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Date:	October 30, 2007
Model:	Falcon 4220

Electromagnetic Compatibility Test Report

For

Wav Inc.

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quality service for over 100 years**

Test Report Details

Tests Performed By: **Underwriters Laboratories Inc.
333 Pfingsten Rd.
Northbrook, IL 60062**

Tests Performed For: **Wav Inc.
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Building 7, Suite 48
West Chicago, IL 60185**

Applicant Contact: **Chuck Bolvin**
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Test Report Date: **October 30, 2007**

Product Type: **PDA with Bar Code Scanner and WiFi Interface**

Product standards **47 CFR Part 15.247 (d) – Radiated Emissions Only**

Model Number: **Falcon 4220**

EUT Category: **Wireless Device**

Testing Start Date: **October 22, 2007**

Date Testing Complete: **October 30, 2007**

Overall Results: Compliant

Underwriters Laboratories Inc. reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. Underwriters Laboratories Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from Underwriters Laboratories Inc. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or endorsement by NVLAP, A2LA, or any agency of the US government.

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Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
none			

1.0 GENERAL - Product Description**1.1 Equipment Description**

The Equipment Under Test (EUT) is a Bar Code Scanner PDA with WiFi Transmitter.

1.2 Device Configuration During Test**1.2.1 Equipment Used During Test:**

Use	Product Type	Manufacturer	Model	Comments
EUT	PDA	Wav Inc.	Falcon 4220	None
Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, or SIM - Simulator (Not Subjected to Test)				

1.2.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	Mains	AC	N	N	None
Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports					

1.2.3 EUT Internal Operating Frequencies:

Frequency (MHz)	Description	Frequency (MHz)	Description

1.2.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	120Vac			60Hz	Single Phase	Plugged in for all testing
2	-	-	-	DC	-	Internal Rechargeable Battery

1.3 EUT Configurations

Mode #	Description
1	EUT was configured on 80cm high non-conductive surface in three orthogonal axis.

1.4 EUT Operation Modes

Mode #	Description
1	EUT was operated on three individual channels (1-low, 6-middle and 11-high). Prior to conducting final scans and measurements worst case modulation from the 802.11b and 802.11g were determined. The worst case modulations were for 802.11b 11mbps and for 802.11g 54mbps.
2	EUT was operated in Receive Mode on individual channels.

2.0 Summary

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by Underwriters Laboratories Inc. in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

2.1 Deviations from standard test methods

None

2.2 Device Modifications Necessary for Compliance

None

2.3 Reference Standards

Standard Number	Standard Name	Standard Date
47 CFR Part 15	Part 15, Subpart C – Radio Frequency Devices – Intentional Radiators	May 2007

2.4 Results Summary

Requirement – Test	Result (Compliant / Non-Compliant)*
Conducted Emissions 150kHz – 30MHz	Compliant
Radiated Emissions 30MHz - 25GHz	Compliant
Radiated Spurious Emissions 1GHz – 25GHz	Compliant
Radiated Spurious – Band Edge Compliance 2.37GHz – 2.51GHz	Compliant

Test Engineer:



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Reviewer:



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Conformity Assessment Services

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

3.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

----- United States -----

Code of Federal Regulations Title 47	Part 15.247d, Subpart C, Radio Frequency Devices – Intentional Radiators
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Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150
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4.1 Test Conditions and Results – MAINS TERMINAL – CONDUCTED EMISSIONS

Test Description	Measurements were made on a ground plane. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.	
Basic Standard	47 CFR Part 15.109	
UL LPG	80-EM-S0026	
	Frequency range on each side of line	Measurement Point
Fully configured sample scanned over the following frequency range	150kHz to 30MHz	Mains
Limits - Class B		
Frequency (MHz)	Limit (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50
Supplementary information: None		

Table 1 Conducted Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 2 Conducted Emissions Test Equipment

Description	Manufacturer	Model	Identifier
Spectrum Analyzer / Preselector	Agilent	E7405A	EMC4242
Transient Limiter	Electro-Metrics	EM7600-2	EMC4224
LISN - L1	Solar	8602-50-TS-50-N	EMC4052
LISN - L2	Solar	8602-50-TS-50-N	EMC4064

Figure 1 Test Setup for Conducted Emissions

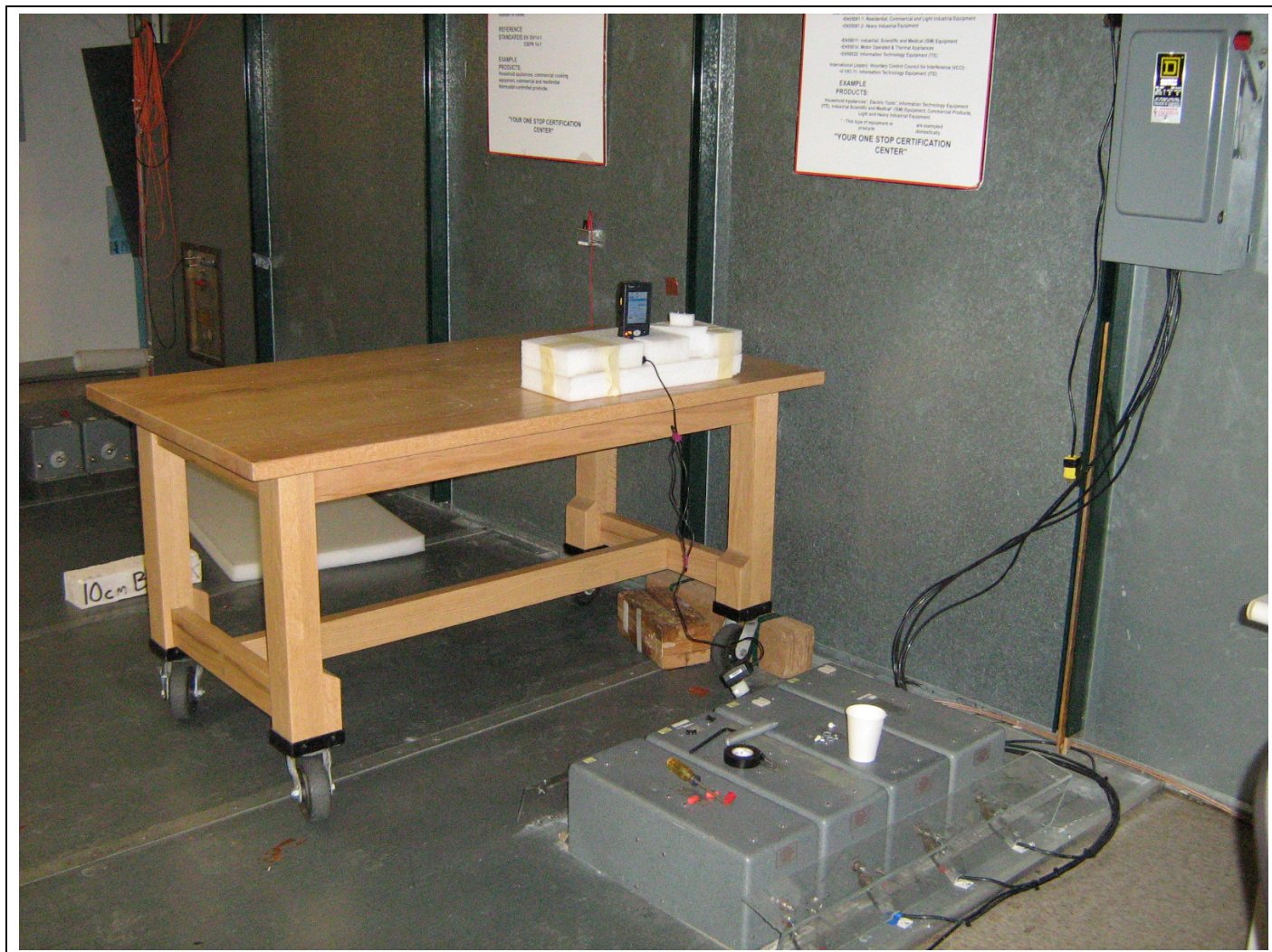


Figure 2 Conducted Emissions Graph – 802.11b (11mbps, ch6)

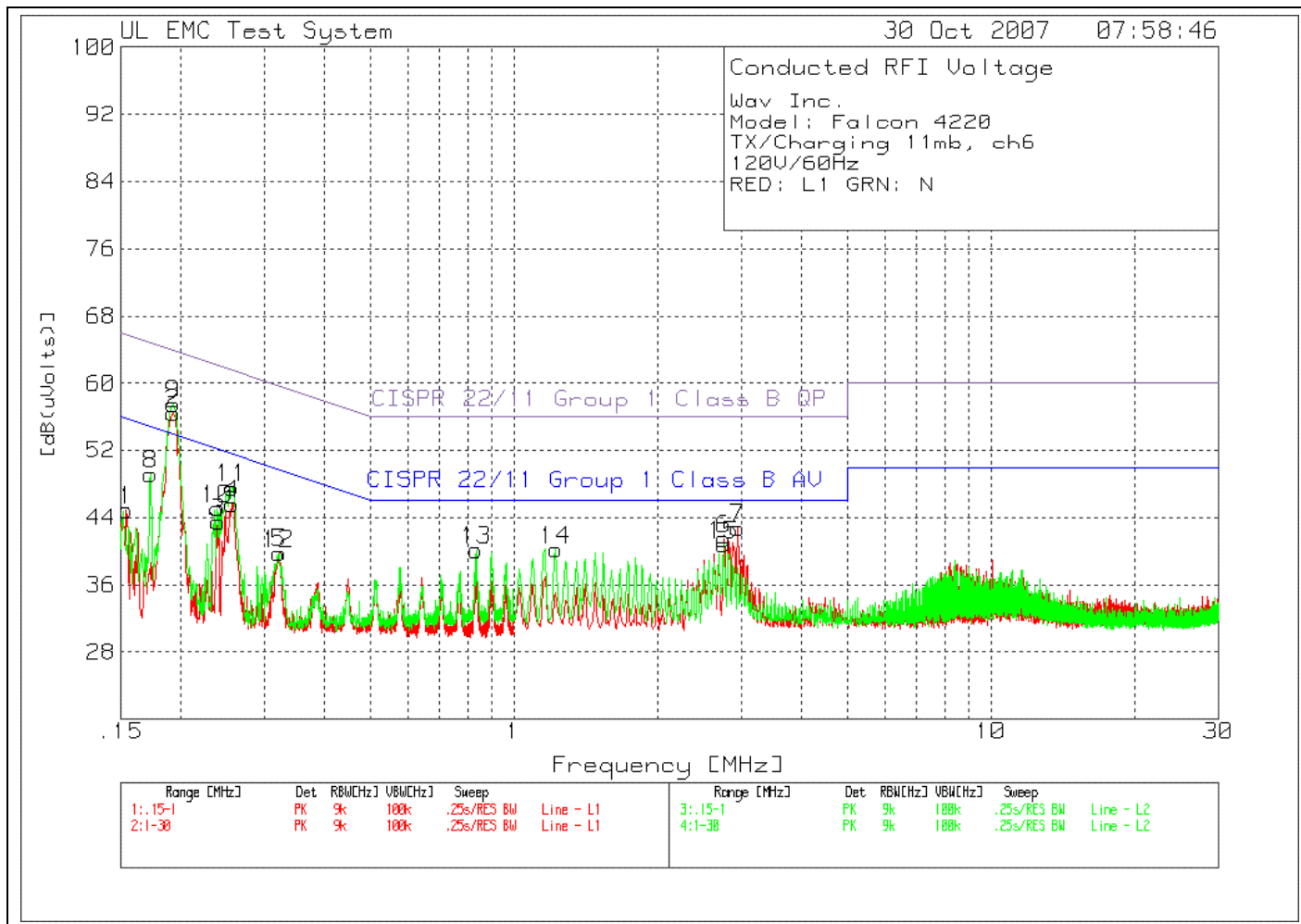


Table 3 Conducted Emissions Data Points

Wav Inc.
 Model: Falcon 4220
 TX/Charging 11mb, ch6
 120V/60Hz
 RED: L1 GRN: N

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
Line											
1	.15424	33.22 pk	10.1	1.6	44.92	-	-	65.8	55.8	-	-
				Margin [dB]		-	-	-20.88	-10.88	-	-
2	.19348	45.23 pk	10.1	1.1	56.43	-	-	63.9	53.9	-	-
				Margin [dB]		-	-	-7.47	2.53	-	-
3	.24041	32.58 pk	10.1	.8	43.48	-	-	62.1	52.1	-	-
				Margin [dB]		-	-	-18.62	-8.62	-	-
4	.25711	34.81 pk	10.1	.7	45.61	-	-	61.5	51.5	-	-
				Margin [dB]		-	-	-15.89	-5.89	-	-
5	.32233	29.28 pk	10	.5	39.78	-	-	59.6	49.6	-	-
				Margin [dB]		-	-	-19.82	-9.82	-	-
6	2.75429	31.27 pk	10.1	.1	41.47	-	-	56	46	-	-
				Margin [dB]		-	-	-14.53	-4.53	-	-
7	2.95323	32.56 pk	10.1	.1	42.76	-	-	56	46	-	-
				Margin [dB]		-	-	-13.24	-3.24	-	-
Neutral											
8	.17333	37.67 pk	10.1	1.4	49.17	-	-	64.8	54.8	-	-
				Margin [dB]		-	-	-15.63	-5.63	-	-
9	.19348	46.22 pk	10.1	1.2	57.52	-	-	63.9	53.9	-	-
				Margin [dB]		-	-	-6.38	3.62	-	-
10	.23908	34.08 pk	10.1	.9	45.08	-	-	62.1	52.1	-	-
				Margin [dB]		-	-	-17.02	-7.02	-	-
11	.25658	36.66 pk	10.1	.8	47.56	-	-	61.5	51.5	-	-
				Margin [dB]		-	-	-13.94	-3.94	-	-
12	.3218	29.24 pk	10	.5	39.74	-	-	59.7	49.7	-	-
				Margin [dB]		-	-	-19.96	-9.96	-	-
13	.83456	29.86 pk	10.1	.2	40.16	-	-	56	46	-	-
				Margin [dB]		-	-	-15.84	-5.84	-	-
14	1.22607	30 pk	10.1	.1	40.2	-	-	56	46	-	-
				Margin [dB]		-	-	-15.8	-5.8	-	-
15	2.75429	30.6 pk	10.1	.1	40.8	-	-	56	46	-	-
				Margin [dB]		-	-	-15.2	-5.2	-	-

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

LIMIT 3: CISPR 22/11 Group 1 Class B QP
 LIMIT 4: CISPR 22/11 Group 1 Class B AV

Model Number: Falcon 4220

Client Name: Wav Inc.

FCC ID: PB24220CF10

Wav Inc.
 Model: Falcon 4220
 TX/Charging 11mb, ch6
 120V/60Hz
 RED: L1 GRN: N

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 [dB(uVolts)]	2	3	4	5	6
Line									
.15424	1.15 ave	10.1	1.6	12.85	-	-	65.8	55.8	-
			Margin [dB]:		-	-	-52.95	-42.95	-
.19348	34.38 ave	10.1	1.1	45.58	-	-	63.9	53.9	-
			Margin [dB]:		-	-	-18.32	-8.32	-
.24041	9.52 ave	10.1	.8	20.42	-	-	62.1	52.1	-
			Margin [dB]:		-	-	-41.68	-31.68	-
.25711	25.25 ave	10.1	.7	36.05	-	-	61.5	51.5	-
			Margin [dB]:		-	-	-25.45	-15.45	-
.32233	19.67 ave	10	.5	30.17	-	-	59.6	49.6	-
			Margin [dB]:		-	-	-29.43	-19.43	-
2.75429	18.72 ave	10.1	.1	28.92	-	-	56	46	-
			Margin [dB]:		-	-	-27.08	-17.08	-
2.95323	16.06 ave	10.1	.1	26.26	-	-	56	46	-
			Margin [dB]:		-	-	-29.74	-19.74	-
Neutral									
.17333	4.89 ave	10.1	1.4	16.39	-	-	64.8	54.8	-
			Margin [dB]:		-	-	-48.41	-38.41	-
.19348	34.95 ave	10.1	1.2	46.25	-	-	63.9	53.9	-
			Margin [dB]:		-	-	-17.65	-7.65	-
.23908	2.88 ave	10.1	.9	13.88	-	-	62.1	52.1	-
			Margin [dB]:		-	-	-48.22	-38.22	-
.25658	26.91 ave	10.1	.8	37.81	-	-	61.5	51.5	-
			Margin [dB]:		-	-	-23.69	-13.69	-
.3218	20.03 ave	10	.5	30.53	-	-	59.7	49.7	-
			Margin [dB]:		-	-	-29.17	-19.17	-
.83456	20.61 ave	10.1	.2	30.91	-	-	56	46	-
			Margin [dB]:		-	-	-25.09	-15.09	-
1.22607	20.83 ave	10.1	.1	31.03	-	-	56	46	-
			Margin [dB]:		-	-	-24.97	-14.97	-
2.75429	16.1 ave	10.1	.1	26.3	-	-	56	46	-
			Margin [dB]:		-	-	-29.7	-19.7	-

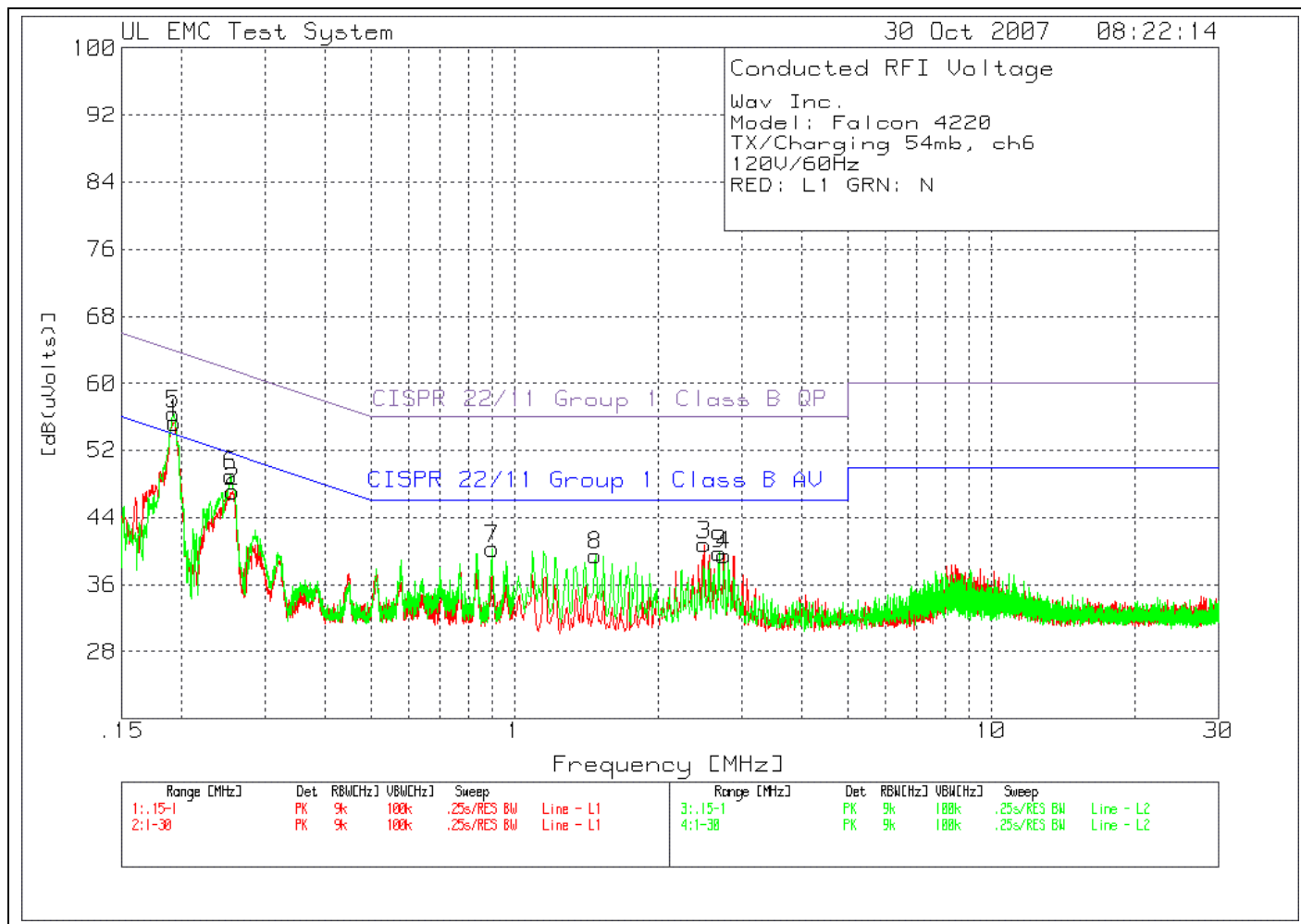
NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

LIMIT 3: CISPR 22/11 Group 1 Class B QP

LIMIT 4: CISPR 22/11 Group 1 Class B AV

Figure 3 Conducted Emissions Graph – 802.11g (54mbps, ch6)



Model Number: Falcon 4220

Client Name: Wav Inc.

FCC ID: PB24220CF10

Table 4 Conducted Emissions Data Points

Wav Inc.

Model: Falcon 4220

TX/Charging 54mb, ch6

120V/60Hz

RED: L1 GRN: N

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
=====											
Line											
1	.19401	44.11 pk	10.1	1.1	55.31	-	-	63.9	53.9	-	-
				Margin [dB]		-	-	-8.59	1.41	-	-
2	.25658	36.34 pk	10.1	.7	47.14	-	-	61.5	51.5	-	-
				Margin [dB]		-	-	-14.36	-4.36	-	-
3	2.50109	30.58 pk	10.1	.1	40.78	-	-	56	46	-	-
				Margin [dB]		-	-	-15.22	-5.22	-	-
4	2.75429	29.29 pk	10.1	.1	39.49	-	-	56	46	-	-
				Margin [dB]		-	-	-16.51	-6.51	-	-
Neutral											
5	.19295	45.08 pk	10.1	1.2	56.38	-	-	63.9	53.9	-	-
				Margin [dB]		-	-	-7.52	2.48	-	-
6	.25446	38.11 pk	10.1	.8	49.01	-	-	61.6	51.6	-	-
				Margin [dB]		-	-	-12.59	-2.59	-	-
7	.89978	30.08 pk	10.1	.1	40.28	-	-	56	46	-	-
				Margin [dB]		-	-	-15.72	-5.72	-	-
8	1.47926	29.3 pk	10.1	.1	39.5	-	-	56	46	-	-
				Margin [dB]		-	-	-16.5	-6.5	-	-
9	2.69099	29.55 pk	10.1	.1	39.75	-	-	56	46	-	-
				Margin [dB]		-	-	-16.25	-6.25	-	-

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

LIMIT 3: CISPR 22/11 Group 1 Class B QP

LIMIT 4: CISPR 22/11 Group 1 Class B AV

Model Number: Falcon 4220

Client Name: Wav Inc.

FCC ID: PB24220CF10

Wav Inc.
 Model: Falcon 4220
 TX/Charging 54mb, ch6
 120V/60Hz
 RED: L1 GRN: N

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 [dB(uVolts)]	2	3	4	5	6
=====									
Line									
.19401	32.66 ave	10.1	1.1	43.86	-	-	63.9	53.9	-
			Margin [dB]:		-	-	-20.04	-10.04	-
.25658	27.39 ave	10.1	.7	38.19	-	-	61.5	51.5	-
			Margin [dB]:		-	-	-23.31	-13.31	-
2.50109	16.44 ave	10.1	.1	26.64	-	-	56	46	-
			Margin [dB]:		-	-	-29.36	-19.36	-
2.75429	15.33 ave	10.1	.1	25.53	-	-	56	46	-
			Margin [dB]:		-	-	-30.47	-20.47	-
Neutral									
.19295	33.09 ave	10.1	1.2	44.39	-	-	63.9	53.9	-
			Margin [dB]:		-	-	-19.51	-9.51	-
.25446	27.27 ave	10.1	.8	38.17	-	-	61.6	51.6	-
			Margin [dB]:		-	-	-23.43	-13.43	-
.89978	20.12 ave	10.1	.1	30.32	-	-	56	46	-
			Margin [dB]:		-	-	-25.68	-15.68	-
1.47926	18.93 ave	10.1	.1	29.13	-	-	56	46	-
			Margin [dB]:		-	-	-26.87	-16.87	-
2.69099	12.95 ave	10.1	.1	23.15	-	-	56	46	-
			Margin [dB]:		-	-	-32.85	-22.85	-

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

LIMIT 3: CISPR 22/11 Group 1 Class B QP
 LIMIT 4: CISPR 22/11 Group 1 Class B AV

4.2 Test Conditions and Results – RADIATED EMISSIONS 30MHz – 25GHz

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	
Basic Standard		
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	10 meter distance
	1GHz – 25GHz	3 meter distance
Limits		
Frequency (MHz)	Limit (dBμV/m)	
	Quasi-Peak	Average
30 - 88	29.54	NA
88 - 216	33.06	NA
216 - 916	35.56	NA
916 – 1,000	43.52	NA
1,000 – 25,000	NA	53.97
Supplementary information: None		

Table 5 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	2
Supplementary information: None		

Table 6 Radiated Emissions Test Equipment

Description	Manufacturer	Model	Identifier
Spectrum Analyzer	HP	8566B	EMC4085
Quasi-Peak Detector	HP	85650A	EMC4016
Bicon Antenna	Chase	VBA6106A	EMC4078
Log-P Antenna	Chase	UPA6109	EMC4258
Spectrum Analyzer	Rhode & Schwartz	FSEK	EMC4182
Antenna Array	UL	BOMS	EMC4276

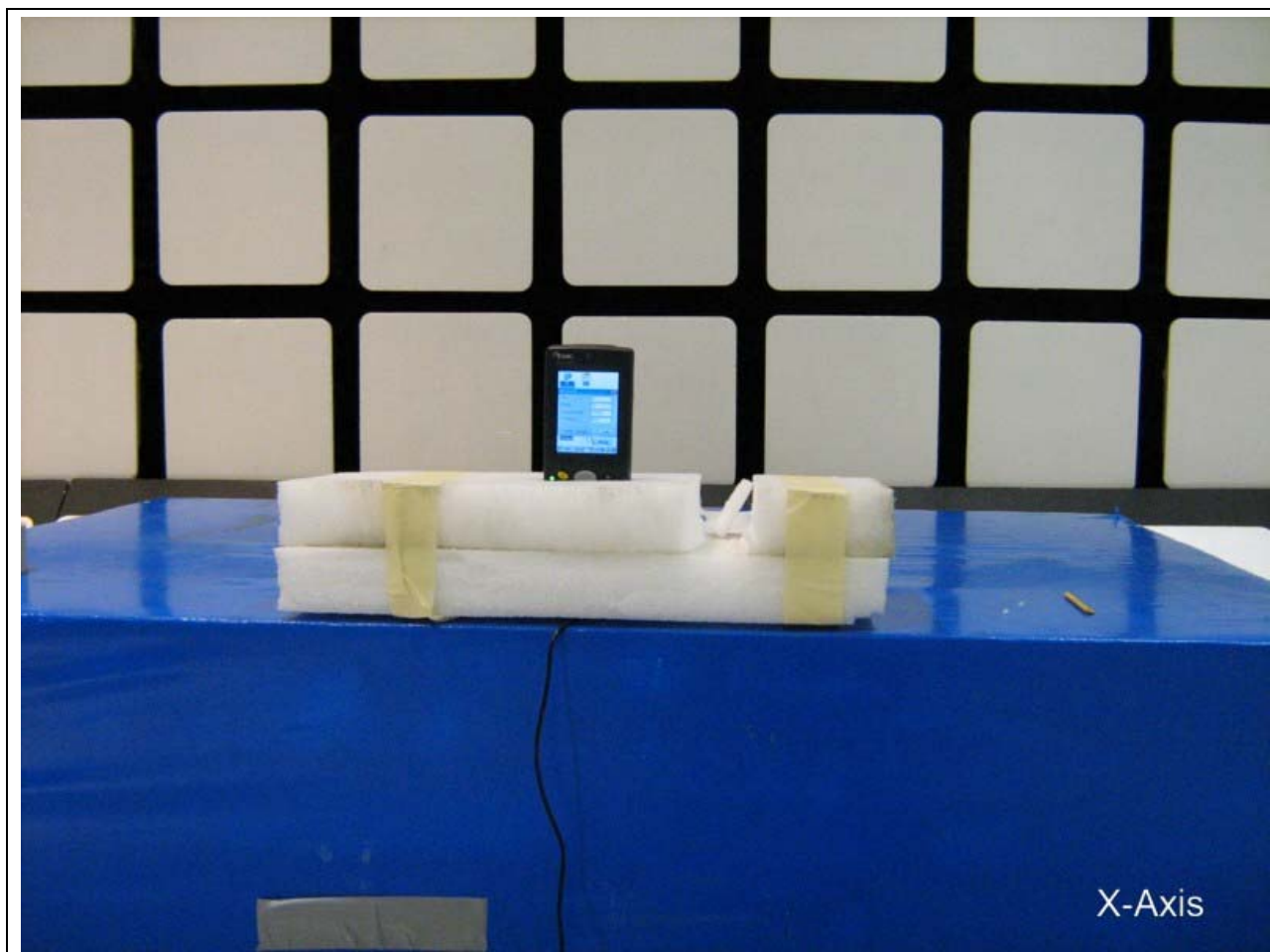
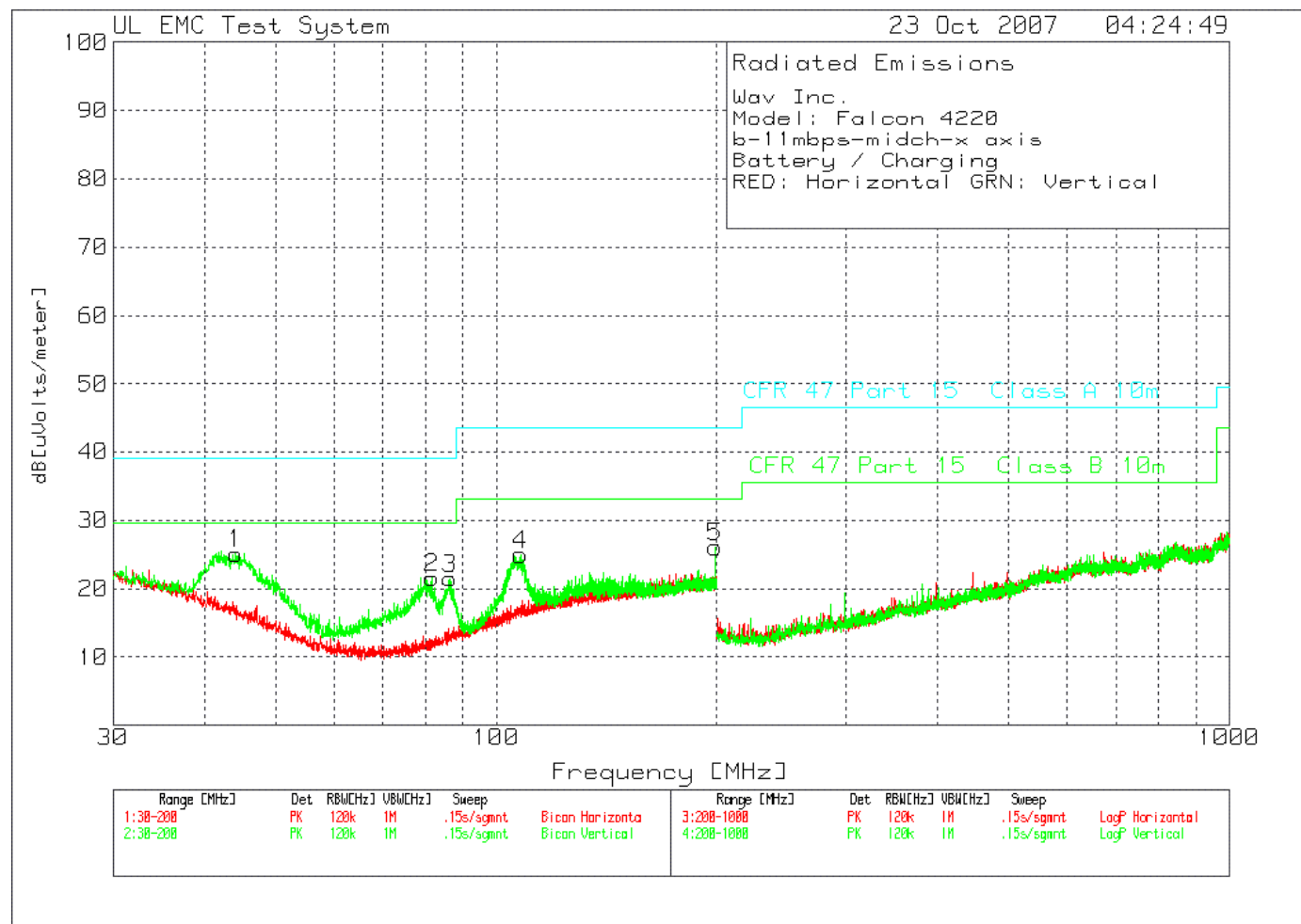
Figure 4 Test setup for Radiated Emissions

Figure 5 Radiated Emissions Graph – 802.11b, Channel 6, X-Axis, RX



Model Number: Falcon 4220

Client Name: Wav Inc.

FCC ID: PB24220CF10

Table 7 Radiated Emissions Data Points – 802.11b, Channel 6, X-Axis, RX

Wav Inc.
Model: Falcon 4220
b-11mbps-midch-x axis - RX
Battery / Charging
RED: Horizontal GRN: Vertical

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 dB[uVolts/meter]	2	3	4	5	6
1	44.7235	42.7 pk	-30.3	12.1	24.5	-	-	39.1	29.6	-
	Azimuth:284	Height:100	Vert	Margin [dB]	-	-	-14.6	-5.1	-	-
2	85.8927	43.3 pk	-30.1	8.3	21.5	-	-	39.1	29.6	-
	Azimuth:70	Height:400	Vert	Margin [dB]	-	-	-17.6	-8.1	-	-
3	104.1839	43.5 pk	-30	11.3	24.8	-	-	43.5	33.1	-
	Azimuth:131	Height:100	Vert	Margin [dB]	-	-	-18.7	-8.3	-	-

LIMIT 3: CFR 47 Part 15 Class A 10m
LIMIT 4: CFR 47 Part 15 Class B 10m

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector

Figure 6 Radiated Emissions Graph – 802.11b, Channel 6, X-Axis, TX

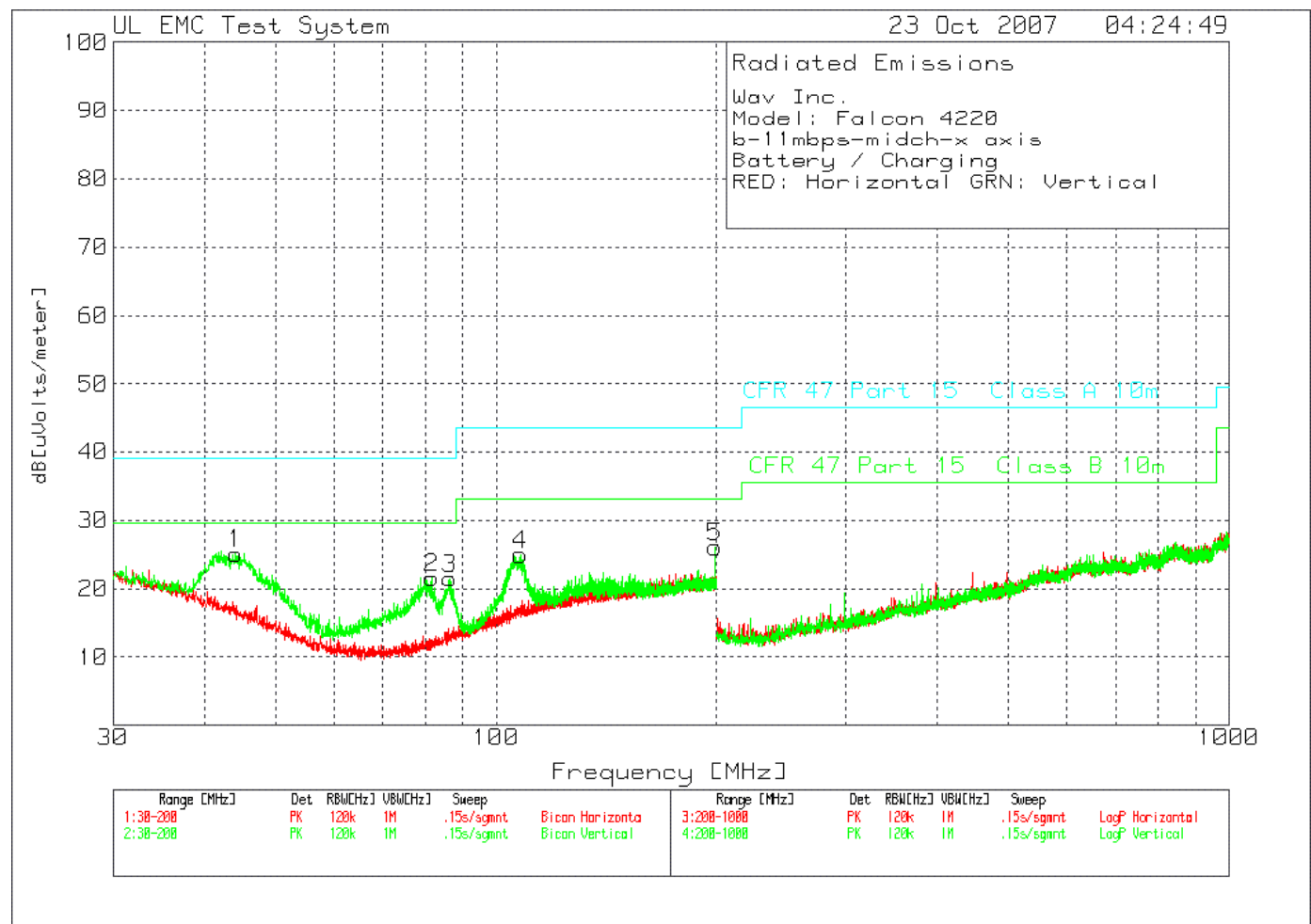


Table 8 Radiated Emissions Data Points – 802.11b, Channel 6, X-Axis, TX

Wav Inc.
 Model: Falcon 4220
 b-11mbps-midch-x axis
 Battery / Charging
 RED: Horizontal GRN: Vertical

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 dB[uVolts/meter]	2	3	4	5	6
1	44.1006	43.1 pk	-30.3	12.3	25.1	-	-	39.1	29.6	-
	Azimuth:19	Height:100	Vert	Margin [dB]	-	-	-14	-4.5	-	-
2	81.7022	44.4 pk	-30.2	7.4	21.6	-	-	39.1	29.6	-
	Azimuth:311	Height:300	Vert	Margin [dB]	-	-	-17.5	-8	-	-
3	86.459	43.2 pk	-30.1	8.4	21.5	-	-	39.1	29.6	-
	Azimuth:311	Height:300	Vert	Margin [dB]	-	-	-17.6	-8.1	-	-
4	107.9214	43.2 pk	-30	11.8	25	-	-	43.5	33.1	-
	Azimuth:2	Height:100	Vert	Margin [dB]	-	-	-18.5	-8.1	-	-
5	199.0939	40 pk	-29.8	15.9	26.1	-	-	43.5	33.1	-
	Azimuth:287	Height:100	Vert	Margin [dB]	-	-	-17.4	-7	-	-

LIMIT 3: CFR 47 Part 15 Class A 10m

LIMIT 4: CFR 47 Part 15 Class B 10m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

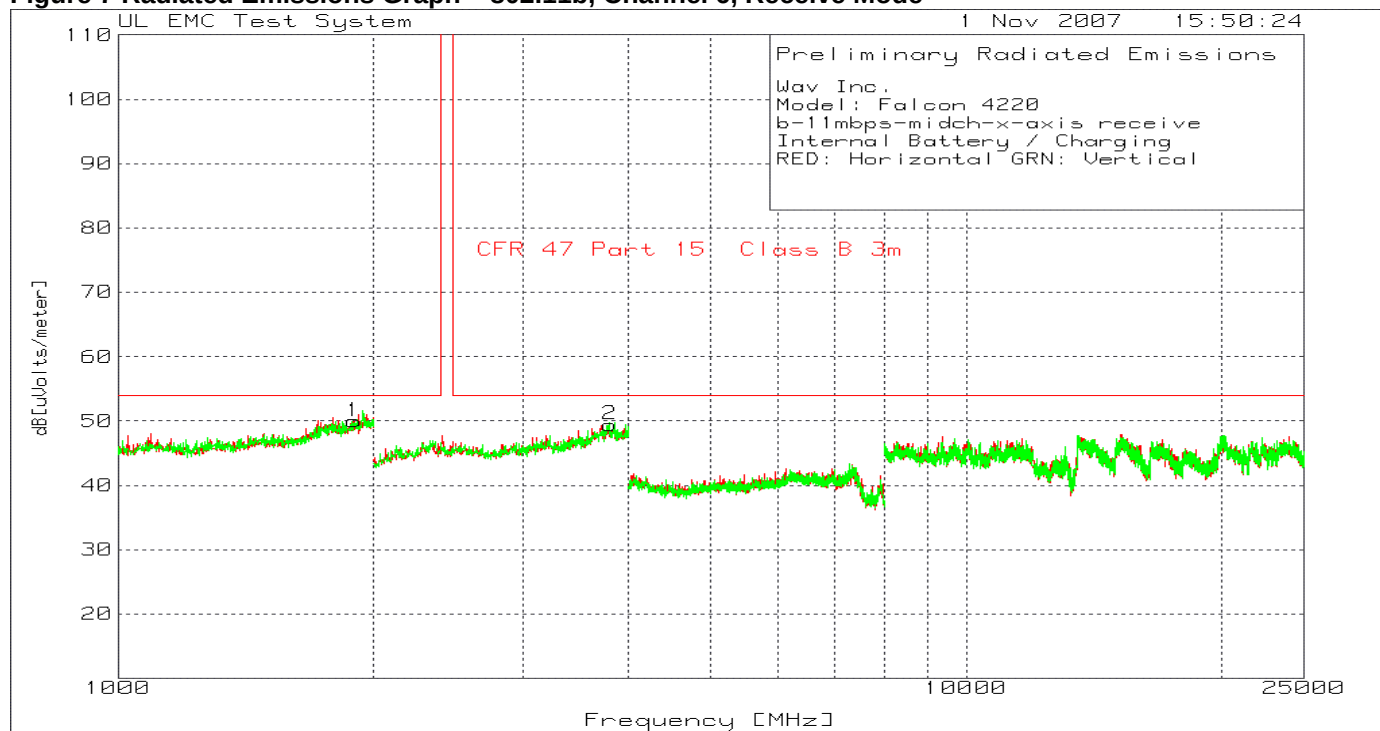
Wav Inc.
 Model: Falcon 4220
 b-11mbps-midch-x axis
 Battery / Charging
 RED: Horizontal GRN: Vertical

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 dB[uVolts/meter]	2	3	4	5	6
45.385	38.75 qp	-30.3	11.8	20.25	-	-	39.1	29.6	-
	Azimuth: 204	Height:100	Vert	Margin [dB]:	-	-	-18.85	-9.35	-

LIMIT 3: CFR 47 Part 15 Class A 10m

LIMIT 4: CFR 47 Part 15 Class B 10m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

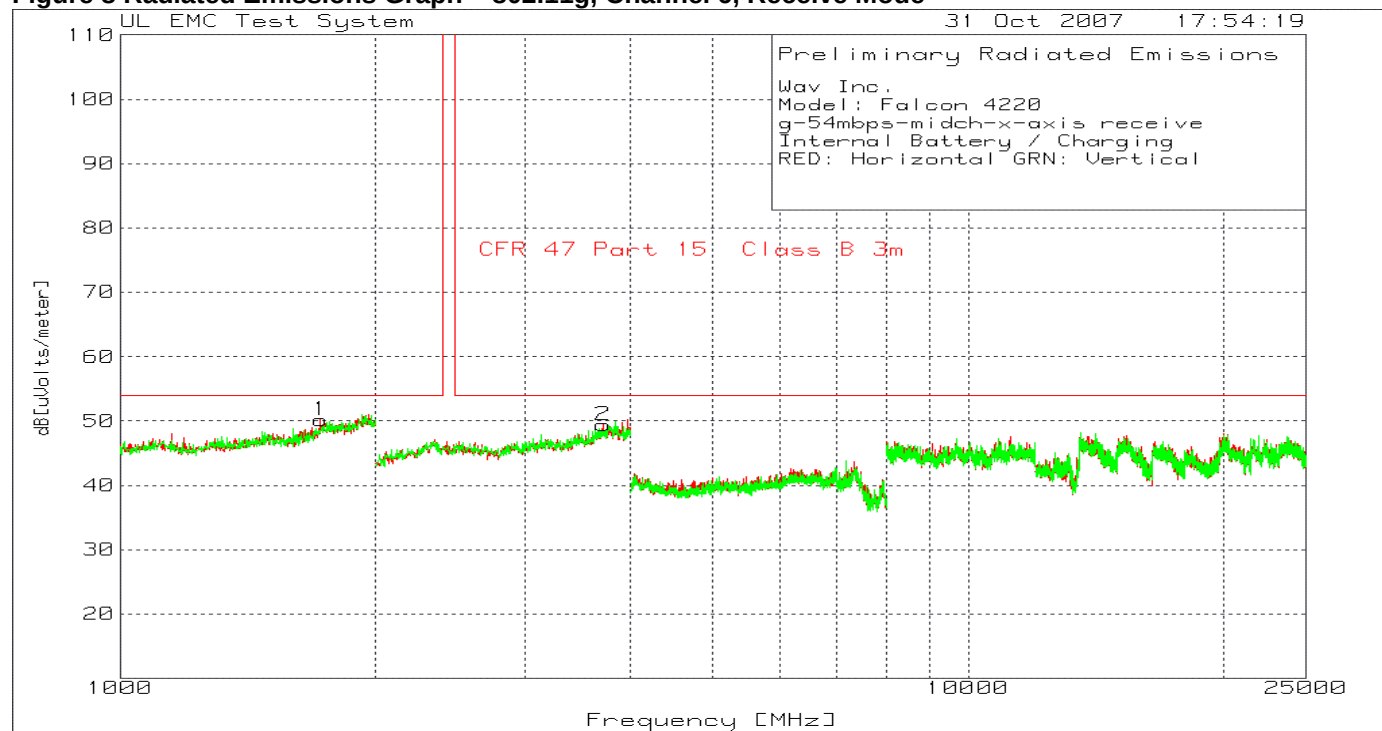
Figure 7 Radiated Emissions Graph – 802.11b, Channel 6, Receive Mode**Table 9 Radiated Emissions Data Points – 802.11b, Channel 6, Receive Mode**

Wav Inc.
Model: Falcon 4220
b-11mbps-midch-x-axis receive
Internal Battery / Charging
RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	1897.796	19.39	pk	3.77	26.8	49.96	54	-4.04	150	Horz
2	3799.599	20.08	pk	5.23	24.1	49.41	54	-4.59	100	Horz

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector

Figure 8 Radiated Emissions Graph – 802.11g, Channel 6, Receive Mode**Table 10 Radiated Emissions Data Points – 802.11g, Channel 6, Receive Mode**

Wav Inc.
Model: Falcon 4220
g-54mbps-midch-x-axis receive
Internal Battery / Charging
RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	1723.447	20.57	pk	3.48	26.1	50.15	54	-3.85	150	Horz
2	3711.423	19.95	pk	5.82	23.6	49.37	54	-4.63	150	Horz

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector

4.3 Test Conditions and Results – SPURIOUS RADIATED EMISSIONS 1GHz – 25GHz

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 meter or 10-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	
Basic Standard		
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	10 meter distance
	1GHz – 25GHz	3 meter distance
Limits		
Frequency (MHz)	Limit (dBμV/m)	
	Quasi-Peak	Average
30 - 88	29.54	NA
88 - 216	33.06	NA
216 - 916	35.56	NA
916 – 1,000	43.52	NA
1,000 – 25,000	NA	53.97
Supplementary information: None		

Table 11 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 12 Radiated Emissions Test Equipment

Description	Manufacturer	Model	Identifier
Spectrum Analyzer	HP	8566B	EMC4085
Quasi-Peak Detector	HP	85650A	EMC4016
Bicon Antenna	Chase	VBA6106A	EMC4078
Log-P Antenna	Chase	UPA6109	EMC4258
Spectrum Analyzer	Rhode & Schwartz	FSEK	EMC4182
Antenna Array	UL	BOMS	EMC4276

Figure 9 Test setup for Radiated Emissions

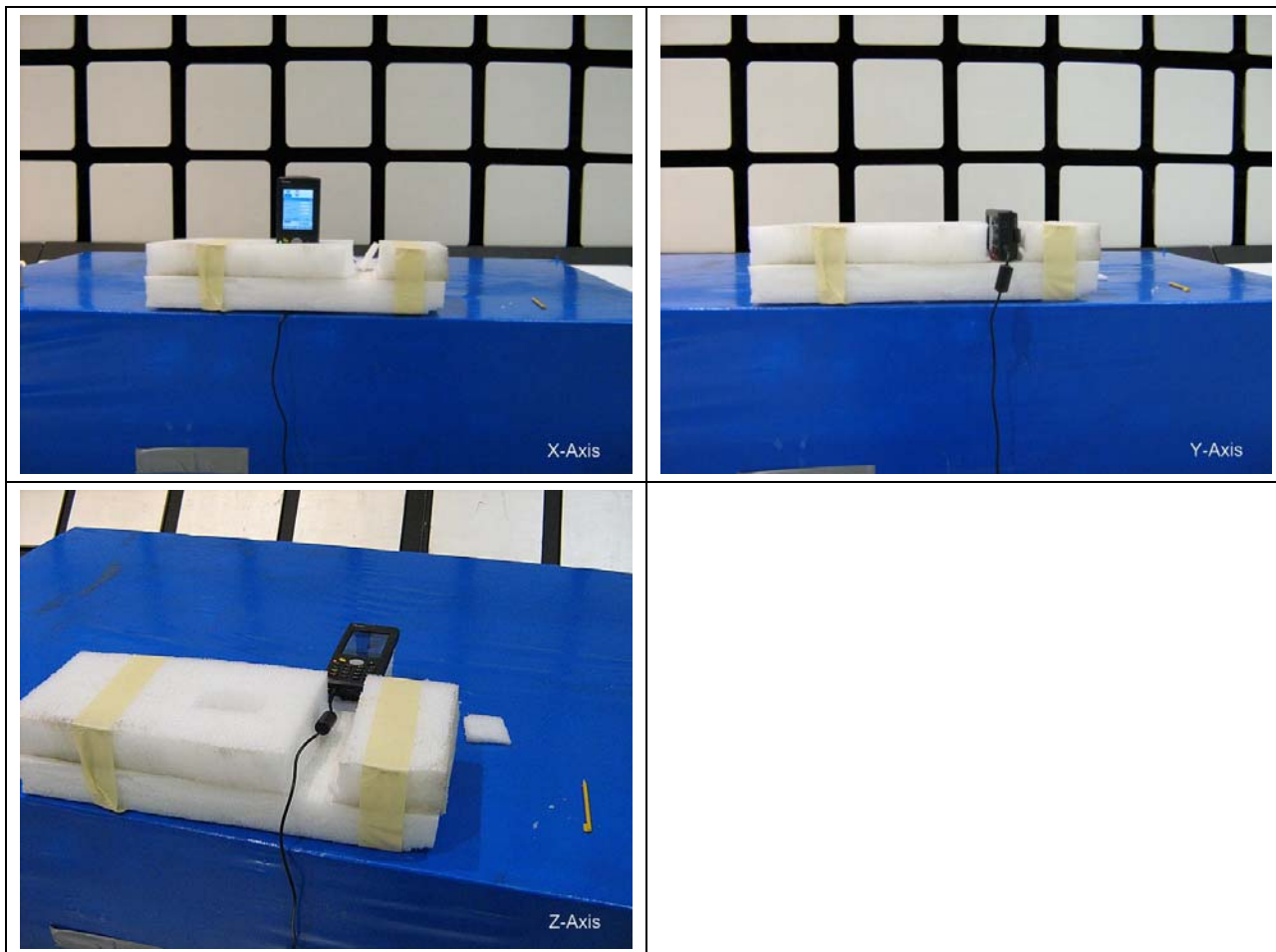


Figure 10 Spurious Radiated Emissions Graph – 802.11b, Channel 1, X-Axis

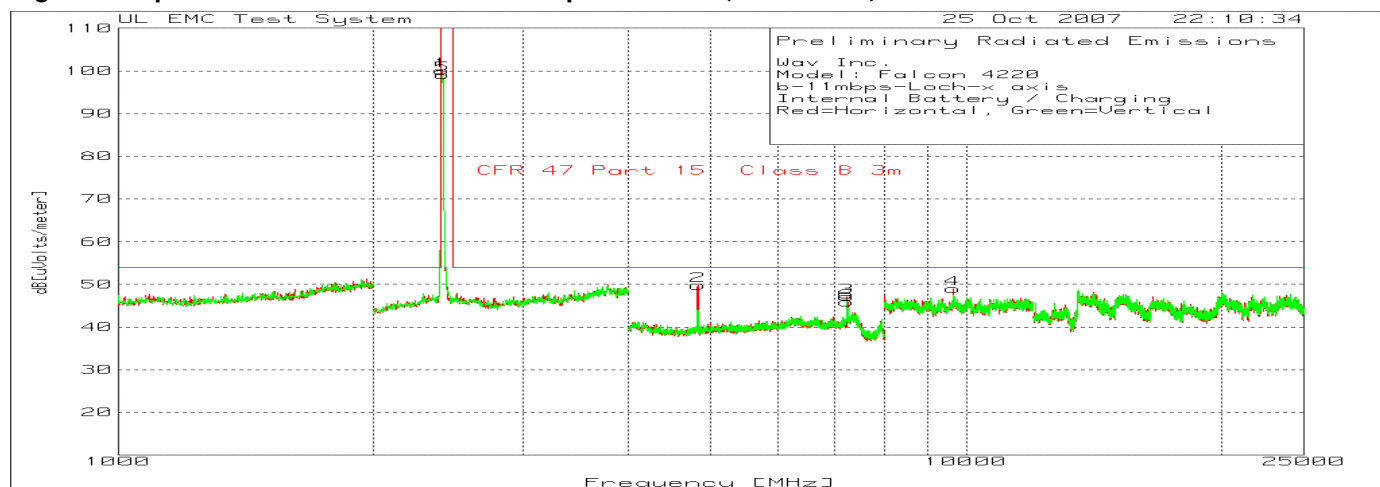


Figure 11 Spurious Radiated Emissions Graph – 802.11b, Channel 1, Y-Axis

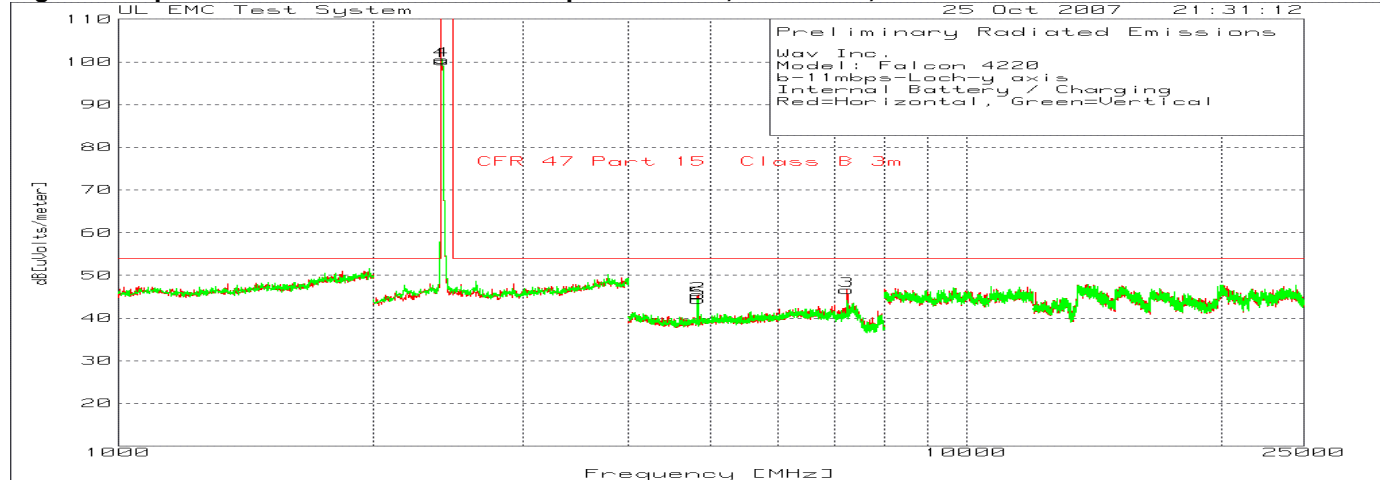


Figure 12 Spurious Radiated Emissions Graph – 802.11b, Channel 1, Z-Axis

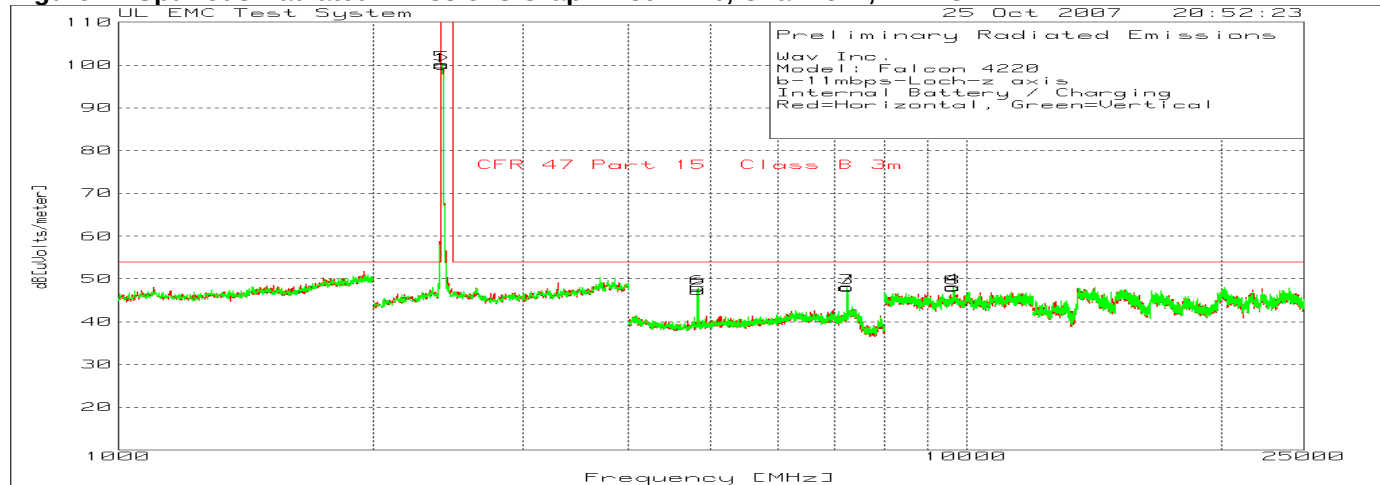


Table 13 Spurious Radiated Emissions Data Points – 802.11b, Channel 1, X, Y, and Z Axis

Wav Inc.

Model: Falcon 4220

b-11mbps-Loch-x axis

Internal Battery / Charging

Red=Horizontal, Green=Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
X-Axis										
1	2408.818	73.78	pk	4.51	21.8	100.09	999	-898.91	100	Horz
2	4824.55	73.31	pk	-51.24	27.7	49.77	54	-4.23	100	Horz
3	7234.156	64.34	pk	-47.19	30	47.15	54	-6.85	100	Horz
4	9649.099	62.33	pk	-49.74	36.4	48.99	54	-5.01	150	Horz
5	2412.826	72.88	pk	4.47	21.8	99.15	999	-899.85	149	Vert
6	7234.156	63.08	pk	-47.19	30	45.89	54	-8.11	100	Vert
Y-Axis										
1	2408.818	73.89	pk	4.51	21.8	100.2	999	-898.8	100	Horz
2	4824.55	68.96	pk	-51.24	27.7	45.42	54	-8.58	100	Horz
3	7234.156	63.76	pk	-47.19	30	46.57	54	-7.43	100	Horz
4	2408.818	74.18	pk	4.51	21.8	100.49	999	-898.51	150	Vert
5	4824.55	67.85	pk	-51.24	27.7	44.31	54	-9.69	100	Vert
Z-Axis										
1	2408.818	73.56	pk	4.51	21.8	99.87	999	-899.13	100	Horz
2	4824.55	70.76	pk	-51.24	27.7	47.22	54	-6.78	100	Horz
3	7234.156	65.18	pk	-47.19	30	47.99	54	-6.01	100	Horz
4	9646.431	61.54	pk	-49.75	36.4	48.19	54	-5.81	150	Horz
5	2408.818	73.9	pk	4.51	21.8	100.21	999	-898.79	150	Vert
6	4824.55	71.46	pk	-51.24	27.7	47.92	54	-6.08	100	Vert
7	7236.825	65.3	pk	-47.22	30	48.08	54	-5.92	100	Vert
8	9646.431	61.27	pk	-49.75	36.4	47.92	54	-6.08	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 13 Spurious Radiated Emissions Graph – 802.11b, Channel 6, X-Axis

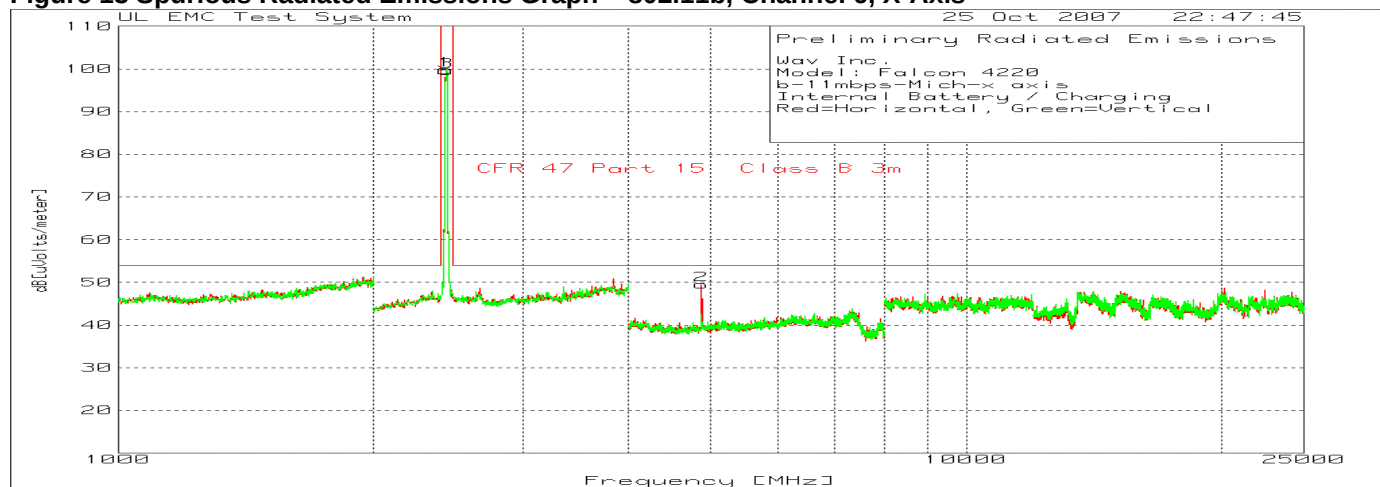


Figure 14 Spurious Radiated Emissions Graph – 802.11b, Channel 6, Y-Axis

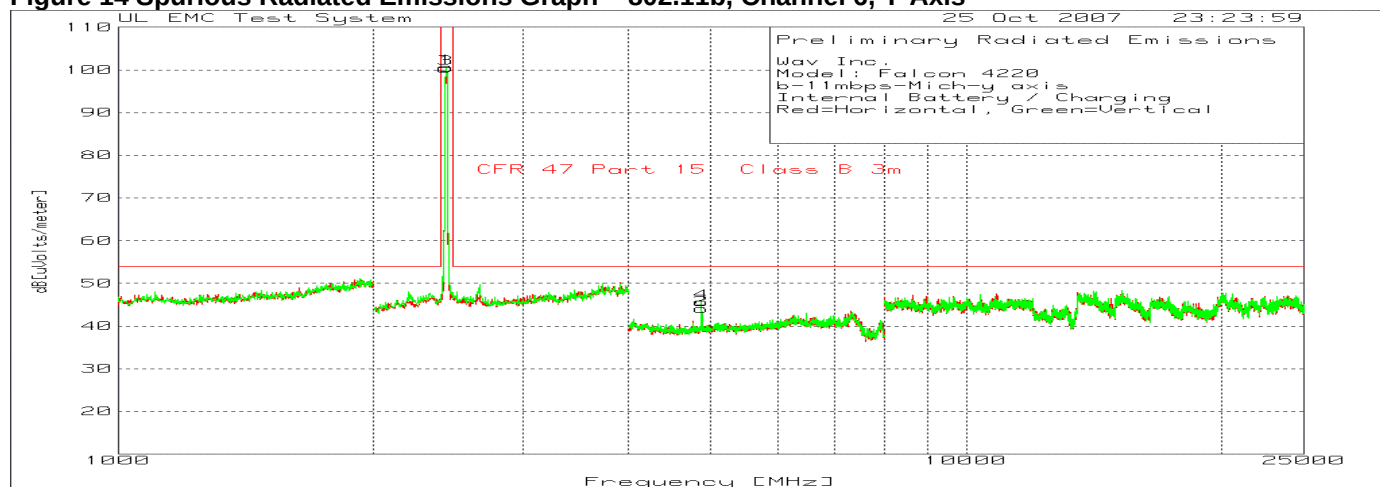


Figure 15 Spurious Radiated Emissions Graph – 802.11b, Channel 6, Z-Axis

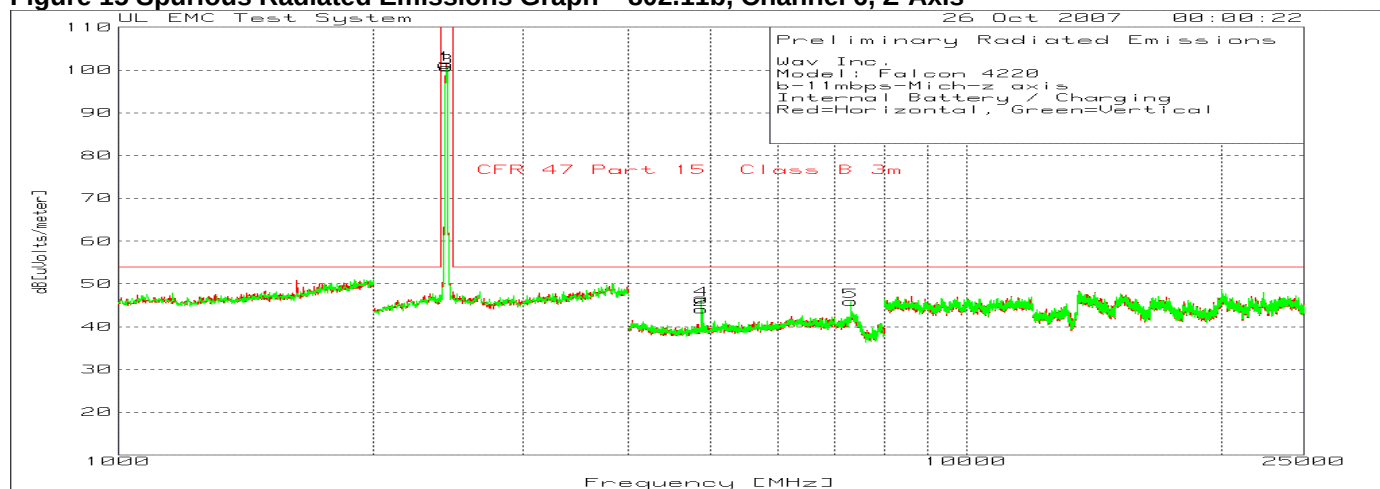


Table 14 Spurious Radiated Emissions Data Points – 802.11b, Channel 6, X, Y, and Z Axis

Wav Inc.

Model: Falcon 4220

b-11mbps-Mich-x axis

Internal Battery / Charging

Red=Horizontal, Green=Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
X-Axis										
1	2432.866	73.85	pk	4.03	21.9	99.78	999	-899.22	100	Horz
2	4872.582	72.93	pk	-51.15	27.7	49.48	54	-4.52	100	Horz
3	2436.874	73.77	pk	3.89	21.9	99.56	999	-899.44	150	Vert
Y-Axis										
1	2436.874	74.79	pk	3.89	21.9	100.58	999	-898.42	100	Horz
2	4872.582	67.5	pk	-51.15	27.7	44.05	54	-9.95	100	Horz
3	2432.866	74.47	pk	4.03	21.9	100.4	999	-898.6	150	Vert
4	4872.582	69.08	pk	-51.15	27.7	45.63	54	-8.37	100	Vert
Z-Axis										
1	2432.866	75.36	pk	4.03	21.9	101.29	999	-897.71	100	Horz
2	4872.582	67.49	pk	-51.15	27.7	44.04	54	-9.96	150	Horz
3	2440.882	74.96	pk	3.85	21.9	100.71	999	-898.29	150	Vert
4	4872.582	69.83	pk	-51.15	27.7	46.38	54	-7.62	100	Vert
5	7314.209	61.67	pk	-46.4	30.6	45.87	54	-8.13	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 16 Spurious Radiated Emissions Graph – 802.11b, Channel 11, X-Axis

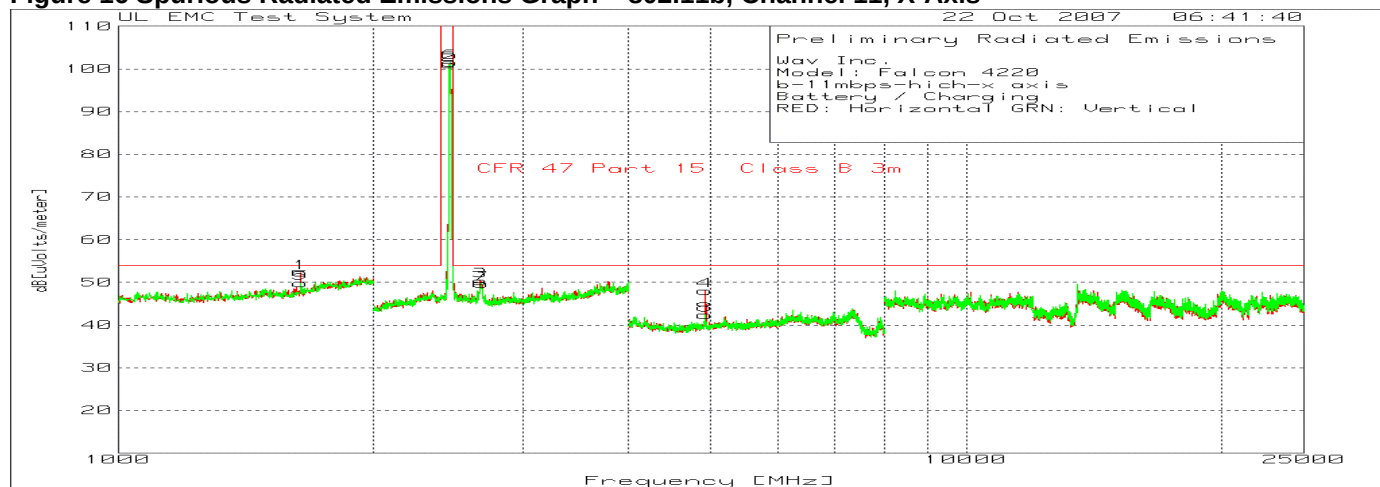


Figure 17 Spurious Radiated Emissions Graph – 802.11b, Channel 11, Y-Axis

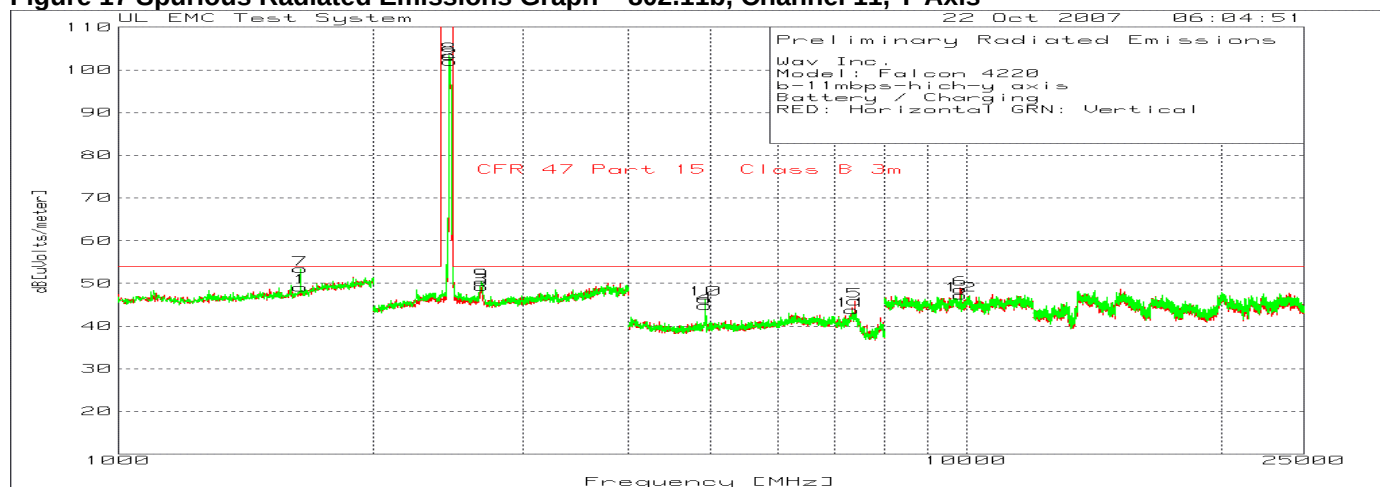


Figure 18 Spurious Radiated Emissions Graph – 802.11b, Channel 11, Z-Axis

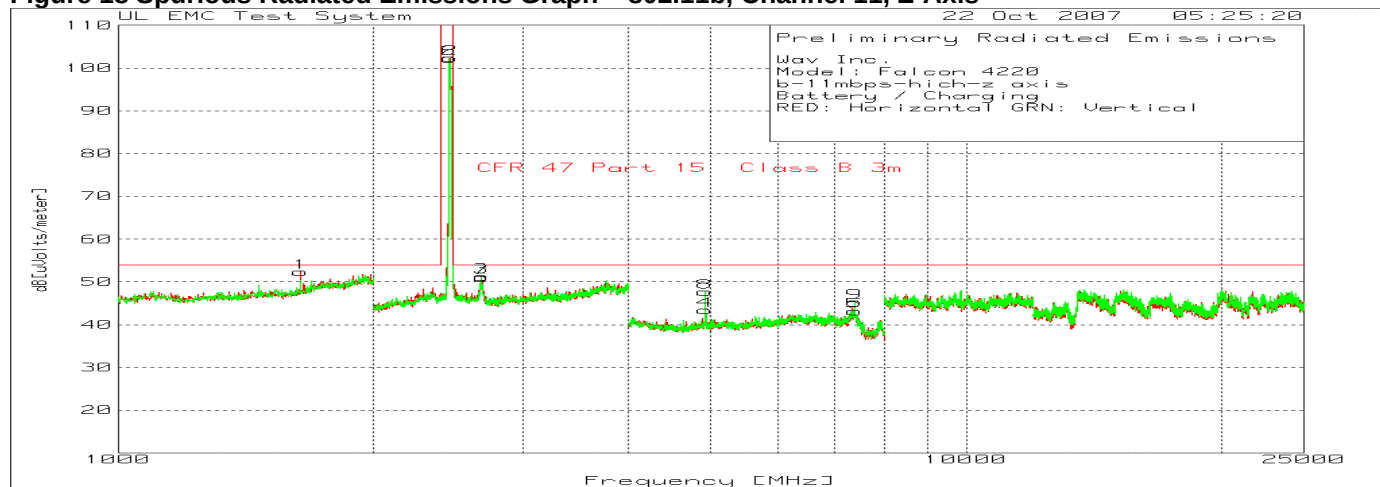


Table 15 Spurious Radiated Emissions Data Points – 802.11b, Channel 11, X, Y, and Z Axis

Wav Inc.

Model: Falcon 4220

b-11mbps-high-x axis

Battery / Charging

RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
X-Axis										
1	1641.283	22.69	pk	3.6	26	52.29	54	-1.71	100	Horz
2	2458.458	75.06	pk	4.01	22	101.07	999	-897.93	100	Horz
3	2674.675	24.12	pk	4.02	22.2	50.34	54	-3.66	100	Horz
4	4923.282	71.31	pk	-51.09	27.8	48.02	54	-5.98	100	Horz
5	1641.283	20.19	pk	3.6	26	49.79	54	-4.21	150	Vert
6	2464.464	75.5	pk	4.02	22	101.52	999	-897.48	150	Vert
7	2680.681	23.54	pk	4.03	22.1	49.67	54	-4.33	150	Vert
8	4923.282	65.64	pk	-51.09	27.8	42.35	54	-11.65	100	Vert
Y-Axis										
1	1641.283	19.48	pk	3.6	26	49.08	54	-4.92	100	Horz
2	2462.462	75.98	pk	4.01	22	101.99	999	-897.01	99	Horz
3	2682.683	23.05	pk	4.04	22.1	49.19	54	-4.81	99	Horz
4	4923.282	68.09	pk	-51.09	27.8	44.8	54	-9.2	100	Horz
5	7386.258	61.67	pk	-46.89	31.1	45.88	54	-8.12	100	Horz
6	9849.233	63.51	pk	-51.27	36.4	48.64	54	-5.36	150	Horz
7	1641.283	23.78	pk	3.6	26	53.38	54	-.62	100	Vert
8	2458.458	77.37	pk	4.01	22	103.38	999	-895.62	100	Vert
9	2682.683	24.23	pk	4.04	22.1	50.37	54	-3.63	100	Vert
10	4923.282	69.65	pk	-51.09	27.8	46.36	54	-7.64	150	Vert
11	7340.894	59.31	pk	-46.38	30.8	43.73	54	-10.27	100	Vert
12	9849.233	62.08	pk	-51.27	36.4	47.21	54	-6.79	150	Vert
Z-Axis										
1	1641.283	22.73	pk	3.6	26	52.33	54	-1.67	105	Horz
2	2462.462	76.33	pk	4.01	22	102.34	999	-896.66	100	Horz
3	2682.683	25.11	pk	4.04	22.1	51.25	54	-2.75	100	Horz
4	4923.282	66.72	pk	-51.09	27.8	43.43	54	-10.57	150	Horz
5	7391.594	59.07	pk	-47	31.1	43.17	54	-10.83	100	Horz
6	2458.458	76.3	pk	4.01	22	102.31	999	-896.69	150	Vert
7	2682.683	24.87	pk	4.04	22.1	51.01	54	-2.99	150	Vert
8	4923.282	70.95	pk	-51.09	27.8	47.66	54	-6.34	150	Vert
9	7391.594	61.16	pk	-47	31.1	45.26	54	-8.74	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 19 Spurious Radiated Emissions Graph – 802.11g, Channel 1, X-Axis

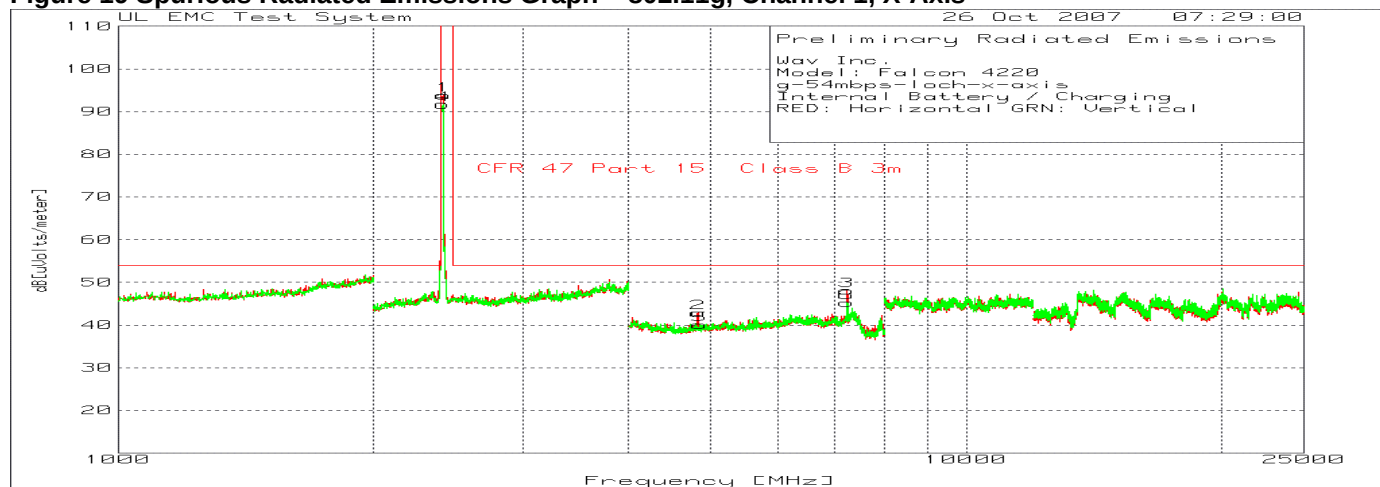


Figure 20 Spurious Radiated Emissions Graph – 802.11g, Channel 1, Y-Axis

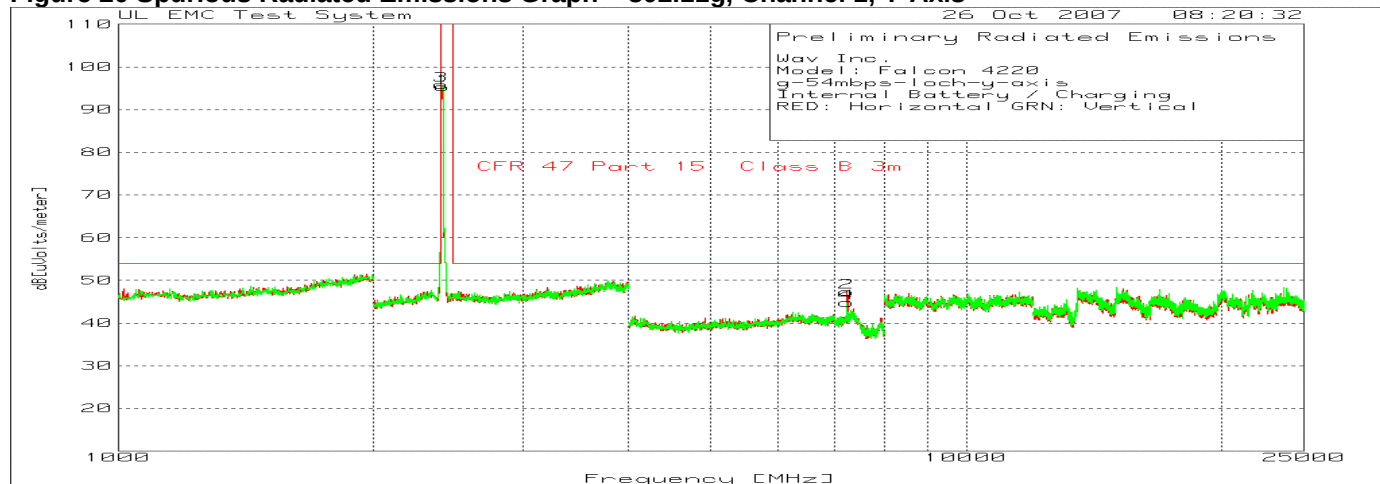


Figure 21 Spurious Radiated Emissions Graph – 802.11g, Channel 1, Z-Axis

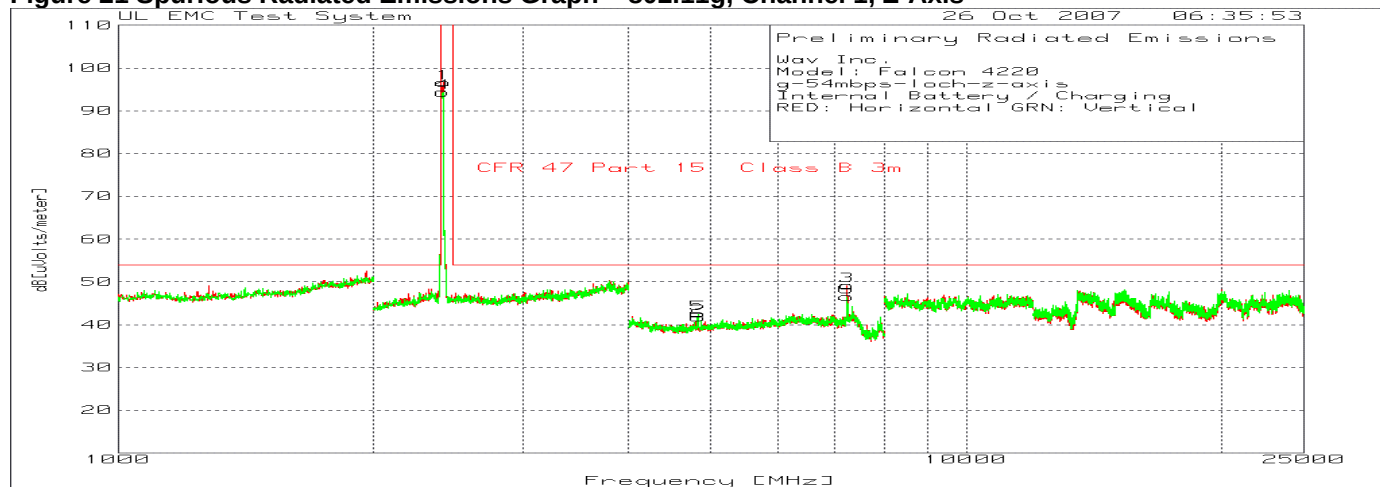


Table 16 Spurious Radiated Emissions Data Points – 802.11g, Channel 1, X, Y, and Z Axis

Wav Inc.
 Model: Falcon 4220
 g-54mbps-loch-x-axis
 Internal Battery / Charging
 RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
X-Axis										
1	2418.418	67.62	pk	4.29	21.9	93.81	999	-905.19	100	Horz
2	4829.887	66.38	pk	-51.22	27.7	42.86	54	-11.14	100	Horz
3	7228.819	65.3	pk	-47.1	29.9	48.1	54	-5.9	100	Horz
4	2414.414	65.48	pk	4.42	21.8	91.7	999	-907.3	149	Vert
5	4848.566	63.62	pk	-51.28	27.7	40.04	54	-13.96	100	Vert
6	7228.819	62.41	pk	-47.1	29.9	45.21	54	-8.79	100	Vert
Y-Axis										
1	2414.414	69.09	pk	4.42	21.8	95.31	999	-903.69	100	Horz
2	7234.156	64.49	pk	-47.19	30	47.3	54	-6.7	100	Horz
3	2404.404	69.63	pk	4.39	21.8	95.82	999	-903.18	100	Vert
4	7234.156	61.98	pk	-47.19	30	44.79	54	-9.21	100	Vert
Z-Axis										
1	2418.418	70.4	pk	4.29	21.9	96.59	999	-902.41	100	Horz
2	4827.218	65.25	pk	-51.24	27.7	41.71	54	-12.29	100	Horz
3	7236.825	66.39	pk	-47.22	30	49.17	54	-4.83	100	Horz
4	2414.414	68.12	pk	4.42	21.8	94.34	999	-904.66	150	Vert
5	4827.218	66.19	pk	-51.24	27.7	42.65	54	-11.35	100	Vert
6	7231.488	63.81	pk	-47.17	29.9	46.54	54	-7.46	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Figure 22 Spurious Radiated Emissions Graph – 802.11g, Channel 6, X-Axis

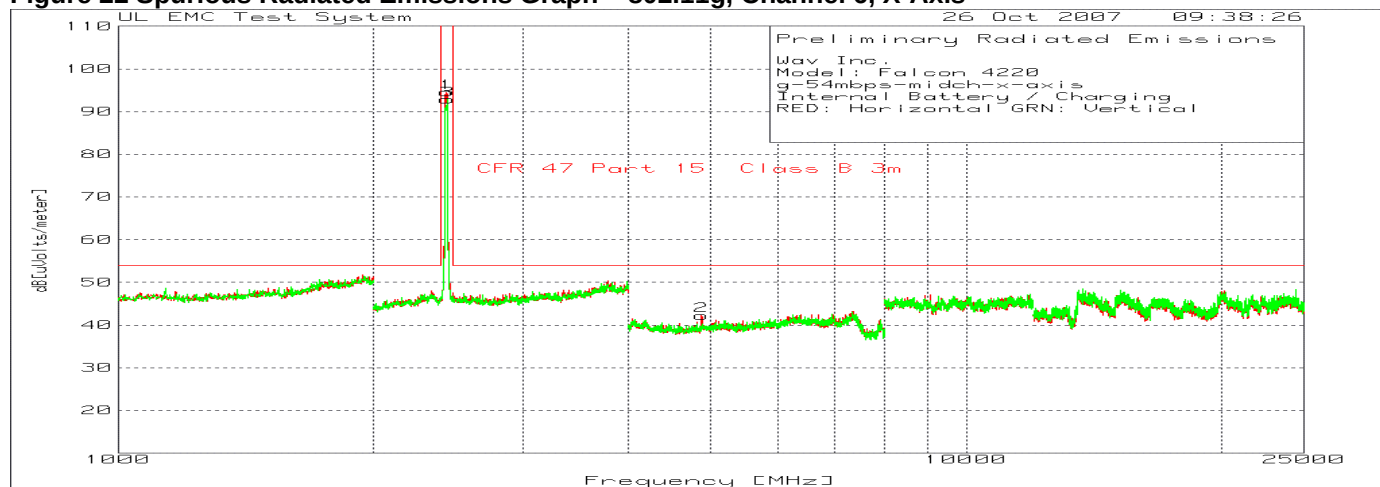


Figure 23 Spurious Radiated Emissions Graph – 802.11g, Channel 6, Y-Axis

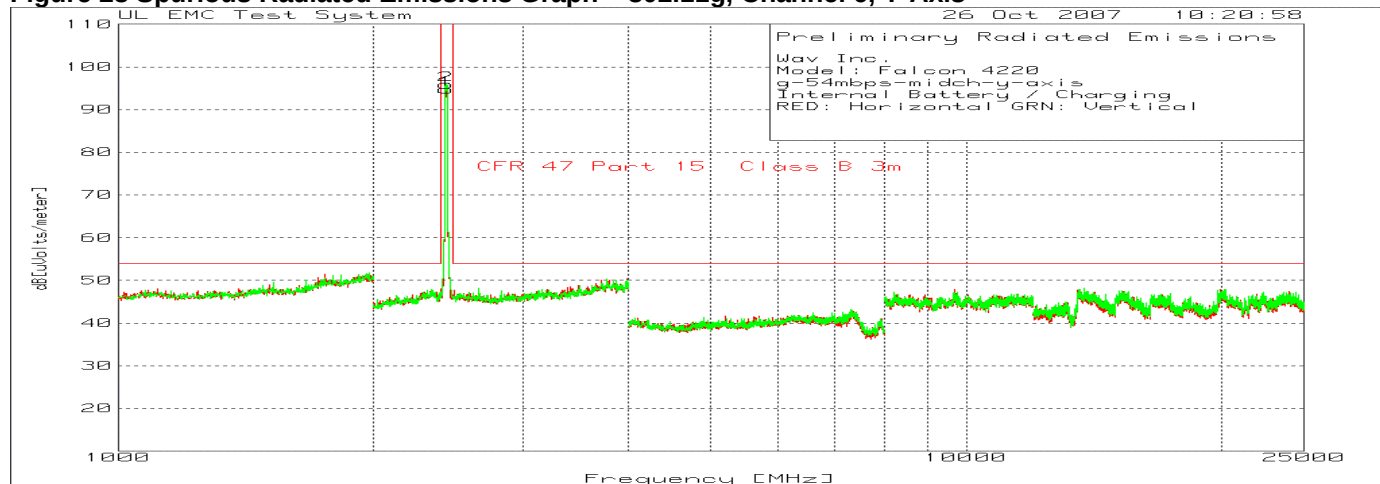


Figure 24 Spurious Radiated Emissions Graph – 802.11g, Channel 6, Z-Axis

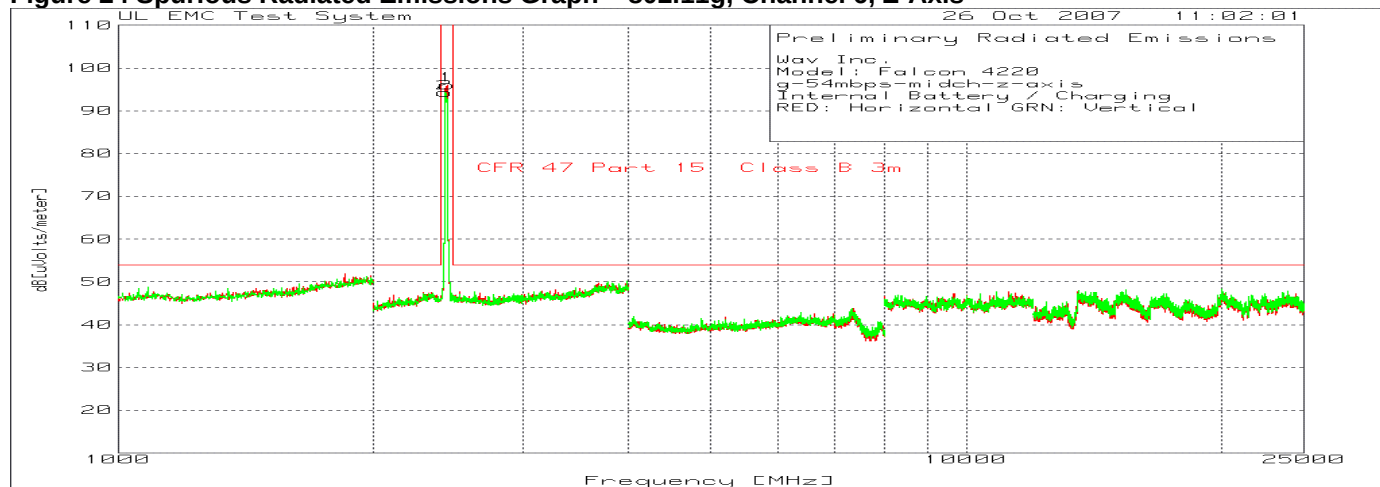


Table 17 Spurious Radiated Emissions Data Points – 802.11g, Channel 6, X, Y, and Z Axis

Wav Inc.
 Model: Falcon 4220
 g-54mbps-midch-x-axis
 Internal Battery / Charging
 RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
X-Axis										
1	2440.44	68.8	pk	3.85	21.9	94.55	999	-904.45	100	Horz
2	4875.25	65.69	pk	-51.17	27.7	42.22	54	-11.78	100	Horz
3	2442.442	67.09	pk	3.85	21.9	92.84	999	-906.16	100	Vert
Y-Axis										
1	2438.438	68.99	pk	3.87	21.9	94.76	999	-904.24	100	Horz
2	2438.438	70.12	pk	3.87	21.9	95.89	999	-903.11	150	Vert
Z-Axis										
1	2442.442	70.32	pk	3.85	21.9	96.07	999	-902.93	100	Horz
2	2428.428	68.15	pk	4.19	21.9	94.24	999	-904.76	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Figure 25 Spurious Radiated Emissions Graph – 802.11g, Channel 11, X-Axis

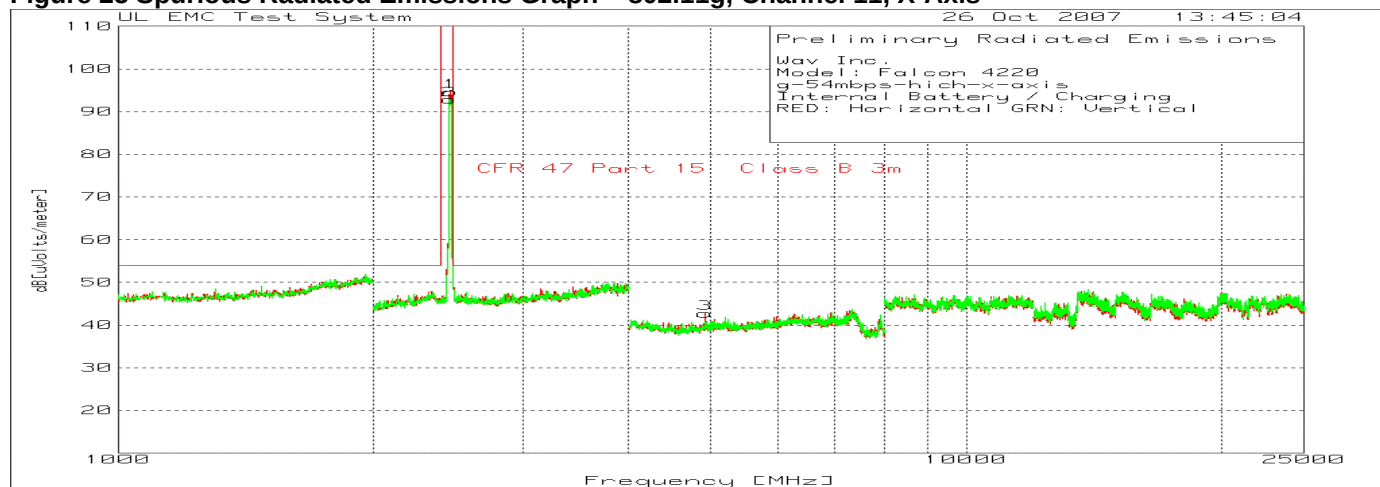


Figure 26 Spurious Radiated Emissions Graph – 802.11g, Channel 11, Y-Axis

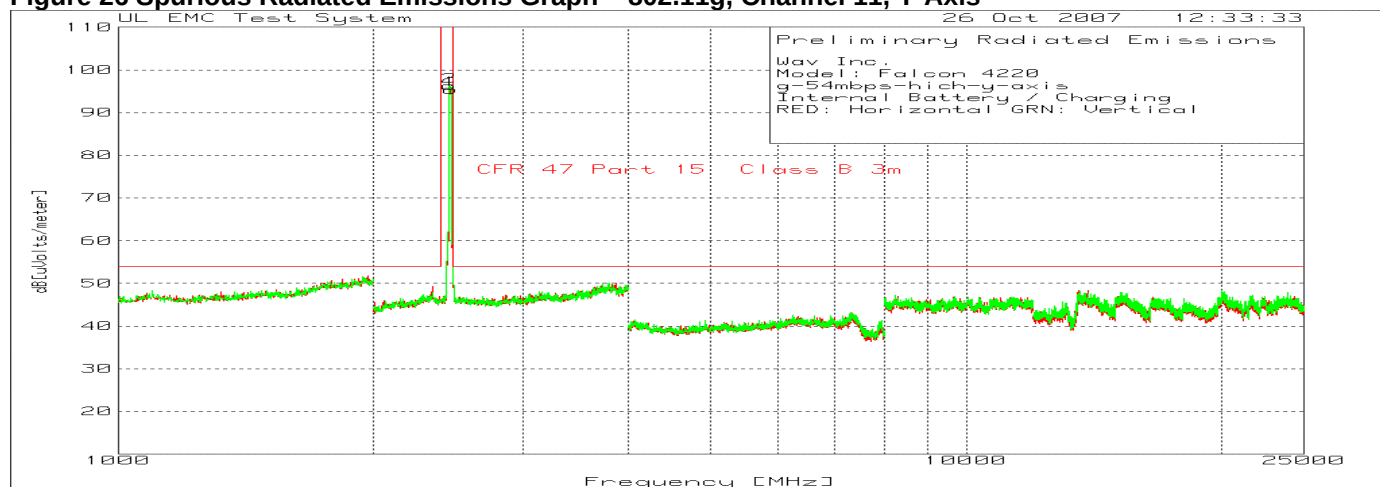


Figure 27 Spurious Radiated Emissions Graph – 802.11g, Channel 11, Z-Axis

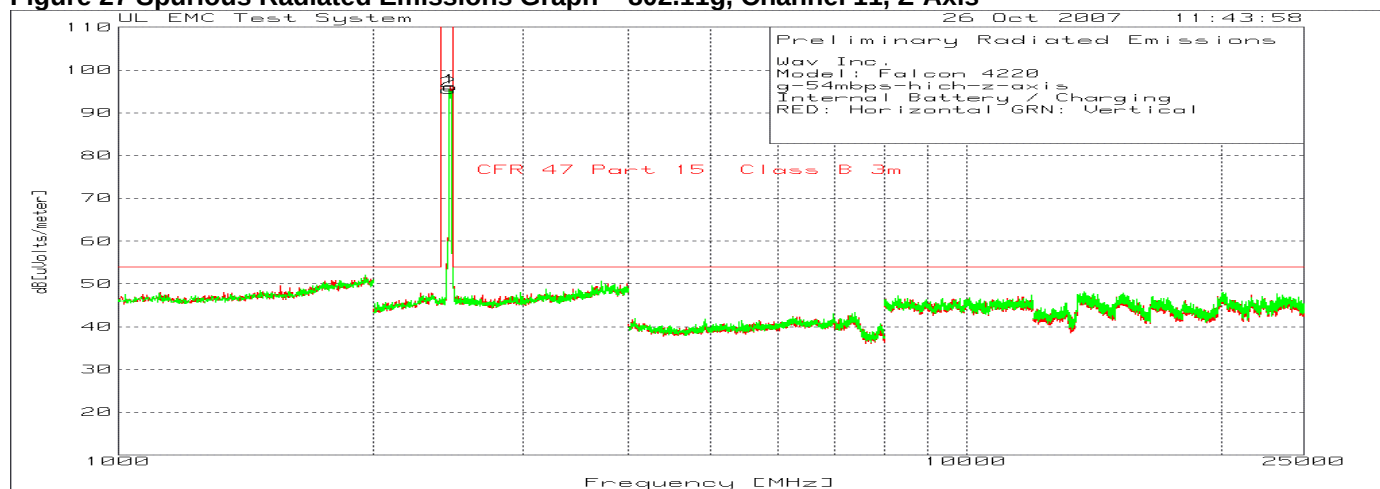


Table 18 Spurious Radiated Emissions Data Points – 802.11g, Channel 11, X, Y, and Z Axis

Wav Inc.

Model: Falcon 4220

g-54mbps-high-x-axis

Internal Battery / Charging

RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(μV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[μVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
X-Axis										
1	2464.464	68.6	pk	4.02	22	94.62	999	-904.38	100	Horz
3	4920.614	65.98	pk	-51.09	27.8	42.69	54	-11.31	100	Horz
2	2458.458	66.83	pk	4.01	22	92.84	999	-906.16	100	Vert
Y-Axis										
1	2466.466	69.39	pk	4.04	22	95.43	999	-903.57	100	Horz
2	2458.458	70.23	pk	4.01	22	96.24	999	-902.76	150	Vert
Z-Axis										
1	2466.466	70.01	pk	4.04	22	96.05	999	-902.95	100	Horz
2	2454.454	69.4	pk	3.96	22	95.36	999	-903.64	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 28 Radiated Emissions Graph

Figure 29 Radiated Emissions Graph

Figure 30 Radiated Emissions Graph

Table 19 Radiated Emissions Data Points

Figure 31 Radiated Emissions Graph

Figure 32 Radiated Emissions Graph

Figure 33 Radiated Emissions Graph

Table 20 Radiated Emissions Data Points

4.4 Test Conditions and Results – SPURIOUS BANDEDGE RADIATED EMISSIONS

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	
Basic Standard		
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	1GHz – 25GHz	3 meter distance
Limits		
Frequency (MHz)	Limit (dB μ V/m)	
	Quasi-Peak	Average
30 - 88	29.54	NA
88 - 216	33.06	NA
216 - 916	35.56	NA
916 – 1,000	43.52	NA
1,000 – 25,000	NA	53.97
Supplementary information: None		

Table 21 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 22 Radiated Emissions Test Equipment

Description	Manufacturer	Model	Identifier
Spectrum Analyzer	HP	8566B	EMC4085
Quasi-Peak Detector	HP	85650A	EMC4016
Bicon Antenna	Chase	VBA6106A	EMC4078
Log-P Antenna	Chase	UPA6109	EMC4258
Spectrum Analyzer	Rhode & Schwartz	FSEK	EMC4182
Antenna Array	UL	BOMS	EMC4276

Figure 34 Test setup for Radiated Emissions

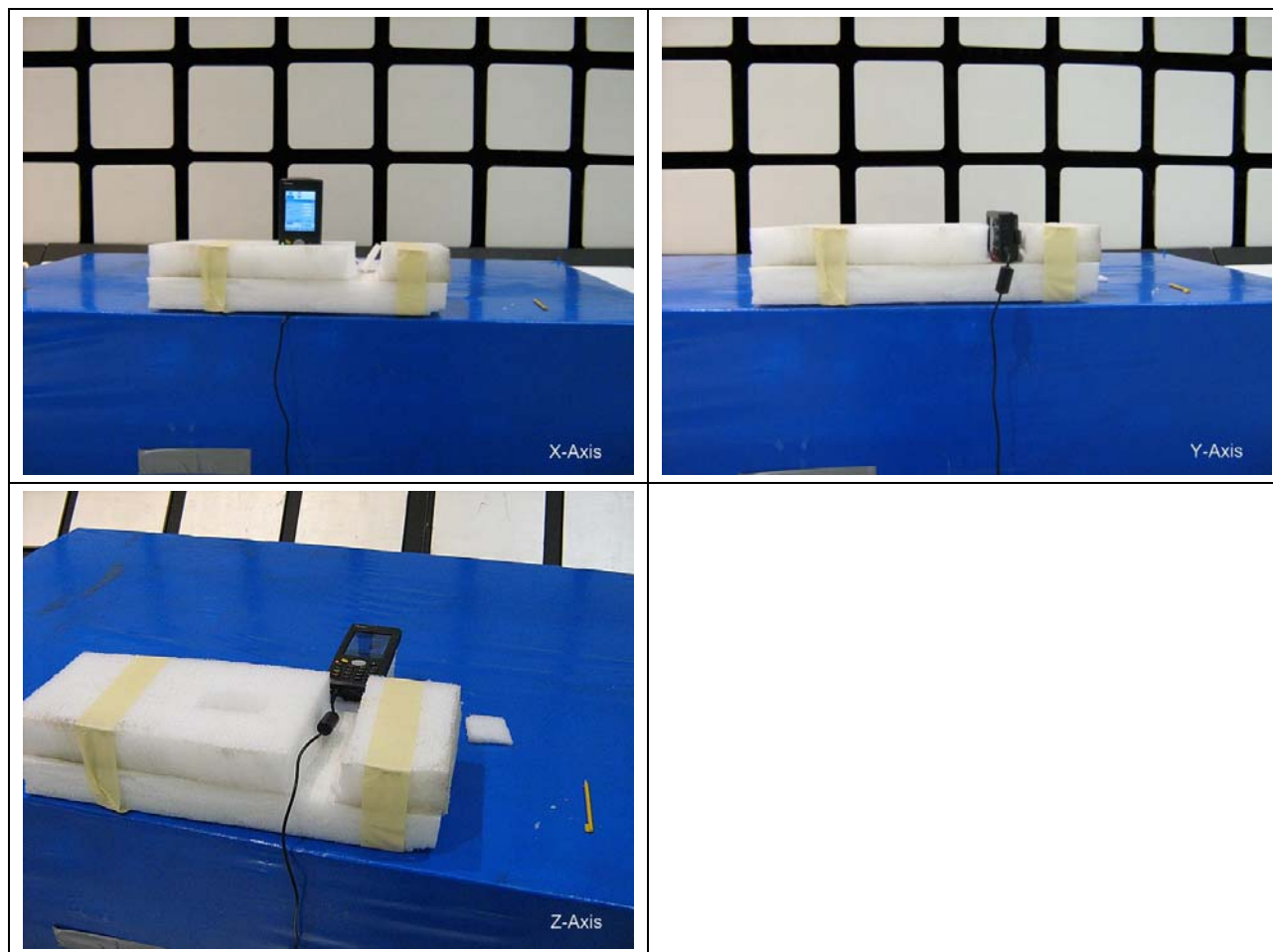


Figure 35 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 1, X-Axis, Horizontal

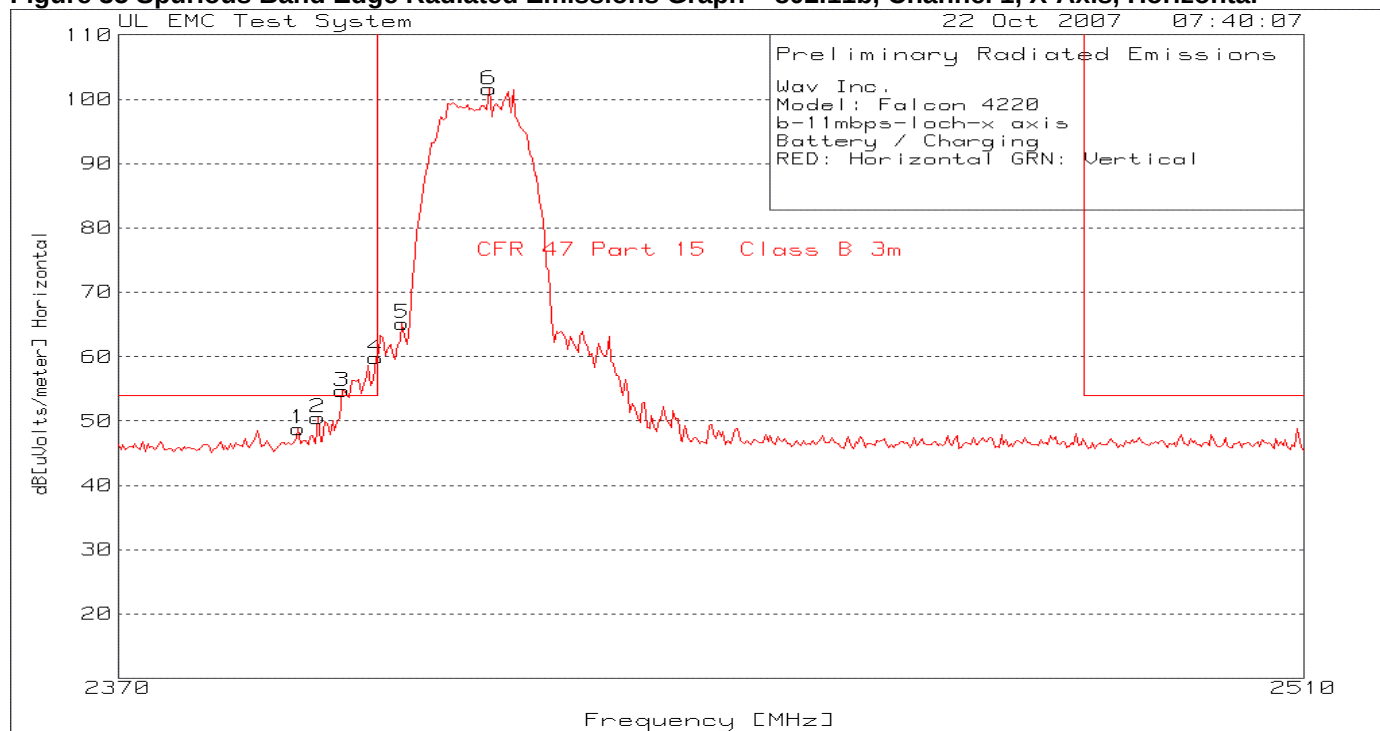


Figure 36 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 1, X-Axis, Vertical

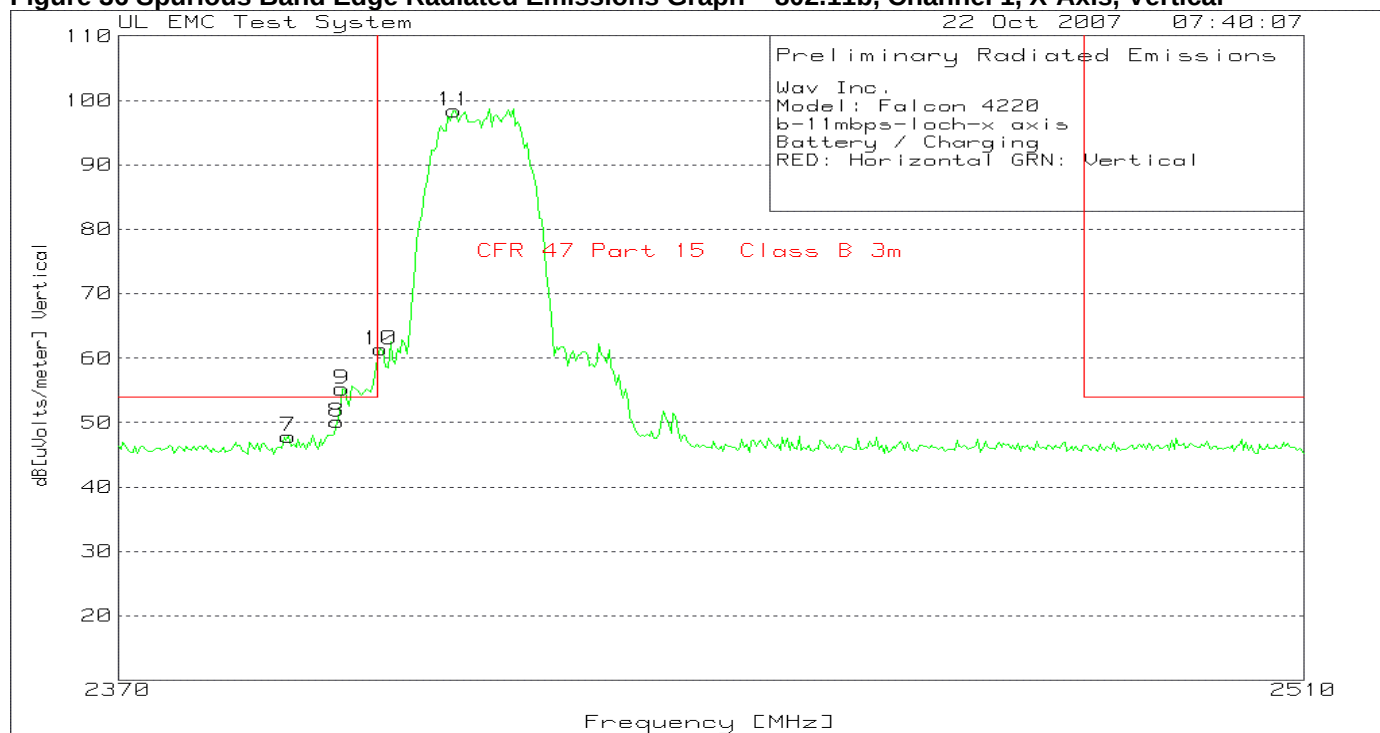


Table 23 Spurious Band Edge Radiated Emissions Data Points – 802.11b, Channel 1, X Axis

Wav Inc.

Model: Falcon 4220

b-11mbps-loch-x axis

Battery / Charging

RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2390.762	22.95	pk	4.04	21.8	48.79	54	-5.21	100	Horz
2	2393.006	24.59	pk	4.11	21.8	50.5	54	-3.5	100	Horz
3	2395.812	28.69	pk	4.17	21.8	54.66	54	.66	150	Horz
4	2399.739	33.75	pk	4.24	21.8	59.79	54	5.79	100	Horz
5	2402.826	39.03	pk	4.33	21.8	65.16	999	-933.84	100	Horz
6	2412.926	75.31	pk	4.47	21.8	101.58	999	-897.42	100	Horz
7	2389.639	22.04	pk	4	21.8	47.84	54	-6.16	150	Vert
8	2395.251	24.15	pk	4.16	21.8	50.11	54	-3.89	100	Vert
9	2395.812	29.24	pk	4.17	21.8	55.21	54	1.21	150	Vert
10	2400.301	35.3	pk	4.26	21.8	61.36	999	-937.64	150	Vert
11	2408.858	72.1	pk	4.51	21.8	98.41	999	-900.59	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 37 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 1, Y-Axis, Horizontal

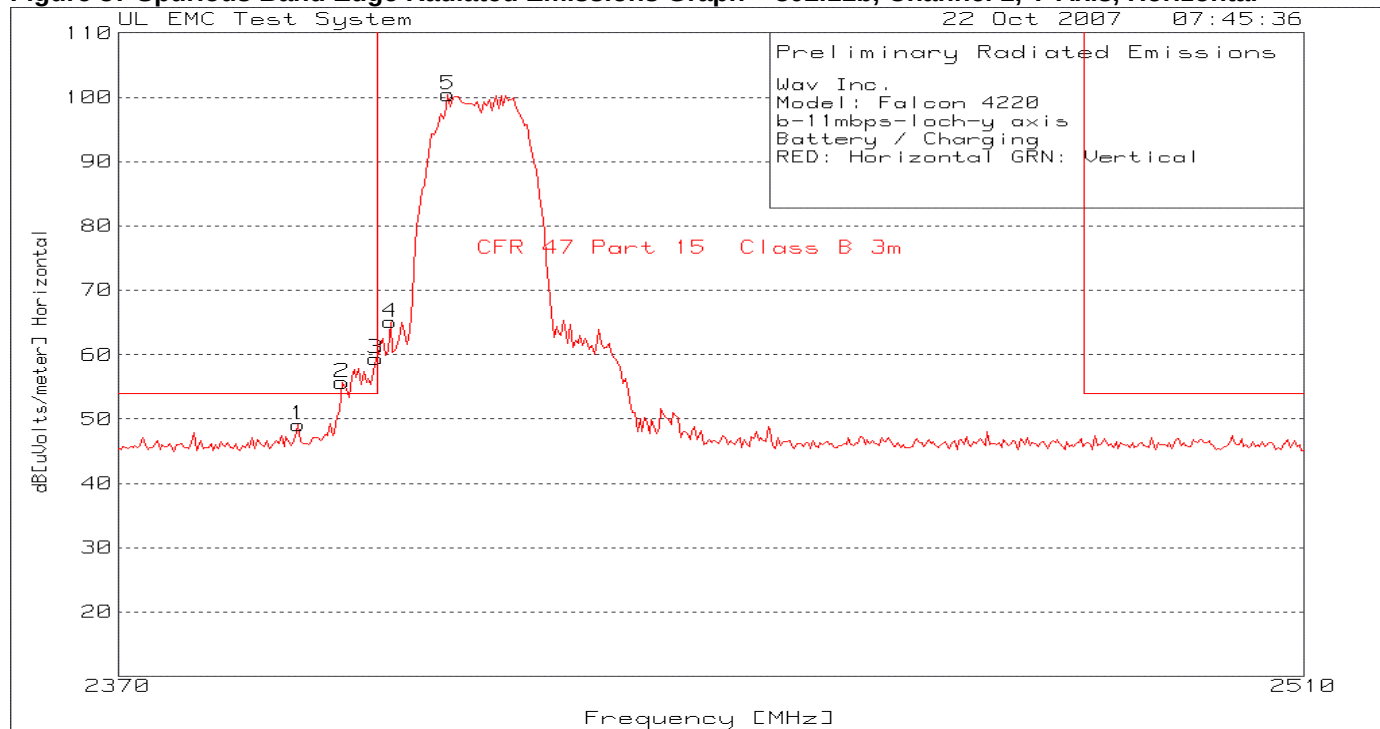


Figure 38 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 1, Y-Axis, Vertical

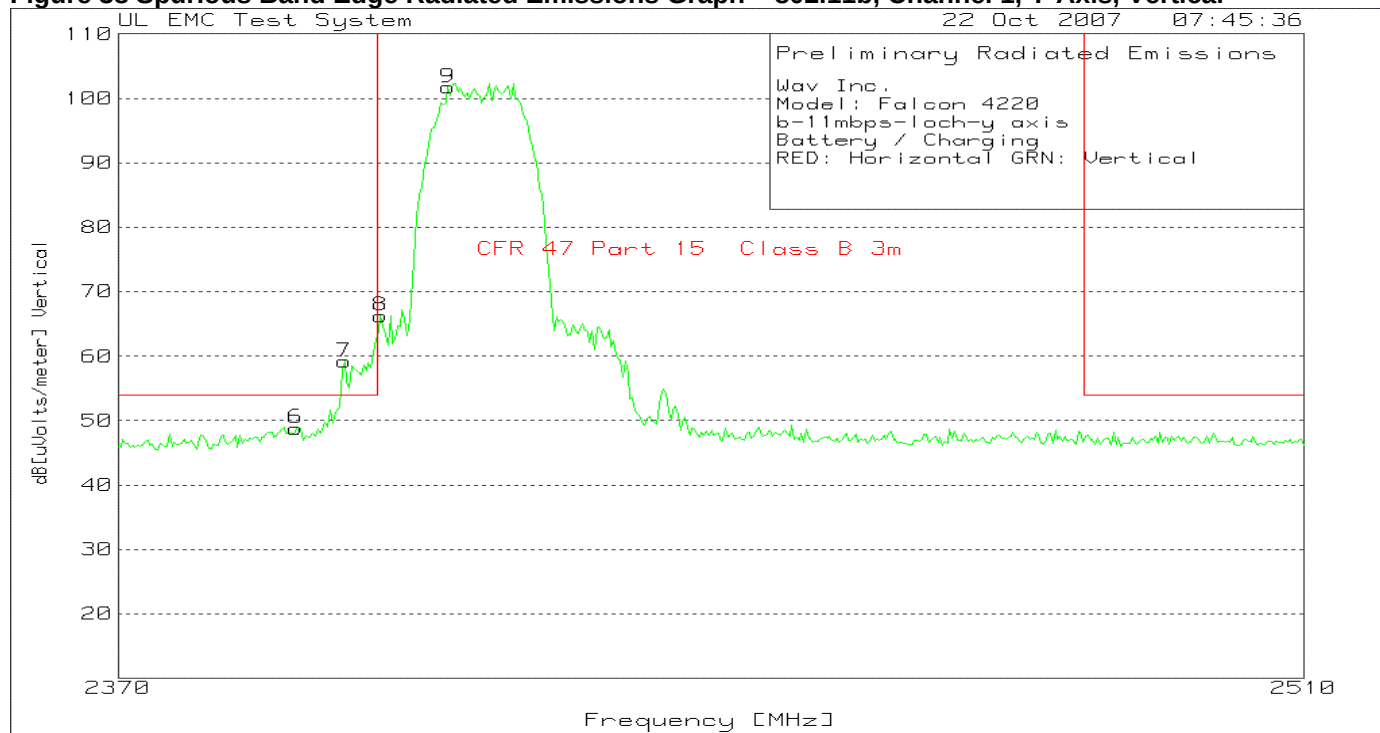


Table 24 Spurious Band Edge Radiated Emissions Data Points – 802.11b, Channel 1, Y Axis

Wav Inc.
 Model: Falcon 4220
 b-11mbps-loch-y axis
 Battery / Charging
 RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2390.762	23.26	pk	4.04	21.8	49.1	54	-4.9	150	Horz
2	2395.812	29.72	pk	4.17	21.8	55.69	54	1.69	100	Horz
3	2399.739	33.32	pk	4.24	21.8	59.36	54	5.36	100	Horz
4	2401.423	38.99	pk	4.29	21.8	65.08	999	-933.92	100	Horz
5	2408.156	74.14	pk	4.5	21.8	100.44	999	-898.56	100	Horz
6	2390.481	22.98	pk	4.03	21.8	48.81	54	-5.19	100	Vert
7	2396.092	33.21	pk	4.18	21.8	59.19	54	5.19	100	Vert
8	2400.301	40.21	pk	4.26	21.8	66.27	999	-932.73	100	Vert
9	2408.156	75.44	pk	4.5	21.8	101.74	999	-897.26	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Figure 39 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 1, Z-Axis, Horizontal

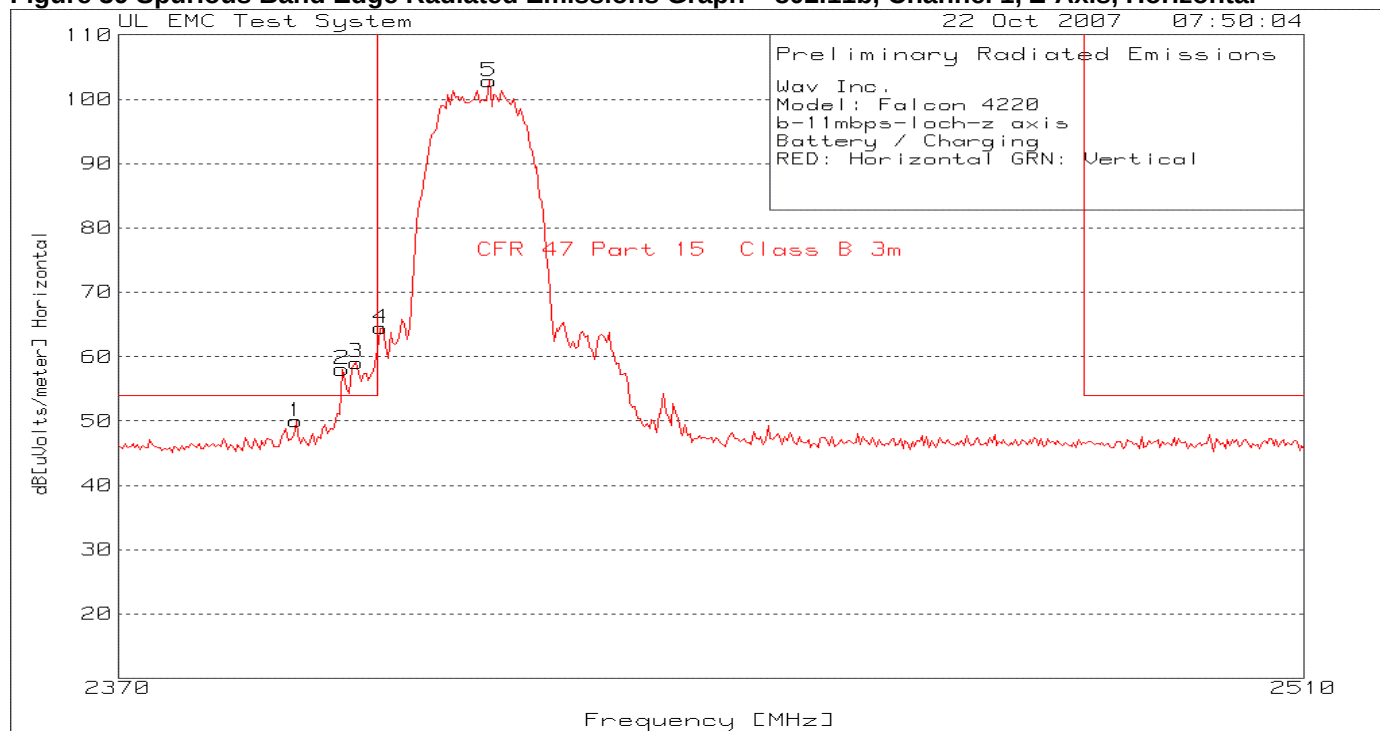


Figure 40 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 1, Z-Axis, Vertical

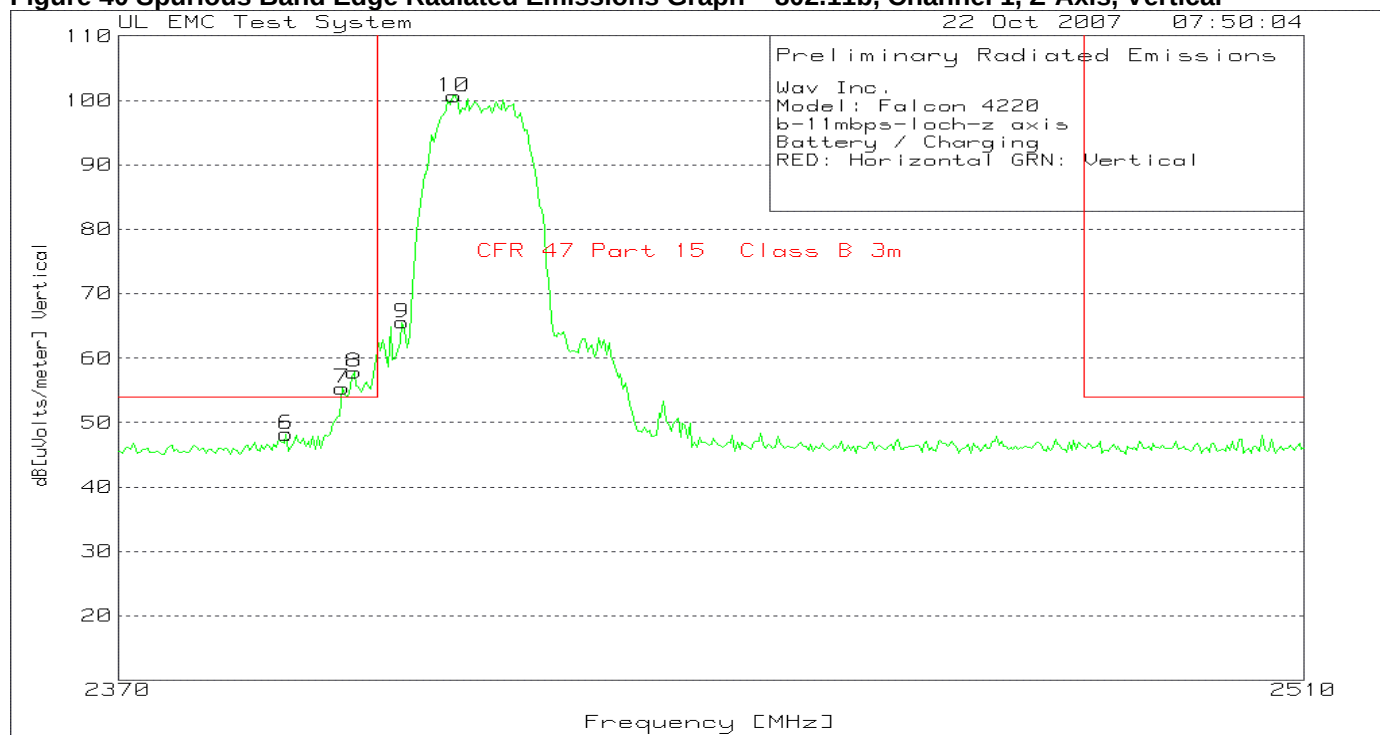


Table 25 Spurious Band Edge Radiated Emissions Data Points – 802.11b, Channel 1, Z Axis

Wav Inc.

Model: Falcon 4220

b-11mbps-loch-z axis

Battery / Charging

RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2390.481	24.14	pk	4.03	21.8	49.97	54	-4.03	100	Horz
2	2395.812	32.07	pk	4.17	21.8	58.04	54	4.04	100	Horz
3	2397.495	33.07	pk	4.2	21.8	59.07	54	5.07	100	Horz
4	2400.301	38.39	pk	4.26	21.8	64.45	999	-934.55	100	Horz
5	2412.926	76.56	pk	4.47	21.8	102.83	999	-896.17	100	Horz
6	2389.359	22.44	pk	3.99	21.8	48.23	54	-5.77	100	Vert
7	2395.812	29.38	pk	4.17	21.8	55.35	54	1.35	150	Vert
8	2397.214	31.84	pk	4.2	21.8	57.84	54	3.84	150	Vert
9	2402.826	39.41	pk	4.33	21.8	65.54	999	-933.46	150	Vert
10	2408.858	74.34	pk	4.51	21.8	100.65	999	-898.35	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 41 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 11, X-Axis, Horizontal

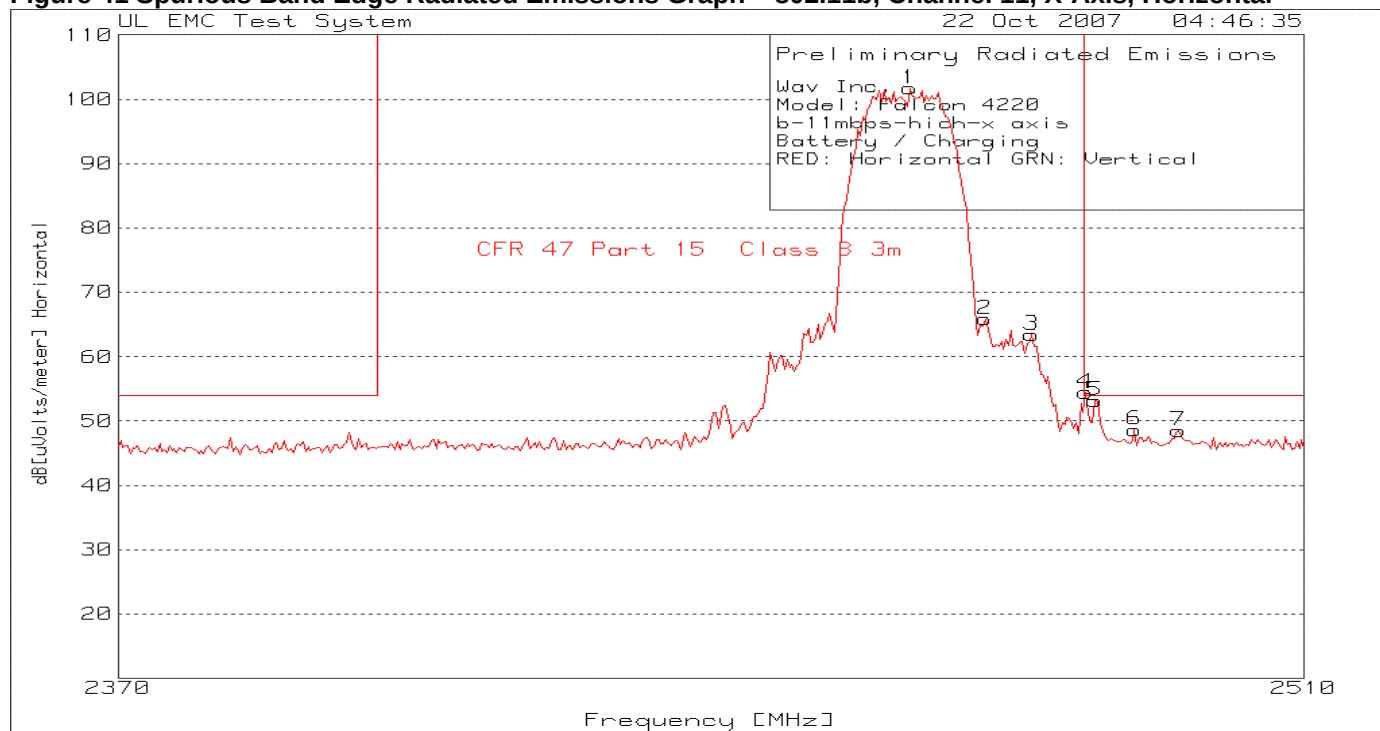


Figure 42 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 11, X-Axis, Vertical

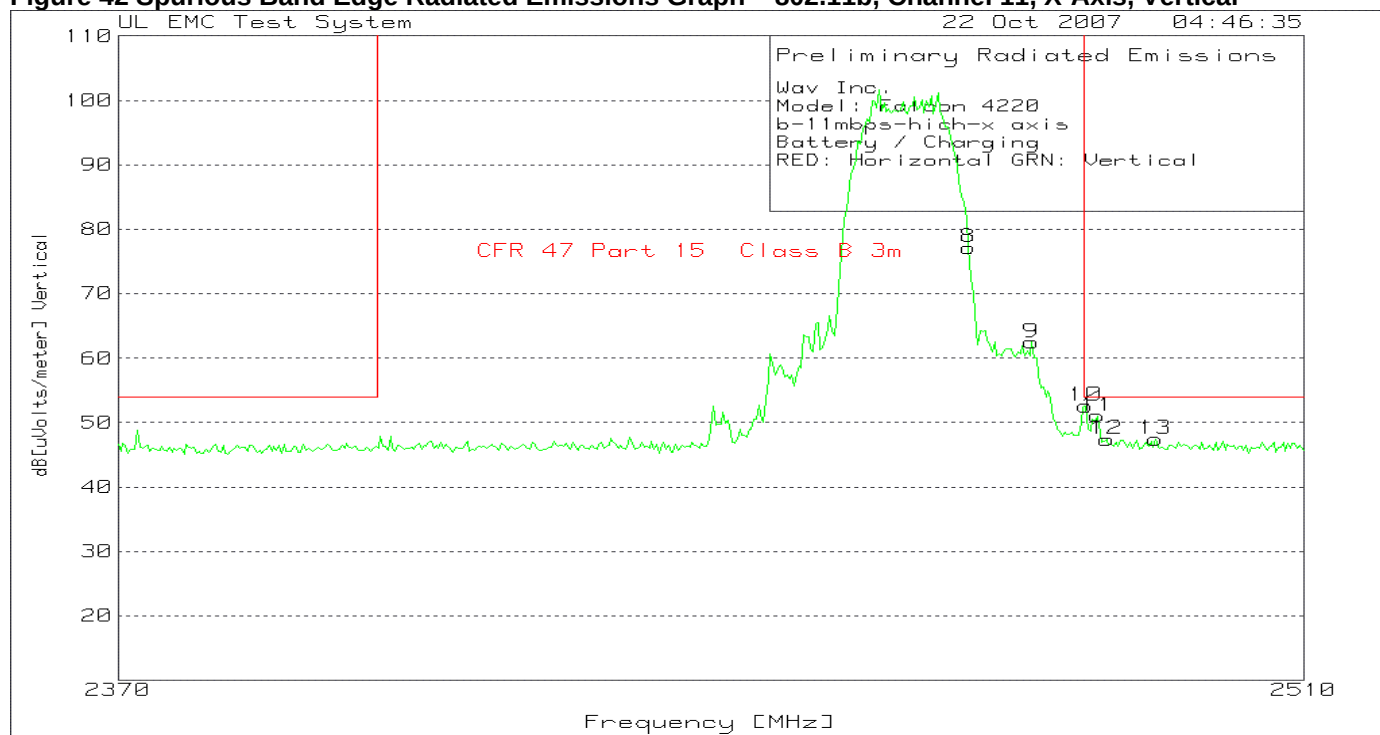


Table 26 Spurious Band Edge Radiated Emissions Data Points – 802.11b, Channel 11, X Axis

Wav Inc.

Model: Falcon 4220

b-11mbps-high-x axis

Battery / Charging

RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2462.585	75.7	pk	4.01	22	101.71	999	-897.29	100	Horz
2	2471.563	39.67	pk	4.18	22	65.85	999	-933.15	100	Horz
3	2477.174	37.23	pk	4.18	22	63.41	999	-935.59	100	Horz
4	2483.627	28.3	pk	4.04	22.1	54.44	54	-.44	100	Horz
5	2484.749	27	pk	4.03	22.1	53.13	54	-.87	100	Horz
6	2489.519	22.46	pk	4.06	22.1	48.62	54	-5.38	100	Horz
7	2494.85	22.39	pk	4.01	22.1	48.5	54	-5.5	100	Horz
8	2469.599	51.05	pk	4.13	22	77.18	999	-921.82	150	Vert
9	2477.174	36.27	pk	4.18	22	62.45	999	-936.55	150	Vert
10	2483.627	26.45	pk	4.04	22.1	52.59	54	-1.41	200	Vert
11	2485.03	24.92	pk	4.03	22.1	51.05	54	-2.95	150	Vert
12	2486.152	21.24	pk	4.04	22.1	47.38	54	-6.62	150	Vert
13	2492.044	21.28	pk	4.06	22.1	47.44	54	-6.56	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Azimuth [deg]	Height [cm]	Polarity
2483.7705	36.21	pk	4.04	22.1	62.35	74	-11.65	360	100	Horz
2484.6723	24.89	av	4.03	22.1	51.02	54	-2.98	360	100	Horz

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 43 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 11, Y-Axis, Horizontal

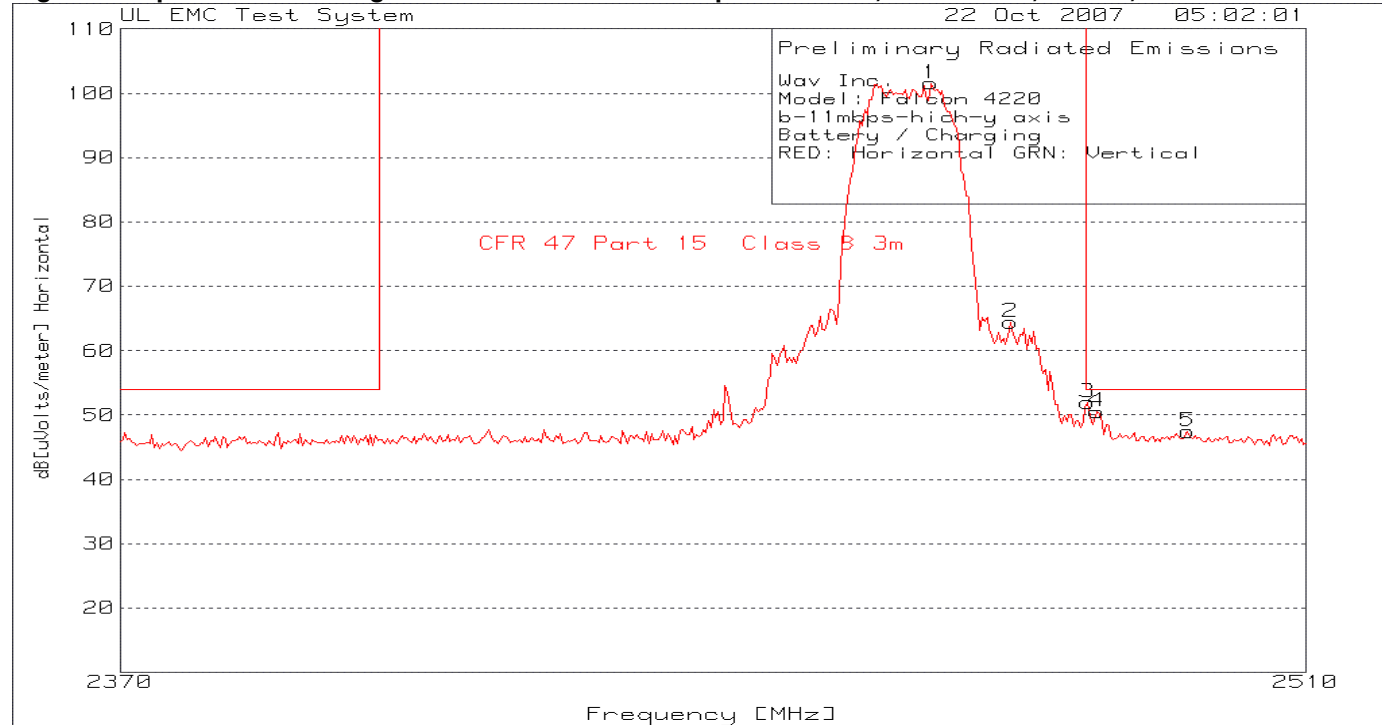


Figure 44 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 11, Y-Axis, Vertical

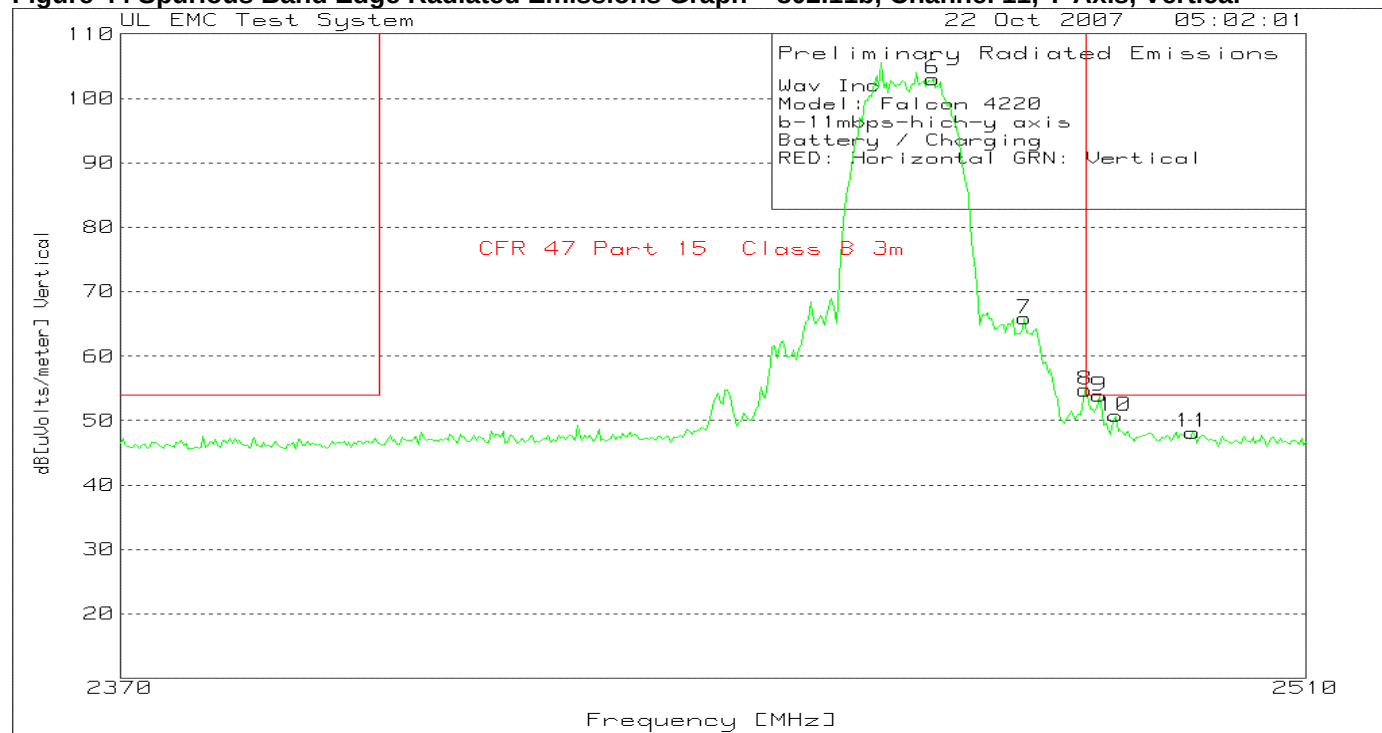


Table 27 Spurious Band Edge Radiated Emissions Data Points – 802.11b, Channel 11, Y Axis

Wav Inc.
 Model: Falcon 4220
 b-11mbps-high-y axis
 Battery / Charging
 RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2464.83	75.53	pk	4.02	22	101.55	999	-897.45	100	Horz
2	2474.369	38.2	pk	4.21	22	64.41	999	-934.59	100	Horz
3	2483.627	25.8	pk	4.04	22.1	51.94	54	-2.06	100	Horz
4	2484.749	24.38	pk	4.03	22.1	50.51	54	-3.49	100	Horz
5	2495.691	21.35	pk	4	22.1	47.45	54	-6.55	150	Horz
6	2465.11	77	pk	4.02	22	103.02	999	-895.98	100	Vert
7	2476.052	39.65	pk	4.2	22	65.85	999	-933.15	150	Vert
8	2483.347	28.63	pk	4.04	22.1	54.77	999	-944.23	150	Vert
9	2485.03	27.74	pk	4.03	22.1	53.87	54	-.13	100	Vert
10	2486.994	24.6	pk	4.05	22.1	50.75	54	-3.25	100	Vert
11	2496.253	22.08	pk	3.98	22.1	48.16	54	-5.84	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Wav Inc.
 Model: Falcon 4220
 b-11mbps-high-y axis
 Battery / Charging
 RED: Horizontal GRN: Vertical

Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
2484.2395	36.9	pk	4.04	22.1	63.04	74	-10.96	82	131	Vert
2483.5541	24.75	av	4.04	22.1	50.89	54	-3.11	82	131	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Figure 45 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 11, Z-Axis, Horizontal

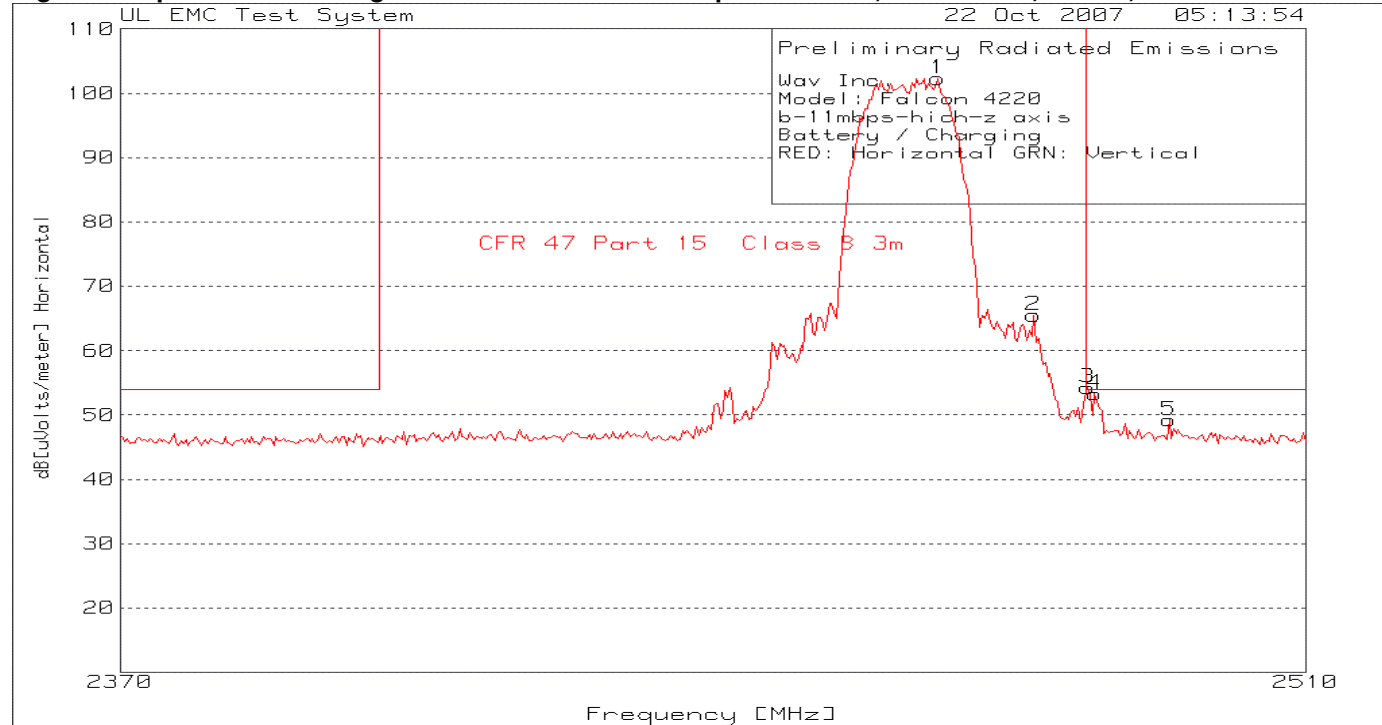


Figure 46 Spurious Band Edge Radiated Emissions Graph – 802.11b, Channel 11, Z-Axis, Vertical

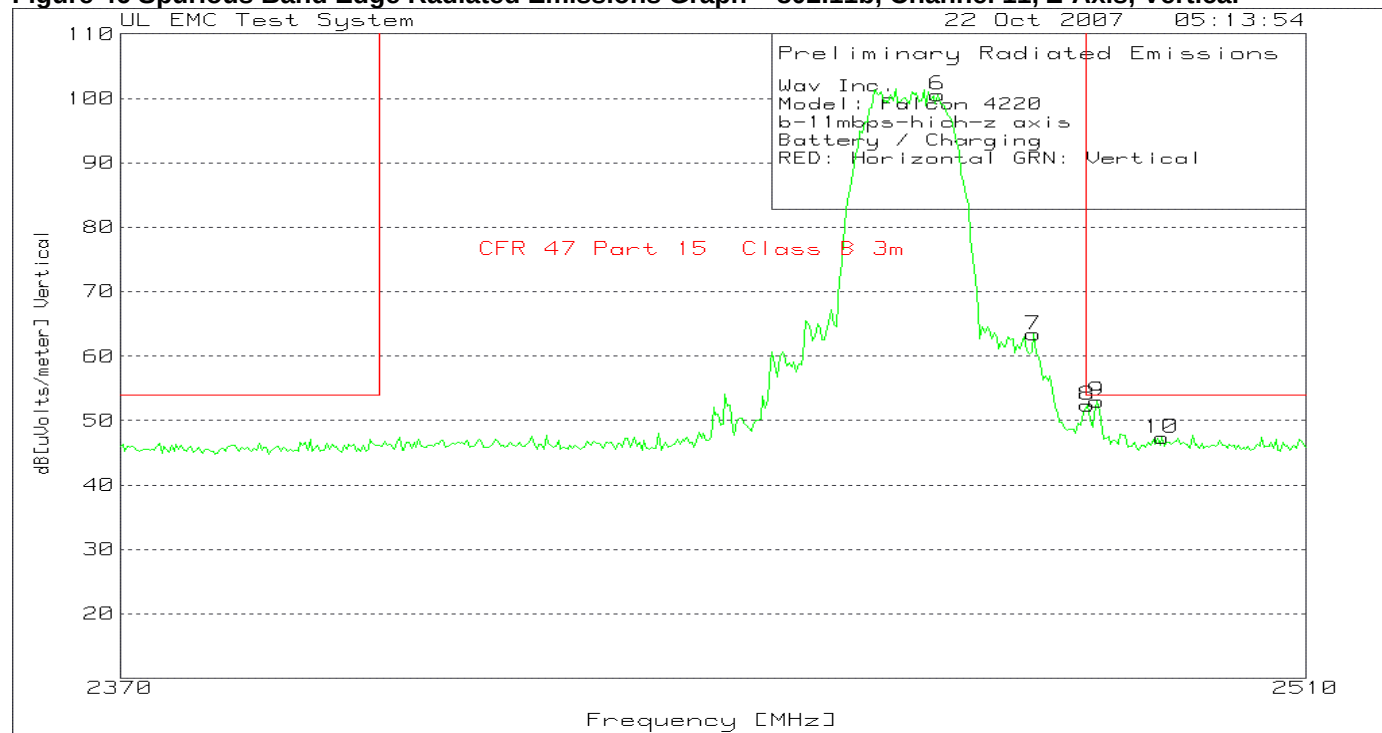


Table 28 Spurious Band Edge Radiated Emissions Data Points – 802.11b, Channel 11, Z Axis

Wav Inc.

Model: Falcon 4220

b-11mbps-high-z axis

Battery / Charging

RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
1	2465.671	76.28	pk	4.03	22	102.31	999	-896.69	100	Horz
2	2477.174	39.33	pk	4.18	22	65.51	999	-933.49	100	Horz
3	2483.627	28.11	pk	4.04	22.1	54.25	54	.25	100	Horz
4	2484.469	27.14	pk	4.04	22.1	53.28	54	-.72	100	Horz
5	2493.447	23.08	pk	4.04	22.1	49.22	54	-4.78	100	Horz
6	2465.671	74.49	pk	4.03	22	100.52	999	-898.48	150	Vert
7	2477.174	37.21	pk	4.18	22	63.39	999	-935.61	150	Vert
8	2483.627	26.24	pk	4.04	22.1	52.38	54	-1.62	150	Vert
9	2484.749	26.86	pk	4.03	22.1	52.99	54	-1.01	150	Vert
10	2492.605	21.18	pk	4.05	22.1	47.33	54	-6.67	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Wav Inc.

Model: Falcon 4220

b-11mbps-high-z axis

Battery / Charging

RED: Horizontal GRN: Vertical

Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Azimuth [deg]	Height [cm]	Polarity
2484.1493	38.47	pk	4.04	22.1	64.61	74	-9.39	355	105	Horz
2483.5	25.24	av	4.04	22.1	51.38	54	-2.62	355	105	Horz

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 47 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 1, X-Axis

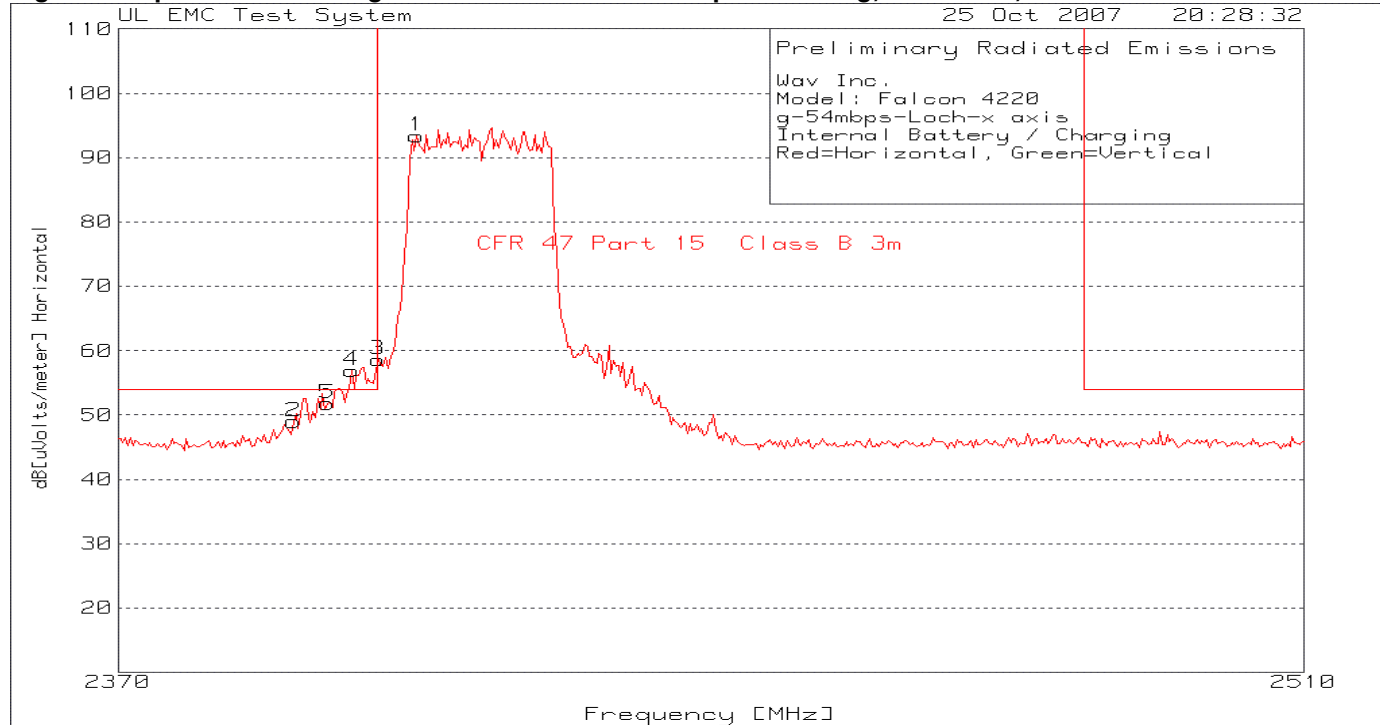


Figure 48 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 1, X-Axis

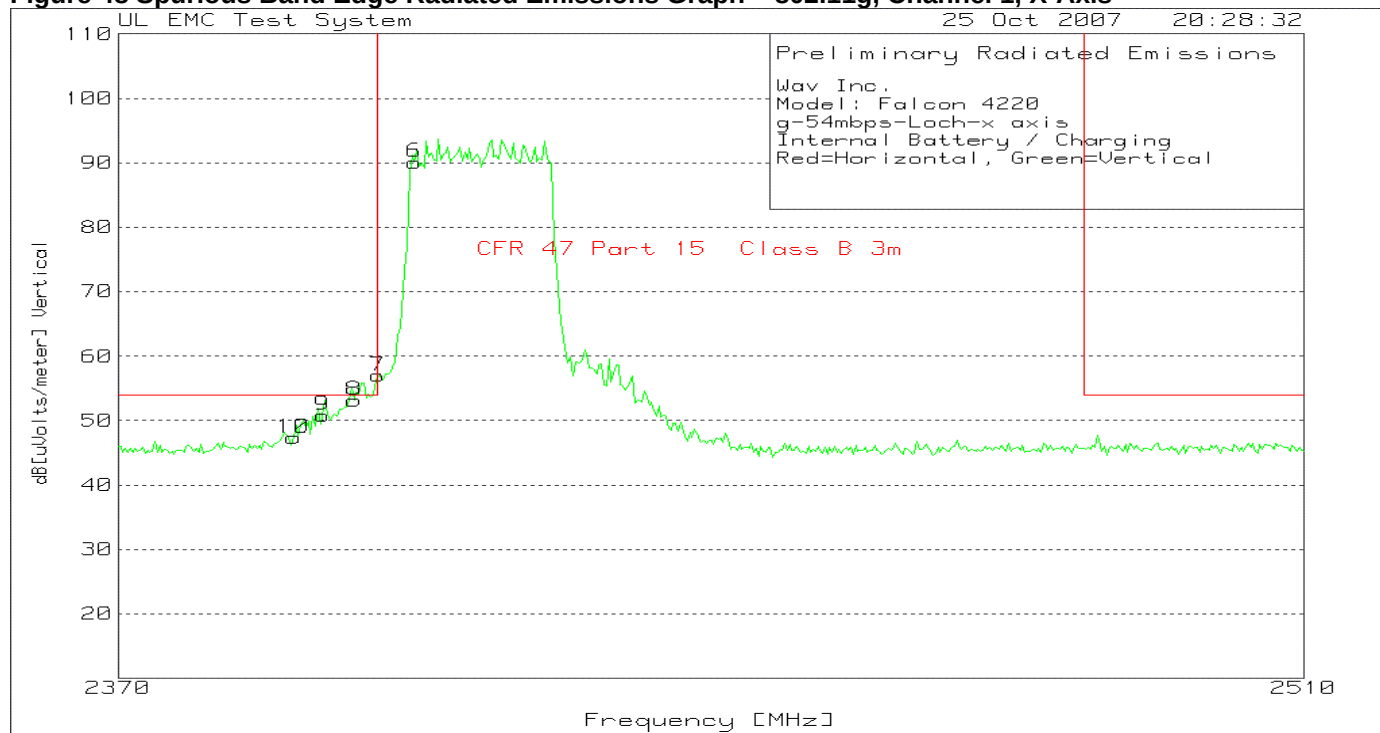


Table 29 Spurious Band Edge Radiated Emissions Data Points – 802.11g, Channel 1, X Axis

Wav Inc.

Model: Falcon 4220

g-54mbps-Loch-x axis

Internal Battery / Charging

Red=Horizontal, Green=Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
1	2404.509	67.16	pk	4.39	21.8	93.35	999	-905.65	100	Horz
2	2390.2	23.17	pk	4.02	21.8	48.99	54	-5.01	100	Horz
3	2400.02	32.58	pk	4.25	21.8	58.63	999	-940.37	100	Horz
4	2396.934	30.89	pk	4.19	21.8	56.88	54	2.88	100	Horz
5	2394.128	25.85	pk	4.14	21.8	51.79	54	-2.21	100	Horz
6	2404.228	63.9	pk	4.38	21.8	90.08	999	-908.92	150	Vert
7	2400.02	30.93	pk	4.25	21.8	56.98	999	-942.02	100	Vert
8	2397.214	27.17	pk	4.2	21.8	53.17	54	-.83	100	Vert
9	2393.567	24.88	pk	4.12	21.8	50.8	54	-3.2	150	Vert
10	2390.2	21.53	pk	4.02	21.8	47.35	54	-6.65	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 49 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 1, Y-Axis

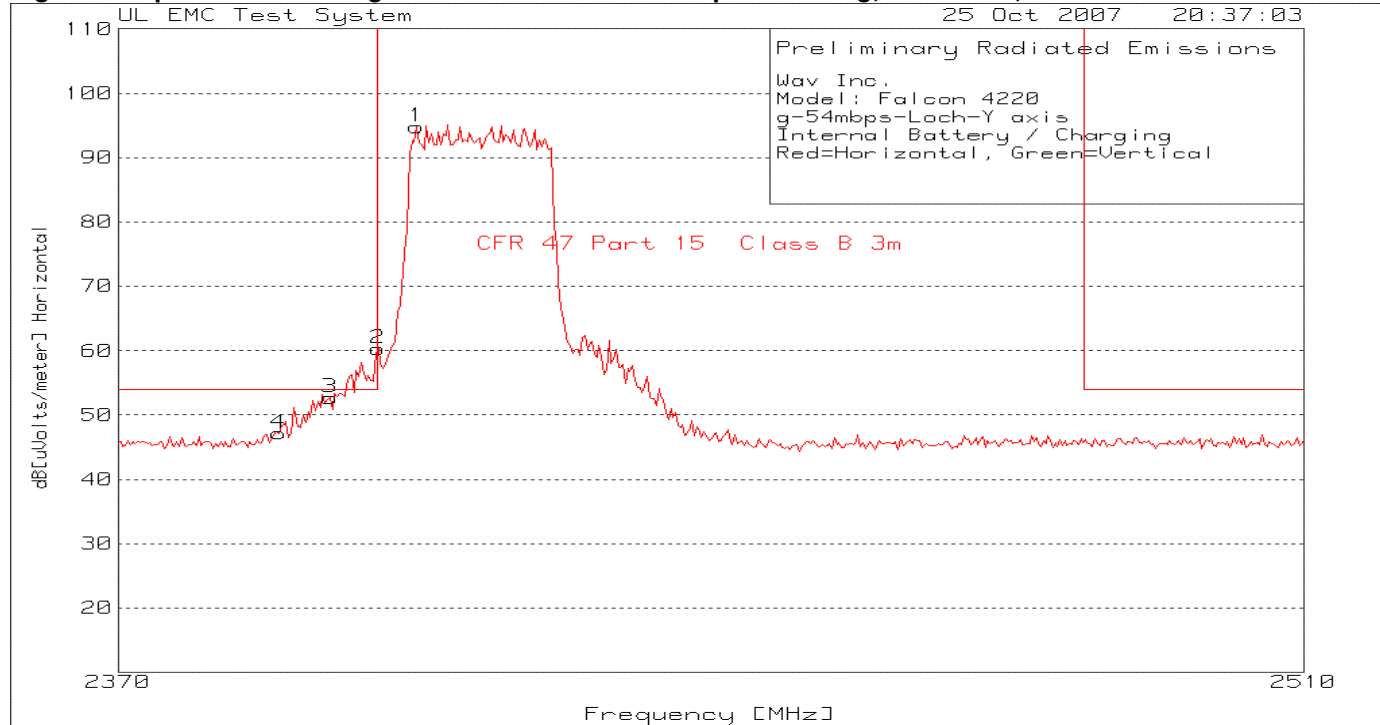


Figure 50 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 1, Y-Axis

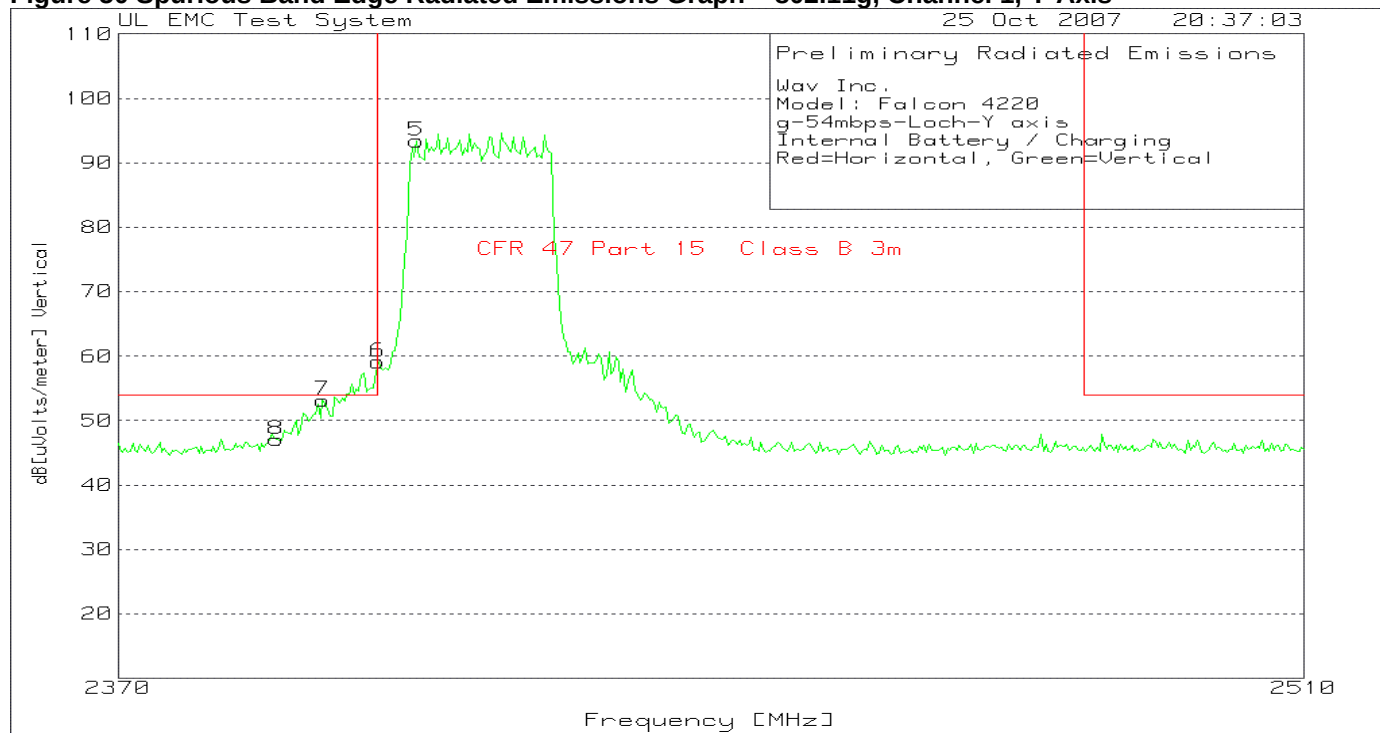


Table 30 Spurious Band Edge Radiated Emissions Data Points – 802.11g, Channel 1, Y Axis

Wav Inc.

Model: Falcon 4220

g-54mbps-Loch-Y axis

Internal Battery / Charging

Red=Horizontal, Green=Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
1	2404.509	68.58	pk	4.39	21.8	94.77	999	-904.23	100	Horz
2	2400.02	34.26	pk	4.25	21.8	60.31	999	-938.69	100	Horz
3	2394.409	26.74	pk	4.14	21.8	52.68	54	-1.32	100	Horz
4	2388.517	21.4	pk	3.96	21.8	47.16	54	-6.84	100	Horz
5	2404.509	67.23	pk	4.39	21.8	93.42	999	-905.58	100	Vert
6	2400.02	33.06	pk	4.25	21.8	59.11	999	-939.89	150	Vert
7	2393.567	27.23	pk	4.12	21.8	53.15	54	-.85	100	Vert
8	2388.236	21.32	pk	3.95	21.8	47.07	54	-6.93	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 51 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 1, Z-Axis

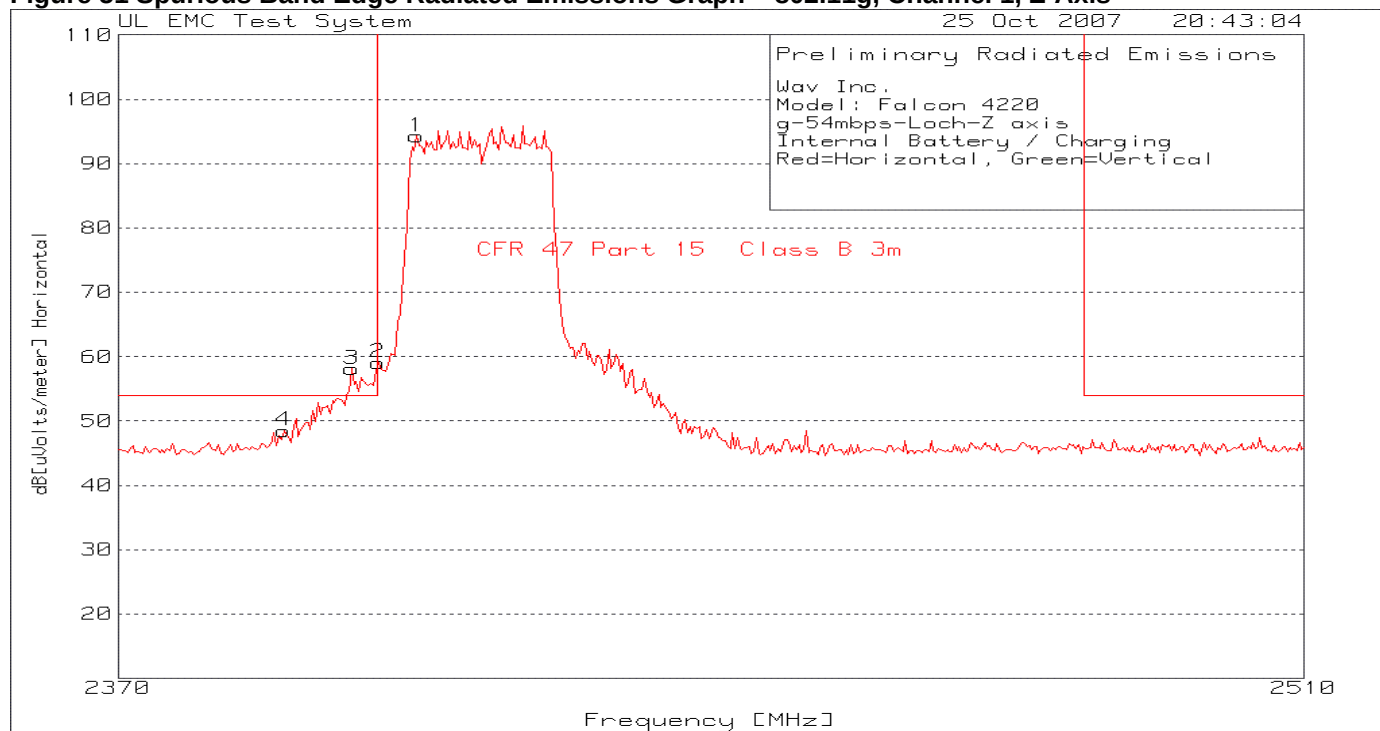


Figure 52 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 1, Z-Axis

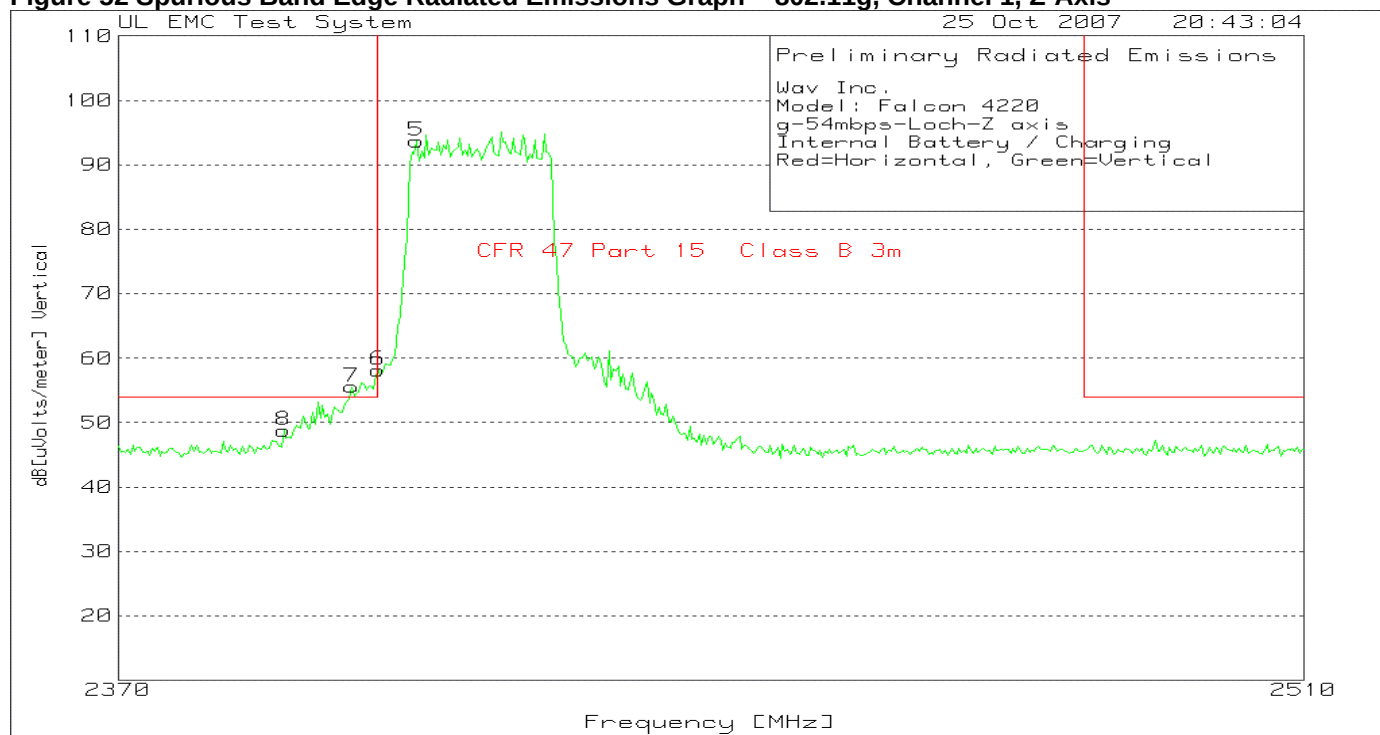


Table 31 Spurious Band Edge Radiated Emissions Data Points – 802.11g, Channel 1, Z Axis

Wav Inc.

Model: Falcon 4220

g-54mbps-Loch-Z axis

Internal Battery / Charging

Red=Horizontal, Green=Vertical

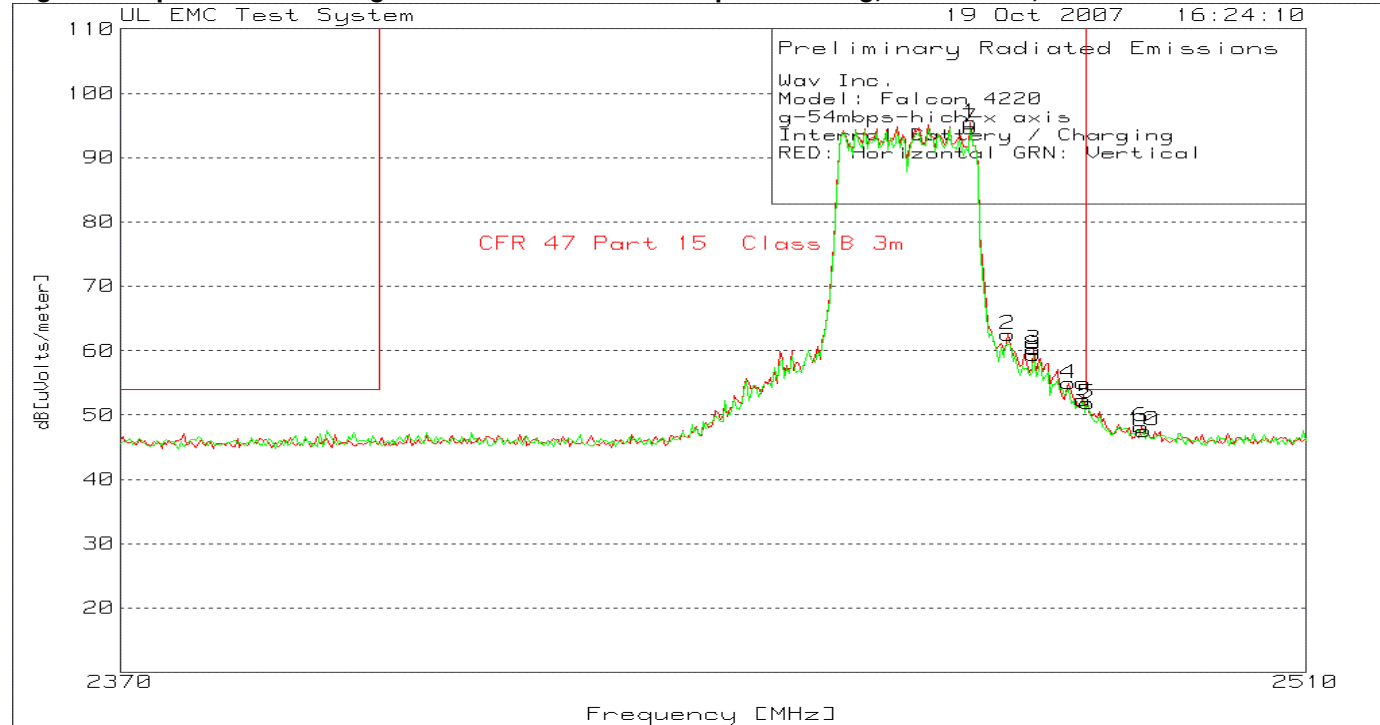
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
1	2404.509	68.07	pk	4.39	21.8	94.26	999	-904.74	100	Horz
2	2400.02	33.01	pk	4.25	21.8	59.06	999	-939.94	100	Horz
3	2396.934	32.11	pk	4.19	21.8	58.1	54	4.1	100	Horz
4	2389.078	22.71	pk	3.98	21.8	48.49	54	-5.51	100	Horz
5	2404.509	67.5	pk	4.39	21.8	93.69	999	-905.31	150	Vert
6	2400.02	32.1	pk	4.25	21.8	58.15	999	-940.85	150	Vert
7	2396.934	29.57	pk	4.19	21.8	55.56	54	1.56	150	Vert
8	2389.078	23.01	pk	3.98	21.8	48.79	54	-5.21	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 53 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 11, X-Axis**Table 32 Spurious Band Edge Radiated Emissions Data Points – 802.11g, Channel 11, X Axis**

Wav Inc.
 Model: Falcon 4220
 g-54mbps-high-x axis
 Internal Battery / Charging
 RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2469.599	69.29	pk	4.13	22	95.42	999	-903.58	100	Horz
2	2474.088	36.29	pk	4.21	22	62.5	999	-936.5	100	Horz
3	2477.174	34.07	pk	4.18	22	60.25	999	-938.75	100	Horz
4	2481.383	28.87	pk	4.07	22	54.94	999	-944.06	149	Horz
5	2483.627	25.69	pk	4.04	22.1	51.83	54	-2.17	149	Horz
6	2490.08	21.99	pk	4.07	22.1	48.16	54	-5.84	100	Horz
7	2469.599	68.48	pk	4.13	22	94.61	999	-904.39	150	Vert
8	2477.174	33.23	pk	4.18	22	59.41	999	-939.59	150	Vert
9	2483.066	26.28	pk	4.04	22	52.32	999	-946.68	150	Vert
10	2490.361	21.39	pk	4.07	22.1	47.56	54	-6.44	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Figure 54 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 11, Y-Axis

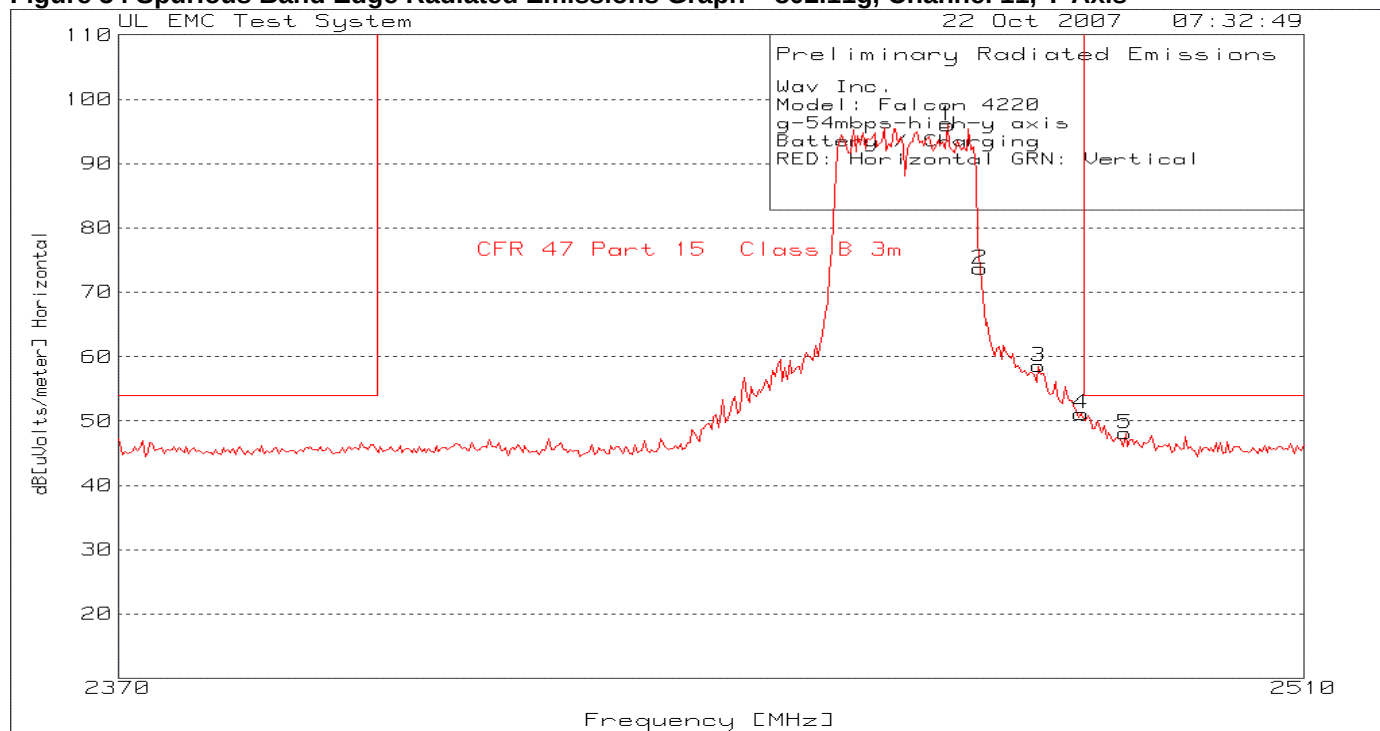


Figure 55 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 11, Y-Axis

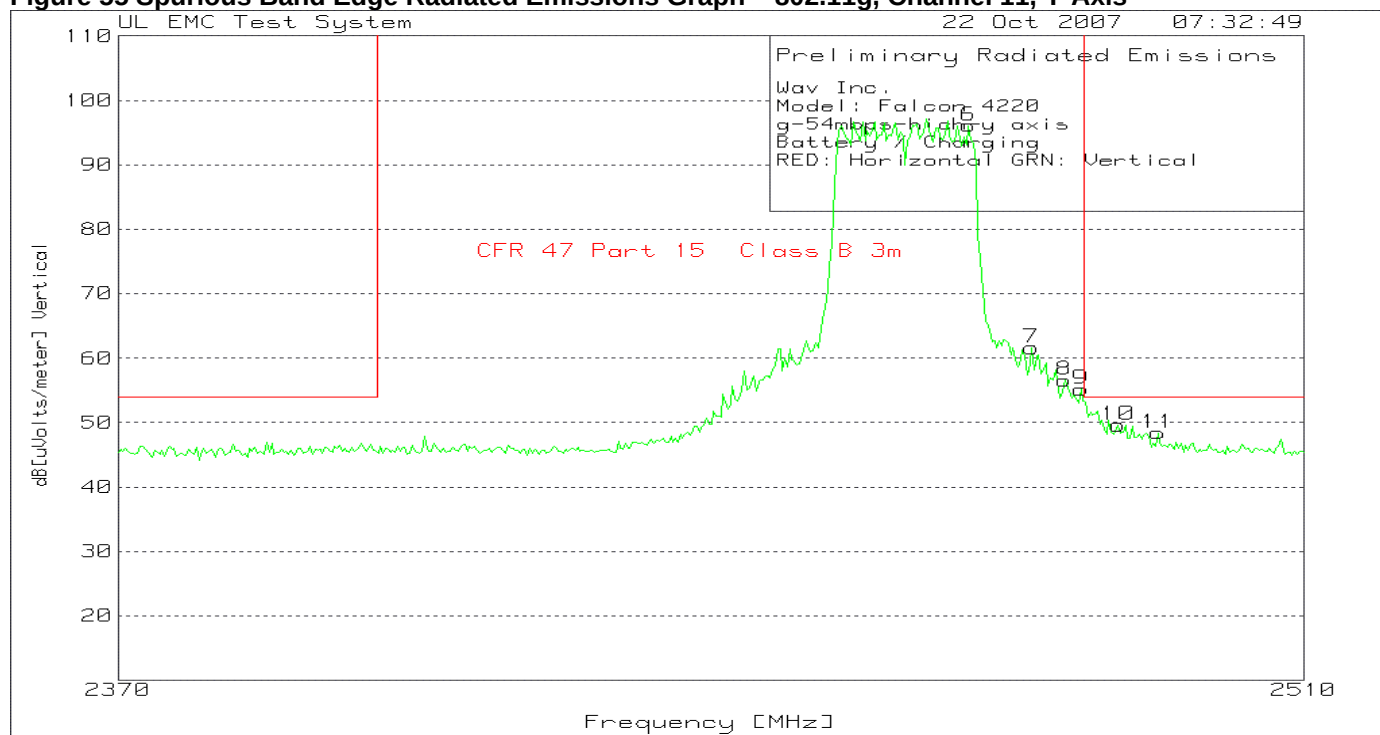


Table 33 Spurious Band Edge Radiated Emissions Data Points – 802.11g, Channel 11, Y Axis

Wav Inc.

Model: Falcon 4220

g-54mbps-high-y axis

Battery / Charging

RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
1	2467.074	69.92	pk	4.06	22	95.98	999	-903.02	100	Horz
2	2471.002	47.51	pk	4.17	22	73.68	999	-925.32	100	Horz
3	2478.016	32.36	pk	4.16	22	58.52	999	-940.48	100	Horz
4	2483.066	25.07	pk	4.04	22	51.11	999	-947.89	100	Horz
5	2488.397	21.94	pk	4.06	22.1	48.1	54	-5.9	100	Horz
6	2469.599	69.95	pk	4.13	22	96.08	999	-902.92	100	Vert
7	2477.174	35.44	pk	4.18	22	61.62	999	-937.38	150	Vert
8	2481.102	30.51	pk	4.08	22	56.59	999	-942.41	100	Vert
9	2483.066	29.14	pk	4.04	22	55.18	999	-943.82	150	Vert
10	2487.555	23.47	pk	4.05	22.1	49.62	54	-4.38	100	Vert
11	2492.325	22.24	pk	4.06	22.1	48.4	54	-5.6	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Figure 56 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 11, Z-Axis

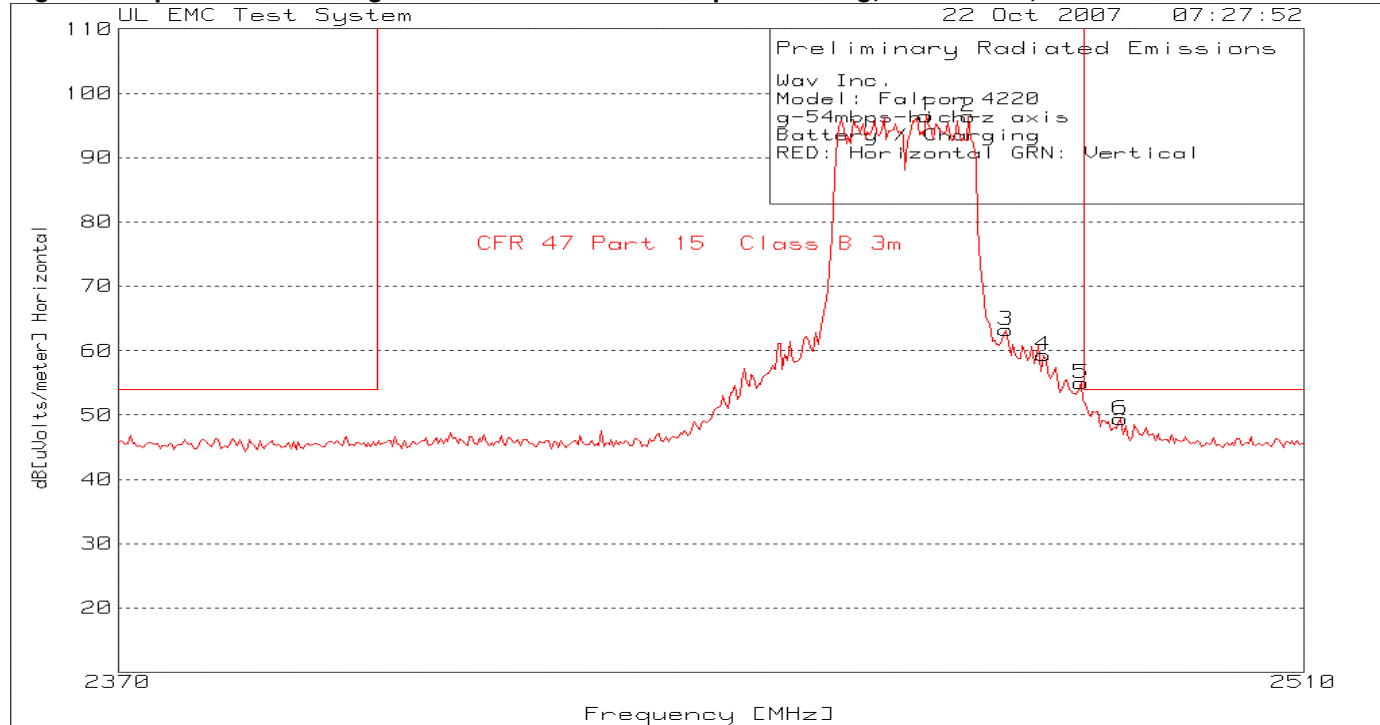


Figure 57 Spurious Band Edge Radiated Emissions Graph – 802.11g, Channel 11, Z-Axis

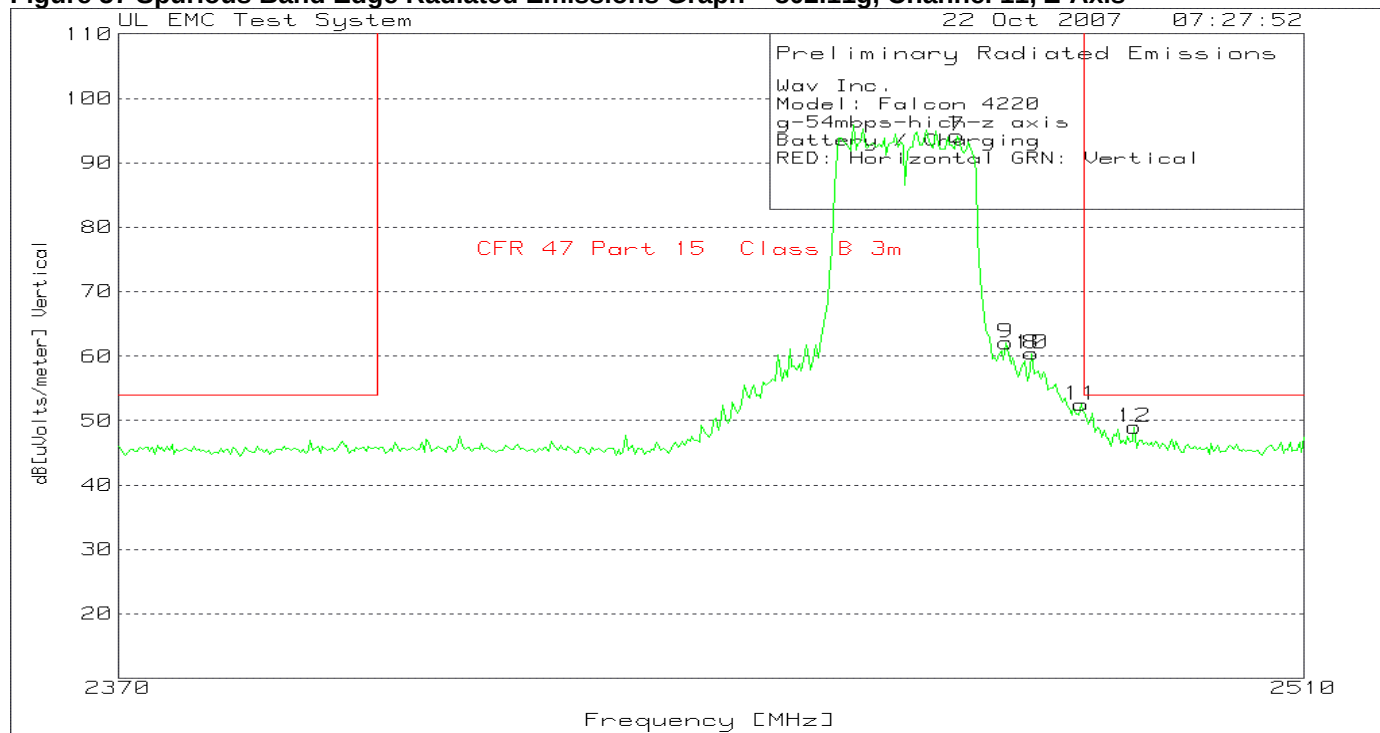


Table 34 Spurious Band Edge Radiated Emissions Data Points – 802.11g, Channel 11, Z Axis

Wav Inc.

Model: Falcon 4220

g-54mbps-high-z axis

Battery / Charging

RED: Horizontal GRN: Vertical

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1 [dB]	Height [cm]	Polarity
1	2464.549	70.47	pk	4.02	22	96.49	999	-902.51	100	Horz
2	2469.599	70.28	pk	4.13	22	96.41	999	-902.59	100	Horz
3	2474.088	36.99	pk	4.21	22	63.2	999	-935.8	100	Horz
4	2478.577	33.16	pk	4.15	22	59.31	999	-939.69	100	Horz
5	2483.066	28.93	pk	4.04	22	54.97	999	-944.03	100	Horz
6	2487.836	23.22	pk	4.05	22.1	49.37	54	-4.63	100	Horz
7	2468.196	68.08	pk	4.09	22	94.17	999	-904.83	150	Vert
8	2477.174	34.23	pk	4.18	22	60.41	999	-938.59	150	Vert
9	2474.088	35.89	pk	4.21	22	62.1	999	-936.9	150	Vert
10	2477.174	34.23	pk	4.18	22	60.41	999	-938.59	150	Vert
11	2483.066	26.44	pk	4.04	22	52.48	999	-946.52	150	Vert
12	2489.519	22.83	pk	4.06	22.1	48.99	54	-5.01	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector

qp - Quasi-Peak detector

av - Average detector

Appendix A

Accreditations and Authorizations



NVLAP Lab code: 100414-0

NVLAP: Recognized under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC EN17025 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. For a full scope listing see <http://ts.nist.gov/ts/htdocs/210/214/scopes/1004140.htm>



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (Ref. No. 91044).



Industry Canada Industrie Canada

Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, Section 3.3. File #: IC 2180



VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: Radiated Emissions R-621, Conducted Emissions C-642.



ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).



NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 89/336/EEC, Article 10 (2). Also validated for the Telecommunication Equipment-Council Directive 99/5/EC, Annex III and IV, Identification Number: 0983.

NIST/CAB: Provisioned to act as a U.S. Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the Asia Pacific Economic Cooperation (APEC) MRA between the American Institute in Taiwan (AIT) and the United States. Our laboratory is considered qualified to test equipment subject to the applicable EMC regulations of the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) which require testing to CNS 13438 (CISPR 22).

NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6