



Test Report

Product Name	Notebook
Model No	MS-1243, MS-1241
FCC ID.	I4L-1243-E7306891
Transmitter Module	Ralink / MS-6891

Applicant	MICRO-STAR INT'L Co., LTD.
Address	No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan, R.O.C.

Date of Receipt	Aug. 25, 2009
Issue Date	Nov. 16, 2009
Report No.	098447R-RFUSP28V01
Report Version	V1.0

The test results relate only to the samples tested.

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Test Report Certification

Issue Date: Nov. 16, 2009

Report No.: 098447R-RFUSP28V01



Accredited by NIST (NVLAP)
NVLAP Lab Code: 200533-0

Product Name	Notebook
Applicant	MICRO-STAR INT'L Co., LTD.
Address	No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan, R.O.C.
Manufacturer	MICRO-STAR INT'L Co., LTD.
Model No.	MS-1243, MS-1241
EUT Rated Voltage	AC 100-240V/50-60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	MSI
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2008 ANSI C63.4: 2003
Test Result	Complied



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Notebook
Trade Name	MSI
Model No.	MS-1243, MS-1241
FCC ID.	I4L-1243-E7306891
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
Power Adapter	DELTA, ADP-65HB BB Cable Out: Non-shielded, 1.8m, with one ferrite core bonded.

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	JOINSON	S79-1800K90-J51	1.76 dBi in 2.4GHz

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 a Notebook with a built-in 2.4GHz WLAN transceiver.
2. The EUT is including two models for difference is CPU.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps 、 802.11g is 6Mbps 、 802.11n(20M-BW) is 6.5Mbps and 、 802.11n(40M-BW) is 13.5Mbps)
5. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices
6. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

The EUT is a Notebook 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 150Mbps(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) SISO technology.

This Notebook, 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 Notebook 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)

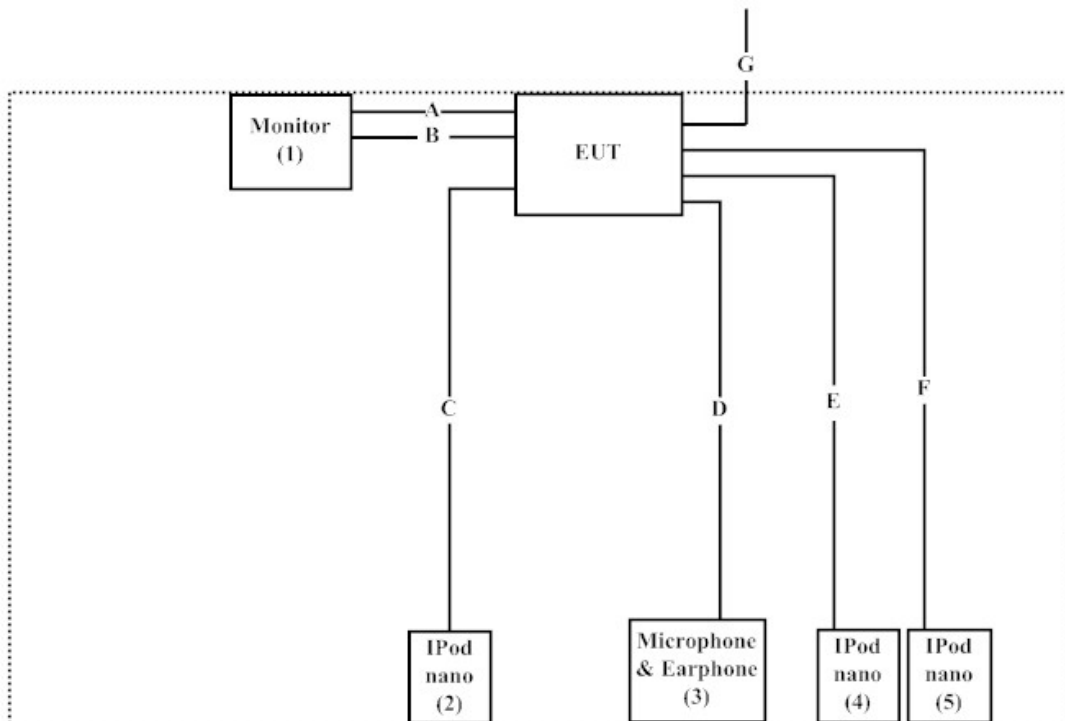
1.3. Tested System Details

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)	Monitor	Dell	2407WFPb	CN-0YY528-46633-796-12T S	N/A
(2)	iPod nano	Apple	A1199	5U704829VQ5	N/A
(3)	Microphone & Earphone	PCHOME	N/A	N/A	N/A
(4)	iPod nano	Apple	A1199	YM706L7GVQ5	N/A
(5)	iPod nano	Apple	A1199	5U72892MVQ5	N/A

Signal Cable Type	Signal cable Description
A	HDMI Cable
B	VGA Cable
C	iPod Cable
D	Microphone & Earphone Cable
E	iPod Cable
F	iPod Cable
G	RJ-45 Cable

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute “QA Test ”Ver 1.2.0.1 on the EUT.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press “OK” to start the continuous transmission.
- (5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

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

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

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 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

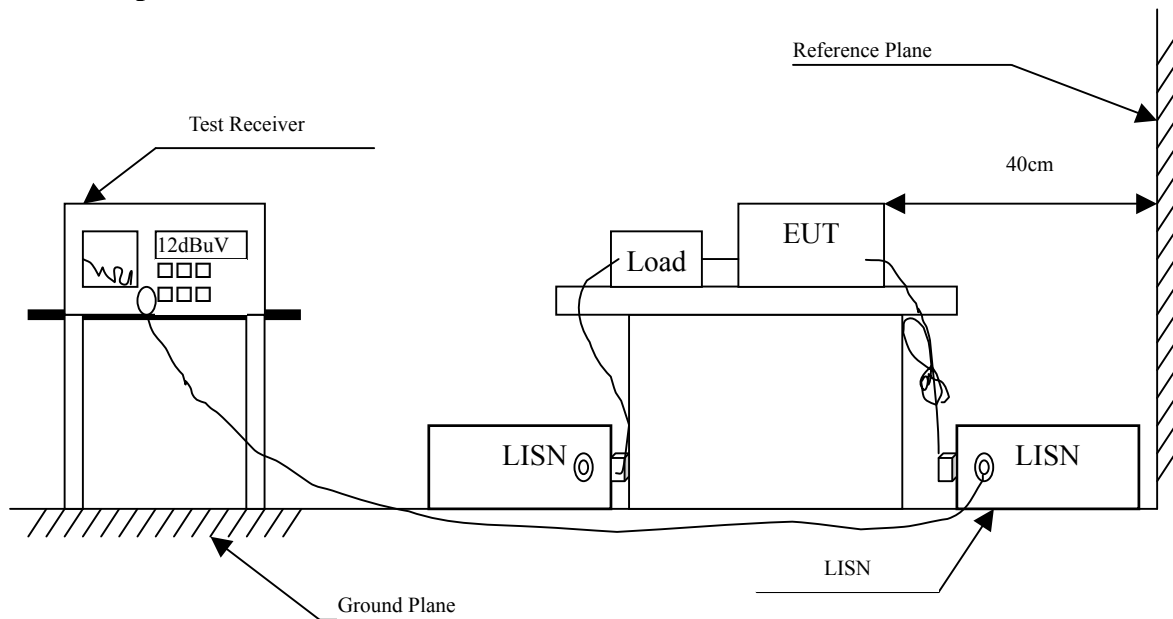
2.1. Test Equipment

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, 2009	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2009	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2009	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2009	
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 : Notebook
 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					
0.209	9.701	35.020	44.721	-19.593	64.314
0.252	9.675	31.890	41.565	-21.521	63.086
0.275	9.659	31.620	41.279	-21.150	62.429
0.318	9.650	24.140	33.790	-27.410	61.200
0.877	9.669	21.810	31.479	-24.521	56.000
15.091	9.990	27.250	37.240	-22.760	60.000
Average					
0.209	9.701	19.950	29.651	-24.663	54.314
0.252	9.675	15.360	25.035	-28.051	53.086
0.275	9.659	19.170	28.829	-23.600	52.429
0.318	9.650	7.130	16.780	-34.420	51.200
0.877	9.669	4.210	13.879	-32.121	46.000
15.091	9.990	20.860	30.850	-19.150	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 : Notebook
 Test Item : Conducted Emission Test
 Power Line : Line 2
 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 2					
Quasi-Peak					
0.205	9.713	35.460	45.173	-19.256	64.429
0.220	9.703	28.820	38.523	-25.477	64.000
0.275	9.669	31.220	40.889	-21.540	62.429
0.310	9.660	22.080	31.740	-29.689	61.429
0.877	9.671	22.680	32.351	-23.649	56.000
15.045	10.000	26.540	36.540	-23.460	60.000
Average					
0.205	9.713	22.590	32.303	-22.126	54.429
0.220	9.703	3.450	13.153	-40.847	54.000
0.275	9.669	19.570	29.239	-23.190	52.429
0.310	9.660	2.170	11.830	-39.599	51.429
0.877	9.671	7.000	16.671	-29.329	46.000
15.045	10.000	19.170	29.170	-20.830	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

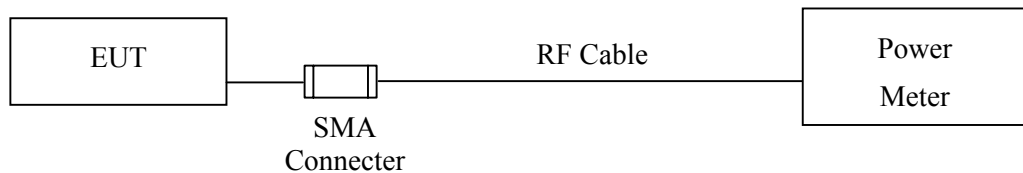
The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Power Meter	Anritsu	ML2495A/6K00003357	May, 2009
X Power Sensor	Anritsu	MA2491A/034457	May, 2009

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

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

Cable Loss=0.5dB		Peak Power Output					
Channel No	Frequency (MHz)	Data Rate				Peak Power	Required Limit
		1	2	5.5	11	1	
1	2412.00	10.22	--	--	--	15.00	1Watt= 30 dBm
6	2437.00	10.32	10.11	9.63	9.21	15.01	1Watt= 30 dBm
11	2462.00	10.35	--	--	--	15.09	1Watt= 30 dBm

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

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

Cable Loss=0.5dB		Peak Power Output									
Channel No.	Frequency (MHz)	Data Rate								Peak Power	Required Limit
		6	9	12	18	24	36	48	54	6	
1	2412.00	14.25	--	--	--	--	--	--	--	17.00	1Watt= 30 dBm
6	2437.00	14.90	14.61	14.05	13.86	13.51	13.22	12.95	12.43	18.9	1Watt= 30 dBm
11	2462.00	14.57	--	--	--	--	--	--	--	18.7	1Watt= 30 dBm

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

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

Cable Loss=0.5dB		Peak Power Output									
Channel No.	Frequency (MHz)	Data Rate								Peak Power	Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS0	
1	2412.00	12.07	--	--	--	--	--	--	--	20.13	1Watt= 30 dBm
6	2437.00	12.03	11.82	11.61	11.37	11.05	10.82	10.46	10.13	20.07	1Watt= 30 dBm
11	2462.00	12.74	--	--	--	--	--	--	--	21.76	1Watt= 30 dBm

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

Product : Notebook
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)

Cable Loss=0.5dB		Peak Power Output (dBm)										
Channel No.	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS0		
3	2422.00	7.85	--	--	--	--	--	--	--	--	21.21	1Watt= 30 dBm
6	2437.00	8.13	8.03	7.84	7.62	7.49	7.33	6.88	6.5		22.11	1Watt= 30 dBm
9	2452.00	7.99	--	--	--	--	--	--	--	--	20.98	1Watt= 30 dBm

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

4. Radiated Emission

4.1. Test Equipment

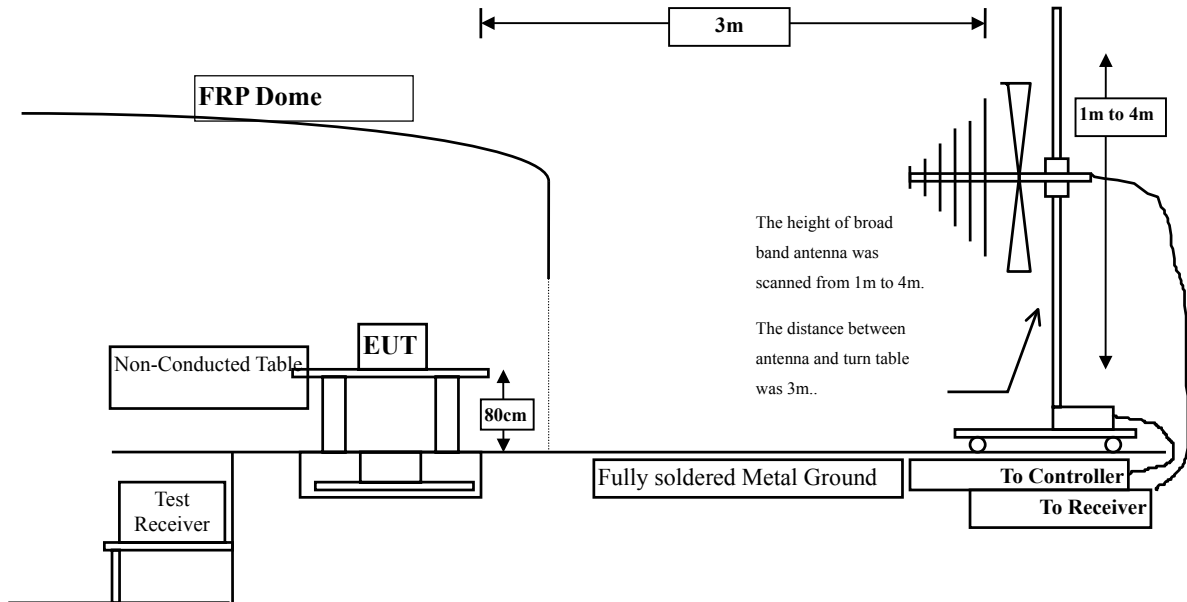
The following test equipment are used during the radiated emission test:

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., 2009
	X	Pre-Amplifier	AGILENT	8447D/2944A09549	Sep., 2009
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2009
	X	Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2009
	X	Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2009
	X	Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

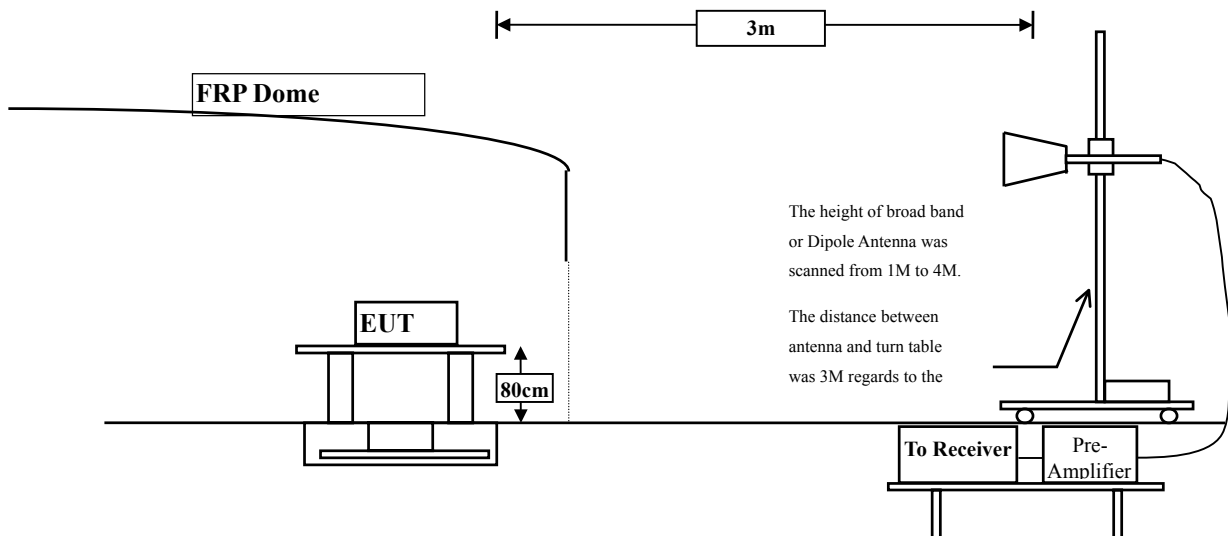
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

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 measurement frequency range from 30MHz - 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 : Notebook
 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	5.206	45.790	50.996	-23.004	74.000
7236.000	10.500	41.400	51.900	-22.100	74.000
9648.000	15.867	40.020	55.887	-18.113	74.000
Average Detector:					
9648.000	15.867	29.280	45.147	-8.853	54.000
Vertical					
Peak Detector:					
4824.000	5.298	43.330	48.628	-25.372	74.000
7236.000	11.445	41.840	53.285	-20.715	74.000
9648.000	16.345	39.710	56.055	-17.945	74.000
Average Detector:					
9648.000	16.345	28.940	45.285	-8.715	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 : Notebook
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
Horizontal					
Peak Detector:					
4874.000	5.091	46.530	51.621	-22.379	74.000
7311.000	10.089	42.140	52.229	-21.771	74.000
9748.000	15.595	39.120	54.715	-19.285	74.000
Average Detector:					
9748.000	15.595	29.160	44.755	-9.245	54.000
Vertical					
Peak Detector:					
4874.000	5.565	44.470	50.036	-23.964	74.000
7311.000	10.902	41.950	52.852	-21.148	74.000
9748.000	15.694	39.880	55.574	-18.426	74.000
Average Detector:					
9748.000	15.694	29.080	44.774	-9.226	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
 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	5.487	44.240	49.728	-24.272	74.000
7386.000	9.028	40.860	49.889	-24.111	74.000
9848.000	15.951	39.400	55.350	-18.650	74.000
Average Detector:					
9848.000	15.951	28.970	44.920	-9.080	54.000
Vertical					
Peak Detector:					
4924.000	6.344	43.110	49.455	-24.545	74.000
7386.000	9.709	40.920	50.630	-23.370	74.000
9848.000	15.920	39.340	55.260	-18.740	74.000
Average Detector:					
9848.000	15.920	28.980	44.900	-9.100	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

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

Frequency MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
Horizontal					
Peak Detector:					
4824.000	5.206	50.920	56.126	-17.874	74.000
7236.000	10.500	43.700	54.200	-19.800	74.000
9648.000	15.867	38.540	54.407	-19.593	74.000
Average					
Detector:					
4824.000	5.206	38.310	43.516	-10.484	54.000
7236.000	10.500	31.870	42.370	-11.630	54.000
9648.000	15.867	28.340	44.207	-9.793	54.000
Vertical					
Peak Detector:					
4824.000	5.298	46.010	51.308	-22.692	74.000
7236.000	11.445	44.680	56.125	-17.875	74.000
9848.000	15.920	39.270	55.190	-18.810	74.000
Average					
Detector:					
7236.000	11.445	32.470	43.915	-10.085	54.000
9848.000	15.920	28.420	44.340	-9.660	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

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

Frequency MHz	Correct Factor Db	Reading Level dBUV	Measurement Level dBUV/m	Margin Db	Limit dBUV/m
Horizontal					
Peak Detector:					
4874.000	5.091	51.510	56.601	-17.399	74.000
7236.000	10.500	44.560	55.060	-18.940	74.000
9748.000	15.595	39.670	55.265	-18.735	74.000
Average					
Detector:					
4874.000	5.091	44.800	49.891	-4.109	54.000
7311.000	10.089	32.270	42.359	-11.641	54.000
9748.000	15.595	28.900	44.495	-9.505	54.000
Vertical					
Peak Detector:					
4874.000	5.565	48.820	54.386	-19.614	74.000
7311.000	10.902	44.760	55.662	-18.338	74.000
9748.000	15.694	39.180	54.874	-19.126	74.000
Average					
Detector:					
4874.000	5.565	35.310	40.876	-13.124	54.000
7311.000	10.902	32.820	43.722	-10.278	54.000
9748.000	15.694	28.310	44.004	-9.996	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
 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	5.487	53.680	59.168	-14.832	74.000
7386.000	9.028	42.550	51.579	-22.421	74.000
9848.000	15.951	40.030	55.980	-18.020	74.000
Average Detector:					
4924.000	5.487	41.250	46.738	-7.262	54.000
9848.000	15.951	29.090	45.040	-8.960	54.000
Vertical					
Peak Detector:					
4924.000	6.344	50.770	57.115	-16.885	74.000
7386.000	9.709	43.210	52.920	-21.080	74.000
9848.000	15.920	38.900	54.820	-19.180	74.000
Average Detector:					
4924.000	6.344	38.130	44.474	-9.526	54.000
9848.000	15.920	29.020	44.940	-9.060	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
 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 MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
Horizontal					
Peak Detector:					
4824.000	5.206	49.360	54.566	-19.434	74.000
7236.000	10.500	45.560	56.060	-17.940	74.000
9648.000	15.867	39.630	55.497	-18.503	74.000
Average					
Detector:					
4824.000	5.206	34.430	39.636	-14.364	54.000
7236.000	10.500	30.470	40.970	-13.030	54.000
9648.000	15.867	28.460	44.327	-9.673	54.000
Vertical					
Peak Detector:					
4824.000	5.298	45.470	50.768	-23.232	74.000
7236.000	11.445	45.700	57.145	-16.855	74.000
9648.000	16.345	39.320	55.665	-18.335	74.000
Average					
Detector:					
7236.000	11.445	31.050	42.495	-11.505	54.000
9648.000	16.345	28.330	44.675	-9.325	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

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

Frequency MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
Horizontal					
Peak Detector:					
4874.000	5.091	50.030	55.121	-18.879	74.000
7311.000	10.089	44.000	54.089	-19.911	74.000
9748.000	15.595	39.410	55.005	-18.995	74.000
Average					
Detector:					
4874.000	5.091	33.100	38.191	-15.809	54.000
7311.000	10.089	30.000	40.089	-13.911	54.000
9748.000	15.595	28.130	43.725	-10.275	54.000
Vertical					
Peak Detector:					
4874.000	5.565	45.380	50.946	-23.054	74.000
7311.000	10.902	43.360	54.262	-19.738	74.000
9748.000	15.694	39.450	55.144	-18.856	74.000
Average					
Detector:					
7311.000	10.902	29.410	40.312	-13.688	54.000
9748.000	15.694	28.310	44.004	-9.996	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

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

Frequency MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	9.487	53.510	62.996	-11.004	74.000
7386.000	14.798	41.800	56.598	-17.402	74.000
9848.000	20.005	39.050	59.056	-14.944	74.000
Average Detector:					
4924.000	9.487	37.090	46.576	-7.424	54.000
7386.000	14.798	26.410	41.208	-12.792	54.000
9848.000	20.005	28.720	48.726	-5.274	54.000
Vertical					
Peak Detector:					
4924.000	9.415	50.490	59.904	-14.096	74.000
7386.000	15.269	43.720	58.989	-15.011	74.000
9848.000	19.191	39.050	58.241	-15.759	74.000
Average Detector:					
4924.000	9.415	34.620	44.034	-9.966	54.000
7386.000	15.269	28.520	43.789	-10.211	54.000
9848.000	19.191	28.990	48.181	-5.819	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2422MHz)

Frequency MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
Horizontal					
Peak Detector:					
4844.000	9.536	45.130	54.666	-19.334	74.000
7266.000	14.459	36.280	50.739	-23.261	74.000
9688.000	19.847	38.940	58.787	-15.213	74.000
Average					
Detector:					
4844.000	9.536	31.840	41.376	-12.624	54.000
9688.000	19.847	28.620	48.467	-5.533	54.000
Vertical					
Peak Detector:					
4844.000	8.627	41.310	49.937	-24.063	74.000
7266.000	15.363	37.070	52.434	-21.566	74.000
9688.000	19.057	38.650	57.707	-16.293	74.000
Average					
Detector:					
9688.000	19.057	28.860	47.917	-6.083	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
 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 MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4874.000	9.473	47.130	56.603	-17.397	74.000
7311.000	14.540	35.780	50.319	-23.681	74.000
9748.000	20.024	39.030	59.055	-14.945	74.000
Average					
Detector:					
4874.000	9.473	34.550	44.023	-9.977	54.000
9748.000	20.024	28.910	48.935	-5.065	54.000
Vertical					
Peak Detector:					
4874.000	8.882	42.180	51.061	-22.939	74.000
7311.000	15.283	36.990	52.273	-21.727	74.000
9748.000	19.228	38.880	58.109	-15.891	74.000
Average					
Detector:					
9748.000	19.228	28.900	48.129	-5.871	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
 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	9.518	47.130	56.648	-17.352	74.000
7536.000	15.588	36.280	51.868	-22.132	74.000
9808.000	20.066	39.020	59.086	-14.914	74.000
Average Detector:					
4904.000	9.518	32.260	41.778	-12.222	54.000
9808.000	20.066	28.960	49.026	-4.974	54.000
Vertical					
Peak Detector:					
4904.000	9.235	43.060	52.294	-21.706	74.000
7356.000	15.318	35.980	51.298	-22.702	74.000
9808.000	19.266	38.950	58.216	-15.784	74.000
Average Detector:					
9808.000	19.266	29.030	48.296	-5.704	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.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

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

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
35.820	-1.516	35.665	34.149	-5.851	40.000
286.080	-5.822	39.715	33.893	-12.107	46.000
466.500	3.015	31.368	34.383	-11.617	46.000
555.740	2.645	32.273	34.918	-11.082	46.000
827.340	7.244	30.201	37.455	-8.545	46.000
988.360	7.349	32.628	40.007	-13.993	54.000
Vertical					
30.000	-3.088	35.570	32.482	-7.518	40.000
286.080	-5.612	39.103	33.491	-12.509	46.000
357.860	-1.339	34.535	33.196	-12.804	46.000
499.480	-0.383	33.705	33.322	-12.678	46.000
790.480	2.597	33.510	36.107	-9.893	46.000
932.100	3.190	31.186	34.376	-11.624	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 : Notebook
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
35.820	-1.516	35.868	34.352	-5.648	40.000
286.080	-5.822	39.872	34.050	-11.950	46.000
462.620	3.449	30.981	34.430	-11.570	46.000
697.360	3.097	32.396	35.493	-10.507	46.000
813.760	6.213	31.265	37.478	-8.522	46.000
1000.000	9.421	29.951	39.372	-14.628	54.000
Vertical					
30.000	-3.088	34.736	31.648	-8.352	40.000
286.080	-5.612	39.405	33.793	-12.207	46.000
357.860	-1.339	35.068	33.729	-12.271	46.000
501.420	-0.290	33.612	33.323	-12.677	46.000
691.540	1.962	30.989	32.952	-13.048	46.000
786.600	2.622	32.014	34.637	-11.363	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 : Notebook
 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 MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
30.000	-0.228	35.414	35.186	-4.814	40.000
286.080	-5.822	39.232	33.410	-12.590	46.000
431.580	0.597	32.652	33.249	-12.751	46.000
881.660	6.584	31.818	38.402	-7.598	46.000
932.100	7.030	31.605	38.635	-7.365	46.000
1000.000	9.421	29.800	39.221	-14.779	54.000
Vertical					
30.000	-3.088	34.921	31.833	-8.167	40.000
175.500	-2.042	32.842	30.800	-12.700	43.500
286.080	-5.612	39.506	33.894	-12.106	46.000
540.220	1.947	30.696	32.643	-13.357	46.000
604.240	1.964	30.918	32.883	-13.117	46.000
934.040	2.746	31.463	34.209	-11.791	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 : Notebook
 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 MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
30.000	-0.228	36.306	36.078	-3.922	40.000
286.080	-5.822	39.166	33.344	-12.656	46.000
460.680	3.891	32.234	36.125	-9.875	46.000
584.840	3.008	31.333	34.341	-11.659	46.000
856.440	6.950	30.397	37.347	-8.653	46.000
1000.000	9.421	31.106	40.527	-13.473	54.000
Vertical					
30.000	-3.088	34.886	31.798	-8.202	40.000
286.080	-5.612	38.974	33.362	-12.638	46.000
357.860	-1.339	34.898	33.559	-12.441	46.000
503.360	-0.280	33.981	33.701	-12.299	46.000
687.660	2.166	30.557	32.724	-13.276	46.000
786.600	2.622	32.311	34.934	-11.066	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

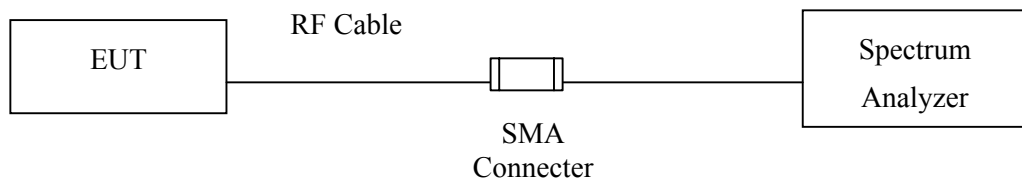
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Nov, 2009
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2009

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

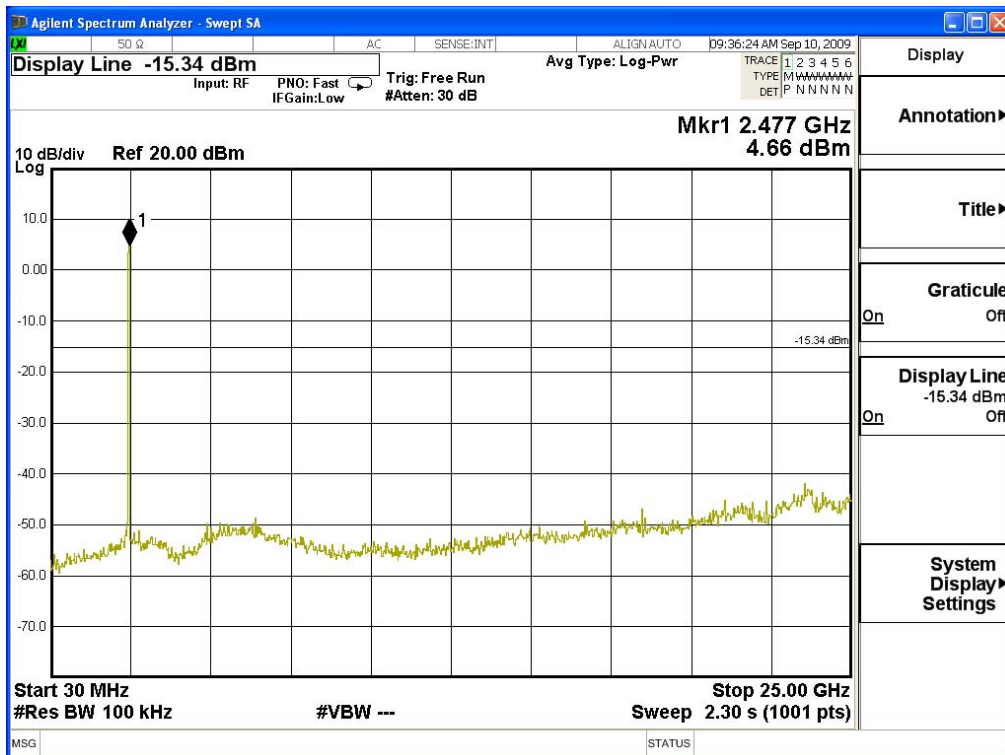
Channel 01 (2412MHz) 30 MHz -25GHz



Channel 06 (2437MHz) 30 MHz -25GHz



Channel 11 (2462MHz) 30 MHz -25GHz

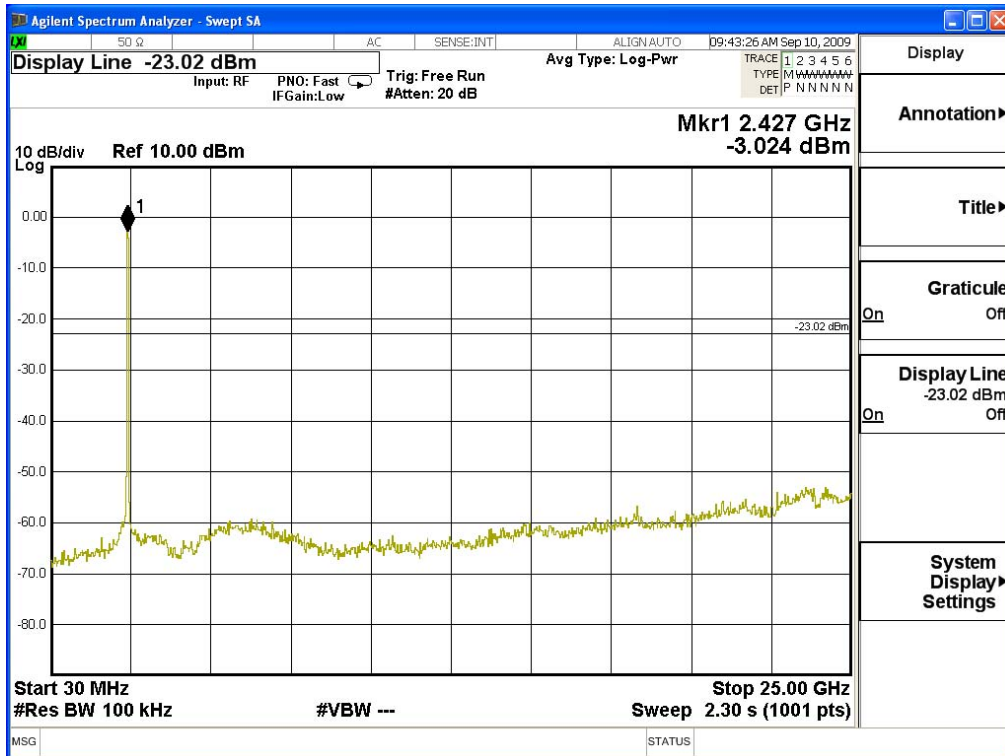


Product : Notebook
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

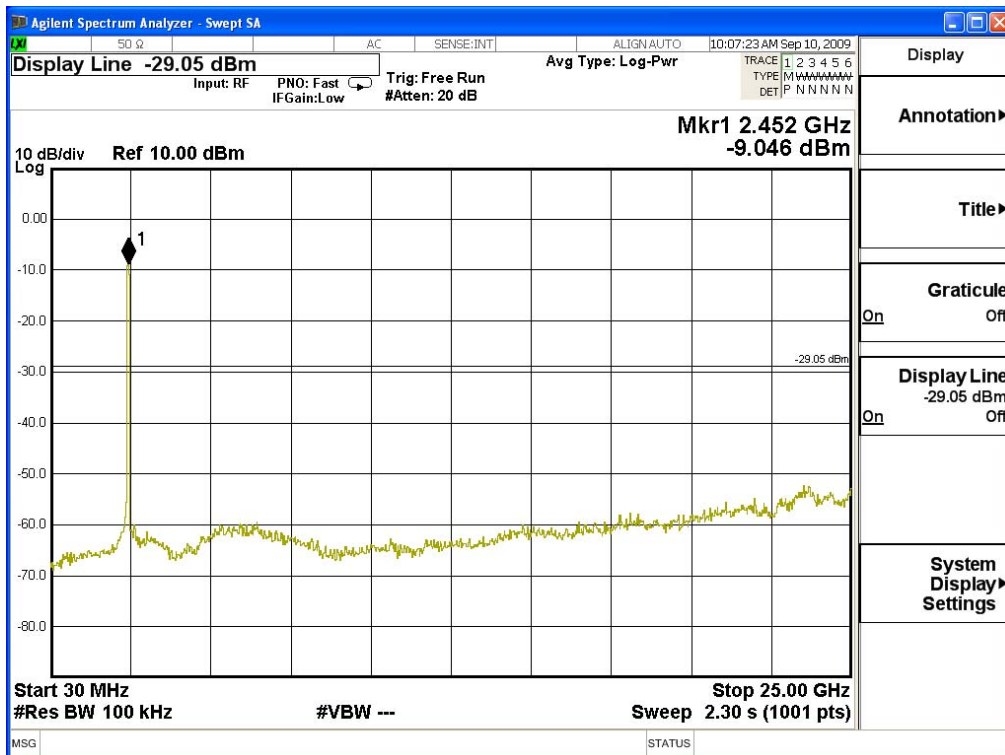
Channel 01 (2412MHz) 30 MHz -25GHz



Channel 06 (2437MHz) 30 MHz -25GHz



Channel 11 (2462MHz) 30 MHz -25GHz

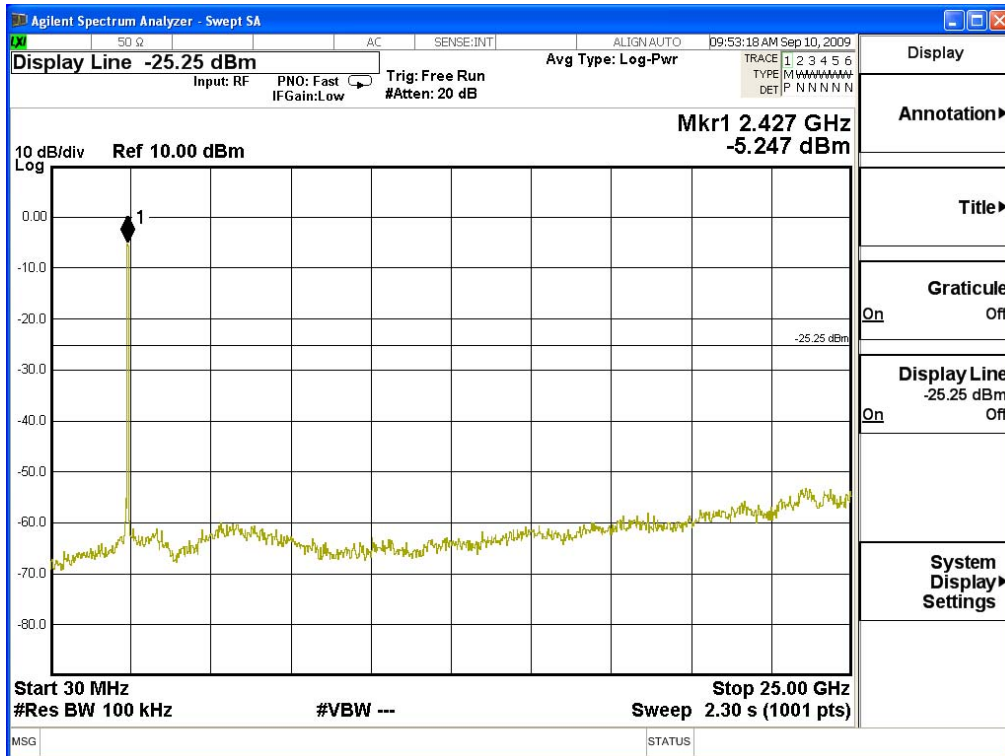


Product : Notebook
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

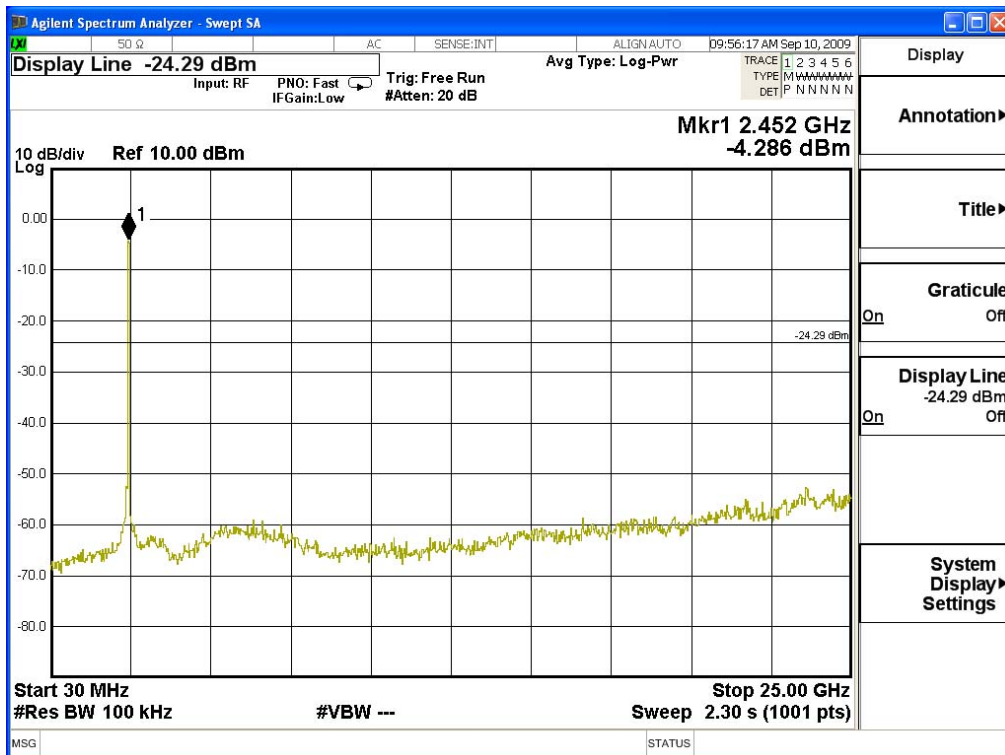
Channel 01 (2412MHz) 30 MHz -25GHz



Channel 06 (2437MHz) 30 MHz -25GHz

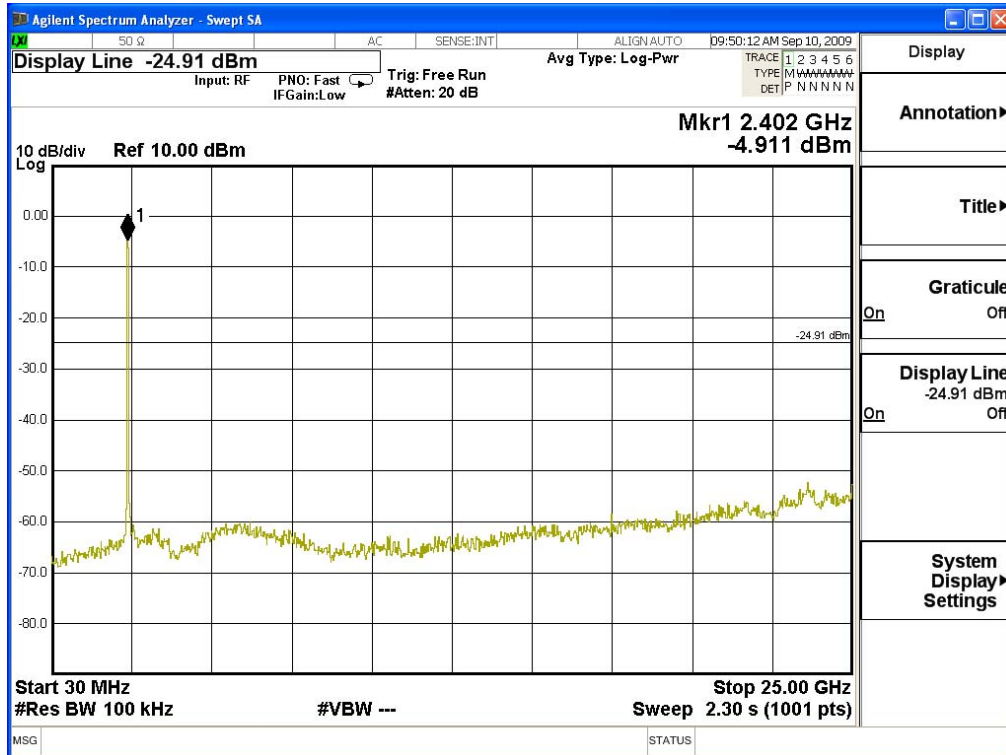


Channel 11 (2462MHz) 30 MHz -25GHz

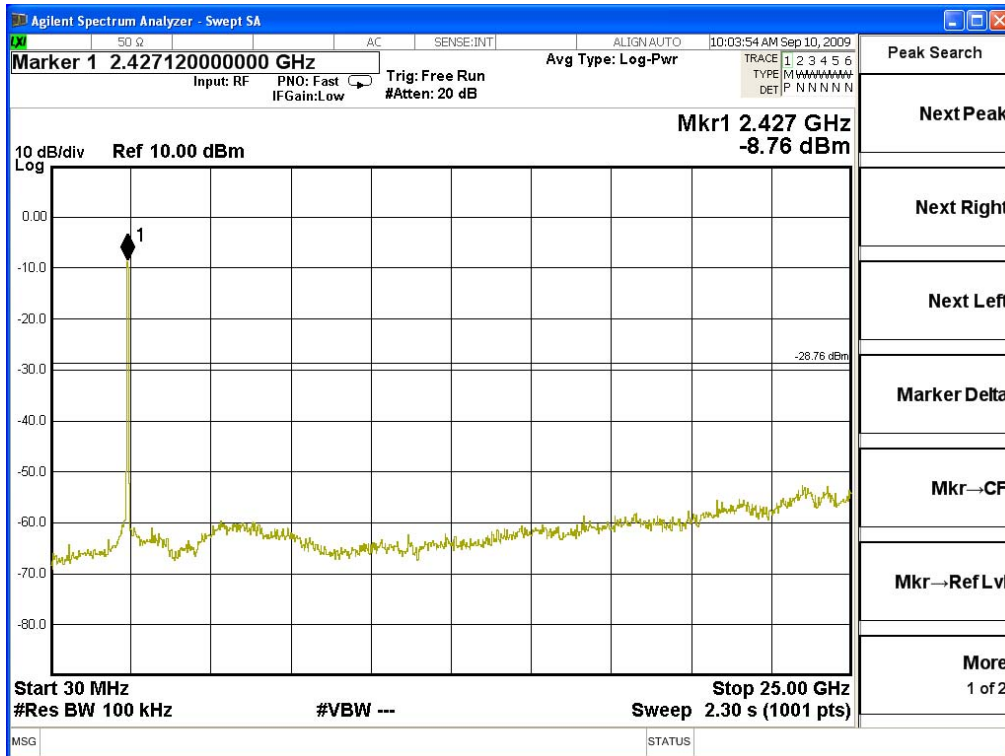


Product : Notebook
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW)

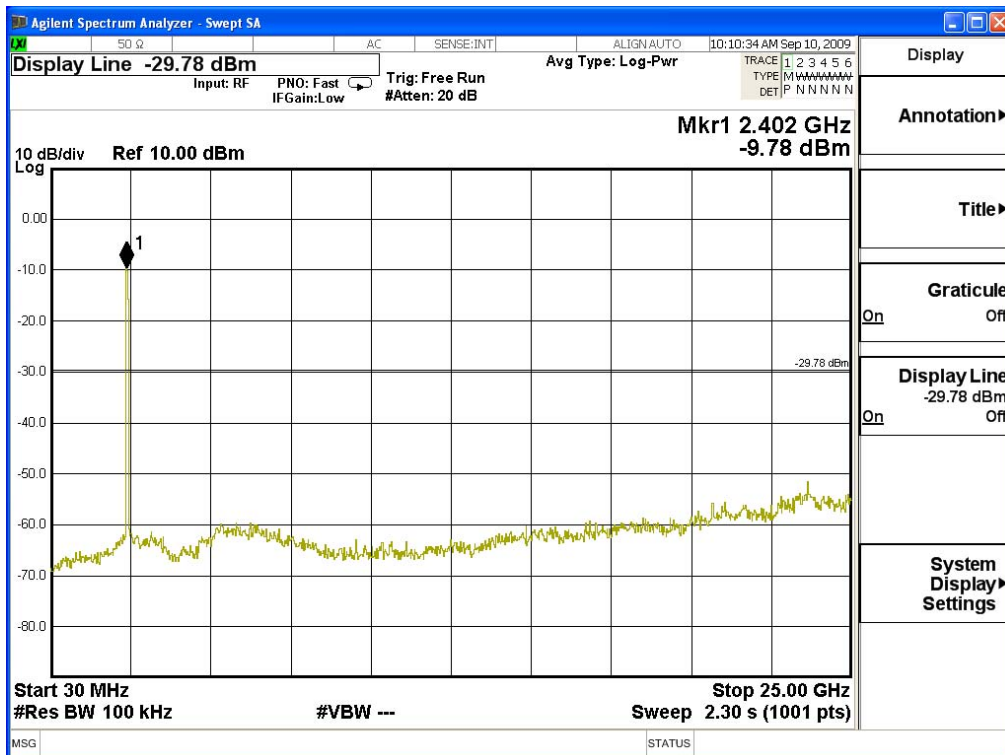
Channel 01 (2422MHz) 30 MHz -25GHz



Channel 04 (2437MHz) 30 MHz -25GHz



Channel 07 (2452MHz) 30MHz-25GHz



6. Band Edge

6.1. Test Equipment

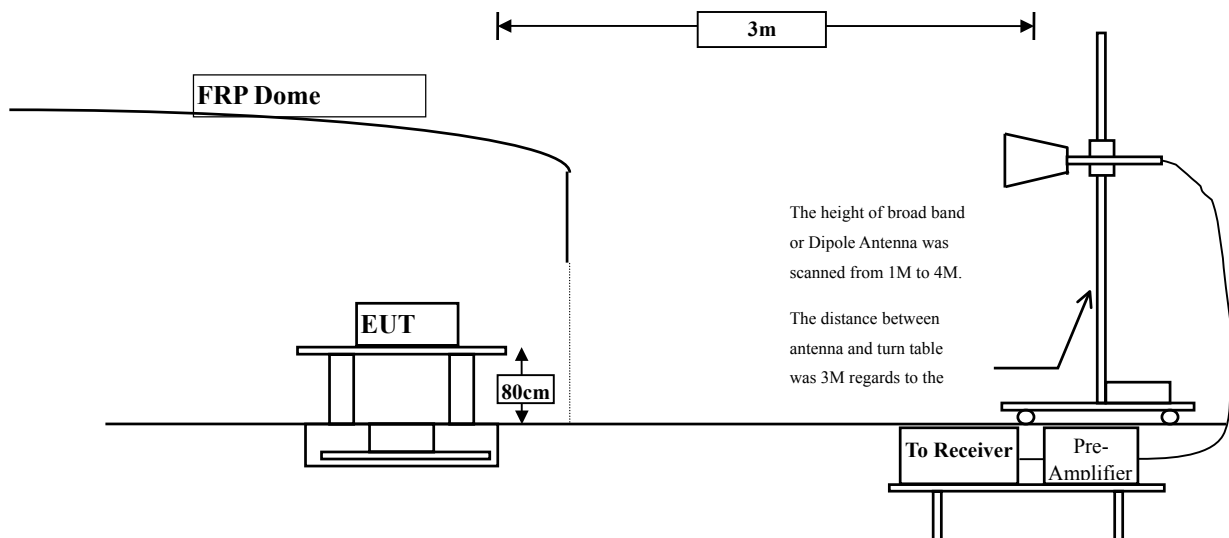
The following test equipments are used during the band edge tests:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr, 2009
	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2009
	X Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2009
	X Pre-Amplifier	AGILENT	8447D/2944A09549	Sep., 2009
	X Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2009
	X Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2009
	X Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2009
	X Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X Coaxial Switch	Anritsu	MP59B/6200265729	N/A

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

6.2. Test Setup

RF Radiated Measurement:



6.3. Limits

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

6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 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 : Notebook
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Marker Delta Method (Low band)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2412	36.613	66.240	102.853	Peak
Horizontal	2412	36.613	62.350	98.963	Average
Vertical	2412	35.629	63.510	99.139	Peak
Vertical	2412	35.629	59.200	94.829	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	2389.2	102.853	49.12	53.733	Peak
Horizontal	2390	98.963	59.183	39.78	Average
Vertical	2389.2	99.139	49.12	50.012	Peak
Vertical	2390	94.829	59.183	35.646	Average

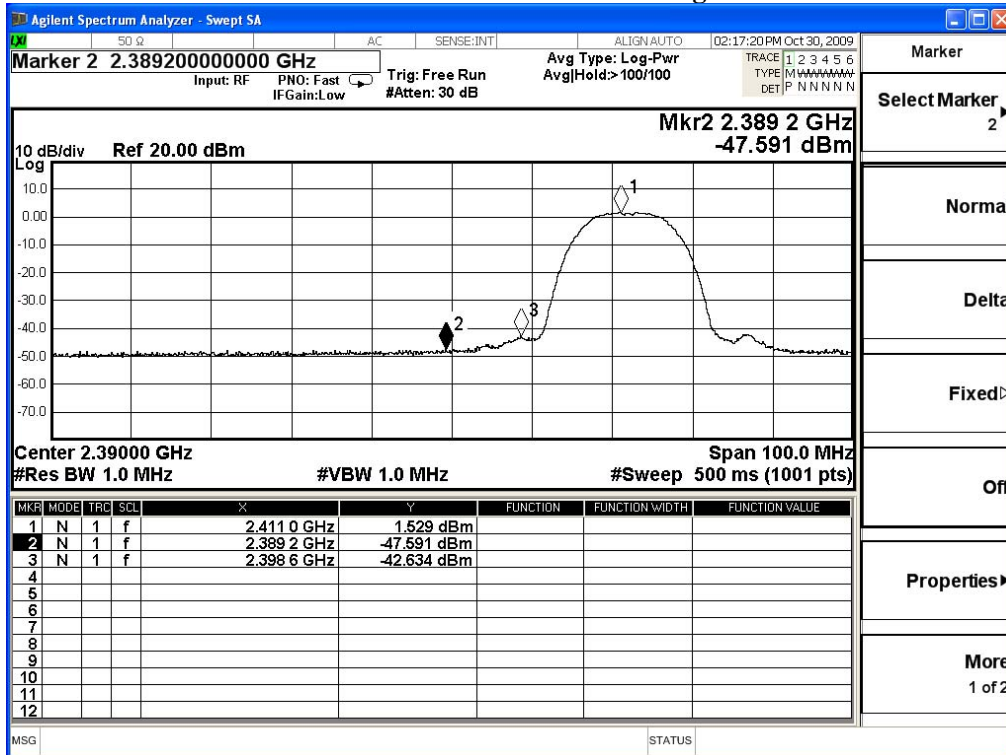
Note:

- The Marker Delta Method is refer to FCC DA 00-705.
- The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

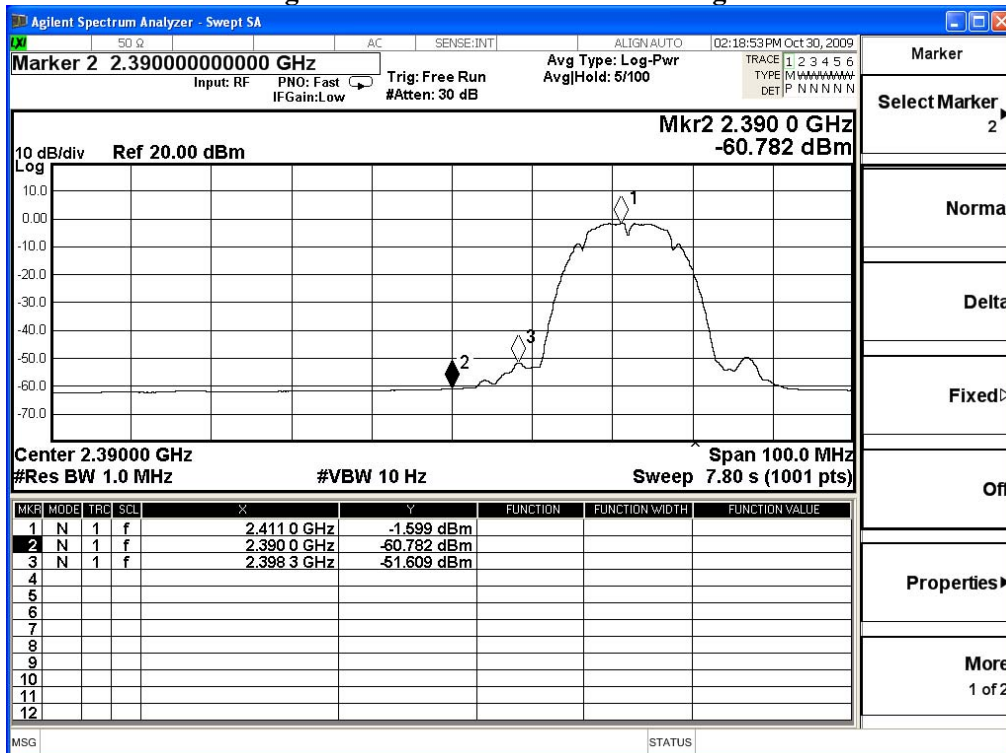
$$\text{Band Edge field Strength} = F - \Delta$$

F = Fundamental field Strength (Peak or Average)
 Δ = Conducted Band Edge Delta (Peak or Average)
- AVG Measurement=Peak Measurement + Duty Cycle.
- If Duty Cycle is smaller than -20dB, based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : Notebook
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Marker Delta Method (Low band)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2462	36.699	60.840	97.539	Peak
Horizontal	2462	36.699	56.980	93.679	Average
Vertical	2462	36.039	60.890	96.929	Peak
Vertical	2462	36.039	56.940	92.979	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	2484.8	97.539	46.845	50.694	Peak
Horizontal	2483.5	93.679	57.818	35.861	Average
Vertical	2484.8	96.929	46.845	50.084	Peak
Vertical	2483.5	92.979	57.818	35.161	Average

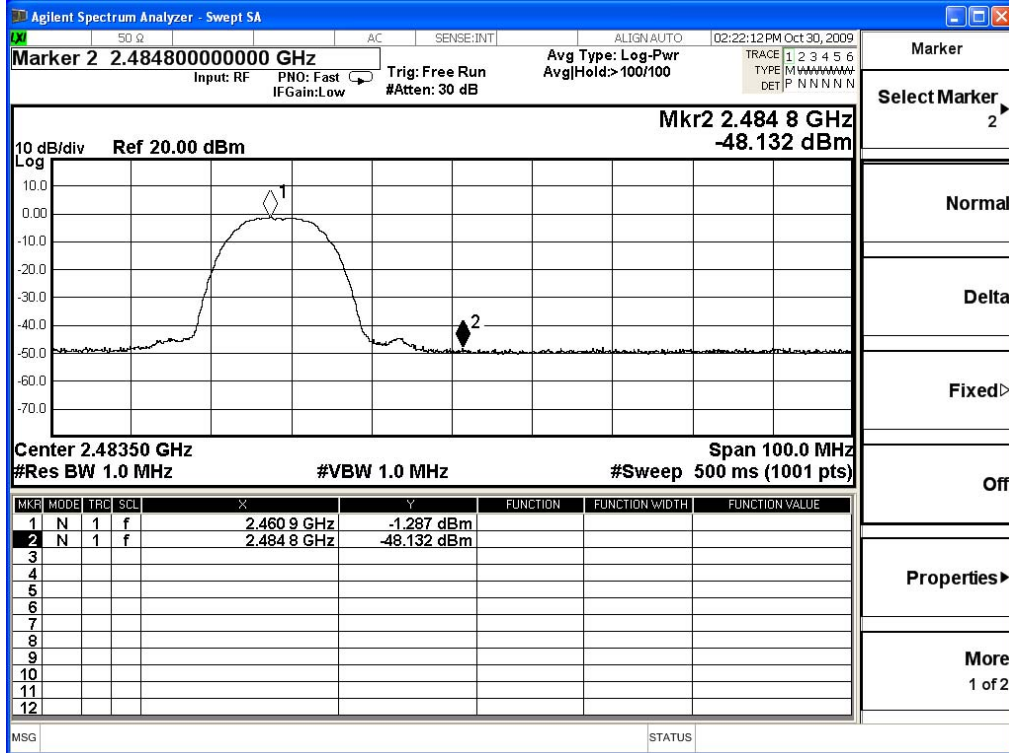
Note:

- The Marker Delta Method is refer to FCC DA 00-705.
- The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

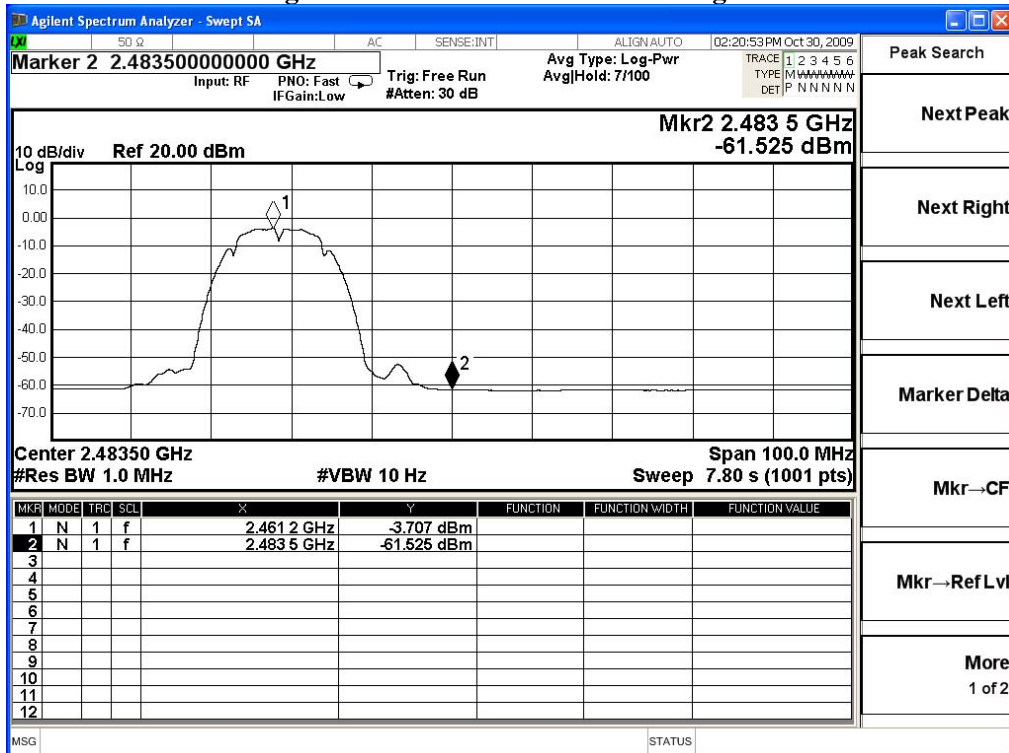
$$\text{Band Edge field Strength} = F - \Delta$$

F = Fundamental field Strength (Peak or Average)
 Δ = Conducted Band Edge Delta (Peak or Average)
- AVG Measurement=Peak Measurement + Duty Cycle.
- If Duty Cycle is smaller than -20dB, based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : Notebook
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Marker Delta Method (Low band)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2412	31.455	74.210	105.664	Peak
Horizontal	2412	31.455	64.860	96.314	Average
Vertical	2412	31.455	71.270	102.724	Peak
Vertical	2412	31.455	61.780	93.234	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	2390.0	105.664	50.94	54.724	Peak
Horizontal	2359.8	96.314	52.71	43.604	Average
Vertical	2390.0	102.724	50.94	51.784	Peak
Vertical	2359.8	93.234	52.71	40.524	Average

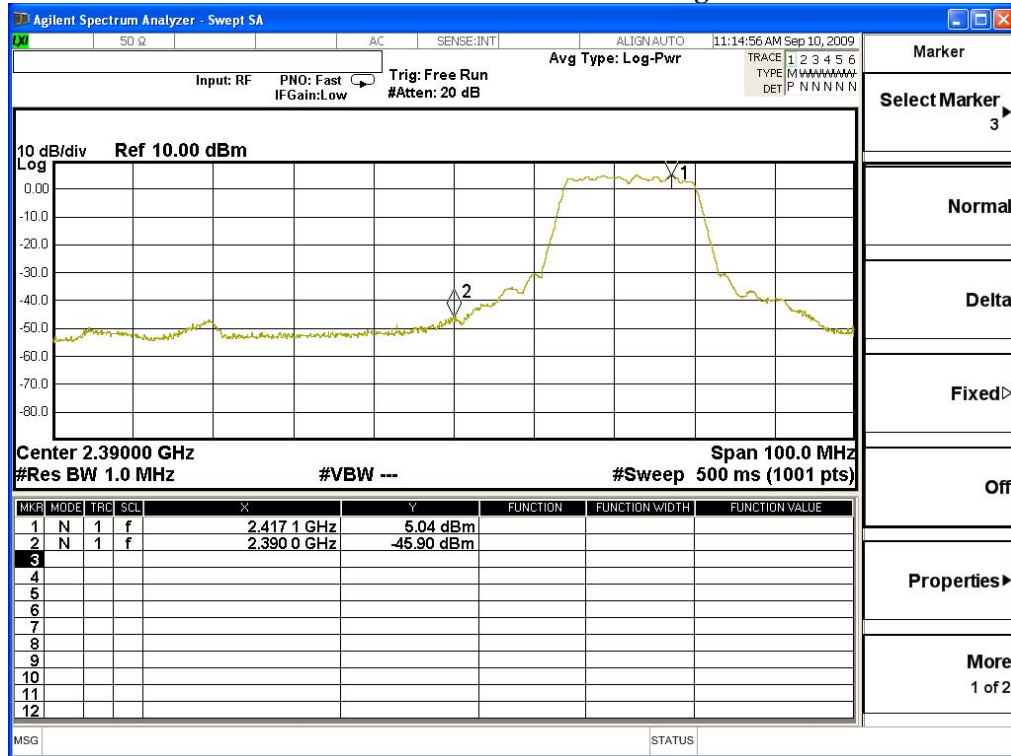
Note:

- The Marker Delta Method is refer to FCC DA 00-705.
- The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

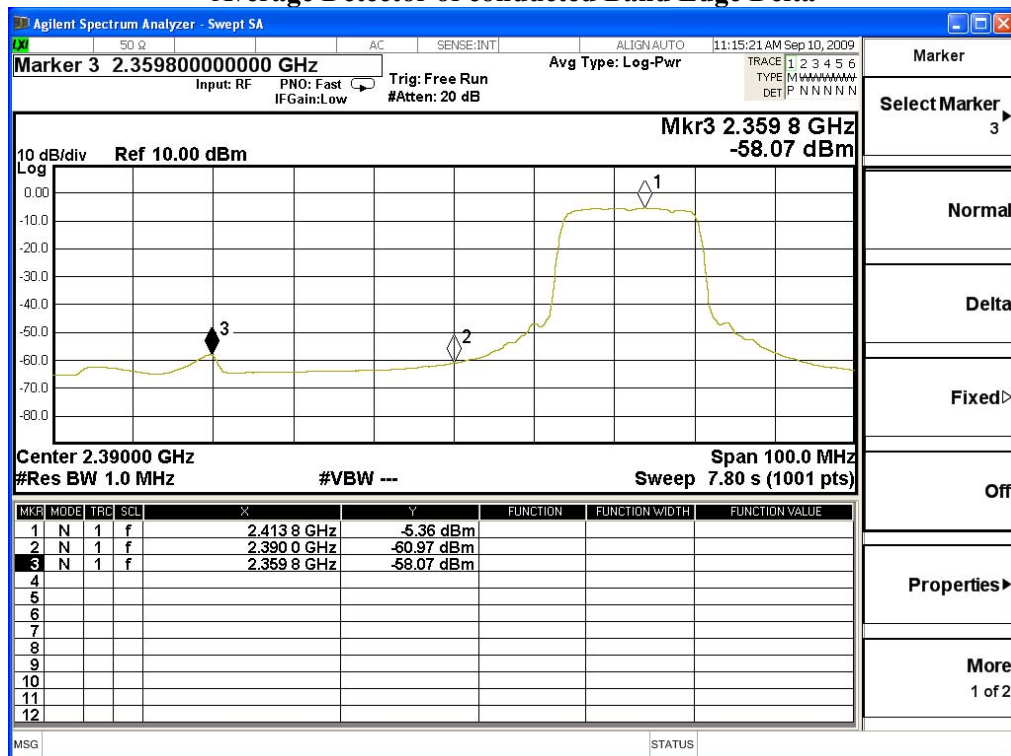
$$\text{Band Edge field Strength} = F - \Delta$$

F = Fundamental field Strength (Peak or Average)
 Δ = Conducted Band Edge Delta (Peak or Average)
- AVG Measurement=Peak Measurement + Duty Cycle.
- If Duty Cycle is smaller than -20dB, based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : Notebook
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Marker Delta Method (Low band)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2462	31.650	78.070	109.720	Peak
Horizontal	2462	31.650	68.560	100.210	Average
Vertical	2462	31.650	75.480	107.130	Peak
Vertical	2462	31.650	66.020	97.670	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	2485.2	109.720	47.95	61.77	Peak
Horizontal	2483.5	100.210	51.4	48.81	Average
Vertical	2485.2	107.130	47.95	59.18	Peak
Vertical	2483.5	97.670	51.4	46.27	Average

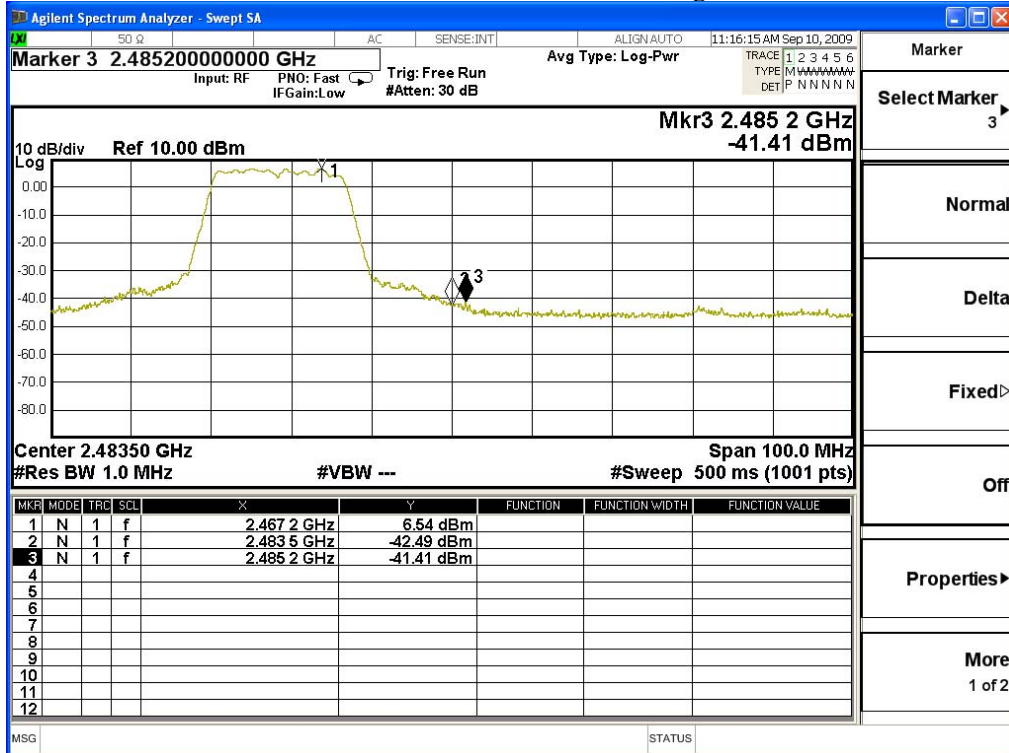
Note:

- The Marker Delta Method is refer to FCC DA 00-705.
- The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

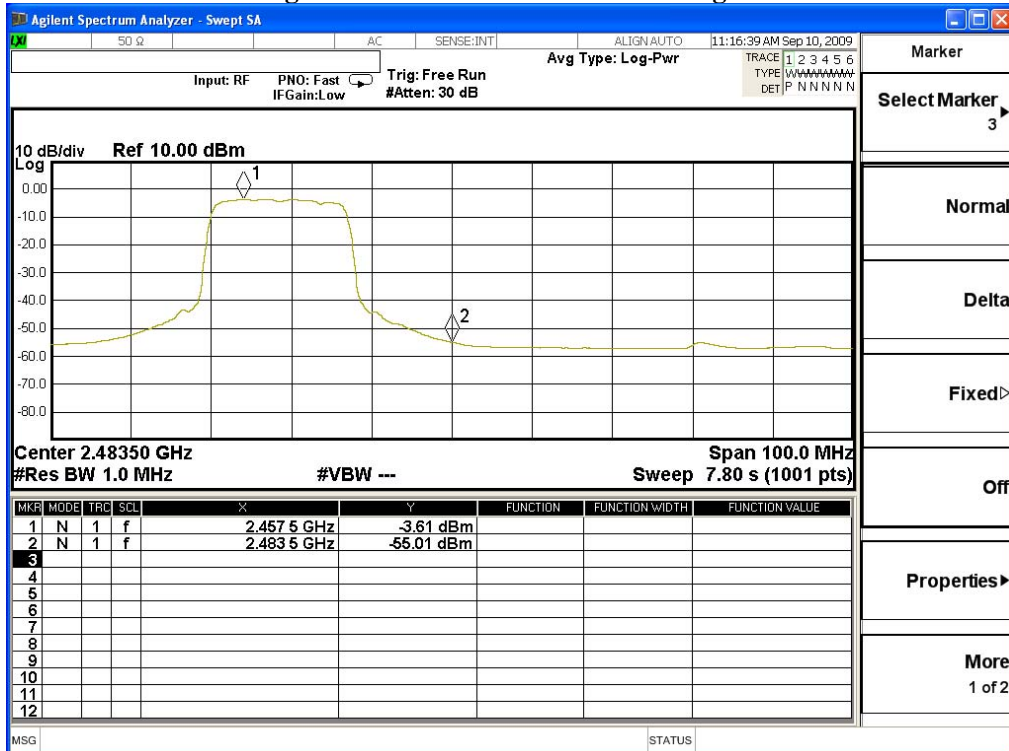
$$\text{Band Edge field Strength} = F - \Delta$$

F = Fundamental field Strength (Peak or Average)
 Δ = Conducted Band Edge Delta (Peak or Average)
- AVG Measurement=Peak Measurement + Duty Cycle.
- If Duty Cycle is smaller than -20dB, based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : Notebook
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Marker Delta Method (Low band)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2412	31.455	70.490	101.944	Peak
Horizontal	2412	31.455	59.430	90.884	Average
Vertical	2412	31.455	67.660	99.114	Peak
Vertical	2412	31.455	55.940	87.394	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	2390.0	101.944	41.88	60.064	Peak
Horizontal	2390.0	90.884	50.7	40.184	Average
Vertical	2390.0	99.114	41.88	57.234	Peak
Vertical	2390.0	87.394	50.7	36.694	Average

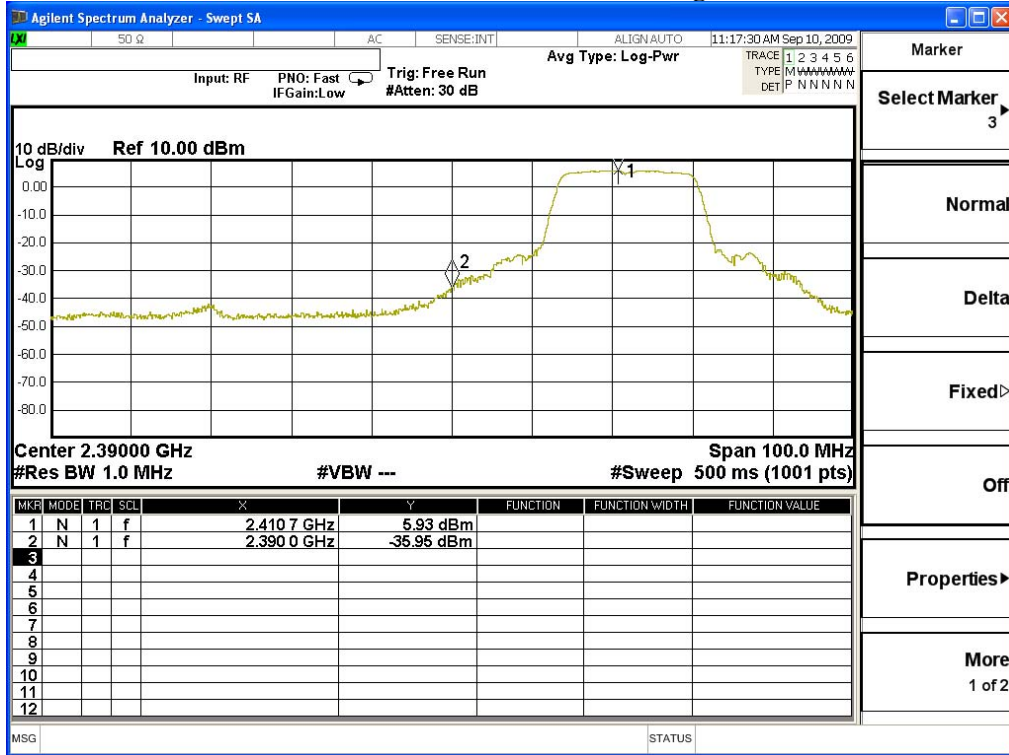
Note:

1. The Marker Delta Method is refer to FCC DA 00-705.
2. The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

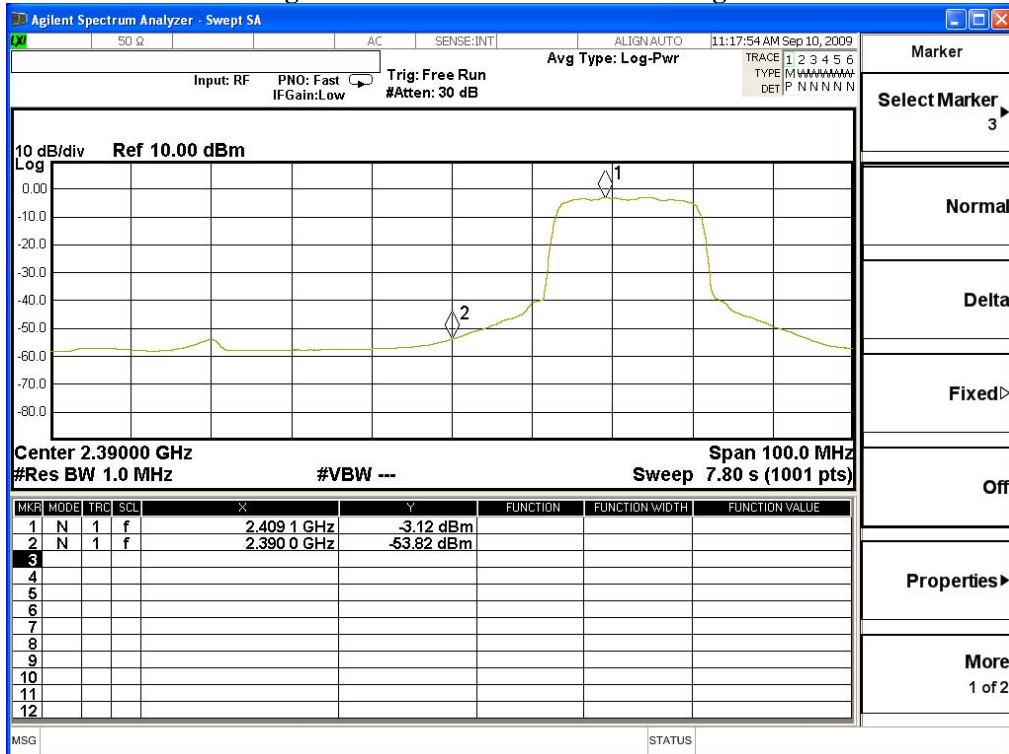
$$\text{Band Edge field Strength} = F - \Delta$$

F = Fundamental field Strength (Peak or Average)
 Δ = Conducted Band Edge Delta (Peak or Average)
3. AVG Measurement=Peak Measurement + Duty Cycle.
4. If Duty Cycle is smaller than -20dB, based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : Notebook
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Marker Delta Method (Low band)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2462	31.650	74.150	105.800	Peak
Horizontal	2462	31.650	63.040	94.690	Average
Vertical	2462	31.650	74.140	105.790	Peak
Vertical	2462	31.650	63.020	94.670	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	105.800	44.88	60.92	Peak
Horizontal	2483.5	94.690	50.27	44.42	Average
Vertical	2483.5	105.790	44.88	60.9	Peak
Vertical	2483.5	94.670	50.27	44.40	Average

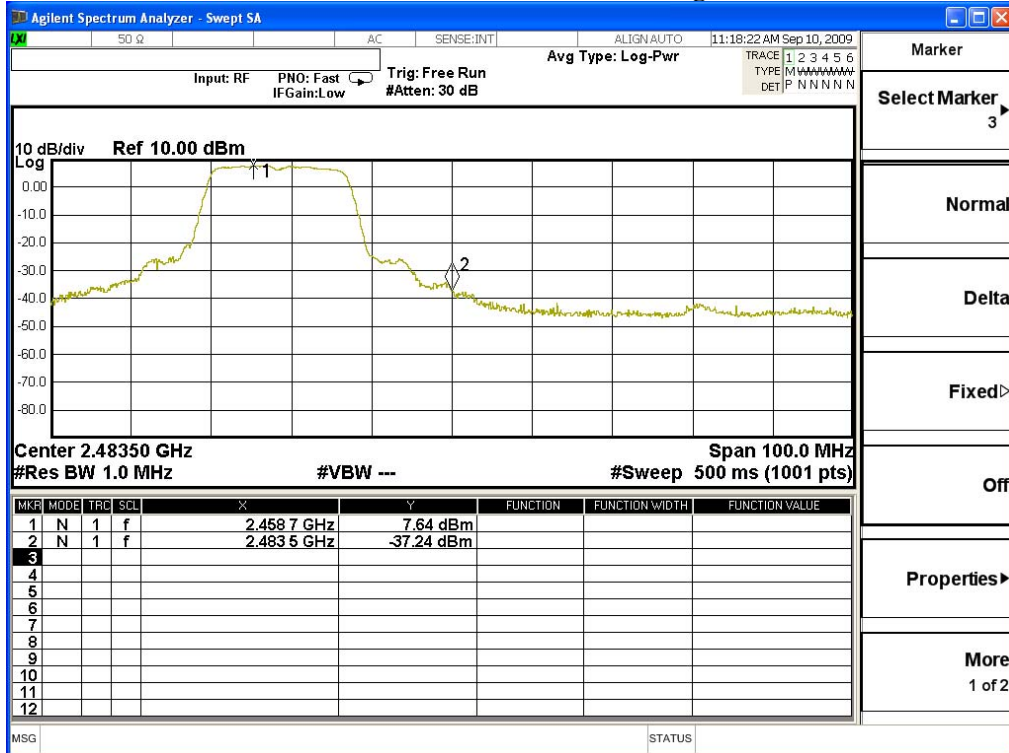
Note:

- The Marker Delta Method is refer to FCC DA 00-705.
- The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

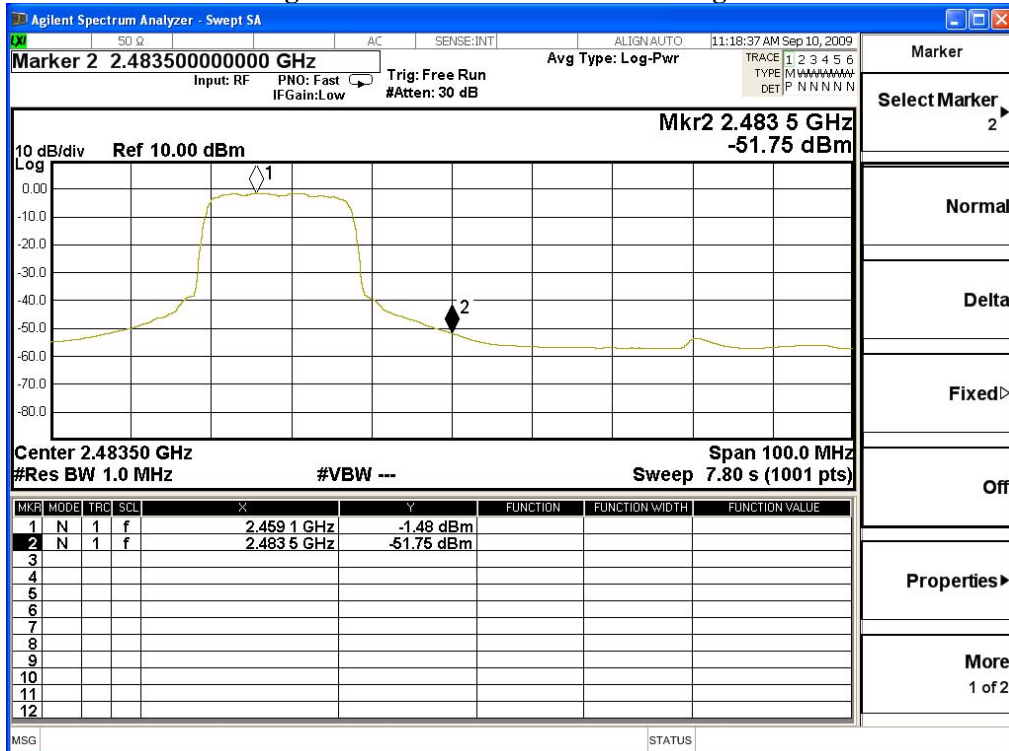
$$\text{Band Edge field Strength} = F - \Delta$$

F = Fundamental field Strength (Peak or Average)
 Δ = Conducted Band Edge Delta (Peak or Average)
- AVG Measurement=Peak Measurement + Duty Cycle.
- If Duty Cycle is smaller than -20dB, based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta



Product : Notebook
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit (802.11n MCS0 15Mbps 40M-BW) (2422MHz)

Marker Delta Method (Low band)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2422	31.495	68.420	99.915	Peak
Horizontal	2422	31.495	57.700	89.195	Average
Vertical	2422	31.495	65.940	97.435	Peak
Vertical	2422	31.495	54.880	86.375	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	2388.8	99.915	33.68	66.235	Peak
Horizontal	2390.0	89.195	43.27	45.925	Average
Vertical	2388.8	97.435	33.68	63.755	Peak
Vertical	2390.0	86.375	43.27	43.105	Average

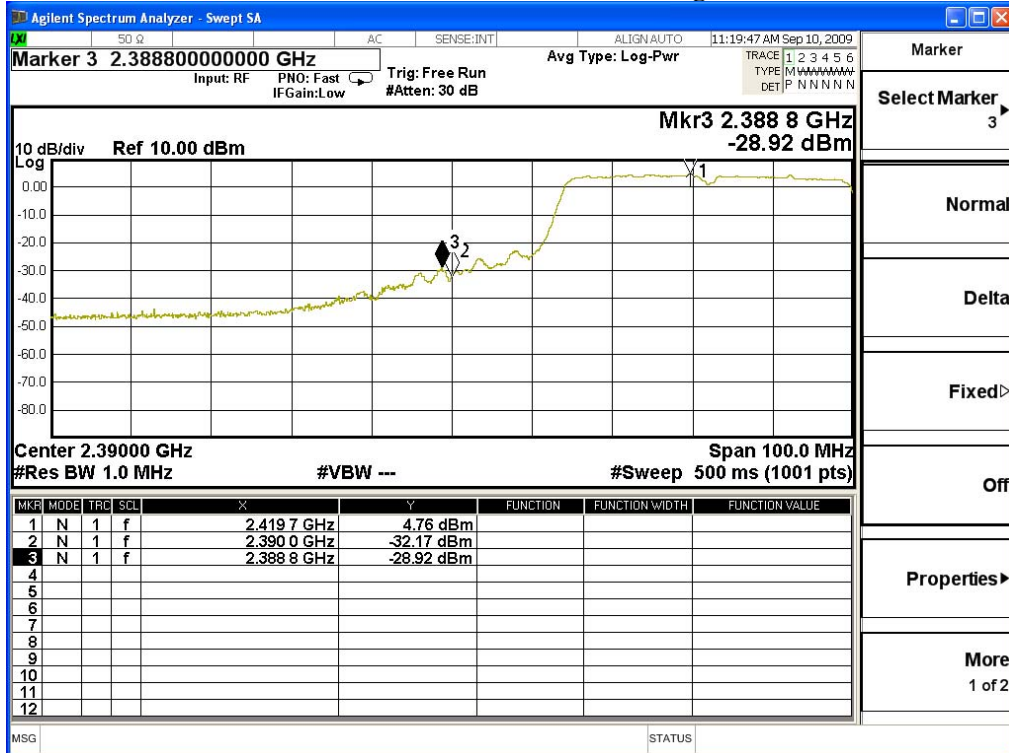
Note:

- The Marker Delta Method is refer to FCC DA 00-705.
- The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

$$\text{Band Edge field Strength} = F - \Delta$$

F = Fundamental field Strength (Peak or Average)
 Δ = Conducted Band Edge Delta (Peak or Average)
- AVG Measurement=Peak Measurement + Duty Cycle.
- If Duty Cycle is smaller than -20dB, based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

Peak Detector of conducted Band Edge Delta



Average Detector of conducted Band Edge Delta

