Excellence in Compliance Testing

Certification Test Report

FCC ID: SM6-LMXR
IC: 9235A-LMXR

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

ACS Report Number: 15-0005.W06.2A

Manufacturer: Mueller Systems, LLC
Model: Repeater Plus Module

Test Begin Date: January 20, 2015
Test End Date: March 4, 2015

Report Issue Date: March 17, 2015

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 21 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 Certification for modular approval.

1.2 Product Description

The Mueller Systems Repeater Plus Module is an ISM band 902 to 928 MHz transceiver module with a maximum output power of +30dBm used in a data collection system connected to a device such as a standard water meter register.

Technical Information:
The 2 modes of operation are detailed as follows. Only mode 2 is addressed in this report.

Mode of Operation	Frequency Range (MHz)	Number of Channels	Channel Separation (kHz)	Data Rates Supported (kbps)	Modulation
1	912.310059 - 927.012451	50	300	4557.3bps and 2604.2bps	FHSS, DSSS
2	903.649963 - 915.725525	24	525	10416.7bps	DTS, DSSS

Antenna Type / Gain: Dipole / 6dBi (Antenna 1)
Printed Inverted F Antenna / 4.8dBi (Antenna 2)
Operating Voltage: 3.6Vdc

Manufacturer Information:
Mueller Systems, LLC
1200 Abernathy Road, NE
Suite 1200
Atlanta, GA 30328

EUT Serial Numbers: 45000321

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

1.3 Test Methodology and Considerations

All modes of operation, including all available data rates, were evaluated. The data presented in this report represents the worst case where applicable.

For radiated emissions three orientations of the EUT were evaluated to determine worst case. The worst case orientation was determined to be the Z orientation.

AC power line conducted emissions was tested in a typical compliant host.

Multiple antenna types are available for use with the EUT. The highest gain of each antenna type was evaluated for compliance.

Software power setting during test: TXP9=11, TXPS2=156
Software version number during test: LFM Release 4.0.8+FCCL

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
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:

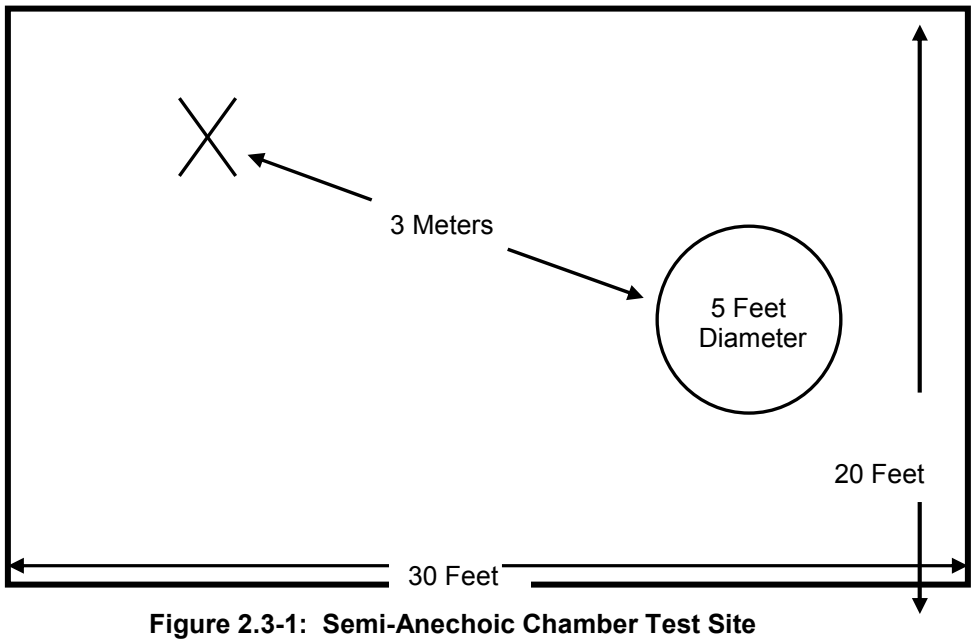

Figure 2.3-1: Semi-Anechoic Chamber Test Site

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:

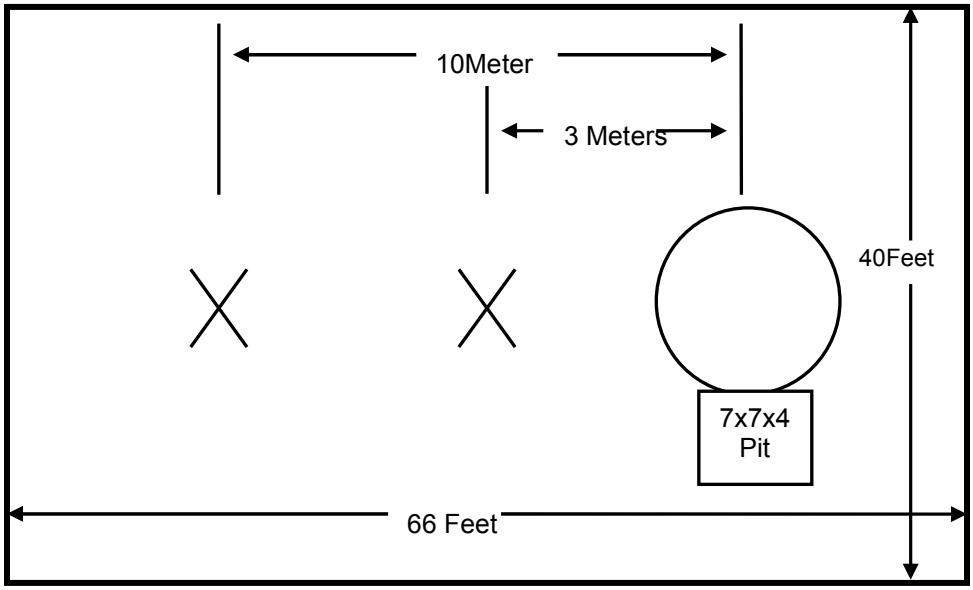

Figure 2.3-2: Open Area Test Site

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:

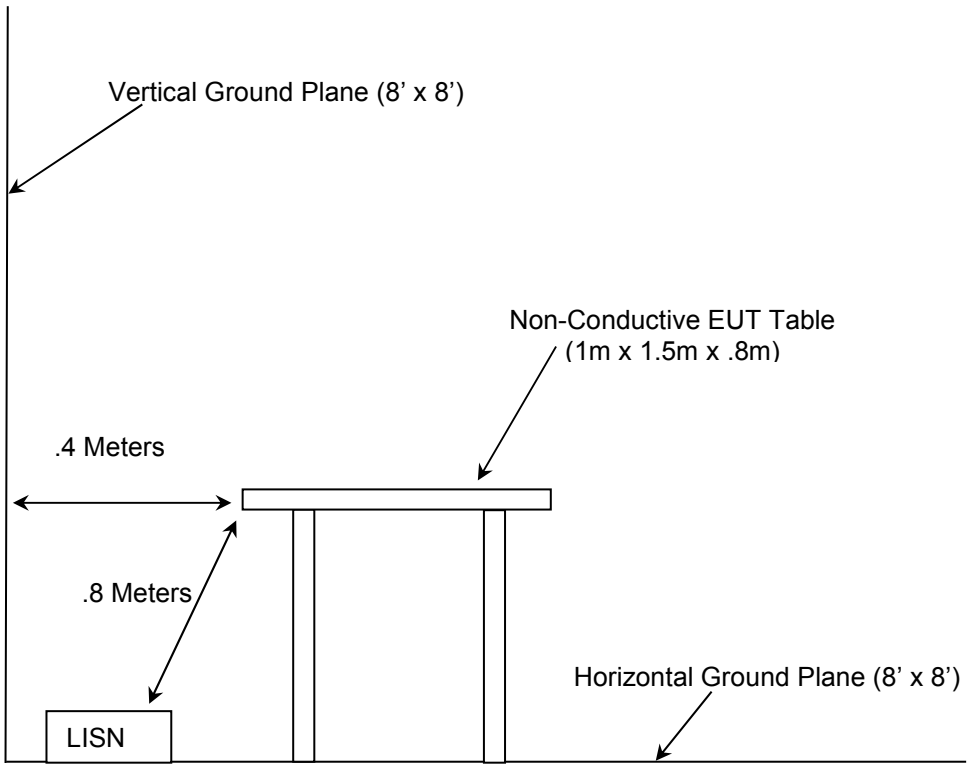

Figure 2.4-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2015
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2015
- FCC KDB 558074 D01 DTS Meas Guidance v03r02 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247, June 5, 2014
- 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 for Compliance of Radio Apparatus, Issue 4, Nov 2014.

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	7/11/2014	7/11/2015
2	Rohde & Schwarz	ESMI-Receiver	Spectrum Analyzers	839587/003	7/11/2014	7/11/2015
30	Spectrum Technologies	DRH-0118	Antennas	970102	4/23/2013	4/23/2015
40	EMCO	3104	Antennas	3211	2/14/2013	2/14/2015
40	EMCO	3104	Antennas	3211	2/10/2015	2/10/2017
73	Agilent	8447D	Amplifiers	2727A05624	7/15/2014	7/15/2015
167	ACS	Chamber EMI Cable Set	Cable Set	167	10/28/2014	10/28/2015
168	Hewlett Packard	11947A	Attenuators	44829	1/19/2015	1/19/2016
267	Agilent	N1911A	Meters	MY45100129	7/30/2013	7/30/2015
268	Agilent	N1921A	Sensors	MY45240184	7/30/2013	7/30/2015
292	Florida RF Cables	SMR-290AW-480.0-SMR	Cables	None	3/17/2014	3/17/2015
316	Rohde Schwarz	ESH3-Z5	LISN	861189-010	10/30/2014	10/30/2015
324	ACS	Belden	Cables	8214	6/4/2014	6/4/2015
331	Microwave Circuits	H1G513G1	Filters	31417	6/2/2014	6/2/2015
338	Hewlett Packard	8449B	Amplifiers	3008A01111	7/30/2013	7/30/2015
340	Aeroflex/Weinschel	AS-20	Attenuators	7136	7/14/2014	7/14/2015
412	Electro Metrics	LPA-25	Antennas	1241	7/24/2014	7/24/2016
422	Florida RF	SMS-200AW-72.0-SMR	Cables	805	11/5/2014	11/5/2015
616	Florida RF Cables	SMRE-200W-12.0-SMRE	Cables	N/A	9/10/2014	9/10/2015
622	Rohde & Schwarz	FSV40	Analyzers	101338	7/12/2014	7/12/2015
RE361	Agilent	AT/E7405A	Analyzers	MY42000089	5/30/2014	5/30/2015

5 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item	Equipment Type	Manufacturer	Model/Part Number	Serial Number
1	DC Power Supply	Agilent	6286A	2109A-06095
2	Mobile Field Radio	Mueller Systems	MS-G-mHUB	12006211
3	AC-DC Power Supply	ICCNexergy	FWC5012F	007050

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

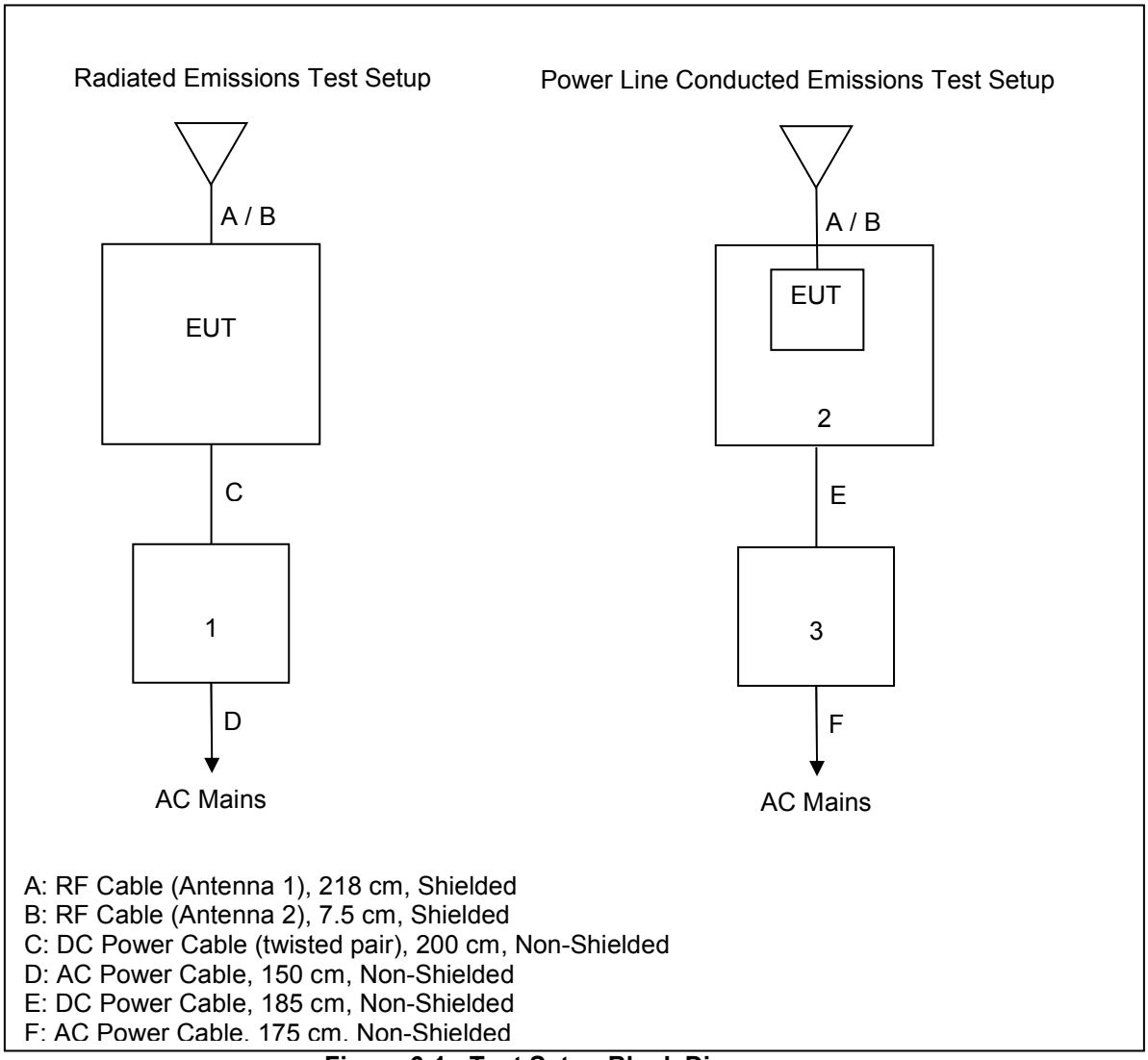

Figure 6-1: Test Setup Block Diagram

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 15.203

The antennas used are a Dipole with 6dBi gain and a Printed Inverted F Antenna with 4.8dBi gain. Theses antennas are detachable utilizing MMCX coupling to the EUT, therefore satisfying the requirements of Section 15.203.

7.2 Power Line Conducted Emissions – FCC 15.207, IC: RSS-Gen 8.8

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 7.2.2-4.

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

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
24.0179	20.844	17.784	12.017	32.861	29.801	60	50	27.139	20.199
21.9978	21.854	19.861	11.968	33.821	31.829	60	50	26.179	18.171
17.3186	21.313	20.389	11.656	32.968	32.045	60	50	27.032	17.955
15.4854	22.494	21.005	11.512	34.005	32.516	60	50	25.995	17.484
0.5079	16.801	16.009	10.241	27.041	26.25	56	46	28.959	19.75
0.190294	33.808	26.874	10.22	44.028	37.094	64.849	54.849	20.821	17.755

Table 7.2.2-2: Conducted EMI Results Line 2 – Antenna 1

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
18.022	22.056	19.965	11.41	33.466	31.375	60	50	26.534	18.625
16.2502	23.842	21.702	11.295	35.137	32.997	60	50	24.863	17.003
15.3635	23.639	21.923	11.249	34.887	33.172	60	50	25.113	16.828
15.3007	23.509	22.242	11.247	34.756	33.489	60	50	25.244	16.511
13.6553	22.58	20.871	11.34	33.92	32.212	60	50	26.08	17.788
0.632313	24.558	24.845	10.24	34.798	35.085	56	46	21.202	10.915

Table 7.2.2-3: Conducted EMI Results Line 1 – Antenna 2

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
25.0569	19.795	16.322	12.1	31.895	28.422	60	50	28.105	21.578
22.6124	14.763	9.301	11.952	26.715	21.253	60	50	33.285	28.747
21.7253	19.807	15.06	11.92	31.727	26.98	60	50	28.273	23.02
15.2379	21.324	18.748	11.506	32.829	30.254	60	50	27.171	19.746
0.566899	26.004	25.088	10.247	36.25	35.335	56	46	19.75	10.665
0.251175	27.305	6.99	10.22	37.525	17.21	63.109	53.109	25.585	35.9

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

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
17.5558	6.666	2.757	11.401	18.067	14.159	60	50	41.933	35.841
15.8128	23.233	21.21	11.26	34.492	32.47	60	50	25.508	17.53
15.688	23.447	21.94	11.257	34.703	33.197	60	50	25.297	16.803
14.6785	23.416	21.778	11.281	34.696	33.058	60	50	25.304	16.942
14.1749	23.037	21.114	11.344	34.381	32.458	60	50	25.619	17.542
0.190494	31.48	25.11	10.22	41.7	35.33	64.843	54.843	23.143	19.513

7.3 6dB / 99% Bandwidth – FCC 15.247(a)(2), IC: RSS-210 A8.2(a)

7.3.1 Measurement Procedure

The 6dB bandwidth was measured in accordance with the FCC KDB 558074 D01 DTS Meas Guidance v03r02. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 100 kHz. The Video Bandwidth (VBW) was set to ≥ 3 times the RBW. The trace was set to max hold with a peak detector active. The marker-delta function of the spectrum analyzer was utilized to determine the 6 dB bandwidth of the emission.

The occupied bandwidth measurement function of the spectrum analyzer was used to measure the 99% bandwidth. The span of the analyzer was set to capture all products of the modulation process, including the emission sidebands. The resolution bandwidth was set to 1% to 5% of the occupied bandwidth. The video bandwidth was set to 3 times the resolution bandwidth. A peak detector was used.

7.3.2 Measurement Results

Table 7.3.2-1: 6dB / 99% Bandwidth

Frequency [MHz]	6dB Bandwidth [kHz]	99% Bandwidth [kHz]
903.649963	796.57	667.11
909.950256	822.04	665.24
915.725525	830.24	662.04

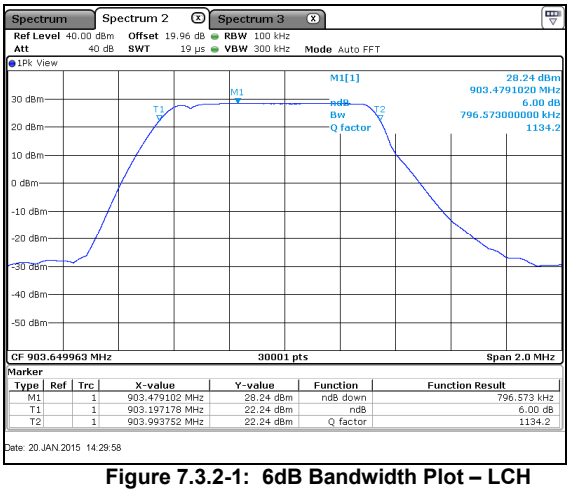

Figure 7.3.2-1: 6dB Bandwidth Plot – LCH

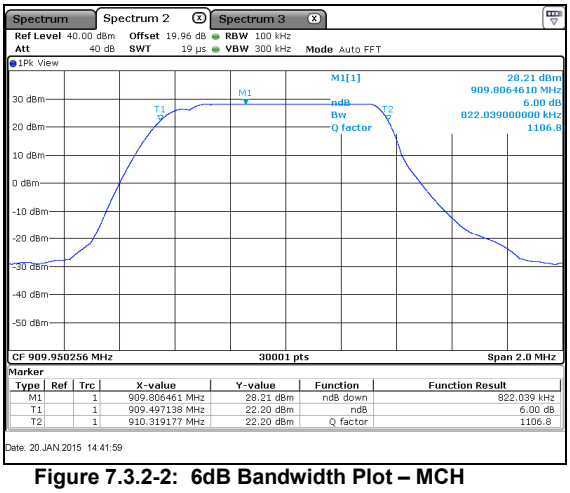

Figure 7.3.2-2: 6dB Bandwidth Plot – MCH

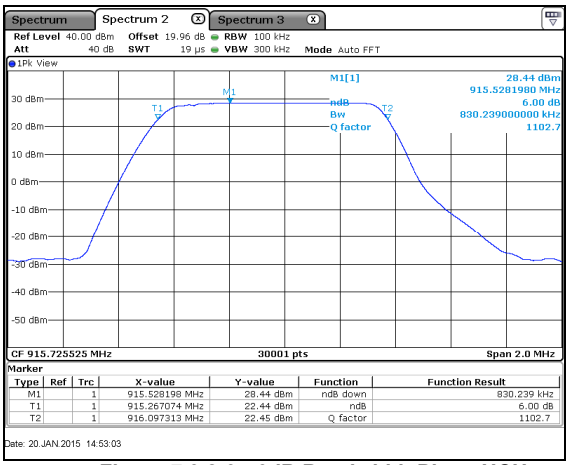

Figure 7.3.2-3: 6dB Bandwidth Plot – HCH

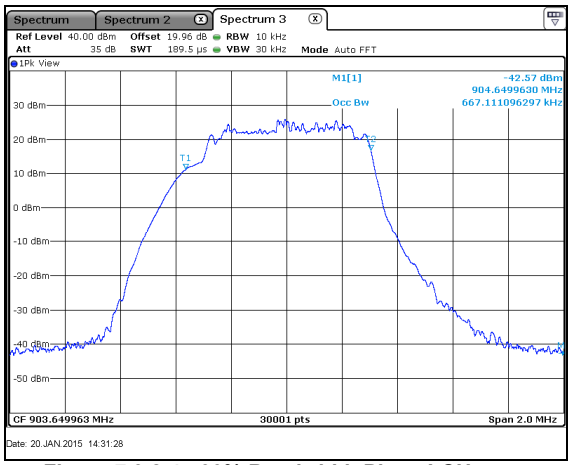

Figure 7.3.2-4: 99% Bandwidth Plot – LCH

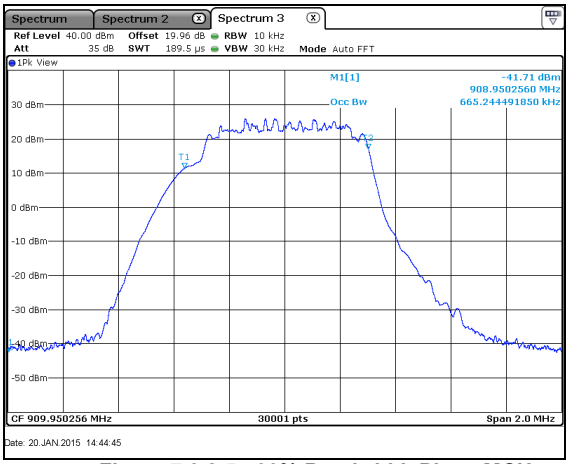

Figure 7.3.2-5: 99% Bandwidth Plot – MCH

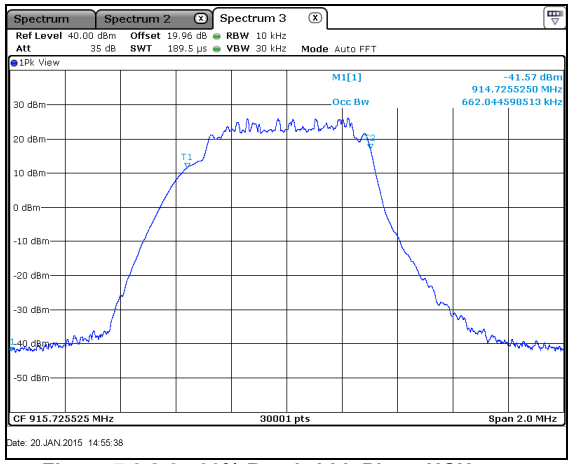

Figure 7.3.2-6: 99% Bandwidth Plot – HCH

7.4 Fundamental Emission Output Power – FCC 15.247(b)(3), IC: RSS-210 A8.4(4)

7.4.1 Measurement Procedure

The maximum peak conducted output power was measured in accordance with FCC KDB 558074 D01 DTS Meas Guidance v03r02 utilizing the AVGPM average power meter method. The RF output of the equipment under test was directly connected to the input of the power meter applying suitable attenuation.

7.4.2 Measurement Results

Table 7.4.2-1: Maximum Average Conducted Output Power

Frequency [MHz]	Level [dBm]
903.649963	29.51
909.950256	29.62
915.725525	29.74

7.5 Emission Levels – FCC 15.247(d), 15.205, 15.209; IC RSS-210 2.2/A8.5, RSS-Gen 8.9

7.5.1 Emissions into Non-restricted Frequency Bands

7.5.1.1 Measurement Procedure

The unwanted emissions into non-restricted bands were measured conducted in accordance with FCC KDB 558074 D01 DTS Meas Guidance v03r02. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer applying suitable attenuation. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 100 kHz. The Video Bandwidth (VBW) was set to ≥ 300 kHz. Span was set to 1.5 times the DTS bandwidth. The trace was set to max hold with a peak detector active. The resulting spectrum analyzer peak level was used to determine the reference level with respect to the 30 dBc limit. The spectrum span was then adjusted for the measurement of spurious emissions from 30MHz to 10GHz, 10 times the highest fundamental frequency.

Band-edge compliance was determined using the conducted marker-delta method in which the radio frequency power that is produced by the EUT is at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power.

7.5.1.2 Measurement Results

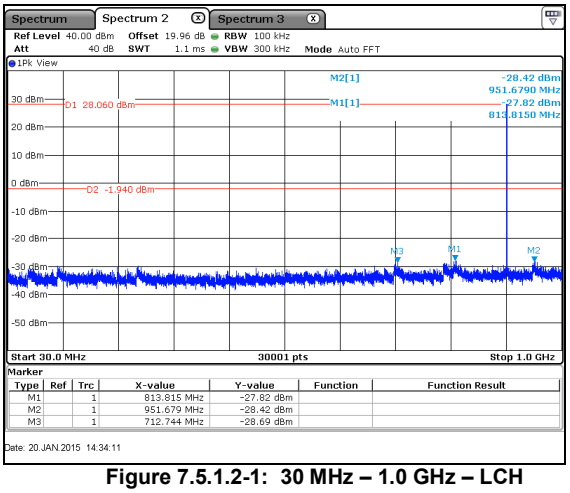

Figure 7.5.1.2-1: 30 MHz – 1.0 GHz – LCH

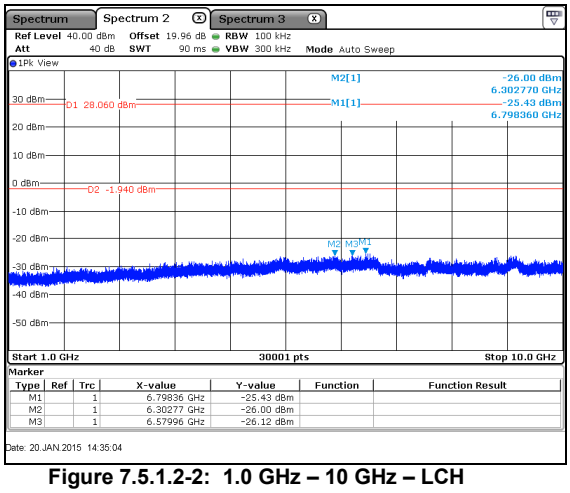

Figure 7.5.1.2-2: 1.0 GHz – 10 GHz – LCH

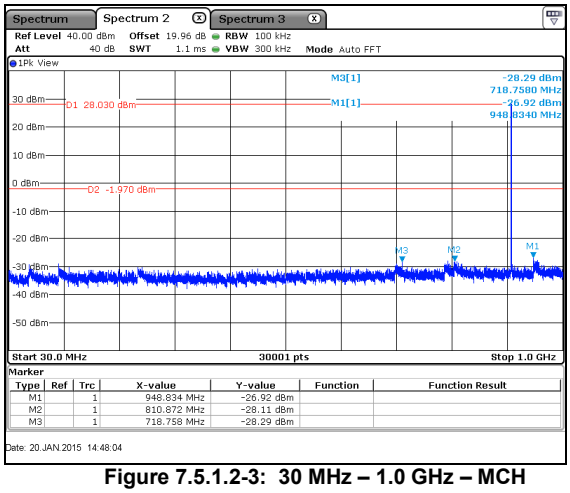

Figure 7.5.1.2-3: 30 MHz – 1.0 GHz – MCH

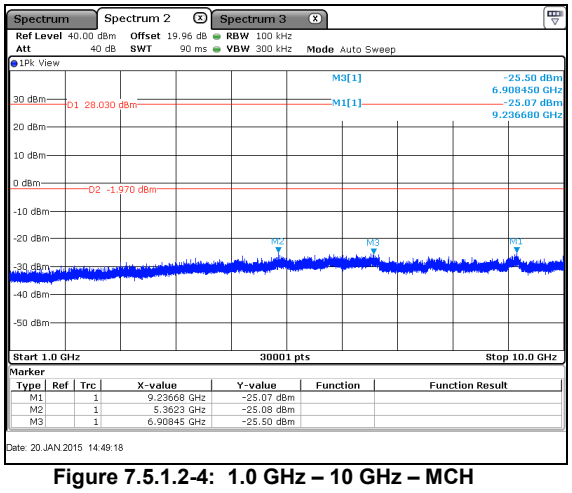

Figure 7.5.1.2-4: 1.0 GHz – 10 GHz – MCH

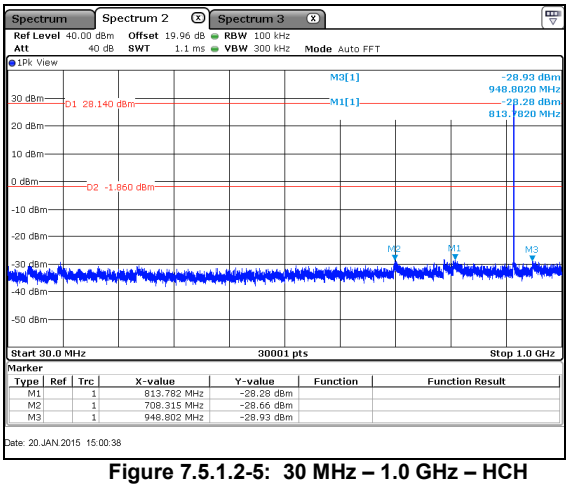

Figure 7.5.1.2-5: 30 MHz – 1.0 GHz – HCH

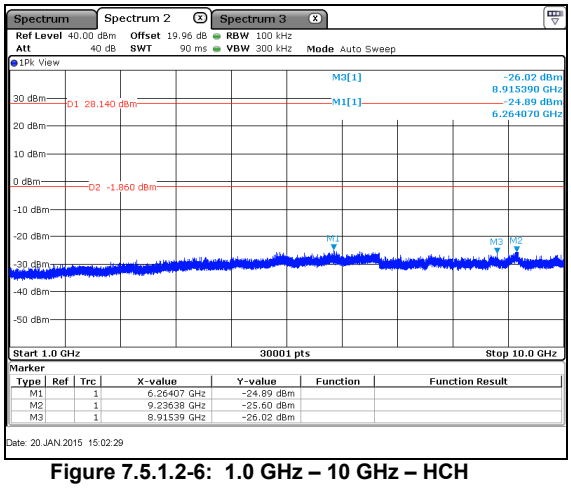

Figure 7.5.1.2-6: 1.0 GHz – 10 GHz – HCH

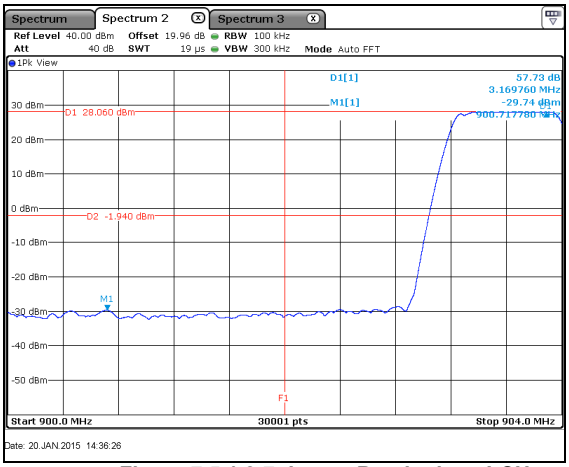

Figure 7.5.1.2-7: Lower Band-edge - LCH

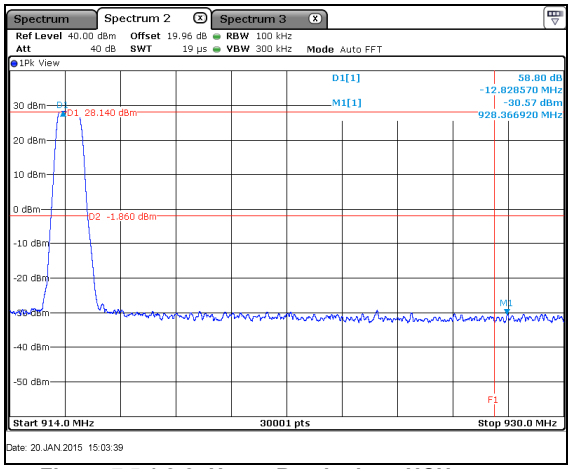

Figure 7.5.1.2-8: Upper Band-edge - HCH

7.5.2 Emissions into Restricted Frequency Bands

7.5.2.1 Measurement Procedure

The unwanted emissions into restricted bands were measured radiated over the frequency range of 30MHz to 10GHz, 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 RBW of 120 kHz and a 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.

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.

7.5.2.2 Measurement Results

Table 7.5.2.2-1: Radiated Spurious Emissions Tabulated Data – Antenna 1

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										
2710.949889	51.77	43.95	H	-4.66	47.11	39.29	74.0	54.0	26.9	14.7
2710.949889	55.91	49.94	V	-4.66	51.25	45.28	74.0	54.0	22.7	8.7
3614.599852	50.47	40.31	H	-1.37	49.10	38.94	74.0	54.0	24.9	15.1
3614.599852	51.36	41.51	V	-1.37	49.99	40.14	74.0	54.0	24.0	13.9
4518.249815	48.06	35.74	H	0.68	48.74	36.42	74.0	54.0	25.3	17.6
5421.899778	46.52	34.27	V	3.43	49.95	37.70	74.0	54.0	24.1	16.3
Middle Channel										
2729.850768	50.29	42.29	H	-4.58	45.71	37.71	74.0	54.0	28.3	16.3
2729.850768	51.29	43.36	V	-4.58	46.71	38.78	74.0	54.0	27.3	15.2
3639.801024	50.22	40.34	H	-1.28	48.94	39.06	74.0	54.0	25.1	14.9
3639.801024	51.67	42.35	V	-1.28	50.39	41.07	74.0	54.0	23.6	12.9
4549.75128	47.17	35.34	H	0.75	47.92	36.09	74.0	54.0	26.1	17.9
5459.701536	45.20	33.13	V	3.59	48.79	36.72	74.0	54.0	25.2	17.3
High Channel										
2747.176575	52.13	44.48	H	-4.51	47.62	39.97	74.0	54.0	26.4	14.0
2747.176575	53.01	46.13	V	-4.51	48.50	41.62	74.0	54.0	25.5	12.4
3662.9021	50.34	39.53	H	-1.20	49.14	38.33	74.0	54.0	24.9	15.7
3662.9021	52.17	43.54	V	-1.20	50.97	42.34	74.0	54.0	23.0	11.7
4578.627625	47.17	36.25	H	0.81	47.98	37.06	74.0	54.0	26.0	16.9
4578.627625	47.07	35.16	V	0.81	47.88	35.97	74.0	54.0	26.1	18.0

Table 7.5.2.2-2: Radiated Spurious Emissions Tabulated Data – Antenna 2

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										
2710.949889	51.08	43.01	H	-4.66	46.42	38.35	74.0	54.0	27.6	15.6
2710.949889	48.52	39.32	V	-4.66	43.86	34.66	74.0	54.0	30.1	19.3
3614.599852	51.06	41.66	H	-1.37	49.69	40.29	74.0	54.0	24.3	13.7
3614.599852	48.52	37.24	V	-1.37	47.15	35.87	74.0	54.0	26.8	18.1
4518.249815	47.99	36.20	H	0.68	48.67	36.88	74.0	54.0	25.3	17.1
8132.849667	44.02	32.19	H	7.99	52.01	40.18	74.0	54.0	22.0	13.8
Middle Channel										
2729.850768	50.71	42.29	H	-4.58	46.13	37.71	74.0	54.0	27.9	16.3
2729.850768	48.11	37.85	V	-4.58	43.53	33.27	74.0	54.0	30.5	20.7
3639.801024	51.18	40.87	H	-1.28	49.90	39.59	74.0	54.0	24.1	14.4
3639.801024	47.86	37.65	V	-1.28	46.58	36.37	74.0	54.0	27.4	17.6
4549.75128	48.19	36.73	H	0.75	48.94	37.48	74.0	54.0	25.1	16.5
High Channel										
2747.176575	49.51	41.18	H	-4.51	45.00	36.67	74.0	54.0	29.0	17.3
2747.176575	49.23	39.86	V	-4.51	44.72	35.35	74.0	54.0	29.3	18.7
3662.9021	50.12	40.31	H	-1.20	48.92	39.11	74.0	54.0	25.1	14.9
3662.9021	48.64	37.72	V	-1.20	47.44	36.52	74.0	54.0	26.6	17.5
4578.627625	47.85	36.35	H	0.81	48.66	37.16	74.0	54.0	25.3	16.8

7.5.2.3 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 (Antenna 1)

Corrected Level: 51.77 - 4.66 = 47.11dBuV/m
Margin: 74.0dBuV/m – 47.11dBuV/m = 26.9dB

Example Calculation: Average (Antenna 1)

Corrected Level: 43.95 - 4.66 - 0 = 39.29dBuV
Margin: 54.0dBuV – 39.29dBuV =14.7dB

7.6 Maximum Power Spectral Density in the Fundamental Emission – FCC 15.247(e) IC: RSS-210 A8.2(b)

7.6.1 Measurement Procedure

The power spectral density was measured in accordance with the FCC KDB 558074 D01 DTS Meas Guidance v03r02 utilizing the AVGPSD-1 (trace averaging with EUT transmitting at full power throughout each sweep) method. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer applying suitable attenuation. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 3 kHz. The Video Bandwidth (VBW) was set to 10 kHz. Span was set to 1.5 times the occupied bandwidth. Trace averaging was employed over a minimum of 100 sweeps with a RMS detector active.

7.6.2 Measurement Results

Table 7.6.2-1: Peak Power Spectral Density

Frequency (MHz)	PSD Level (dBm)
903.649963	3.30
909.950256	3.51
915.725525	4.07

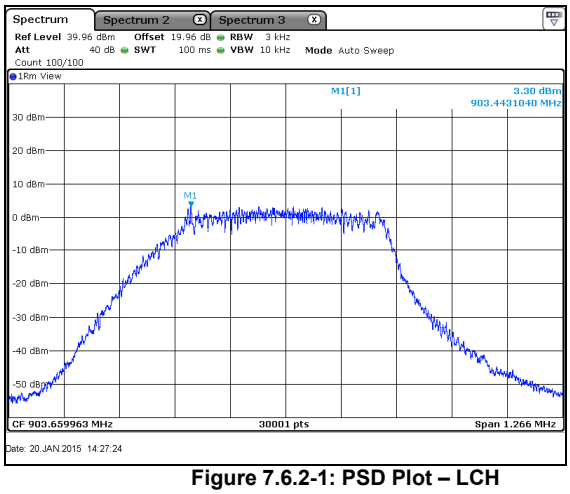

Figure 7.6.2-1: PSD Plot – LCH

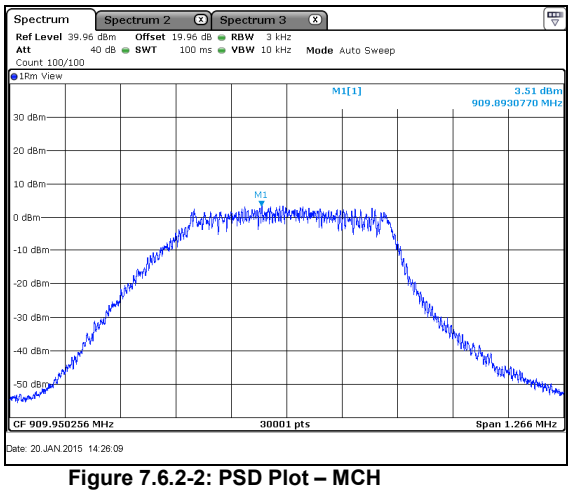

Figure 7.6.2-2: PSD Plot – MCH

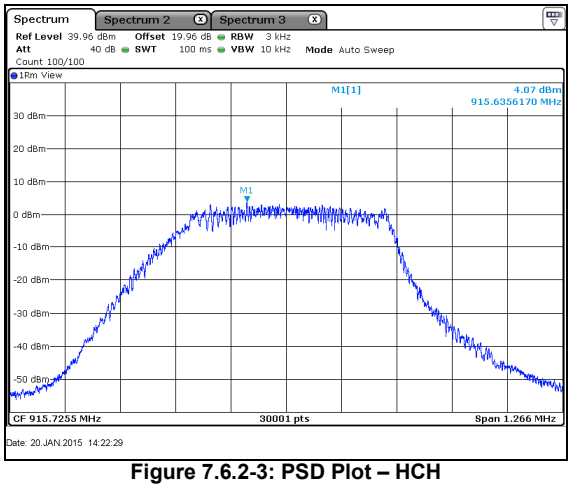

Figure 7.6.2-3: PSD Plot – HCH

8 CONCLUSION

In the opinion of ACS, Inc. the Repeater Plus Module, provided by Mueller Systems, LLC meets the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-210.

END REPORT