Excellence in Compliance Testing

Certification Test Report

FCC ID: R4N-AW2400MR
IC: 5303A-AW2400MR

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

ACS Report Number: 14-0082.W04.1A

Manufacturer: Avalan Wireless Systems Inc.
Model: AW2400MR

Test Begin Date: March 3, 2014
Test End Date: April 3, 2014

Report Issue Date: April 14, 2014

FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200612-0

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Reviewed by:
Kirby Munroe
Director, Wireless Certifications
ACS, Inc.

This report contains 18 pages

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1 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 for a Class II Permissive Change.

The purpose of the Class II Permissive Change is to include (3) additional antennas.

1.2 Product Description

The AW2400MTR Radio Module a point to multi-point Ethernet Bridge which allows the user to create a long-range, wireless Ethernet network with up to 16 subscriber units per access point.

Technical Information:

Band of Operation:	2416.667 - 2475.0 MHz
Number of Channels:	29
Modulation Format:	FSK
Antenna Type/Gain:	L-Com HG2415U-PRO Omni-Directional (Center fed Collinear Dipole Array) / 15dBi PCTel WISP24015PTNF Yagi / 15dBi ARCWireless Panel / 19dBi
Operating Voltage:	12 VDC

Manufacturer Information:
AvaLAN Wireless
125A Castle Drive
Madison, AL 35758

Test Sample Serial Number: 349

Test Sample Condition: The test samples were provided in good working order with no visible defects.

1.3 Test Methodology and Considerations

For radiated emissions, including band edge, preliminary measurements were collected for the EUT set in three orthogonal orientations. The measurements reported herein correspond to the orientation leading to the highest emissions relative to the limits.

1.4 Modifications of EUT

The AW2400MR radio module's shielding has been improved since the original certification. This shielding was necessary during the recent testing for the new antenna in this permissive change request. The board layout, bill of materials and schematic were not modified. Photographs of these modifications are included in an attestation letter provided by the manufacturer.

The mechanical shielding changes to the module include:
- Soldering at 3 extra locations between the main processor board and the radio board.
- Soldering the circumference of the shield cover.
- Addition of Radio Frequency absorber at two locations.

The absorber materials used:
- MAST Technologies MF22-0001-01
- MAST Technologies MR21-0005-01

2 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

ACS is accredited to ISO/IEC 17025 by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 200612-0. Unless otherwise specified, all tests methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

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.

FCC Registration Number: 511277
Industry Canada Lab Code: IC 4175A-1
VCCI Member Number: 1831

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

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:

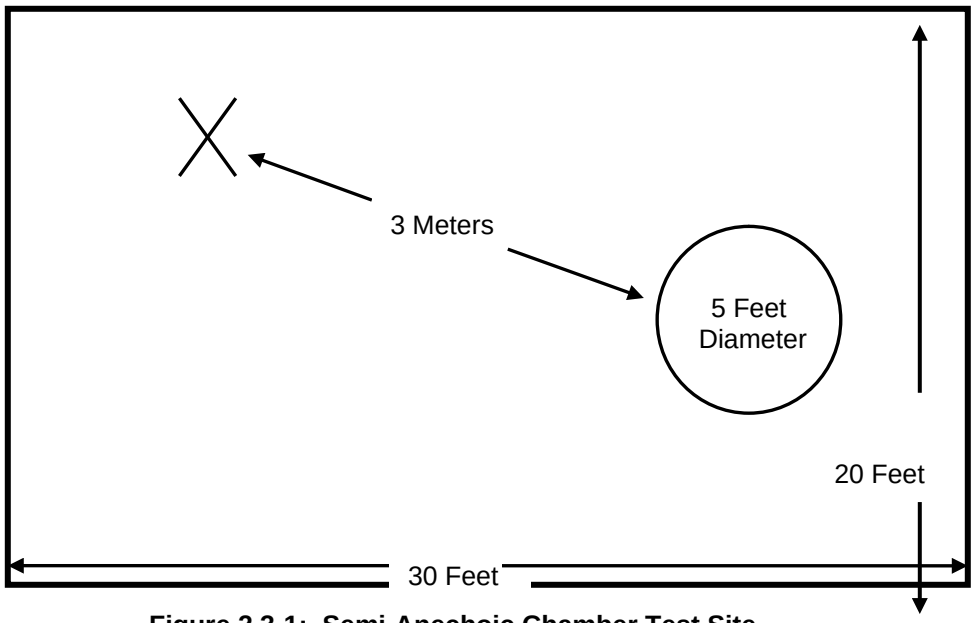

Figure 2.3-1: Semi-Anechoic Chamber Test Site

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:

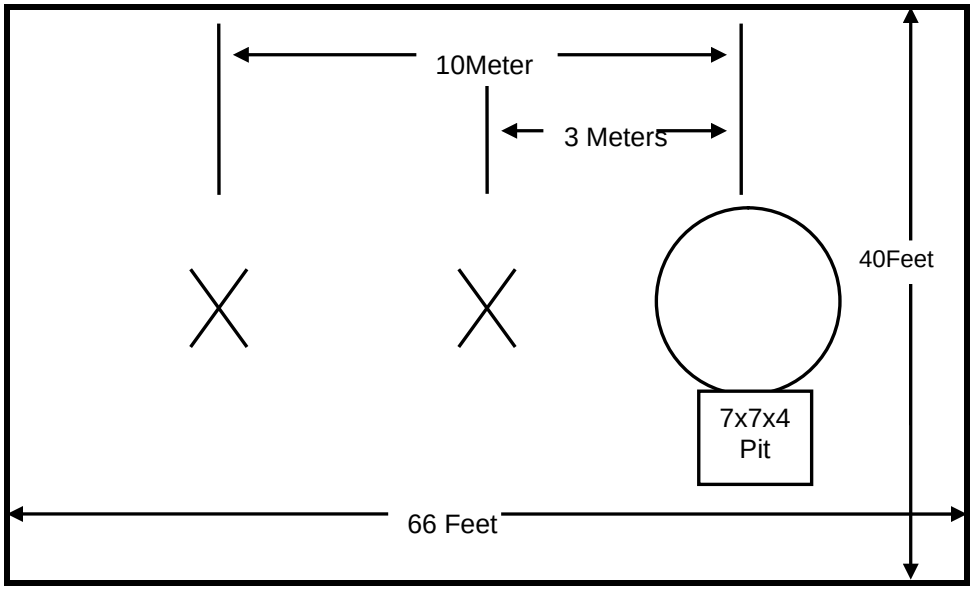

Figure 2.3-2: Open Area Test Site

2.4 Conducted Emissions Test Site Description

The AC mains conducted EMI site is located in the main EMC lab. It consists of an 8' x 8' solid aluminum horizontal ground 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 4.1.3-1:

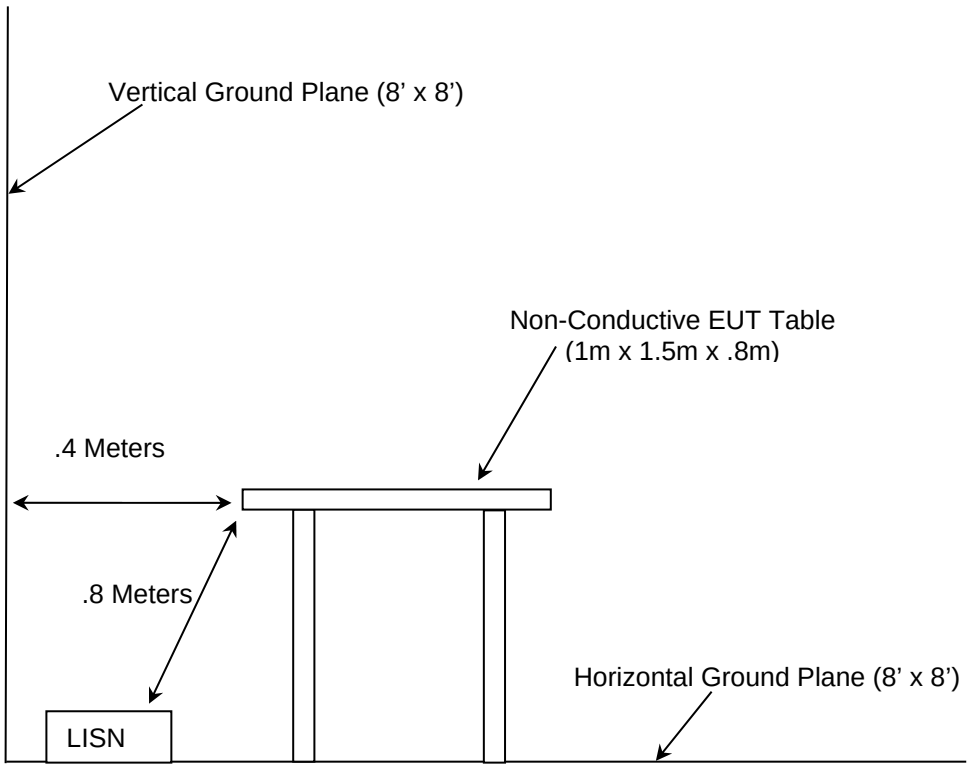

Figure 2.4-1: AC Mains Conducted EMI Site

3 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
- ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2014
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2014
- FCC KDB 558074 D01 DTS Meas Guidance v03r01 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247, April 9, 2013
- Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 8, Dec 2010
- Industry Canada Radio Standards Specification: RSS-GEN – General Requirements and Information for the Certification of Radiocommunication Equipment, Issue 3, Dec 2010.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
1	Rohde & Schwarz	ESMI - Display	Spectrum Analyzers	833771/007	8/2/2012	8/2/2014
2	Rohde & Schwarz	ESMI-Receiver	Spectrum Analyzers	839587/003	8/2/2012	8/2/2014
30	Spectrum Technologies	DRH-0118	Antennas	970102	4/23/2013	4/23/2015
40	EMCO	3104	Antennas	3211	2/14/2013	2/14/2015
73	Agilent	8447D	Amplifiers	2727A05624	7/16/2013	7/16/2014
153	EMCO	3825/2	LISN	9411-2268	7/31/2012	7/31/2014
167	ACS	Chamber EMI Cable Set	Cable Set	167	11/7/2013	11/7/2014
168	Hewlett Packard	11947A	Attenuators	44829	1/27/2014	1/27/2015
292	Florida RF Cables	SMR-290AW-480.0-SMR	Cables	None	3/26/2013	3/26/2014
292	Florida RF Cables	SMR-290AW-480.0-SMR	Cables	None	3/17/2014	3/17/2015
324	ACS	Belden	Cables	8214	6/17/2013	6/17/2014
334	Rohde&Schwarz	3160-09	Antennas	49404	11/4/2010	NCR
335	Suhner	SF-102A	Cables	882/2A	7/29/2013	7/29/2014
338	Hewlett Packard	8449B	Amplifiers	3008A01111	7/30/2013	7/30/2015
345	Suhner Sucoflex	102A	Cables	1077/2A	7/29/2013	7/29/2014
412	Electro Metrics	LPA-25	Antennas	1241	7/27/2012	7/27/2014
422	Florida RF	SMS-200AW-72.0-SMR	Cables	805	11/7/2013	11/7/2014
432	Microwave Circuits	H3G020G4	Filters	264066	6/19/2013	6/19/2014
616	Florida RF Cables	SMRE-200W-12.0-SMRE	Cables	N/A	9/26/2013	9/26/2014
RE361	Agilent	AT/E7405A	Analyzers	MY42000089	5/28/2013	5/28/2014

5 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	Antenna	L-Com	HG2415U-PRO	N/A
2	Antenna	ARC Wireless	ARC-IA2419B02	ARC-IA2419B02RK103606 120529
3	Antenna	PCtel	WISP24015PTNF	72590
4	Power Supply	Condor	HK-Q106-A12	N/A

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

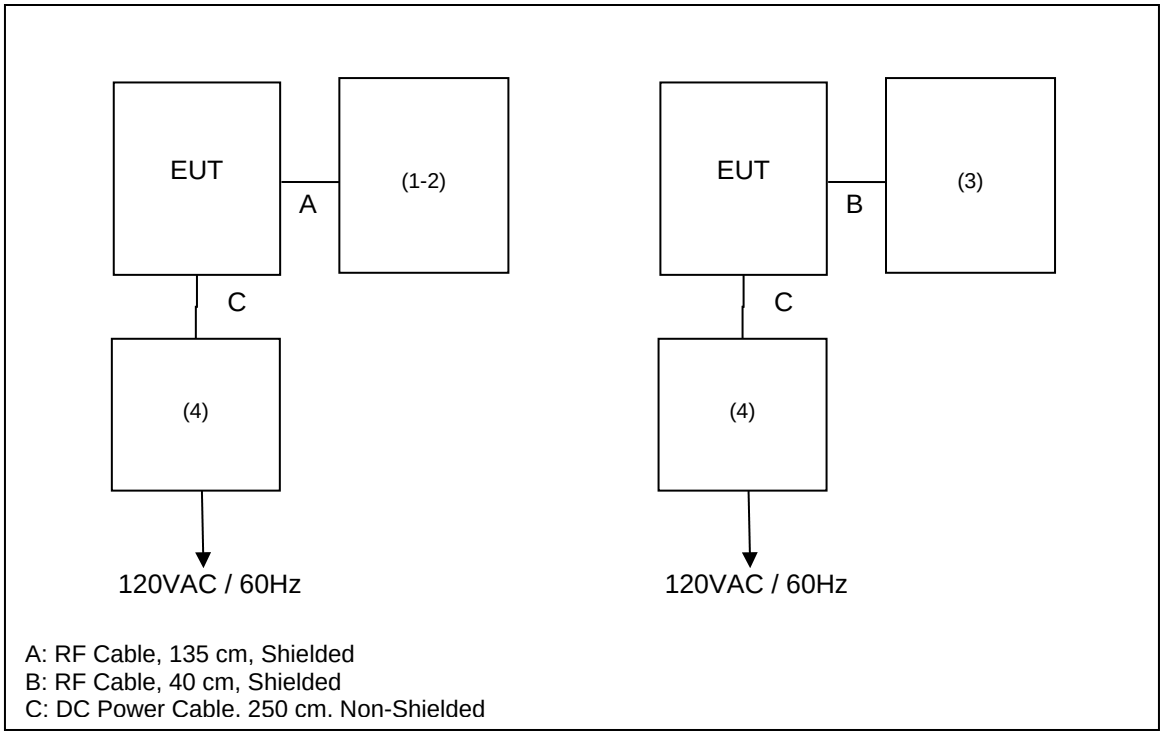

Figure 6-1: EUT Test Setup

7 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 AW2400MR utilizes a reverse SMA connector however the antennas are fitted with non-unique connectors (e.g. N-type, SMA). Professional installation is required.

7.2 Power Line Conducted Emissions – FCC: Section 15.207, IC: RSS-Gen 7.2.4

7.2.1 Measurement Procedure

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 Measurement Results

Results of the test are shown below in Tables 7.2.2-1 through 7.2.2-6.

Table 7.2.2-1: Conducted EMI Results – Line 1
Omni-Directional (Center fed Collinear Dipole Array) Antenna

Frequency (MHz)	Uncorrected Reading		Total Correction Factor (dB)	Corrected Level		Limit		Margin (dB)	
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
23.4706	27.047	21.733	10.939	37.986	32.672	60	50	22.014	17.328
18.2428	30.241	25.255	10.768	41.009	36.023	60	50	18.991	13.977
13.4183	28.962	23.902	10.613	39.575	34.515	60	50	20.425	15.485
0.706163	27.689	19.835	10.279	37.968	30.115	56	46	18.032	15.885
0.403487	31.282	24.325	10.189	41.471	34.514	58.758	48.758	17.287	14.243
0.331625	29.539	19.471	10.192	39.731	29.663	60.811	50.811	21.08	21.147

Table 7.2.2-2: Conducted EMI Results – Line 2
Omni-Directional (Center fed Collinear Dipole Array) Antenna

Frequency (MHz)	Uncorrected Reading		Total Correction Factor (dB)	Corrected Level		Limit		Margin (dB)	
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
23.9259	28.255	23.692	10.962	39.217	34.654	60	50	20.783	15.346
22.8224	25.723	19.64	10.906	36.629	30.546	60	50	23.371	19.454
14.3361	27.803	20.265	10.685	38.487	30.949	60	50	21.513	19.051
14.1525	29.353	21.825	10.659	40.012	32.484	60	50	19.988	17.516
11.9538	27.802	20.739	10.553	38.355	31.293	60	50	21.645	18.707
11.8912	30.768	22.417	10.551	41.318	32.968	60	50	18.682	17.032

Table 7.2.2-3: Conducted EMI Results – Line 1 Panel Antenna

Frequency (MHz)	Uncorrected Reading		Total Correction Factor (dB)	Corrected Level		Limit		Margin (dB)	
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
23.1271	31.401	25.982	10.922	42.322	36.903	60	50	17.678	13.097
18.2424	30.87	25.663	10.768	41.638	36.432	60	50	18.362	13.568
0.702055	30.183	24.827	10.283	40.466	35.11	56	46	15.534	10.89
0.405425	32.808	29.206	10.189	42.997	39.395	58.702	48.702	15.705	9.307
0.351237	31.024	27.627	10.191	41.215	37.818	60.25	50.25	19.036	12.433
0.318775	28.547	19.191	10.193	38.74	29.384	61.178	51.178	22.438	21.794

Table 7.2.2-4: Conducted EMI Results – Line 2 Panel Antenna

Frequency (MHz)	Uncorrected Reading		Total Correction Factor (dB)	Corrected Level		Limit		Margin (dB)	
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
24.4095	28.046	23.159	10.987	39.032	34.145	60	50	20.968	15.855
23.1284	31.93	26.016	10.922	42.851	36.938	60	50	17.149	13.062
16.2268	30.429	23.594	10.775	41.203	34.369	60	50	18.797	15.631
14.2144	29.023	21.588	10.668	39.69	32.256	60	50	20.31	17.744
12.7464	28.8	21.494	10.586	39.386	32.08	60	50	20.614	17.92
0.157244	27.116	24.61	10.328	37.444	34.938	65.793	55.793	28.349	20.855

Table 7.2.2-5: Conducted EMI Results – Line 1 Yagi Antenna

Frequency (MHz)	Uncorrected Reading		Total Correction Factor (dB)	Corrected Level		Limit		Margin (dB)	
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
17.6944	30.375	25.371	10.77	41.145	36.141	60	50	18.855	13.859
16.2279	30.946	25.85	10.775	41.72	36.624	60	50	18.28	13.376
0.760455	29.203	22.998	10.225	39.428	33.224	56	46	16.572	12.776
0.455963	29.333	24.476	10.189	39.522	34.666	57.258	47.258	17.736	12.593
0.407675	32.048	27.517	10.189	42.237	37.706	58.638	48.638	16.401	10.932
0.308113	30.442	26.65	10.194	40.636	36.844	61.482	51.482	20.847	14.639

Table 7.2.2-6: Conducted EMI Results – Line 2 Yagi Antenna

Frequency (MHz)	Uncorrected Reading		Total Correction Factor (dB)	Corrected Level		Limit		Margin (dB)	
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
23.1281	29.822	26.389	10.922	40.743	37.311	60	50	19.257	12.689
21.6622	27.749	23.676	10.847	38.596	34.523	60	50	21.404	15.477
20.3193	26.151	21.19	10.779	36.93	31.969	60	50	23.07	18.031
18.3649	28.867	22.925	10.768	39.634	33.693	60	50	20.366	16.307
14.213	27.509	20.568	10.667	38.176	31.236	60	50	21.824	18.764
12.1972	26.758	19.949	10.563	37.321	30.513	60	50	22.679	19.487

7.3 Emission Levels – FCC: Section 15.247(d), 15.205 IC: RSS-210 2.2, A8.5

7.3.1 Emissions into Restricted Frequency Bands

7.3.1.1 Measurement Procedure

The unwanted emissions into restricted bands were measured radiated 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 and average measurements were made with RBW and VBW of 1 MHz and 3 MHz respectively. The average emissions were further corrected by applying the duty cycle correction of the EUT for comparison to the average limit.

Each emission found to be in a restricted band as defined by section 15.205, including any emission at the operational band-edge, was compared to the radiated emission limits as defined in section 15.209.

7.3.1.2 Duty Cycle Correction

For average radiated measurements, using a 74.98% duty cycle, the measured level was reduced by a factor 2.5dB. The duty cycle correction factor is determined using the formula: 20log (74.98/100) = -2.5dB.

A detailed analysis of the duty cycle timing is provided in the test report accompanying the original application for certification.

7.3.1.3 Measurement Results

Radiated spurious emissions found in the band of 30MHz to 25GHz are reported in the table 7.3.1.3-1 to 7.3.1.3-3 below.

Table 7.3.1.3-1: Radiated Spurious Emissions Tabulated Data
Omni-Directional (Center fed Collinear Dipole Array) Antenna

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
Low Channel										
4833.34	55.73	46.31	H	1.52	57.25	45.33	74.0	54.0	16.7	8.7
4833.34	58.24	49.46	V	1.52	59.76	48.48	74.0	54.0	14.2	5.5
7250.01	57.43	48.14	H	7.95	65.38	53.58	74.0	54.0	8.6	0.4
7250.01	57.28	48.03	V	7.95	65.23	53.47	74.0	54.0	8.8	0.5
2483.5	56.01	43.18	V	-5.89	50.12	34.79	74.0	54.0	23.9	19.2
2390	59.13	46.21	V	-6.40	52.73	37.31	74.0	54.0	21.3	16.7
2292.5	60.48	47.42	V	-6.93	53.55	37.98	74.0	54.0	20.5	16.0
2668	53.95	42.19	V	-4.90	49.05	34.78	74.0	54.0	25.0	19.2
Mid Channel										
4880	54.84	45.29	H	1.60	56.44	44.39	74.0	54.0	17.6	9.6
4880	57.83	48.77	V	1.60	59.43	47.87	74.0	54.0	14.6	6.1
7320	55.98	46.38	H	8.00	63.98	51.88	74.0	54.0	10.0	2.1
7320	55.83	46.31	V	8.00	63.83	51.81	74.0	54.0	10.2	2.2
2483.5	58.12	45.57	V	-5.89	52.23	37.18	74.0	54.0	21.8	16.8
2390	57.12	45.09	V	-6.40	50.72	36.19	74.0	54.0	23.3	17.8
2300	62.52	49.18	V	-6.89	55.63	39.79	74.0	54.0	18.4	14.2
High Channel										
4950	50.01	39.15	H	1.72	51.73	38.37	74.0	54.0	22.3	15.6
4950	55.68	46.28	V	1.72	57.40	45.50	74.0	54.0	16.6	8.5
7425	57.68	48.26	H	8.08	65.76	53.84	74.0	54.0	8.2	0.2
7425	56.03	46.51	V	8.08	64.11	52.09	74.0	54.0	9.9	1.9
2483.5	64.03	50.72	V	-5.89	58.14	42.33	74.0	54.0	15.9	11.7
2682.6	54.48	43.62	V	-4.83	49.65	36.29	74.0	54.0	24.3	17.7
2375.43	63.78	50.27	V	-6.48	57.30	41.29	74.0	54.0	16.7	12.7

Table 7.3.1.3-2: Radiated Spurious Emissions Tabulated Data
Yagi Antenna

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
Low Channel										
4833.34	60.74	51.13	H	1.53	62.27	50.15	74.0	54.0	11.7	3.8
4833.34	51.81	41.55	V	1.53	53.34	40.57	74.0	54.0	20.7	13.4
7250.01	55.73	45.82	H	7.98	63.71	51.30	74.0	54.0	10.3	2.7
7250.01	54.15	44.20	V	7.98	62.13	49.68	74.0	54.0	11.9	4.3
12083.35	47.87	35.72	H	15.00	62.87	48.22	83.5	63.5	20.6	15.3
2390	54.46	41.23	V	-6.39	48.07	32.34	74.0	54.0	25.9	21.7
1611.18	51.32	41.68	V	-10.55	40.77	28.63	74.0	54.0	33.2	25.4
2668.6	56.16	44.17	V	-4.89	51.27	36.78	74.0	54.0	22.7	17.2
Mid Channel										
4880	59.38	50.50	H	1.60	60.98	49.60	74.0	54.0	13.0	4.4
4880	50.72	40.06	V	1.60	52.32	39.16	74.0	54.0	21.7	14.8
7320	56.92	47.65	H	8.04	64.96	53.19	74.0	54.0	9.0	0.8
7320	54.58	44.68	V	8.04	62.62	50.22	74.0	54.0	11.4	3.8
2483.5	58.62	45.11	V	-5.88	52.74	36.73	74.0	54.0	21.3	17.3
2390	60.36	46.79	V	-6.39	53.97	37.90	74.0	54.0	20.0	16.1
2677.26	55.12	43.95	V	-4.84	50.28	36.61	74.0	54.0	23.7	17.4
2311.87	52.88	40.19	H	-6.81	46.07	30.88	74.0	54.0	27.9	23.1
2311.87	56.23	43.16	V	-6.81	49.42	33.85	74.0	54.0	24.6	20.2
High Channel										
4950	59.05	49.96	H	1.72	60.77	49.18	74.0	54.0	13.2	4.8
4950	54.23	44.38	V	1.72	55.95	43.60	74.0	54.0	18.0	10.4
7425	56.85	47.42	H	8.12	64.97	53.04	74.0	54.0	9.0	1.0
7425	57.71	48.36	V	8.12	65.83	53.98	74.0	54.0	8.2	0.0
2483.5	53.07	40.06	H	-5.88	47.19	31.68	74.0	54.0	26.8	22.3
2483.5	67.31	53.01	V	-5.88	61.43	44.63	74.0	54.0	12.6	9.4
2681.32	51.14	39.22	V	-4.82	46.32	31.90	74.0	54.0	27.7	22.1
2375.31	50.29	37.95	H	-6.47	43.82	28.98	74.0	54.0	30.2	25.0
2375.31	63.1	50.57	V	-6.47	56.63	41.60	74.0	54.0	17.4	12.4

Table 7.3.1.3-3: Radiated Spurious Emissions Tabulated Data
Panel Antenna

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
Low Channel										
4833.34	54.51	45.11	H	1.52	56.03	44.13	74.0	54.0	18.0	9.9
4833.34	55.32	46.03	V	1.52	56.84	45.05	74.0	54.0	17.2	8.9
7250.01	56.92	47.40	H	7.95	64.87	52.84	74.0	54.0	9.1	1.2
7250.01	57.12	47.53	V	7.95	65.07	52.97	74.0	54.0	8.9	1.0
2390	53.42	40.42	H	-6.40	47.02	31.52	74.0	54.0	27.0	22.5
2390	63.43	49.76	V	-6.40	57.03	40.86	74.0	54.0	17.0	13.1
2295.4	58.14	44.71	H	-6.92	51.22	35.29	74.0	54.0	22.8	18.7
2295.4	64.18	50.67	V	-6.92	57.26	41.25	74.0	54.0	16.7	12.7
Mid Channel										
4880	55.91	46.15	H	1.60	57.51	45.25	74.0	54.0	16.5	8.7
4880	56.11	46.54	V	1.60	57.71	45.64	74.0	54.0	16.3	8.4
7320	56.72	47.27	H	8.00	64.72	52.77	74.0	54.0	9.3	1.2
7320	57.63	48.26	V	8.00	65.63	53.76	74.0	54.0	8.4	0.2
12200	49.41	37.17	H	15.59	65.00	50.25	83.5	63.5	18.5	13.3
12200	48.34	36.15	V	15.59	63.93	49.23	83.5	63.5	19.6	14.3
2483.5	66.78	53.37	V	-5.89	60.89	44.98	74.0	54.0	13.1	9.0
2390	66.95	54.21	V	-6.40	60.55	45.31	74.0	54.0	13.5	8.7
7320	55.53	46.07	H	8.00	63.53	51.57	74.0	54.0	10.5	2.4
7320	56.54	47.6	V	8.00	64.54	53.10	74.0	54.0	9.5	0.9
High Channel										
4950	54.10	44.02	H	1.72	55.82	43.24	74.0	54.0	18.2	10.8
4950	55.35	46.13	V	1.72	57.07	45.35	74.0	54.0	16.9	8.6
7425	57.68	48.31	H	8.08	65.76	53.89	74.0	54.0	8.2	0.1
7425	55.60	45.82	V	8.08	63.68	51.40	74.0	54.0	10.3	2.6
2483.5	54.34	41.33	H	-5.89	48.45	32.94	74.0	54.0	25.6	21.1
2483.5	70.44	56.13	V	-5.89	64.55	47.74	74.0	54.0	9.5	6.3
2682.6	52.61	42.02	H	-4.83	47.78	34.69	74.0	54.0	26.2	19.3
2682.6	62.13	52.17	V	-4.83	57.30	44.84	74.0	54.0	16.7	9.2
2355.4	65.17	52.04	V	-6.59	58.58	42.95	74.0	54.0	15.4	11.1
7425	57.68	48.36	H	8.08	65.76	53.94	74.0	54.0	8.2	0.1
7425	56.41	46.81	V	8.08	64.49	52.39	74.0	54.0	9.5	1.6
4950	54.24	44.07	H	1.72	55.96	43.29	74.0	54.0	18.0	10.7
4950	56.23	46.74	V	1.72	57.95	45.96	74.0	54.0	16.0	8.0
2483.5	55.26	41.89	H	-5.89	49.37	33.50	74.0	54.0	24.6	20.5
2483.5	70.78	55.85	V	-5.89	64.89	47.46	74.0	54.0	9.1	6.5

7.3.1.4 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 - Omni-Directional Antenna

Corrected Level: 55.73 + 1.52 = 57.25dBuV/m
Margin: 74dBuV/m – 57.25dBuV/m = 16.7dB

Example Calculation: Average - Omni-Directional Antenna

Corrected Level: 46.31 + 1.52 - 2.5 = 45.33dBuV
Margin: 54dBuV – 45.33dBuV = 8.7dB

8 CONCLUSION

In the opinion of ACS, Inc. the AW2400MR, manufactured by Avalan Wireless meets the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-210 as applicable to the Class II Permissive Change.

END REPORT