FCC Part 15 Subpart C
Transmitter Certification

Direct Sequence Spread Spectrum Transmitter

Test Report

FCC ID: HSW-ZMN2400HP

FCC Rule Part: 15.247

ACS Report Number: 05-0453-15C-B

Manufacturer: Cirronet, Inc.
Model: ZMN2400HP

Test Begin Date: January 25, 2005
Test End Date: January 30, 2005

Report Issue Date: February 15, 2006

FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200612

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This report contains 17 pages

Table of Contents

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.

1.2 Product Description

1.2.1 General

The Cirronet ZMN2400HP Series radio modules utilizes the IEEE 802.15.4 standard ZigBee Physical layer hardware for wireless low data rate monitoring and control applications. The application of the ZMN2400 Series is a wireless network for data collection in industrial monitoring and control.

1.2.2 Manufacturer Information

Cirronet Inc
3079 Premiere Parkway
Suite 140
Duluth, GA 30097

1.2.3 Antenna List

Manufacture	Antenna Type	Model Number	Antenna Gain	Connector Type
Mobile Mark	Omni	OD9-2400	9 dBi	Type N

2.0 TEST FACILITIES

2.1 Location

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

Advanced Compliance Solutions
5015 B.U. Bowman Drive
Buford, GA 30518
Phone: (770) 831-8048
Fax: (770) 831-8598

2.2 Laboratory Accreditations/Recognitions/Certifications

The Semi-Anechoic Chamber Test Site, Open Area Test Site (OATS) and Conducted Emissions Site have been fully described, submitted to, and accepted by the FCC, Industry Canada and the Japanese Voluntary Control Council for Interference by information technology equipment. In addition, ACS is compliant to ISO 17025 as certified by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program. The following certification numbers have been issued in recognition of these accreditations and certifications:

FCC Registration Number: 89450
Industry Canada Lab Code: IC 4175
VCCI Member Number: 1831

- VCCI OATS Registration Number R-1526
- VCCI Conducted Emissions Site Registration Number: C-1608

NVLAP Lab Code: 200612

2.3 Radiated Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The Semi-Anechoic Chamber Test Site consists of a 20' x 30' x 18' shielded enclosure. The chamber is lined with Toyo Ferrite Grid Absorber, model number FFG-1000. The ferrite tile grid is 101 x 101 x 19mm thick and weighs approximately 550 grams. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber.

The turntable is 150cm in diameter and is located 160cm from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is all steel, flush mounted table installed in an all steel frame. The table is remotely operated from inside the control room located 25' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Behind the turntable is a 3' x 6' x 4' deep shielded pit used for support equipment if necessary. The pit is equipped with 1 - 4" PVC chases from the turntable to the pit that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit.

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3-1 below:

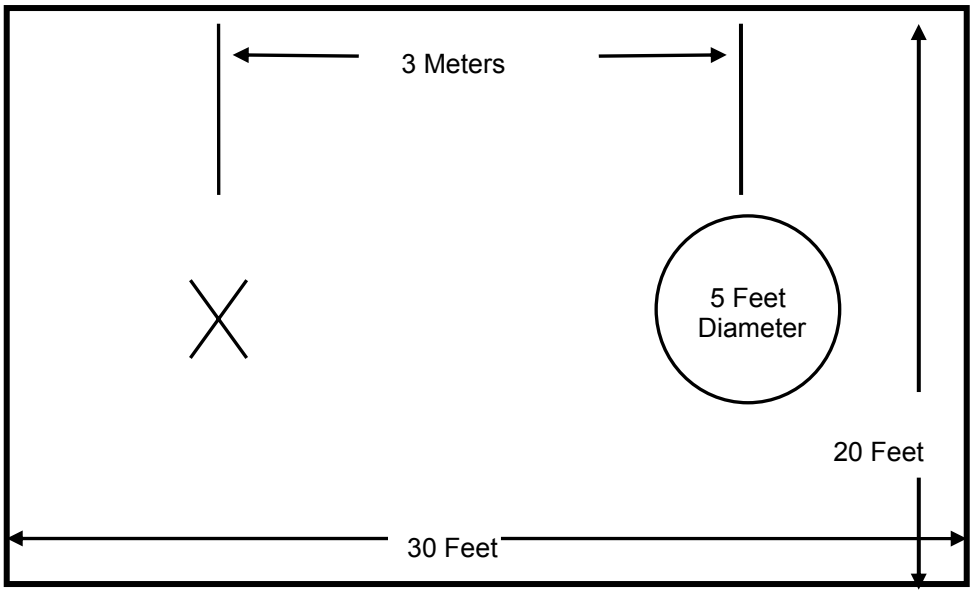

Figure 2.3-1: Semi-Anechoic Chamber Test Site

2.3.2 Open Area Tests Site (OATS)

The open area test site consists of a 40' x 66' concrete pad covered with a perforated electro-plated galvanized sheet metal. The perforations in the sheet metal are 1/8" holes that are staggered every 3/16". The individual sheets are placed to overlap each other by 1/4" and are riveted together to provide a continuous seam. Rivets are spaced every 3" in a 3 x 20 meter perimeter around the antenna mast and EUT area. Rivets in the remaining area are spaced as necessary to properly secure the ground plane and maintain the electrical continuity.

The entire ground plane extends 12' beyond the turntable edge and 16' beyond the antenna mast when set to a 10 meter measurement distance. The ground plane is grounded via 4 - 8' copper ground rods, each installed at a corner of the ground plane and bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is an all aluminum 10' flush mounted table installed in an all aluminum frame. The table is remotely operated from inside the control room located 40' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Adjacent to the turntable is a 7' x 7' square and 4' deep concrete pit used for support equipment if necessary. The pit is equipped with 5 - 4" PVC chases from the pit to the control room that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit. The pit is covered with 2 sheets of 1/4" diamond style re-enforced steel sheets. The sheets are painted to match the perforated steel ground plane; however the underside edges have been masked off to maintain the electrical continuity of the ground plane. All reflecting objects are located outside of the ellipse defined in ANSI C63.4.

A diagram of the Open Area Test Site is shown in Figure 2.3-2 below:

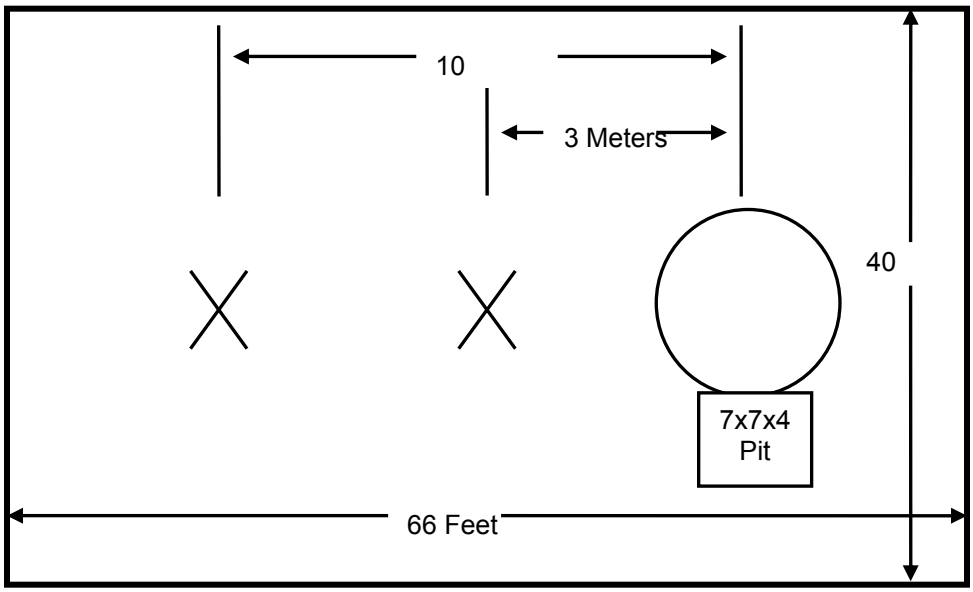

Figure 2.3-2: Open Area Test Site

2.4 Conducted Emissions Test Site Description
The AC mains conducted EMI site is a shielded room with the following dimensions:

- Height: 3.0 Meters
- Width: 3.6 Meters
- Length: 4.9 Meters

The room is manufactured by Rayproof Corporation and installed by Panashield, Inc. Earth ground is provided to the room via an 8' copper ground rod. Each panel of the room is connected electrically at intervals of 4".

Power to the room is filtered to prevent ambient noise from coupling to the EUT and measurement equipment. Filters are models 1B42-60P manufactured by Rayproof Corporation.

The room 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:

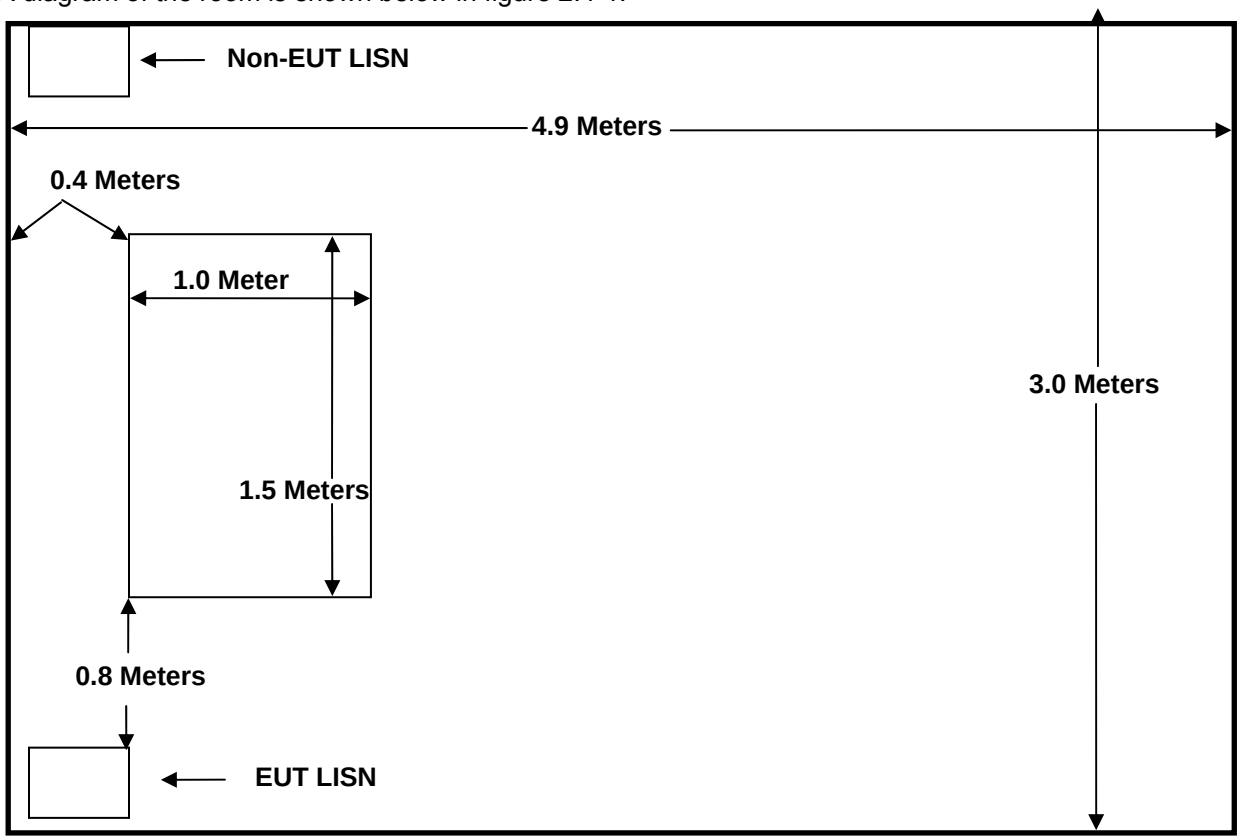

Figure 2.4-1: AC Mains Conducted EMI Site

3.0 APPLICABLE STANDARD REFERENCES
The following standards were used:

1 - ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the 9 KHz to 40GHz
2 - US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators
3 - FCC OET Bulletin 65 Appendix C - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

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					
ACS#	**Mfg.**	**Eq. type**	**Model**	**S/N**	**Cal. Due**
☐ 25	Chase	Bi-Log Antenna	CBL6111	1043	5/23/06
☐ 268	Agilent	Sensor	N1921A	MY45240184	10/10/06
☐ 041	ElectroMetrics	Bi-Con Antenna	BIA-25	2925	5/25/06
☐ 090	ElectroMetrics	LPA Antenna	LPA-25	1476	5/27/06
☐ 78	EMCO	Loop Antenna	6502	9104-2608	1/13/2006
☐ 152	EMCO	LISN	3825/2	9111-1905	1/18/06
☐ 153	EMCO	LISN	3825/2	9411-2268	12/5/06
☐ 225	Andrew	OATS RF cable	Heliax	225	1/07/07
☐ 165	ACS	Conducted EMI Cable Set	RG8	165	1/06/06
☐ 22	Agilent	Pre-Amplifier	8449B	3008A00526	5/06/06
☐ 73	Agilent	Pre-Amplifier	8447D	272A05624	5/18/06
☐ 30	Spectrum Technologies	Horn Antenna	DRH-0118	970102	5/09/06
☐ 105	Microwave Circuits	High Pass Filter	H1G810G1	2123-01 DC0225	9/13/06
☐ 209	Microwave Circuits	High Pass Filter	H3G020G2	4382-01 DC0421	9/20/06
☐ 1	Rohde & Schwarz	Receiver Display	804.8932.52	833771/007	3/07/06
☐ 2	Rohde & Schwarz	ESMI Receiver	1032.5640.53	839587/003	3/07/06
☐ 3	Rohde & Schwarz	Receiver Display	804.8932.52	839379/011	11/02/06
☐ 4	Rohde & Schwarz	ESMI Receiver	1032.5640.53	833827/003	11/02/06
☐ ---	Agilent	Spectrum Analyzer	E7405A	US39110103	6/6/06
☐ 213	Test Equipment Corp.	Pre-Amplifier	PA-102	44927	12/5/06
☐ 204	ACS	Cable	RG8	204	3/16/06
☐ 6	Harbour Industries	HF RF Cable	LL-335	00006	3/16/06
☐ 7	Harbour Industries	HF RF Cable	LL-335	00007	3/16/06
☐ 208	Harbour Industries	HF RF Cable	LL142	00208	6/24/06
☐ 167	ACS	Chamber EMI Cable Set	RG6	167	1/7/07
☐ 204	ACS	Chamber EMI RF cable	RG8	204	3/16/06
☐ 237	Gigatronics	Signal Generator	900	282706	1/10/07
☐ 267	Agilent	Power Meter	N1911A	MY45100129	10/30/06

5.0 SUPPORT EQUIPMENT

Table 5-3: Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number	FCC ID
1	Evaluation Board	Cirronet	NA	NA	NA
2	Skynet	Power Supply	DDD-0610	NA	NA

6.0 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

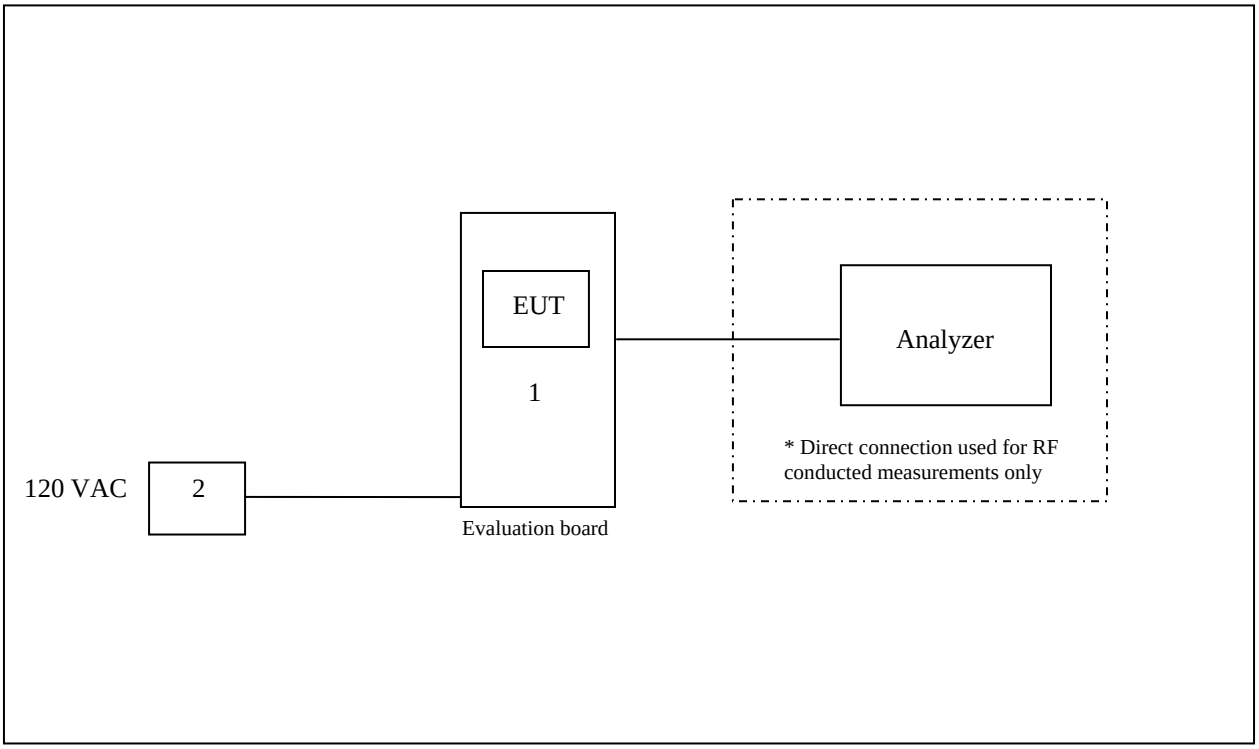

Figure 6-1: EUT Test Setup

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

Cirronet's ZigBee Module output is through a set of connections which are like a ball grid array and once soldered to a PC board the connects are not accessible. Without a support PC board the module is unusable. The antennas evaluated with this device are listed in Section 1.2.3.

7.2 Power Line Conducted Emissions - FCC Section 15.207

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 through 7.2-16 and Figure 7.2-1 through 7.2-8.

Table 7.2-1: Line 1 Conducted EMI Results (Quasi-Peak)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.258	32.4	9.7	61.4	29.0	L1	FLO
0.366	30.0	9.7	58.5	28.5	L1	FLO
0.438	28.2	9.7	57.0	28.8	L1	FLO
0.702	19.1	9.7	56.0	36.8	L1	FLO
1.728	12.7	9.7	56.0	43.2	L1	FLO
2.136	11.6	9.6	56.0	44.3	L1	FLO
3.828	9.3	9.6	56.0	46.6	L1	FLO
6.918	9.1	9.5	60.0	50.8	L1	FLO
20.016	10.1	9.3	60.0	49.8	L1	FLO
21.270	8.9	8.8	60.0	51.0	L1	FLO

Table 7.2-2: Line 1 Conducted EMI Results (Average)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.240	12.5	9.7	52.0	39.5	L1	FLO
0.390	9.4	9.7	48.0	38.6	L1	FLO
0.504	8.9	9.7	46.0	37.0	L1	FLO
0.780	9.4	9.7	46.0	36.5	L1	FLO
1.728	9.4	9.7	46.0	36.5	L1	FLO
2.136	8.6	9.6	46.0	37.3	L1	FLO
3.900	6.5	9.6	46.0	39.4	L1	FLO
6.882	6.3	9.5	50.0	43.6	L1	FLO
20.016	7.2	9.3	50.0	42.7	L1	FLO
21.366	6.2	8.8	50.0	43.7	L1	FLO

Table 7.2-3: Line 2 Conducted EMI Results (Quasi-Peak)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.258	32.3	9.7	61.4	29.1	L2	FLO
0.306	31.0	9.7	60.0	29.0	L2	FLO
0.414	28.2	9.7	57.5	29.3	L2	FLO
0.744	15.1	9.7	56.0	40.8	L2	FLO
1.596	10.9	9.7	56.0	45.0	L2	FLO
2.784	8.9	9.6	56.0	47.0	L2	FLO
3.720	9.2	9.6	56.0	46.7	L2	FLO
6.918	9.1	9.5	60.0	50.8	L2	FLO
19.710	14.6	9.3	60.0	45.3	L2	FLO
28.716	11.8	8.9	60.0	48.1	L2	FLO

Table 7.2-4: Line 2 Conducted EMI Results (Average)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.252	9.9	9.7	51.6	41.7	L2	FLO
0.372	10.6	9.7	48.4	37.7	L2	FLO
0.486	8.2	9.7	46.2	37.9	L2	FLO
0.780	9.9	9.7	46.0	36.0	L2	FLO
1.602	7.0	9.7	46.0	38.9	L2	FLO
2.784	6.4	9.6	46.0	39.5	L2	FLO
3.684	6.5	9.6	46.0	39.4	L2	FLO
6.918	6.5	9.5	50.0	43.4	L2	FLO
20.016	9.1	9.3	50.0	40.8	L2	FLO
28.908	8.3	8.9	50.0	41.6	L2	FLO

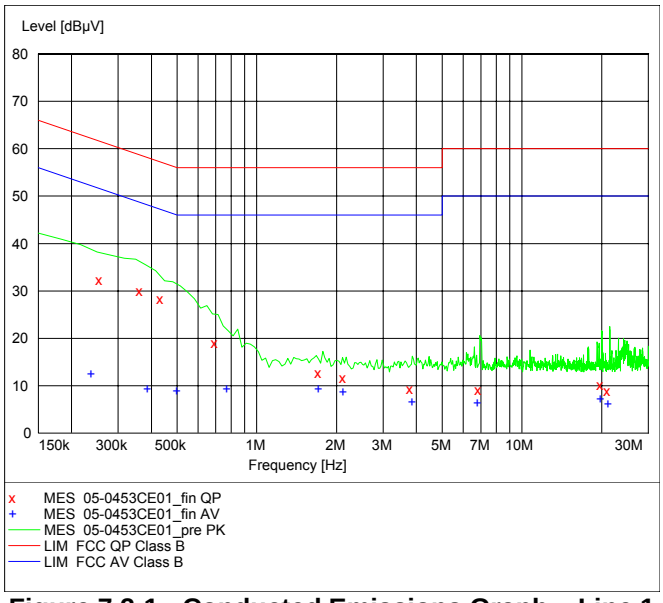

Figure 7.2-1: Conducted Emissions Graph – Line 1

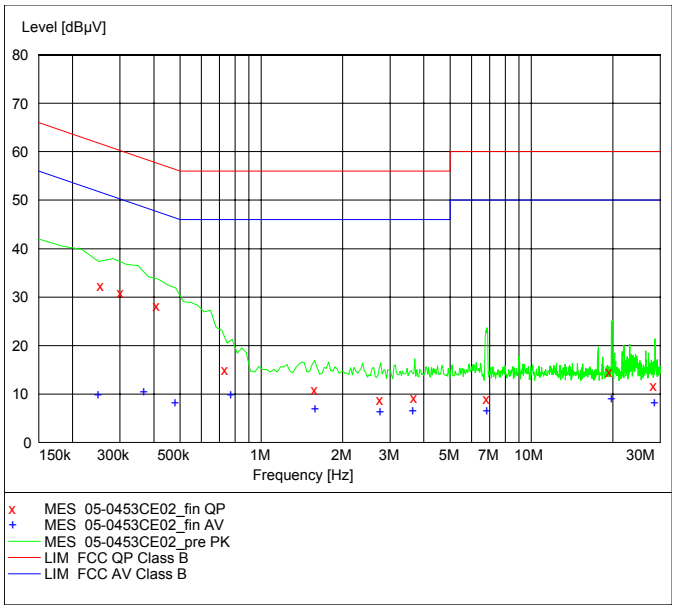

Figure 7.2-2: Conducted Emissions Graph – Line 2

7.3 Radiated Emissions - FCC Section 15.109(Unintentional Radiation)

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.

7.3.2 Test Results

Results of the test are given below in Table 7.3.2-1:

Table 7.3.2-1: Radiated Emissions

Frequency (MHz)	Polarization (H/V)	Height (cm)	Azimuth (deg)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30	VERTICAL	100	0	28.6	40	11.4
42.32	VERTICAL	105	2	8.5	40	31.5
85.68	VERTICAL	110	232	4.3	40	35.7
117.44	VERTICAL	105	79	16.6	43.5	26.9
149.68	VERTICAL	104	184	20.6	43.5	22.9
171.68	VERTICAL	100	320	16.7	43.5	26.8
344.72	VERTICAL	330	58	11.4	46	34.6
494.64	VERTICAL	350	2	17.9	46	28.1
703.84	VERTICAL	305	0	22.5	46	23.5
960	VERTICAL	130	13	26.2	46	19.8

* Note: All emissions above 960.0 MHz were attenuated at least 20 dB below the permissible limit.

7.4 6dB Bandwidth – FCC Section 15.247(a)

7.4.1 Test Methodology

The 6dB bandwidth was measured in accordance with the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 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 are shown below in table 7.4.2-1 and figure 7.4.2-1 to 7.4.2-3:

Table 7.4.2-1: 6dB Bandwidth

Frequency [MHz]	Bandwidth [MHz]	Limit	Result
2405	1.58	≥ 500 kHz	PASS
2440	1.64	≥ 500 kHz	PASS
2475	1.59	≥ 500 kHz	PASS

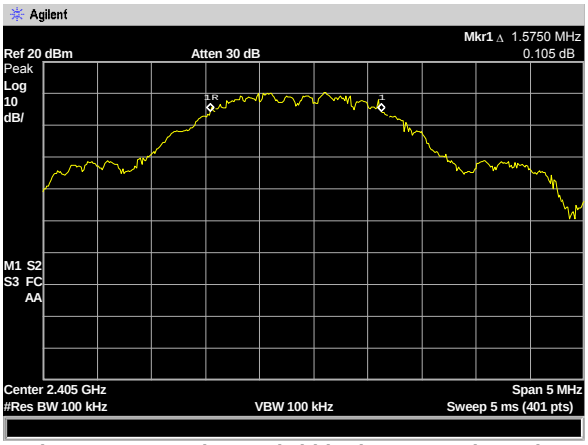

Figure 7.4.2-1: 6dB Bandwidth Plot – Low Channel

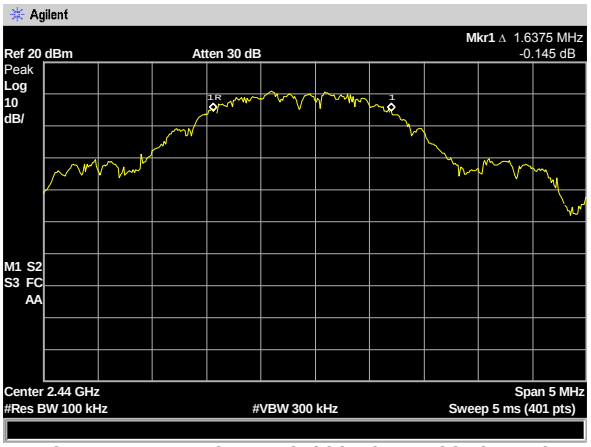

Figure 7.4.2-2: 6dB Bandwidth Plot – Mid Channel

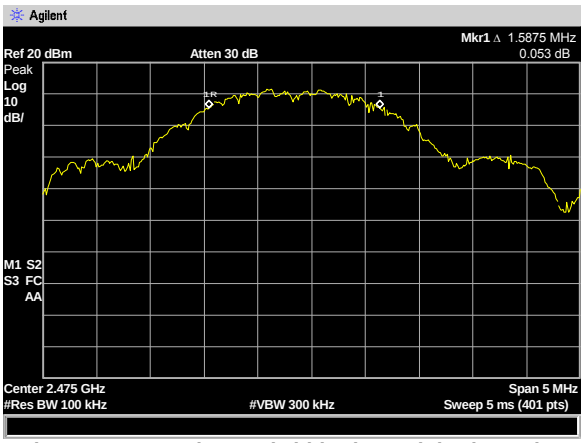

Figure 7.4.2-3: 6dB Bandwidth Plot – High Channel

7.5 Peak Output Power Requirement - FCC Section 15.247(b)

7.5.1 Test Methodology

The Peak Output Power was measured in accordance with the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 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.

7.5.2 Test Results

Results are shown below in Table 7.5.2-1.

Table 7.5.2-1: Peak Output Power

Frequency (MHz)	Output Power (dBm)
2405	16.48
2440	16.73
2475	17.03

7.6 Band-Edge Compliance and Spurious Emissions - FCC Section 15.247(d)

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.

7.6.1.2 Test Results

Band-edge compliance is displayed in Table 7.6.1.2-1 and Figure 7.6.1.2-1 – 7.6.1.2-3.

Table 7.6.1.2-1: Upper Band-edge Marker Delta Method

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											
2475	118.40	118.40	V	0.46	118.86	118.86	53.94	64.92	18.90	9.08	35.10

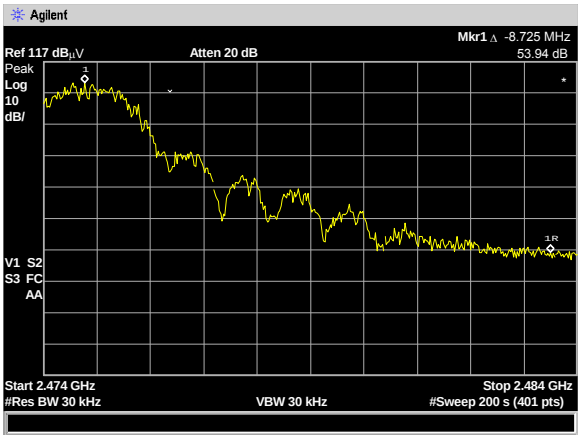

Figure 7.6.1.2-1: Upper Band-edge (Radiated)

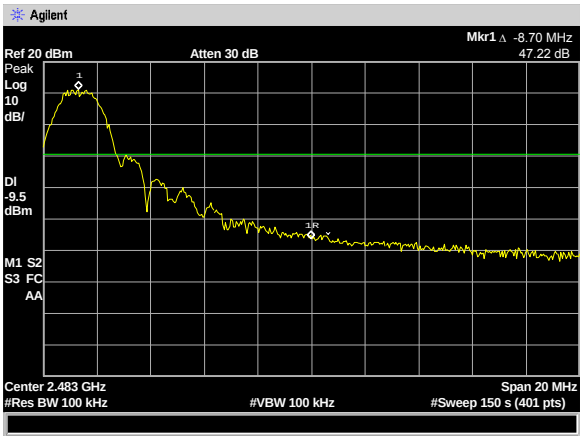

Figure 7.6.1.2-2: Upper Band-edge (Conducted)

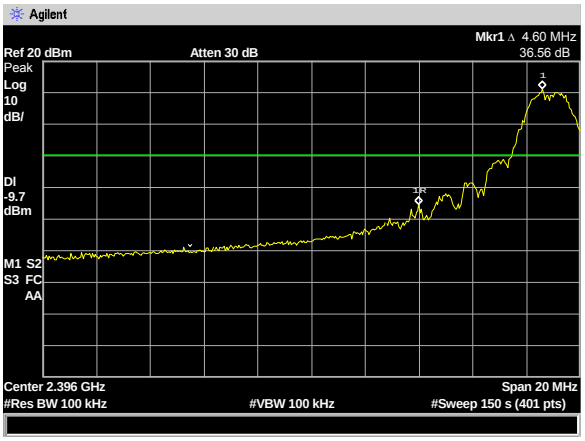

Figure 7.6.1.2-3: Lower Band-edge (Conducted)

7.6.2 RF Conducted Spurious Emissions

The RF Conducted Spurious Emissions were measured in accordance with the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 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 are displayed in Figures 7.6.2.2-1 through 7.6.2.2-6.

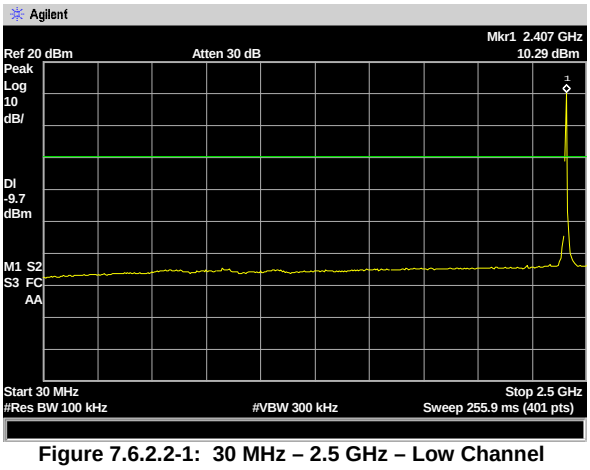

Figure 7.6.2.2-1: 30 MHz – 2.5 GHz – Low Channel

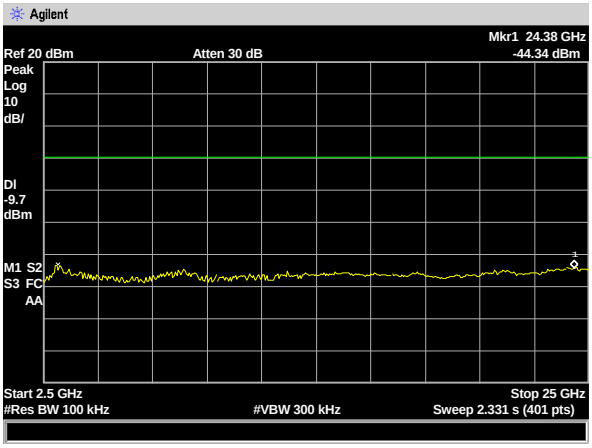

Figure 7.6.2.2-2: 2.5 GHz – 25 GHz – Low Channel

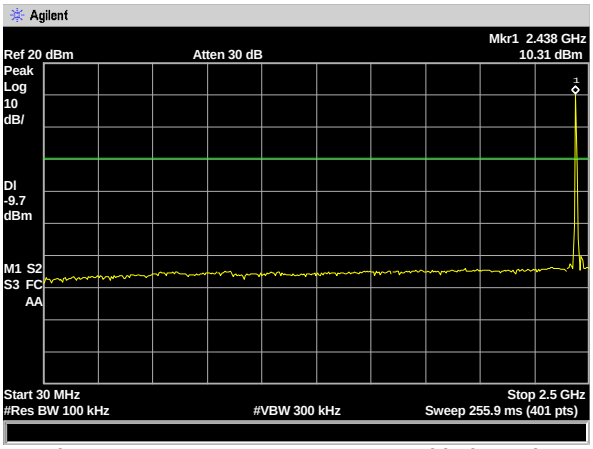

Figure 7.6.2.2-3: 30 MHz – 2.5 GHz –Mid Channel

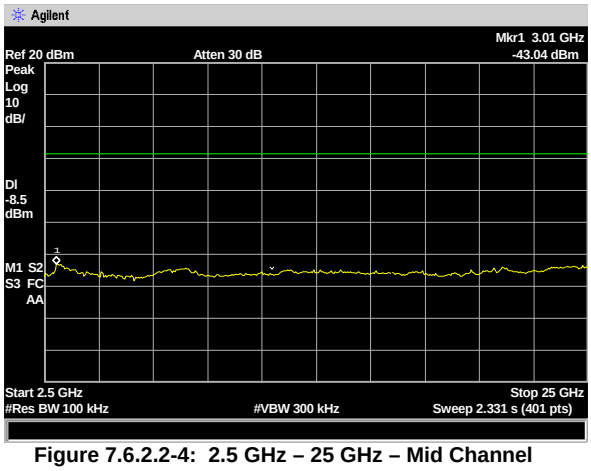

Figure 7.6.2.2-4: 2.5 GHz – 25 GHz – Mid Channel

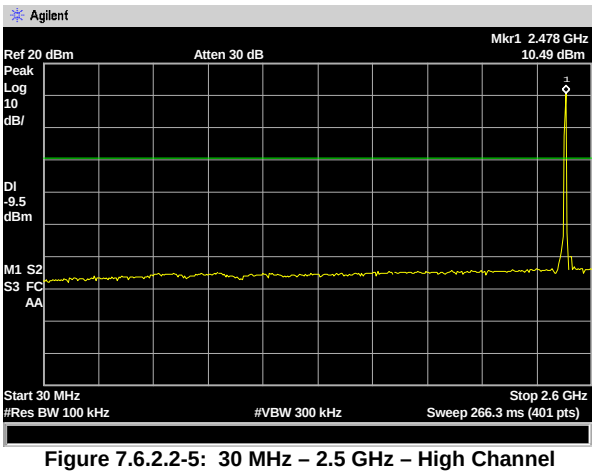

Figure 7.6.2.2-5: 30 MHz – 2.5 GHz – High Channel

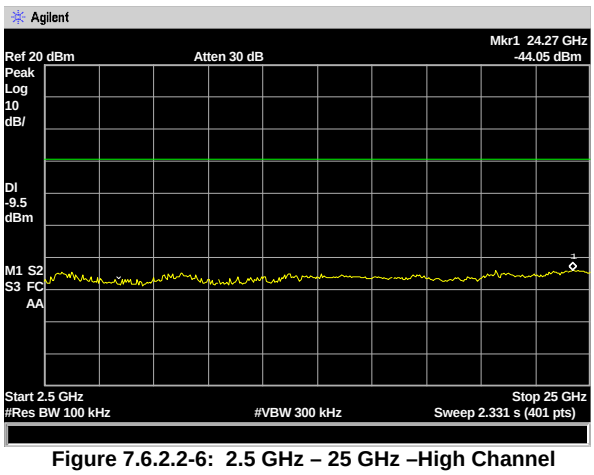

Figure 7.6.2.2-6: 2.5 GHz – 25 GHz –High Channel

7.6.3 Radiated Spurious Emissions (Restricted Bands) - FCC Section 15.205

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 46.02dB to account for the duty cycle of the EUT. The packet transmissions length is 0.5ms. The duty cycle correction factor is determined using the formula: 20log (0.5/100) = -46.02dB.

A detailed analysis of the duty cycle timing is provided below in figure 7.6.3.3-1.

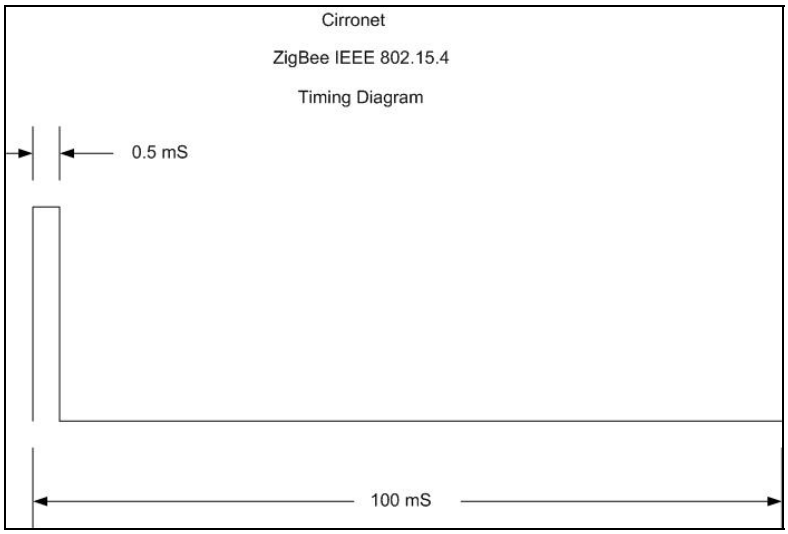

Figure 7.6.3.3-1: Duty Cycle Timing Diagram

7.6.3.3 Test Results

Using the procedures set forth in the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 15.247", radiated spurious emissions found in the band of 30MHz to 25GHz 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

Frequency	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
(MHz)	pk	avg	(H/V)	(dB)	pk	avg	pk	avg	pk	avg
Spurious Emissions										
4810	52.24	52.24	H	12.33	64.57	18.55	74	54	9.43	35.45
4810	59.37	59.37	V	12.33	71.70	25.68	74	54	2.30	28.32
4880	51.06	51.06	H	12.57	63.63	17.61	74	54	10.37	36.39
4880	53.52	53.52	V	12.57	66.09	20.07	74	54	7.91	33.93
7320	45.73	45.73	V	17.91	63.64	17.62	74	54	10.36	36.38
4950	48.48	48.48	H	12.81	61.29	15.27	74	54	12.71	38.73
4950	56.84	56.84	V	12.81	69.65	23.63	74	54	4.35	30.37
7425	53.80	53.80	V	17.90	71.70	25.68	74	54	2.30	28.32

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: 52.24 + 12.33 = 64.57 dBuV/m
Margin: 74dBuV/m – 64.57 dBuV/m = 9.43 dB

Example Calculation: Average

Corrected Level: 52.24 + 12.33 -46.02 = 18.55 dBuV
Margin: 54dBuV – 18.55 dBuV = 35.45 dB

7.7 Peak Power Spectral Density- FCC Section 15.247(d)

7.7.1 Test Methodology

The power spectral density was measured in accordance with the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 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 500 kHz and the sweep time was calculated to be 168s (Span/3 kHz).

7.7.2 Test Results

Results are shown below in table 7.7.2-1 and figures 7.7.2-1 – 7.7.2-3:

Table 7.7.2-1: Peak Power Spectral Density

Frequency [MHz]	Level [dBm]	Limit [dBm]	Result
2405	2.51	8	PASS
2440	3.85	8	PASS
2475	3.90	8	PASS

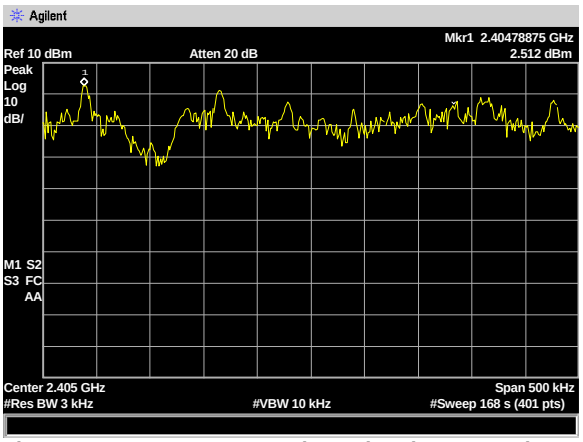

Figure 7.7.2-1: Power Spectral Density Plot – Low Channel

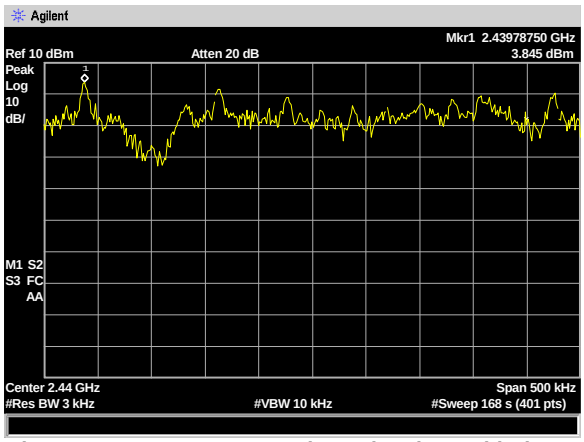

Figure 7.7.2-2: Power Spectral Density Plot – Mid Channel

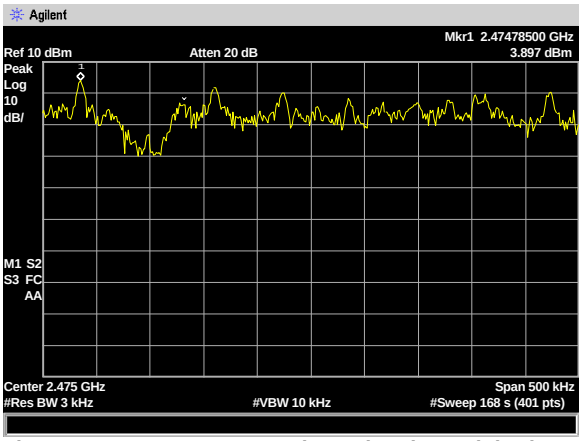

Figure 7.7.2-3: Power Spectral Density Plot – High Channel

8.0 CONCLUSION

In the opinion of ACS, Inc. the ZMN2400HP, manufactured by Cirronet, Inc. does meet the requirements of FCC Part 15 subpart C.