peak
Vertical	2412	30.95	66.81	97.759	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Detector
Horizontal	2390	93.078	48.8	44.278	Peak
Horizontal	2390	88.468	57.87	30.598	Average
Vertical	2390	104.089	48.8	55.289	Peak
Vertical	2390	97.759	57.87	39.889	Average

Note:

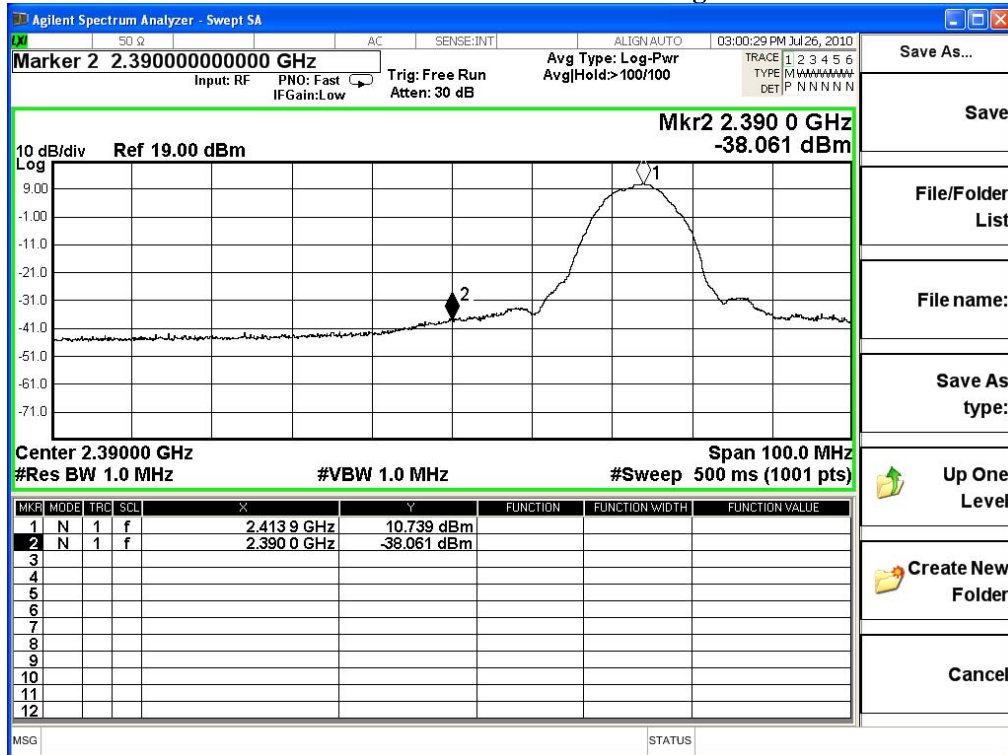
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Δ

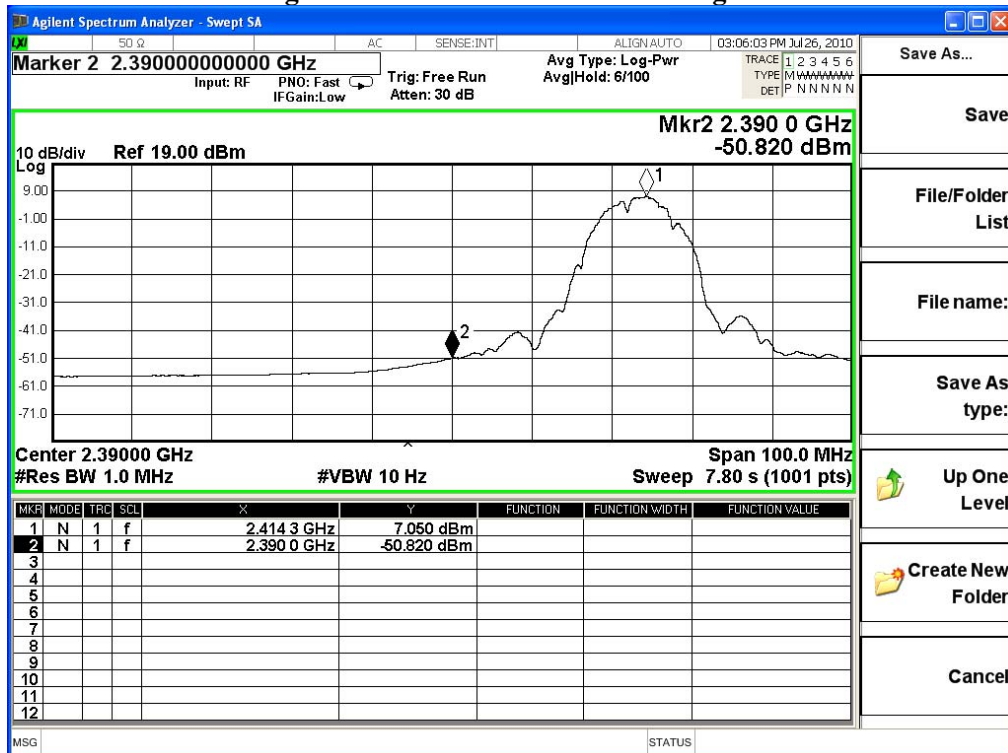
F = Fundamental field Strength (Peak or Average)

Δ = Conducted Band Edge Delta (Peak or Average)

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2462	32.019	61.89	93.909	Peak
Horizontal	2462	32.019	51.69	83.709	Average
Vertical	2462	31.29	73.45	104.74	Peak
Vertical	2462	31.29	68.52	99.81	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Detector
Horizontal	2483.5	93.909	47.121	46.788	Peak
Horizontal	2483.5	83.709	55.165	28.544	Average
Vertical	2483.5	104.74	47.121	57.619	Peak
Vertical	2483.5	99.81	55.165	44.645	Average

Note:

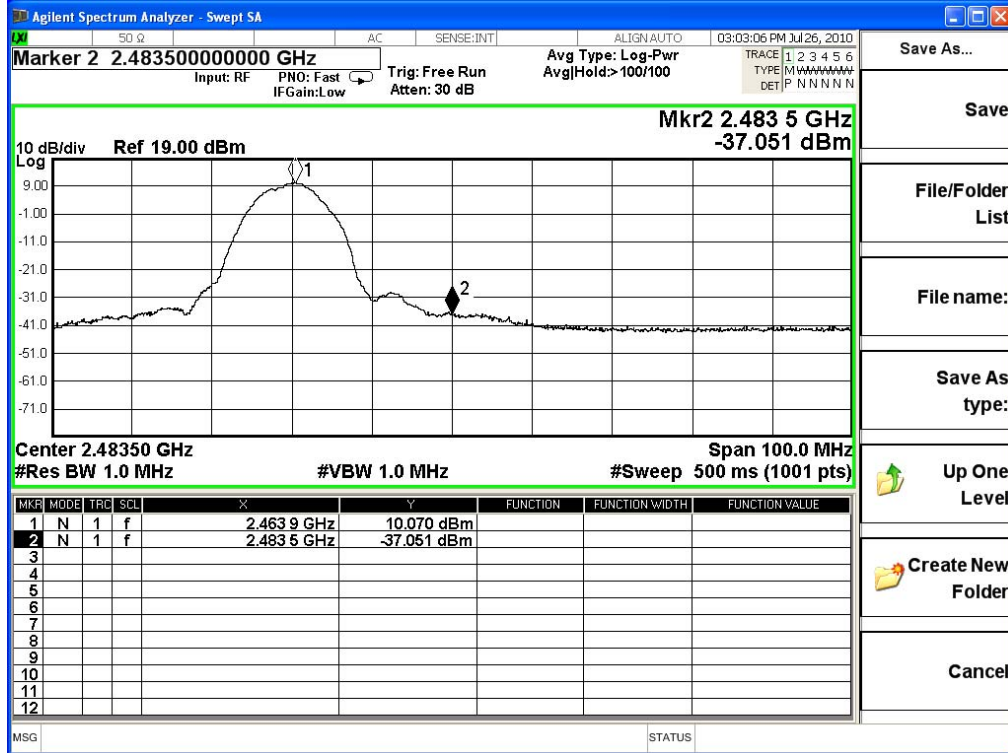
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Δ

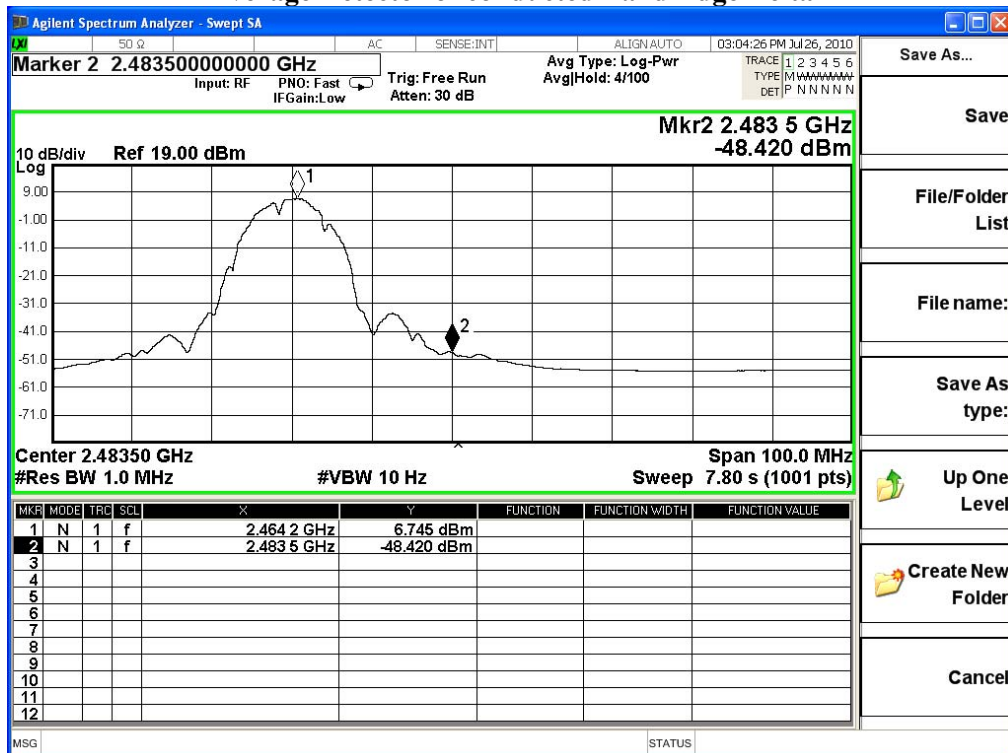
F = Fundamental field Strength (Peak or Average)

Δ = Conducted Band Edge Delta (Peak or Average)

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2412	31.639	62.4	94.038	Peak
Horizontal	2412	31.639	47.92	79.558	Average
Vertical	2412	30.95	74.47	105.419	Peak
Vertical	2412	30.95	57.07	88.019	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Detector
Horizontal	2390	94.038	36.81	57.228	Peak
Horizontal	2390	79.558	40.591	38.967	Average
Vertical	2390	105.419	36.81	68.609	Peak
Vertical	2390	88.019	40.591	47.428	Average

Note:

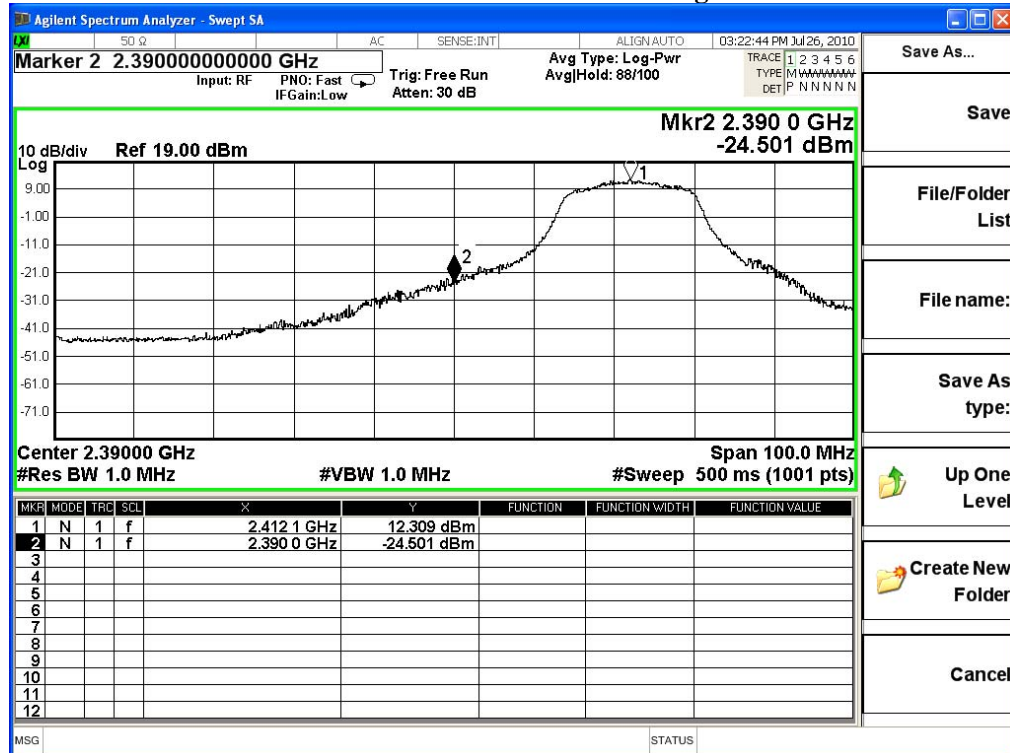
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Δ

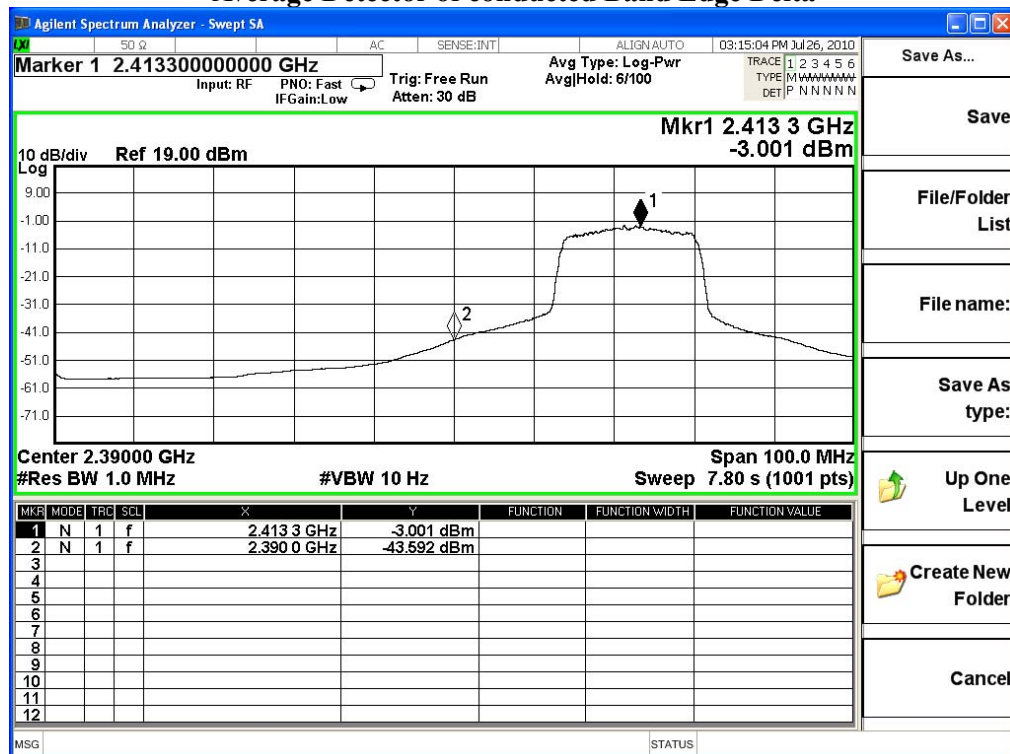
F = Fundamental field Strength (Peak or Average)

Δ = Conducted Band Edge Delta (Peak or Average)

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2462	32.019	63.39	95.409	Peak
Horizontal	2462	32.019	49.16	81.179	Average
Vertical	2462	31.29	75.16	106.45	Peak
Vertical	2462	31.29	59.64	90.93	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Detector
Horizontal	2483.5	95.409	38.242	57.167	Peak
Horizontal	2483.5	81.179	41.807	39.372	Average
Vertical	2483.5	106.45	38.242	68.208	Peak
Vertical	2483.5	90.93	41.807	49.123	Average

Note:

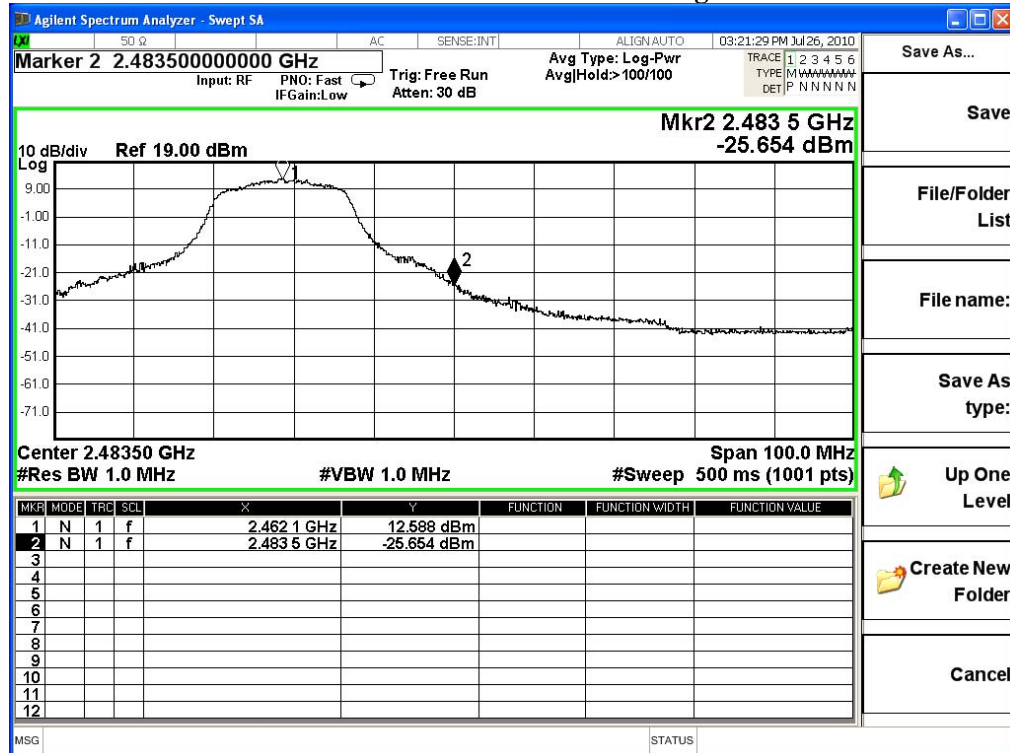
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Δ

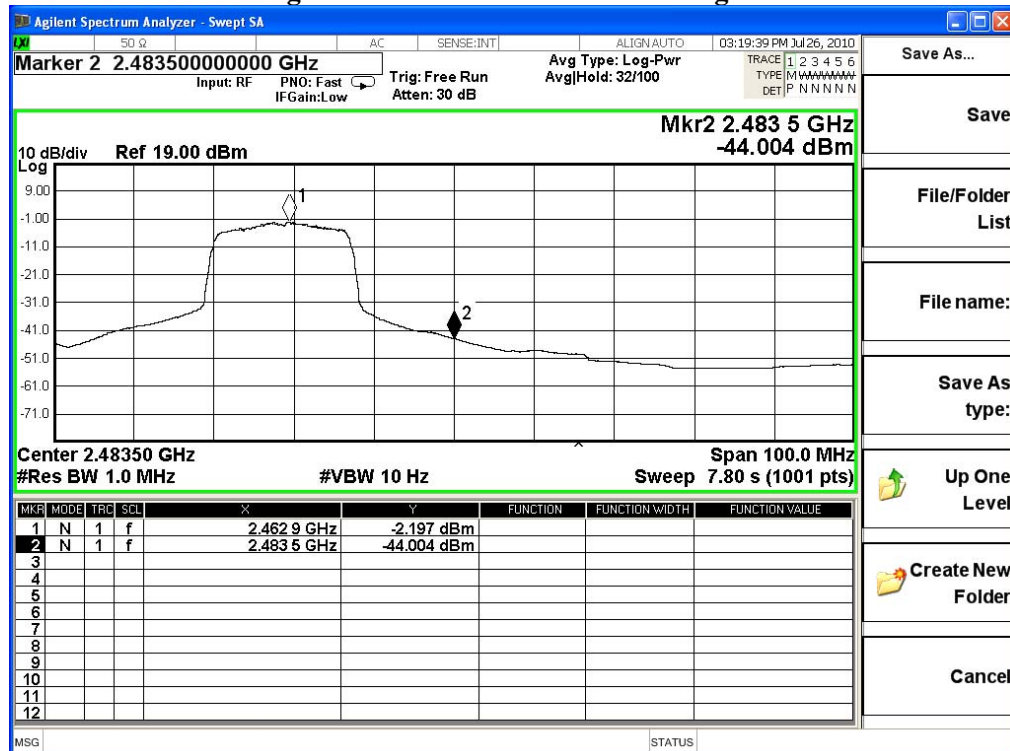
F = Fundamental field Strength (Peak or Average)

Δ = Conducted Band Edge Delta (Peak or Average)

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : IEEE 802.11b/g/n USB Wireless module
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2412	31.639	60.46	92.098	Peak
Horizontal	2412	31.639	46.48	78.118	Average
Vertical	2412	30.95	73.08	104.029	Peak
Vertical	2412	30.95	56.5	87.449	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Detector
Horizontal	2390	92.098	37.077	55.021	Peak
Horizontal	2390	78.118	41.019	37.099	Average
Vertical	2390	104.029	37.077	66.952	Peak
Vertical	2390	87.449	41.019	46.43	Average

Note:

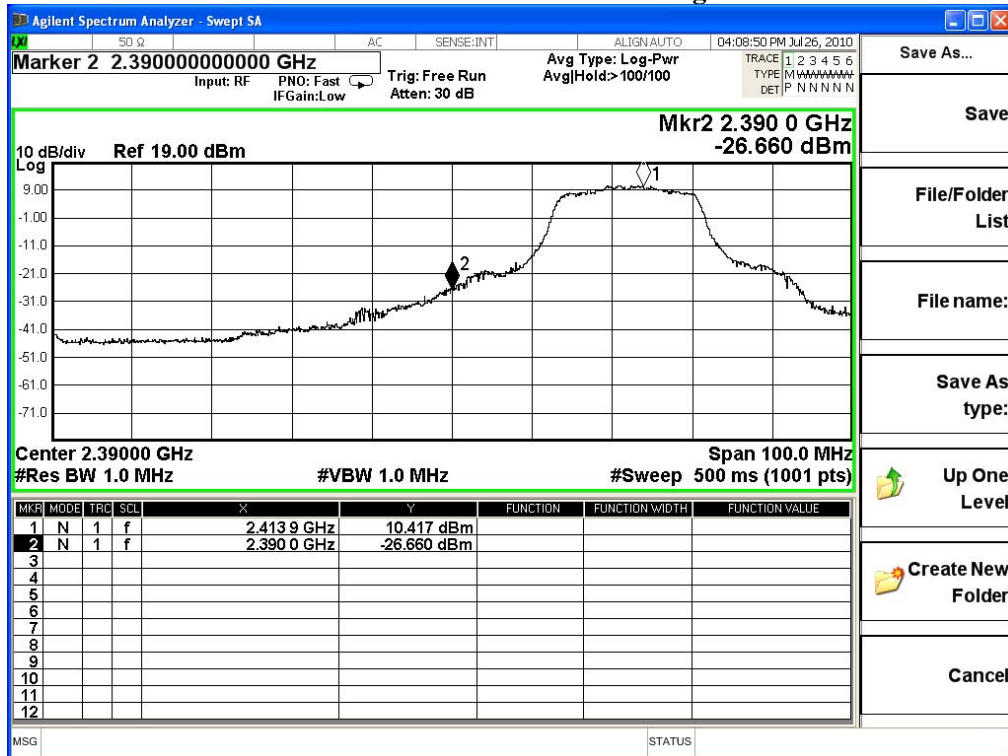
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Δ

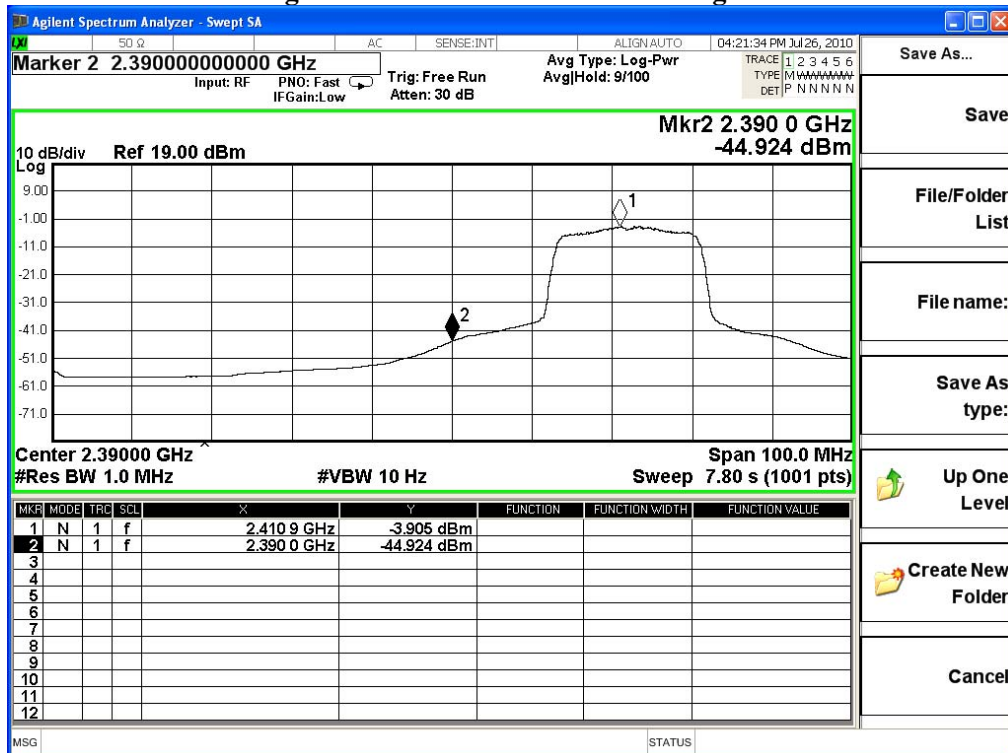
F = Fundamental field Strength (Peak or Average)

Δ = Conducted Band Edge Delta (Peak or Average)

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2462	32.019	62.5	94.519	Peak
Horizontal	2462	32.019	40.38	72.399	Average
Vertical	2462	31.29	71.79	103.08	Peak
Vertical	2462	31.29	57.47	88.76	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Detector
Horizontal	2483.5	94.519	39.669	54.85	Peak
Horizontal	2483.5	72.399	41.674	30.725	Average
Vertical	2483.5	103.08	39.669	63.411	Peak
Vertical	2483.5	88.76	41.674	47.086	Average

Note:

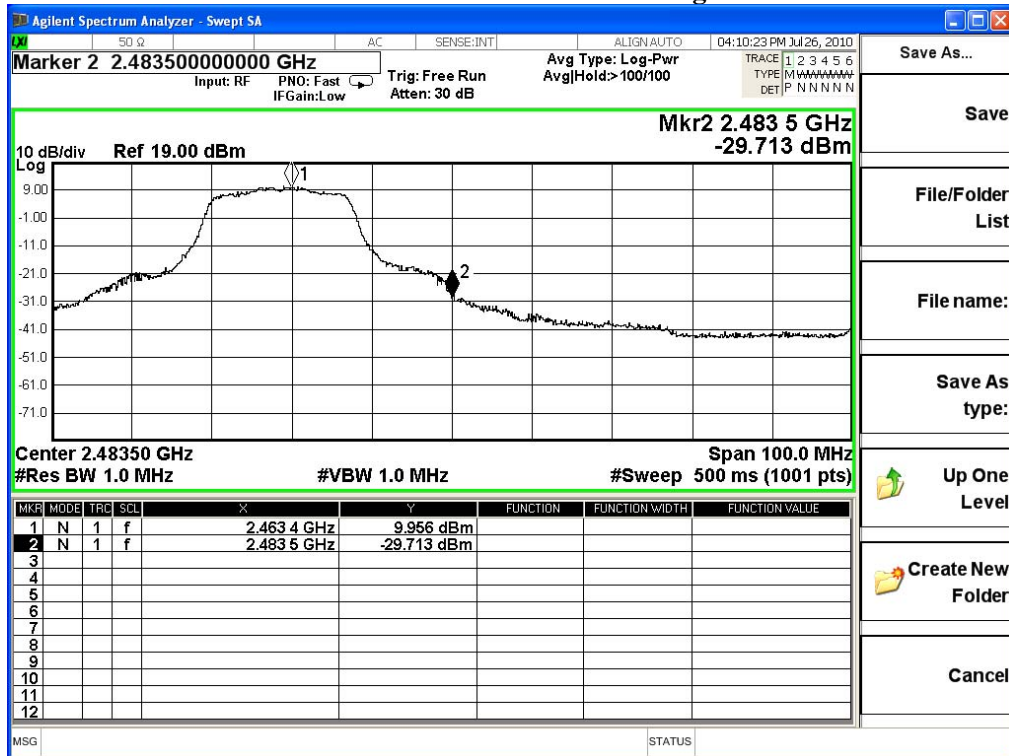
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Δ

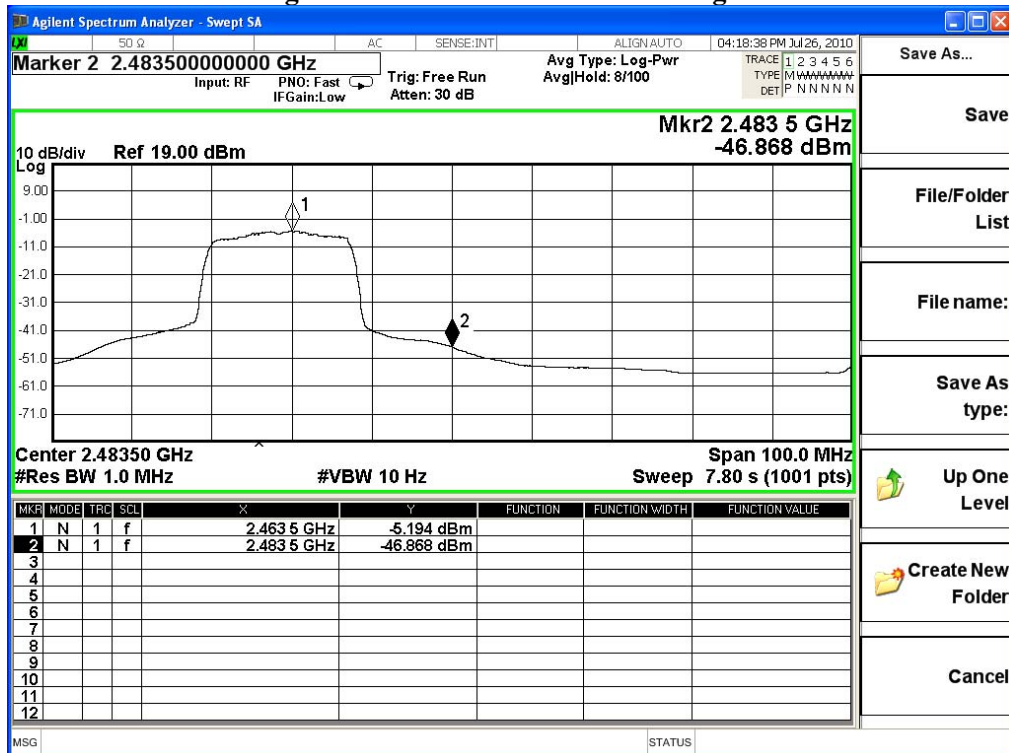
F = Fundamental field Strength (Peak or Average)

Δ = Conducted Band Edge Delta (Peak or Average)

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : IEEE 802.11b/g/n USB Wireless module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2422MHz)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2422	31.715	59.34	91.055	Peak
Horizontal	2422	31.715	35.27	66.985	Average
Vertical	2422	31.017	69.83	100.847	Peak
Vertical	2422	31.017	42.66	73.677	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Detector
Horizontal	2390	91.055	31.964	59.091	Peak
Horizontal	2390	66.985	23.615	43.37	Average
Vertical	2390	100.847	31.964	68.883	Peak
Vertical	2390	73.677	23.615	50.062	Average

Note:

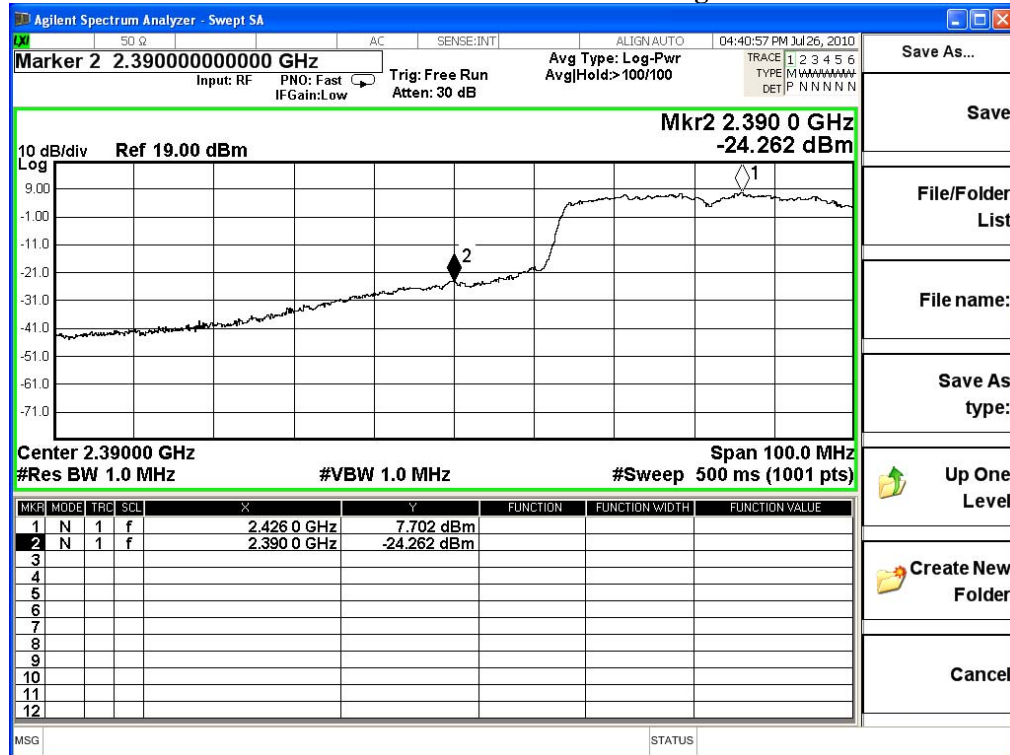
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Δ

F = Fundamental field Strength (Peak or Average)

Δ = Conducted Band Edge Delta (Peak or Average)

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta

