Excellence in Compliance Testing

Certification Test Report

FCC ID: U4A-AHGUHF00
IC: 6982A-AHGUHF00

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

ACS Report Number: 10-0344.W06.11.A

Manufacturer: Assa Abloy
Model: AH13

Test Begin Date: October 11, 2010
Test End Date: October 12, 2010

Report Issue Date: March 15, 2011

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.

1.2 Product description

The AH13 is a communication hub within an industrial lock system. When a user presents a supported credential to the lock, the system is designed to send the credential wirelessly to the AH13 communication hub. The AH13 communication hub then communicates with an EAC (Electronic Access Control) system. The EAC system provides the access decision which is sent to the communication hub, to the lock where access is granted or denied.

Antenna(s):
Laird Technologies model NanoBlue-IP04
Gain: 2 dBi
Frequency Range: 2.4-2.5GHZ
Polarization: Linear
VSWR: <2.5:1
Dimensions: 1.88"x0.5"x0.032"

Operating Voltage: 24VDC

Manufacturer Information:
Assa Abloy
110 Sargent Drive
New Haven, CT 06511

Test Sample Serial Number(s): 0x2554E

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

1.3 Test Methodology and Considerations

The AH13 can be mounted in multiple orientations therefore radiated emissions were evaluated with the EUT positioned in all possible orientations that represent the final installation. Data representing the worst case orientation (upright) is provided in this report.

For RF conducted measurements, the AH13 was modified with an external RF connector to the PCB. The AH13 utilizes non-detachable antennas for normal operation but for RF conducted testing, the antennas were disconnected and a 50-Ohm test cable soldered (with the appropriate ground connection) to the PCB.

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: 894540
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:

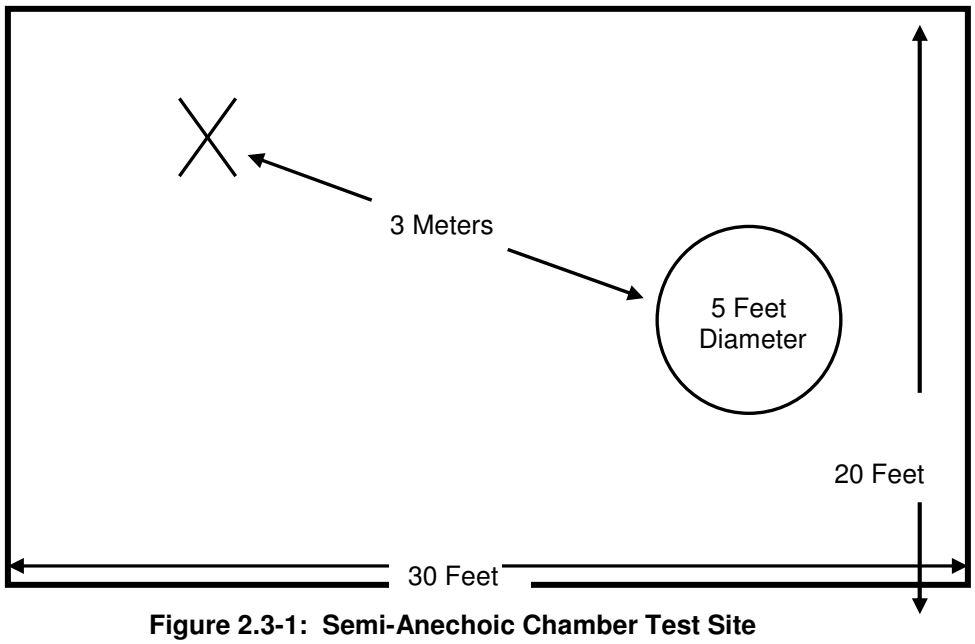


Figure 2.3-1: Semi-Anechoic Chamber Test Site

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:

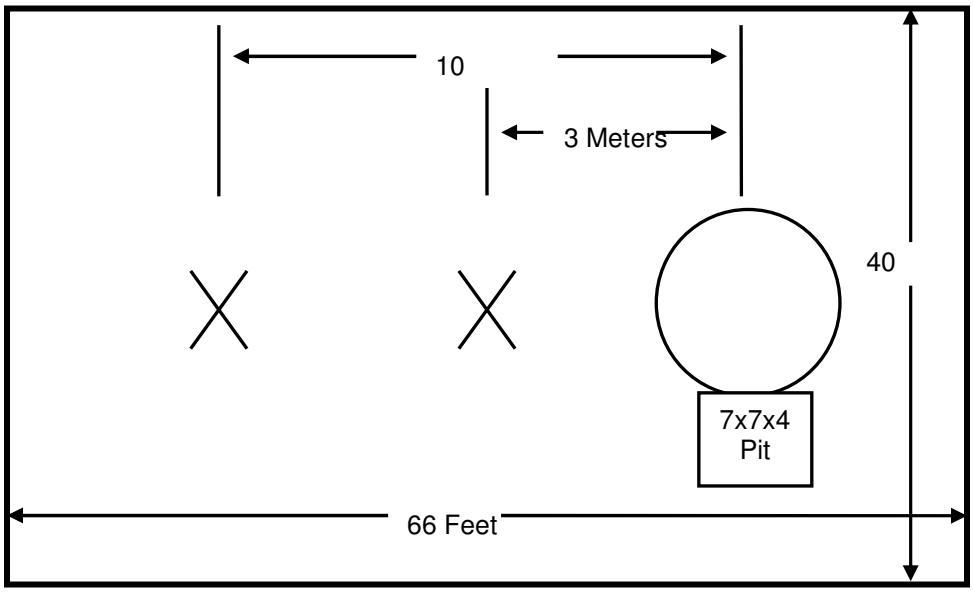


Figure 2.3-2: Open Area Test Site

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 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 4.1.3-1:

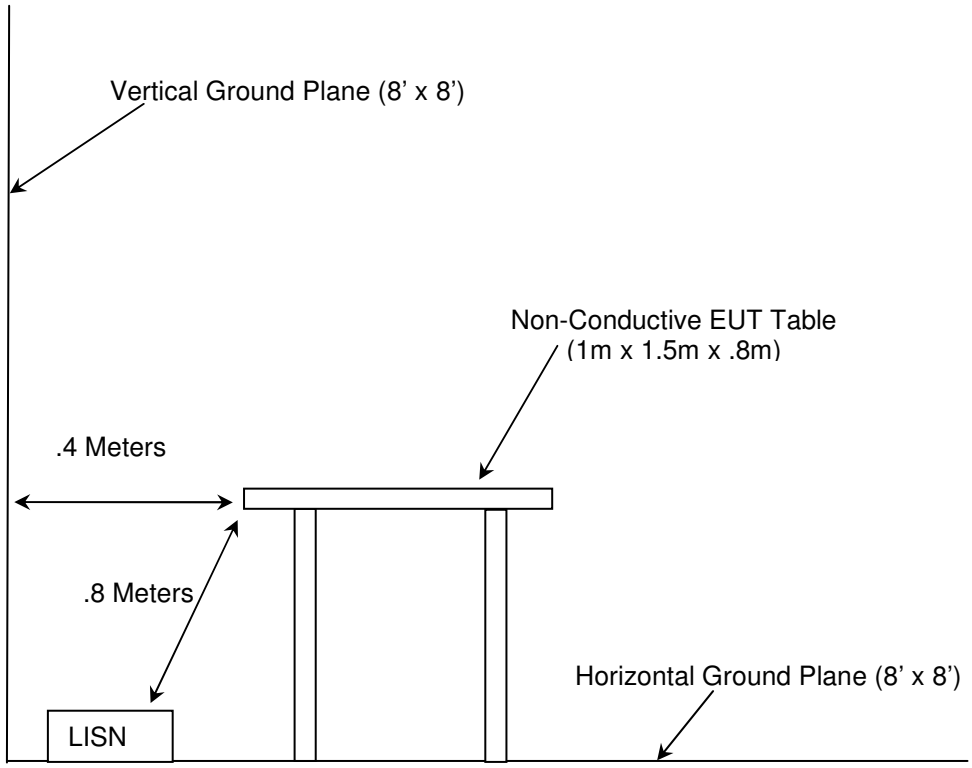


Figure 2.4-1: AC Mains Conducted EMI Site

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
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2010
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2010
- 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 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

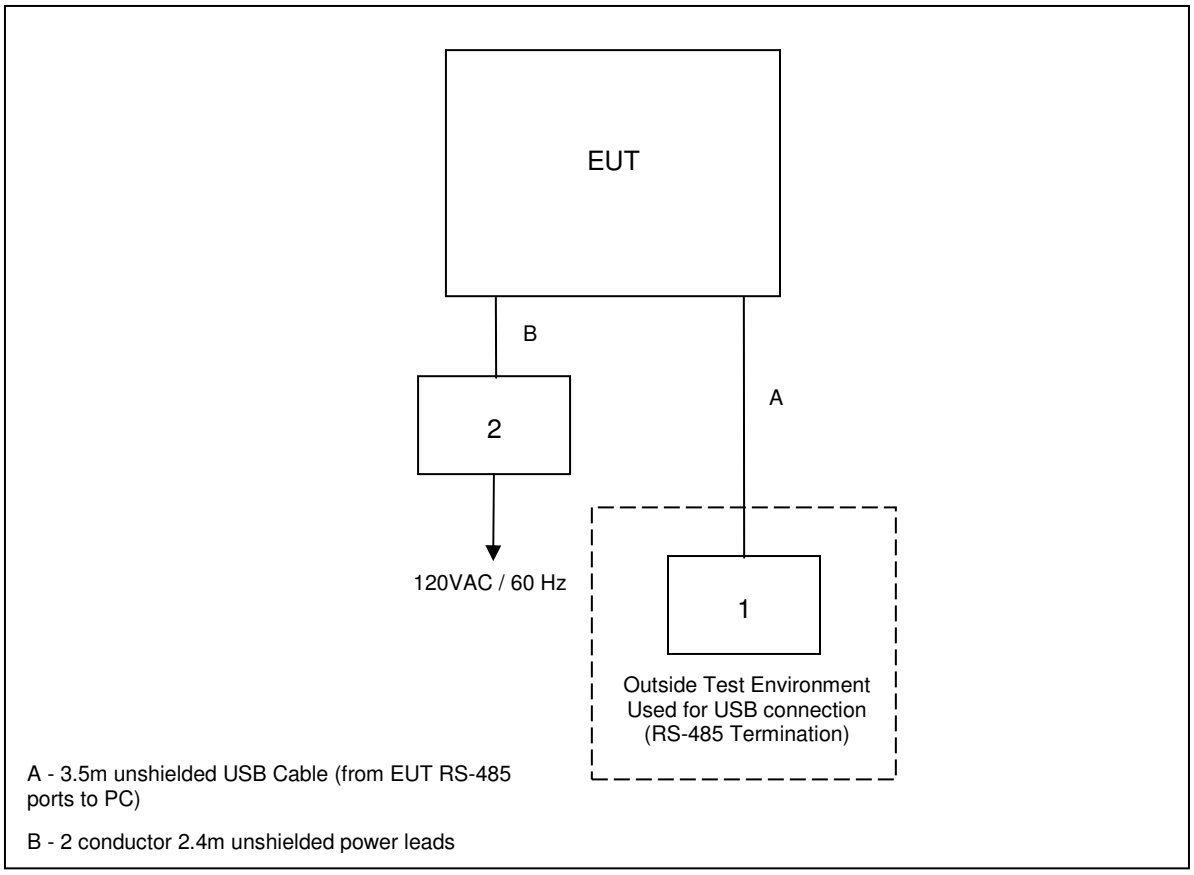
AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
1	Rohde & Schwarz	ESMI - Display	Spectrum Analyzers	833771/007	9/23/2010	9/23/2012
2	Rohde & Schwarz	ESMI-Receiver	Spectrum Analyzers	839587/003	9/23/2010	9/23/2012
3	Rohde & Schwarz	ESMI - Display	Spectrum Analyzers	839379/011	2/2/2009	2/2/2011
4	Rohde & Schwarz	ESMI - Receiver	Spectrum Analyzers	833827/003	2/2/2009	2/2/2011
22	Agilent	8449B	Amplifiers	3008A00526	9/2/2010	8/30/2011
25	Chase	CBL6111	Antennas	1043	9/13/2010	9/13/2012
30	Spectrum Technologies	DRH-0118	Antennas	970102	5/8/2009	5/8/2011
73	Agilent	8447D	Amplifiers	2727A05624	5/26/2010	5/26/2011
153	EMCO	3825/2	LISN	9411-2268	1/11/2009	1/11/2011
167	ACS	hamber EMI Cable S	Cable Set	167	1/25/2010	1/25/2011
168	Hewlett Packard	11947A	Attenuators	44829	2/4/2010	2/4/2011
283	Rohde & Schwarz	FSP40	Spectrum Analyzers	1000033	8/31/2010	8/31/2011
291	Florida RF Cables	IRE-200W-12.0-SM	Cables	None	12/7/2010	12/7/2011
292	Florida RF Cables	IR-290AW-480.0-SI	Cables	None	12/7/2010	12/7/2011
324	ACS	Belden	Cables	8214	7/9/2010	7/9/2011
329	A.H.Systems	SAS-571	Antennas	721	8/4/2009	8/4/2011
334	Rohde&Schwarz	3160-10	Antennas	45576	11/4/2010	NCR
335	Suhner	SF-102A	Cables	882/2A	10/29/2010	10/29/2011
340	Aeroflex/Weinschel	AS-20	Attenuators	7136	10/5/2010	10/5/2011
345	Suhner Sucoflex	102A	Cables	1077/2A	10/29/2010	10/29/2011
422	Florida RF	MS-200AW-72.0-SM	Cables	805	1/26/2010	1/26/2011
432	Microwave Circuits	H3G020G4	Filters	264066	7/16/2010	7/16/2011

5 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	Laptop PC	Compact	Presario V2000	CNF5321QC2
2	Power Supply	BK Precision	1697	S240502326

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM



Note: For RF conducted measurements, the EUT was connected directly to the RF input of a spectrum analyzer.

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 antenna is NanoBlue PCB antenna model NanoBlue-IP04. The antenna is directly connected to the EUT via a modified cable and thus satisfies FCC Part 15.203.

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 and Table 7.2.2-1.

Table 7.2.2-1: Line 1 Conducted EMI Results

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.174	59.5	9.9	65	5.3	L1	GND	QP
0.324	52	10	60	7.6	L1	GND	QP
0.48	45.8	10	56	10.5	L1	GND	QP
0.666	42.2	10	56	13.8	L1	GND	QP
0.702	37.8	10.1	56	18.2	L1	GND	QP
0.804	32.1	10.1	56	23.9	L1	GND	QP
1.032	27.2	10	56	28.8	L1	GND	QP
1.152	32.1	10	56	23.9	L1	GND	QP
1.242	22.1	10	56	33.9	L1	GND	QP
26.31	27.4	9.4	60	32.6	L1	GND	QP
0.174	52.2	9.9	55	2.5	L1	GND	AVG
0.342	39	10	49	10.1	L1	GND	AVG
0.486	29	10	46	17.2	L1	GND	AVG
0.618	32.6	10	46	13.4	L1	GND	AVG
0.762	16.7	10.1	46	29.3	L1	GND	AVG
0.774	17.2	10.1	46	28.8	L1	GND	AVG
1.032	18.4	10	46	27.6	L1	GND	AVG
1.104	15.2	10	46	30.8	L1	GND	AVG
1.302	15.4	10	46	30.6	L1	GND	AVG
26.388	21.1	9.4	50	28.9	L1	GND	AVG

Table 7.2.2-2: Line 2 Conducted EMI Results

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.174	59.5	9.9	65	5.3	L2	GND	QP
0.318	50.1	10	60	9.7	L2	GND	QP
0.48	42.2	10	56	14.1	L2	GND	QP
0.672	36.5	10	56	19.5	L2	GND	QP
0.792	36.3	10.1	56	19.7	L2	GND	QP
0.9	22.4	10	56	33.6	L2	GND	QP
1.938	26.6	10	56	29.4	L2	GND	QP
2.07	26.8	10	56	29.2	L2	GND	QP
2.244	22.8	10	56	33.2	L2	GND	QP
12.48	27.9	9.9	60	32.1	L2	GND	QP
0.174	51.8	9.9	55	2.9	L2	GND	AVG
0.342	36.7	10	49	12.4	L2	GND	AVG
0.498	21.7	10	46	24.4	L2	GND	AVG
0.666	24.3	10	46	21.7	L2	GND	AVG
0.798	23.5	10.1	46	22.5	L2	GND	AVG
0.978	19.4	10	46	26.6	L2	GND	AVG
1.92	11.4	10	46	34.6	L2	GND	AVG
2.076	10.7	10	46	35.3	L2	GND	AVG
2.226	13.7	10	46	32.3	L2	GND	AVG
12.39	23.4	9.9	50	26.6	L2	GND	AVG

7.3 6dB / 99% Bandwidth – FCC: Section 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 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.

The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission and approximately 20 dB below the peak level. The RBW was to 1% - 3% of the estimated emission bandwidth. The trace was set to max hold with a peak detector active. The occupied bandwidth measurement function of the analyzer was used for the 99% bandwidth.

7.3.2 Measurement Results

Results are shown below in Table 7.3.2-1 and figure 7.3.2-1 to 7.3.2-6:

Table 7.3.2-1: 6dB / 99% Bandwidth

Frequency [MHz]	6dB Bandwidth [MHz]	99% Bandwidth [MHz]
2405	1.58	2.33
2440	1.59	2.33
2480	1.63	2.33

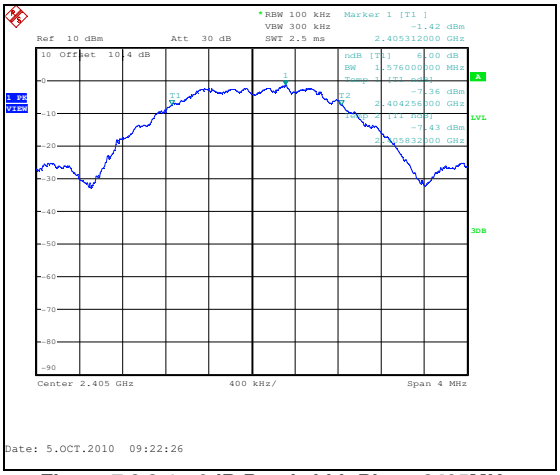


Figure 7.3.2-1: 6dB Bandwidth Plot – 2405MHz

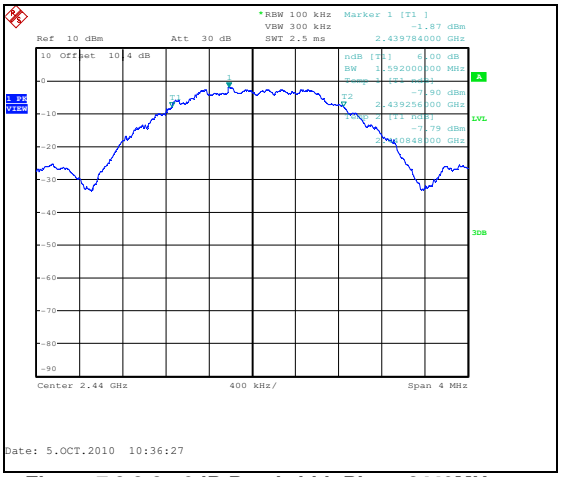


Figure 7.3.2-2: 6dB Bandwidth Plot – 2440MHz

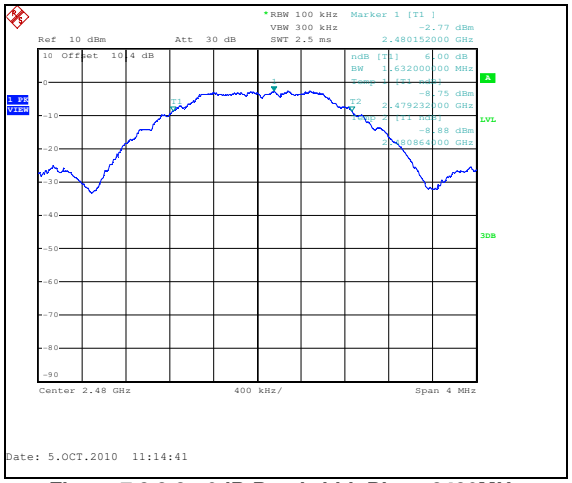


Figure 7.3.2-3: 6dB Bandwidth Plot – 2480MHz

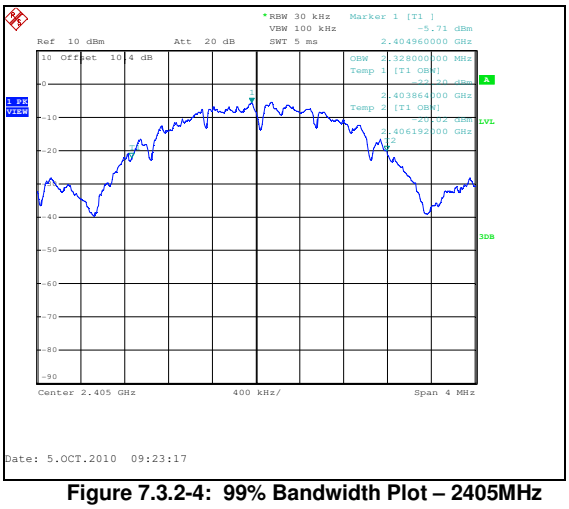


Figure 7.3.2-4: 99% Bandwidth Plot – 2405MHz

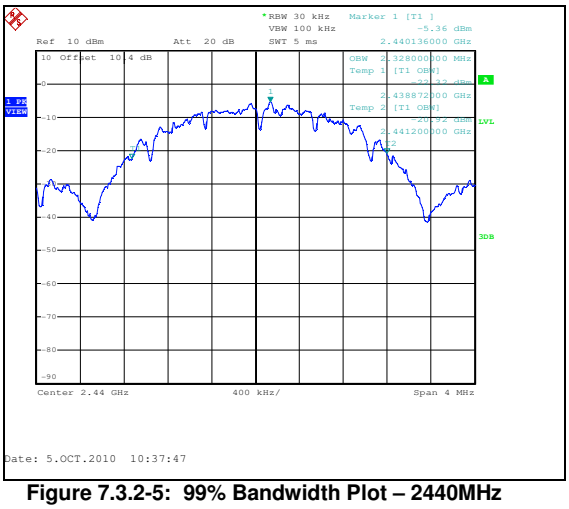


Figure 7.3.2-5: 99% Bandwidth Plot – 2440MHz

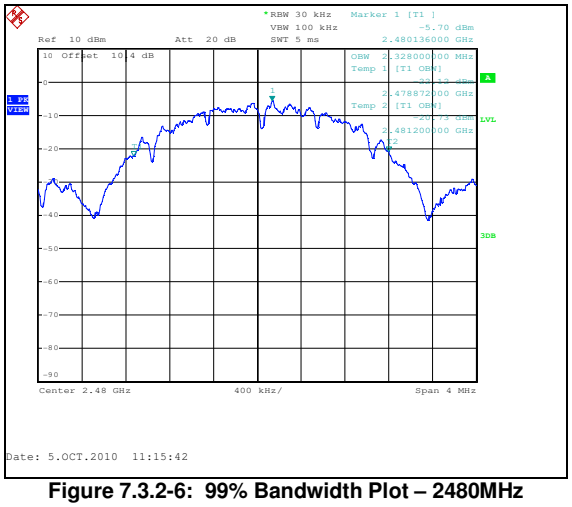


Figure 7.3.2-6: 99% Bandwidth Plot – 2480MHz

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

7.4.1 Measurement Procedure

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 Spectrum Analyzer.

7.4.2 Measurement Results

Results are shown below in Table 7.5.2-1 and Figures 7.5.2-1 to 7.5.2-4.

Table 7.4.2-1: Peak Output Power

Frequency (MHz)	Output Power (dBm)
2405	1.91
2440	1.60
2480	1.24

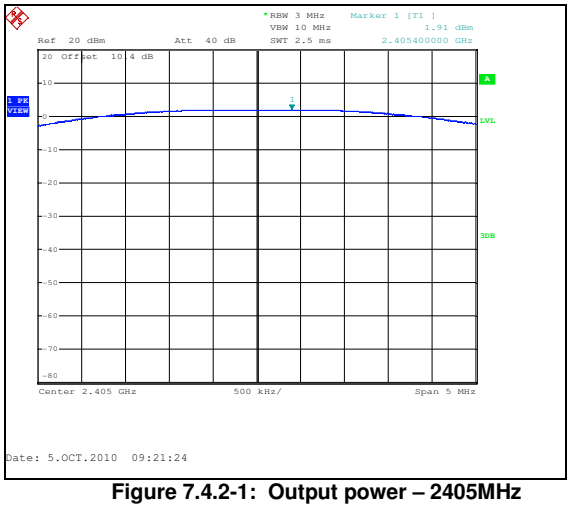


Figure 7.4.2-1: Output power – 2405MHz

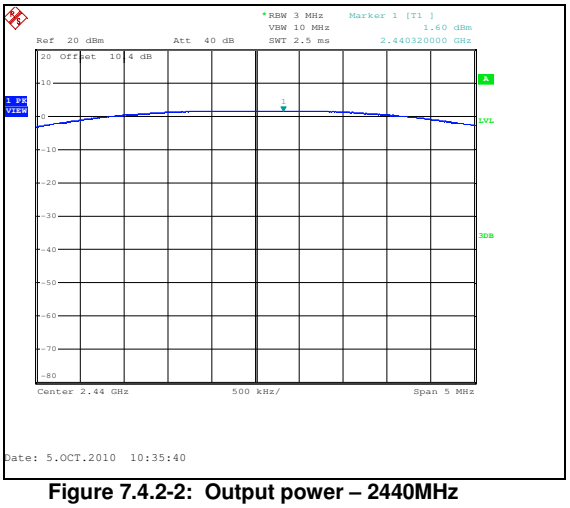


Figure 7.4.2-2: Output power – 2440MHz

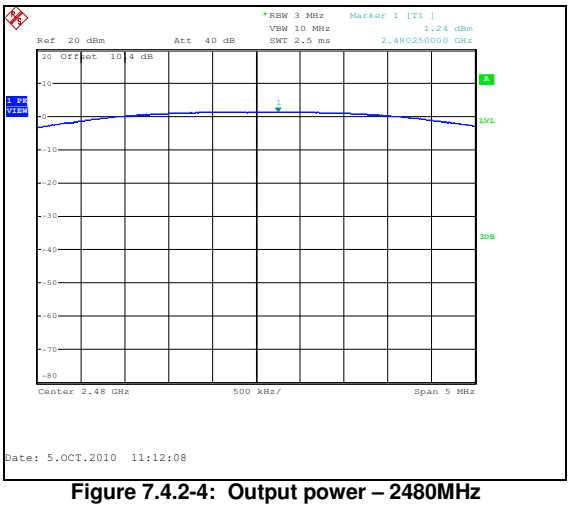


Figure 7.4.2-4: Output power – 2480MHz

7.5 Band-Edge Compliance and Spurious Emissions-FCC 15.247d IC:RSS-210 2.6, A8.5

7.5.1 Band-Edge Compliance of RF Conducted Emissions

7.5.1.1 Measurement Procedure

The EUT was investigated at the low and high channels of operation to determine band-edge compliance. Because the upper band-edge coincides with a restricted band, band-edge compliance for the upper band-edge was determined based on absolute radiated field strength measurements.

The lower 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 20 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

Band-edge compliance is displayed in Tables 7.5.1.2-1 and Figure 7.5.1.2-1.

Table 7.5.1.2-1: Upper Band-edge Radiated Emissions - 2480MHz

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
2483.5	67.41	58.35	H	1.00	68.41	49.67	74.0	54.0	5.6	4.3
2483.5	62.03	53.01	V	1.00	63.03	44.33	74.0	54.0	11.0	9.7

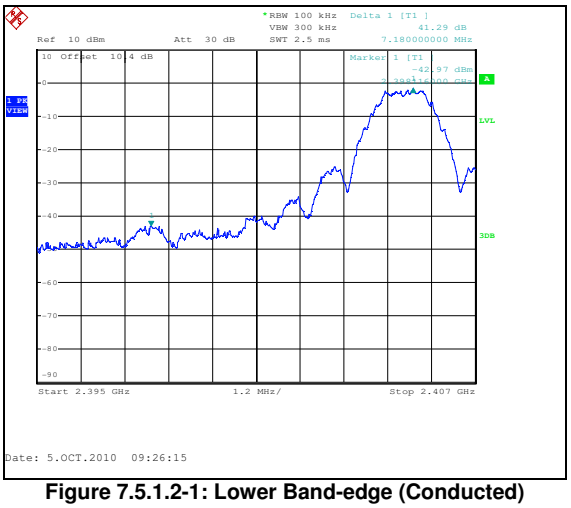


Figure 7.5.1.2-1: Lower Band-edge (Conducted)

7.5.2 RF Conducted Spurious Emissions

7.5.2.1 Measurement Procedure

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.

7.5.2.2 Measurement 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 7.5.2.2-1 through 7.5.2.2-9.

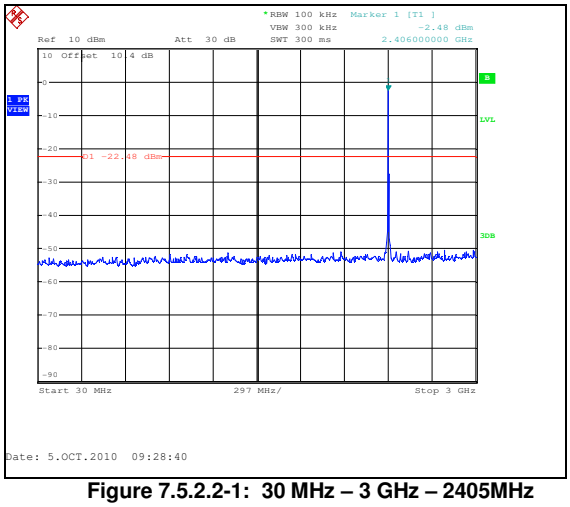


Figure 7.5.2.2-1: 30 MHz – 3 GHz – 2405MHz

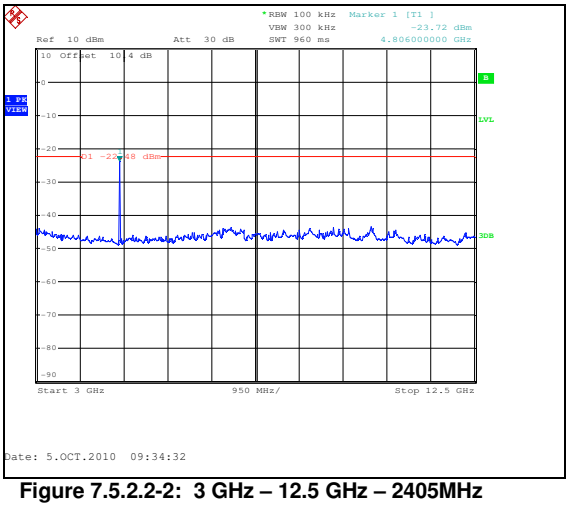


Figure 7.5.2.2-2: 3 GHz – 12.5 GHz – 2405MHz

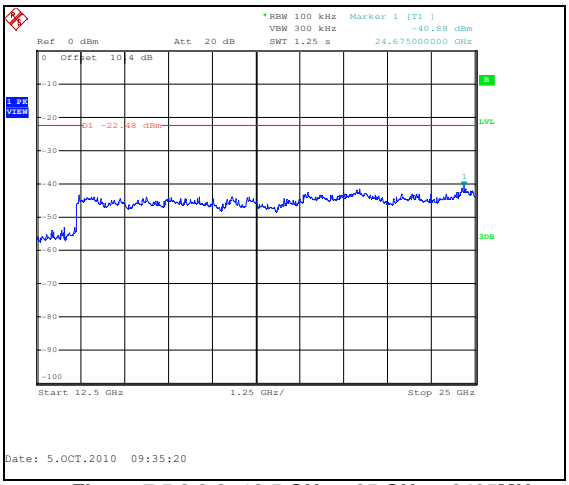


Figure 7.5.2.2-3: 12.5 GHz – 25 GHz – 2405MHz

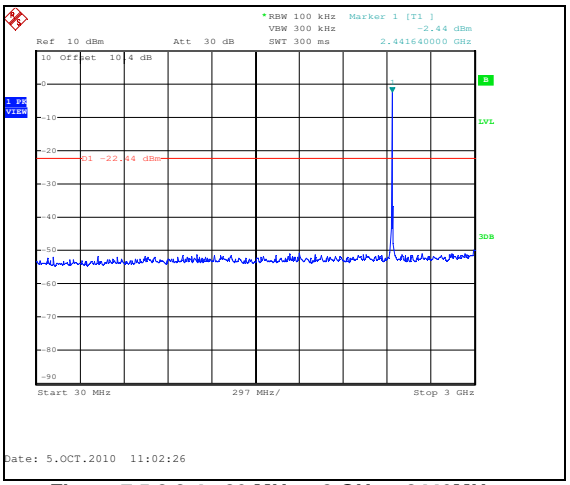


Figure 7.5.2.2-4: 30 MHz – 3 GHz – 2440MHz

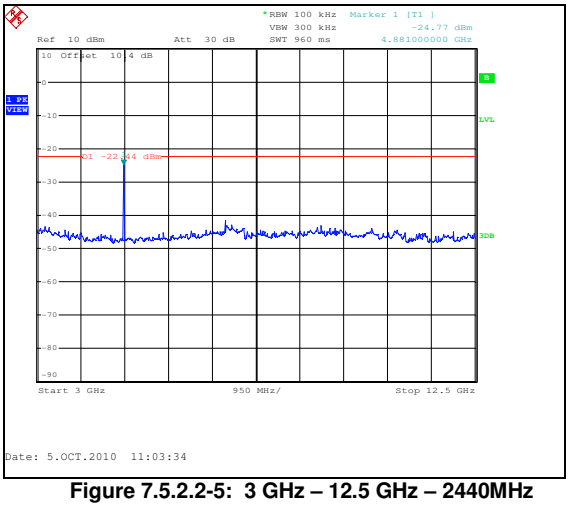


Figure 7.5.2.2-5: 3 GHz – 12.5 GHz – 2440MHz

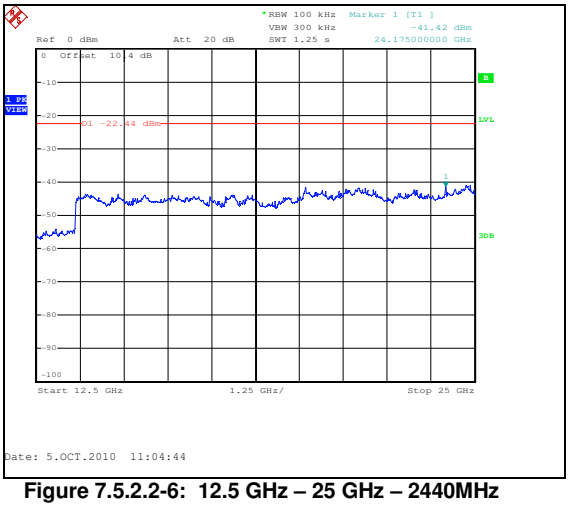


Figure 7.5.2.2-6: 12.5 GHz – 25 GHz – 2440MHz

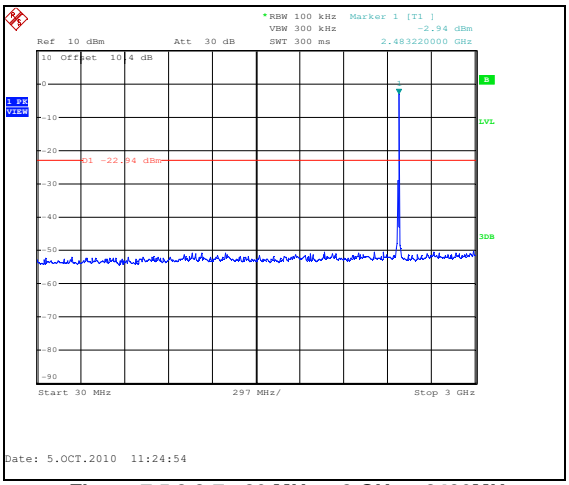


Figure 7.5.2.2-7: 30 MHz – 3 GHz – 2480MHz

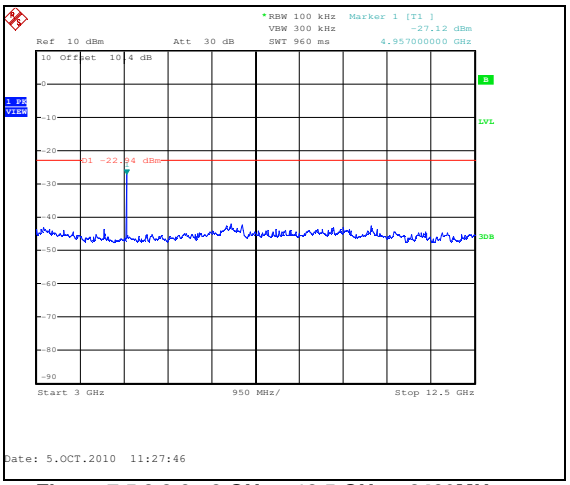


Figure 7.5.2.2-8: 3 GHz – 12.5 GHz – 2480MHz

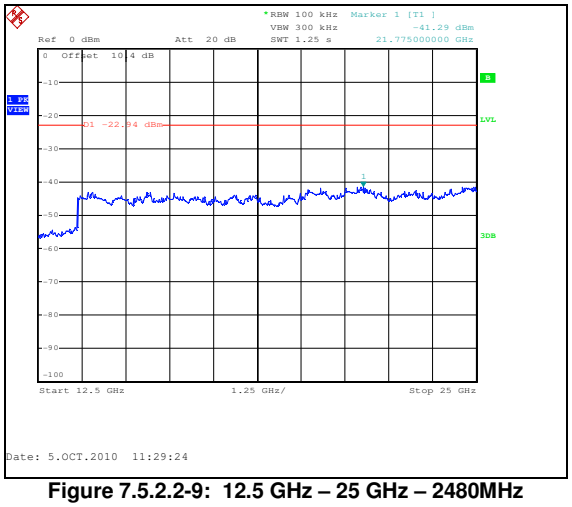


Figure 7.5.2.2-9: 12.5 GHz – 25 GHz – 2480MHz

7.5.3 Radiated Spurious Emissions (Restricted Bands) - FCC Sec. 15.205 IC: RSS-210 2.6

7.5.3.1 Measurement Procedure

Radiated emissions tests were made over the frequency range of 30MHz to 25 GHz, 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 was compared to the radiated emission limits as defined in section 15.209.

7.5.3.2 Duty Cycle Correction

For average radiated measurements, using a 32.8% duty cycle, the measured level was reduced by a factor of 9.68dB. The duty cycle correction factor is determined using the formula: 20log (32.8/100) = -9.68dB.

A detailed analysis of the duty cycle timing is provided in the Theory of Operation accompanying this report.

7.5.3.3 Measurement Results

Radiated spurious emissions found in the band of 30MHz to 25GHz are reported in the tables below.

Table 7.5.3.3-1: Radiated Spurious Emissions Tabulated Data – 2405MHz

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
4810	56.26	49.07	H	8.33	64.59	47.71	74.0	54.0	9.4	6.3
4810	54.36	46.61	V	8.33	62.69	45.25	74.0	54.0	11.3	8.7

* Note: All emissions above 4810 MHz were attenuated below the permissible limit.

Table 7.5.3.3-2: Radiated Spurious Emissions Tabulated Data – 2440MHz

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
4880	54.44	46.86	H	8.53	62.97	45.71	74.0	54.0	11.0	8.3
4880	54.25	46.41	V	8.53	62.78	45.26	74.0	54.0	11.2	8.7

* Note: All emissions above 4880 MHz were attenuated below the permissible limit.

Table 7.5.3.3-3: Radiated Spurious Emissions Tabulated Data–2480MHz

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
4960	52.39	43.16	H	8.77	61.16	42.25	74.0	54.0	12.8	11.8
4960	52.37	44.03	V	8.77	61.14	43.12	74.0	54.0	12.9	10.9
7440	49.10	37.12	V	13.42	62.52	40.86	74.0	54.0	11.5	13.1

* Note: All emissions above 7440 MHz were attenuated below the permissible limit.

7.5.3.4 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: 56.26+ 8.33 = 64.59dBuV/m
Margin: 74dBuV/m – 64.59dBuV/m = 9.4dB

Example Calculation: Average

Corrected Level: 49.07 + 8.33 – 9.68 = 47.7dBuV
Margin: 54dBuV – 47.7dBuV = 6.3dB

7.6 Peak Power Spectral Density- FCC Section 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 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 68s ~ (Span/3 kHz).

7.6.2 Measurement Results

Results are shown below in table 7.6.2-1 and figures 7.6.2-1 – 7.6.2-3:

Table 7.6.2-1: Peak Power Spectral Density

Frequency (MHz)	PSD Level (dBm)
2405	-13.29
2440	-14.02
2480	-12.82

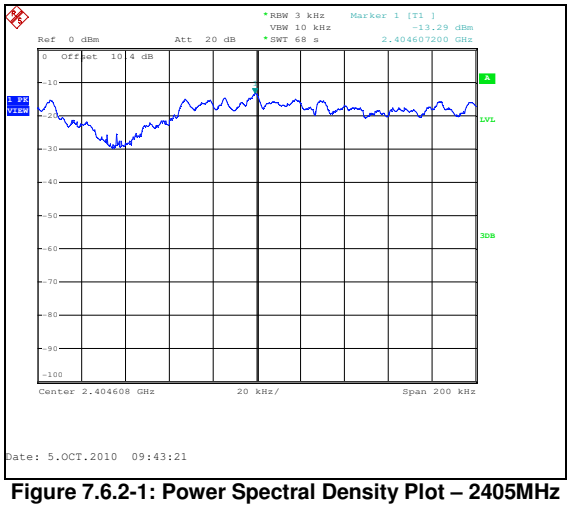


Figure 7.6.2-1: Power Spectral Density Plot – 2405MHz

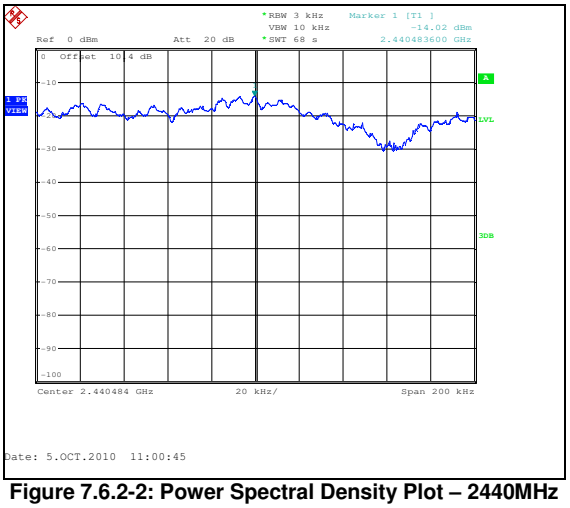


Figure 7.6.2-2: Power Spectral Density Plot – 2440MHz

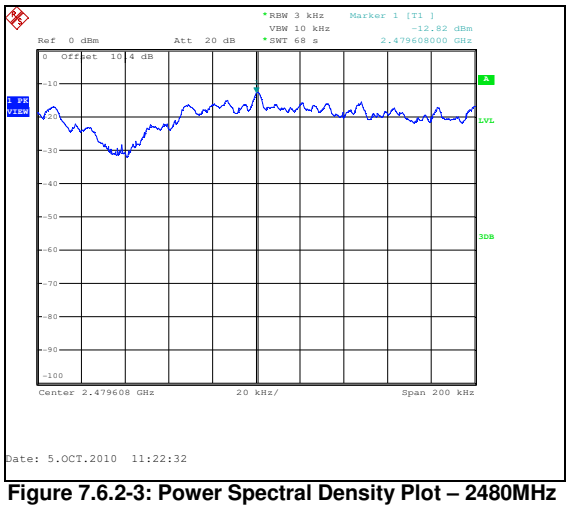


Figure 7.6.2-3: Power Spectral Density Plot – 2480MHz

8 CONCLUSION

In the opinion of ACS, Inc. the AH13, manufactured by Assa Abloy meets the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-210.

END REPORT