TEST REPORT

Report Number: 101200098DEN-001F
Project Number: G101200098

Report Issue Date: 01/13/2014

Product Designation: **Model:** AR5

Standards: FCC 47 CFR Part 15 Subpart C, 15.247
RSS-210 issue 8 2010
RSS-GEN issue 3 2010

Tested by:
Intertek Testing Services NA, Inc.
1795 Dogwood St. Suite 200
Louisville, CO 80027

Client:
Levven Electronics Ltd.
9741 54th Ave
Edmonton, AB T6E 5J4

Report prepared by

Randy Thompson
Senior EMC Project Engineer

Report reviewed by

Michael Spataro
Engineering Team Leader

TABLE OF CONTENTS

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded **the product tested complies with the requirements of the standard(s) indicated**. The results obtained in this test report pertain only to the item(s) tested.

General Test Methodology

All measurements were performed according to the procedures in the following documents:

- ANSI C63.10:2009 – ANSI Standard for Testing Unlicensed Wireless Devices

Test Facility

Intertek Denver's testing facilities are located at 1795 Dogwood St. Suite 200 Louisville, CO 80027. The testing facility is ISO17025:2005 accredited by A2LA, our lab code is 2506.02, our VCCI registration numbers are. R-1643, C-1752 and T-1558, our FCC designation no. US1121 and our IC lab no. 2042N.

Testing contained in this test report may not be covered under the laboratories scope of accreditation. A note will be placed in the specific test section for testing not coved under the laboratories scope.

2 Test Summary

Section	Test Specification	Test Description	Test Date	Result
5	15.31(e)	AC Supply Variation	10/11/2013	Pass
6	15.247(b)(1)/RSS-210 A8.4(2)	Maximum Peak Output Power - Conducted	05/29/2013	Pass
7	15.247(a)(1)/RSS-210 A8.1(a)	-20dB Bandwidth of the Hopping Channel	05/29/2013 09/22/2013	Pass
8	15.247(a)(1)/RSS-210 A8.1(b)	Hopping Channel Carrier Frequency Separation	09/22/2013	Pass
9	15.247(a)(1)(iii)/RSS-210 A8.1(d)	Number of Hopping Channels	10/11/2013	Pass
10	15.247(a)(1)(iii)/RSS-210 A8.1(d)	Average Time of Occupancy of the Hopping Channel - DCCF	09/22/2013	Pass
11	15.247(d)/RSS-210 A8.5	Spurious and Band Edge Emissions - Conducted	05/30/2013	Pass
12	15.247(d)/15.209/RSS-210 A8.5/RSS-GEN 7.2.2	Spurious and Band Edge Restricted Band Emissions - Radiated	05/30/2013	Pass
13	15.203	Antenna Requirement	10/11/2013	Pass
14	15.207/RSS-GEN 7.2.4	Transmitter Power Line Conducted Emissions.	06/23/2013	Pass
15	FCC 15.247(i)/RSS-GEN 5.6	RF Exposure Requirements	10/11/2013	Pass

Notes:

1) Unintentional Radiated and Conducted Emissions were tested/passed and documented in the following Intertek Report: 101200098DEN-001C.
2) The product is internally ac-powered.
3) Product originally tested under model number WA-SKAA, later changed to AR5. Some graphs in this test report still contain the old model number.

General Radio Test Notes:

- ANSI C63.10, Section 4.2.3.2/ FCC 15.35: Measurement detector functions and bandwidths utilized in this testing were per the preceding guidelines.
- ANSI C63.10, Section 4.2.3.2.2/ FCC 15.35(b): When an average limit is specified, the peak emission must also be measured to ensure the emissions is less than 20dB above the average limit and/or below the peak limit specified. This report includes both average and peak test data.
- ANSI C63.10, Section 4.2.3.2.4/ FCC 15.35(c): When the field strength (or envelope power) is not constant or when it pulses, and an average detector/limit is specified to be used, a duty cycle correction factor may be utilized to determine the pulsed “average” of the field strength or power.
- ANSI C63.10, Section 5.3/ FCC 15.31: All radiated field strength measurements taken at an antenna-to-product test distance of 3-meters.
- ANSI C63.10, Section 5.5, Table 2/ FCC 15.33(a): The frequency range of measurement was per the requirements of the preceding standards. The product was tested from 30MHz to 25GHz.
- ANSI C63.10, Section 6.3.1/ FCC 15.35(b): Measurement bandwidths utilized for fundamental peak emissions were equal to or greater than the 6dB bandwidth of the emission.
- ANSI C63.10, Section 6.3/ FCC 15.31(m): Measurements were taken for at the lowest, near the middle and highest channels of the product tested.

3 Description of Equipment Under Test

Model:	AR5, AR5-A, AR5-B
Type of EUT:	Wireless Audio Amplifier
Serial Number:	EMC1
FCC ID:	2AA9NAR5
Industry Canada ID:	11506A-AR5
Related Submittal(s) Grants:	NA
Company:	Leven Electronics Ltd.
Customer:	Leven Electronics Ltd.
Address:	9741 54th Ave. Edmonton, AB T6E 5J4
Phone:	(780) 391.3008
Fax:	(780) 391.3001
Test Standards:	☒ 47 CFR, Part 15C:§15.247 ☒ RSS–210, Issue 8, 2010 ☒ RSS-Gen, Issue 3, 2010 ☐ 47 CFR, Part 15B:§15.107 and §15.109, Class B ☐ Other ICES-003 issue 5 2012
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	05/21/2013
Test Work Started:	05/29/2013
Test Work Completed:	10/11/2013
Test Sample Conditions:	☐ Damaged ☐ Poor (Usable) ☒ Good

Note: Unintentional Radiated and Conducted Emissions per FCC 47 CFR, Part 15B/ ICES-003 were tested/passed and documented in the following Intertek Report: 101200098DEN-001C.

Product Description:	Wireless Audio Amplifier
Transmitter Type:	☒ FHSS ☐ Digital Modulation ☐ WiFi ☐ Blue Tooth
Operating Frequency Range(s):	Range From 2.4 to 2.483.5 GHz
Number of Channels:	20
Modulation:	FHSS
Antenna(s) Info:	Antenna: Type: PCB F / 3dBi gain.
Rated Power:	35 mW
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☐ Internal battery ☒ External power source
Special Test Arrangement:	Since the product can be mounted in several orientations, the EUT was rotated and tested in three orthogonal axes to determine the maximum emissions
Test Facility Accreditation:	A2LA (Certificate No. 2506.02)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2009 and FCC Publication Number DA 00-705

Description of Equipment Under Test (provided by client)
The product tested is a wireless audio amplifier. The product can also be configured as a wired audio amplifier. For wireless operation, an SKAA transmitter dongle for iPhone or iPad is required. Audio is streamed over the wireless/ wired link to the audio amplifier. The product will be marketed in the US and Canada.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
AC Input 120VAC	unknown	60Hz	1

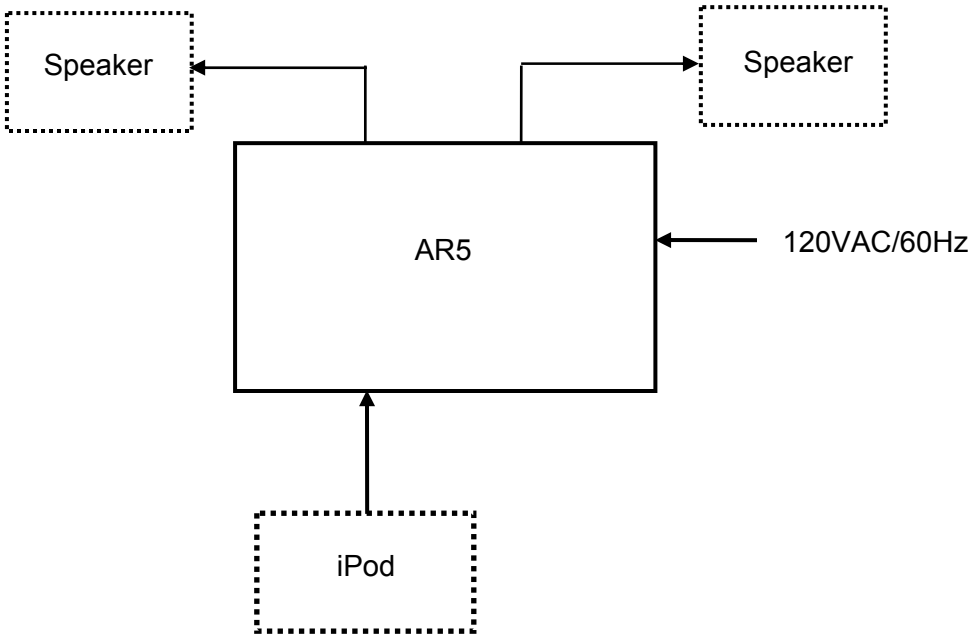
Descriptions of EUT Exercising
☒ Standby/Idle Mode
☒ Continuous transmission, un-modulated carrier (CW)
☒ Continuous transmission, modulated carrier (CW)
☒ Continuous Receive Mode

Note: The chosen mode of operation described above is dependent upon the specific test to be performed.

4 System setup including cable interconnection details, support equipment and simplified block diagram

Method:
Record the details of EUT cabling, document the support equipment, and show the interconnections in a block diagram.

EUT Block Diagram: EMC Perspective



Note: Dashed lines indicate auxiliary/support equipment

Support Data:

ID	Description/ Function	Shield Type	Length	Connector	Connection	Ferrites
1	AC Cable			2-meter	None	None
2	RCA Audio Cable			1-meter	Yes	None

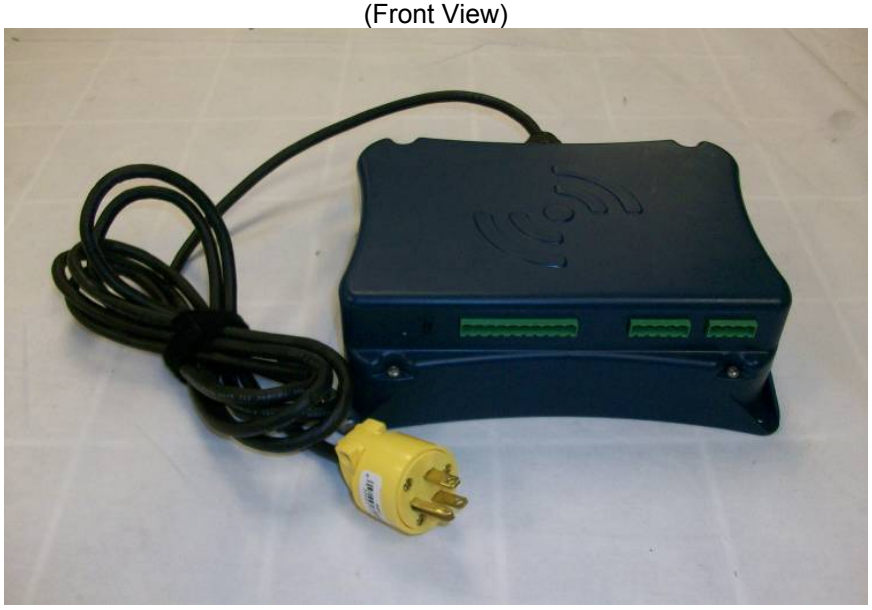
Support Equipment			
Description	Manufacturer	Model Number	Serial Number
iPod	Apple	Nano	---
Speakers	Sony	---	---

Notes:

Photograph: Product Tested

AR5

(Front View)



(Rear View)

5 AC Supply Variation

Method:

The test methods used comply with ANSI C63.10.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

- ANSI C63.10: 2009, Section 6.8.2/15.31(e)

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
18891	AC Power Supply	PACIFIC POWER	360AMXT/UPC32	0165	VBU	VBU
SW-8	Radiated Emissions VBA worksheet	Microsoft	Excel	none	VBU	VBU

Results: There is no significant difference in the radiated field strength of the fundamental frequency with respect to varying the ac voltage. Therefore, all measurements will be taken using the nominal rated voltage of the product.

Test Data:

FREQ	LEVEL	DET	CABLE	FINAL	RBW
MHz	dBm	Qp Av Pk	+ [dB]	= [dBuV]	(MHz)
AC @ Nominal Voltage – 120 VAC / 60 Hz					
2403.6	13.1	**Pk**	1.31	14.41	1
AC @ 115% Nominal Voltage – 138 VAC / 60 Hz					
2403.6	13.2	**Pk**	1.31	14.51	1
AC @ 85% Nominal Voltage – 102 VAC / 60 Hz					
2403.6	13.2	**Pk**	1.31	14.51	1

6 Maximum Peak Output Power - Conducted

Method:

The test methods used comply with ANSI C63.10 section 6.10.1. Unless otherwise stated no deviations were made from FCC 15.247 or RSS-210.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

The maximum peak conducted output power

Fundamental Frequency	Number of Hopping Channels	Output power (Watts)
2400-2483.5 MHz	≥75	1
2400-2483.5 MHz	≤75	0.125

- FCC 15.247(b)(1)
- RSS-210 A8.4(2)

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
SW-8	Radiated Emissions VBA worksheet	Microsoft	Excel	none	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary: Radiated Field Strength Emissions – Tx Fundamental

Fundamental	Conducted port					
Frequency Range:	☐ 902-928MHz ☒ 2400-2483.5MHz ☐ 5725-5850MHz					
Low Frequency MHz	**Measured Power (dBm)**	**Correction Cable/Atten (dB)**	**Final Corrected (dBm)**	**Standard Limit (dBm)**	**Limit Reduction (dB)**	**Margin (dB)**
2403.6	13.23	1.31	14.54	21	0	-6.46
Mid Frequency MHz						
2440.4904	13.88	1.33	15.21	21	0	-5.79
High Frequency MHz						
2477.31	13.86	1.34	15.20	21	0	-5.80
RBW:	☐ 100kHz	☐ 300kHz	☐ 500kHz	☐ 1MHz	☒ 3MHz	☐ 10MHz
VBW:	☐ 300kHz	☐ 1MHz	☐ 1MHz	☐ 3 MHz	☒ 10MHz	☐ 10MHz
Antenna Gain:	☒ < 6dBi ☐ >6dBi and = dBi, Output power reduction = dB					

Test Method:

- ANSI C63.10:2009, Section 6.10.1

Notes:

1. The limit for RSS-210 is identical to the limit for FCC 15.247.

Limit is 0.125W

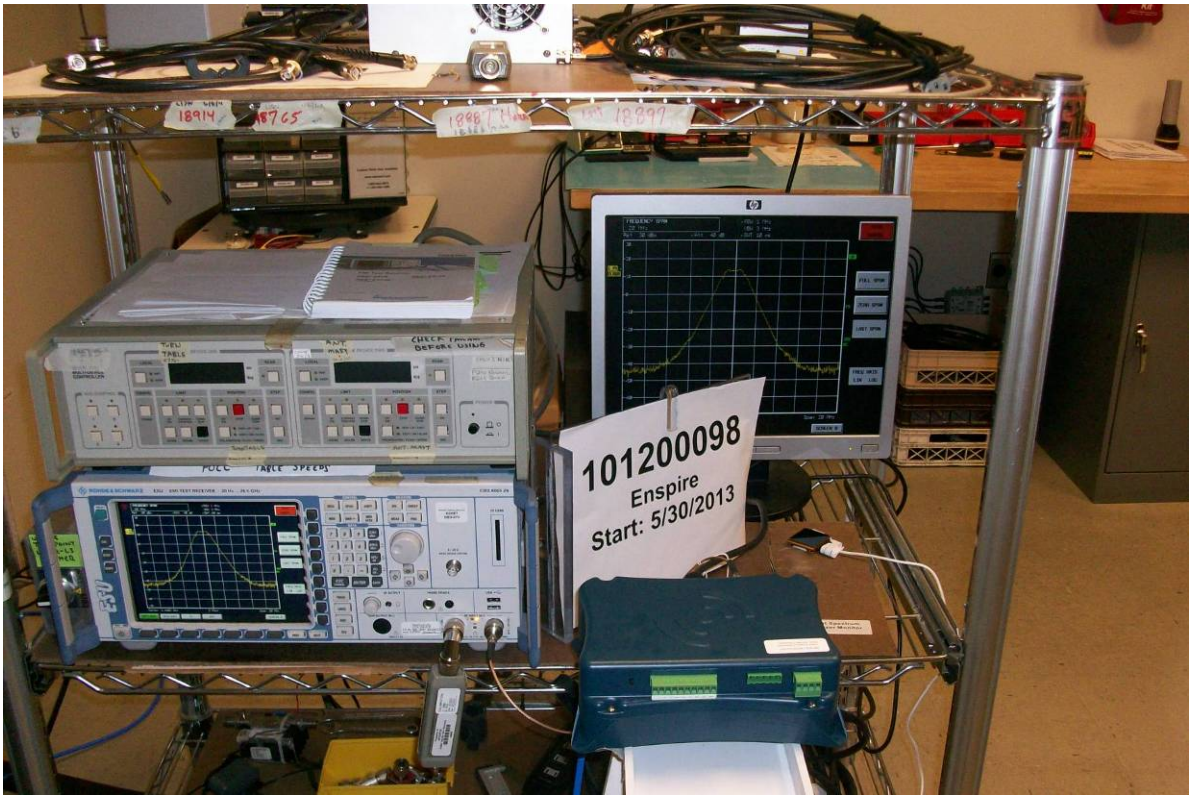
Worst Case Fundamental – Mid Channel 2440.4904MHz @ 15.21 dBm

15.21 dBm = 0.0331W

Delta

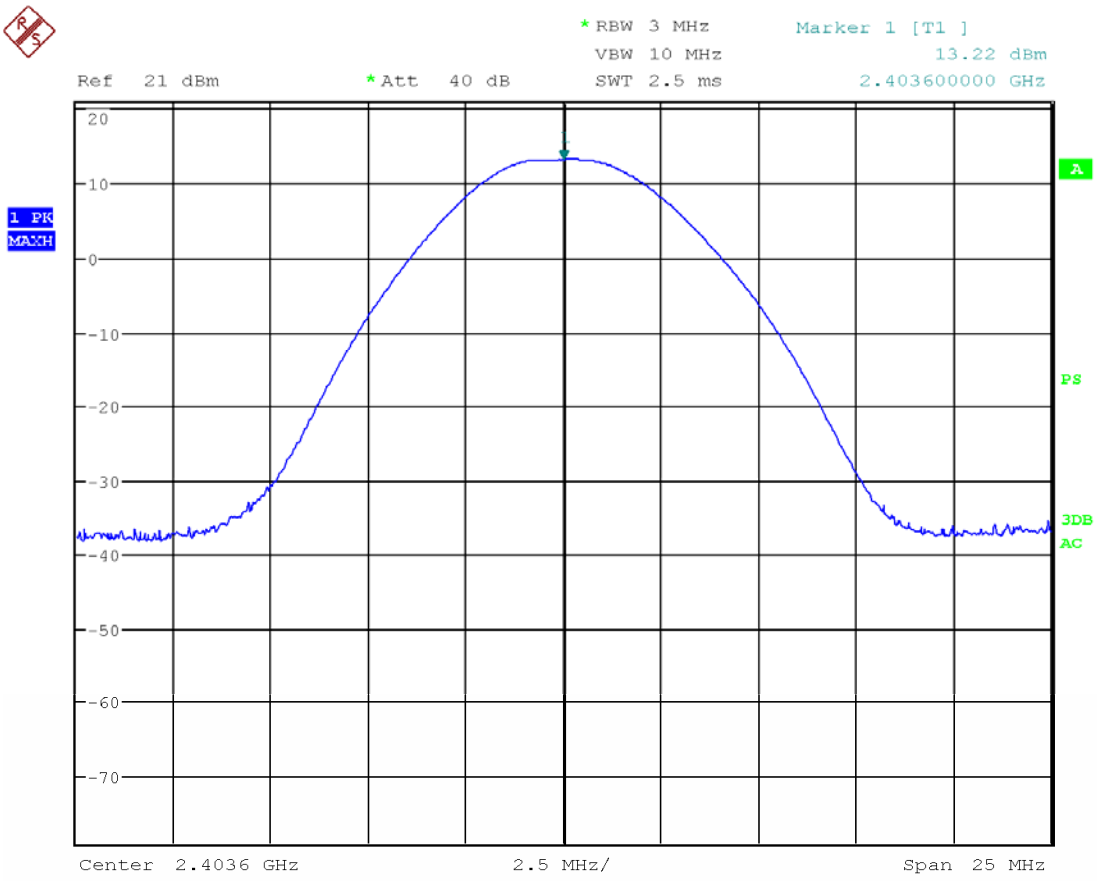
0.0331 – 0.125 = -0.0919W

Setup Photographs: Conducted Port



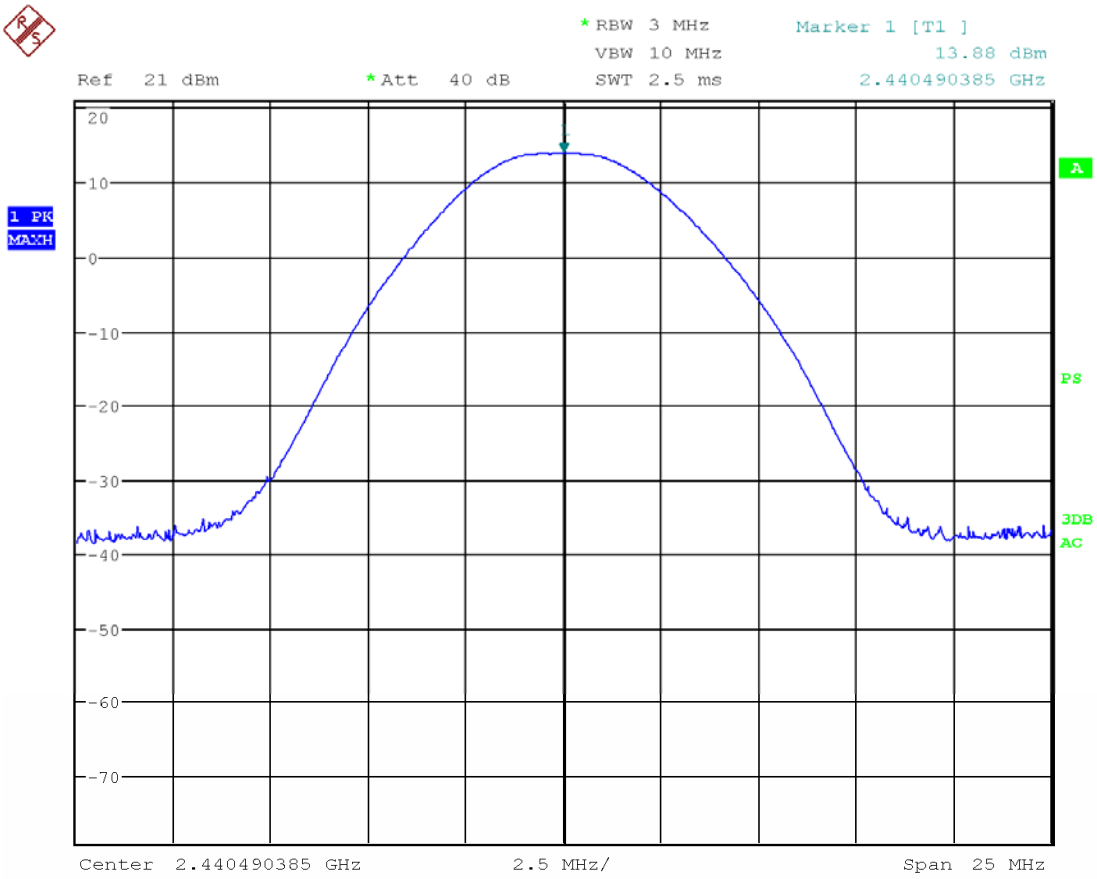
Plots:

Low Channel



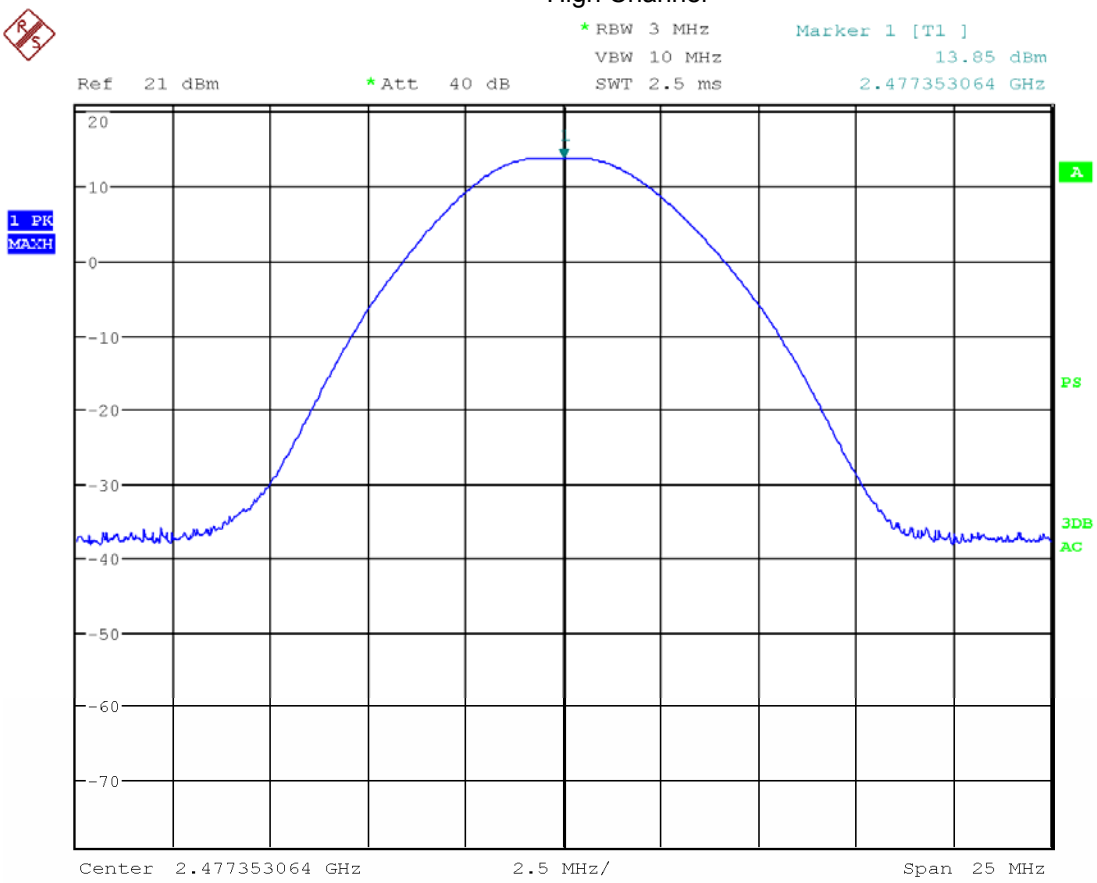
Date: 30.MAY.2013 10:42:27

Mid Channel



Date: 30.MAY.2013 10:52:16

High Channel



Date: 30.MAY.2013 10:55:26

7 -20dB Bandwidth of the Hopping Channel

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.247 or RSS-210.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification

- 15.247(a)(1)
- RSS-210 A8.1(a)

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
SW-8	Radiated Emissions VBA worksheet	Microsoft	Excel	none	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary:

Frequency Range:	☐ 902-928MHz ☒ 2400-2483.5MHz ☐ 5725-5850MHz			
Low Frequency Channel (kHz)	**Middle Frequency Channel (kHz)**	**Upper Frequency Channel (kHz)**	**Limit (kHz)**	**Result**
2179.48	2275.64	2187.50	N/A	**Pass**
Span:	500kHz			
RBW:	☐ 3kHz ☐ 30kHz ☐ 100kHz ☒ other 30kHz			
VBW:	☐ 3kHz ☐ 10kHz ☒ 100kHz ☐ other kHz			

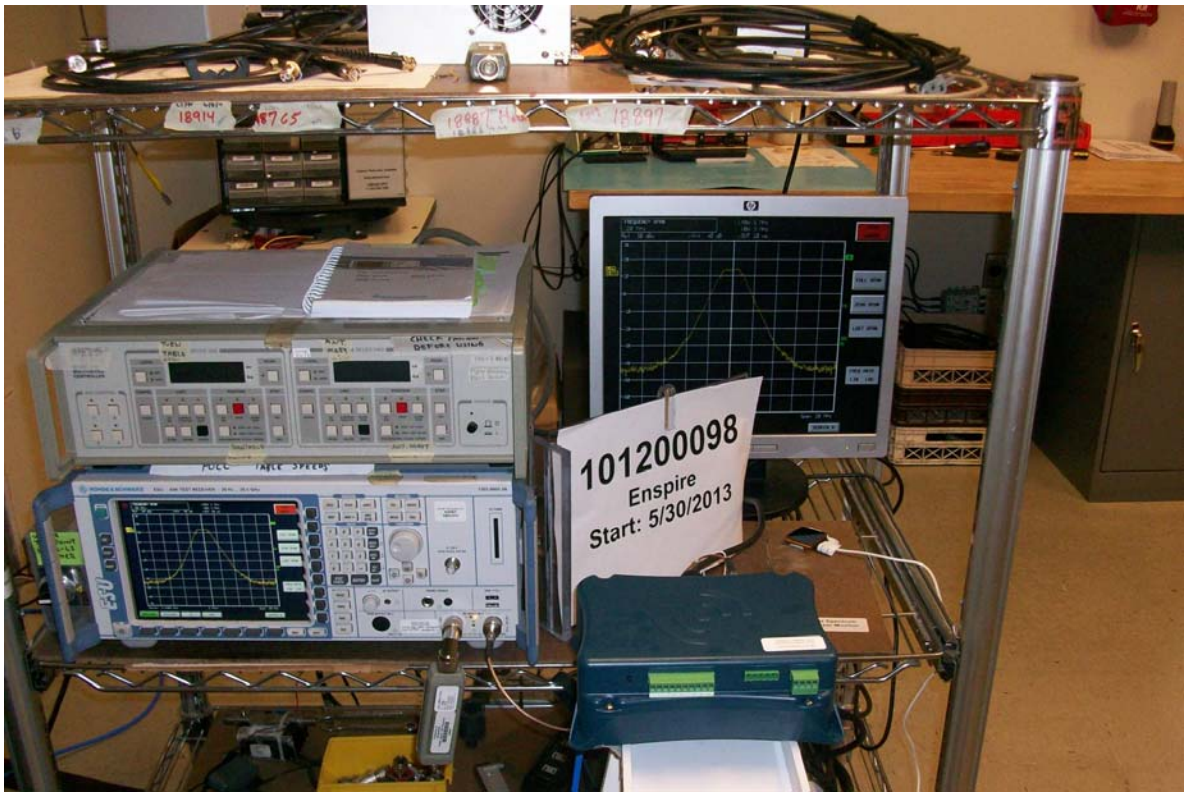
Test Method:

- ANSI C63.10:2009, Section 6.9

Notes:

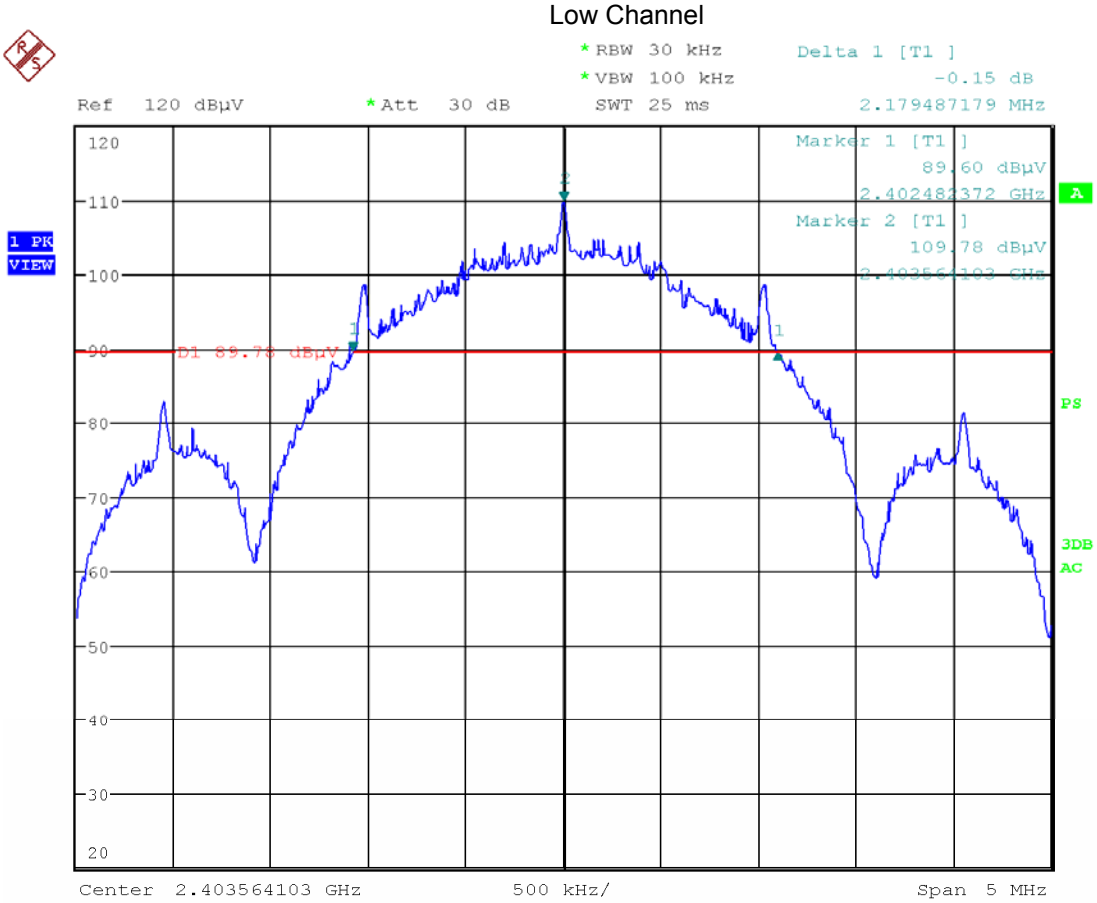
1. No limit applies for the 20dB bandwidth. The measurement is utilized as a reference for hopping channel carrier frequency separation and measurement bandwidth minimum for peak output power.

Setup Photographs: Conducted Port

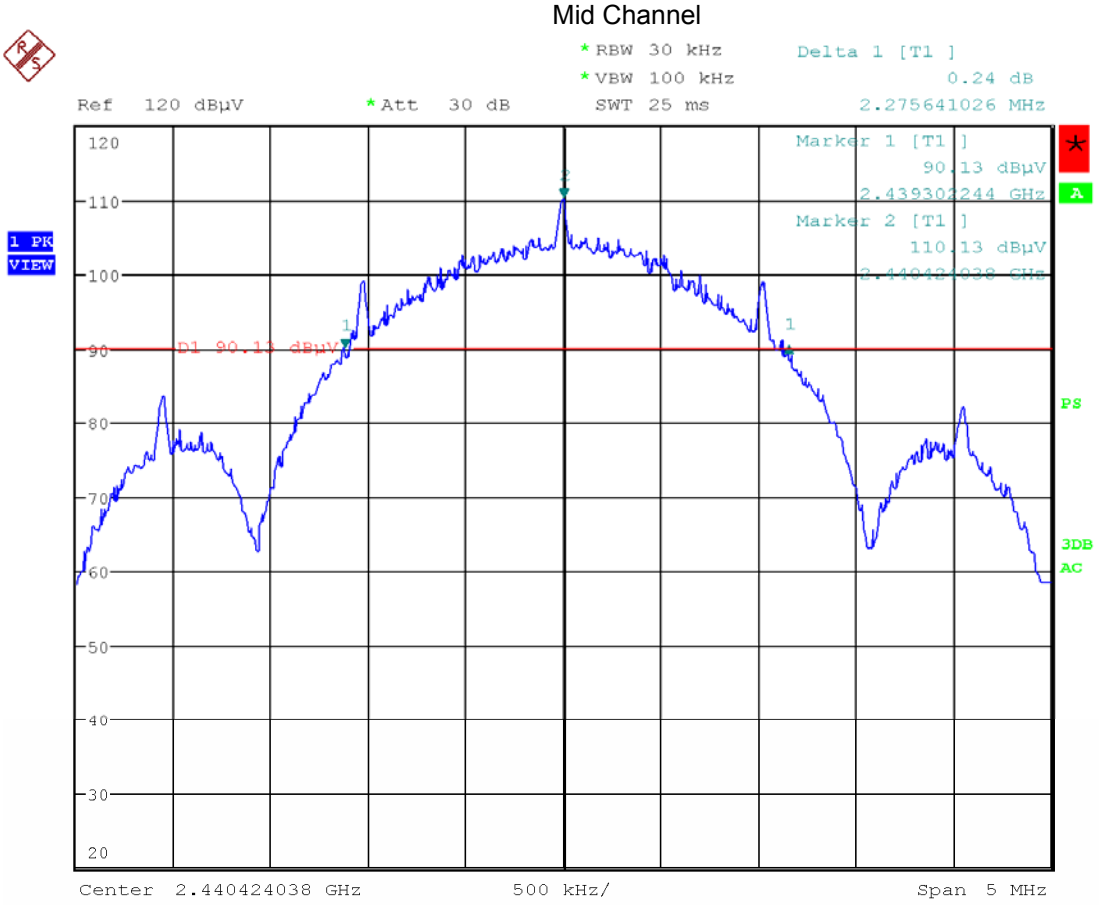


Plots: 20 dB Bandwidth

Low Channel

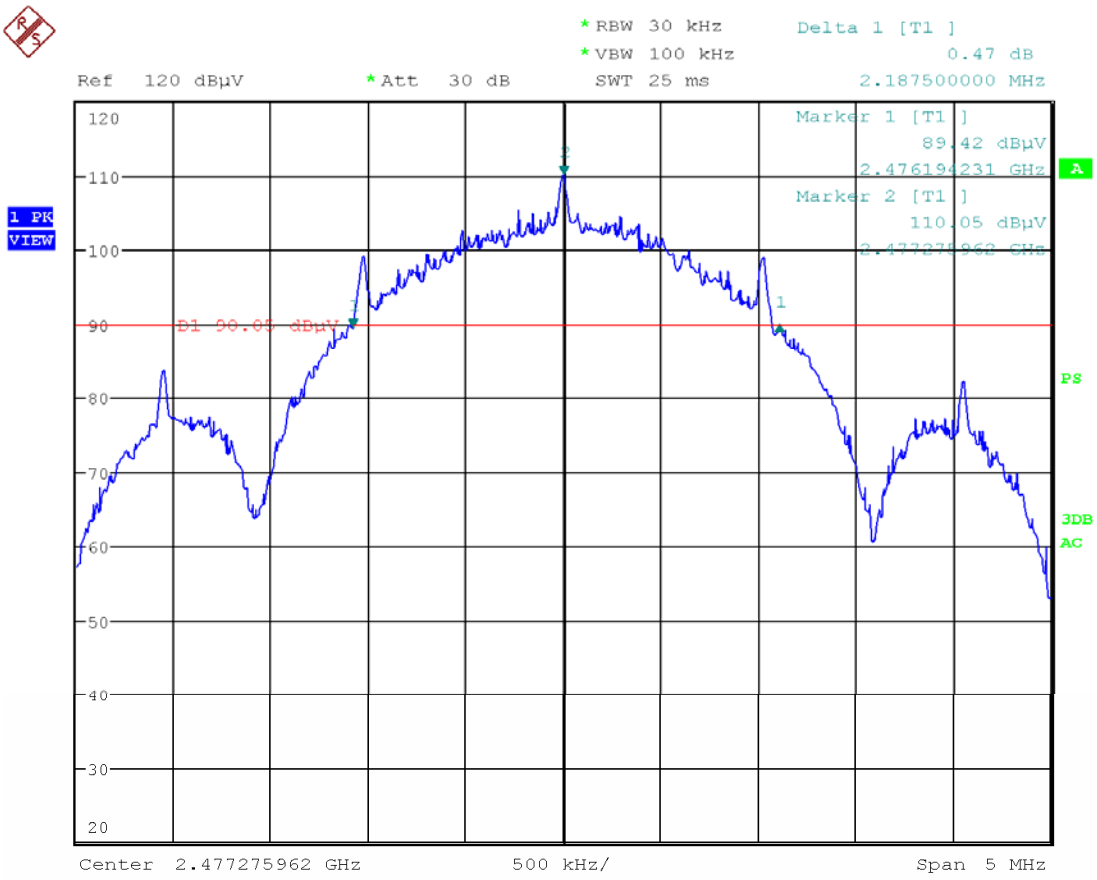


Mid Channel



Date: 22.SEP.2013 14:10:53

High Channel



8 Hopping Channel Carrier Frequency Separation

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.247 and RSS-210.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

- FCC 15.247(a)(1)
- RSS-210 A8.1(b)

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
SW-8	Radiated Emissions VBA worksheet	Microsoft	Excel	none	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary:

Frequency Range:	☐ 902-928MHz ☒ 2400-2483.5MHz ☐ 5725-5850MHz	
Measured Separation (kHz)	**Limit (kHz)**	**Result**
3069.53	2275.64	**Pass**
Limit:	☐ 25kHz ☒ 20dB channel bandwidth ☐ 2/3 of 20dB channel bandwidth	
Span:	15 MHz	
RBW:	☐ 3kHz ☐ 10kHz ☐ 100kHz ☒ other 500kHz	
VBW:	☐ 3kHz ☐ 10kHz ☐ 100kHz ☒ other 1000kHz	

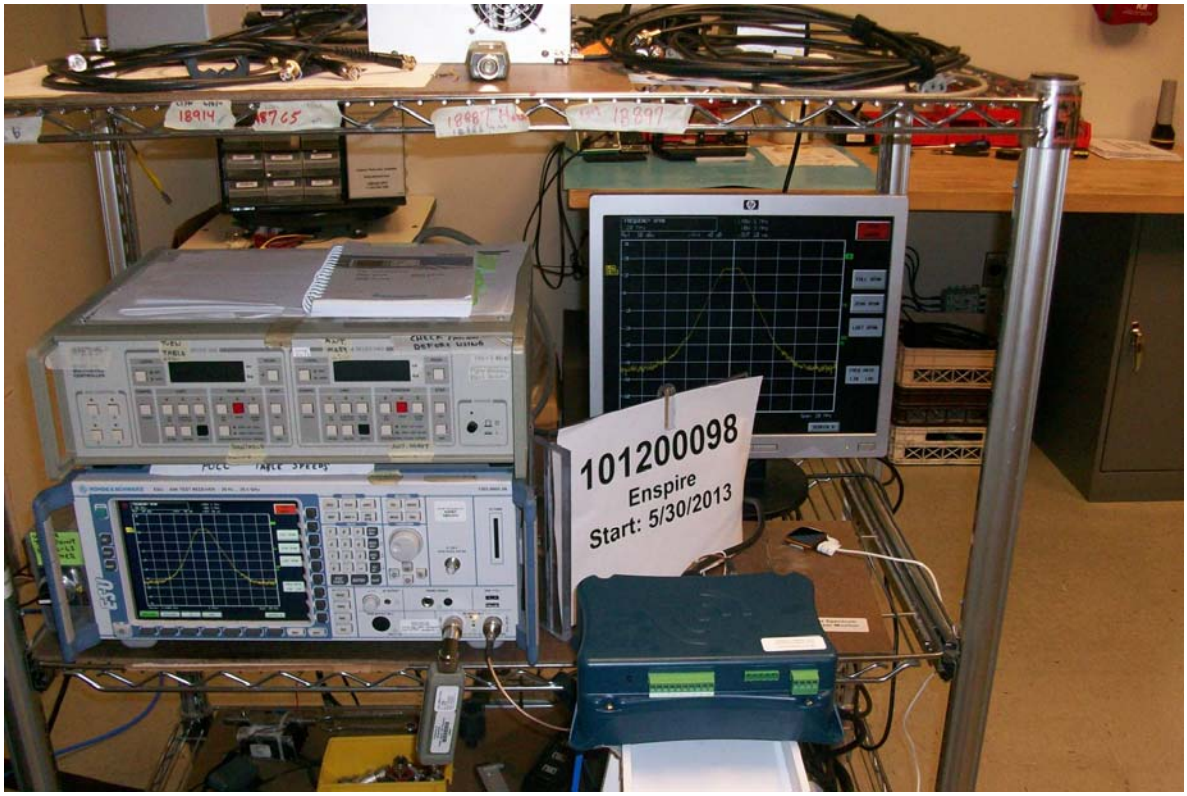
Test Method:

- ANSI C63.10:2009, Section 7.7.2

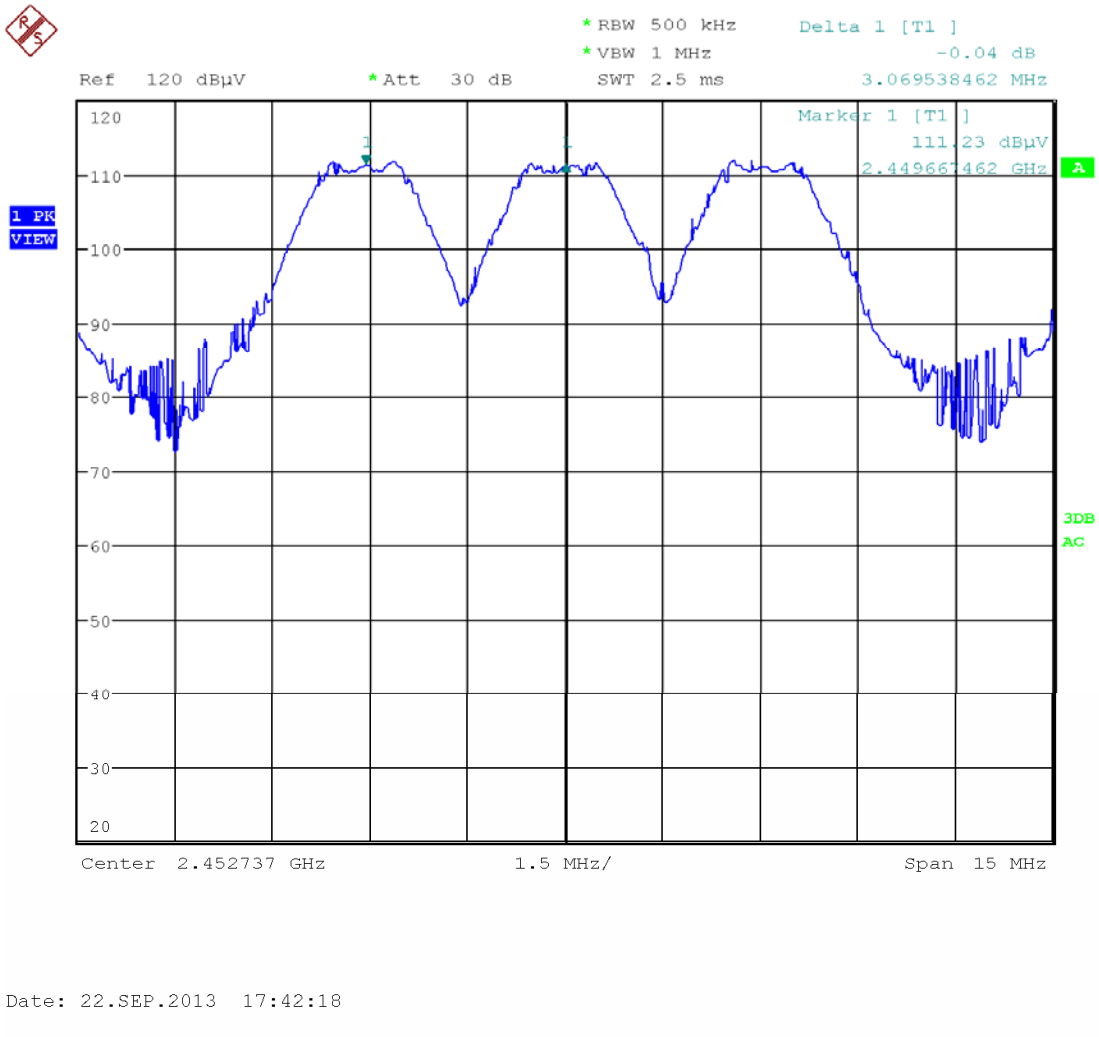
Notes:

1. The limit for RSS-210 is identical to the limit for FCC 15.247.

Setup Photographs: Conducted Port



Plots:


RBW 500 kHz
VBW 1 MHz
SWT 2.5 ms
Delta 1 [T1]
-0.04 dB
3.069538462 MHz
Ref 120 dBµV
Att 30 dB
Marker 1 [T1]
111.23 dBµV
2.449667462 GHz
1 PK
VIEW
A
3DB
AC
120
110
100
90
80
70
60
50
40
30
20
Center 2.452737 GHz
1.5 MHz/
Span 15 MHz
Date: 22.SEP.2013 17:42:18

9 Number of Hopping Channels

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from 15.247 or RSS-210.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

- 15.247(a)(1)(iii)
- RSS-210 A8.1(d)

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
SW-8	Radiated Emissions VBA worksheet	Microsoft	Excel	none	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary:

Frequency Range:	☐ 902-928MHz ☒ 2400-2483.5MHz ☐ 5725-5850MHz	
Measured Number	**Requirements**	**Result**
20	≥15	**Pass**
Channel 20dB Bandwidth:	☐ <250kHz ☒ ≥250kHz	

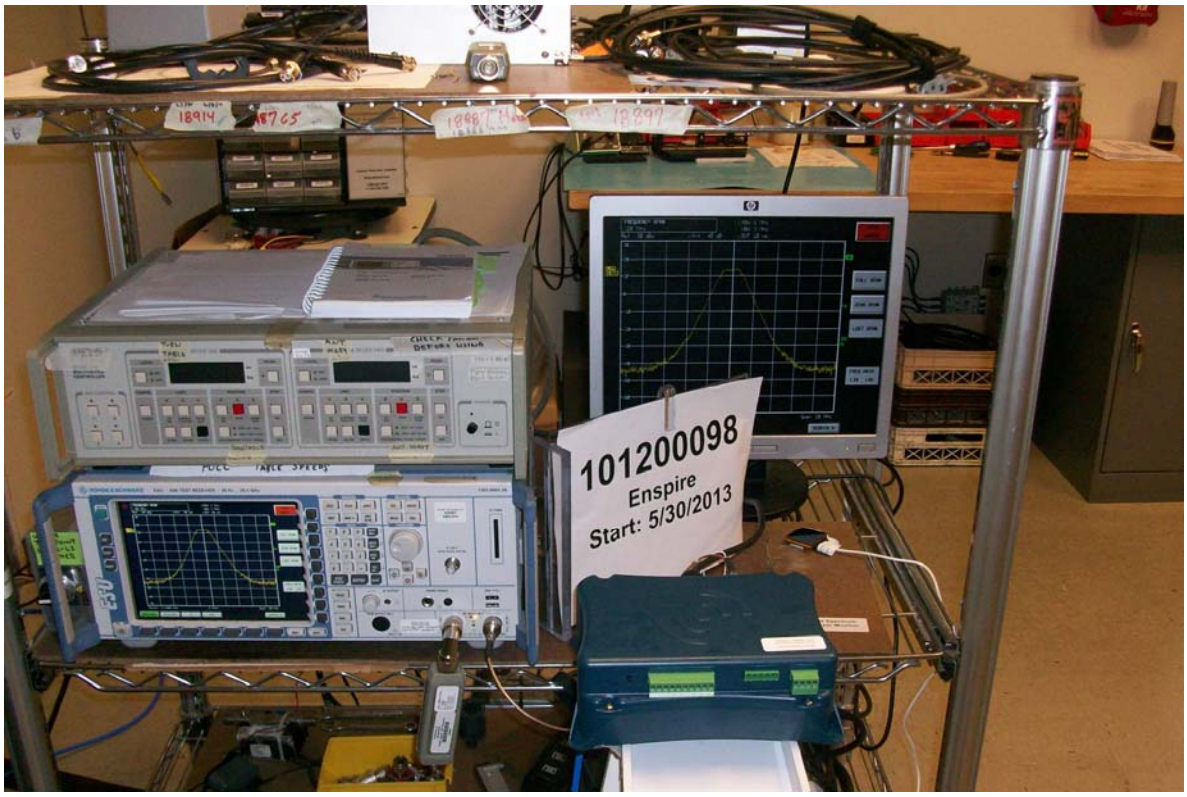
Test Method:

- ANSI C63.10:2009, Section 7.7.3

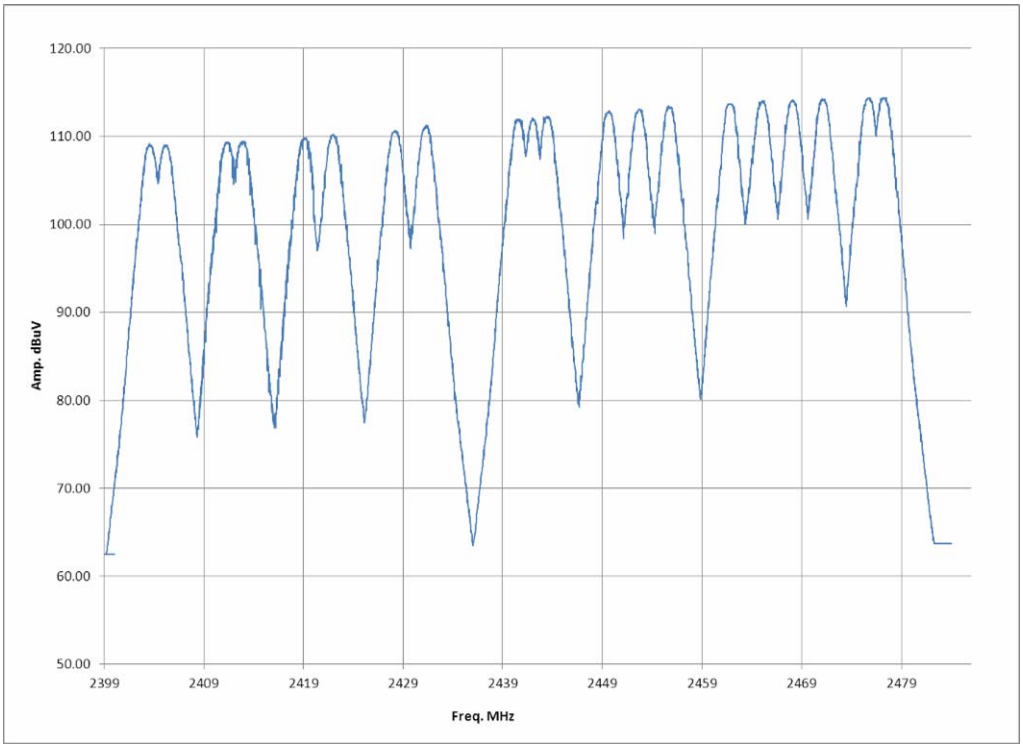
Notes:

1. The limit for RSS-210 is identical to the limit for FCC 15.247.
2. The span was broken up into 4 segments and then the trace data combined for the plot below.

Test Setup Photographs:



Plots:



10 Average Time of Occupancy of the Hopping Channel - DCCF

Method:

The test methods used comply with ANSI C63.4. Unless otherwise stated no deviations were made from FCC 15.247 & RSS-210.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

- 15.247(a)(1)(iii)
- RSS-210 A8.1(d)

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
SW-8	Radiated Emissions VBA worksheet	Microsoft	Excel	none	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary:

Frequency Range:	☐ 902-928MHz ☒ 2400-2483.5MHz ☐ 5725-5850MHz		
Measured / Calculated Time sec	**Period sec**	**Limit sec**	**Result**
0.311	8	0.4	**Pass**
Period:	☐ 10s ☐ 20s ☐ 30s ☒ 0.4s multiplied by the channel number		
Channel 20dB Bandwidth:	☐ <250kHz ☐ ≥250kHz		

Time of occupancy calculation:

The minimum measured repetition of the channel occupancy (repetition) = 0.0055 sec
Single occupancy duration (single duration) = .000214 sec
Period = 8 sec

Time of occupancy = (single duration) x (period) / (repetition) = .000214 x 8 / .0055 (sec) = 0.311 sec

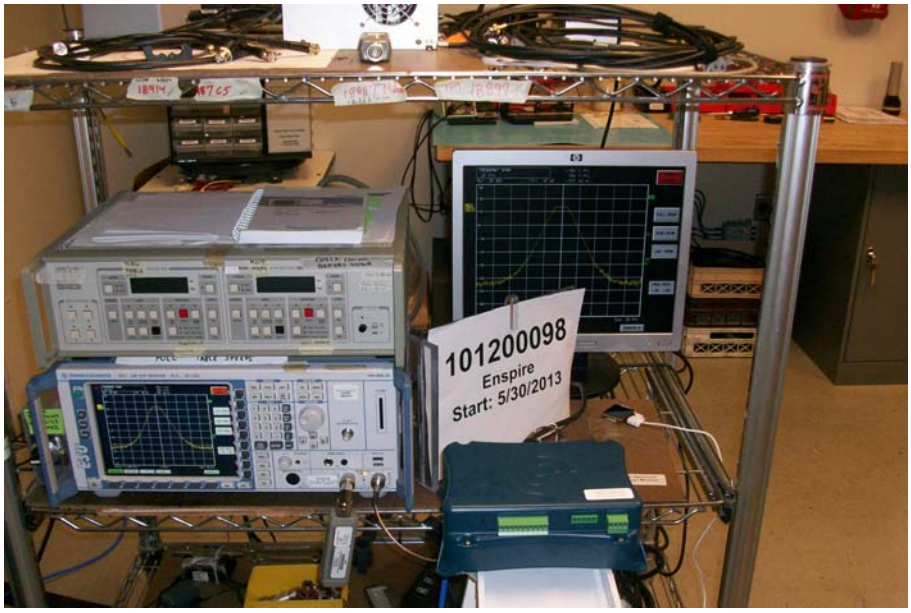
Test Method:

- ANSI C63.10:2009, Section 7.7.4

Notes:

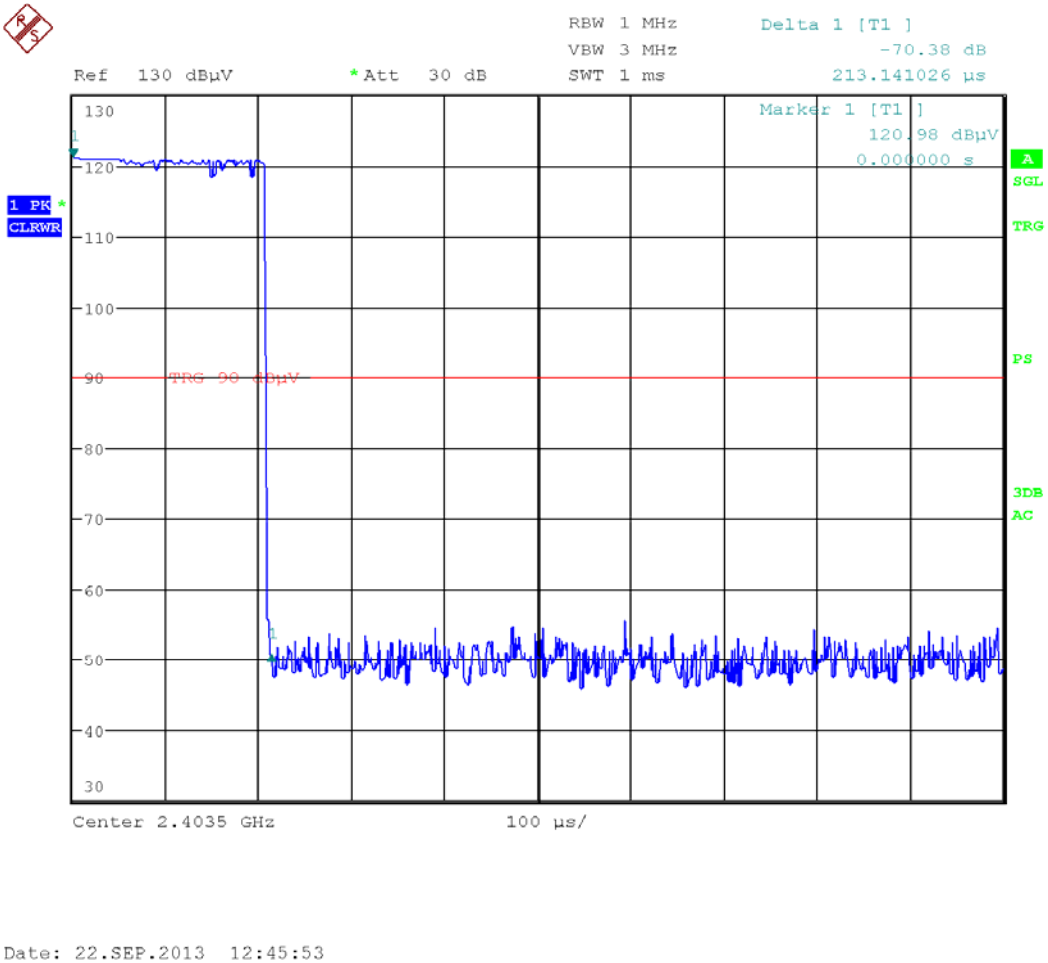
1. The limit for RSS-210 is identical to the limit for FCC 15.247.

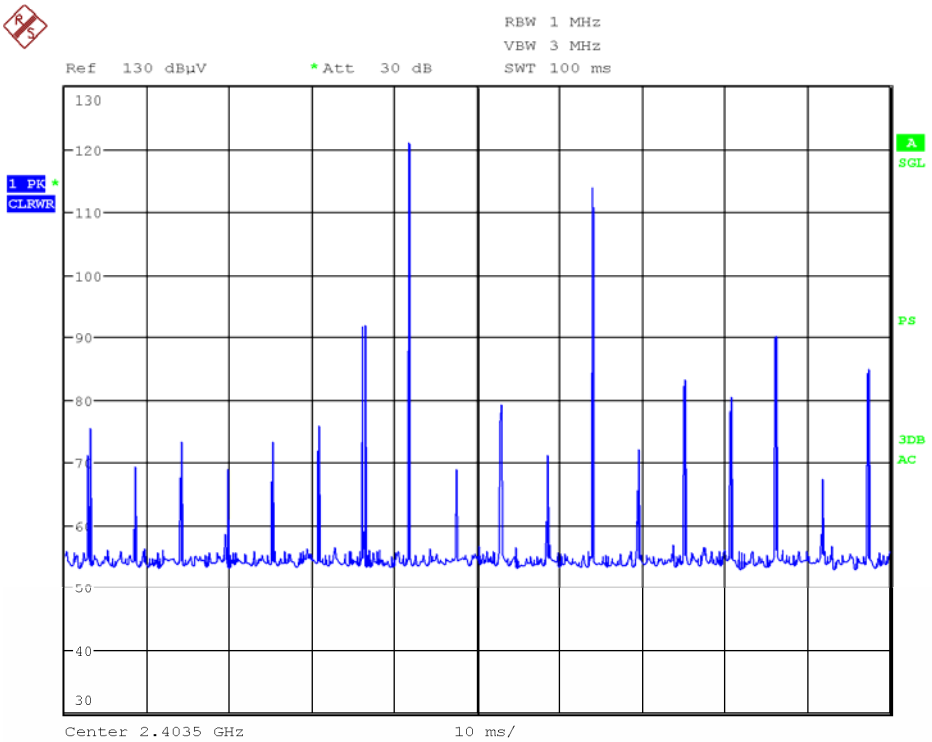
Setup Photographs:



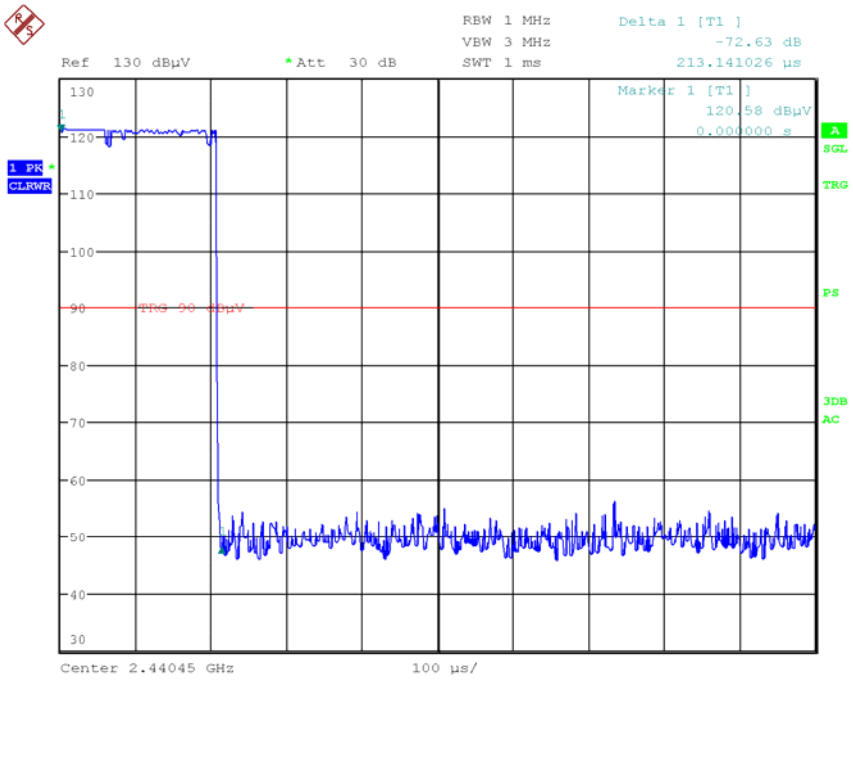
Plots:

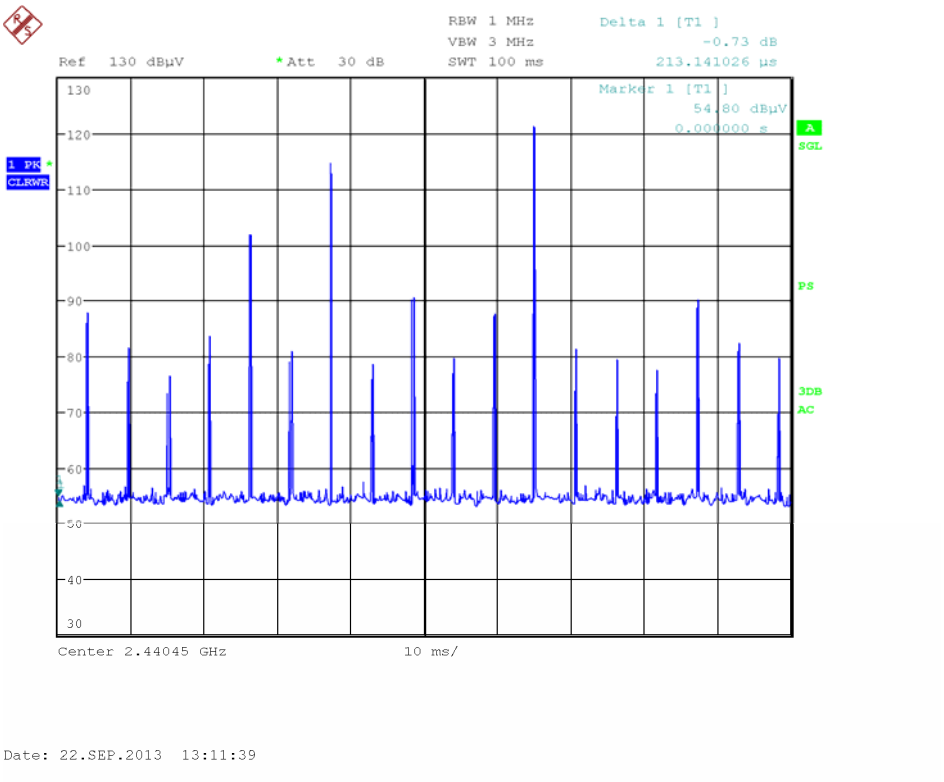
Low Channel



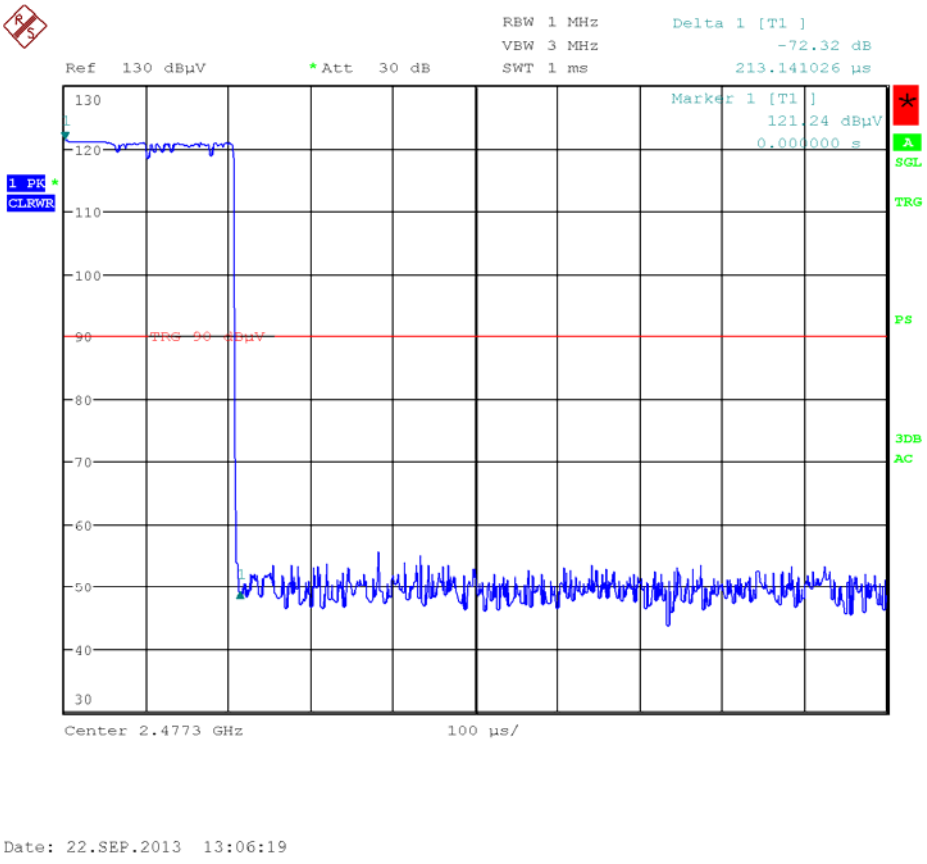

RBW 1 MHz
VBW 3 MHz
SWT 100 ms
Ref 130 dBµV
*Att 30 dB
1 PK
CLRWR
A
SGL
PS
3DB
AC
Center 2.4035 GHz
10 ms/
Date: 22.SEP.2013 13:01:37

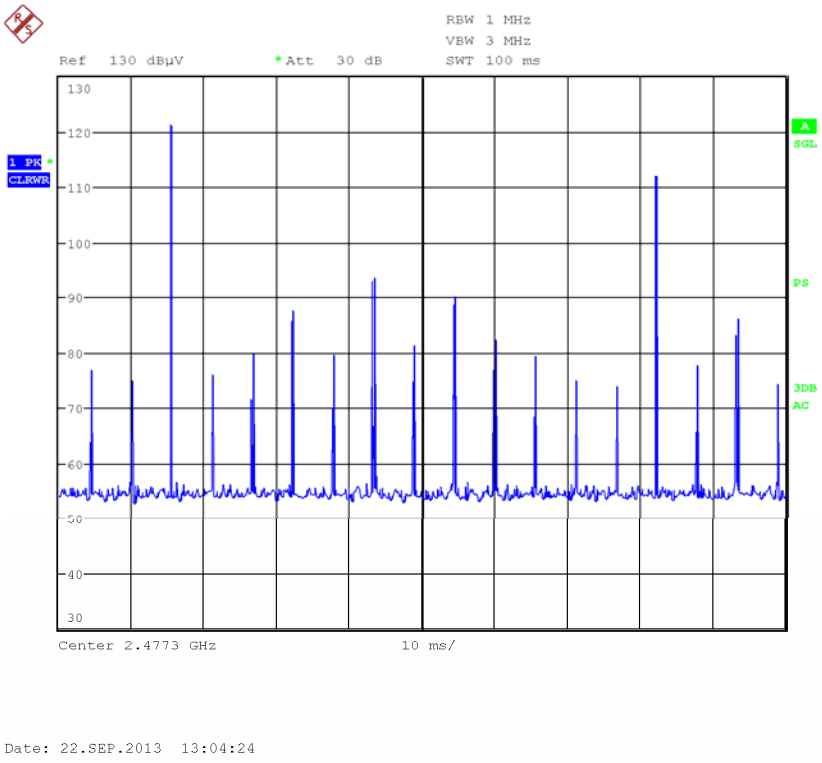
Mid Channel


RBW 1 MHz
VBW 3 MHz
SWT 1 ms
Delta 1 [T1]
-72.63 dB
213.141026 µs
Marker 1 [T1]
120.58 dBµV
0.000000 s
Ref 130 dBµV
*Att 30 dB
1 PK
CLRWR
A
SGL
TRG
PS
3DB
AC
Center 2.44045 GHz
100 µs/
Date: 22.SEP.2013 13:10:48



High Channel





DCCF Calculation:

20 log (t/100mS)

Where t is the transmission time in a 100mS window.

t = 0.214 x 18 = 3.9 mS

20 log (3.9/100) = -28 dB

Maximum allowable DCCF correction is -28dB.

11 Spurious and Band Edge Emissions - Conducted

The test methods used comply with ANSI C63.4. Unless otherwise stated no deviations were made from FCC 15.247 & RSS-210.

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.35(c) & IC RSS-GEN.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

- 15.247(d)
- RSS-210 A8.5

Frequency Range:	☐ 902-928MHz ☒ 2400-2483.5MHz ☐ 5725-5850MHz		
	Output Power with 100 kHz Bandwidth dBm	**Minimum Allowed Attenuation dB**	**Limit dB**
Low Frequency Channel	14.20	20	-5.80
Middle Frequency Channel	14.29	20	-5.71
Upper Frequency Channel	14.27	20	-5.73
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
SW-8	Radiated Emissions VBA worksheet	Microsoft	Excel	none	VBU	VBU

Results:

The sample tested was found to comply.

Test Method:

- ANSI C63.10: 2009, Clause 7.7.10

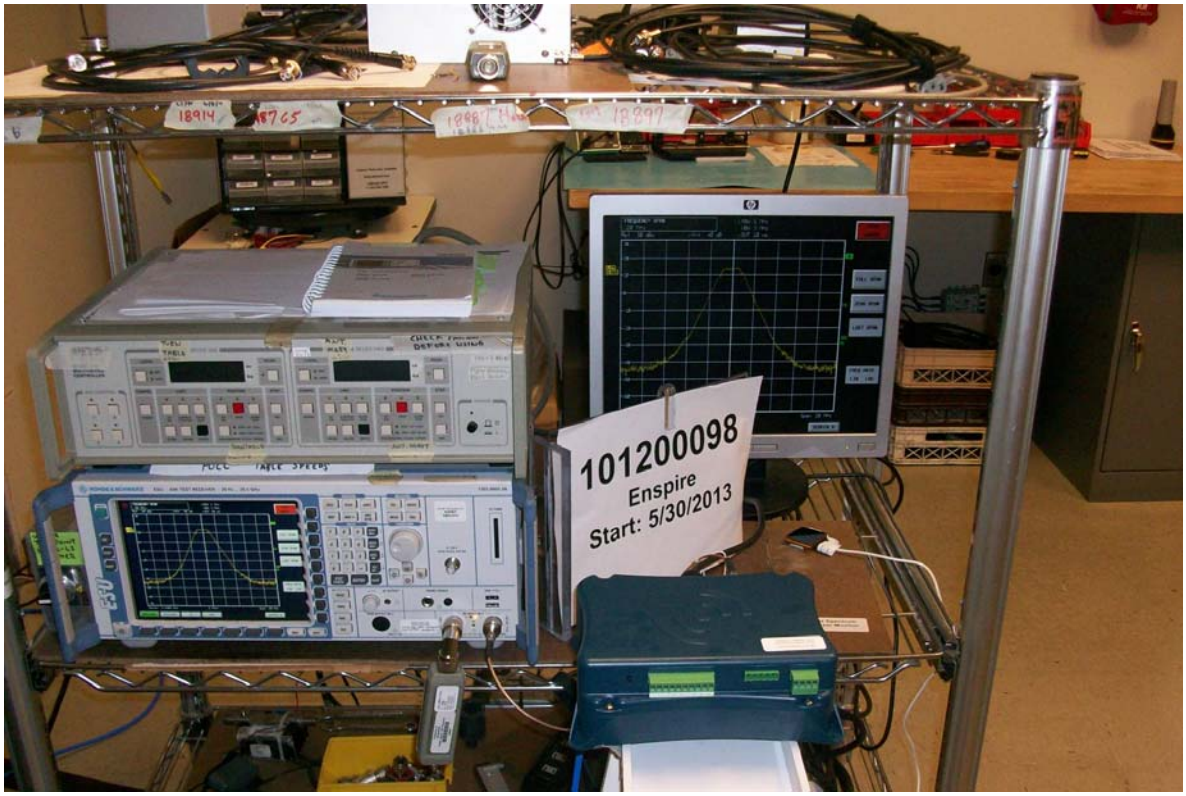
Test Data:

Test Report #:	**G101200098**	Test Area:	CC1 Radiated		Temperature:	23.2	°C
Test Method:	FCC 15.247	Test Date:	5/30/2013		Relative Humidity:	31.5	%
EUT Model #:	AR5	EUT Power:	120VAC/60Hz		Air Pressure:	82.9	kPa
EUT Serial #:	EMC1						
Manufacturer:	Enspire Electronics				Level Key		
EUT Description:	Wireless or Wired Audio Amplifier				Pk – Peak		
Notes:					Qp – Quasi Peak		
					Av - Average		

FREQ	LEVEL	DET	CABLE	FINAL	Limit	DELTA	RBW
MHz	dBm	Qp Av Pk	+ [dB]	= [dBm]	dBm	dB	(MHz)
Harmonics of Fundamental - Conducted Port Measurements							
Time/date stamp: 11:38:00 AM_2013-05-30							
Low Channel Harmonics							
4806.319	-46.99	Pk	2.16	-44.83	-5.8	-39.03	0.1
7209.478	-51.4	Pk	3.17	-48.23	-5.8	-42.43	0.1
9612.637	-53.57	Pk	4.57	-49	-5.8	-43.2	0.1
12015.8	-57.38	Pk	6.25	-51.13	-5.8	-45.33	0.1
14418.96	-64.08	Pk	7.3	-56.78	-5.8	-50.98	0.1
16822.12	-64.81	Pk	11.51	-53.3	-5.8	-47.5	0.1
19225.27	-63.79	Pk	14.96	-48.83	-5.8	-43.03	0.1
21628.43	-64.5	Pk	14.78	-49.72	-5.8	-43.92	0.1
24035.59	-64.66	Pk	14.78	-49.88	-5.8	-44.08	0.1
Mid Channel Harmonics							
4879.842	-49.53	Pk	2.16	-47.37	-5.71	-41.66	0.1
7319.764	-52.14	Pk	3.14	-49	-5.71	-43.29	0.1
9759.685	-49.17	Pk	5	-44.17	-5.71	-38.46	0.1
12199.61	-60.86	Pk	5.69	-55.17	-5.71	-49.46	0.1
14639.53	-63.44	Pk	8.94	-54.5	-5.71	-48.79	0.1
17079.45	-64.63	Pk	13.15	-51.48	-5.71	-45.77	0.1
19519.37	-65.66	Pk	11.64	-54.02	-5.71	-48.31	0.1
21959.29	-64.51	Pk	14.78	-49.73	-5.71	-44.02	0.1
24401.96	-64.8	Pk	14.78	-50.02	-5.71	-44.31	0.1

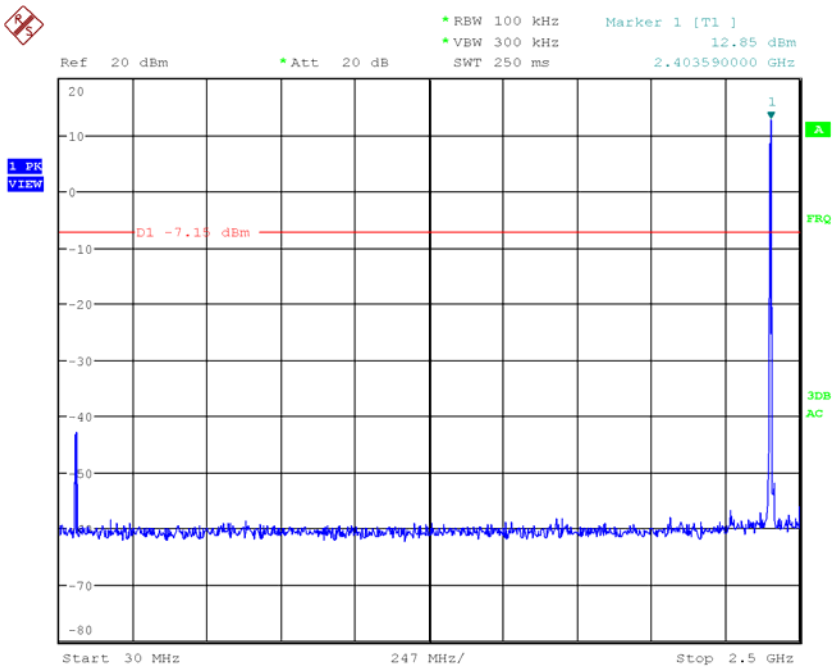
FREQ	LEVEL	DET	CABLE	FINAL	Limit	DELTA	RBW
MHz	dBm	Qp Av Pk	+ [dB]	= [dBm]	dBm	dB	(MHz)
High Channel Harmonics							
4954.546	-51.1	Pk	2.16	-48.94	-5.73	-43.21	0.1
7431.819	-53.92	Pk	3.36	-50.56	-5.73	-44.83	0.1
9907.449	-50.8	Pk	4.97	-45.83	-5.73	-40.1	0.1
12384.72	-63.05	Pk	5.7	-57.35	-5.73	-51.62	0.1
14862	-64.65	Pk	10.26	-54.39	-5.73	-48.66	0.1
17339.27	-65.34	Pk	11.49	-53.85	-5.73	-48.12	0.1
19816.54	-64.21	Pk	14.78	-49.43	-5.73	-43.7	0.1
22293.81	-66.28	Pk	14.78	-51.5	-5.73	-45.77	0.1
24771.09	-63.9	Pk	14.78	-49.12	-5.73	-43.39	0.1

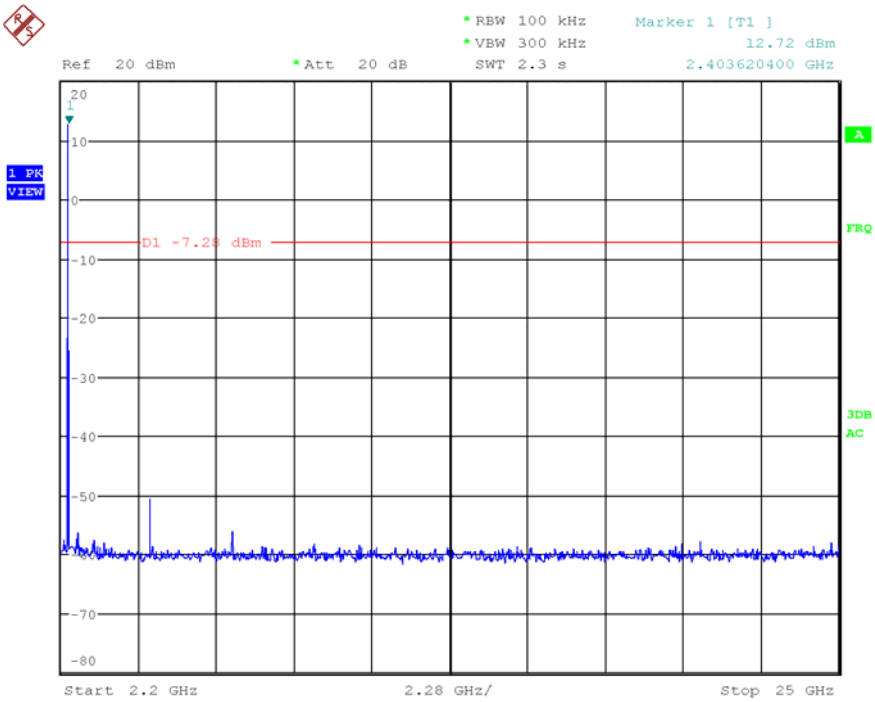
Setup Photographs:



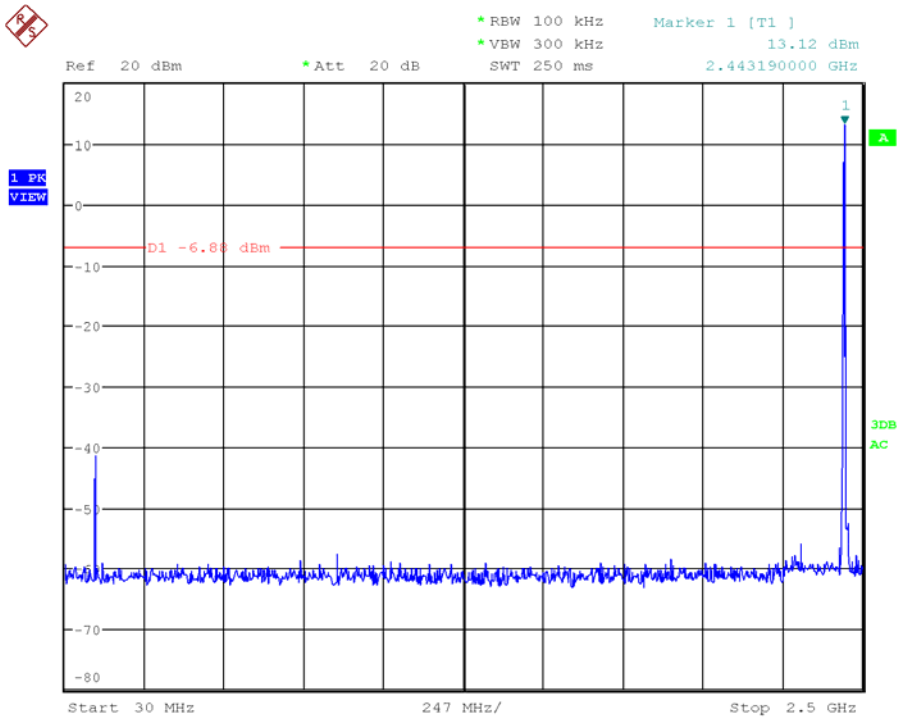
Plots:

Low Channel





Mid Channel



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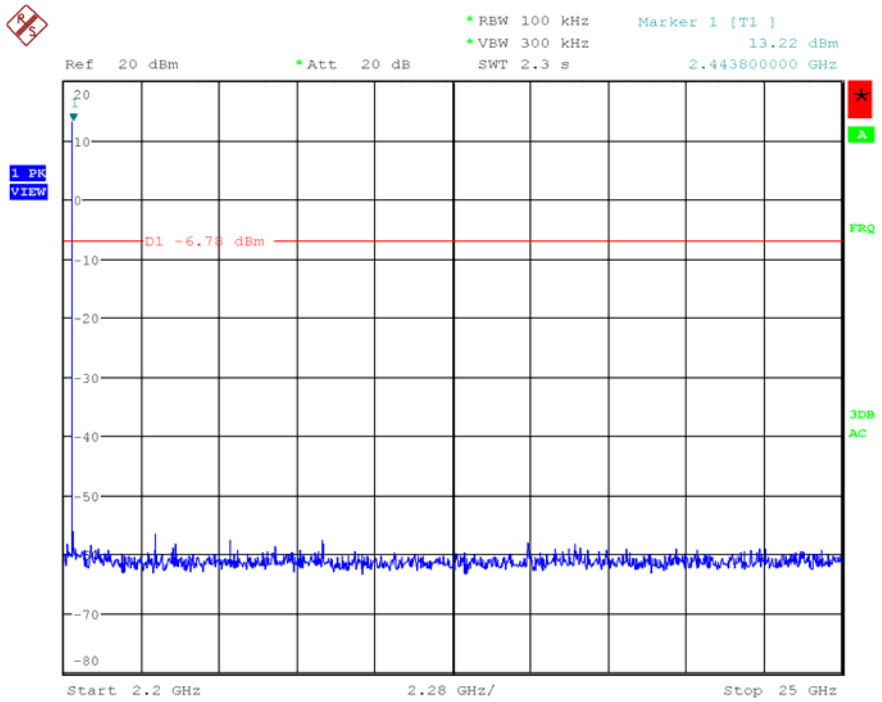

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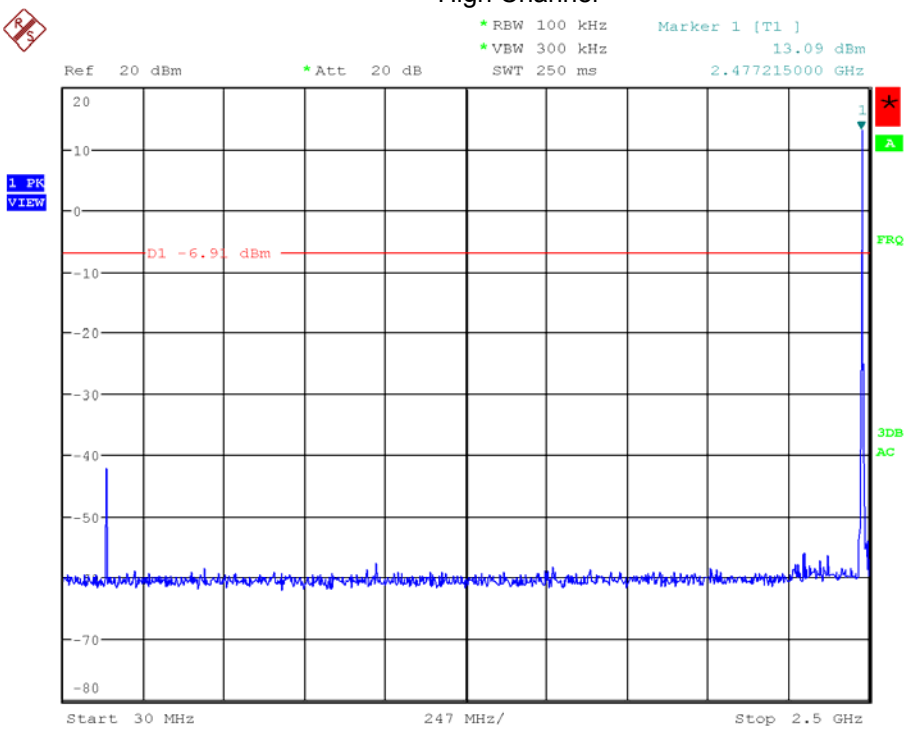
High Channel



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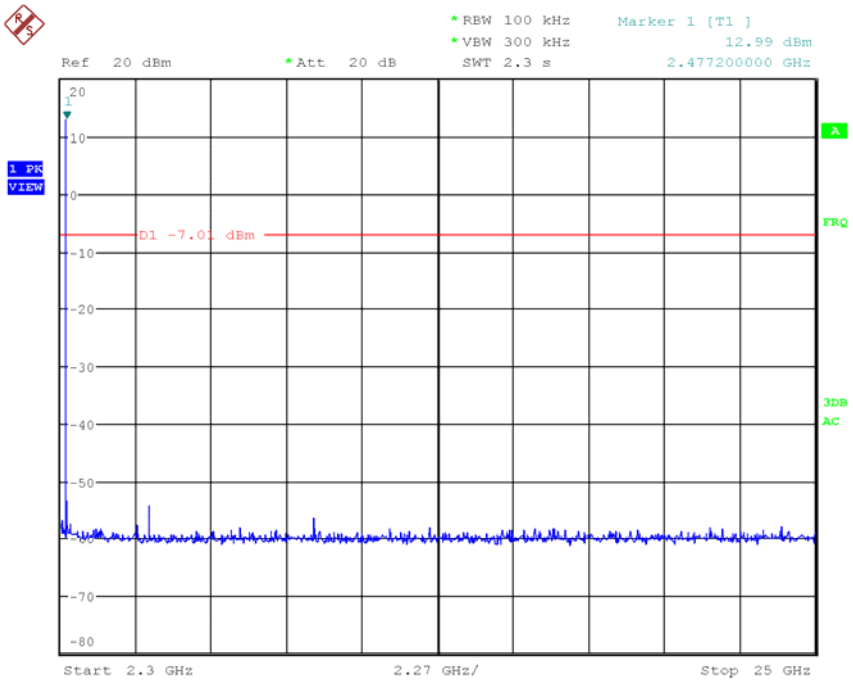

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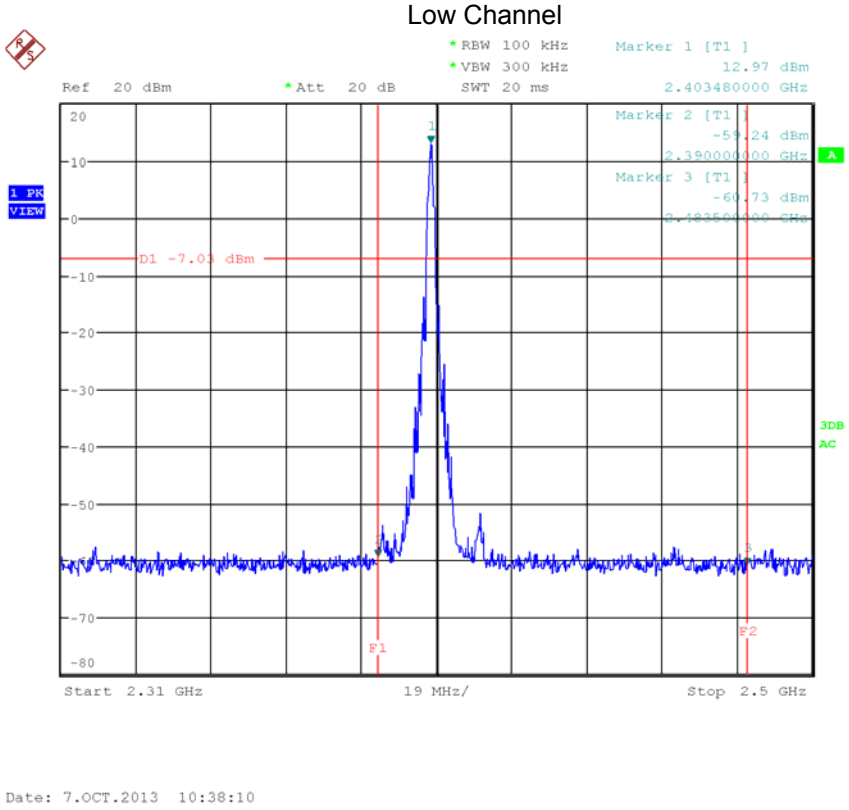
Band Edge

Low Channel



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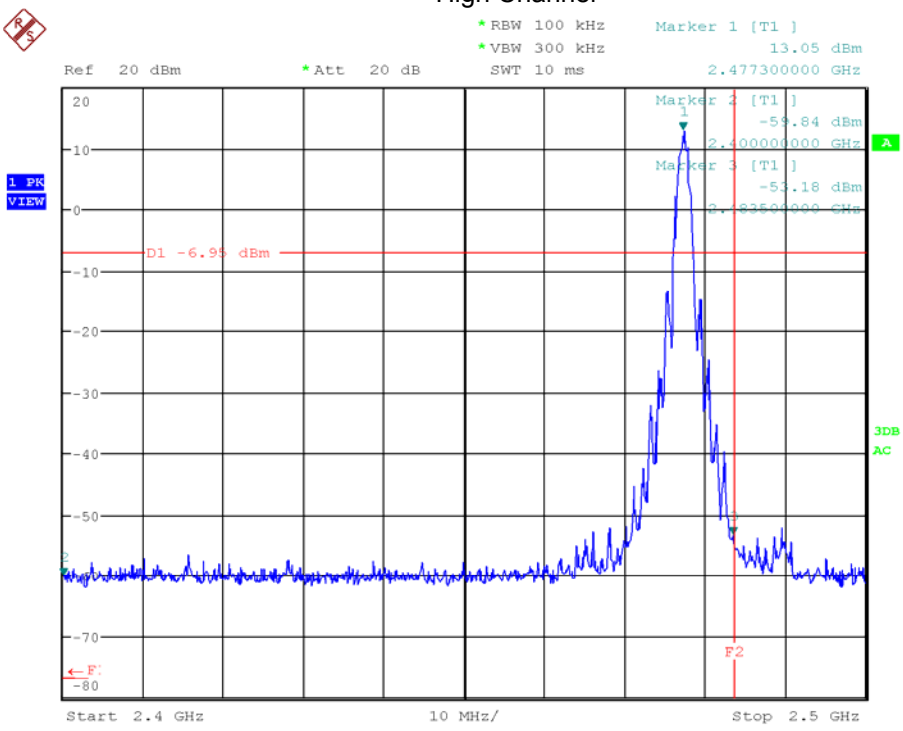
High Channel



Date: 7.OCT.2013 10:43:55

Notes: None

12 Spurious and Band Edge/Restricted Band Emissions - Radiated

Method:

The test methods used comply with ANSI C63.4. Unless otherwise stated no deviations were made from FCC 15.247 and RSS-210.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

FCC part 15.209	
Freq. MHz	Amp. dBuV/m @ 3 m
30	40
88	40
88	43.5
216	43.5
216	46
960	46
960	54
40000	54

- 15.247(d)/15.209
- RSS-210 A8.5/RSS-GEN 7.2.2

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	03/19/2013	03/19/2014
19937	Bilog Antenna 30 MHz - 6GHz	Sunol Sciences	JB6	A050707-2	03/20/2013	03/20/2014
18906	Amplifier 1-4GHz	Mini-Circuits Lab	ZHL-42	N052792-2	06/10/2013	06/10/2014
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/07/2013	06/07/2014
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	11/15/2012	11/15/2013
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/07/2013	06/07/2014
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/07/2013	06/07/2014
18805	Harmonic Mixer	Hewlett-Packard	11970K	2332A01280	01/30/2013	01/30/2014
18806	Harmonic Mixer	Hewlett-Packard	11970A	3003A07640	01/30/2013	01/30/2014
DEN-059	High Pass Filter	Mini-Circuits	VHF-3100+	3 1120	11/06/2012	11/06/2013
18913	Spectrum Analyzer	Agilent	E7405A	MY44211889	08/06/2013	08/06/2014
SW-8	Radiated Emissions VBA worksheet	Microsoft	Excel	none	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary:

Test Report #:	**G101200098**	Test Area:	CC1 Radiated	Temperature:	23.2	°C
Test Method:	FCC 15.247(d)	Test Date:	05/30/2013	Relative Humidity:	31.5	%
EUT Model #:	AR5	EUT Power:	120VAC/60Hz	Air Pressure:	82.9	kPa
EUT Serial #:	EMC1					
Manufacturer:	Enspire Electronics			Level Key		
EUT Description:	Wireless or Wired Audio Amplifier			Pk – Peak		
Notes:	Maximum duty cycle correction utilized for pulsed average measurements in data below is 20dB. Therefore, the product satisfies the peak limit requirements per FCC 15.31.			Qp – Quasi Peak		
	Note: Actual allowed measured/calculated duty cycle correction = -28dB			Av - Average		

Measurements: Restricted Band Harmonics of the Fundamental

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	DCCF	FINAL	POL	HGT	AZ	Limit	DELTA	RBW
MHz	dBuV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	- [dB]	= [dBuV/m]	(V/H)	(m)	(DEG)	15.209 Avg	dB	(MHz)
Radiated Field Measurement of Harmonics in Restricted Band - Axis 1													
Time/date stamp: 04:22:13 PM_2013-05-30													
Low Channel Restricted Band: 4-8GHz													
4807.0000	74.62	**Pk**	5.16	32.89	38.96	20.00	53.71	V	2.74	105.0	54.00	- 0.29	1.000
7211.9423	56.05	**Pk**	6.41	36.06	39.48	20.00	39.04	V	1.33	249.0	54.00	- 14.96	1.000
7211.9423	53.03	**Pk**	6.41	36.06	39.48	20.00	36.02	H	2.04	83.0	54.00	- 17.98	1.000
4807.7821	74.01	**Pk**	5.16	32.89	38.96	20.00	53.10	H	2.54	328.0	54.00	- 0.90	1.000
4807.5321	72.98	**Pk**	5.16	32.89	38.96	20.00	52.07	H	2.54	328.0	54.00	- 1.93	1.000
Low Channel Restricted Band: 8-18GHz													
12019.5500	50.39	**Pk**	8.71	39.20	45.59	20.00	32.71	V	1.61	0.0	54.00	- 21.29	1.000
12019.5500	51.34	**Pk**	8.71	39.20	45.59	20.00	33.66	H	1.33	0.0	54.00	- 20.34	1.000
Mid Channel Restricted Band: 8-18GHz													
12202.2500	50.03	**Pk**	8.82	38.99	45.31	20.00	32.53	H	1.33	0.0	54.00	- 21.47	1.000
12202.2500	50.23	**Pk**	8.82	38.99	45.31	20.00	32.73	V	1.39	151.0	54.00	- 21.27	1.000
Mid Channel Restricted Band: 4-8GHz													
4881.5000	73.28	Pk	5.20	32.99	38.83	20.00	52.64	V	2.62	92.0	54.00	- 1.36	1.000
4881.5000	71.19	Pk	5.20	32.99	38.83	20.00	50.55	H	2.37	28.0	54.00	- 3.45	1.000
7322.2500	51.73	**Pk**	6.47	36.54	39.21	20.00	35.53	H	2.27	87.0	54.00	- 18.47	1.000
7322.2500	51.74	**Pk**	6.47	36.54	39.21	20.00	35.54	V	2.74	300.0	54.00	- 18.46	1.000
7322.2500	51.08	**Pk**	6.47	36.54	39.21	20.00	34.88	H	2.15	356.0	54.00	- 19.12	1.000
High Channel Restricted Band: 4-8GHz													

4955.1260	72.87	Pk	5.24	33.15	38.70	20.00	52.56	H	1.97	334.0	54.00	- 1.44	1.000
4955.1260	70.95	**Pk**	5.24	33.15	38.70	20.00	50.64	V	1.97	334.0	54.00	- 3.36	1.000
7432.6890	46.78	**Pk**	6.52	36.67	39.24	20.00	30.73	V	1.72	118.0	54.00	- 23.27	1.000
7432.6890	49.01	**Pk**	6.52	36.67	39.24	20.00	32.96	H	2.53	225.0	54.00	- 21.04	1.000
High Channel Restricted Band: 8-18GHz													
12387.8150	39.92	**Pk**	8.93	38.85	45.02	20.00	22.68	H	1.47	28.0	54.00	- 31.32	1.000
12387.8154	40.03	Pk	8.93	38.85	45.02	20.00	22.79	V	1.53	36.0	54.00	- 31.21	1.000

Measurements 30MHz to 1000MHz: Tx Spurious

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	FINAL	POL	HGT	AZ	DELTA	RBW
MHz	dBuV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV/m]	(V/H)	(m)	(DEG)	15.209	(MHz)
36.0000	28.31	**Qp**	0.40	16.80	28.20	17.31	V	1.00	291.6	- 22.69	0.120
72.0000	44.11	**Qp**	0.77	8.20	28.09	24.98	V	1.00	133.0	- 15.02	0.120
80.0000	41.00	**Qp**	0.77	7.80	28.06	21.51	V	1.00	60.7	- 18.49	0.120
140.0000	33.24	**Qp**	0.80	12.80	27.77	19.07	V	1.00	337.7	- 24.45	0.120
180.0000	44.13	**Qp**	0.90	11.50	27.58	28.95	V	1.00	223.5	- 14.57	0.120
193.8200	46.54	**Qp**	0.93	11.68	27.51	31.64	V	1.00	187.2	- 11.88	0.120
228.0000	31.17	**Qp**	1.01	11.34	27.35	16.17	V	1.00	81.3	- 29.85	0.120
286.0000	29.09	**Qp**	1.15	13.76	27.12	16.88	V	1.00	268.7	- 29.14	0.120
180.0000	42.33	**Qp**	0.90	11.50	27.58	27.15	H	2.61	122.7	- 16.37	0.120
104.0000	40.39	**Qp**	0.77	11.60	27.94	24.82	H	2.63	277.8	- 18.70	0.120
193.8000	46.71	**Qp**	0.93	11.68	27.51	31.81	H	2.45	291.0	- 11.71	0.120

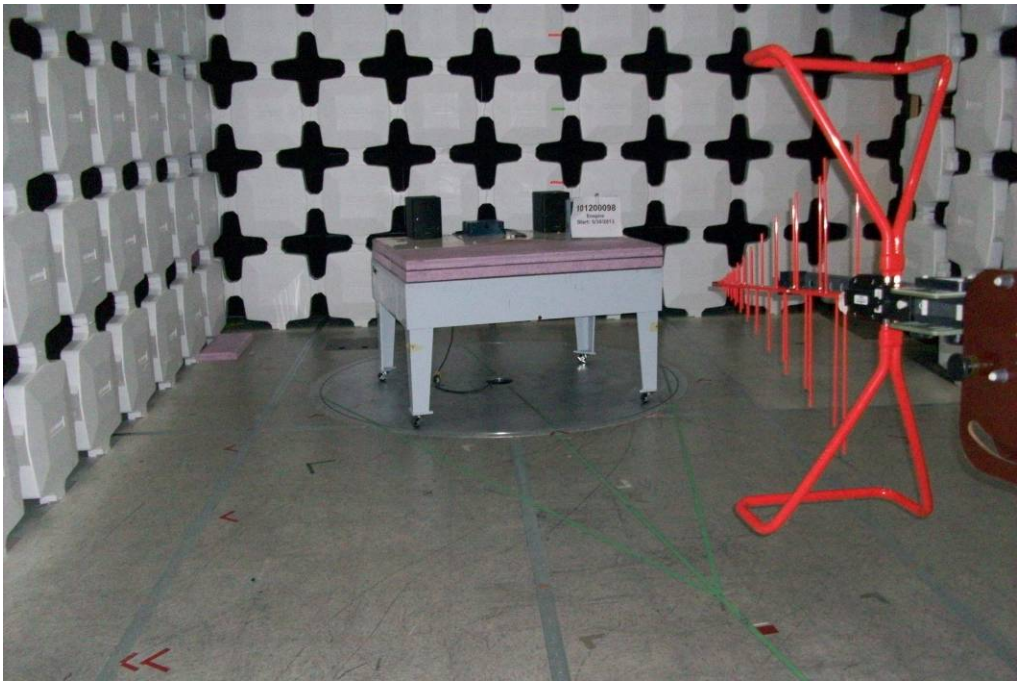
Setup Photographs:

Horn Antenna – 1GHz to 18GHz

Product (Front View)

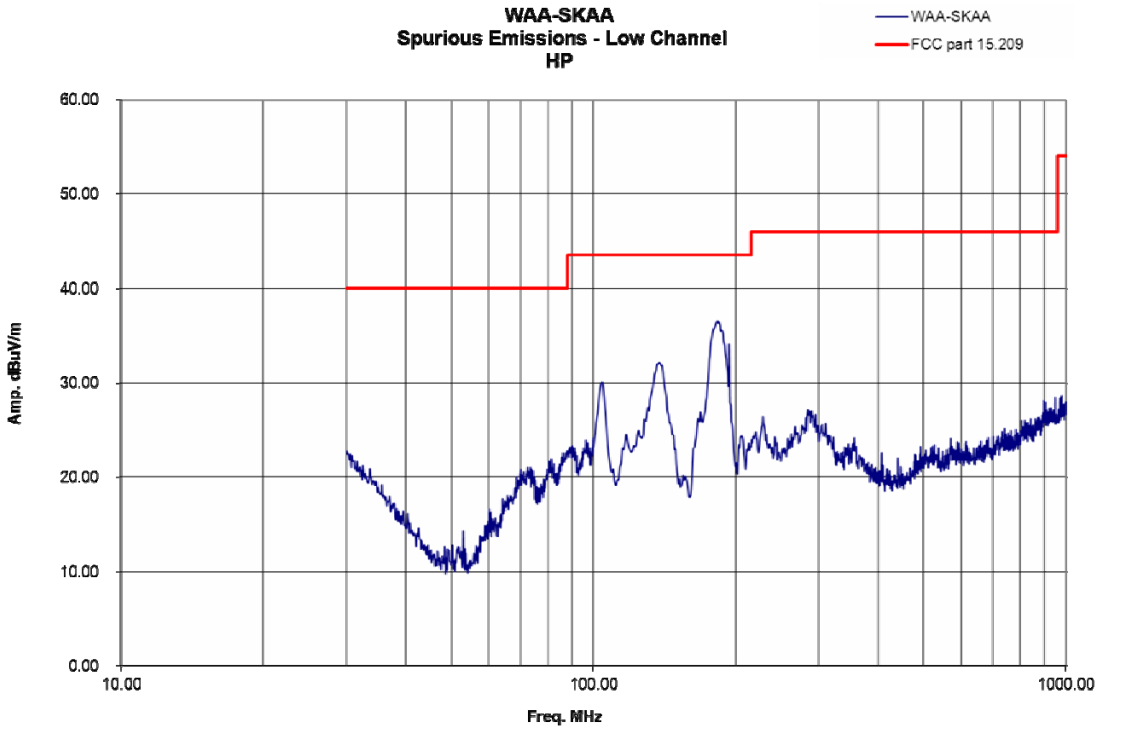
Product (Rear View)

Bilog Antenna – 30MHz to 1000MHz



Harmonic Mixer (Antenna/Preamp) – 18GHz to 25GHz

Plots:


WAA-SKAA
Spurious Emissions - Low Channel
HP
WAA-SKAA
FCC part 15.209
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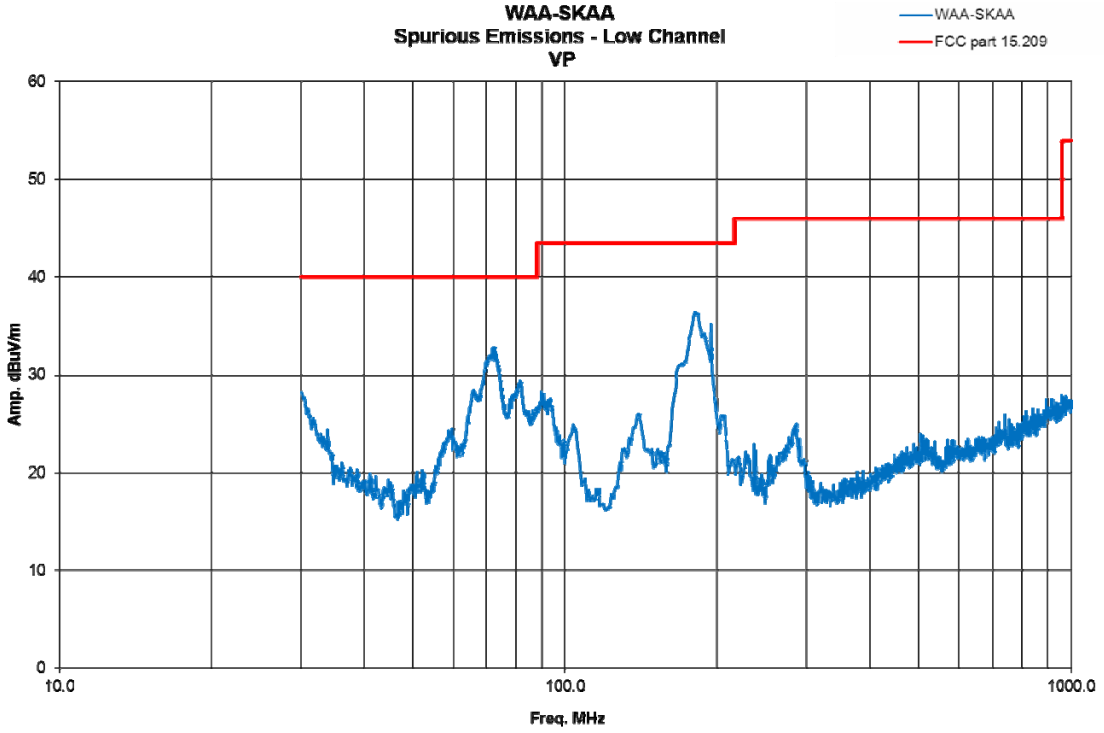
40.00
30.00
20.00
10.00
0.00
Amp. dBuV/m
10.00
100.00
1000.00
Freq. MHz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Spurious Emissions - Low Channel
VP
WAA-SKAA
FCC part 15.209
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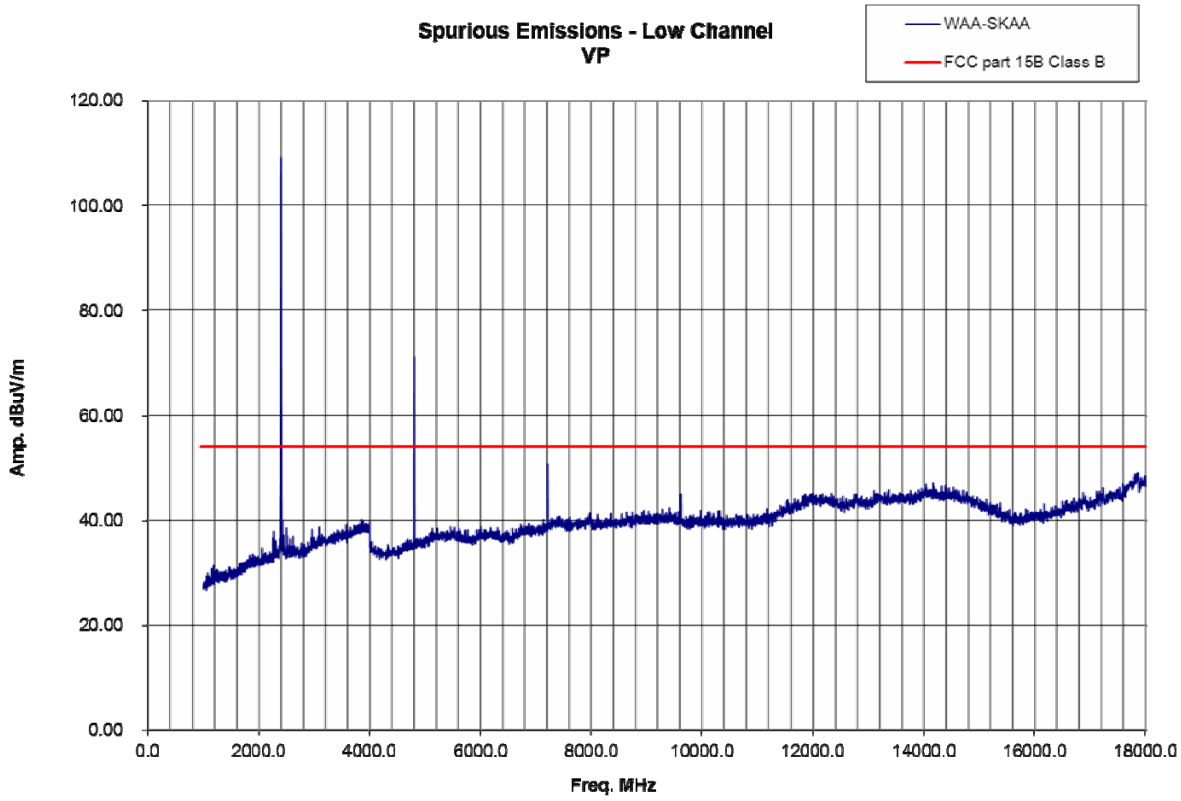
50
40
30
20
10
0
Amp. dBuV/m
10.0
100.0
1000.0
Freq. MHz


Spurious Emissions - Low Channel
VP
WAA-SKAA
FCC part 15B Class B
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100.00
80.00
60.00
40.00
20.00
0.00
Amp. dBuV/m
0.0
2000.0
4000.0
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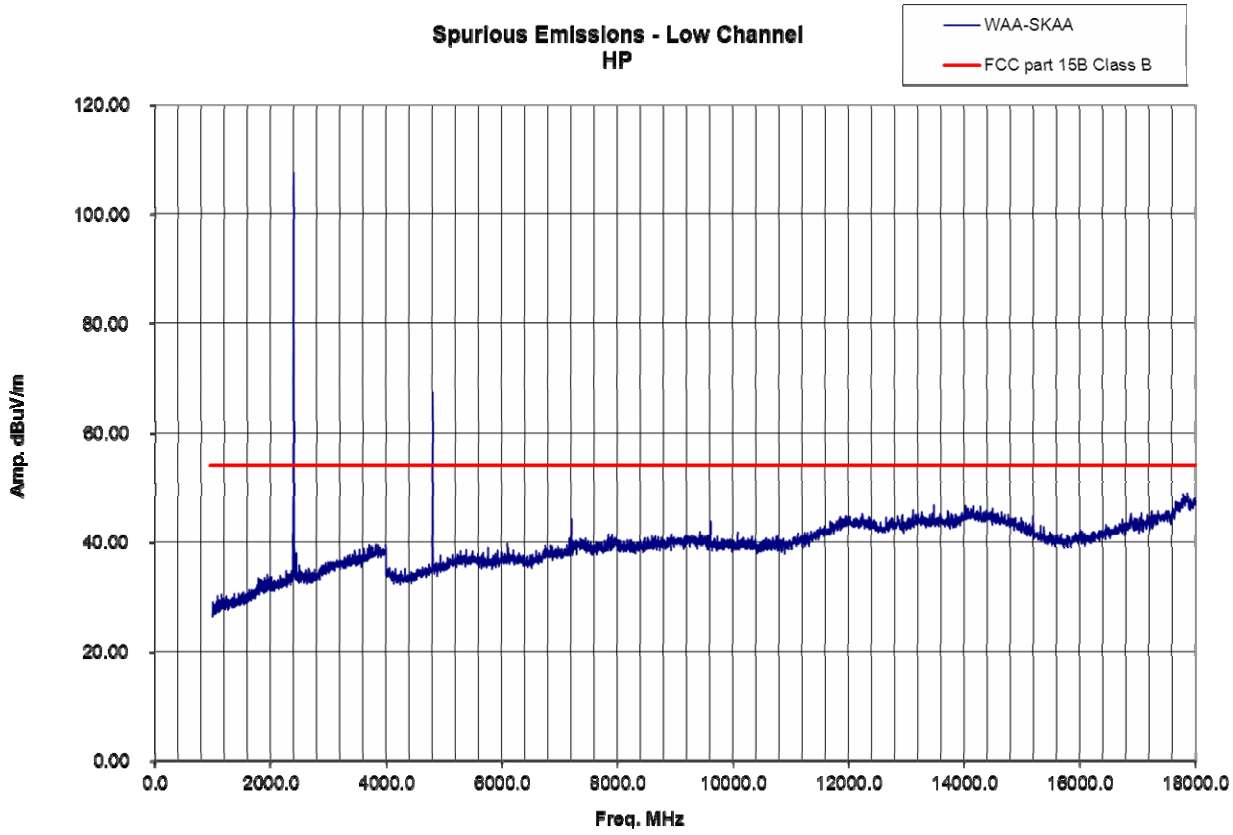
16000.0
18000.0
Freq. MHz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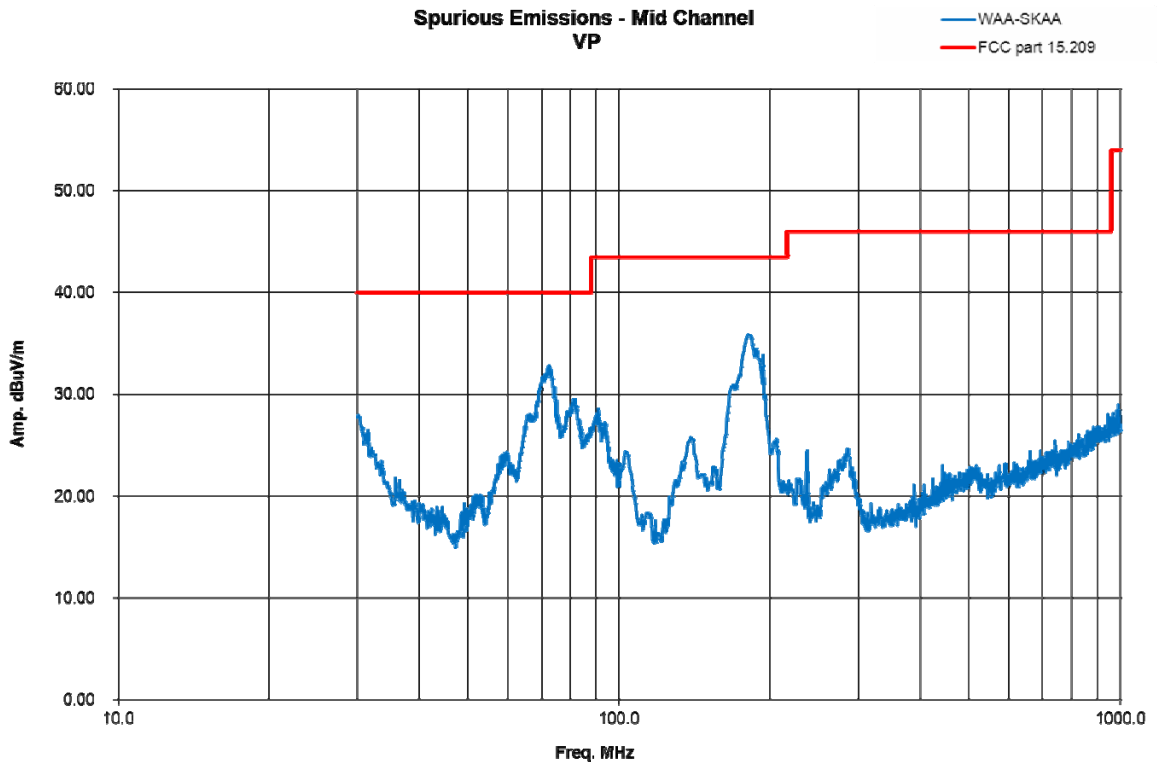
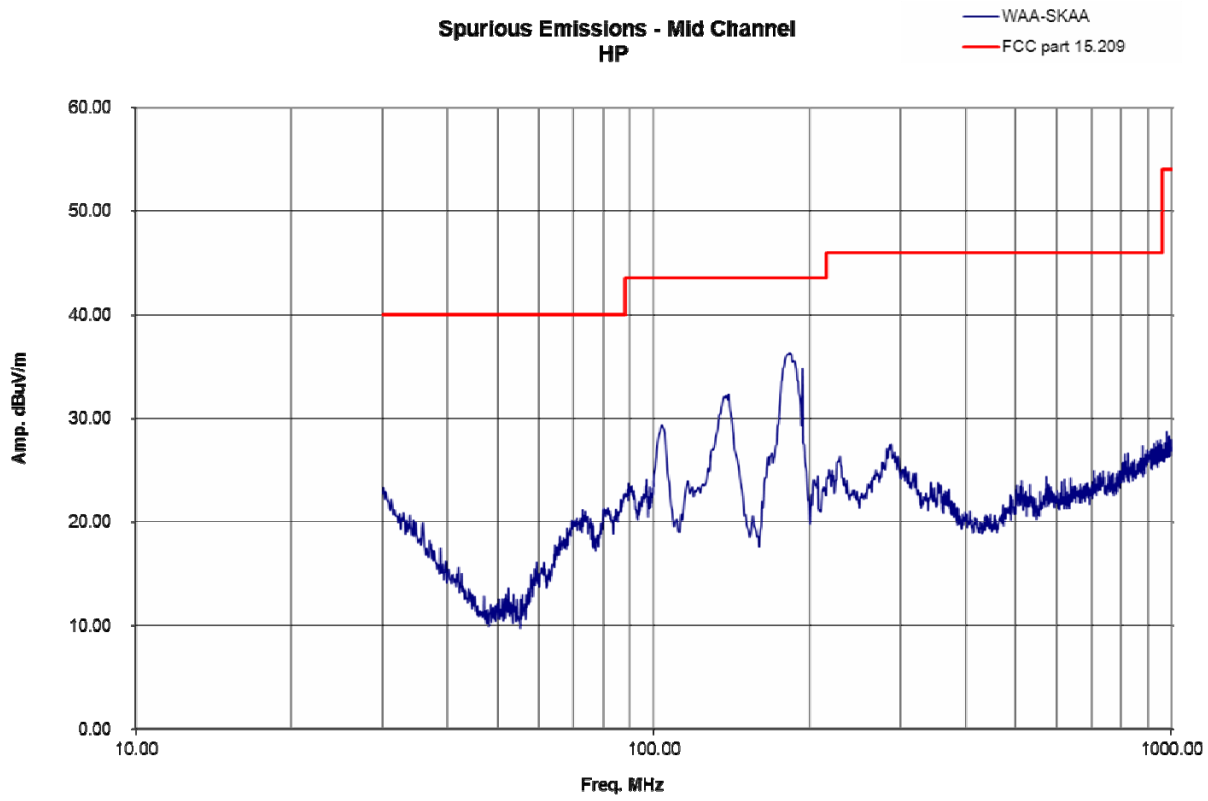
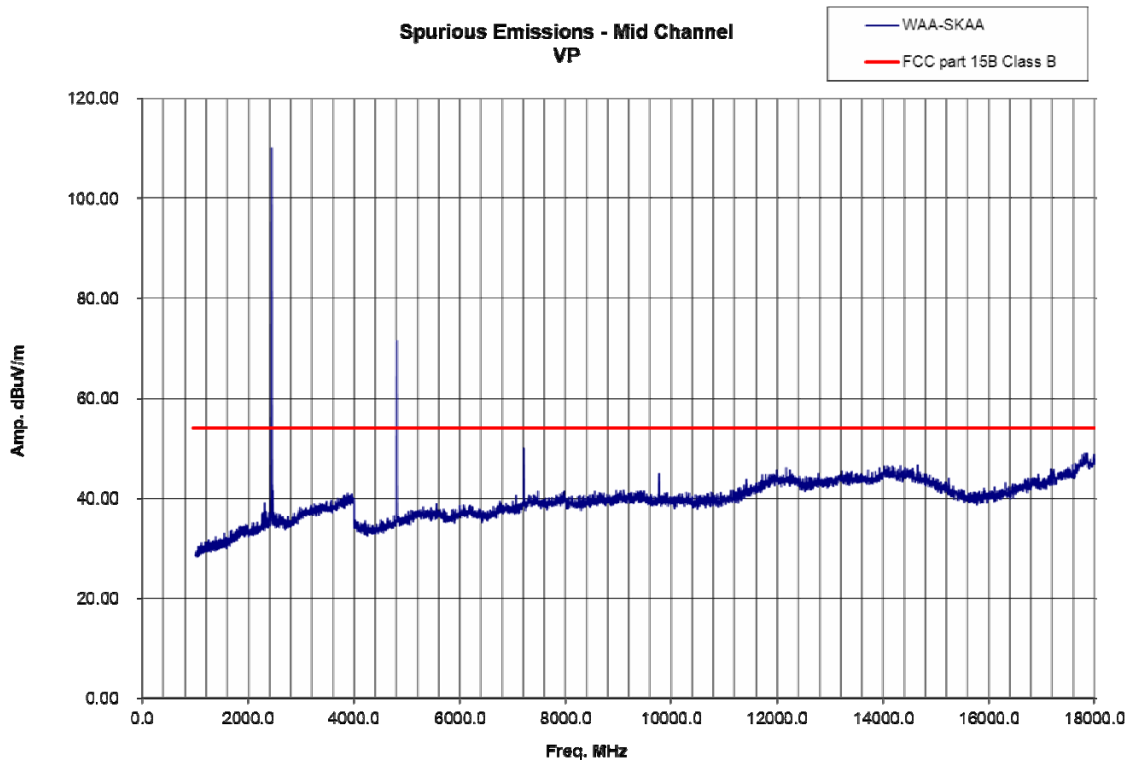
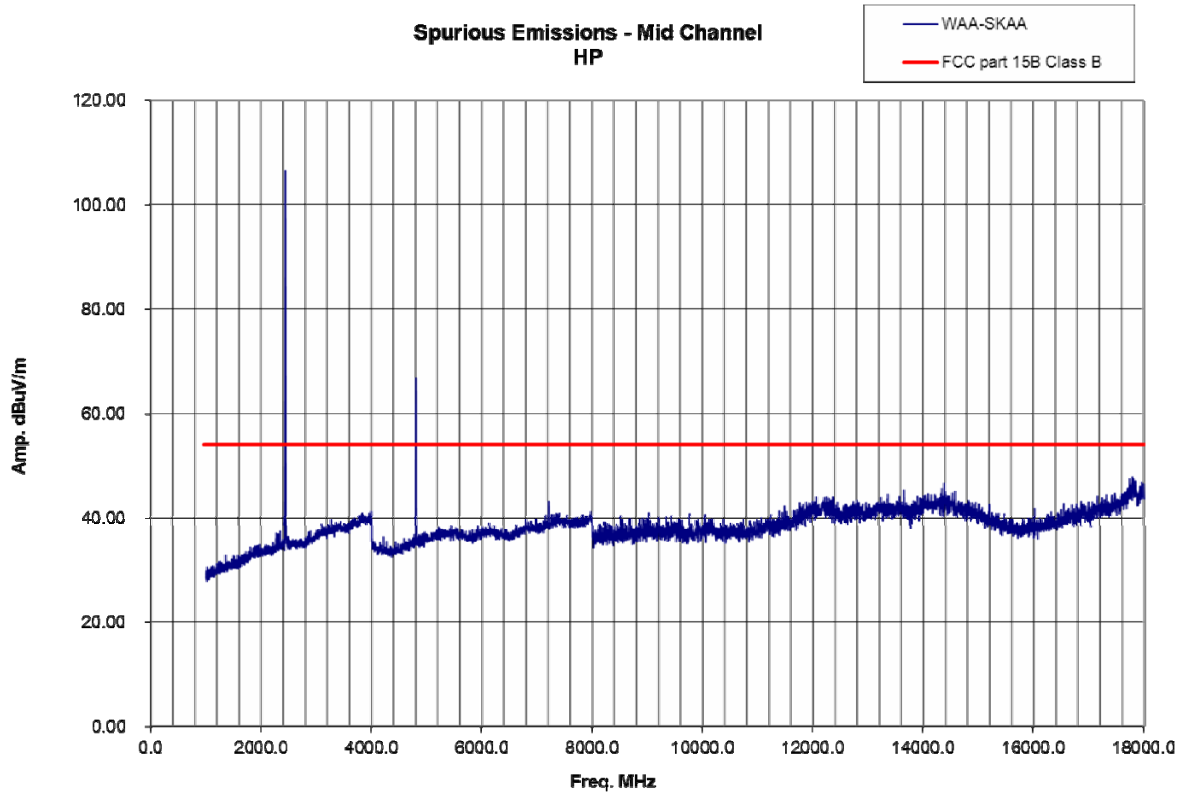
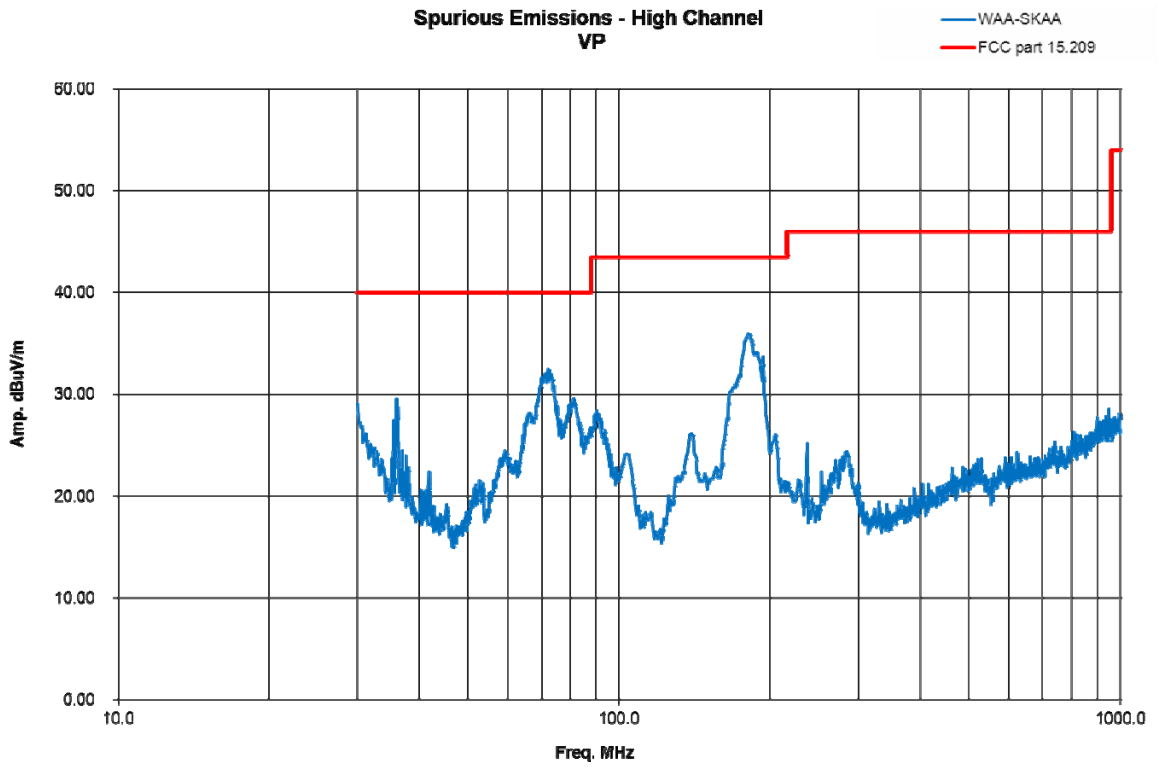
HP
WAA-SKAA
FCC part 15B Class B
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Amp. dBuV/m
0.0
2000.0
4000.0
6000.0
8000.0
10000.0
12000.0
14000.0
16000.0
18000.0
Freq. MHz

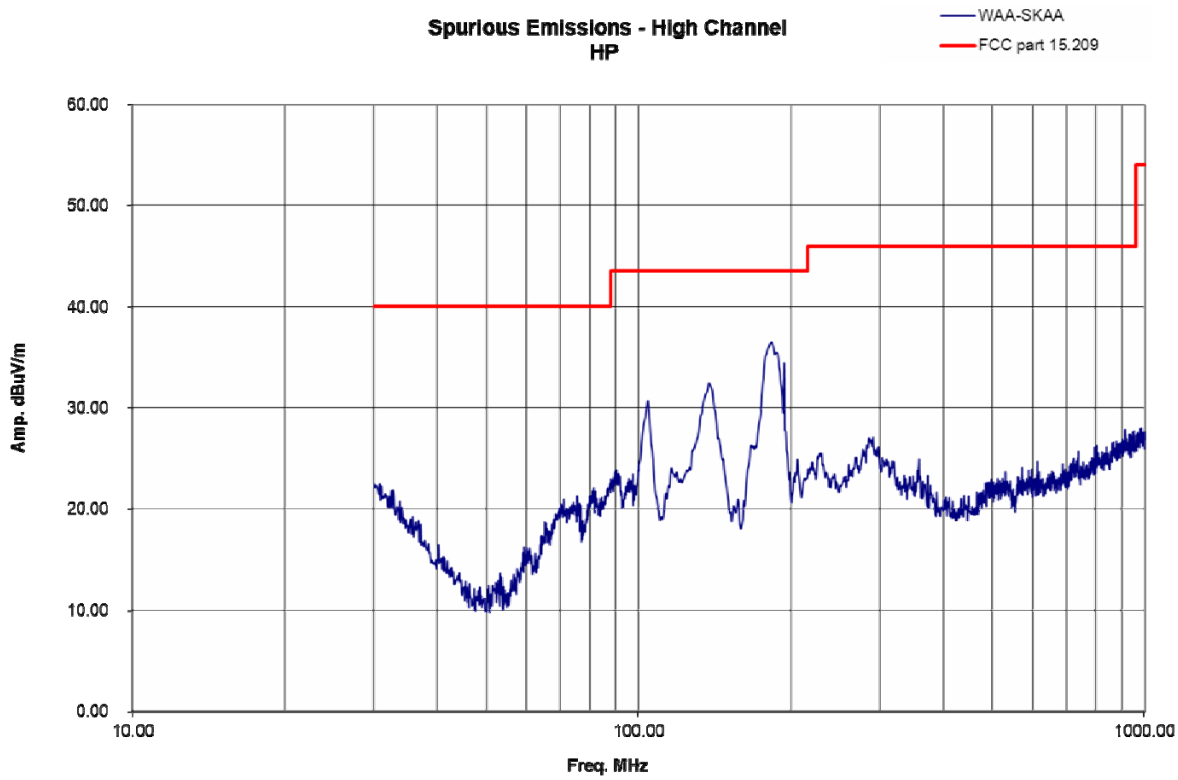

Spurious Emissions - Mid Channel
VP
WAA-SKAA
FCC part 15.209
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Amp. dBuV/m
10.0
100.0
1000.0
Freq. MHz

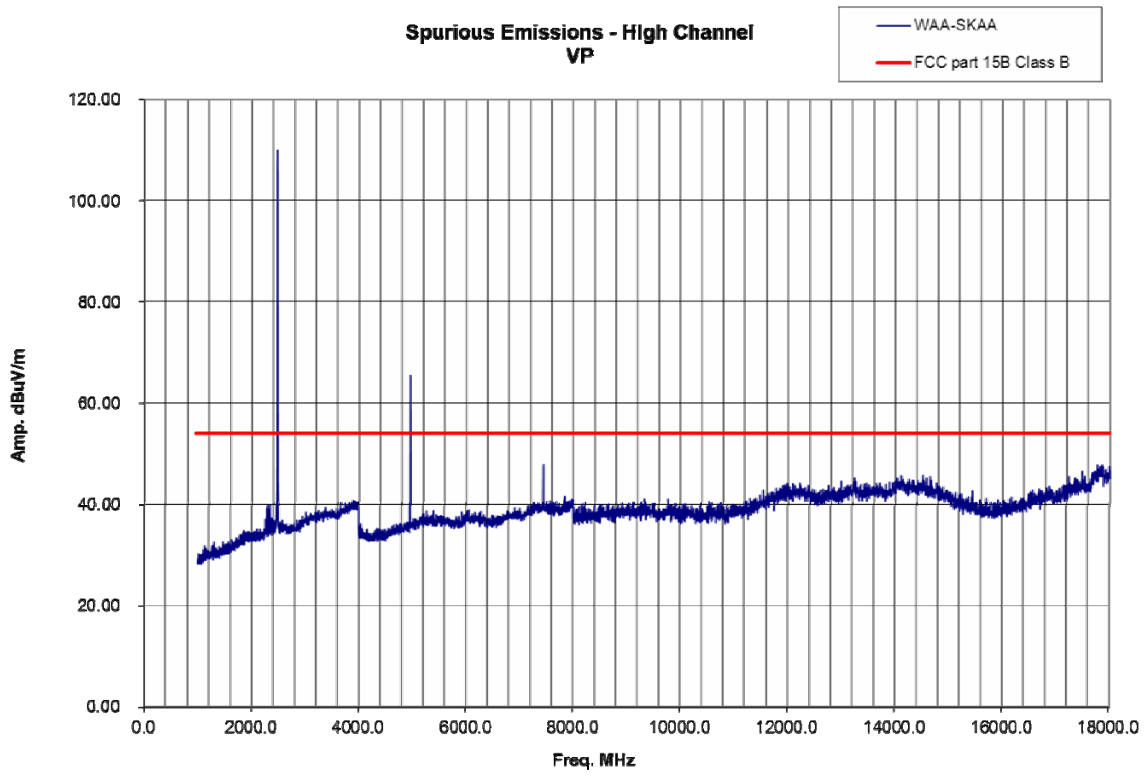

Spurious Emissions - Mid Channel
HP
WAA-SKAA
FCC part 15.209
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Amp. dBuV/m
10.00
100.00
1000.00
Freq. MHz

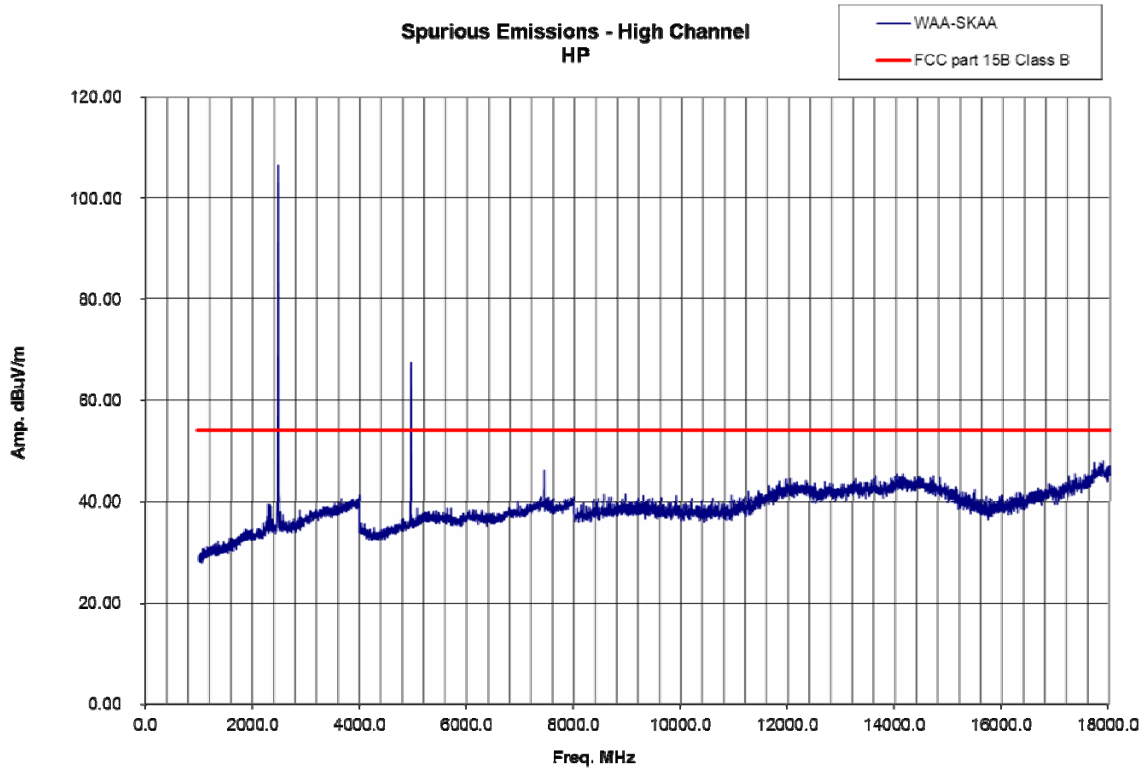

Spurious Emissions - Mid Channel
VP
WAA-SKAA
FCC part 15B Class B
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Amp. dBuV/m
0.0
2000.0
4000.0
6000.0
8000.0
10000.0
12000.0
14000.0
16000.0
18000.0
Freq. MHz

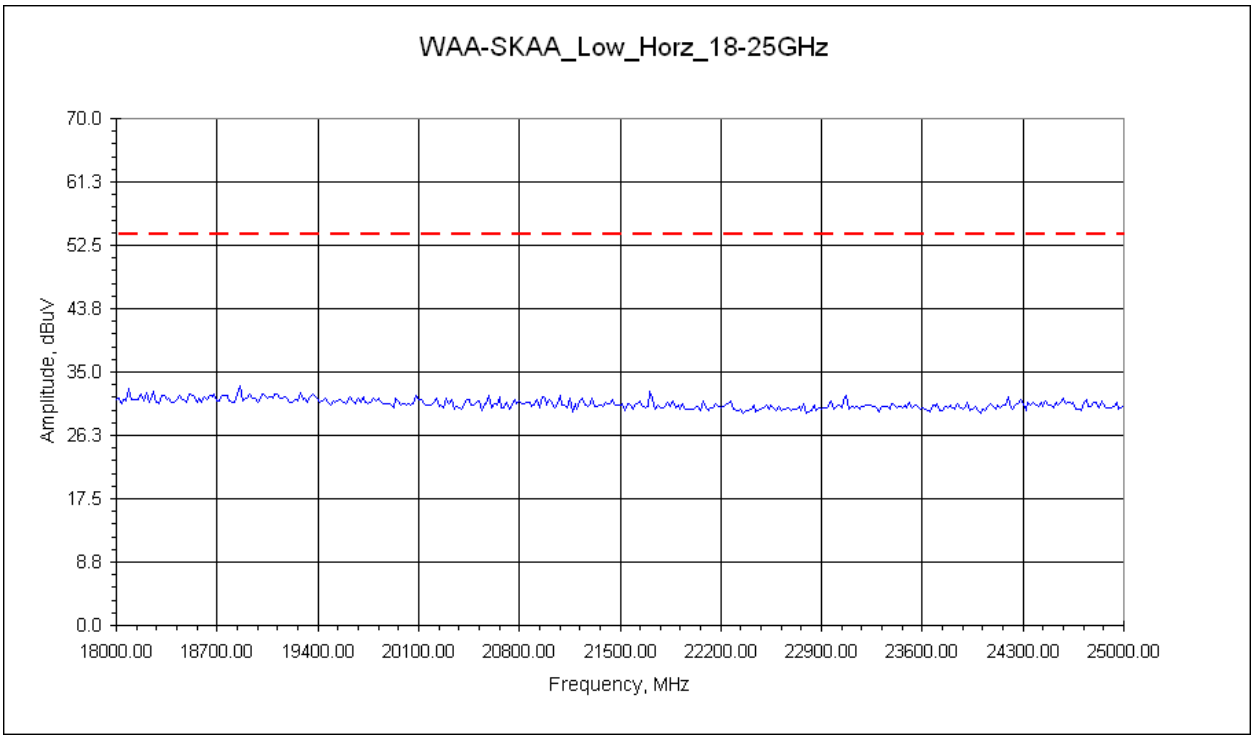

Spurious Emissions - Mid Channel
HP
WAA-SKAA
FCC part 15B Class B
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Amp. dBuV/m
0.0
2000.0
4000.0
6000.0
8000.0
10000.0
12000.0
14000.0
16000.0
18000.0
Freq. MHz

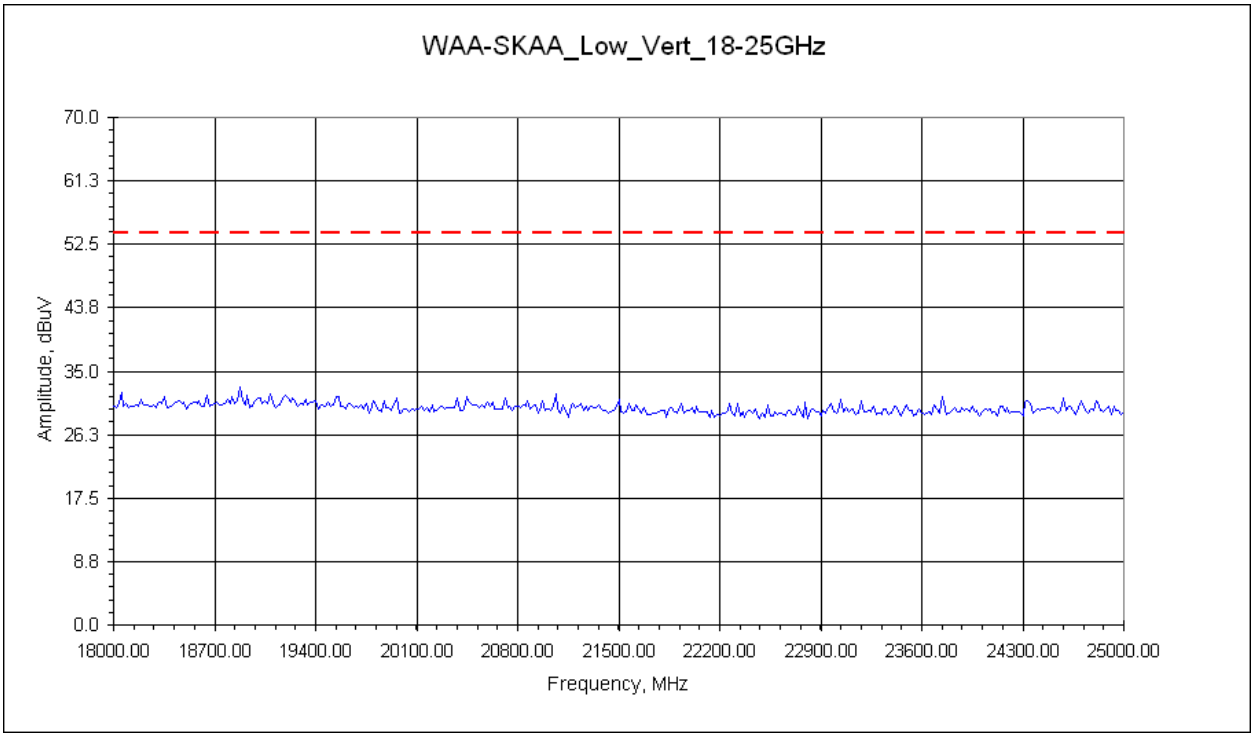

Spurious Emissions - High Channel
VP
WAA-SKAA
FCC part 15.209
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Amp. dBuV/m
10.0
100.0
1000.0
Freq. MHz

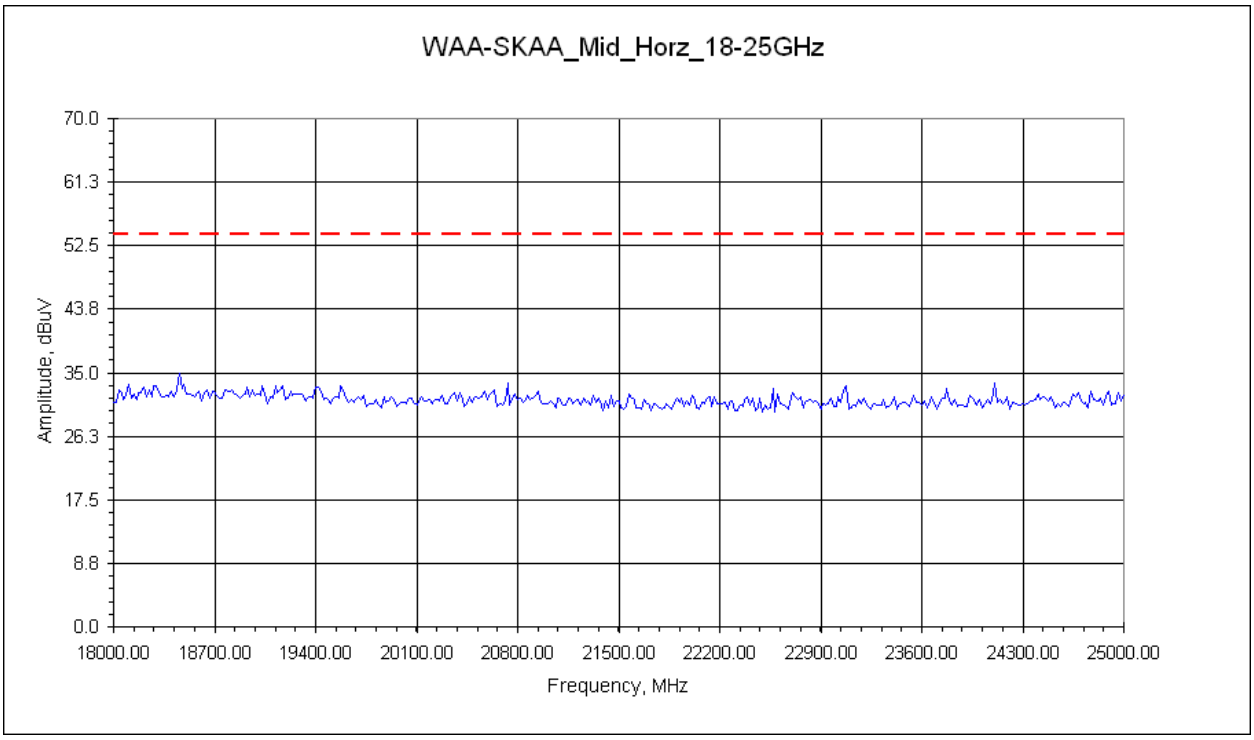

Spurious Emissions - High Channel
HP
WAA-SKAA
FCC part 15.209
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Amp. dBuV/m
10.00
100.00
1000.00
Freq. MHz

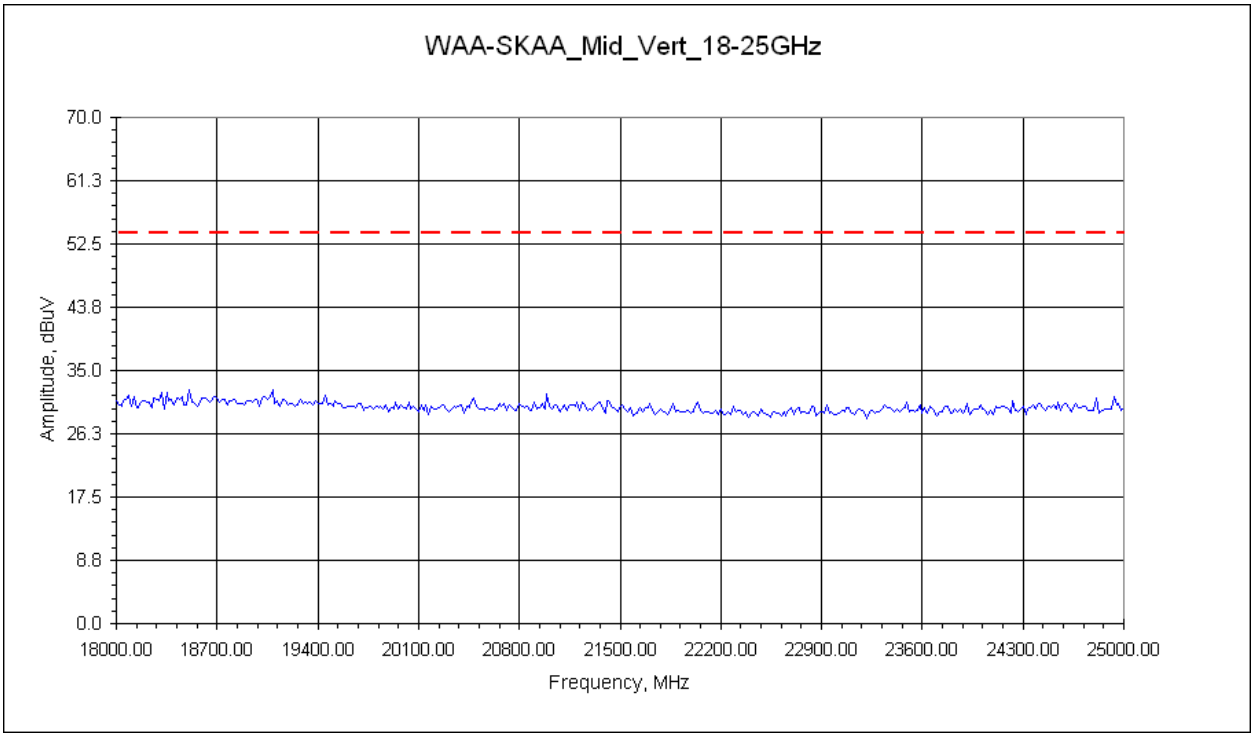

Spurious Emissions - High Channel
VP
WAA-SKAA
FCC part 15B Class B
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Amp. dBuV/m
0.0
2000.0
4000.0
6000.0
8000.0
10000.0
12000.0
14000.0
16000.0
18000.0
Freq. MHz

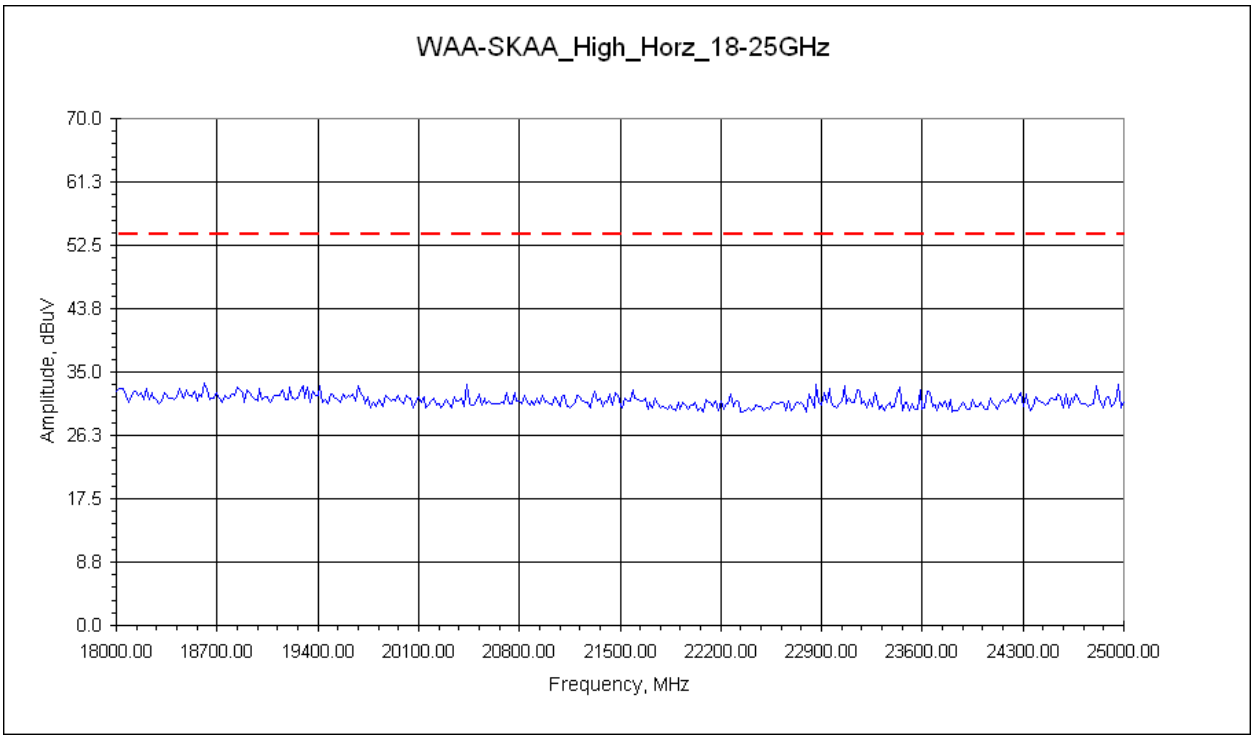

Spurious Emissions - High Channel
HP
WAA-SKAA
FCC part 15B Class B
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Amp. dBuV/m
0.0
2000.0
4000.0
6000.0
8000.0
10000.0
12000.0
14000.0
16000.0
18000.0
Freq. MHz

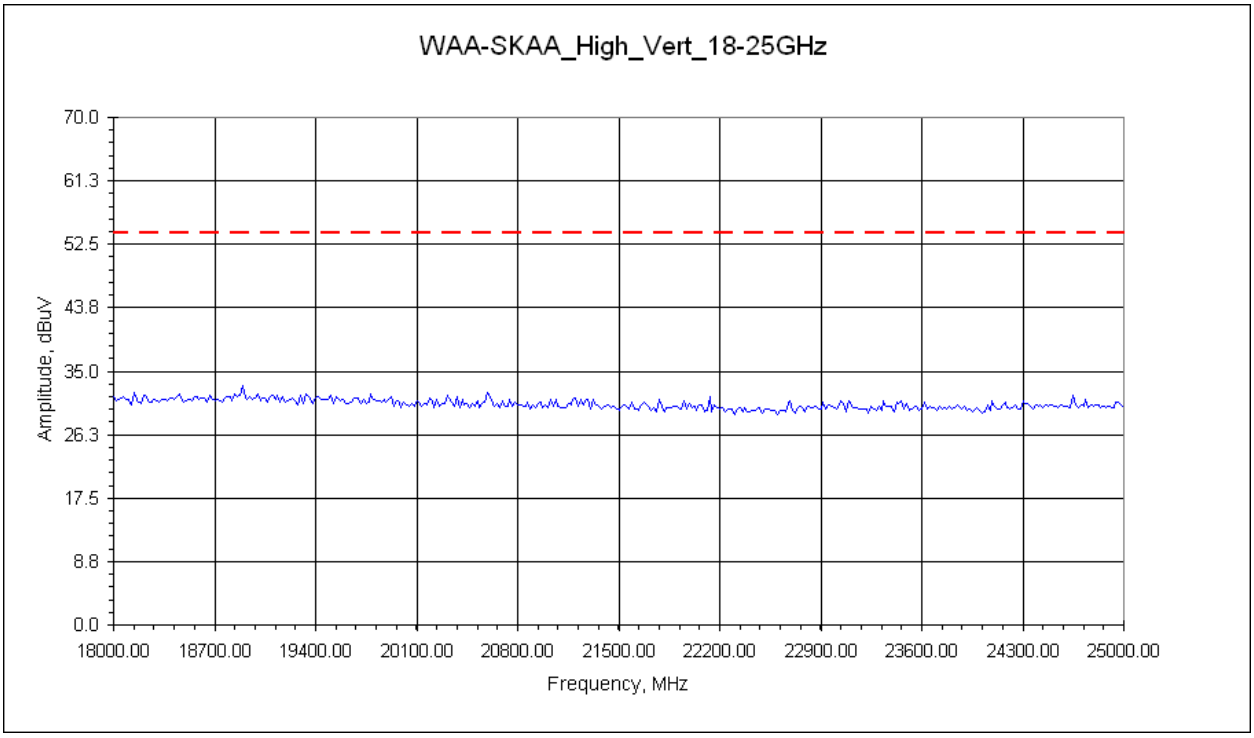

WAA-SKAA_Low_Horz_18-25GHz
70.0
61.3
52.5
43.8
35.0
26.3
17.5
8.8
0.0
Amplitude, dBuV
18000.00
18700.00
19400.00
20100.00
20800.00
21500.00
22200.00
22900.00
23600.00
24300.00
25000.00
Frequency, MHz


WAA-SKAA_Low_Vert_18-25GHz
70.0
61.3
52.5
43.8
35.0
26.3
17.5
8.8
0.0
Amplitude, dBuV
18000.00
18700.00
19400.00
20100.00
20800.00
21500.00
22200.00
22900.00
23600.00
24300.00
25000.00
Frequency, MHz


WAA-SKAA_Mid_Horz_18-25GHz
70.0
61.3
52.5
43.8
35.0
26.3
17.5
8.8
0.0
Amplitude, dBuV
18000.00
18700.00
19400.00
20100.00
20800.00
21500.00
22200.00
22900.00
23600.00
24300.00
25000.00
Frequency, MHz

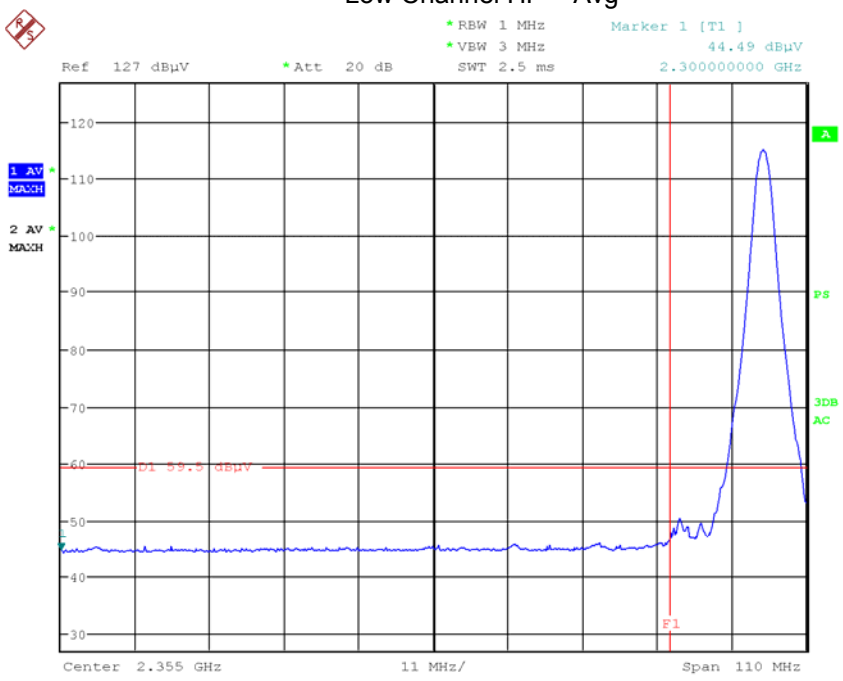

WAA-SKAA_Mid_Vert_18-25GHz
70.0
61.3
52.5
43.8
35.0
26.3
17.5
8.8
0.0
Amplitude, dBuV
18000.00
18700.00
19400.00
20100.00
20800.00
21500.00
22200.00
22900.00
23600.00
24300.00
25000.00
Frequency, MHz


WAA-SKAA_High_Horz_18-25GHz
70.0
61.3
52.5
43.8
35.0
26.3
17.5
8.8
0.0
Amplitude, dBuV
18000.00
18700.00
19400.00
20100.00
20800.00
21500.00
22200.00
22900.00
23600.00
24300.00
25000.00
Frequency, MHz


WAA-SKAA_High_Vert_18-25GHz
70.0
61.3
52.5
43.8
35.0
26.3
17.5
8.8
0.0
Amplitude, dBuV
18000.00
18700.00
19400.00
20100.00
20800.00
21500.00
22200.00
22900.00
23600.00
24300.00
25000.00
Frequency, MHz

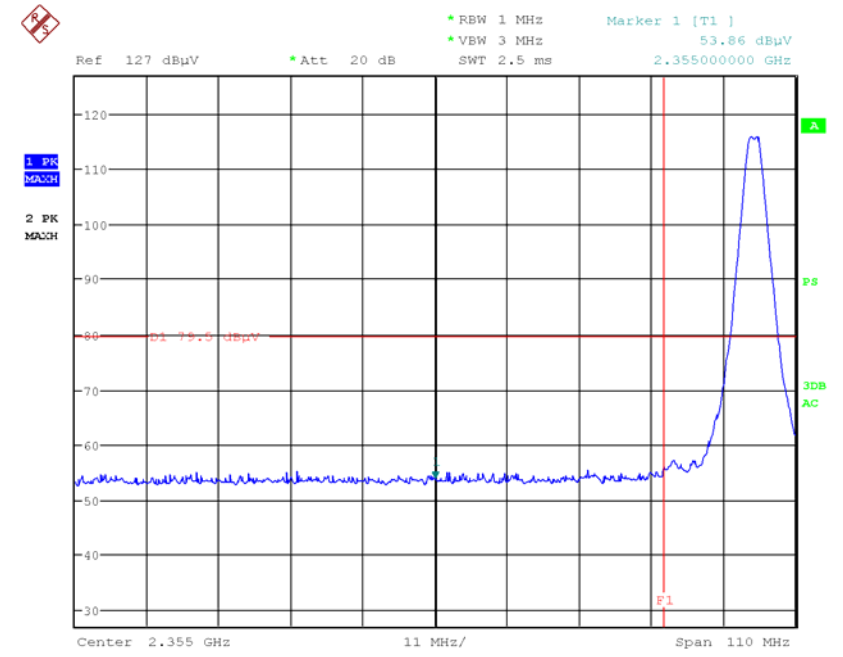
Band Edge

Low Channel HP – Avg



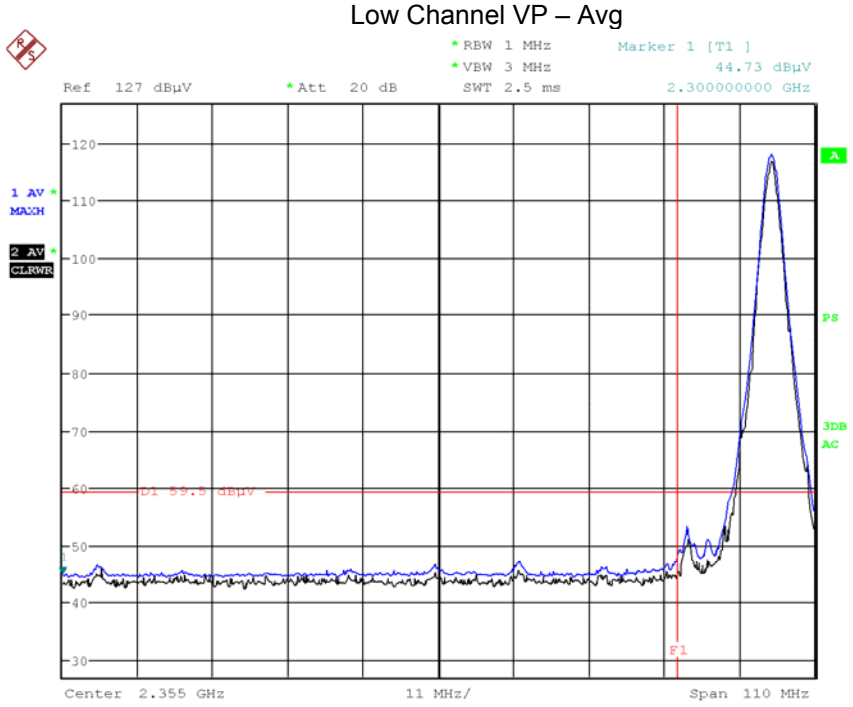
Date: 16.OCT.2013 16:37:26

Low Channel HP – Pk



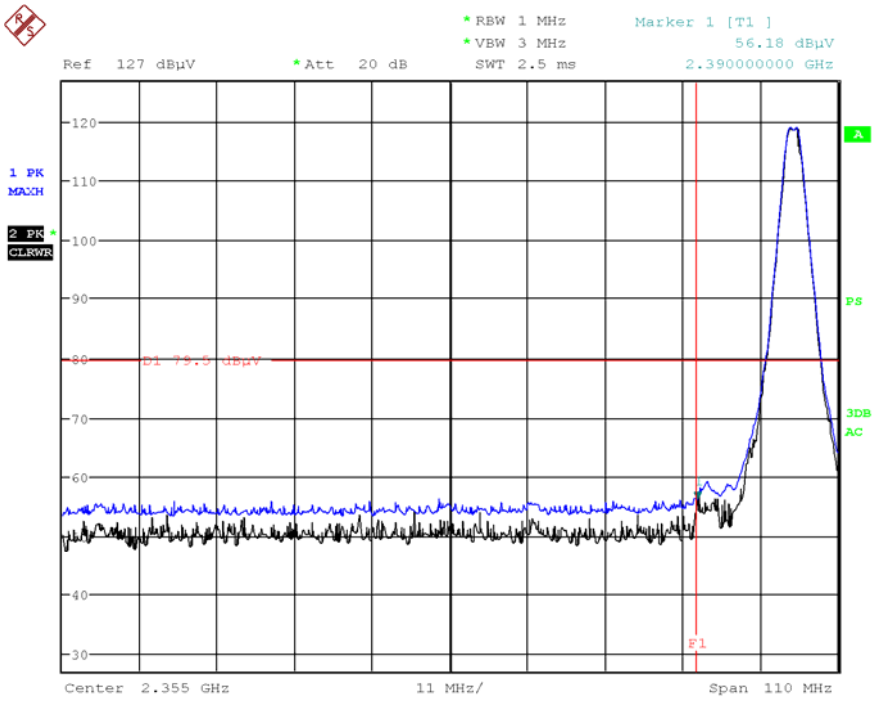
Date: 16.OCT.2013 16:38:17

Low Channel VP – Avg



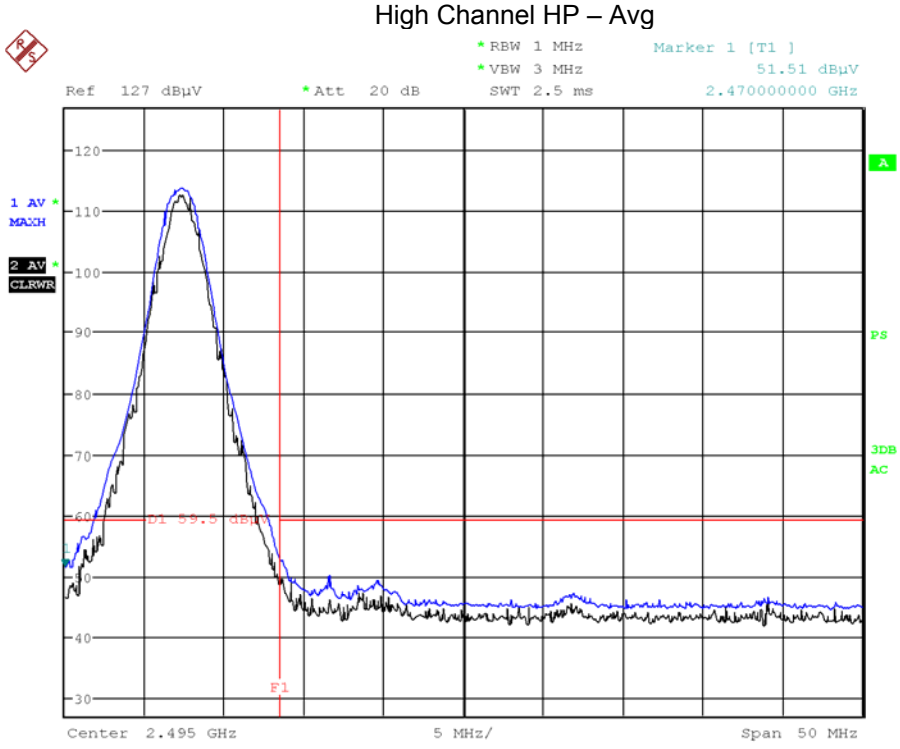
Date: 16.OCT.2013 16:46:47

Low Channel VP – Pk



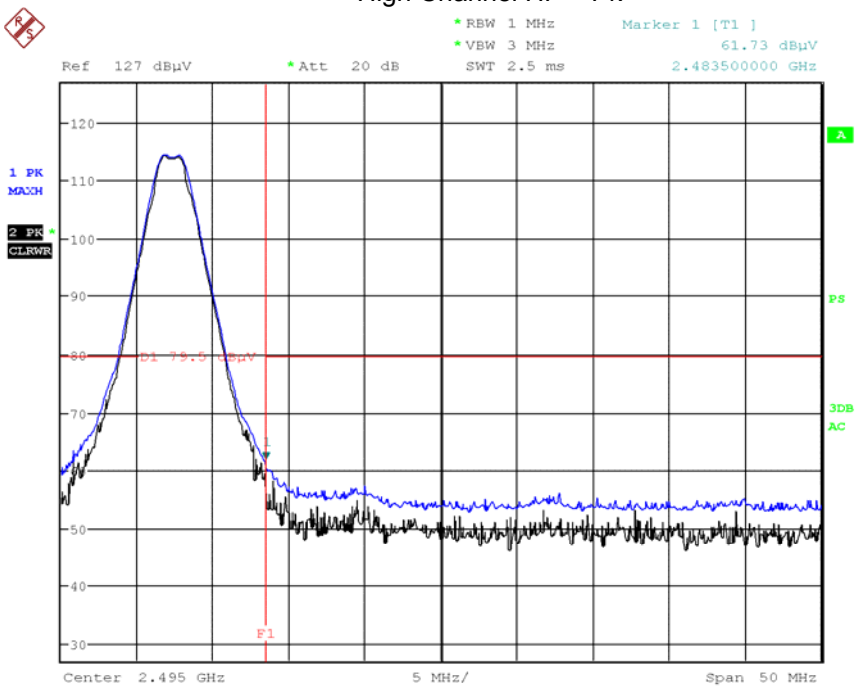
Date: 16.OCT.2013 16:45:45

High Channel HP – Avg



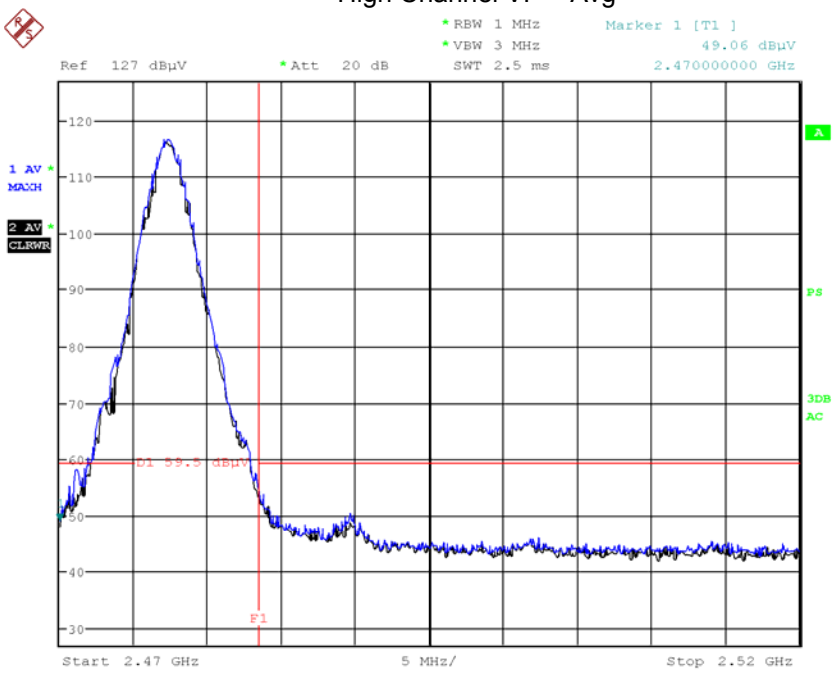
Date: 16.OCT.2013 17:05:23

High Channel HP – Pk



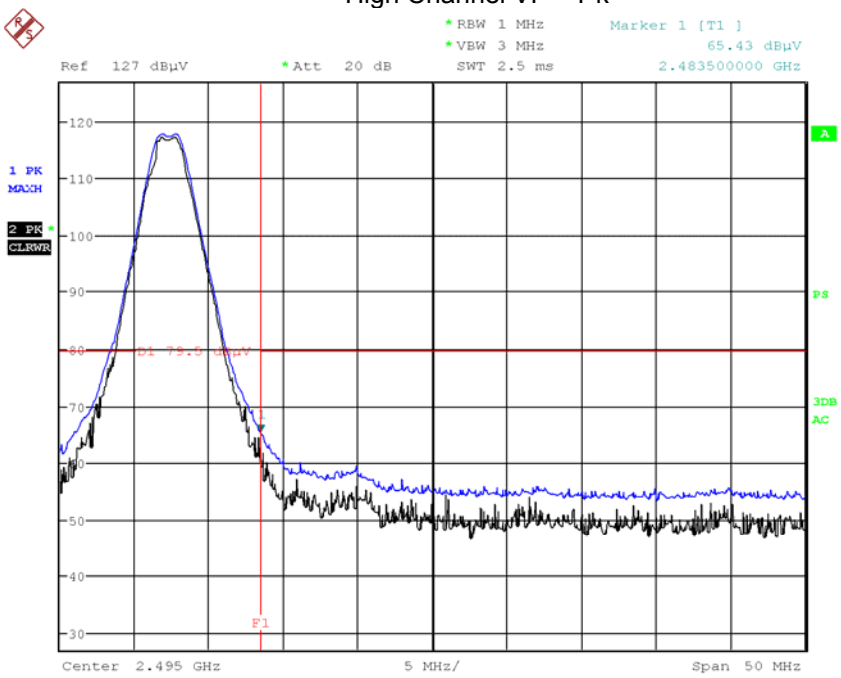
Date: 16.OCT.2013 17:04:39

High Channel VP – Avg



Date: 16.OCT.2013 16:58:03

High Channel VP – Pk



Date: 16.OCT.2013 16:57:12

13 Antenna Requirement

Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.203.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

- FCC 15.203

Results:

The product utilizes an integral antenna – not user accessible; therefore, the sample tested was found to comply.

14 AC Mains Conducted Emissions – Transmitter

Method:

The test methods used comply with ANSI C63.4. Unless otherwise stated no deviations were made from FCC 15.207 and RSS-GEN.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification:

- FCC 15.207
- RSS-GEN 7.2.4

Test Equipment Used:

Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
18885	Transient Limiter	Hewlett-Packard	11947A	3107A00700	05/05/2013	05/05/2014
18914	Single Phase LISN	EMCO	3816/NM	9408-1003	04/11/2013	04/11/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 1.0	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary:

Test Report #:	**G101200098**	Test Area:	CC1 Radiated		Temperature:	23.2	°C
Test Method:	FCC 15.207	Test Date:	6/23/2013		Relative Humidity:	31.5	%
EUT Model #:	AR5	EUT Power:	120VAC/60Hz		Air Pressure:	82.9	kPa
EUT Serial #:	EMC1						
Manufacturer:	Enspire Electronics				Level Key		
EUT Description:	Wireless or Wired Audio Amplifier				Pk – Peak		
Notes:					Qp – Quasi Peak		
					Av - Average		

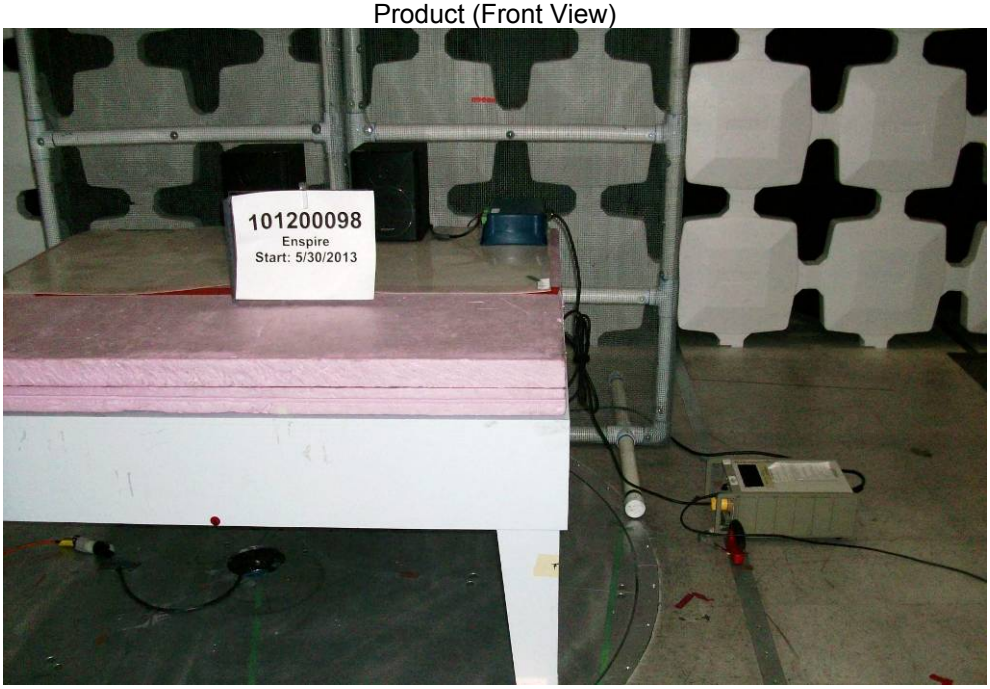
FREQ	LEVEL	DET	CABLE	LISN	ATTEN	FINAL		DELTA1	DELTA2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	+ [dB]	= [dBuV]		AV15.207	QP15.207	(MHz)
Measurements - Wireless mode-Idle										
0.178	5.35	**Av**	0.10	0.03	9.96	15.45	Line 2	- 39.13	NA	0.009

FREQ	LEVEL	DET	CABLE	LISN	ATTEN	FINAL		DELTA1	DELTA2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	+ [dB]	= [dBuV]		AV15.207	QP15.207	(MHz)
0.200	5.87	**Av**	0.10	0.03	9.96	15.96	Line 2	- 37.65	NA	0.009
0.340	7.79	**Av**	0.10	0.02	9.97	17.88	Line 2	- 31.32	NA	0.009
0.584	3.80	**Av**	0.10	0.02	9.97	13.90	Line 2	- 32.10	NA	0.009
0.948	6.88	**Av**	0.20	0.02	9.98	17.08	Line 2	- 28.92	NA	0.009
8.323	9.69	**Av**	0.50	0.10	10.00	20.29	Line 2	- 29.71	NA	0.009
19.800	6.62	**Av**	1.10	0.21	10.02	17.96	Line 2	- 32.04	NA	0.009
27.100	17.06	**Av**	1.30	0.24	10.04	28.64	Line 2	- 21.36	NA	0.009
28.000	17.85	**Av**	1.30	0.21	10.04	29.40	Line 2	- 20.60	NA	0.009
0.178	6.14	**Av**	0.10	0.03	9.96	16.24	Line 1	- 38.34	NA	0.009
0.200	6.55	Av	0.10	0.03	9.96	16.65	Line 1	- 36.96	NA	0.009
0.340	7.98	**Av**	0.10	0.03	9.97	18.08	Line 1	- 31.13	NA	0.009
0.584	3.35	Av	0.10	0.02	9.97	13.45	Line 1	- 32.55	NA	0.009
0.948	6.90	**Av**	0.20	0.03	9.98	17.10	Line 1	- 28.90	NA	0.009
8.323	9.39	Av	0.50	0.09	10.00	19.98	Line 1	- 30.02	NA	0.009
19.800	6.93	**Av**	1.10	0.22	10.02	18.27	Line 1	- 31.73	NA	0.009
27.100	16.86	Av	1.30	0.16	10.04	28.36	Line 1	- 21.64	NA	0.009
28.000	18.17	**Av**	1.30	0.13	10.04	29.64	Line 1	- 20.36	NA	0.009
0.178	13.86	**Qp**	0.10	0.03	9.96	23.96	Line 2	NA	- 40.62	0.009
0.200	15.05	**Qp**	0.10	0.03	9.96	25.14	Line 2	NA	- 38.47	0.009
0.340	18.00	**Qp**	0.10	0.02	9.97	28.09	Line 2	NA	- 31.11	0.009
0.584	12.94	**Qp**	0.10	0.02	9.97	23.04	Line 2	NA	- 32.96	0.009
0.948	16.03	**Qp**	0.20	0.02	9.98	26.23	Line 2	NA	- 29.77	0.009
8.323	18.50	**Qp**	0.50	0.10	10.00	29.10	Line 2	NA	- 30.90	0.009
19.800	15.90	**Qp**	1.10	0.21	10.02	27.24	Line 2	NA	- 32.76	0.009
27.100	26.56	**Qp**	1.30	0.24	10.04	38.14	Line 2	NA	- 21.86	0.009
28.000	27.52	**Qp**	1.30	0.21	10.04	39.07	Line 2	NA	- 20.93	0.009
0.178	15.35	**Qp**	0.10	0.03	9.96	25.45	Line 1	NA	- 39.13	0.009
0.200	16.51	Qp	0.10	0.03	9.96	26.61	Line 1	NA	- 37.00	0.009
0.340	18.26	**Qp**	0.10	0.03	9.97	28.36	Line 1	NA	- 30.85	0.009
0.584	12.42	Qp	0.10	0.02	9.97	22.52	Line 1	NA	- 33.48	0.009
0.948	15.85	**Qp**	0.20	0.03	9.98	26.05	Line 1	NA	- 29.95	0.009
8.323	18.42	Qp	0.50	0.09	10.00	29.01	Line 1	NA	- 30.99	0.009
19.800	16.07	**Qp**	1.10	0.22	10.02	27.41	Line 1	NA	- 32.59	0.009
27.100	26.66	Qp	1.30	0.16	10.04	38.16	Line 1	NA	- 21.84	0.009
28.000	27.70	**Qp**	1.30	0.13	10.04	39.17	Line 1	NA	- 20.83	0.009
**********										
Measurements - Wireless mode-Playing Audio										
0.294	23.53	**Av**	0.10	0.03	9.97	33.62	Line 1	- 16.79	NA	0.009
0.294	37.21	**Qp**	0.10	0.03	9.97	47.30	Line 1	NA	- 13.11	0.009
0.320	21.79	**Av**	0.10	0.03	9.97	31.88	Line 1	- 17.82	NA	0.009
0.320	36.70	**Qp**	0.10	0.03	9.97	46.79	Line 1	NA	- 12.91	0.009
0.374	36.70	**Av**	0.10	0.03	9.97	46.80	Line 1	- 1.62	NA	0.009
0.374	45.42	**Qp**	0.10	0.03	9.97	55.52	Line 1	NA	- 2.90	0.009
0.374	36.08	**Av**	0.10	0.03	9.97	46.18	Line 1	- 2.24	NA	0.009
0.374	44.27	**Qp**	0.10	0.03	9.97	54.37	Line 1	NA	- 4.05	0.009
0.380	35.02	**Av**	0.10	0.03	9.97	45.12	Line 1	- 3.16	NA	0.009
0.380	35.20	**Av**	0.10	0.03	9.97	45.30	Line 1	- 2.98	NA	0.009

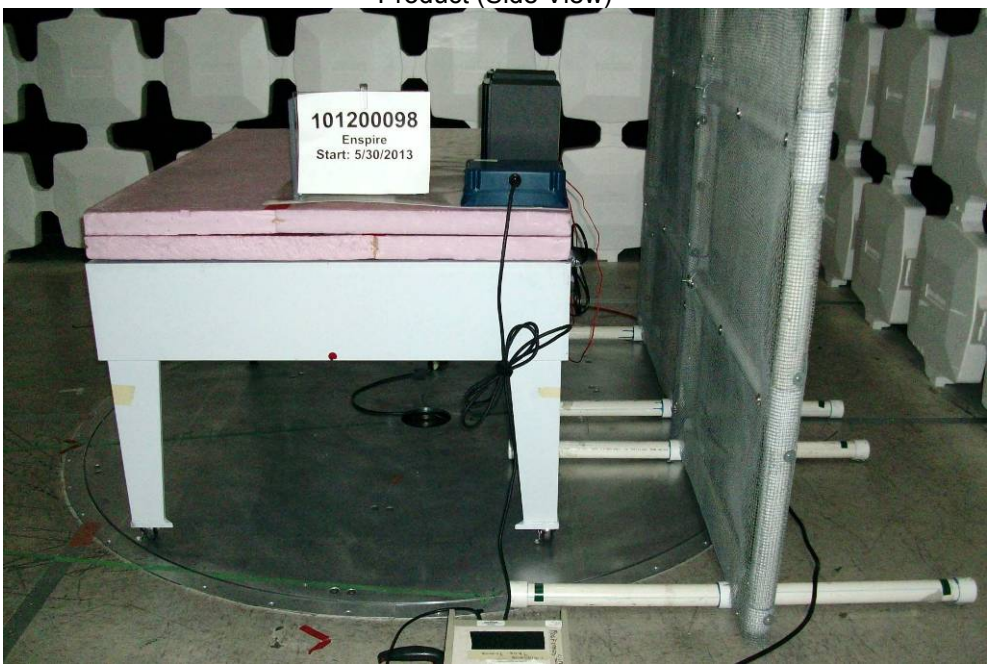
FREQ	LEVEL	DET	CABLE	LISN	ATTEN	FINAL		DELTA1	DELTA2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	+ [dB]	= [dBuV]		AV15.207	QP15.207	(MHz)
0.380	43.79	Qp	0.10	0.03	9.97	53.89	Line 1	NA	- 4.39	0.009
0.380	45.19	Qp	0.10	0.03	9.97	55.29	Line 1	NA	- 2.99	0.009
0.680	13.97	Av	0.10	0.03	9.98	24.07	Line 1	- 21.93	NA	0.009
0.680	33.33	Qp	0.10	0.03	9.98	43.43	Line 1	NA	- 12.57	0.009
1.134	21.37	Av	0.20	0.03	9.98	31.58	Line 1	- 14.42	NA	0.009
1.134	32.49	Qp	0.20	0.03	9.98	42.70	Line 1	NA	- 13.30	0.009
2.620	16.30	Av	0.20	0.03	9.98	26.51	Line 1	- 19.49	NA	0.009
2.620	24.90	Qp	0.20	0.03	9.98	35.11	Line 1	NA	- 20.89	0.009
7.535	18.86	Av	0.45	0.07	9.99	29.38	Line 1	- 20.62	NA	0.009
7.535	28.45	Qp	0.45	0.07	9.99	38.97	Line 1	NA	- 21.03	0.009
11.359	32.62	Av	0.70	0.12	10.00	43.44	Line 1	- 6.56	NA	0.009
11.359	42.28	Qp	0.70	0.12	10.00	53.10	Line 1	NA	- 6.90	0.009
11.659	33.82	Av	0.73	0.12	10.00	44.67	Line 1	- 5.33	NA	0.009
11.659	45.63	Qp	0.73	0.12	10.00	56.48	Line 1	NA	- 3.52	0.009
11.809	33.56	Av	0.76	0.12	10.00	44.45	Line 1	- 5.55	NA	0.009
11.809	41.44	Qp	0.76	0.12	10.00	52.33	Line 1	NA	- 7.67	0.009
17.824	27.85	Av	1.10	0.18	10.02	39.15	Line 1	- 10.85	NA	0.009
17.824	32.33	Qp	1.10	0.18	10.02	43.63	Line 1	NA	- 16.37	0.009
25.178	22.53	Av	1.20	0.20	10.04	33.97	Line 1	- 16.03	NA	0.009
25.178	28.05	Qp	1.20	0.20	10.04	39.49	Line 1	NA	- 20.51	0.009
0.294	18.98	Av	0.10	0.03	9.97	29.07	Line 2	- 21.34	NA	0.009
0.294	32.47	Qp	0.10	0.03	9.97	42.56	Line 2	NA	- 17.85	0.009
0.320	20.93	Av	0.10	0.02	9.97	31.02	Line 2	- 18.68	NA	0.009
0.320	36.41	Qp	0.10	0.02	9.97	46.50	Line 2	NA	- 13.20	0.009
0.380	36.11	Av	0.10	0.02	9.97	46.20	Line 2	- 2.08	NA	0.009
0.380	44.75	Qp	0.10	0.02	9.97	54.84	Line 2	NA	- 3.44	0.009
0.680	13.93	Av	0.10	0.02	9.98	24.03	Line 2	- 21.97	NA	0.009
0.680	33.27	Qp	0.10	0.02	9.98	43.37	Line 2	NA	- 12.63	0.009
1.134	20.94	Av	0.20	0.02	9.98	31.14	Line 2	- 14.86	NA	0.009
1.134	31.26	Qp	0.20	0.02	9.98	41.46	Line 2	NA	- 14.54	0.009
2.620	16.15	Av	0.20	0.03	9.98	26.36	Line 2	- 19.64	NA	0.009
2.620	25.30	Qp	0.20	0.03	9.98	35.51	Line 2	NA	- 20.49	0.009
7.535	17.93	Av	0.45	0.08	9.99	28.46	Line 2	- 21.54	NA	0.009
7.535	27.47	Qp	0.45	0.08	9.99	38.00	Line 2	NA	- 22.00	0.009
11.809	33.21	Av	0.76	0.12	10.00	44.10	Line 2	- 5.90	NA	0.009
11.809	40.13	Qp	0.76	0.12	10.00	51.02	Line 2	NA	- 8.98	0.009
17.824	28.53	Av	1.10	0.18	10.02	39.83	Line 2	- 10.17	NA	0.009
17.824	32.95	Qp	1.10	0.18	10.02	44.25	Line 2	NA	- 15.75	0.009
25.178	22.33	Av	1.20	0.32	10.04	33.88	Line 2	- 16.12	NA	0.009
25.178	27.60	Qp	1.20	0.32	10.04	39.15	Line 2	NA	- 20.85	0.009

Setup Photographs: AC Mains Conducted Emissions – Transmitter

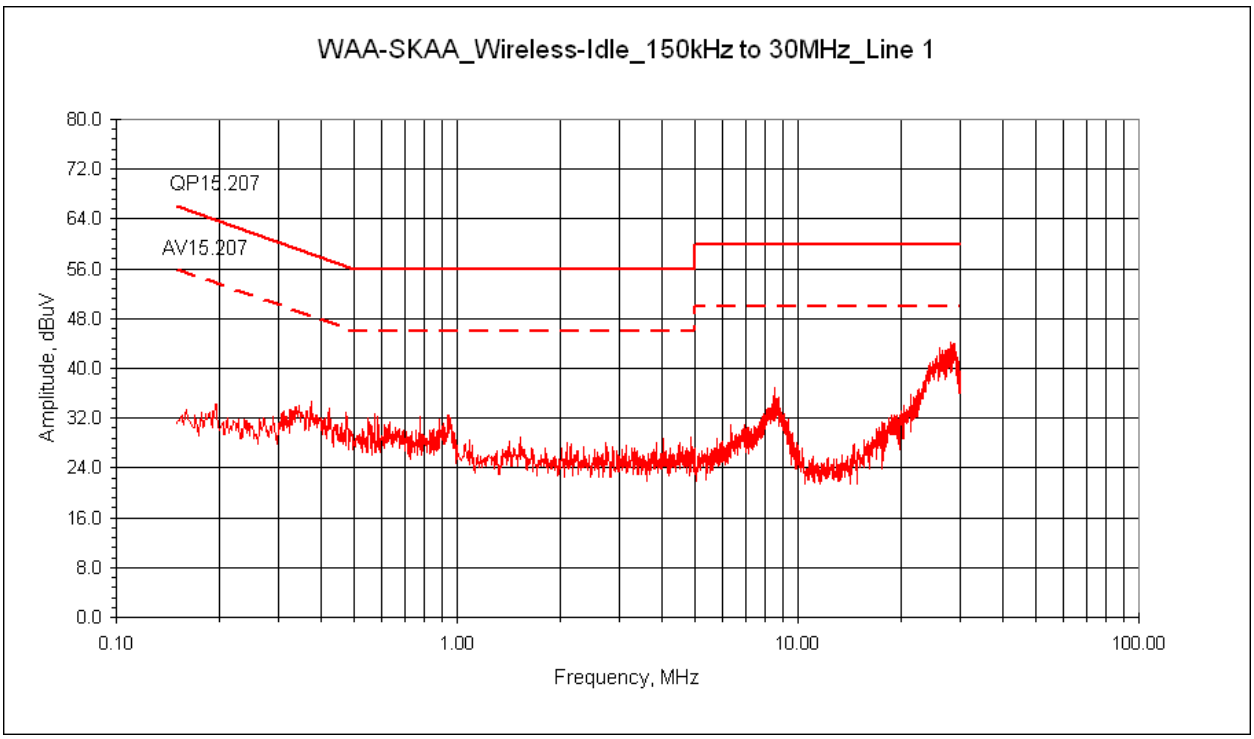
Product (Front View)

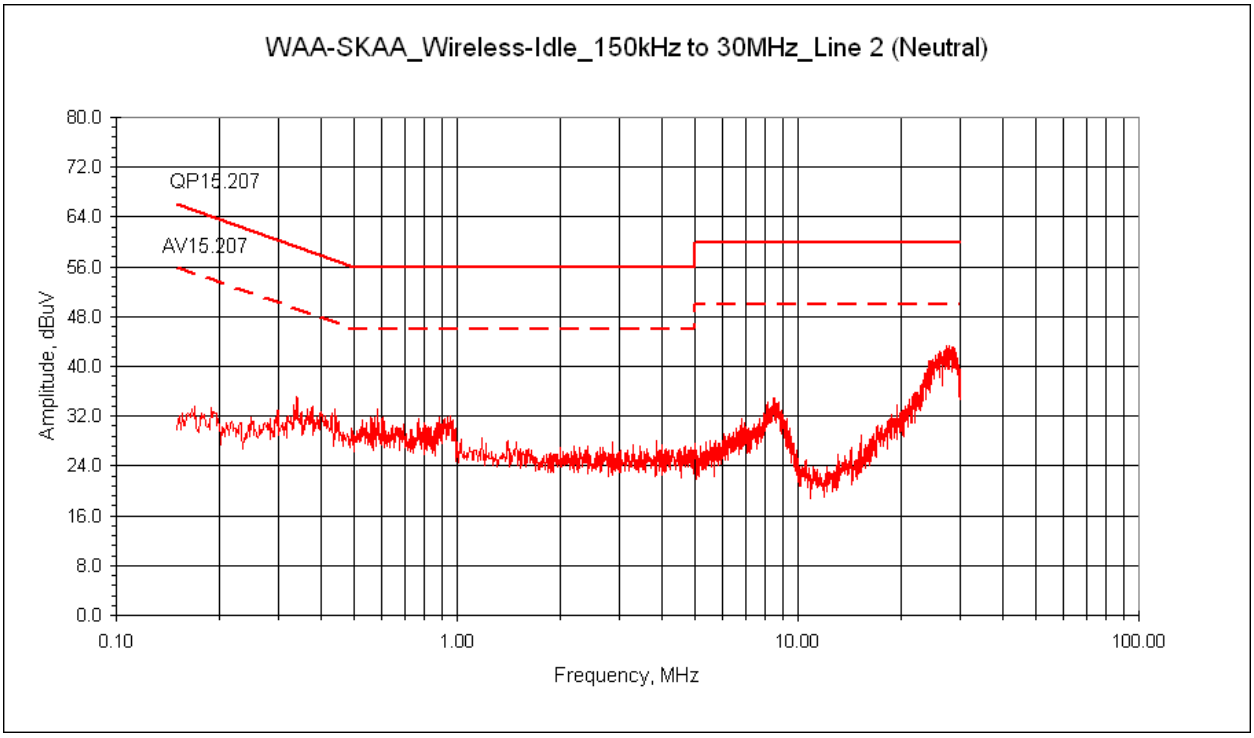


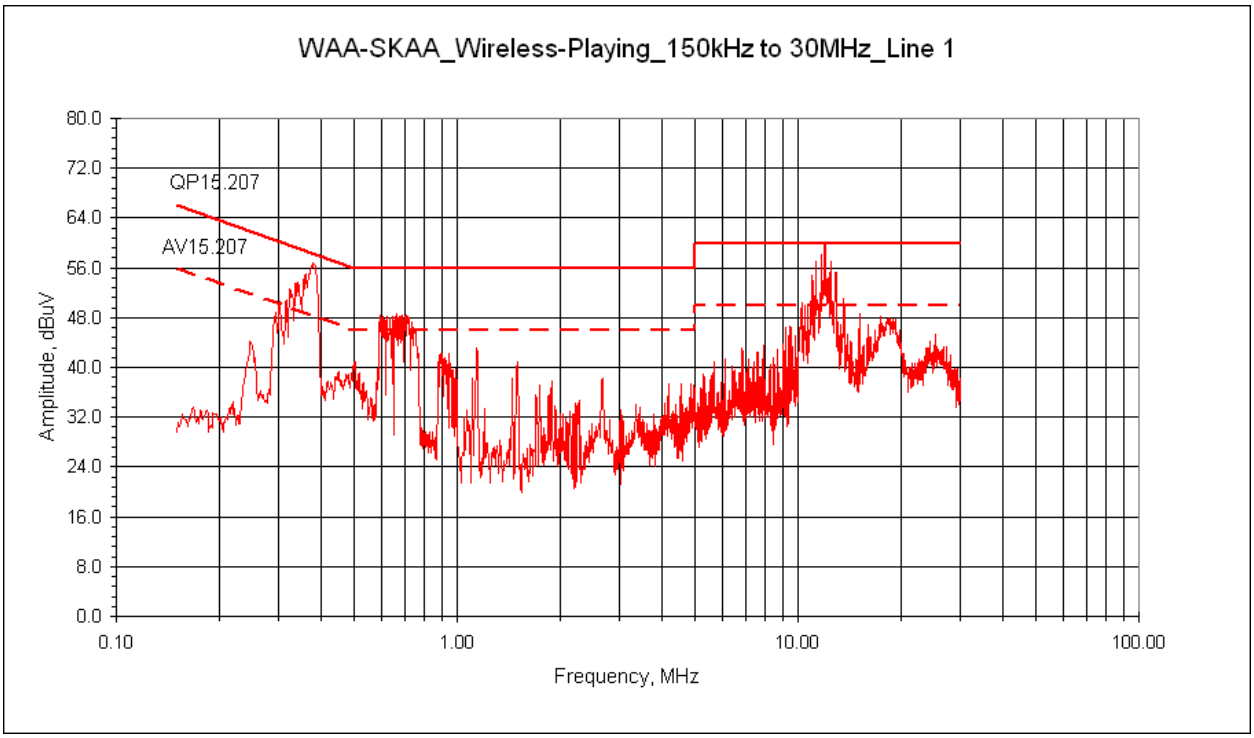
Product (Side View)

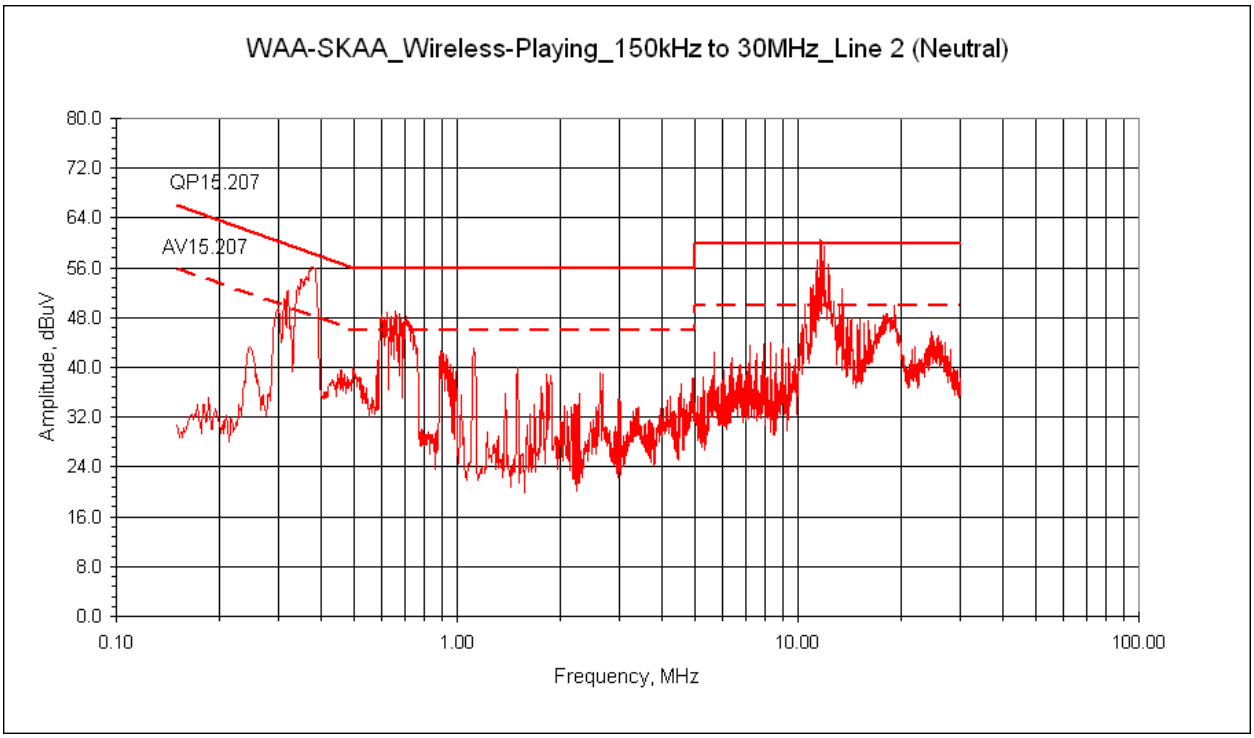


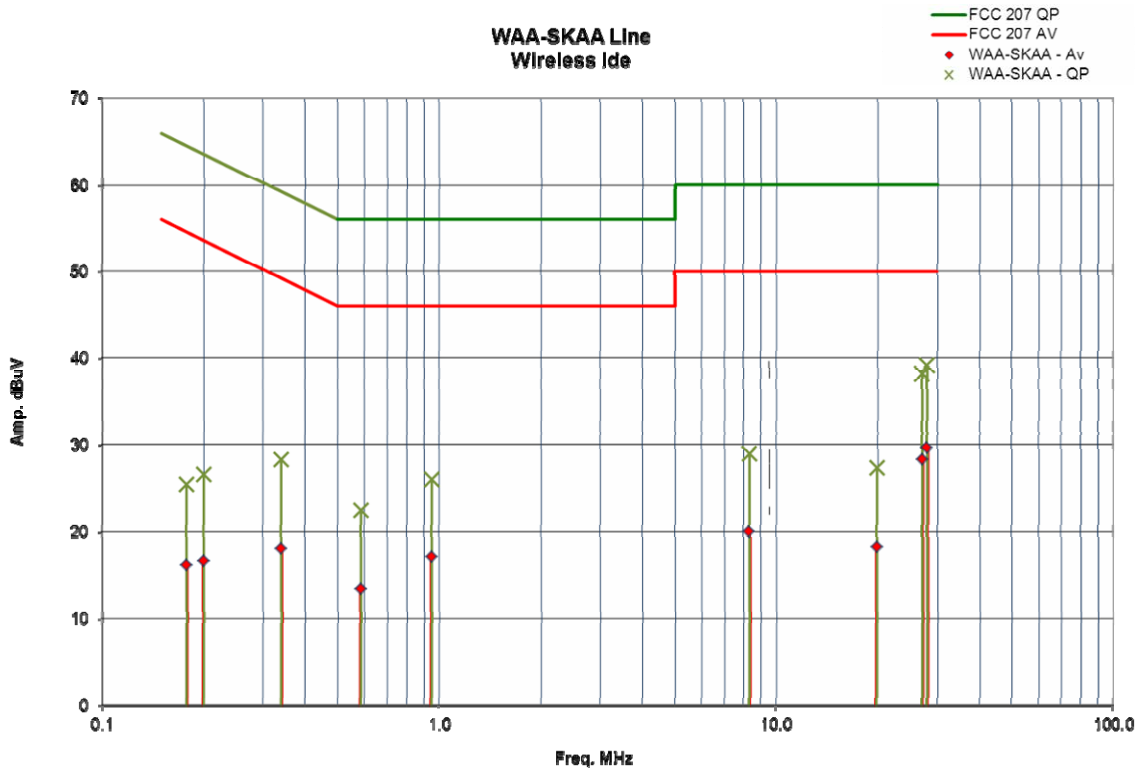
Plots:

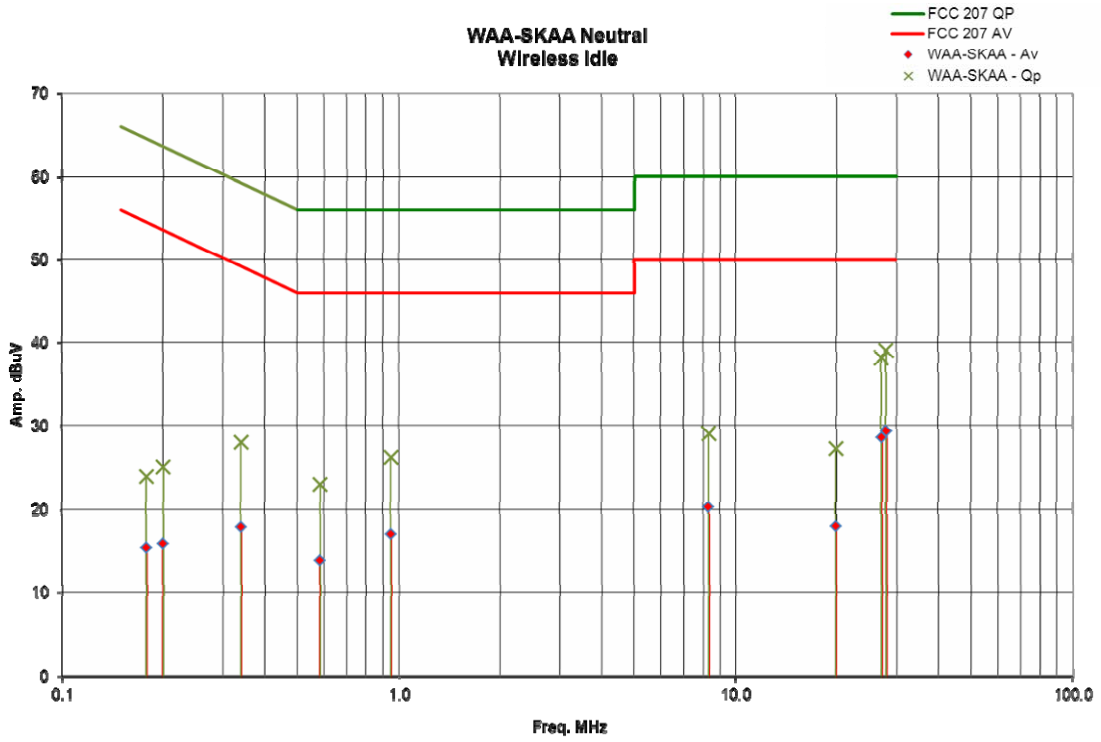

WAA-SKAA_Wireless-Idle_150kHz to 30MHz_Line 1
QP15.207
AV15.207
Amplitude, dBuV
Frequency, MHz
80.0
72.0
64.0
56.0
48.0
40.0
32.0
24.0
16.0
8.0
0.0
0.10
1.00
10.00
100.00

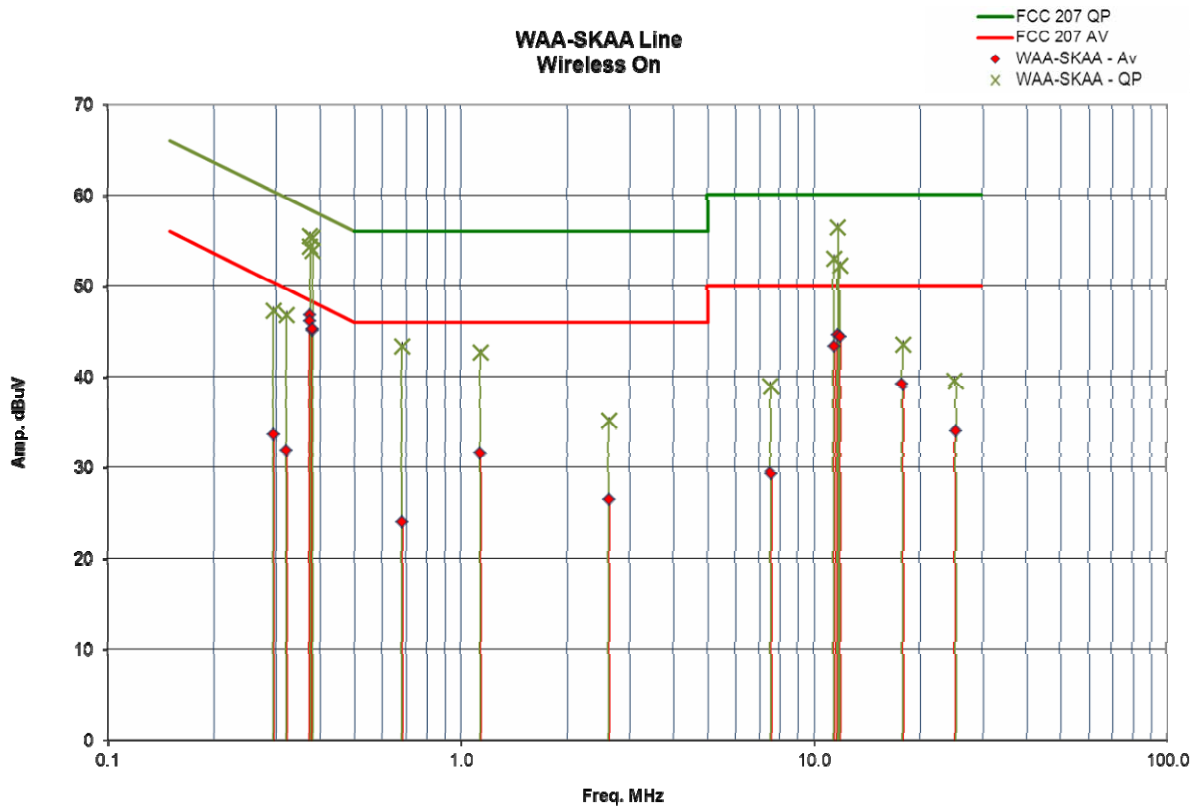

WAA-SKAA_Wireless-Idle_150kHz to 30MHz_Line 2 (Neutral)
QP15.207
AV15.207
Amplitude, dBuV
Frequency, MHz
80.0
72.0
64.0
56.0
48.0
40.0
32.0
24.0
16.0
8.0
0.0
0.10
1.00
10.00
100.00

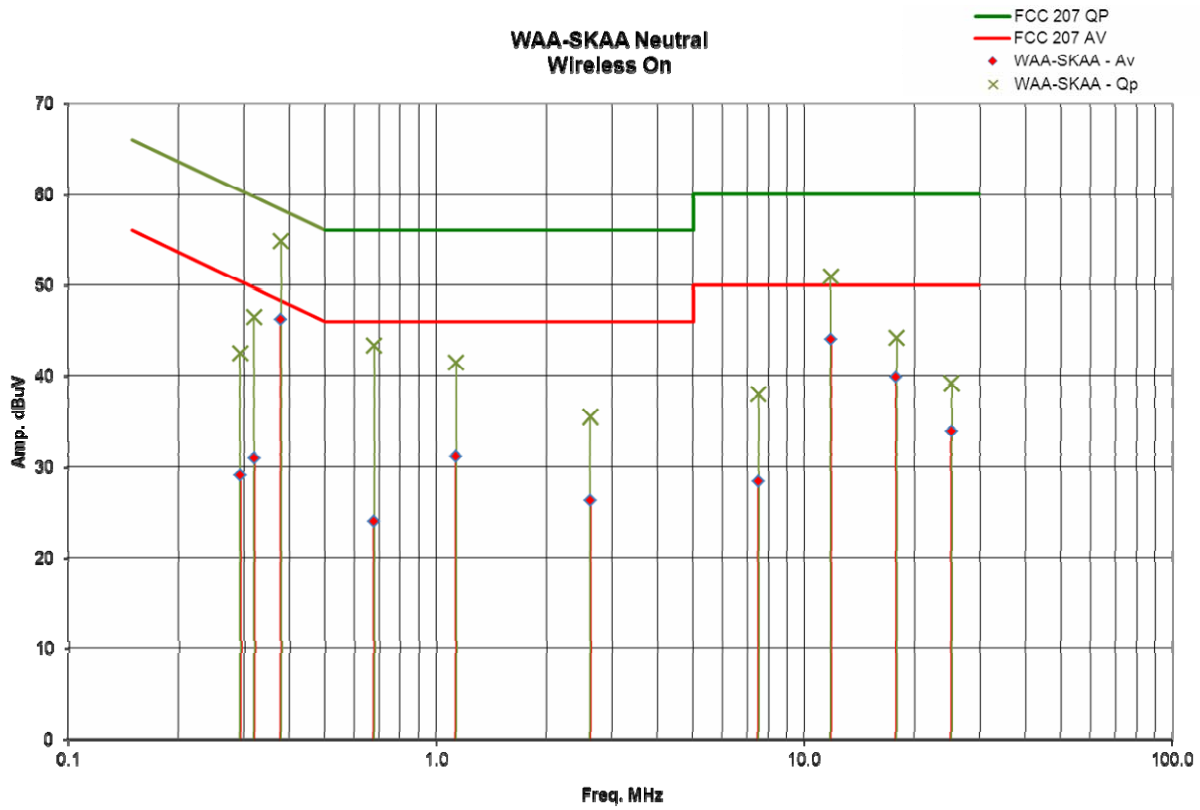

WAA-SKAA_Wireless-Playing_150kHz to 30MHz_Line 1
QP15.207
AV15.207
Amplitude, dBuV
80.0
72.0
64.0
56.0
48.0
40.0
32.0
24.0
16.0
8.0
0.0
0.10
1.00
10.00
100.00
Frequency, MHz


WAA-SKAA_Wireless-Playing_150kHz to 30MHz_Line 2 (Neutral)
QP15.207
AV15.207
Amplitude, dBuV
80.0
72.0
64.0
56.0
48.0
40.0
32.0
24.0
16.0
8.0
0.0
0.10
1.00
10.00
100.00
Frequency, MHz


WAA-SKAA Line
Wireless Idle
FCC 207 QP
FCC 207 AV
WAA-SKAA - Av
WAA-SKAA - QP
Amp. dBuV
Freq. MHz
0
10
20
30
40
50
60
70
0.1
1.0
10.0
100.0


WAA-SKAA Neutral
Wireless Idle
FCC 207 QP
FCC 207 AV
WAA-SKAA - Av
WAA-SKAA - Qp
Amp. dBuV
Freq. MHz
0
10
20
30
40
50
60
70
0.1
1.0
10.0
100.0


WAA-SKAA Line
Wireless On
FCC 207 QP
FCC 207 AV
WAA-SKAA - Av
WAA-SKAA - QP
Amp. dBuV
Freq. MHz
0.1
1.0
10.0
100.0
0
10
20
30
40
50
60
70


WAA-SKAA Neutral
Wireless On
FCC 207 QP
FCC 207 AV
WAA-SKAA - Av
WAA-SKAA - Qp
Amp. dBuV
Freq. MHz
0.1
1.0
10.0
100.0
0
10
20
30
40
50
60
70

15 RF Exposure Requirements

Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC OET 65 & IC RSS-102.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

Test Requirement/Specification

- FCC OET Bulletin 65/ KDB 447498
- RSS-102

Results:

The sample tested was found to comply.

Test Data: RF Exposure – MPE

RF Exposure Requirements - MPE

Project #:		Test Area:	Intertek Louisville
Test Method:	FCC CFR47 Part 1.1310	Test Date:	10/7/2013
EUT Model #:	AR5		
EUT Serial #:	EMC1		
Manufacturer:	Leven Electronics		
EUT Description:	Wireless or Wired Audio Amplifier		
Notes:	15.247 FHSS 2.4GHz		

The following limit is from table 1 (B) Limits for General Population/Uncontrolled Exposure in FCC part 1.1310:

Power Density Limit for Frequency Range 1500 – 100,000 MHz = 1 mW/cm^2

The following calculation was used to determine compliance to the above limit. The calculation is from FCC OET bulletin 65.

Power Density(S) $=PG/4\pi R^2$ or $S=EIRP/4\pi R^2$

Where:
S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (mW).
G = numeric power gain of the antenna in the direction of interest relative to an isotropic radiator.
R = distance to the center of radiation of the antenna (cm)

In this case, 20cm will be used.

Maximum measured conducted power to the antenna = 33.1 mW

Maximum typical gain declared by the manufacture = 3 dBi = 1.99 (numeric gain)

Power Density

Power (mW)	Gain (dbi)	Gain numeric	Distance (cm)	Power Density (mW/cm^2)
33.1	3	2	20	0.013

Therefore: Power Density Margin (Δ Limit) = 0.013 – 1 = -0.987 mW/cm^2

16 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of k = 2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty ±	Notes
Radiated emissions, 10kHz to 30 MHz	3.4 dB	
Radiated emissions, 30 to 200 MHz HP	2.2 dB	
Radiated emissions, 30 to 200 MHz VP	3.8 dB	
Radiated emissions, 200 to 1000 MHz HP	2.8 dB	
Radiated emissions, 200 to 1000 MHz VP	2.7 dB	
Radiated emissions, 1 to 18 GHz	5.2 dB	
Conducted port emissions 10kHz to 1000 MHz	1.0 dB	
Conducted port emissions 1 to 18 GHz	1.6 dB	
AC mains Conducted emissions, 9kHz to 30 MHz	3.14 dB	

17 Revision History

Revision Level	Date	Report Number	Notes
0	01/13/2014	101200098DEN-001F	Original Report
1	2/11/2014	101200098DEN-001F	Changed model number from WA-SKAA to AR5 on the pages; 1, 9, 11, 35, 62 and report footer. Changed company name on footer, from Enspire to Levven. Added note on page 4 about graphs still having an old model number. Changed FCC and IC IDs on page 5 to reflect new model number. Revised By: Michael Spataro  Reviewed By: Randy Thompson