Excellence in Compliance Testing

Certification Test Report

FCC ID: VRA-SG9011028
IC: 7420A-SG011028

FCC Rule Part: 15.247
IC Radio Standards Specification: RSS-210

ACS Report Number: JA-2447 - 15C

Manufacturer: Sagrad Inc.
Model: SG901-1028

Test Begin Date: August 18, 2008
Test End Date: October 21, 2008

Report Issue Date: October 30, 2008

Prepared by: _____
J. Kirby Munroe
Director, Wireless Certifications
ACS, Inc.

Reviewed by: _____
Sam Wismer
Vice President, Technology
ACS, Inc.

This report contains 32 pages

Table of Contents

Additional Exhibits Included In Filing

Internal Photos
RF Exposure
Test Setup Photographs
Label Information
Manual
Theory of Operation
Schematics
System Block Diagram

1.0 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-210.

1.2 Product Description

1.2.1 General

The SG901-1028 is an 802.11b/g WiFi module.

Applicant Information:
Sagrad Inc.
4325 Woodland Park Drive, Suite 101
West Melbourne, Fl 32904

Test Sample Serial Number(s):
3009

Test Sample Condition:
The test sample was provided in good working condition with no visible defects.

1.2.2 Intended Use

This module is designed to be used with different types of processors (Blackfin, Samsung, etc) and in different types of applications (medical, industrial, etc).

1.3 Test Methodology and Considerations

Testing was done for both 802.11b and 802.11g modes. Power was taken at each data rate available for b and g modes, and the worst case data rate was used to test spurious emissions.

2.0 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Rubicom Systems Inc.
284 West Dr. Suite B
Melbourne FL 32904
Phone: (321) 951-1710
Fax: (321) 951-2362

2.2 Laboratory Accreditations/Recognitions/Certifications

- FCC Registration Number: 90911
- Industry Canada Lab Code: IC 4175B

2.3 Radiated Emissions Test Site Description

The open area test site consists of a large concrete pad covered with a ½" x ½ inch galvanized 20AWG hardware cloth to form the ground reference plan. The overall dimension of the ground reference plane is 15m x 3.6m. All reflecting objects are located outside of the ellipse defined in ANSI C63.4:2003.

A remotely controlled antenna mast is used to raise and lower and antenna between 1-4 meters as necessary to maximize emissions.

The OATS is equipped with a manually operated turntable that can be rotated through 360º to maximize the azimuth of the emissions. The turntable measures .8meter in height and 1.2 meters in width. The turntable is made of wood construction.

A diagram of the Open Area Test Site is shown in Figure 2.3-1 below:

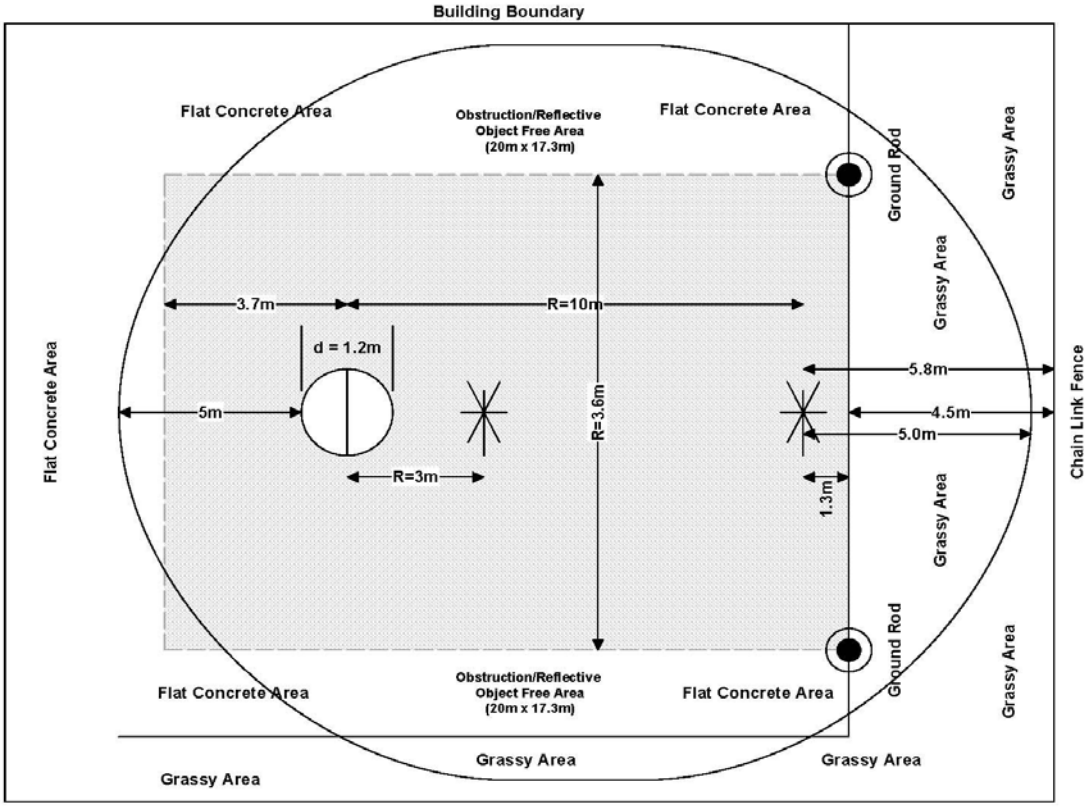

Figure 2.3-1: Open Area Test Site

2.4 Conducted Emissions Test Site Description

The AC mains conducted EMI site is located in the main EMC lab. It consists of an 8' x 8' solid aluminum horizontal group reference plane (GRP) bonded every 3" to an 8' X 8' vertical ground plane.

The site is of sufficient size to test table top and floor standing equipment in accordance with section 6.1.4 of ANSI C63.4.

A diagram of the room is shown below in figure 2.4-1:

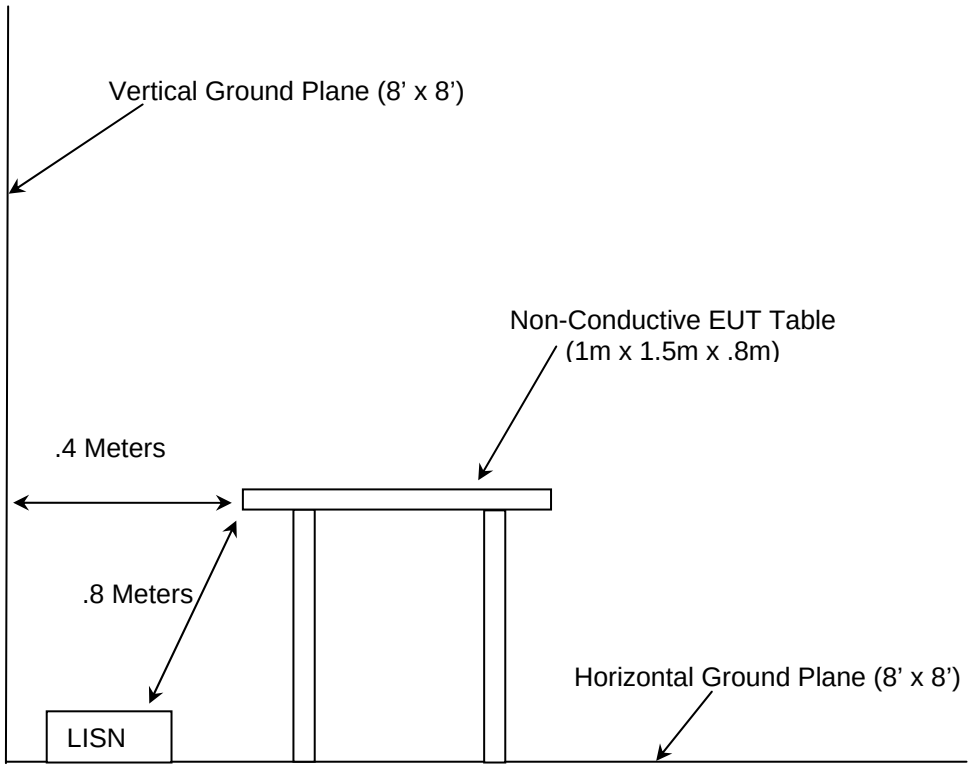

Figure 2.4-1: AC Mains Conducted EMI Site

3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2008
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2008
- FCC OET Bulletin 65 Appendix C - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, 2001
- FCC KDB Publication No. 558074 - Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247), March 2005
- Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 7 June 2007
- Industry Canada Radio Standards Specification: RSS-GEN – General Requirements and Information for the Certification of Radiocommunication Equipment, Issue2, June 2007.

4.0 LIST OF TEST EQUIPMENT

All test equipment used for regulatory testing is calibrated yearly or according to manufacturer's specifications.

Table 4.0-1: Test Equipment

Equipment Calibration Information					
Asset#	**Mfg.**	**Eq. type**	**Model**	**S/N**	**Cal. Due**
282	Microwave Circruits	Filter	H2G020G4	74541	2/25/09
1173	Hewlett Packard	Amplifier	8449B	3008A00644	4/15/09
1169	A.H. Systems	Antenna	SAS-200/571	376	5/7/09
395	Florida RF Labs	Cable	SMSE-290-48.0-SMRE	N/A	12/5/08
396	Florida RF Labs	Cable	SMS-290AW-480.0-SMS	N/A	7/17/09
1206	Chase	Antenna	CLB6111B	2210	5/15/09
1004	Rubicom	Amplfier	RTL-1004	946-03098	10/27/09
1224	Belden	Cable	Belden 8214-60'	1224	9/28/08
1230	Belden	Cable	Belden 8214-24'	1230	10/4/08
316	Rohde Schwarz	LISN	ESH3-Z5	861189-010	9/11/09
1269	Florida RF Labs	Cable	2Y194	0001	9/3/09
1222	Hewlett Packard	Limiter	11947A	3107A02944	10/4/09
NA	Agilent	Spectrum Analyzer	E7405A	MY42000128	9/3/2009
1244	Eagle	Filter	C7RFM3MFMF	HLC-700	1/11/09

5.0 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	EUT	Sagrad	SG901-1028	3009
2	Laptop	IBM	2366-42U	78-TD497

6.0 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

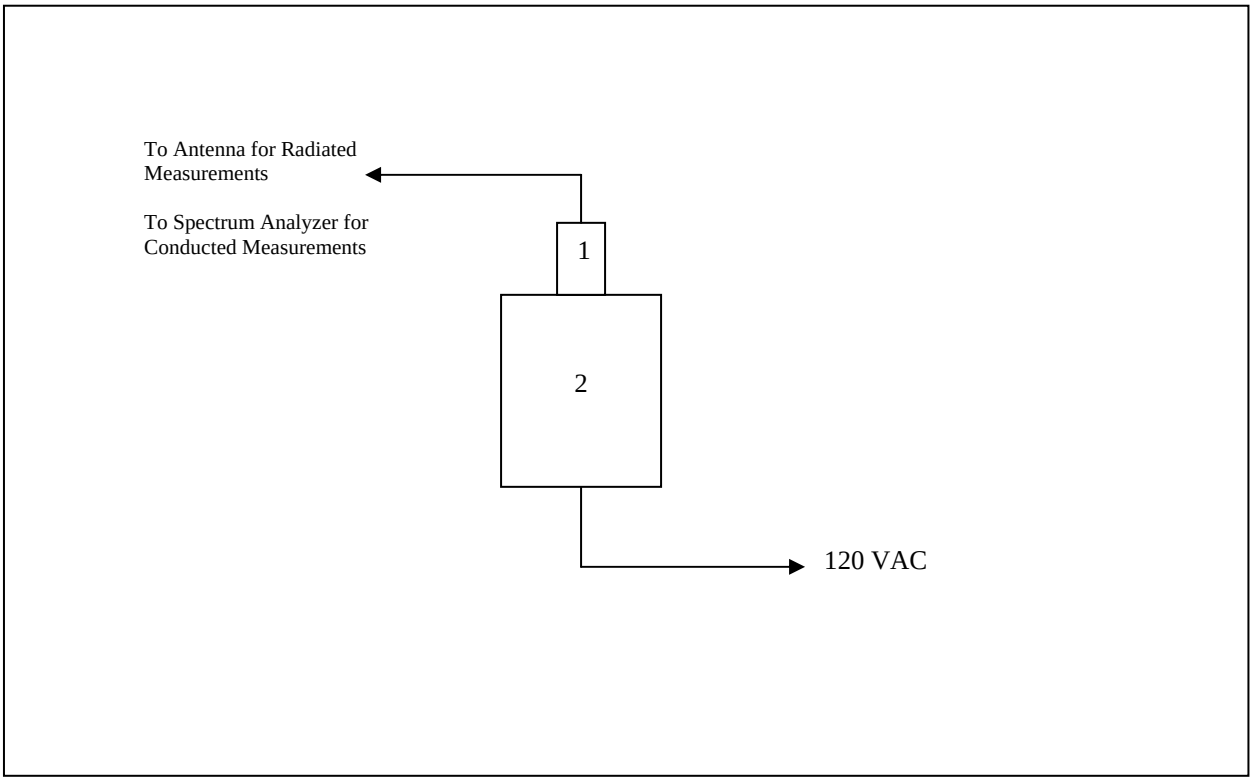

Figure 6-1: EUT Test Setup

*See Test Setup photographs for additional detail.

7.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: Section 15.203

The SG901-1028 was tested with three different detachable antennas, each with a unique connector type.
Antenna 1 is a ¼ wave dipole, with a Reverse SMA connector and 4.9 dBi gain.
Antenna 2 is a PCB, with a UFL connector and 2 dBi gain.
Antenna 3 is a Mobile Low Profile Vertical (MLPV) with a Reverse SMA connector and 3 dBi gain.

7.2 Power Line Conducted Emissions – FCC: Section 15.207 IC: RSS-Gen 7.2.2

7.2.1 Test Methodology

ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150kHz to 30MHz with the spectrum analyzer's resolution bandwidth set to 9kHz and the video bandwidth set to 30kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss
Margin = Applicable Limit - Corrected Reading

7.2.2 Test Results

Results of the test are shown below in and Tables 7.2-1.

Table 7.2-1: Line 1 Conducted EMI Results

Frequency (MHz)	Uncorrected Reading (dBuV)		Total Correction Factor (dB)	Corrected Level (dBuV)		Limit (dBuV)		Margin (dB)		Line
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	
Line 1										
0.1694	35.54	21.12	10.15	45.69	31.27	64.99	54.99	19.3	23.7	FLO
0.1849	33.15	18.47	10.15	43.30	28.62	64.26	54.26	21.0	25.6	FLO
0.2187	30.02	13.42	9.95	39.97	23.37	62.87	52.87	22.9	29.5	FLO
0.2712	25.18	13.62	9.98	35.16	23.60	61.08	51.08	25.9	27.5	FLO
0.6096	22.44	18.26	10.24	32.68	28.50	56.00	46.00	23.3	17.5	FLO
16.097	25.91	11.79	11.02	36.93	22.81	60.00	50.00	23.1	27.2	FLO
Line 2										
0.19225	32.18	12.92	10.15	42.33	23.07	63.94	53.94	21.6	30.9	FLO
0.2158	29.91	12.8	9.95	39.86	22.75	62.98	52.98	23.1	30.2	FLO
0.2305	28.69	17.45	9.96	38.65	27.41	62.43	52.43	23.8	25.0	FLO
0.2895	24.44	15.4	9.99	34.43	25.39	60.54	50.54	26.1	25.1	FLO
0.6782	22.32	19.78	10.22	32.54	30.00	56.00	46.00	23.5	16.0	FLO
16.135	22.29	11.37	11.02	33.31	22.39	60.00	50.00	26.7	27.6	FLO

7.3 Radiated Emissions – FCC: Section 15.109(Unintentional Radiation) IC: RSS-210 2.6

7.3.1 Test Methodology

Radiated emissions tests were performed over the frequency range of 30MHz to 1 GHz. Measurements of the radiated field strength were made at a distance of 3m from the boundary of the equipment under test (EUT) and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. Radiated measurements were made with the Spectrum Analyzer's resolution bandwidth set to 120 KHz for measurements above 30MHz. Average measurements are taken with the RBW and VBW were set to 1MHz and 10 Hz respectively for measurements above 1000MHz.

7.3.2 Test Results

Results of the test are given in Table 7.3-1 below:

Table 7.3-1: Radiated Emissions Tabulated Data

Frequency (MHz)	Level (dBuV)		Antenna Polarity (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg			pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
147.5		45.24	H	-11.61	---------	33.63	--------	43.5	---------	9.87
196.1		48.40	H	-13.39	---------	35.01	--------	43.5	---------	8.49
239.7		36.36	H	-10.83	---------	25.53	--------	46.0	---------	20.47
368.6		40.23	H	-5.58	---------	34.65	--------	46.0	---------	11.35
456.8		44.18	V	-0.94	---------	43.24	--------	46.0	---------	2.76
729		34.52	V	3.21	---------	37.73	--------	46.0	---------	8.27
913.8		17.11	V	8.23	---------	25.34	--------	46.0	---------	20.66

* Note: All emissions above 913.8 MHz were attenuated below the permissible limit.

7.4 6dB Bandwidth – FCC: Section 15.247(a)(2) IC: RSS-210 A8.2(a)

7.4.1 Test Methodology

The 6dB bandwidth was measured in accordance with the FCC KDB Publication No. 558074 "Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)". The RBW of the spectrum analyzer was set to 100 kHz and VBW 300 kHz. Span was set large enough to capture the entire emissions and >> RBW.

7.4.2 Test Results

Results for both b and g modes are shown below in table 7.4.2-1 to 7.4.2-2 and figure 7.4.2-1 to 7.4.2-6:

Table 7.4.2-1: 6dB Bandwidth – 802.11b mode

Frequency [MHz]	Bandwidth [MHz]
2412	12.0
2437	12.075
2462	12.0

Table 7.4.2-2: 6dB Bandwidth – 802.11g mode

Frequency [MHz]	Bandwidth [MHz]
2412	16.5
2437	16.5
2462	16.5

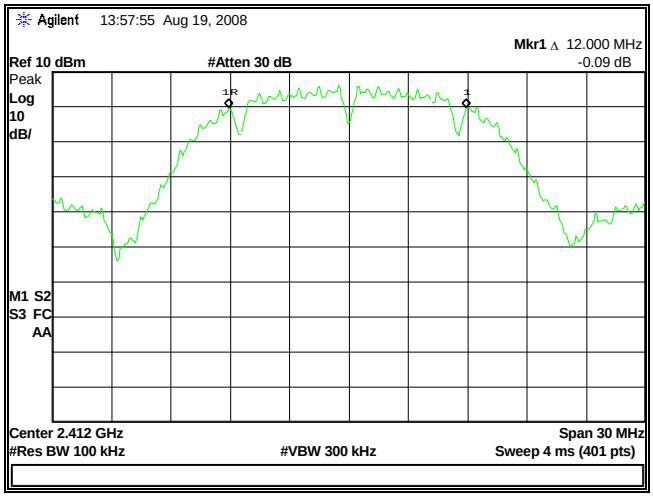

Figure 7.4.2-1: 6dB Bandwidth Plot – Low Channel - 802.11b

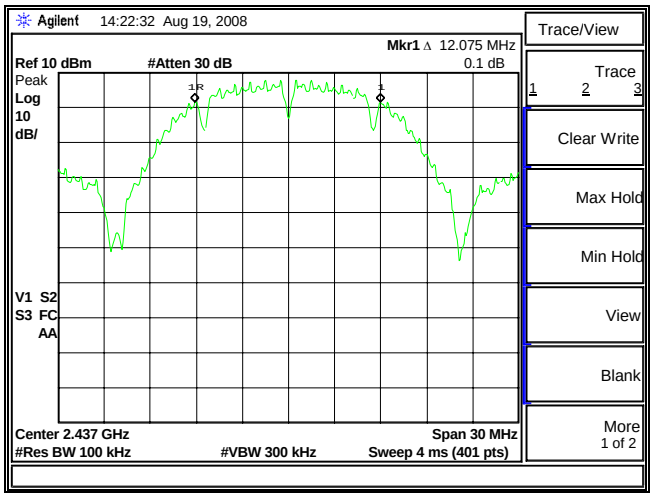

Figure 7.4.2-2: 6dB Bandwidth Plot – Mid Channel - 802.11b

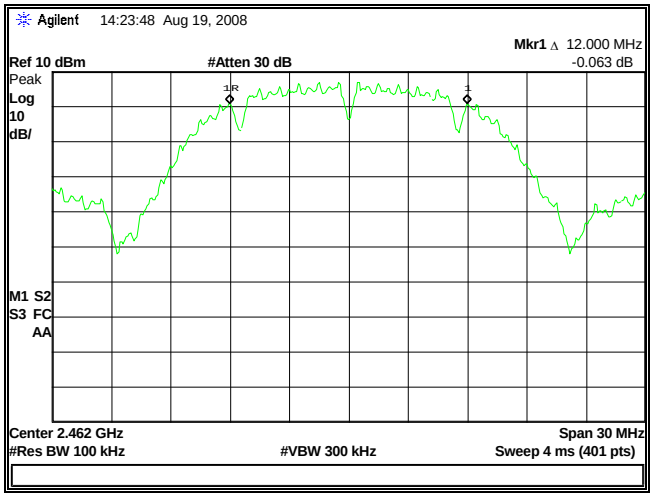

Figure 7.4.2-3: 6dB Bandwidth Plot – High Channel - 802.11b

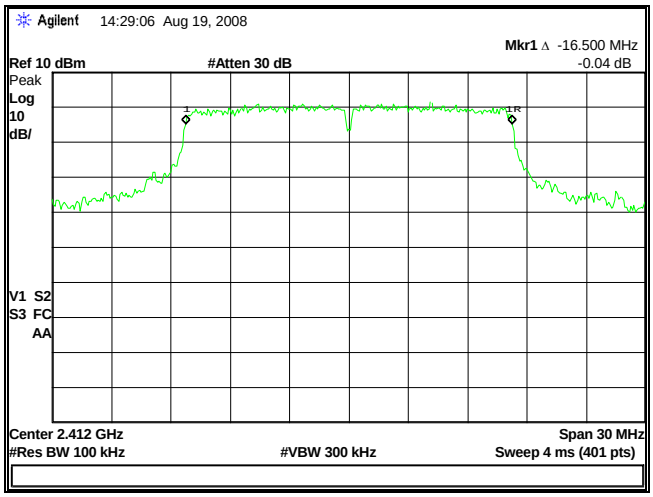

Figure 7.4.2-4: 6dB Bandwidth Plot – Low Channel - 802.11g

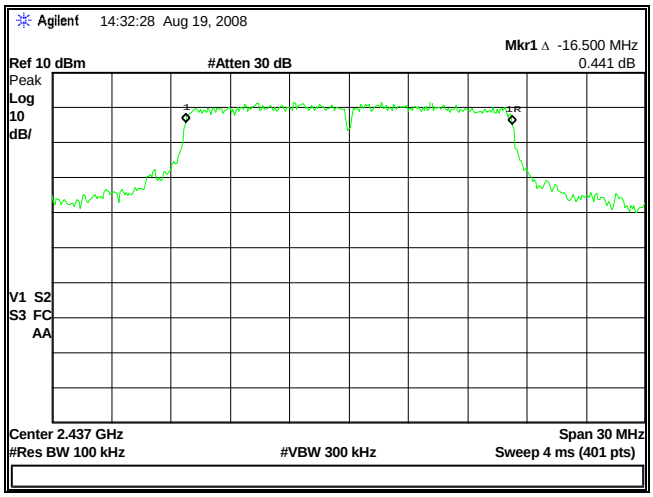

Figure 7.4.2-5: 6dB Bandwidth Plot – Mid Channel - 802.11g

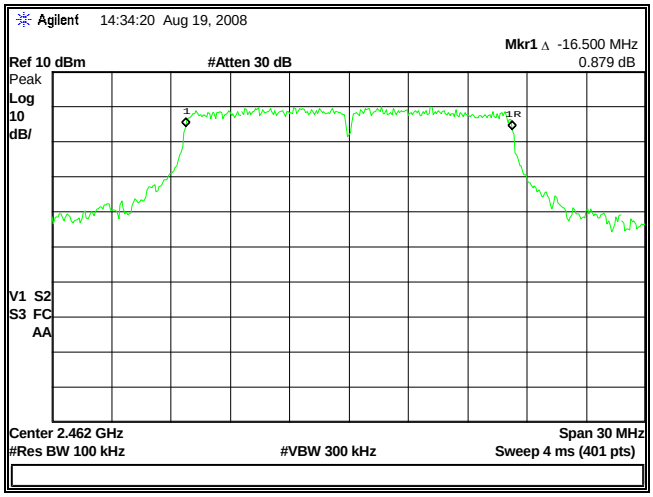

Figure 7.4.2-6: 6dB Bandwidth Plot – High Channel - 802.11g

7.5 Peak Output Power Requirement - FCC Section 15.247(b)(3) IC: RSS-210 A8.4(4)

7.5.1 Test Methodology

The Peak Output Power was measured in accordance with the FCC KDB Publication No. 558074 "Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)" Power Option 1. The RF output of the equipment under test was directly connected to the input of the Power Meter.

Data was collected with the EUT operating at maximum power. Power was taken at each data rate available for b and g modes. The worst case data rate is shown below.

7.5.2 Test Results

Results for both b and g modes are shown below in table 7.5.2-1 to 7.5.2-2.

Table 7.5.2-1: Peak Output Power – 802.11b

Frequency (MHz)	Output Power (dBm)
2412	21.2
2437	21.5
2462	21.4

Table 7.5.2-1: Peak Output Power – 802.11b

Frequency (MHz)	Output Power (dBm)
2412	19.1
2437	20.5
2462	20.0

7.6 Band-Edge Compliance and Spurious Emissions - FCC Section 15.247(d) IC: RSS-210 2.6, A8.5

7.6.1 Band-Edge Compliance of RF Emissions

7.6.1.1 Test Methodology

The EUT was investigated at the low and high channels of operation to determine band-edge compliance. All antenna types were evaluated. Because the upper band-edge coincides with a restricted band, band-edge compliance for the upper band-edge was determined using the radiated mark-delta method as outlined in FCC DA 00-705. The radiated field strength of the fundamental emission was first determined and then the mark-delta method was used to determine the field strength of the band-edge emissions.

The lower band-edge compliance was determined using the marker-delta method in which the radio frequency power that is produced by the EUT is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power.

Radiated data was taken for each of the three antennas.

7.6.1.2 Test Results

Band-edge compliance for both b and g modes are displayed in Table 7.6.1.2-1 to 7.6.1.2-6 and Figure 7.6.1.2-1 – 7.6.1.2-8.

Table 7.6.1.2-1: Upper Band-edge Marker Delta Method – 802.11b Antenna 1

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Fundamental Field Strength (dBuV/m)		Delta-Marker (dB)	Band-edge Field Strength (dBuV/m)		Margin to Limit (dBuV/m) 74	54
	pk	avg	(H/V)	(dB)	pk	avg		pk	avg	pk	avg
Fundamental Frequency											
2462	111.30	108.30	V	-3.10	108.20	99.18	50.65	57.55	48.53	16.45	5.47

Table 7.6.1.2-2: Upper Band-edge Marker Delta Method – 802.11b Antenna 2

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Fundamental Field Strength (dBuV/m)		Delta-Marker (dB)	Band-edge Field Strength (dBuV/m)		Margin to Limit (dBuV/m) 74	54
	pk	avg	(H/V)	(dB)	pk	avg		pk	avg	pk	avg
Fundamental Frequency											
2462	107.00	101.70	V	-3.10	103.90	92.58	46.15	57.75	46.43	16.25	7.57

Table 7.6.1.2-3: Upper Band-edge Marker Delta Method – 802.11b Antenna 3

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Fundamental Field Strength (dBuV/m)		Delta-Marker (dB)	Band-edge Field Strength (dBuV/m)		Margin to Limit (dBuV/m) 74	54
	pk	avg	(H/V)	(dB)	pk	avg		pk	avg	pk	avg
Fundamental Frequency											
2462	106.50	102.00	V	-3.10	103.40	92.88	47.91	55.49	44.97	18.51	9.03

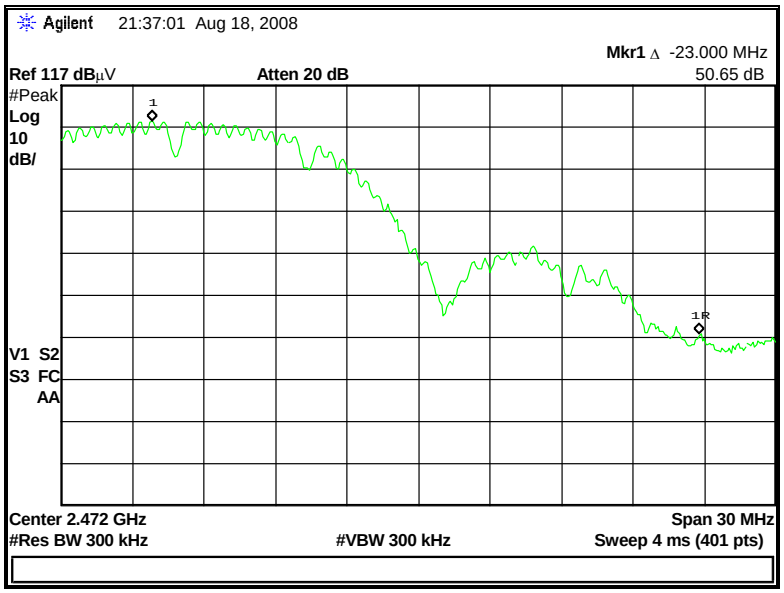

Figure 7.6.1.2-1: Upper Band-edge (Radiated) – 802.11b, Antenna 1

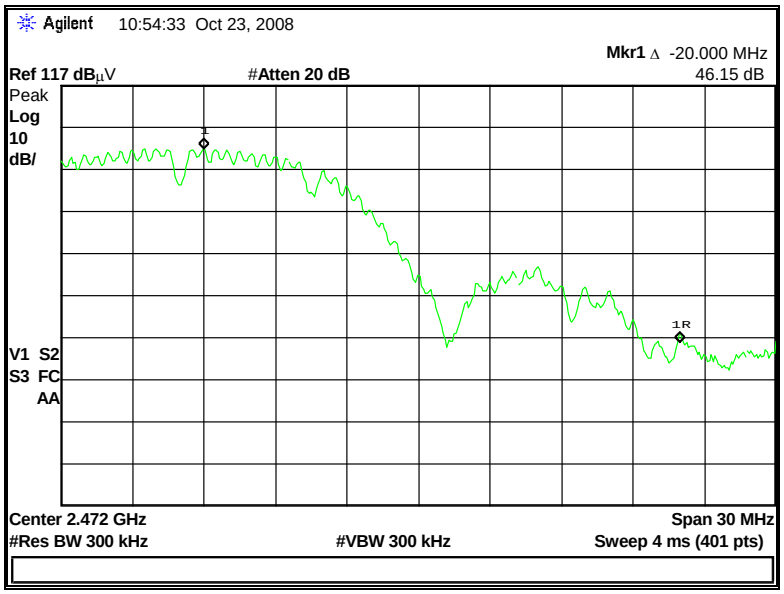

Figure 7.6.1.2-2: Upper Band-edge (Radiated) – 802.11b, Antenna 2

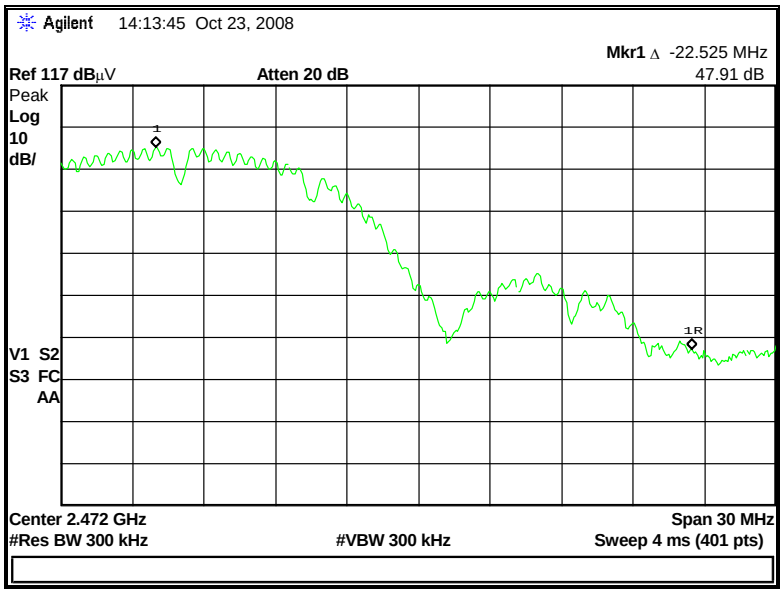

Figure 7.6.1.2-3: Upper Band-edge (Radiated) – 802.11b, Antenna 3

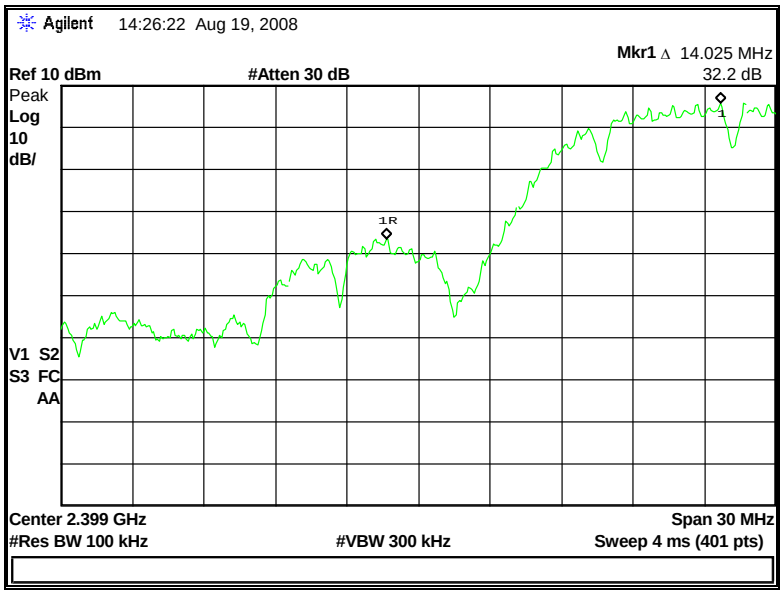

Figure 7.6.1.2-4: Lower Band-edge (Conducted) – 802.11b

Table 7.6.1.2-4: Upper Band-edge Marker Delta Method – 802.11g, Antenna 1

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Fundamental Field Strength (dBuV/m)		Delta-Marker (dB)	Band-edge Field Strength (dBuV/m)		Margin to Limit (dBuV/m) 74	54
	pk	avg	(H/V)	(dB)	pk	avg		pk	avg	pk	avg
Fundamental Frequency											
2462	110.90	102.20	V	-3.10	107.80	93.08	40.6	67.20	52.48	6.80	1.52

Table 7.6.1.2-5: Upper Band-edge Marker Delta Method – 802.11g, Antenna 2

Frequency (MHz)			Antenna Polarity	Correction Factors	Fundamental Field Strength (dBuV/m)		Delta-Marker (dB)	Band-edge Field Strength (dBuV/m)		Margin to Limit (dBuV/m) 74	54
	pk	avg	(H/V)	(dB)	pk	avg		pk	avg	pk	avg
Fundamental Frequency											
2462	103.50	93.05	V	-3.10	100.40	83.93	39.62	60.78	44.31	13.22	9.69

Table 7.6.1.2-6: Upper Band-edge Marker Delta Method – 802.11g, Antenna 3

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Fundamental Field Strength (dBuV/m)		Delta-Marker (dB)	Band-edge Field Strength (dBuV/m)		Margin to Limit (dBuV/m) 74	54
	pk	avg	(H/V)	(dB)	pk	avg		pk	avg	pk	avg
Fundamental Frequency											
2462	104.70	94.64	V	-3.10	101.60	85.52	39.83	61.77	45.69	12.23	8.31

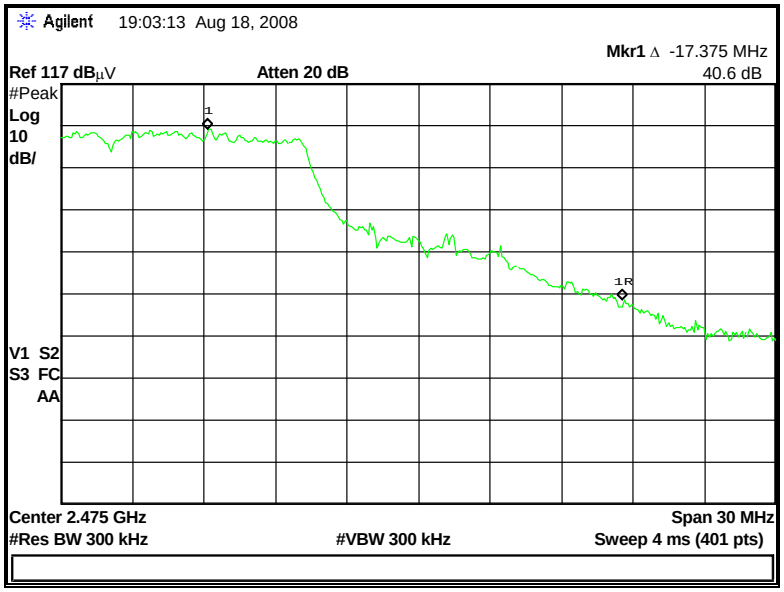

Figure 7.6.1.2-5: Upper Band-edge (Radiated) – 802.11g, Antenna 1

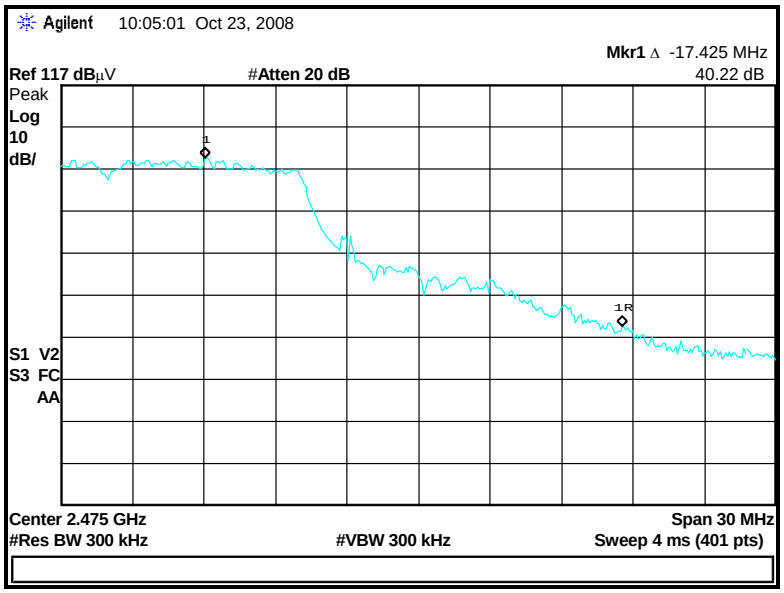

Figure 7.6.1.2-6: Upper Band-edge (Radiated) – 802.11g, Antenna 2

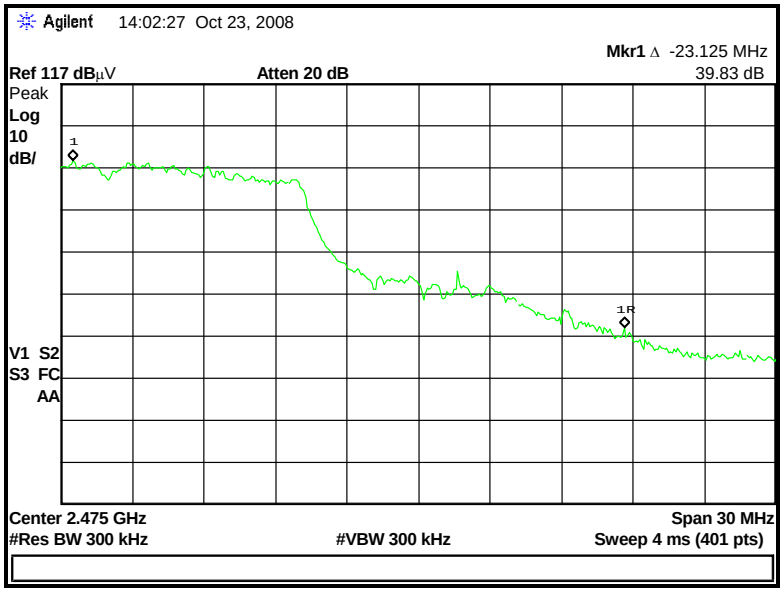

Figure 7.6.1.2-7: Upper Band-edge (Radiated) – 802.11g, Antenna 3

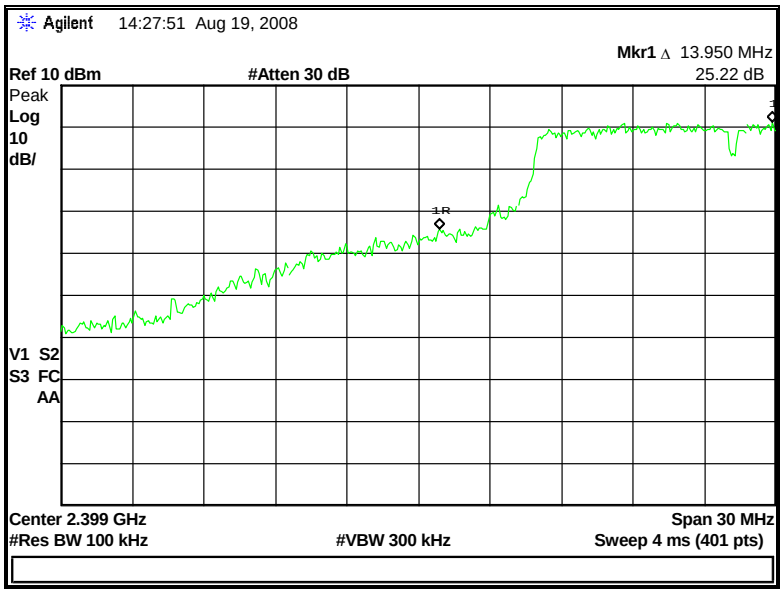

Figure 7.6.1.2-8: Lower Band-edge (Conducted) – 802.11g

7.6.2 RF Conducted Spurious Emissions

7.6.2.1 Test Methodology

The RF Conducted Spurious Emissions were measured in accordance with the FCC KDB Publication No. 558074 "Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)". The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer. The EUT was investigated for conducted spurious emissions from 30MHz to 25GHz, 10 times the highest fundamental frequency. For each measurement, the spectrum analyzer's RBW was set to 100 kHz and the VBW was set to 300 kHz. The peak detector and Max Hold function of the analyzer were utilized.

7.6.2.2 Test Results

In a 100 kHz bandwidth, the radio frequency power that was produced by the EUT emissions is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power. RF Conducted Emissions for both b and g modes are displayed in Figures 7.6.2.2-1 through 7.6.2.2-12.

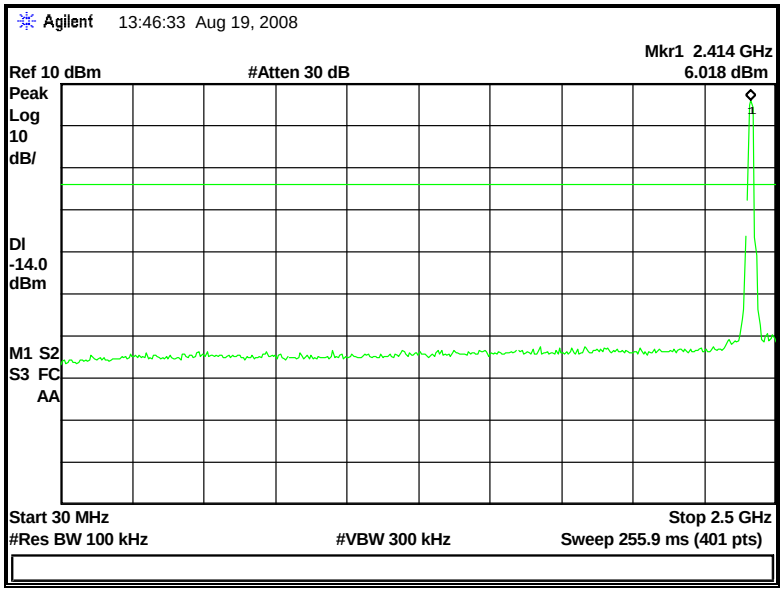

Figure 7.6.2.2-1: 30 MHz – 2.5 GHz – Low Channel – 802.11b

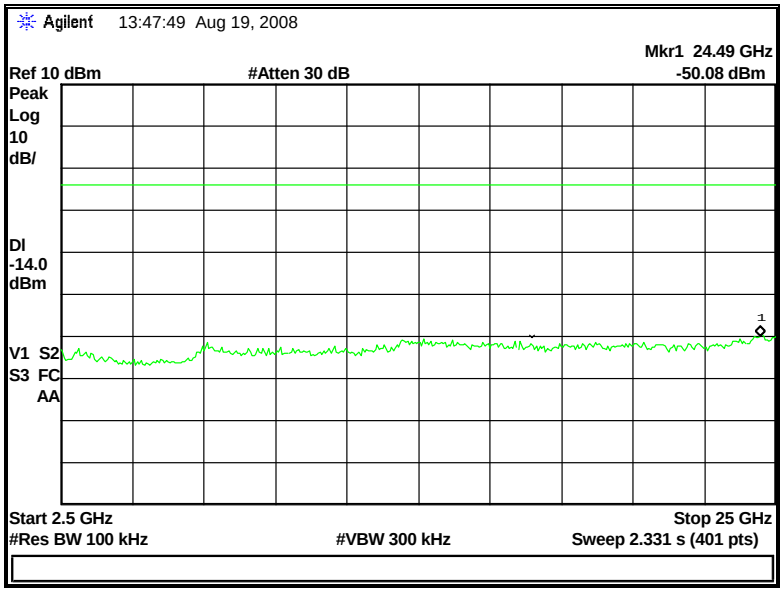

Figure 7.6.2.2-2: 2.5 GHz – 25 GHz – Low Channel – 802.11 b

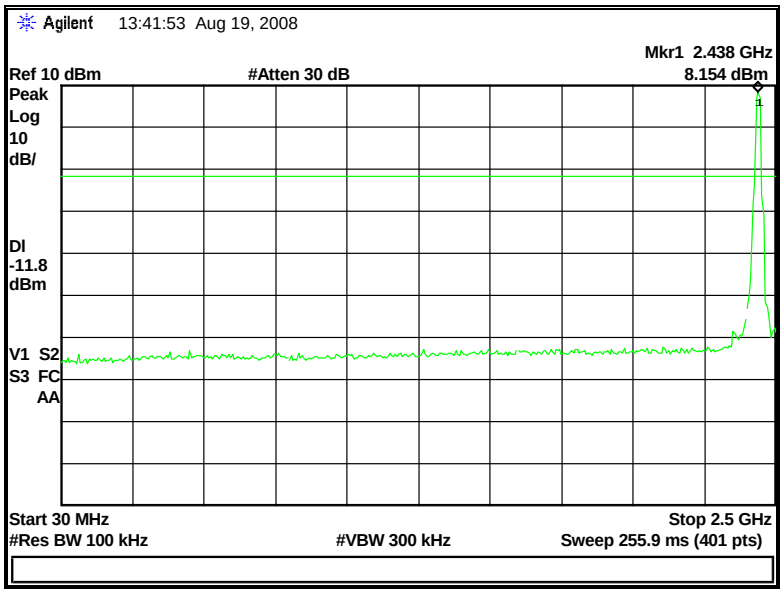

Figure 7.6.2.2-3: 30 MHz – 2.5 GHz –Mid Channel – 802.11 b

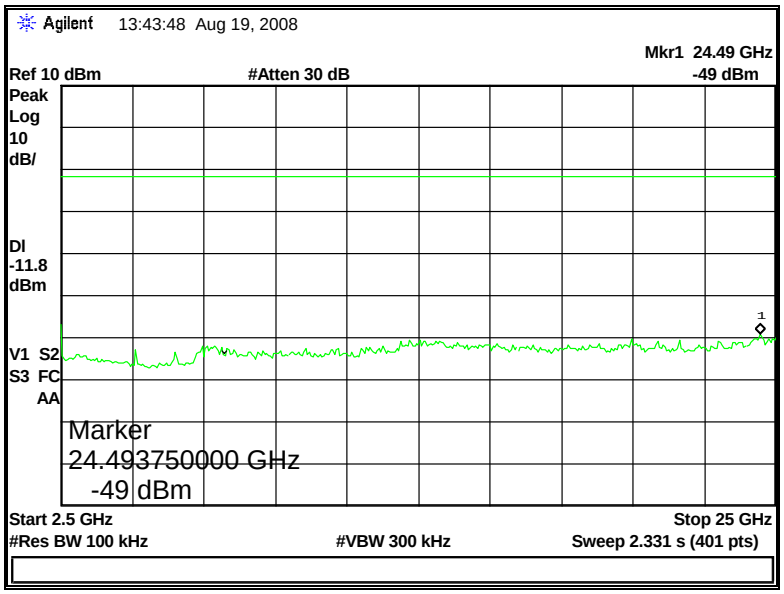

Figure 7.6.2.2-4: 2.5 GHz – 25 GHz – Mid Channel – 802.11 b

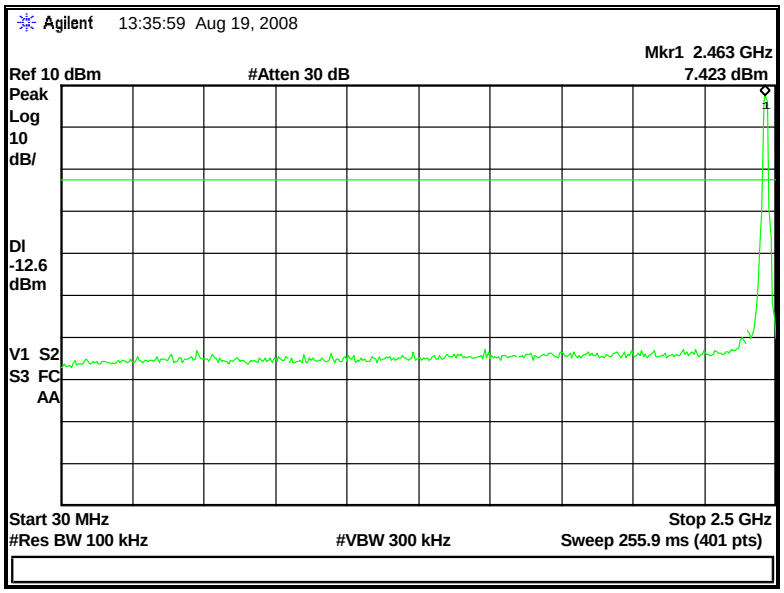

Figure 7.6.2.2-5: 30 MHz – 2.5 GHz – High Channel – 802.11 b

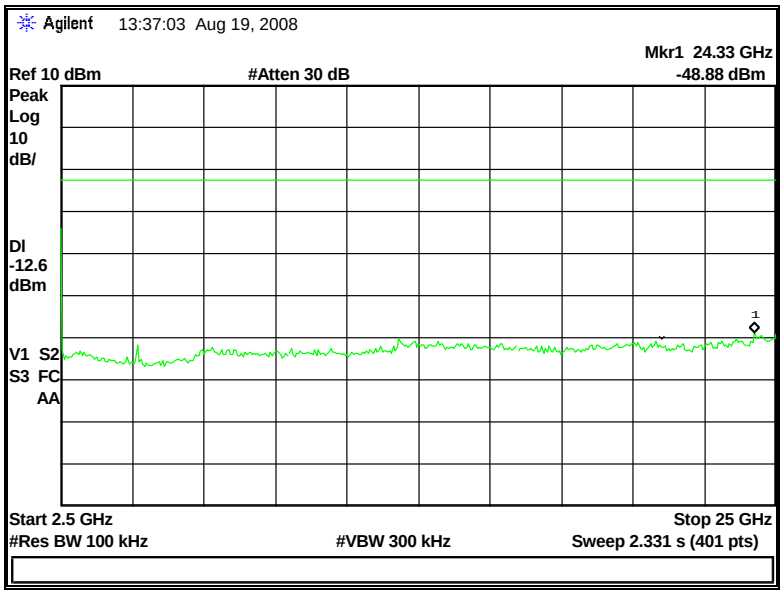

Figure 7.6.2.2-6: 2.5 GHz – 25 GHz –High Channel – 802.11 b

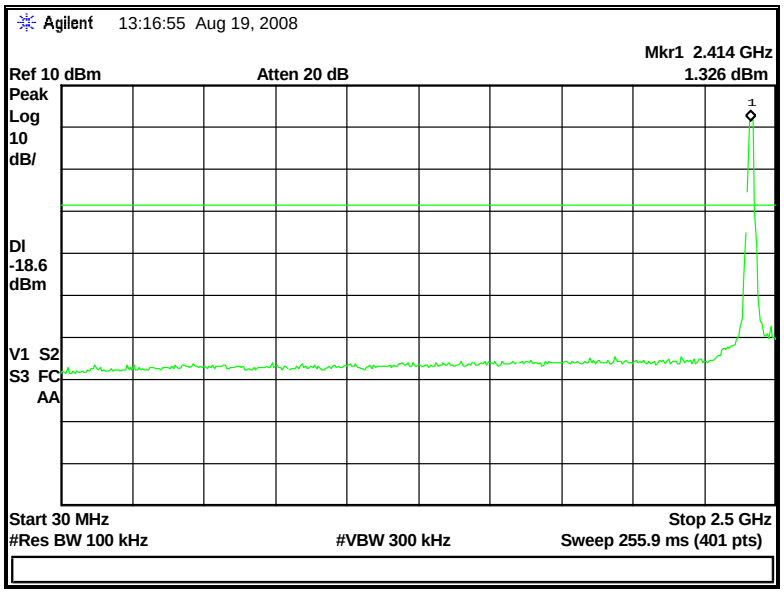

Figure 7.6.2.2-7: 30 MHz – 2.5 GHz – Low Channel – 802.11g

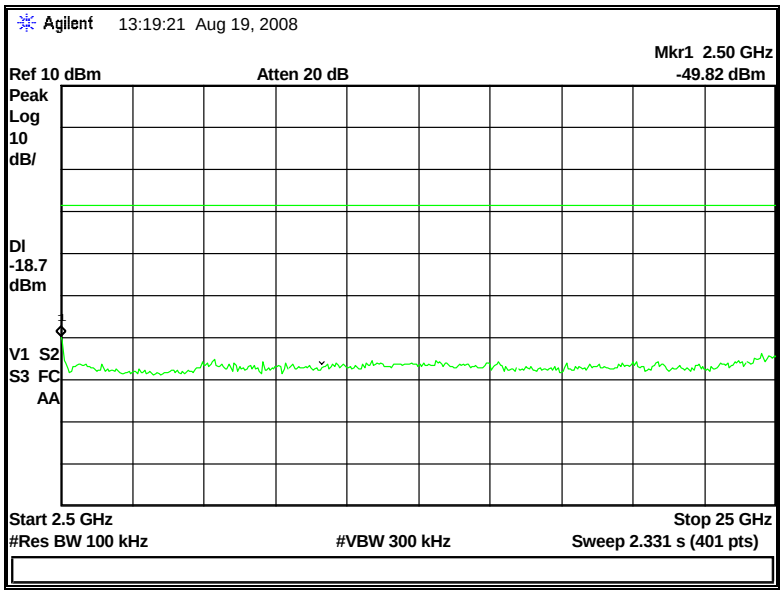

Figure 7.6.2.2-8: 2.5 GHz – 25 GHz – Low Channel – 802.11 g

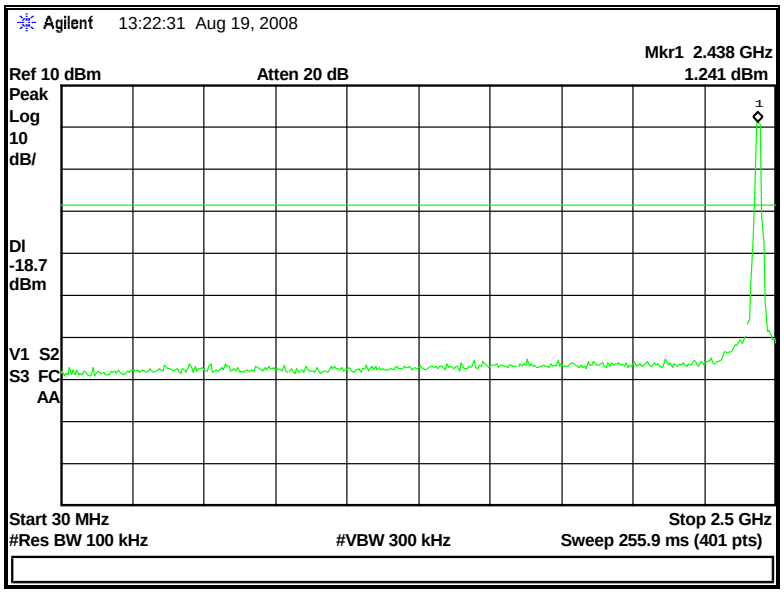

Figure 7.6.2.2-9: 30 MHz – 2.5 GHz –Mid Channel – 802.11 g

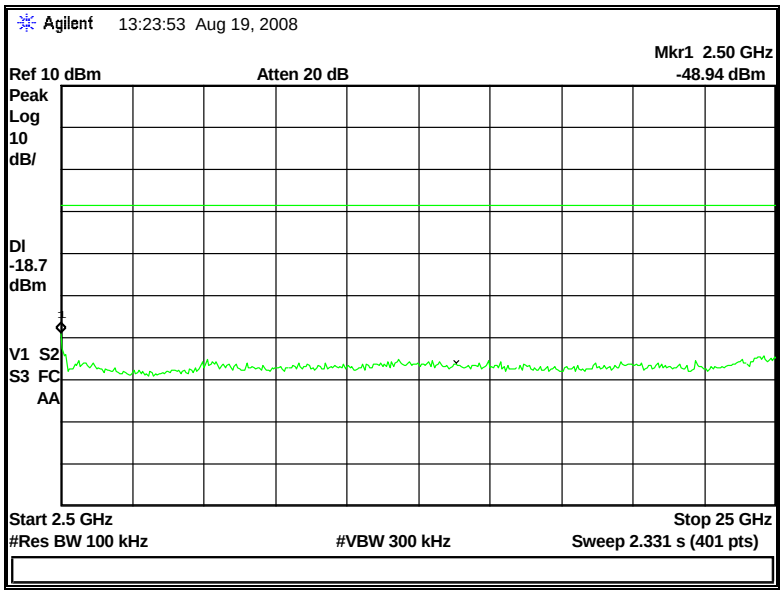

Figure 7.6.2.2-10: 2.5 GHz – 25 GHz – Mid Channel – 802.11 g

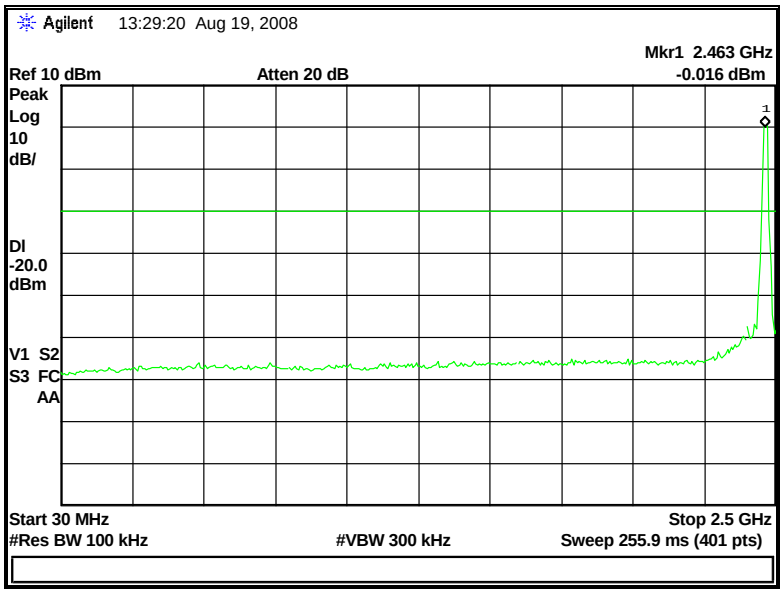

Figure 7.6.2.2-11: 30 MHz – 2.5 GHz – High Channel – 802.11 g

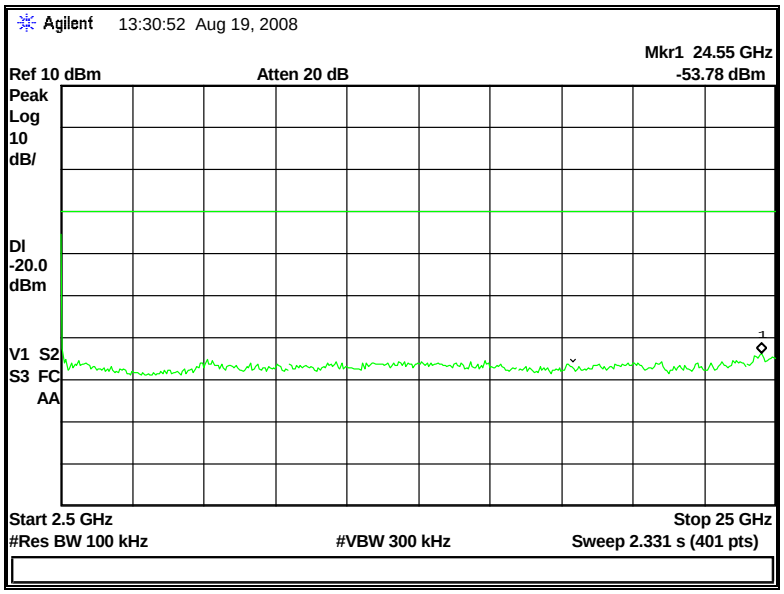

Figure 7.6.2.2-12: 2.5 GHz – 25 GHz –High Channel – 802.11 g

7.6.3 Radiated Spurious Emissions (Restricted Bands) - FCC Section 15.205 IC: RSS-210 2.6

7.6.3.1 Test Methodology

Radiated emissions tests were made over the frequency range of 30MHz to 25GHz, 10 times the highest fundamental frequency.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000MHz, peak measurements made with RBW and VBW of 1 MHz. Average measurements were made with RBW of 1MHz and a VBW of 10Hz. The average emissions were further corrected by applying the duty cycle correction of the EUT to the average measurements for comparison to the average limit.

7.6.3.2 Duty Cycle Correction

For average radiated measurements, the measured level was reduced by a factor 6.02dB to account for the applicant desired duty cycle of the EUT. The packet transmissions length is 2ms. There are 10 transmissions pulses during 100 ms, therefore the total transmission length is 10*2=20ms. The applicant wanted to use a worst case 50ms length to account for any future application. The 50ms duty cycle correction factor is determined using the formula: 20log (50/100) = 6.02dB.

A detailed analysis of the duty cycle timing is provided below in figures 7.6.3.2-1 to 7.6.3.2-2.

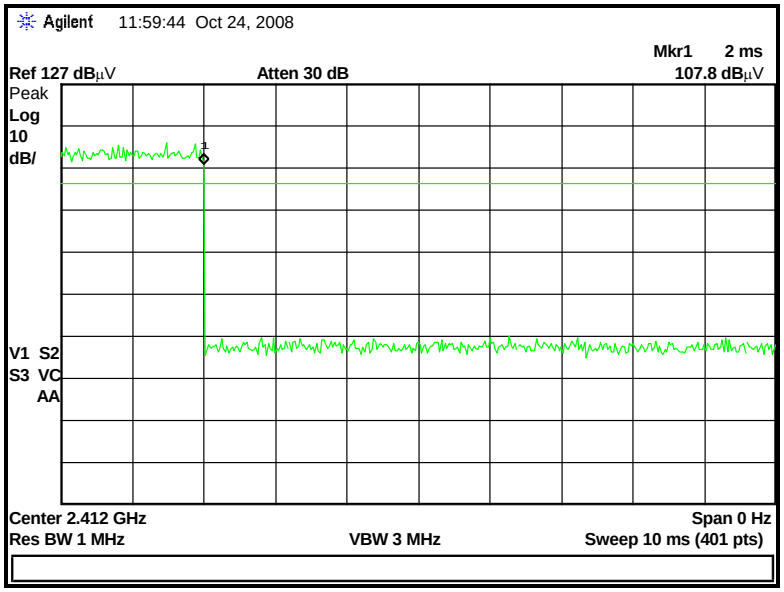

Figure 7.6.3.2-1: Duty Cycle Timing Diagram, One Period

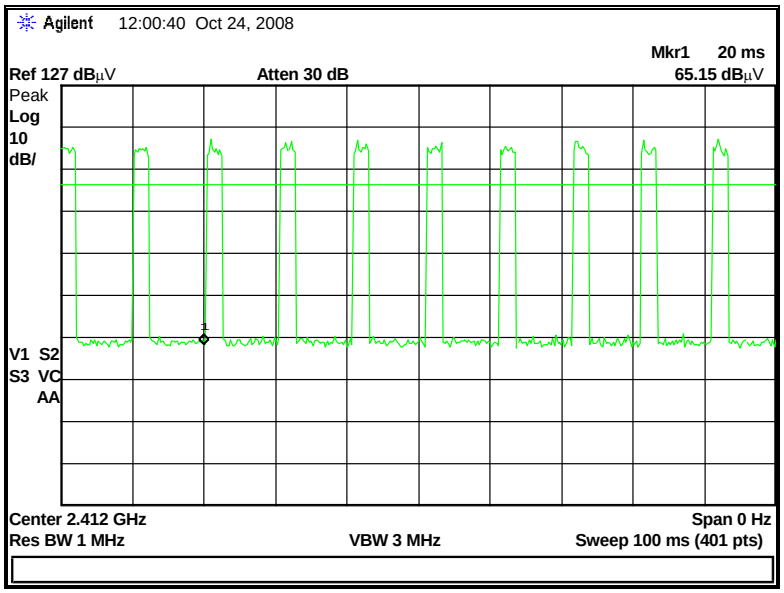

Figure 7.6.3.2-1: Duty Cycle Timing Diagram, Over 100ms

7.6.3.3 Test Results

Using the procedures set forth in the FCC KDB Publication No. 558074 "Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)", radiated spurious emissions found in the band of 30MHz to 25GHz for both b and g modes are reported in Table 7.6.3.3-1 to 7.6.3.3-3. Each emission found to be in a restricted band as defined by section 15.205, was compared to the radiated emission limits as defined in section 15.209.

Table 7.6.3.3-1: Radiated Spurious Emissions – Low Channel – 802.11b

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
2nd Antenna										
4824	52.55	49.62	H	4.75	57.30	48.35	74.0	54.0	16.70	5.65
4824	53.82	51.90	V	4.65	58.47	50.53	74.0	54.0	15.53	3.47
3rd Antenna										
4824	47.98	41.54	H	4.75	52.73	40.27	74.0	54.0	21.27	13.73
4824	47.16	40.70	V	4.65	51.81	39.33	74.0	54.0	22.19	14.67

Table 7.6.3.3-2: Radiated Spurious Emissions – Mid Channel – 802.11b

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
1st Antenna										
4874	52.26	49.25	H	4.98	57.24	48.21	74.0	54.0	16.76	5.79
4874	51.74	48.58	V	4.85	56.59	47.41	74.0	54.0	17.41	6.59
2nd Antenna										
4874	52.66	50.96	H	4.98	57.64	49.92	74.0	54.0	16.36	4.08
4874	53.93	51.60	V	4.85	58.78	50.43	74.0	54.0	15.22	3.57
3rd Antenna										
4874	49.12	44.38	H	4.98	54.10	43.34	74.0	54.0	19.90	10.66
4874	48.01	42.74	V	4.85	52.86	41.57	74.0	54.0	21.14	12.43

Table 7.6.3.3-3: Radiated Spurious Emissions – High Channel – 802.11b

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
2nd Antenna										
4924	54.94	53.32	H	5.20	60.14	52.50	74.0	54.0	13.86	1.50
4924	55.42	53.35	V	5.05	60.47	52.38	74.0	54.0	13.53	1.62
3rd Antenna										
4924	51.39	48.31	H	5.20	56.59	47.49	74.0	54.0	17.41	6.51
4924	50.28	46.66	V	5.05	55.33	45.69	74.0	54.0	18.67	8.31

Note all emissions not reported were below the noise floor of the spectrum analyzer.

For the 802.11g mode, all emissions were below the noise floor of the spectrum analyzer.

7.6.3.4 Sample Calculation:

$R_C = R_U + CF_T$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation: Peak

Corrected Level: 52.55+ 4.75= 57.30dBuV/m

Margin: 74dBuV/m – 57.30dBuV/m = 16.70dB

Example Calculation: Average

Corrected Level: 49.62+ 4.75-6.02= 48.35dBuV

Margin: 54dBuV – 48.35dBuV = 5.65dB

7.7 Peak Power Spectral Density- FCC Section 15.247(e) IC: RSS-210 A8.2(b)

7.7.1 Test Methodology

The power spectral density was measured in accordance with the FCC KDB Publication No. 558074 "Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)". The emission peaks within the pass band were located and zoomed in on. The spectrum analyzer RBW was set to 3 kHz and VBW 10 kHz. Span was adjusted to 200 kHz and the sweep time was calculated to be 67s (Span/3 kHz).

7.7.2 Test Results

Results for both b and g modes are shown below in table 7.7.2-1 to 7.7.2-2 and figures 7.7.2-1 – 7.7.2-6:

Table 7.7.2-1: Peak Power Spectral Density – 802.11b

Frequency (MHz)	PSD Level (dBm)
2412	-14.23
2437	-13.68
2462	-13.79

Table 7.7.2-2: Peak Power Spectral Density – 802.11g

Frequency (MHz)	PSD Level (dBm)
2412	-14.65
2437	-14.26
2462	-15.28

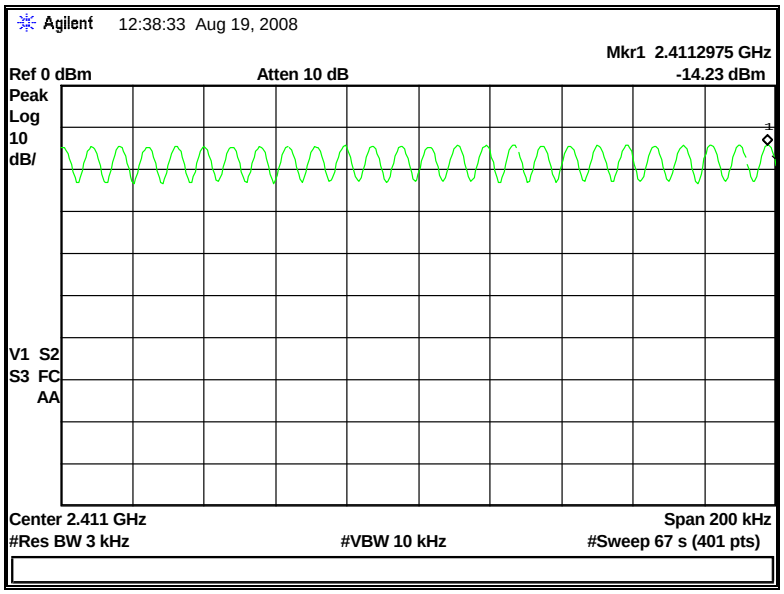

Figure 7.7.2-1: Power Spectral Density Plot – Low Channel – 802.11b

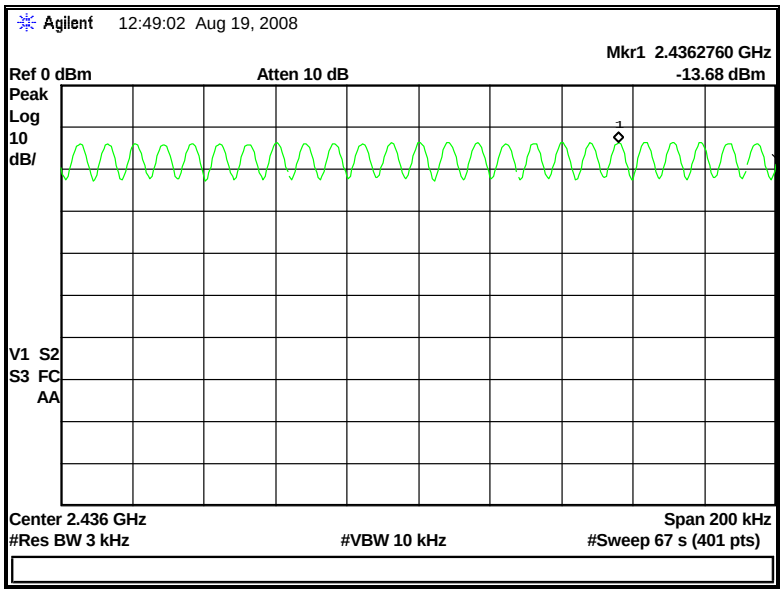

Figure 7.7.2-2: Power Spectral Density Plot – Mid Channel – 802.11b

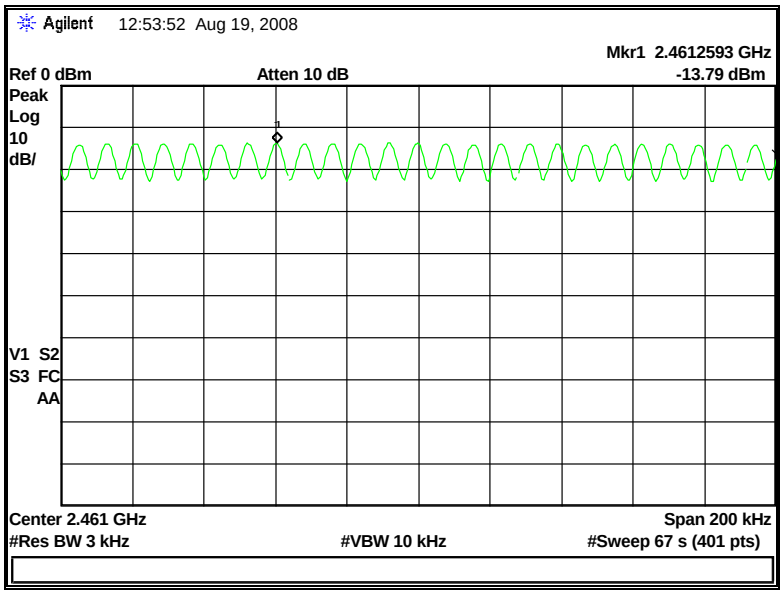

Figure 7.7.2-3: Power Spectral Density Plot – High Channel – 802.11b

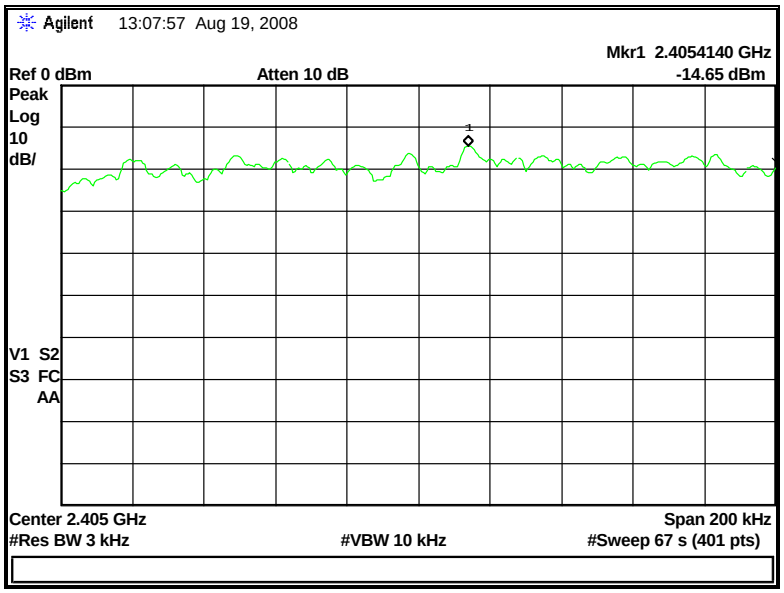

Figure 7.7.2-4: Power Spectral Density Plot – Low Channel – 802.11g

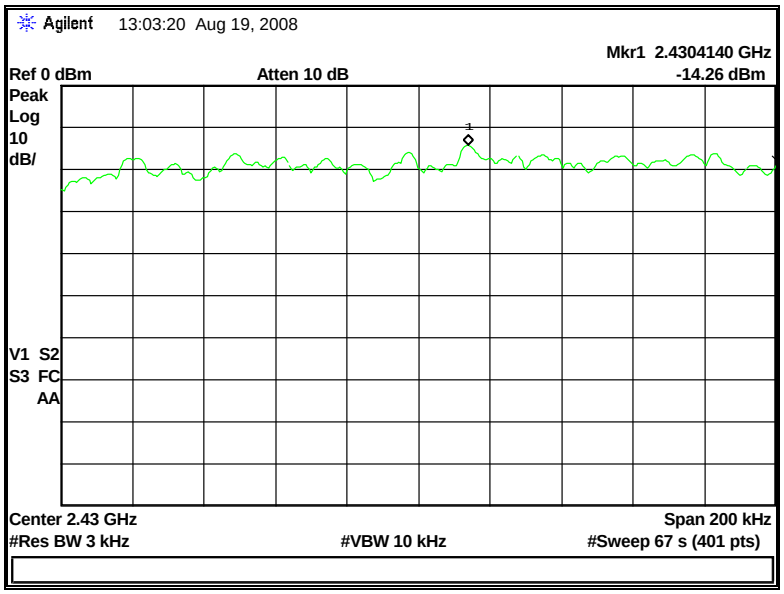

Figure 7.7.2-5: Power Spectral Density Plot – Mid Channel – 802.11g

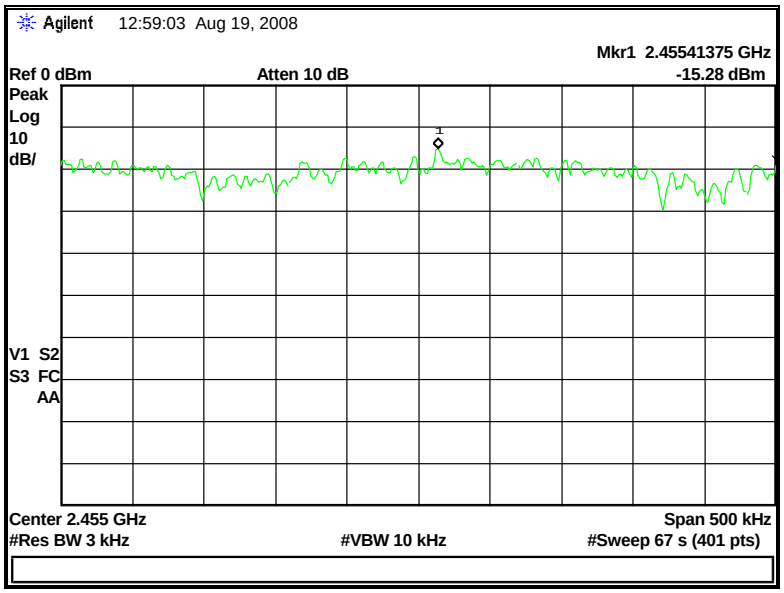

Figure 7.7.2-6: Power Spectral Density Plot – High Channel – 802.11g

8.0 CONCLUSION

In the opinion of ACS, Inc. the SG901-1028, manufactured by Sagrad Inc. meets the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-210.

END REPORT