

## TEST REPORT

**Report Number: 102654813DEN-001**

**Project Number: G102654813**

**Report Issue Date: 7/26/2016**

**Product Designation: Model: EN1244**

**Standards: FCC Part 15 Subpart C (15.247)**

Operation within the bands 902-928 MHz

**IC RSS-247, Issue 1: 2015**

**IC RSS-GEN, Issue 4: 2014**

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

Client:  
Inovonics Wireless Corp.  
397 S. Taylor Ave.  
Louisville, CO 80027  
USA

Report prepared by



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EMC Project Engineer

Report reviewed by



Michael Spataro  
Engineering Team Leader

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## 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 C63.10:2013 – 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 covered under the laboratories scope.

**2 Test Summary**

Section	Test Specification	Test Description	Test Date	Result
5	15.31(e)	AC Supply Variation		N/A(1)
6	15.247(b)(1)/RSS-247 5.4(1)	Maximum Peak Output Power - Radiated	7/14/2016	Pass
7	15.247(a)(1)/RSS-247 5.1 (3)	-20dB Bandwidth of the Hopping Channel	7/15/2016	Pass
8	15.247(a)(1)/RSS-247 5.1 (2)	Hopping Channel Carrier Frequency Separation	7/15/2016	Pass
9	15.247(b)(1)(i)/RSS-247 5.1 (3)	Number of Hopping Channels	7/15/2016	Pass
10	15.247(a)(1)(i)/RSS-247 5.1 (3)	Average Time of Occupancy of the Hopping Channel - DCCF	7/15/2016	Pass
11	15.247(d)/RSS-247 5.5	Spurious and Band Edge Emissions - Radiated	7/14/2016	Pass
12	15.247(d)/15.209/RSS-247 5.5 /RSS-GEN 8.10	Spurious and Band Edge Restricted Band Emissions - Radiated	7/14/2016	Pass
13	15.203	Antenna Requirement	7/14/2016	Pass
14	15.207/RSS-GEN 8.8	Transmitter Power Line Conducted Emissions.		N/A(1)
15	FCC 15.247(i)/RSS-GEN 5.6	RF Exposure Requirements	7/15/2016	Pass

## Notes:

- 1) The product is battery powered.

**General Radio Test Notes:**

- ANSI C63.10, Section 4.1.4/ FCC 15.35: Measurement detector functions and bandwidths utilized in this testing were per the preceding guidelines. 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 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 10GHz.
- ANSI C63.10, Section 6.3.3/ 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 5.6/ 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**

<b>Model:</b>	EN1244
<b>Type of EUT:</b>	Smoke Detector with FHSS Transmitter
<b>Serial Number:</b>	N/A
<b>FCC ID:</b>	HCQ3B6OT9GSK
<b>Industry Canada ID:</b>	2309A-OT9GSK
<b>Related Submittal(s) Grants:</b>	NA
<b>Company:</b>	Inovonics Wireless Corp.
<b>Customer:</b>	Corey Leavitt
<b>Address:</b>	397 S. Taylor Ave. Louisville, CO 80027 USA
<b>Phone:</b>	303-209-7143
<b>Fax:</b>	303-209-7243
<b>e-mail:</b>	Cleavitt@inovonics.com
<b>Test Standards:</b>	<input checked="" type="checkbox"/> 47 CFR, Part 15C:§15.247 <input checked="" type="checkbox"/> RSS-247, Issue 1: 2015 <input checked="" type="checkbox"/> RSS-GEN, Issue 4: 2014 <input type="checkbox"/> 47 CFR, Part 15B:§15.107 and §15.109, Class B <input type="checkbox"/> AS/NZS 4268, Issue 3: 2012
<b>Type of radio:</b>	<input checked="" type="checkbox"/> Stand -alone <input type="checkbox"/> Module <input type="checkbox"/> Hybrid
<b>Date Sample Submitted:</b>	07/14/2016
<b>Test Work Started:</b>	07/14/2016
<b>Test Work Completed:</b>	07/20/2016
<b>Test Sample Conditions:</b>	<input type="checkbox"/> Damaged <input type="checkbox"/> Poor (Usable) <input checked="" type="checkbox"/> Good

<b>Product Description:</b>	Smoke Detector Transmitter
<b>Transmitter Type:</b>	<input checked="" type="checkbox"/> FHSS <input type="checkbox"/> Digital Modulation <input type="checkbox"/> WiFi <input type="checkbox"/> Blue Tooth
<b>Operating Frequency Range(s):</b>	902 MHz – 928 MHz
<b>Number of Channels:</b>	25
<b>Modulation:</b>	2FSK
<b>Emission Designator:</b>	328KF1D
<b>Antenna(s) Info:</b>	Integral
<b>Rated Power:</b>	<100mW
<b>Antenna Installation:</b>	<input checked="" type="checkbox"/> User <input type="checkbox"/> Professional <input checked="" type="checkbox"/> Factory
<b>Transmitter power configuration:</b>	<input checked="" type="checkbox"/> Internal battery <input type="checkbox"/> External power source
<b>Special Test Arrangement:</b>	The EUT was rotated and tested in three orthogonal axes to determine the maximum emissions.
<b>Test Facility Accreditation:</b>	A2LA (Certificate No. 2506.01)
<b>Test Methodology:</b>	Measurements performed according to the procedures in ANSI C63.10-2013 and FCC Publication Number DA 00-705

**Description of Equipment Under Test (provided by client)**

EUT shall be powered by an internal battery, energized as intended & programmed to broadcast continuously at one of three channel frequencies, low (902.4MHz), center (914.8MHz) and high (927.6MHz).

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## Equipment Under Test Power Configuration

Rated Voltage	Rated Current	Rated Frequency	Number of Phases
3 Vdc	120 mA maximum	NA DCV	NA DCV

## Descriptions of EUT Exercising

- |                                                                                        |
|----------------------------------------------------------------------------------------|
| <input type="checkbox"/> Standby/Idle Mode                                             |
| <input checked="" type="checkbox"/> Continuous transmission, un-modulated carrier (CW) |
| <input checked="" type="checkbox"/> Continuous transmission, modulated carrier (CW)    |
| <input type="checkbox"/> Continuous Receive Mode                                       |

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

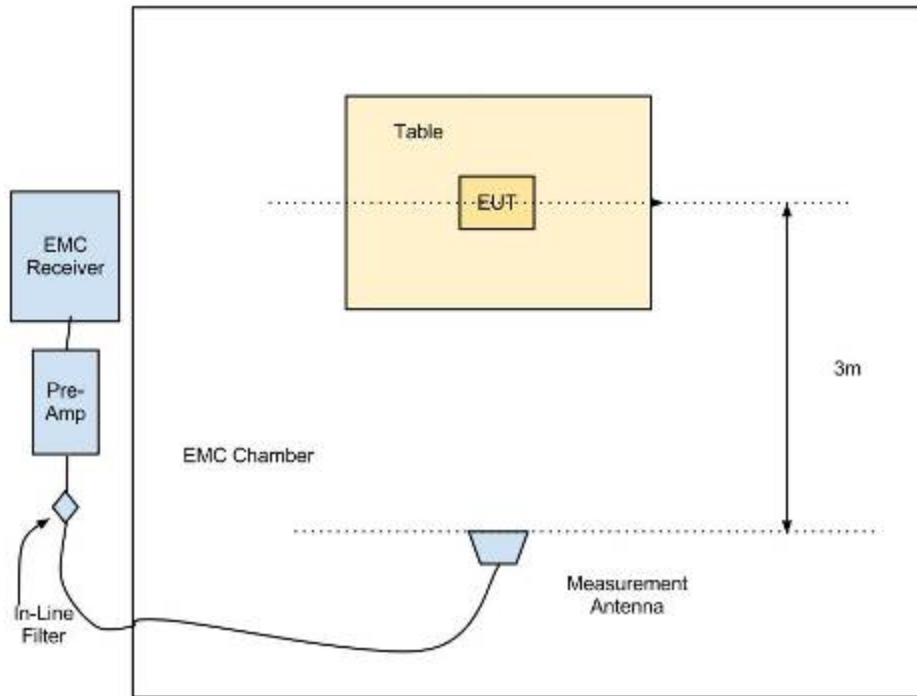


#### 4 System setup including cable interconnection details, support equipment and simplified block diagram

**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

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## Support Data:

ID	Description/ Function	Shield Type	Length	Connector	Connection	Ferrites
	None					

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

Notes:

Photograph: Product Tested - X, Y, Z Dimensional



EN1244 – Axis 1



EN1244 – Axis 2 (worse Case)



EN1244 – Axis 3

**5 AC Supply Variation – Not Applicable (Product Battery Operated)**

## 6 Maximum Peak Output Power - Radiated

### Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.247 or RSS-247.

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)
902 - 928 MHz	≥50	1
902 - 928 MHz	≤50	0.25

- FCC 15.247(b)(1)
- RSS-247 5.4 (1)

### Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	12/28/2015	12/28/2017
18743	Pre Amp:700 kHz- 1GHz	Mini-Circuits	AM-34-000110	686965	9/3/2015	9/3/2016
18906	Pre Amp: 1GHz – 4GHz	Mini-Circuits Lab	ZHL-42	N052792-2	4/26/2016	4/26/2017
DEN-032	4-18 GHz LNA	NARDA	DBL-0618N615	031	4/13/2016	4/13/2017
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	HP	5	3/31/2016	3/31/2017
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	6/22/2016	6/22/2017
DEN-152	Hi Pass Filter: VHF-1320+, 1700-3800MHz	Mini-Circuits	VHF-1320	30716	9/3/2015	9/3/2016
DEN-155	Notch Filter: 902MHz - 928MHz	Micro-Tronics	BRC50722	004	04/27/2016	04/27/2017
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	12/19/2015	12/19/2016
CC1-E2	Radiated Cable	Teledyne	90-206-300; PN:F-130-S1S1-100; 90-206-072;	E2-A; 5026702	11/17/2015	11/17/2016
LAB-012	Wireless BP, Tem and Humidity sensor	Omega	ZED-BTH	0070368	9/01/2015	9/1/2016

### Software Utilized:

Name	Manufacturer	Version
SW-6: Software for Radiated and Conducted emissions.	Intertek	OATS cvi, V.1.0

### Results:

The sample tested was found to comply.

**Test Summary: Radiated Field Strength Emissions – Tx Fundamental**

Fundamental	Radiated Max Output Power					
<b>Frequency Range:</b>	<input checked="" type="checkbox"/> 902-928MHz		<input type="checkbox"/> 2400-2483.5MHz		<input type="checkbox"/> 5725-5850MHz	
Low Frequency MHz	Measured Power (dBm)	Duty Cycle Correction (dB)	Final Corrected (dBm)	Standard Limit (dBm)	Limit Reduction (dB)	Margin (dB)
Vertical: 902.3	18.7	0	18.7	24	N/A	5.3
Horizontal: 902.3	20.4	0	20.4	24	N/A	3.6
<b>Mid Frequency MHz</b>						
Vertical: 914.7	17.7	0	17.7	24	N/A	6.3
Horizontal: 914.7	19.0	0	19.0	24	N/A	5.0
<b>High Frequency MHz</b>						
Vertical: 927.5	17.9	0	17.9	24	N/A	6.1
Horizontal: 927.5	19.1	0	19.1	24	N/A	4.9
<b>RBW:</b>	<input type="checkbox"/> 100kHz	<input type="checkbox"/> 300kHz	<input type="checkbox"/> 500kHz	<input checked="" type="checkbox"/> 1MHz	<input type="checkbox"/> 3MHz	<input type="checkbox"/> 10MHz
<b>VBW:</b>	<input type="checkbox"/> 300kHz	<input type="checkbox"/> 1MHz	<input type="checkbox"/> 1MHz	<input checked="" type="checkbox"/> 3 MHz	<input type="checkbox"/> 10MHz	<input type="checkbox"/> 10MHz
<b>Antenna Gain:</b>	<input checked="" type="checkbox"/> < 6dBi <input type="checkbox"/> >6dBi and = <input type="text"/> dBi, Output power reduction = <input type="text"/> dB					

**Test Method:**

- ANSI C63.10:2013, Section 6.5.

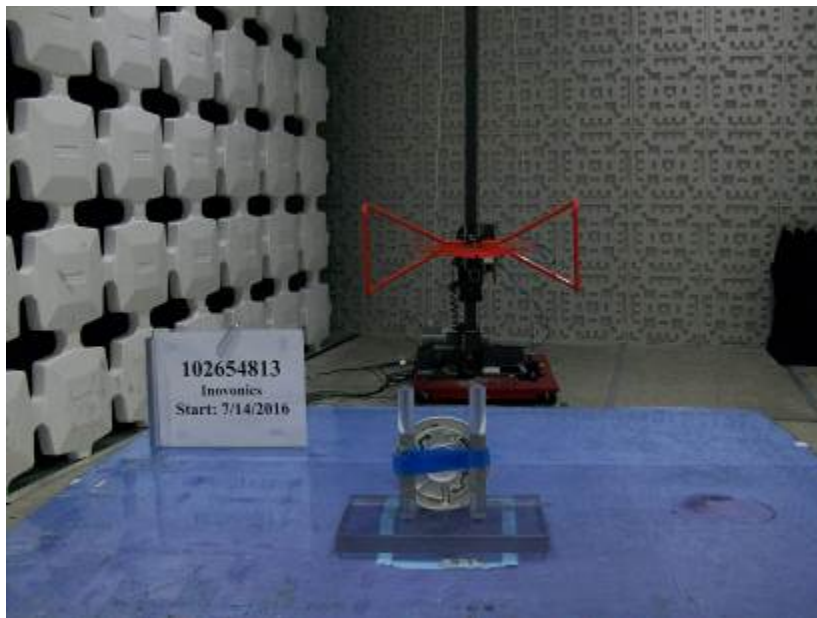
**Notes:**

- The limit for RSS-247 is identical to the limit for FCC 15.247.

**Setup Photographs: Radiated Field Strength Emissions – Tx Fundamental**



Antenna Setup – Front (30-1000 MHz)



Antenna Setup – Rear (30-1000 MHz)

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**Data:**

FREQ	LEVEL	DET	CABLE	ANT	FINAL	POL	HGT	AZ	LIMIT	DELT A	RBW
MHz	dBuV	$\frac{Qp}{Av}$ Pk Rms	+ [dB]	+ [dB/m]	= [dBuV]	(V/H)	(m)	(DEG )	125.2 dBuV	dBuV	(MHz)
<b>Fundamental</b>											
Low Channel Axis-1											
902.5000	82.84	<b>Pk</b>	2.70	28.40	113.94	V	1.19	99.8	125.2	-11.36	1.000
902.4160	79.14	<b>Pk</b>	2.70	28.40	110.24	H	1.56	199.7	125.2	-15.06	1.000
Low Channel Axis-2											
902.4160	75.00	<b>Pk</b>	2.70	28.40	106.10	V	1.00	356.1	125.2	-19.20	1.000
902.4160	84.51	<b>Pk</b>	2.70	28.40	115.61	H	1.00	196.4	125.2	-9.69	1.000
Low Channel Axis-3											
902.4160	81.95	<b>Pk</b>	2.70	28.40	113.05	V	1.00	160.2	125.2	-12.25	1.000
902.4160	83.53	<b>Pk</b>	2.70	28.40	114.63	H	1.37	253.7	125.2	-10.67	1.000
Mid channel Axis-1											
914.7917	80.97	<b>Pk</b>	2.75	28.50	112.22	V	1.00	118.9	125.2	-13.08	1.000
914.7917	78.71	<b>Pk</b>	2.75	28.50	109.96	H	1.41	197.8	125.2	-15.34	1.000
Mid channel Axis-2											
914.7917	74.03	<b>Pk</b>	2.75	28.50	105.28	V	1.00	357.4	125.2	-20.02	1.000
914.7917	82.95	<b>Pk</b>	2.75	28.50	114.20	H	1.65	150.9	125.2	-11.10	1.000
Mid channel Axis-3											
914.7917	81.70	<b>Pk</b>	2.75	28.50	112.95	V	1.00	32.0	125.2	-12.35	1.000
914.7917	79.01	<b>Pk</b>	2.75	28.50	110.26	H	1.38	213.7	125.2	-15.04	1.000
High Channel Axis-1											
927.5962	81.50	<b>Pk</b>	2.77	28.85	113.12	V	1.15	156.3	125.2	-12.18	1.000
927.5962	79.07	<b>Pk</b>	2.77	28.85	110.69	H	2.33	174.0	125.2	-14.61	1.000
High Channel Axis-2											
927.5962	74.72	<b>Pk</b>	2.77	28.85	106.34	V	2.62	359.9	125.2	-18.96	1.000
927.5962	82.65	<b>Pk</b>	2.77	28.85	114.27	H	1.61	116.6	125.2	-11.03	1.000
High Channel Axis-3											
927.5962	80.13	<b>Pk</b>	2.77	28.85	111.75	V	1.59	36.8	125.2	-13.55	1.000
927.5962	76.42	<b>Pk</b>	2.77	28.85	108.04	H	1.31	200.9	125.2	-17.26	1.000



Convert Power from Field Strength.

$$P=(E*D)^2/(30*G)$$

Where

P=Power in Watts

E=Field in V/m

D=Distance

G=Linear gain of the antenna

Freq. MHz	Final dBuV/m	Calculated Watts	Limit Watts	Delta
Low Channel Axis-1				
902.5000	113.94	0.074	0.25	- 0.176
902.4160	110.24	0.032	0.25	- 0.218
Low Channel Axis-2				
902.4160	106.10	0.012	0.25	- 0.238
902.4160	115.61	0.109	0.25	- 0.141
Low Channel Axis-3				
902.4160	113.05	0.061	0.25	- 0.189
902.4160	114.63	0.087	0.25	- 0.163
Mid channel Axis-1				
914.7917	112.22	0.050	0.25	- 0.200
914.7917	109.96	0.030	0.25	- 0.220
Mid channel Axis-2				
914.7917	105.28	0.010	0.25	- 0.240
914.7917	114.20	0.079	0.25	- 0.171
Mid channel Axis-3				
914.7917	112.95	0.059	0.25	- 0.191
914.7917	110.26	0.032	0.25	- 0.218
High Channel Axis-1				
927.5962	113.12	0.062	0.25	- 0.188
927.5962	110.69	0.035	0.25	- 0.215
High Channel Axis-2				
927.5962	106.34	0.013	0.25	- 0.237
927.5962	114.27	0.080	0.25	- 0.170
High Channel Axis-3				
927.5962	111.75	0.045	0.25	- 0.205
927.5962	108.04	0.019	0.25	- 0.231

**7 -20dB Bandwidth of the Hopping Channel****Method:**

Unless otherwise stated no deviations were made from FCC 15.247 or RSS-247.

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-247 5.1(3)

**Test Equipment Used:**

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	12/28/2015	12/28/2017
18743	Pre Amp:700 kHz- 1GHz	Mini-Circuits	AM-34-000110	686965	9/3/2015	9/3/2016
18906	Pre Amp: 1GHz – 4GHz	Mini-Circuits Lab	ZHL-42	N052792-2	4/26/2016	4/26/2017
DEN-032	4-18 GHz LNA	NARDA	DBL-0618N615	031	4/13/2016	4/13/2017
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	HP	5	3/31/2016	3/31/2017
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	6/22/2016	6/22/2017
DEN-152	Hi Pass Filter: VHF-1320+, 1700-3800MHz	Mini-Circuits	VHF-1320	30716	9/3/2015	9/3/2016
DEN-155	Notch Filter: 902MHz - 928MHz	Micro-Tronics	BRC50722	004	04/27/2016	04/27/2017
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	12/19/2015	12/19/2016
CC1-E2	Radiated Cable	Teledyne	90-206-300; PN:F-130-S1S1-100; 90-206-072;	E2-A; 5026702002; E2-C; E2-D	11/17/2015	11/17/2016
LAB-012	Wireless BP, Tem and Humidity sensor	Omega	zED-BTH	0070368	9/01/2015	9/1/2016

**Results:**

The sample tested was found to comply.

**Test Summary:**

<b>Frequency Range:</b>	<input checked="" type="checkbox"/> 902-928MHz <input type="checkbox"/> 2400-2483.5MHz <input type="checkbox"/> 5725-5850MHz			
<b>Low Frequency Channel (kHz)</b>	<b>Middle Frequency Channel (kHz)</b>	<b>Upper Frequency Channel (kHz)</b>	<b>Limit (kHz)</b>	<b>Result</b>
328	323	322	250	<b>Pass</b>
<b>Span:</b>	500kHz			
<b>RBW:</b>	<input type="checkbox"/> 3kHz <input type="checkbox"/> 30kHz <input checked="" type="checkbox"/> 100kHz <input type="checkbox"/> other 30kHz			
<b>VBW:</b>	<input type="checkbox"/> 3kHz <input type="checkbox"/> 10kHz <input checked="" type="checkbox"/> 300kHz <input type="checkbox"/> other 300kHz			

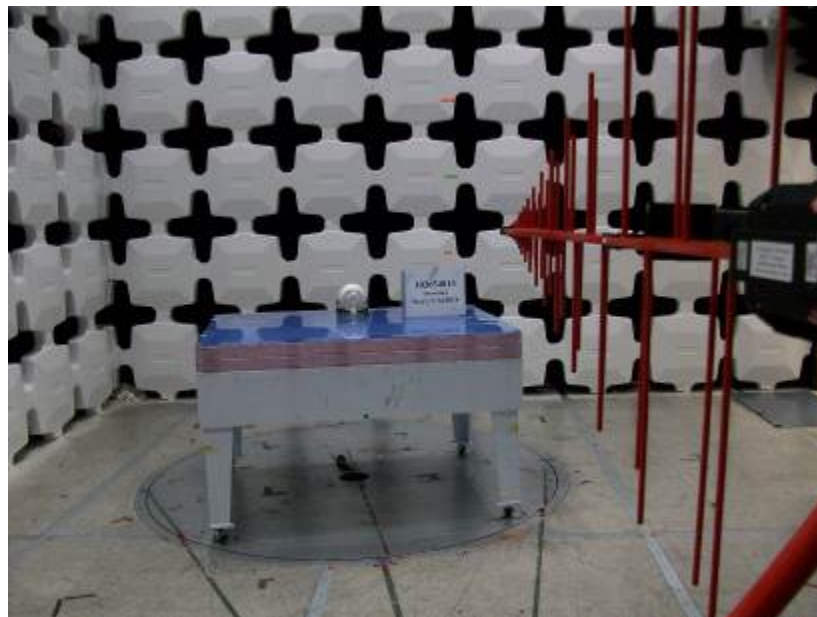
**Test Method:**

FCC Publication Number DA 00-705

**Notes:**

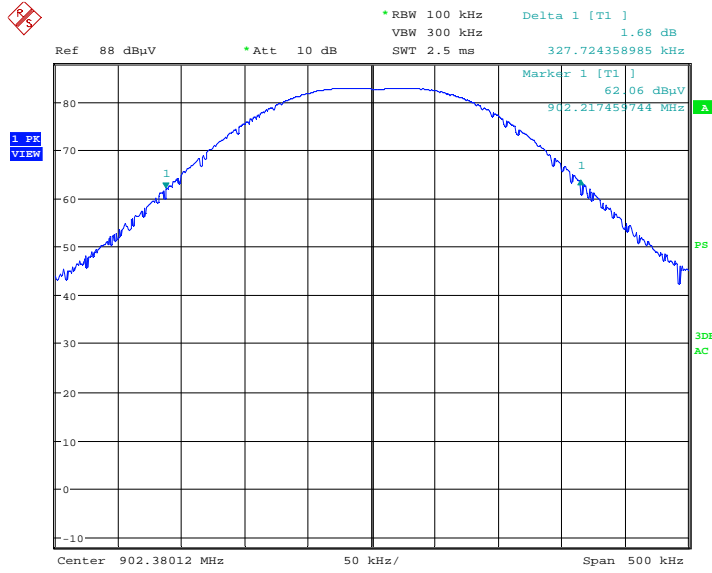
1. The limit for RSS-247 is identical to the limit for FCC 15.247.

**Setup Photographs: Radiated**



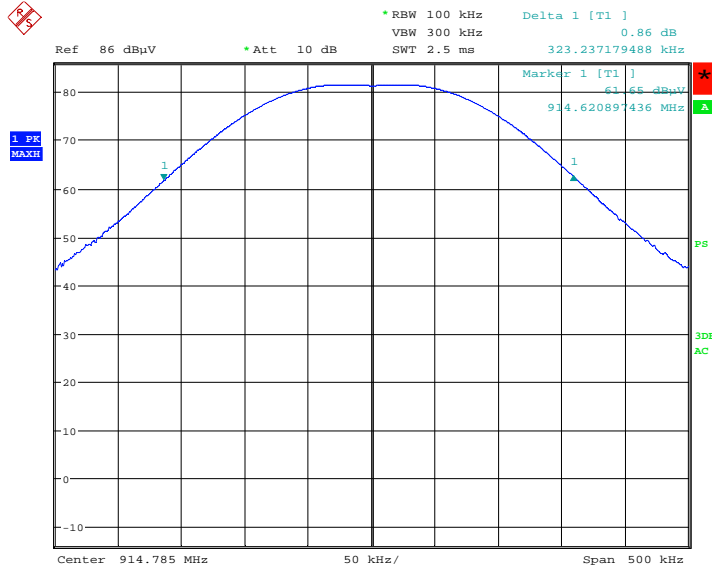
Plots: 20 dB Bandwidth

Low Channel



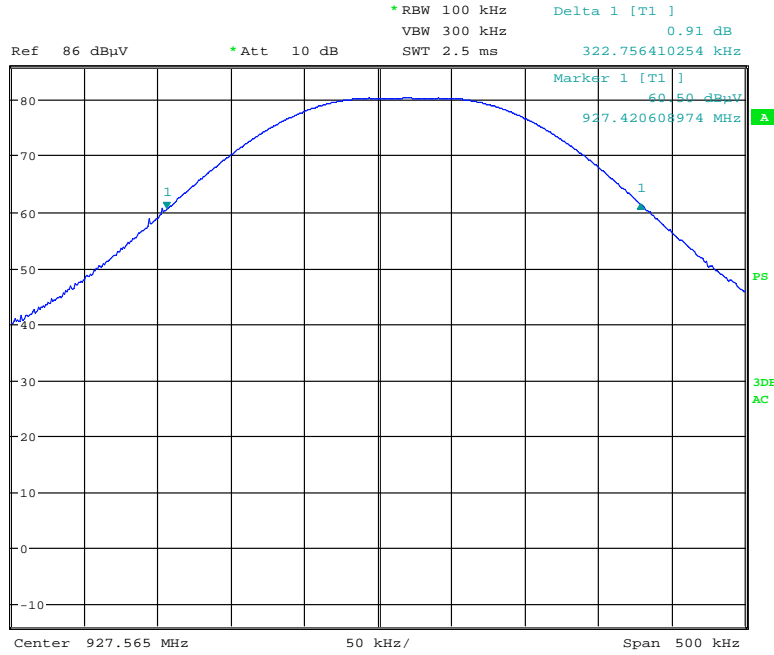
Date: 15.JUL.2016 15:18:58

Mid Channel



Date: 15.JUL.2016 15:27:37

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-247.

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 25kHz 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-247 5.1(3)

### Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	12/28/2015	12/28/2017
18743	Pre Amp:700 kHz- 1GHz	Mini-Circuits	AM-34-000110	686965	9/3/2015	9/3/2016
18906	Pre Amp: 1GHz – 4GHz	Mini-Circuits Lab	ZHL-42	N052792-2	4/26/2016	4/26/2017
DEN-032	4-18 GHz LNA	NARDA	DBL-0618N615	031	4/13/2016	4/13/2017
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	HP	5	3/31/2016	3/31/2017
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	6/22/2016	6/22/2017
DEN-152	Hi Pass Filter: VHF-1320+, 1700-3800MHz	Mini-Circuits	VHF-1320	30716	9/3/2015	9/3/2016
DEN-155	Notch Filter: 902MHz - 928MHz	Micro-Tronics	BRC50722	004	04/27/2016	04/27/2017
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	12/19/2015	12/19/2016
CC1-E2	Radiated Cable	Teledyne	90-206-300; PN:F-130-S1S1-100; 90-206-072;	E2-A; 5026702 002; E2-C; E2-D	11/17/2015	11/17/2016
LAB-012	Wireless BP, Tem and Humidity sensor	Omega	ZED-BTH	0070368	9/01/2015	9/1/2016

### Results:

The sample tested was found to comply.

**Test Summary:**

<b>Frequency Range:</b>	<input checked="" type="checkbox"/> 902-928MHz	<input type="checkbox"/> 2400-2483.5MHz	<input type="checkbox"/> 5725-5850MHz
<b>Measured Separation (kHz)</b>	<b>Limit (kHz)</b>		<b>Result</b>
801	328		<b>Pass</b>
<b>Limit:</b>	<input type="checkbox"/> 25kHz <input checked="" type="checkbox"/> 20dB channel bandwidth <input type="checkbox"/> 2/3 of 20dB channel bandwidth		
<b>Span:</b>	2 MHz		
<b>RBW:</b>	<input type="checkbox"/> 3kHz	<input type="checkbox"/> 10kHz	<input type="checkbox"/> 100kHz <input checked="" type="checkbox"/> other 200kHz
<b>VBW:</b>	<input type="checkbox"/> 3kHz	<input type="checkbox"/> 10kHz	<input type="checkbox"/> 100kHz <input checked="" type="checkbox"/> other 500kHz

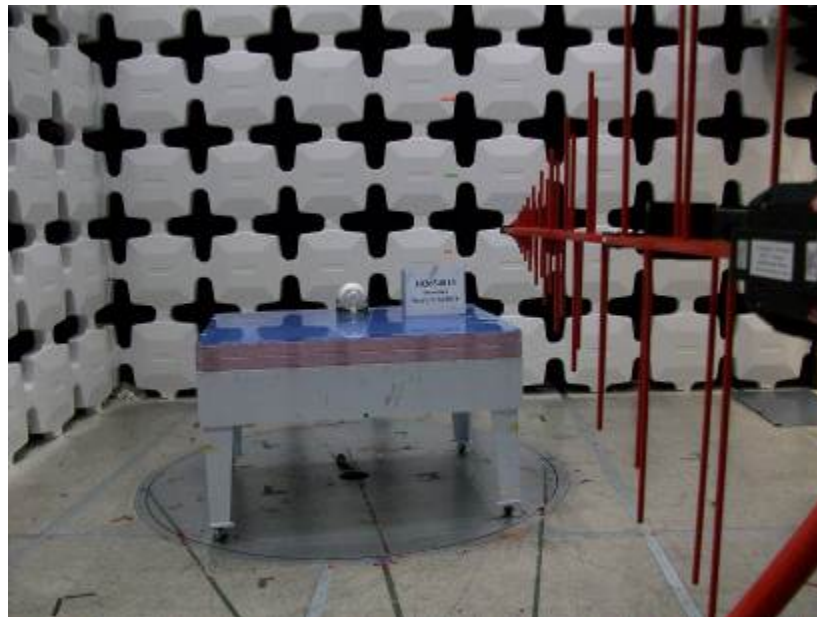
**Test Method:**

- ANSI C63.10:2013, Section 7.8.2

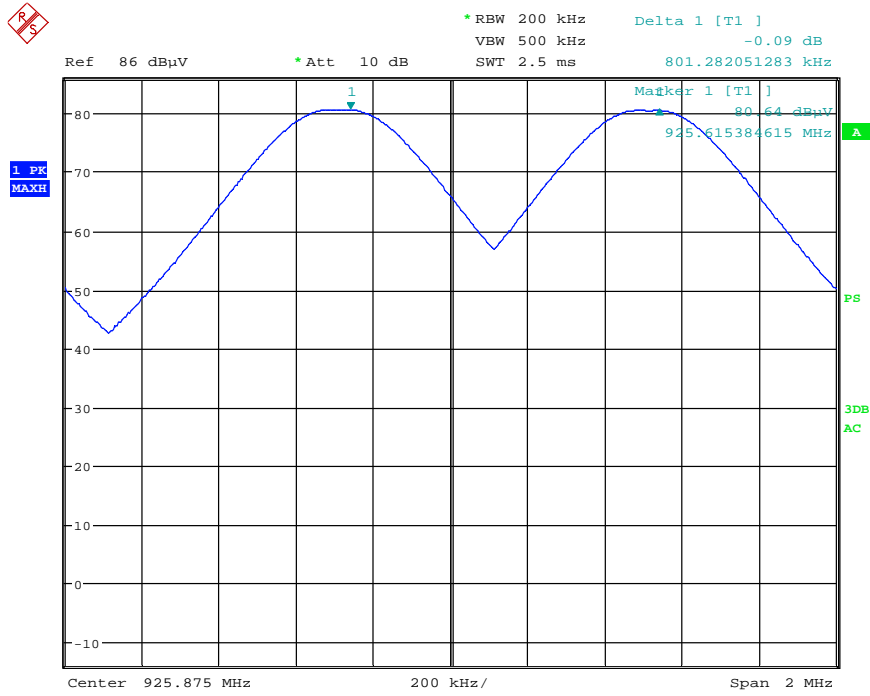
**Notes:**

1. The limit for RSS-247 is identical to the limit for FCC 15.247.

**Setup Photographs: Radiated**



Plots:





**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-247.

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

**Test Requirement/Specification:**

- 15.247(b)(1)(i)
- RSS-247 5.1(3)

**Test Equipment Used:**

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	12/28/2015	12/28/2017
18743	Pre Amp:700 kHz- 1GHz	Mini-Circuits	AM-34-000110	686965	9/3/2015	9/3/2016
18906	Pre Amp: 1GHz – 4GHz	Mini-Circuits Lab	ZHL-42	N052792-2	4/26/2016	4/26/2017
DEN-032	4-18 GHz LNA	NARDA	DBL-0618N615	031	4/13/2016	4/13/2017
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	HP	5	3/31/2016	3/31/2017
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	6/22/2016	6/22/2017
19937	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-2	3/9/2016	3/9/2017
DEN-152	Hi Pass Filter: VHF-1320+, 1700-3800MHz	Mini-Circuits	VHF-1320	30716	9/3/2015	9/3/2016
DEN-155	Notch Filter: 902MHz - 928MHz	Micro-Tronics	BRC50722	004	04/27/2016	04/27/2017
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	12/19/2015	12/19/2016
CC1-E2	Radiated Cable	Teledyne	90-206-300; PN:F-130-S1S1-100; 90-206-072;	E2-A; 5026702002; E2-C; E2-D	11/17/2015	11/17/2016
LAB-012	Wireless BP, Tem and Humidity sensor	Omega	zED-BTH	0070368	9/01/2015	9/1/2016

**Results:**

The sample tested was found to comply.

**Test Summary:**

<b>Frequency Range:</b>	<input checked="" type="checkbox"/> 902-928MHz	<input type="checkbox"/> 2400-2483.5MHz	<input type="checkbox"/> 5725-5850MHz
<b>Measured Number</b>	<b>Requirements</b>		<b>Result</b>
25	≥25		<b>Pass</b>
<b>Channel 20dB Bandwidth:</b>	<input type="checkbox"/> <250kHz <input checked="" type="checkbox"/> ≥250kHz		

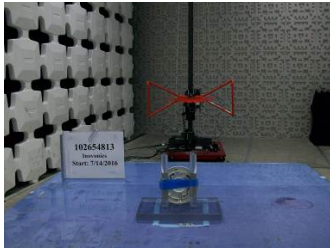
**Test Method:**

- ANSI C63.10:2013, Section 7.8.3

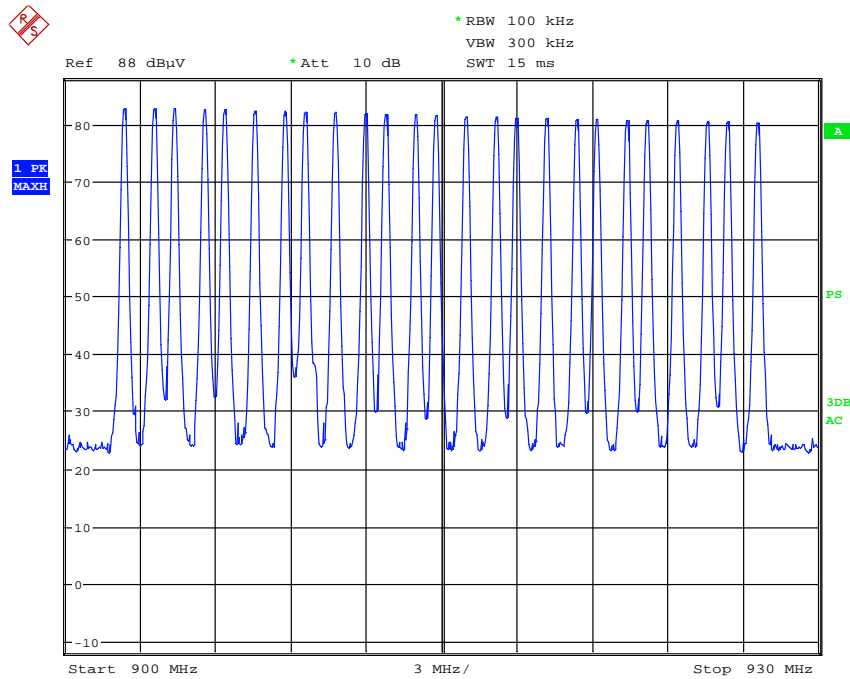
**Notes:**

1. The limit for RSS-247 is identical to the limit for FCC 15.247.

Test Setup Photographs:



Plots:



Date: 15.JUL.2016 15:09:29

### 10 Average Time of Occupancy 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 & RSS-247.

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

**Test Requirement/Specification:**

- 15.247(a)(1)(i)
- RSS-247 5.1(3)

**Test Equipment Used:**

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	6/22/2016	6/22/2017
DEN-152	Hi Pass Filter: VHF-1320+, 1700-3800MHz	Mini-Circuits	VHF-1320	30716	9/3/2015	9/3/2016
DEN-155	Notch Filter: 902MHz - 928MHz	Micro-Tronics	BRC50722	004	04/27/2016	04/27/2017
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	12/19/2015	12/19/2016
CC1-E2	Radiated Cable	Teledyne	90-206-300; PN:F-130-S1S1-100; 90-206-072;	E2-A; 5026702002; E2-C; E2-D	11/17/2015	11/17/2016
LAB-012	Wireless BP, Tem and Humidity sensor	Omega	zED-BTH	0070368	9/01/2015	9/1/2016

**Results:**

The sample tested was found to comply.

**Test Summary:**

<b>Frequency Range:</b>	<input checked="" type="checkbox"/> 902-928MHz <input type="checkbox"/> 2400-2483.5MHz <input type="checkbox"/> 5725-5850MHz		
<b>Measured / Calculated Time sec</b>	<b>Period sec</b>	<b>Limit sec</b>	<b>Result</b>
0.102	10	0.4	<b>Pass</b>
<b>Period:</b>	<input checked="" type="checkbox"/> 10s <input type="checkbox"/> 20s <input type="checkbox"/> 30s <input type="checkbox"/> 0.4s multiplied by the channel number		
<b>Channel 20dB Bandwidth:</b>	<input type="checkbox"/> <250kHz <input checked="" type="checkbox"/> ≥250kHz		

Time of occupancy calculation:

The minimum measured repetition of the channel occupancy (repetition) = 5  
 Single occupancy duration (single duration) = .0204 sec  
 Period = 10 sec

Time of occupancy = (single duration) x (period) = 5 \* 0.0204 = 0.102 s

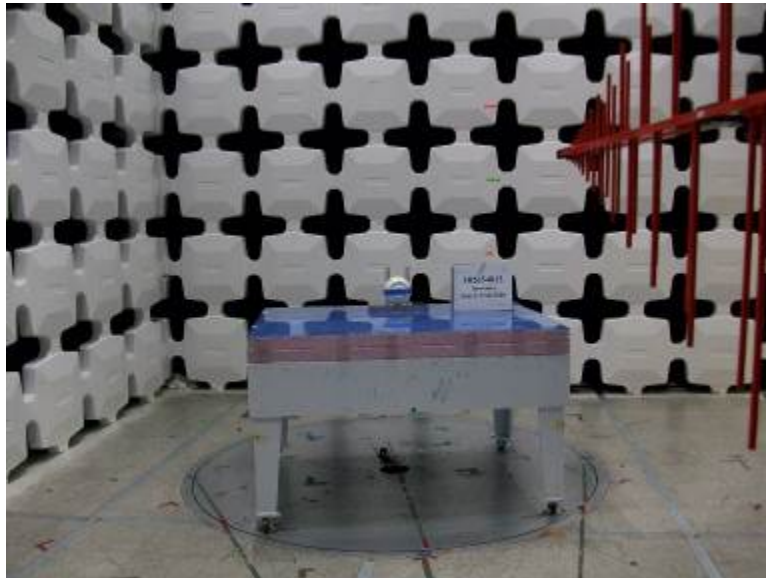
**Test Method:**

- ANSI C63.10:2013, Section 7.8.4

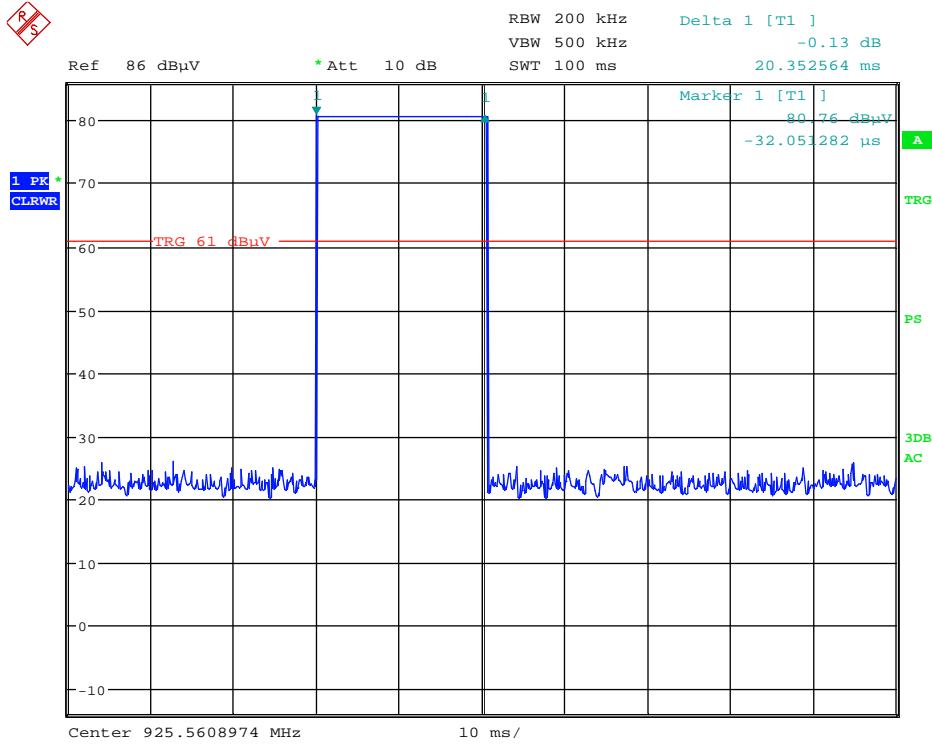
**Notes:**

1. The limit for RSS-247 is identical to the limit for FCC 15.247.

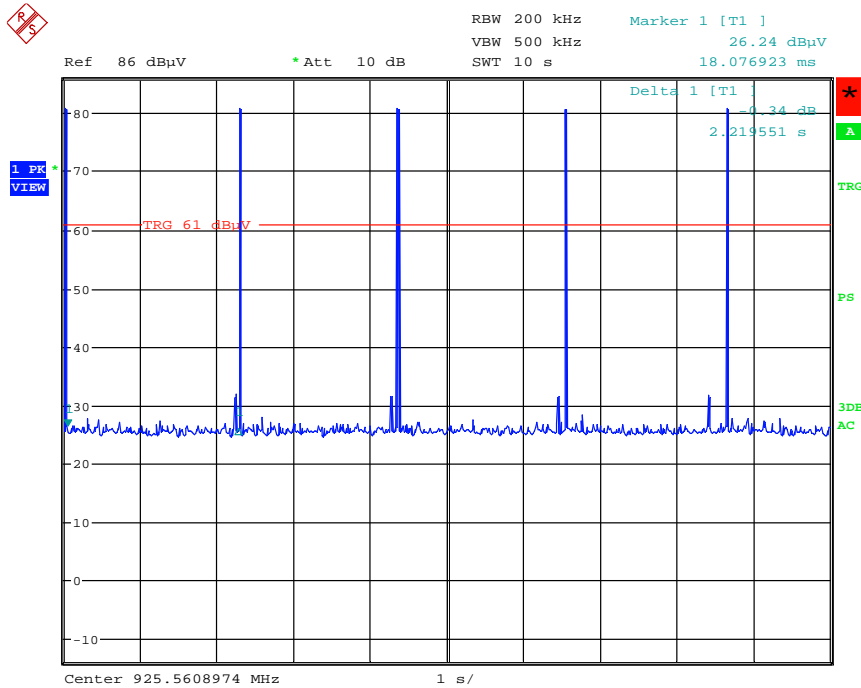
**Setup Photographs:**



Plots:



Date: 15.JUL.2016 16:12:30



Date: 15.JUL.2016 16:03:54

DCCF Calculation:

$$20 \log (t/100\text{mS})$$

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

$$t = 20.3\text{ mS}$$

$$20 \log (0.203) = -13.8 \text{ dB}$$

Maximum allowable DCCF correction is -13.8dB.

### 11 Spurious and Band Edge Emissions - Radiated

The test methods used comply with ANSI C63.4. Unless otherwise stated no deviations were made from FCC 15.247 & RSS-247.

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-247 5.5

<b>Frequency Range:</b>	<input checked="" type="checkbox"/> 902-928MHz <input type="checkbox"/> 2400-2483.5MHz <input type="checkbox"/> 5725-5850MHz		
	<b>Output Power with 100 kHz Bandwidth</b>	<b>Minimum Allowed Attenuation dB</b>	<b>Limit dB</b>
	<b>Vertical</b>		
<b>914.78</b>	101.7	20	81.7
<b>Analyzer Settings:</b>	<input checked="" type="checkbox"/> RBW=100KHz		
<b>Minimum Allowed Attenuation:</b>	<input checked="" type="checkbox"/> 20dB <input type="checkbox"/> 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

#### Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	6/22/2016	6/22/2017
DEN-152	Hi Pass Filter: VHF-1320+, 1700-3800MHz	Mini-Circuits	VHF-1320	30716	9/3/2015	9/3/2016
DEN-155	Notch Filter: 902MHz - 928MHz	Micro-Tronics	BRC50722	004	04/27/2016	04/27/2017
DEN-073	EMI Receiver (10Hz - 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	12/19/2015	12/19/2016
CC1-E2	Radiated Cable	Teledyne	90-206-300; PN:F-130-S1S1-100; 90-206-072;	E2-A; 5026702002; E2-C; E2-D	11/17/2015	11/17/2016
LAB-012	Wireless BP, Tem and Humidity sensor	Omega	zED-BTH	0070368	9/01/2015	9/1/2016

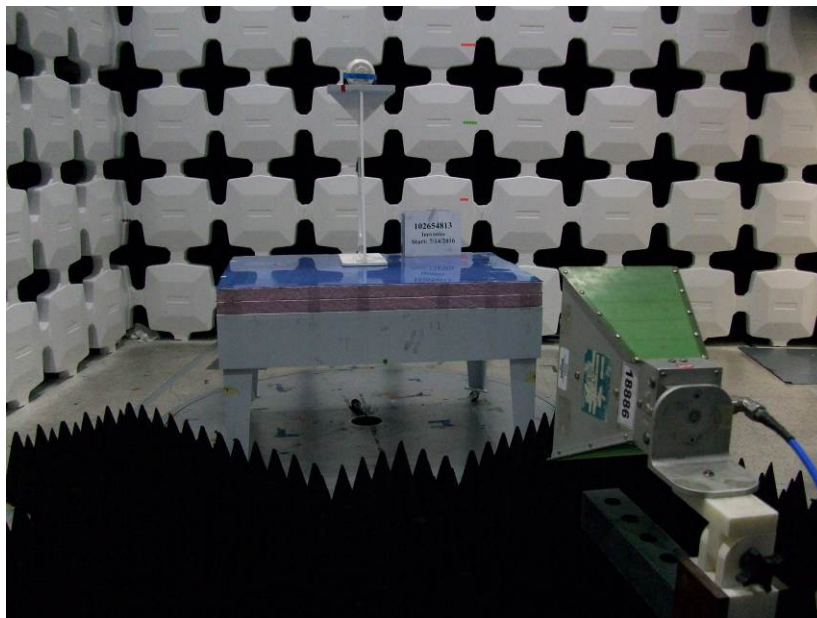
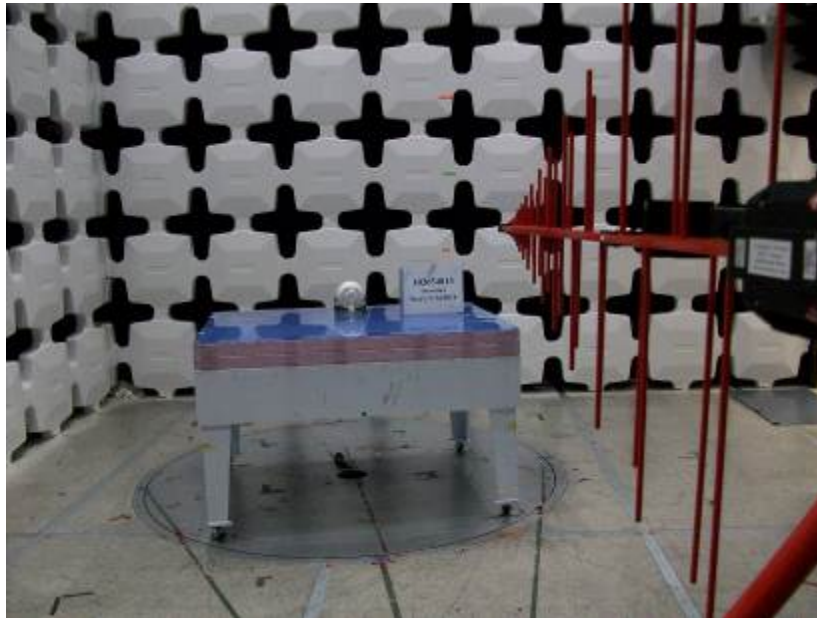
#### Results:

The sample tested was found to comply.

#### Test Method:

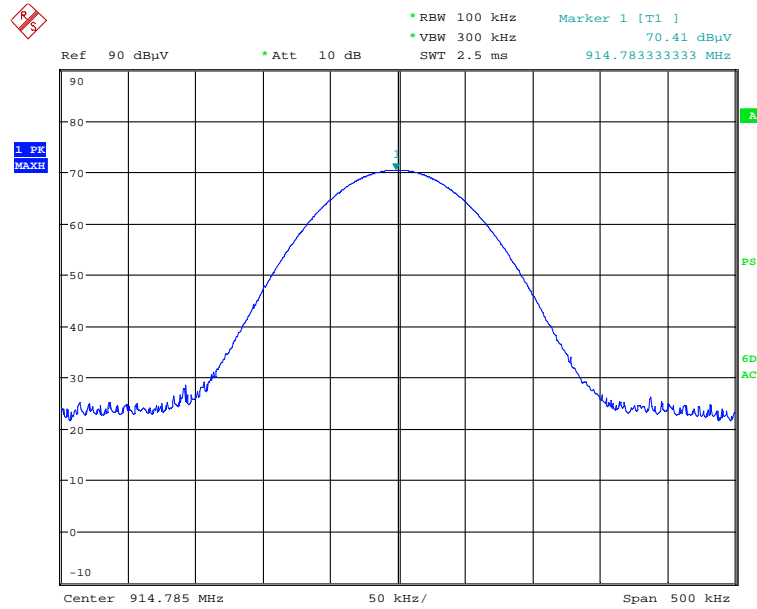
- ANSI C63.10: 2009, Clause 7.8.6

Setup Photographs:





**Plots: Output into 100kHz RBW:**



Date: 20.JUL.2016 18:38:01

Mid Channel Axis 2 represents the lowest measured fundamental, and represents the lowest possible 20dBc limit for non-restricted band harmonics.

FREQ	LEVEL	DET	CABLE	ANT	FINAL	POL	HGT	AZ	RBW
<u>MHz</u>	<u>dBuV</u>	<u>Qp</u> <u>Av</u> <u>Pk</u> <u>Rms</u>	+ [dB]	+ [dB/m]	= [dBuV]	(V/H)	(m)	(DEG)	(MHz)
Mid channel Axis-2									
914.7850	70.41	<b>Pk</b>	2.75	28.50	101.66	V	1.00	357.4	0.100

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	LIMIT	DELTA2	RBW
<u>MHz</u>	<u>dBuV</u>	<u>Qp</u> <u>Av</u> <u>Pk</u> <u>Rms</u>	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)		-20dBc	(MHz)
LC-Axis 1 (Harmonics None Restricted Band) EN 1244													
1804.77	72.93	<b>Pk</b>	3.86	26.85	37.83	0.72	66.52	V	1.94	341.50	81.70	-15.18	1.00
6316.69	53.32	<b>Pk</b>	7.62	34.97	45.91	0.00	50.00	V	1.99	353.30	81.70	-31.70	1.00
7219.07	56.55	<b>Pk</b>	8.26	36.32	47.17	0.00	53.96	V	1.14	210.20	81.70	-27.74	1.00
1804.77	70.34	<b>Pk</b>	3.86	26.85	37.83	0.72	63.93	H	1.49	212.60	81.70	-17.77	1.00
6316.69	51.39	<b>Pk</b>	7.62	34.97	45.91	0.00	48.07	H	2.63	247.70	81.70	-33.63	1.00
7219.07	55.93	<b>Pk</b>	8.26	36.32	47.17	0.00	53.34	H	2.44	40.00	81.70	-28.36	1.00
LC-Axis 2 (Harmonics None Restricted Band) EN 1244													
1804.77	65.99	<b>Pk</b>	3.86	26.85	37.83	0.72	59.58	V	1.15	196.20	81.70	-22.12	1.00
6316.68	52.00	<b>Pk</b>	7.62	34.97	45.91	0.00	48.68	V	1.00	153.60	81.70	-33.02	1.00

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FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	LIMIT	DELTA2	RBW
MHz	dBuV	Qp Av Pk Rms	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H )	(m)	(DEG)		-20dBc	(MHz)
7219.07	56.75	<b>Pk</b>	8.26	36.32	47.17	0.00	54.16	V	2.07	188.20	81.70	-27.54	1.00
1804.77	69.36	<b>Pk</b>	3.86	26.85	37.83	0.72	62.95	H	1.63	273.70	81.70	-18.75	1.00
6316.68	52.58	<b>Pk</b>	7.62	34.97	45.91	0.00	49.26	H	1.53	201.80	81.70	-32.44	1.00
7219.07	55.88	<b>Pk</b>	8.26	36.32	47.17	0.00	53.29	H	1.86	188.20	81.70	-28.41	1.00
LC-Axis 3 (Harmonics None Restricted Band) EN 1244													
1804.77	67.88	<b>Pk</b>	3.86	26.85	37.83	0.72	61.47	V	1.20	273.70	81.70	-20.23	1.00
6315.77	51.14	<b>Pk</b>	7.62	34.97	45.91	0.00	47.82	V	1.44	229.10	81.70	-33.88	1.00
7219.07	57.27	<b>Pk</b>	8.26	36.32	47.17	0.00	54.68	V	1.48	220.00	81.70	-27.02	1.00
1804.77	67.85	<b>Pk</b>	3.86	26.85	37.83	0.72	61.44	H	2.29	359.90	81.70	-20.26	1.00
6315.77	51.14	<b>Pk</b>	7.62	34.97	45.91	0.00	47.82	H	1.79	187.40	81.70	-33.88	1.00
7219.07	57.27	<b>Pk</b>	8.26	36.32	47.17	0.00	54.68	H	2.02	290.90	81.70	-27.02	1.00
MC-Axis 1 (Harmonics None Restricted Band) EN 1244													
1829.57	70.96	<b>Pk</b>	3.88	27.04	37.83	0.68	64.74	V	1.00	140.10	81.70	-16.96	1.00
5488.70	54.04	<b>Pk</b>	7.01	34.39	43.27	0.00	52.16	V	1.24	248.40	81.70	-29.54	1.00
6403.49	54.11	<b>Pk</b>	7.66	34.92	46.24	0.00	50.45	V	1.78	161.00	81.70	-31.25	1.00
1829.57	69.88	<b>Pk</b>	3.88	27.04	37.83	0.68	63.66	H	2.03	28.60	81.70	-18.04	1.00
5488.70	54.67	<b>Pk</b>	7.01	34.39	43.27	0.00	52.79	H	2.10	178.50	81.70	-28.91	1.00
6403.49	52.59	<b>Pk</b>	7.66	34.92	46.24	0.00	48.93	H	2.44	196.20	81.70	-32.77	1.00
MC-Axis 2 (Harmonics None Restricted Band) EN 1244													
1829.57	61.44	<b>Pk</b>	3.88	27.04	37.83	0.68	55.22	V	1.32	209.90	81.70	-26.48	1.00
5488.70	55.81	<b>Pk</b>	7.01	34.39	43.27	0.00	53.93	V	1.29	100.30	81.70	-27.77	1.00
1829.57	69.32	<b>Pk</b>	3.88	27.04	37.83	0.68	63.10	H	1.85	53.90	81.70	-18.60	1.00
5488.70	55.81	<b>Pk</b>	7.01	34.39	43.27	0.00	53.93	H	1.89	165.50	81.70	-27.77	1.00
6403.49	52.01	<b>Pk</b>	7.66	34.92	46.24	0.00	48.35	H	1.73	215.80	81.70	-33.35	1.00
6403.49	52.25	<b>Pk</b>	7.66	34.92	46.24	0.00	48.59	H	1.31	170.40	81.70	-33.11	1.00
MC-Axis 3 (Harmonics None Restricted Band) EN 1244													
1829.57	69.34	<b>Pk</b>	3.88	27.04	37.83	0.68	63.12	V	1.59	236.00	81.70	-18.58	1.00
5488.70	55.34	<b>Pk</b>	7.01	34.39	43.27	0.00	53.46	V	1.21	194.30	81.70	-28.24	1.00
6403.34	52.08	<b>Pk</b>	7.66	34.92	46.24	0.00	48.43	V	1.00	239.40	81.70	-33.27	1.00
1829.57	65.81	<b>Pk</b>	3.88	27.04	37.83	0.68	59.59	H	2.13	211.50	81.70	-22.11	1.00
5488.70	57.13	<b>Pk</b>	7.01	34.39	43.27	0.00	55.25	H	1.67	93.50	81.70	-26.45	1.00
6403.34	53.03	<b>Pk</b>	7.66	34.92	46.24	0.00	49.38	H	1.54	263.90	81.70	-32.32	1.00
HC-Axis-1 (Harmonics None Restricted Band) EN 1244													
1855.17	75.98	<b>Pk</b>	3.90	27.24	37.84	0.64	69.93	V	1.27	166.80	81.70	-11.77	1.00
5565.50	53.86	<b>Pk</b>	7.06	34.34	43.45	0.00	51.80	V	1.40	237.30	81.70	-29.90	1.00
6493.08	54.43	<b>Pk</b>	7.71	34.91	46.55	0.00	50.50	V	1.53	39.90	81.70	-31.20	1.00
9275.09	52.50	<b>Pk</b>	9.33	37.55	47.45	0.00	51.93	V	1.67	146.70	81.70	-29.77	1.00
1855.17	70.15	<b>Pk</b>	3.90	27.24	37.84	0.64	64.10	H	2.31	359.90	81.70	-17.60	1.00

# Intertek

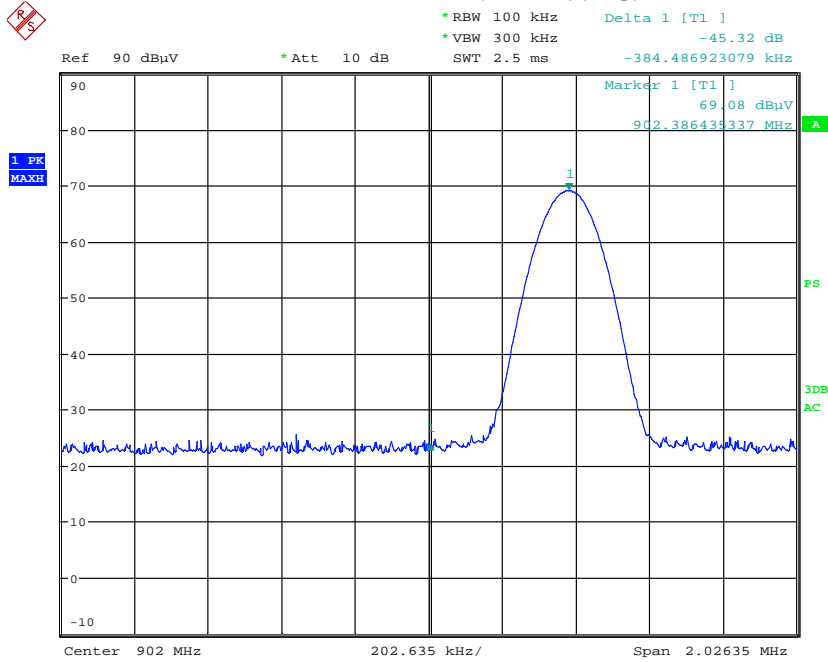
Report Number: 102654813DEN-001

Issued: 7/26/2016

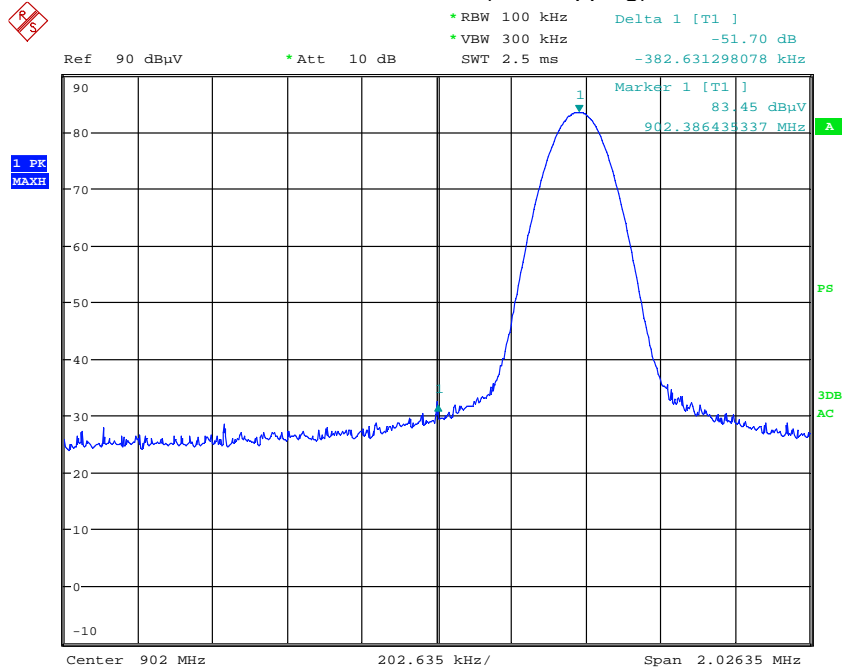
FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	FINAL	POL	HGT	AZ	LIMIT	DELTA2	RBW
MHz	dBuV	$\frac{Qp}{Av}$ Pk Rms	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H )	(m)	(DEG)		-20dBc	(MHz)
5565.50	53.63	<b>Pk</b>	7.06	34.34	43.45	0.00	51.57	H	1.79	285.20	81.70	-30.13	1.00
6493.08	54.43	<b>Pk</b>	7.71	34.91	46.55	0.00	50.50	H	1.79	136.70	81.70	-31.20	1.00
9275.09	52.00	<b>Pk</b>	9.33	37.55	47.45	0.00	51.43	H	2.23	167.70	81.70	-30.27	1.00
HC-Axis-2 (Harmonics None Restricted Band) EN 1244													
1855.17	62.08	<b>Pk</b>	3.90	27.24	37.84	0.64	56.03	V	1.00	271.90	81.70	-25.67	1.00
5565.50	58.16	<b>Pk</b>	7.06	34.34	43.45	0.00	56.10	V	1.47	137.90	81.70	-25.60	1.00
6493.08	53.39	<b>Pk</b>	7.71	34.91	46.55	0.00	49.46	V	2.02	142.60	81.70	-32.24	1.00
9275.83	54.06	<b>Pk</b>	9.33	37.55	47.45	0.00	53.49	V	1.24	170.30	81.70	-28.21	1.00
1855.17	69.14	<b>Pk</b>	3.90	27.24	37.84	0.64	63.09	H	1.32	164.60	81.70	-18.61	1.00
5565.50	58.16	<b>Pk</b>	7.06	34.34	43.45	0.00	56.10	H	1.10	63.80	81.70	-25.60	1.00
6493.08	52.98	<b>Pk</b>	7.71	34.91	46.55	0.00	49.05	H	1.63	116.90	81.70	-32.65	1.00
9275.83	54.06	<b>Pk</b>	9.33	37.55	47.45	0.00	53.49	H	1.68	147.00	81.70	-28.21	1.00
HC-Axis-3 (Harmonics None Restricted Band) EN 1244													
1855.17	70.51	<b>Pk</b>	3.90	27.24	37.84	0.64	64.46	V	1.31	115.20	81.70	-17.24	1.00
5565.50	56.78	<b>Pk</b>	7.06	34.34	43.45	0.00	54.72	V	1.52	158.40	81.70	-26.98	1.00
6493.08	54.20	<b>Pk</b>	7.71	34.91	46.55	0.00	50.27	V	1.14	128.10	81.70	-31.43	1.00
9275.84	53.23	<b>Pk</b>	9.33	37.55	47.45	0.00	52.66	V	1.86	90.60	81.70	-29.04	1.00
1855.17	70.21	<b>Pk</b>	3.90	27.24	37.84	0.64	64.16	H	1.83	164.60	81.70	-17.54	1.00
5565.50	56.78	<b>Pk</b>	7.06	34.34	43.45	0.00	54.72	H	2.01	127.40	81.70	-26.98	1.00
6493.08	54.20	<b>Pk</b>	7.71	34.91	46.55	0.00	50.27	H	2.07	164.50	81.70	-31.43	1.00
9275.84	52.65	<b>Pk</b>	9.33	37.55	47.45	0.00	52.08	H	1.90	125.10	81.70	-29.62	1.00

Plots: Band Edge

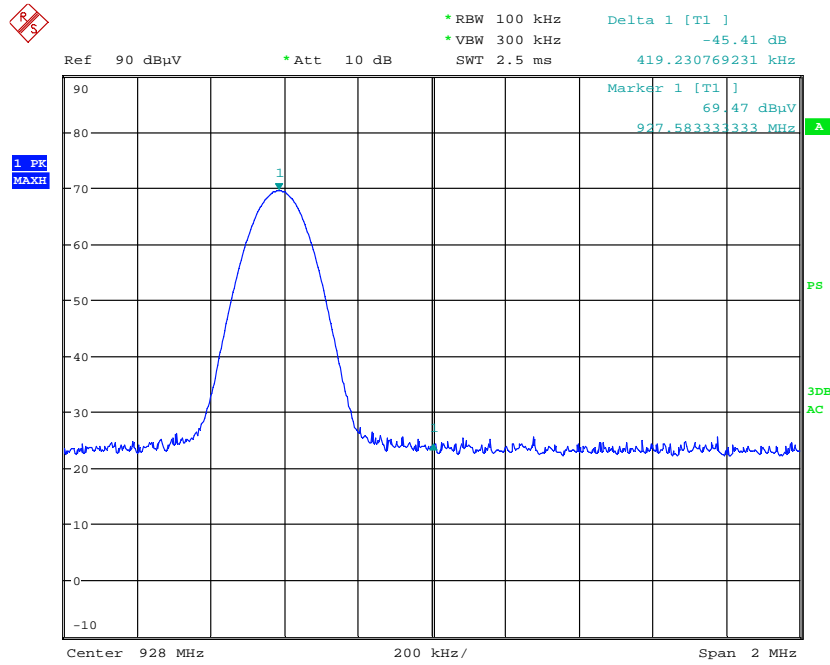
Low Channel-Vertical (non-hopping)



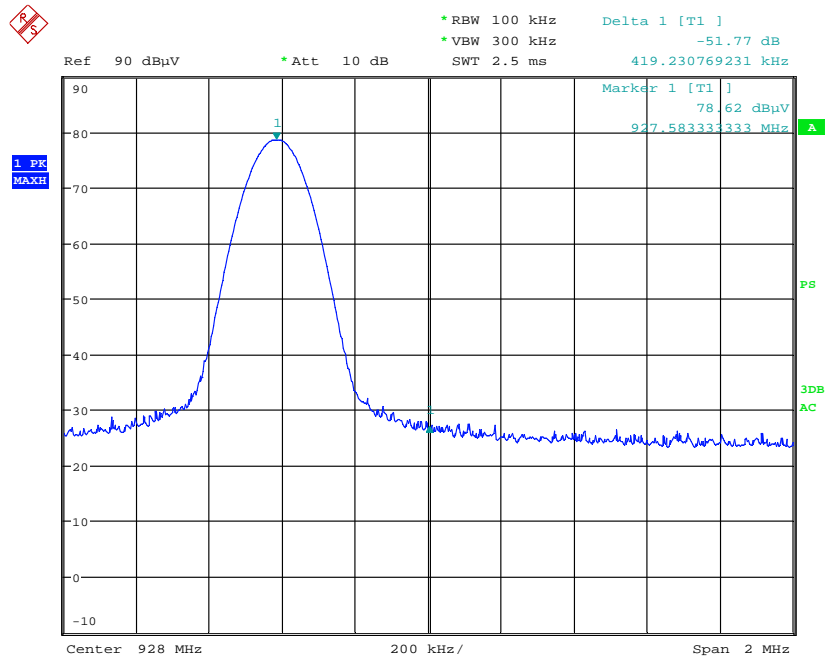
Low Channel-Horizontal (non-hopping)



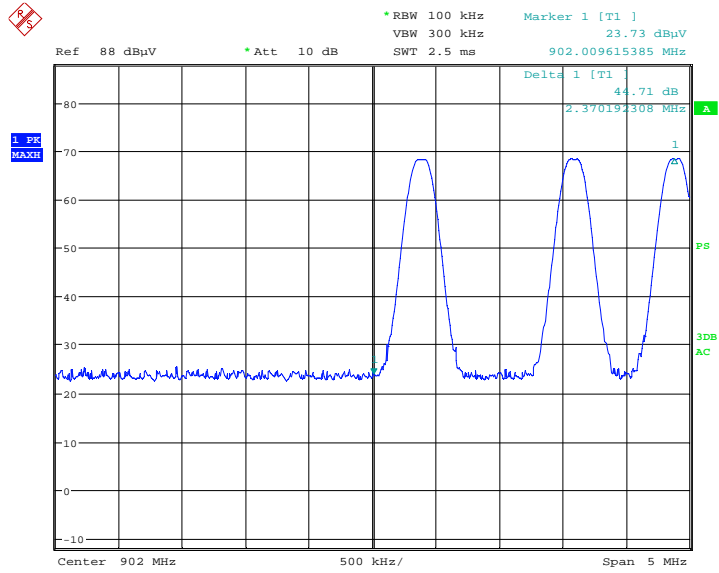
High Channel-Vertical (non-hopping)



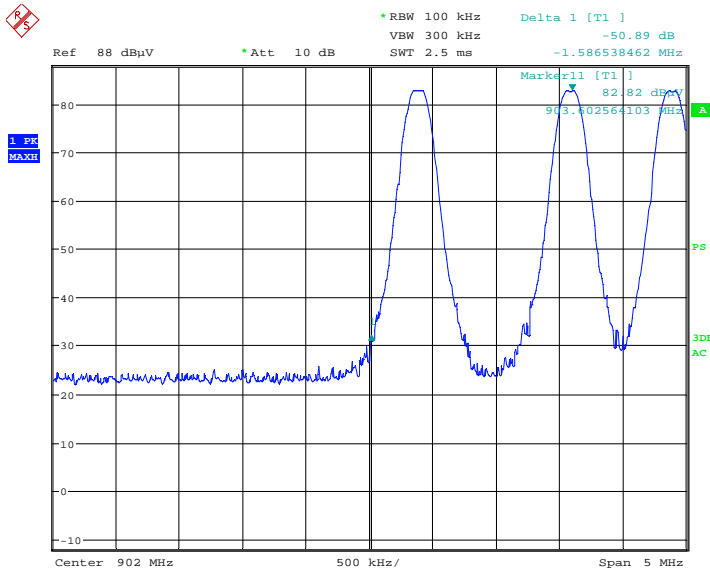
High Channel-Horizontal (non-hopping)



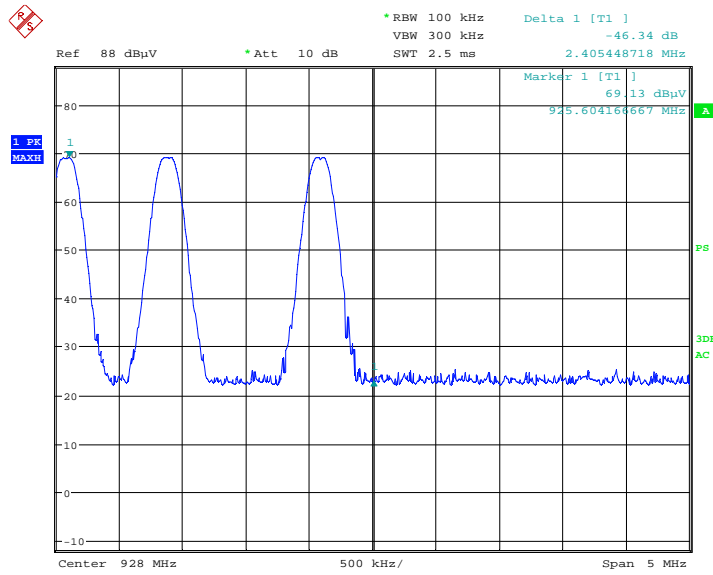
Low Channel-Vertical (hopping)



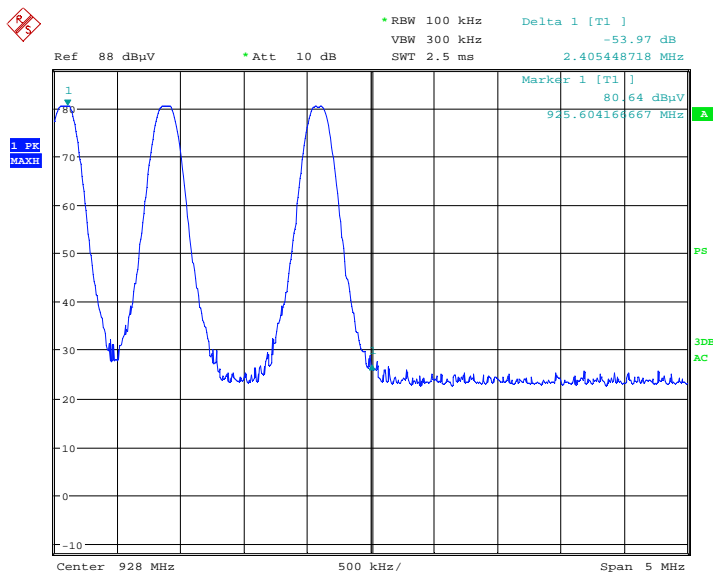
Low Channel-Horizontal (hopping)



High Channel-Vertical (hopping)



High Channel-Horizontal (hopping)



Notes: None

## 12 Spurious 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-247.

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-247 5.5/RSS-GEN 8.10

### Test Equipment Used:

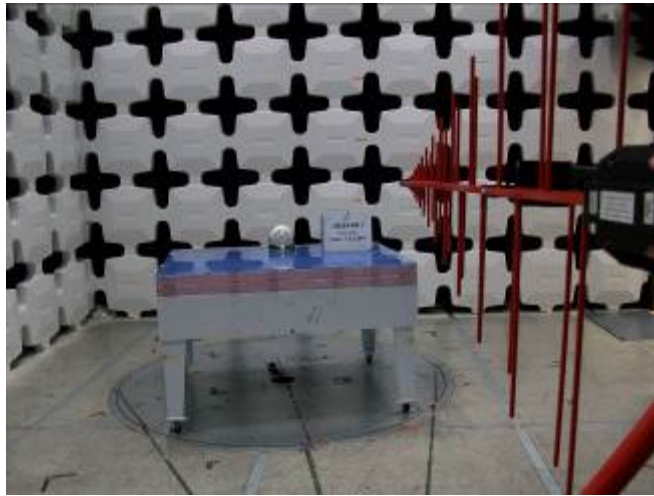
Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	12/28/2015	12/28/2017
18743	Pre Amp:700 kHz- 1GHz	Mini-Circuits	AM-34-000110	686965	9/3/2015	9/3/2016
18906	Pre Amp: 1GHz – 4GHz	Mini-Circuits Lab	ZHL-42	N052792-2	4/26/2016	4/26/2017
DEN-032	4-18 GHz LNA	NARDA	DBL-0618N615	031	4/13/2016	4/13/2017
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	HP	5	3/31/2016	3/31/2017
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	6/22/2016	6/22/2017
DEN-152	Hi Pass Filter: VHF-1320+, 1700-3800MHz	Mini-Circuits	VHF-1320	30716	9/3/2015	9/3/2016
DEN-155	Notch Filter: 902MHz - 928MHz	Micro-Tronics	BRC50722	004	04/27/2016	04/27/2017
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	12/19/2015	12/19/2016
CC1-E2	Radiated Cable	Teledyne	90-206-300; PN:F-130-S1S1-100; 90-206-072;	E2-A; 5026702002; E2-C; E2-D	11/17/2015	11/17/2016
LAB-012	Wireless BP, Tem and Humidity sensor	Omega	zED-BTH	0070368	9/01/2015	9/1/2016

### Results:

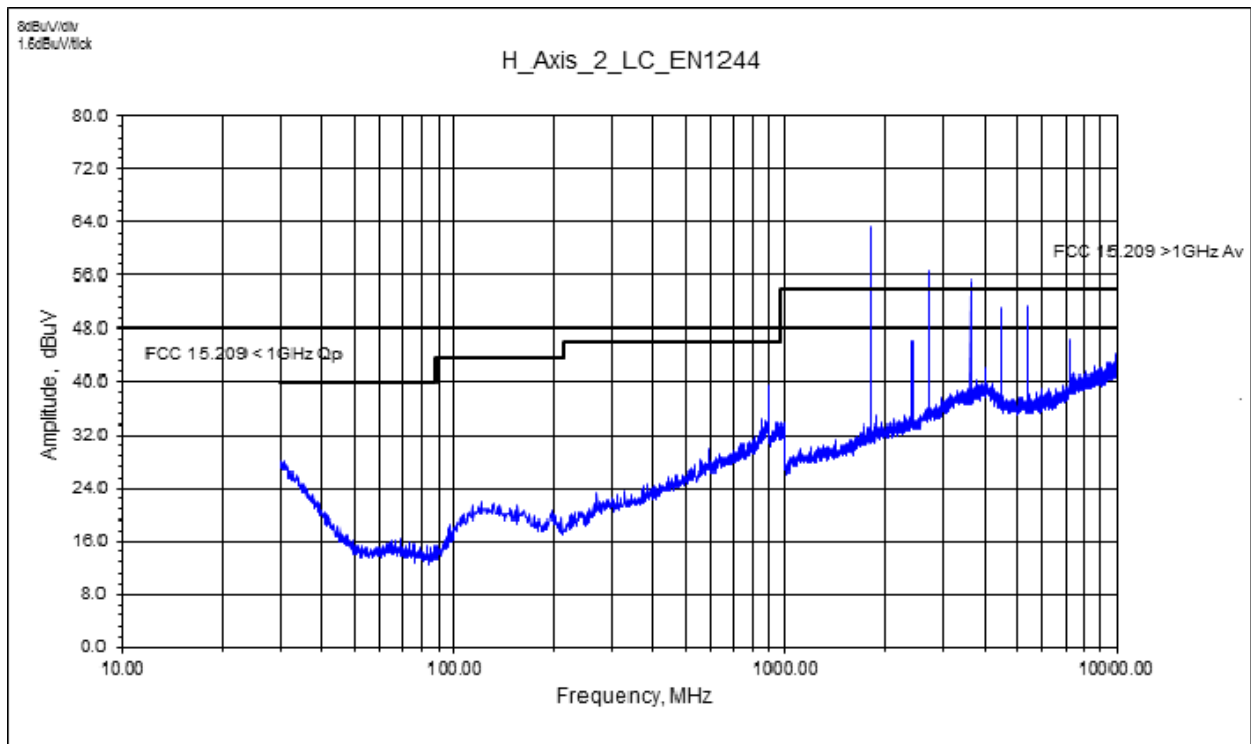
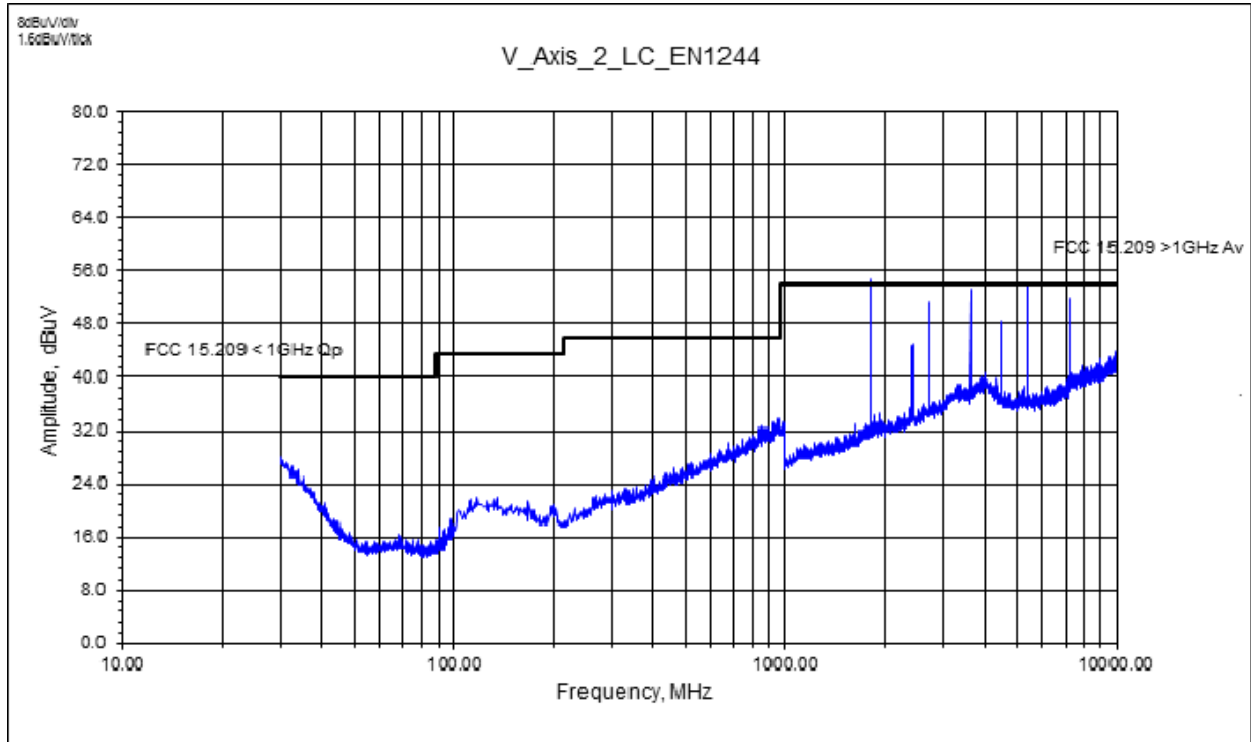
The sample tested was found to comply.

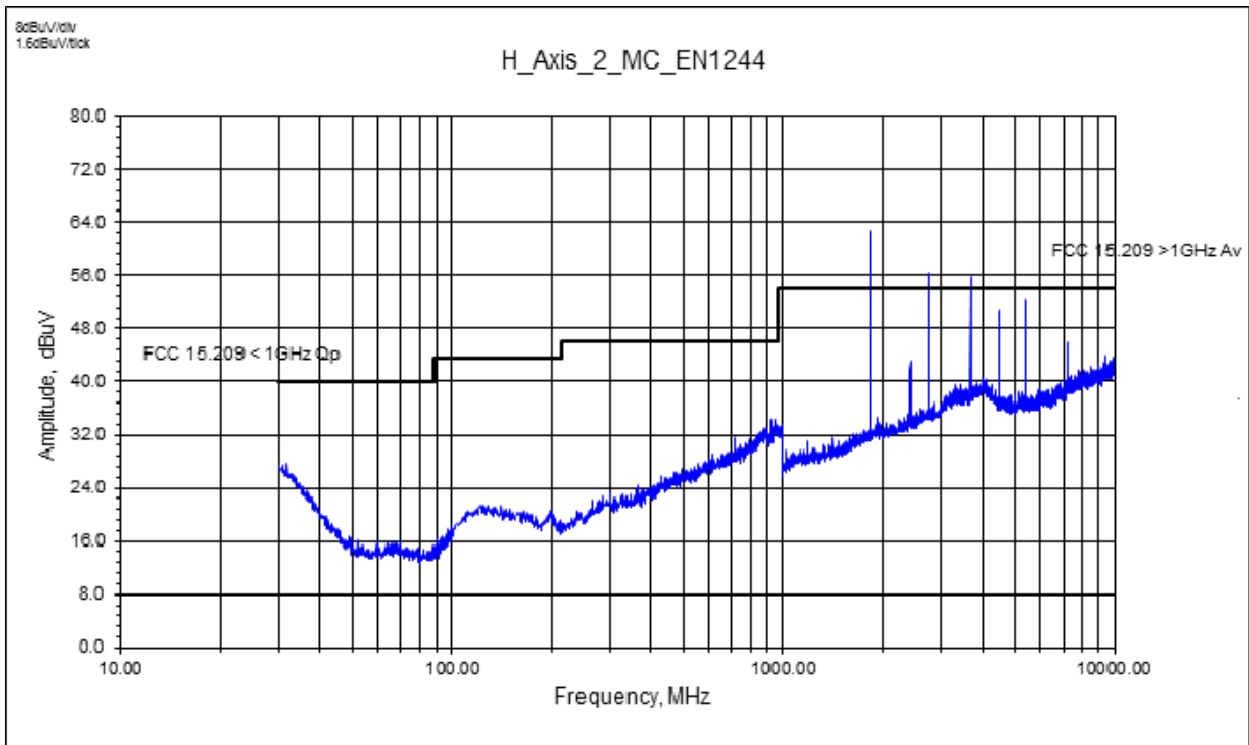
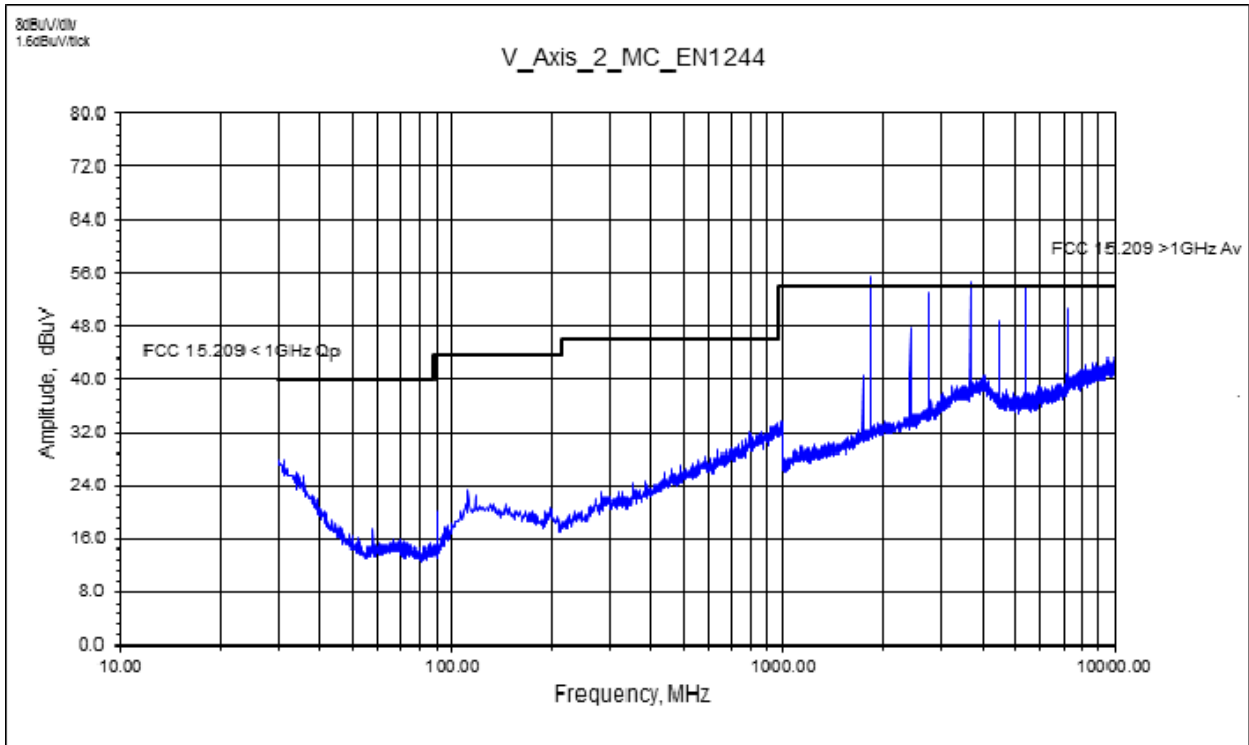


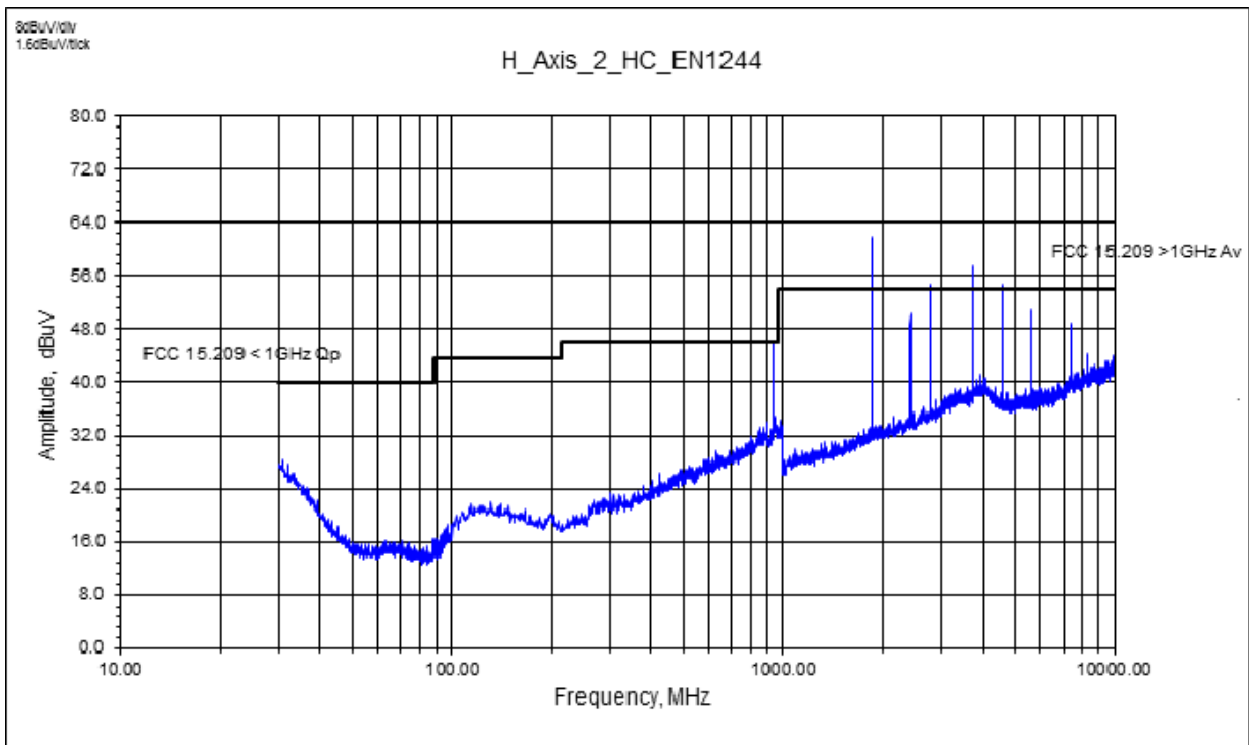
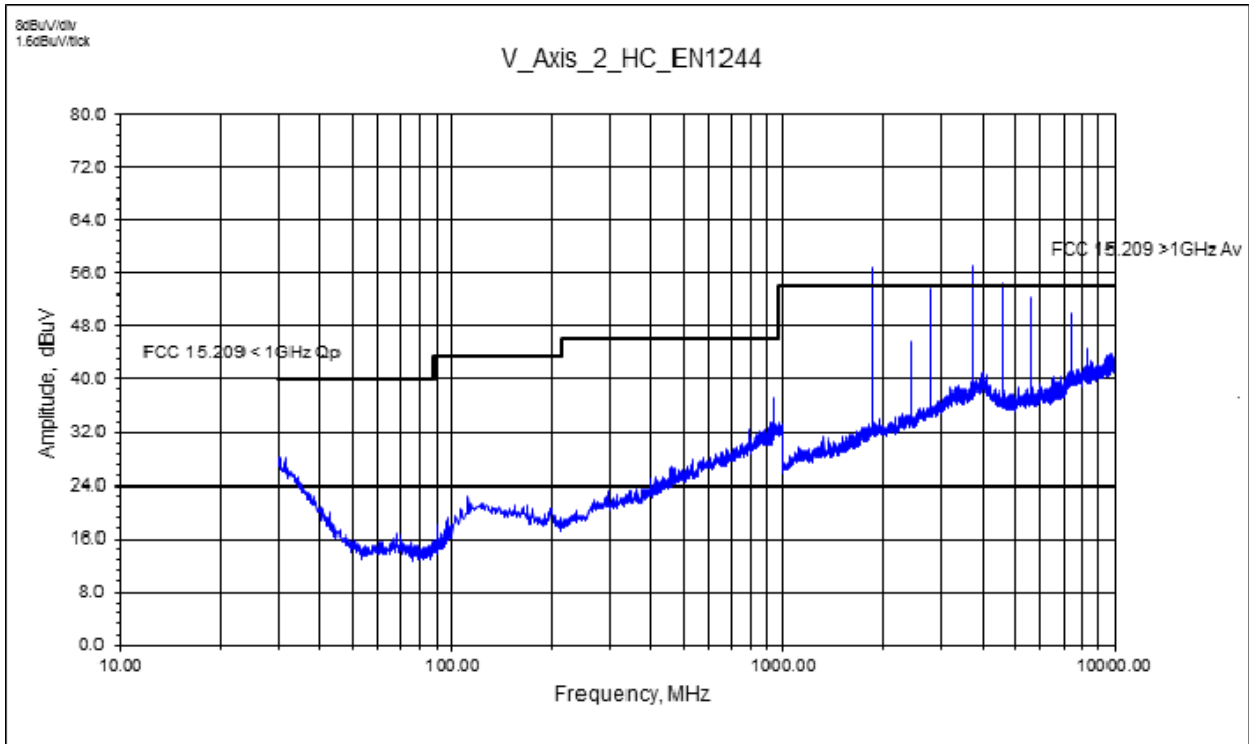
**Setup Photographs:**



Plots: Prescan only







# Intertek

Report Number: 102654813DEN-001

Issued: 7/26/2016

## Data:

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	DUTY CC	FINAL	POL	HGT	AZ	LIMIT 1		LIMIT 2		DELTA 1		DELTA 2		RBW
												FCC 15.209 >1GHz Av	FCC 15.209 >1GHz PK	FCC 15.209 >1GHz Av	FCC 15.209 >1GHz PK	FCC 15.209 >1GHz Av	FCC 15.209 >1GHz PK	FCC 15.209 >1GHz Av	FCC 15.209 >1GHz PK	
MHz	dBuV	Qp Av Pk Rms	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	- [dB]	= [dBuV]	(V/H)	(m)	(DEG)									(MHz)
<b>Harmonics Restricted Band</b>																				
<b>LC_Axis 1 EN1244</b>																				
2707.152	58.32	PK	4.79	29.11	37.94	0.52	N/A	54.8	V	2.091	97.7	N/A	73.98	N/A					-19.18	1
3609.535	58.06	PK	5.56	31.75	38.4	0.51	N/A	57.47	V	2.091	97.7	N/A	73.98	N/A					-16.51	1
4511.918	50.32	PK	6.25	32.69	34.84	0	N/A	54.42	V	1	1.8	N/A	73.98	N/A					-19.56	1
5414.301	57.25	PK	6.94	34.3	43.03	0	N/A	55.47	V	1.001	29.2	N/A	73.98	N/A					-18.51	1
8122.508	51.63	PK	8.84	36.98	46.22	0	N/A	51.24	V	1.519	232.1	N/A	73.98	N/A					-22.74	1
9025.181	53.02	PK	9.22	37.41	47.28	0	N/A	52.37	V	1.001	94.6	N/A	73.98	N/A					-21.61	1
2707.152	58.12	PK	4.79	29.11	37.94	0.52	N/A	54.6	H	1.442	146.4	N/A	73.98	N/A					-19.38	1
3609.535	58.06	PK	5.56	31.75	38.4	0.51	N/A	57.47	H	1.301	33.3	N/A	73.98	N/A					-16.51	1
4511.918	51.28	PK	6.25	32.69	34.84	0	N/A	55.38	H	1.561	211	N/A	73.98	N/A					-18.6	1
5414.301	57.36	PK	6.94	34.3	43.03	0	N/A	55.58	H	1.703	171.8	N/A	73.98	N/A					-18.4	1
8122.508	52.13	PK	8.84	36.98	46.22	0	N/A	51.74	H	1.753	250.7	N/A	73.98	N/A					-22.24	1
9025.181	52.5	PK	9.22	37.41	47.28	0	N/A	51.85	H	1.597	151.4	N/A	73.98	N/A					-22.13	1
2707.152	58.32	Av	4.79	29.11	37.94	0.52	13.7	41.1	V	2.091	97.7	53.98	N/A	N/A					-12.88	N/A
3609.535	58.06	Av	5.56	31.75	38.4	0.51	13.7	43.78	V	2.091	97.7	53.98	N/A	N/A					-10.2	N/A
4511.918	50.32	Av	6.25	32.69	34.84	0	13.7	40.72	V	1	1.8	53.98	N/A	N/A					-13.26	N/A
5414.301	57.25	Av	6.94	34.3	43.03	0	13.7	41.76	V	1.001	29.2	53.98	N/A	N/A					-12.22	N/A
8122.508	51.63	Av	8.84	36.98	46.22	0	13.7	37.53	V	1.519	232.1	53.98	N/A	N/A					-16.45	N/A
9025.181	53.02	Av	9.22	37.41	47.28	0	13.7	38.67	V	1.001	94.6	53.98	N/A	N/A					-15.31	N/A
2707.152	58.12	Av	4.79	29.11	37.94	0.52	13.7	40.9	H	1.442	146.4	53.98	N/A	N/A					-13.08	N/A
3609.535	58.06	Av	5.56	31.75	38.4	0.51	13.7	43.78	H	1.301	33.3	53.98	N/A	N/A					-10.2	N/A
4511.918	51.28	Av	6.25	32.69	34.84	0	13.7	41.68	H	1.561	211	53.98	N/A	N/A					-12.3	N/A
5414.301	57.36	Av	6.94	34.3	43.03	0	13.7	41.87	H	1.703	171.8	53.98	N/A	N/A					-12.11	N/A
8122.508	52.13	Av	8.84	36.98	46.22	0	13.7	38.03	H	1.753	250.7	53.98	N/A	N/A					-15.95	N/A
9025.181	52.5	Av	9.22	37.41	47.28	0	13.7	38.15	H	1.597	151.4	53.98	N/A	N/A					-15.83	N/A
<b>LC_Axis 2 EN1244</b>																				
2707.152	60.53	PK	4.79	29.11	37.94	0.52	N/A	57.01	V	1.302	27.2	N/A	73.98	N/A					-16.97	1
3609.535	56.82	PK	5.56	31.75	38.4	0.51	N/A	56.23	V	1.287	135.7	N/A	73.98	N/A					-17.75	1
4511.917	49.25	PK	6.25	32.69	34.84	0	N/A	53.35	V	1.219	359.9	N/A	73.98	N/A					-20.63	1
5414.301	58.1	PK	6.94	34.3	43.03	0	N/A	56.32	V	1.411	41.9	N/A	73.98	N/A					-17.66	1
8122.709	52	PK	8.84	36.98	46.22	0	N/A	51.61	V	1.155	33.2	N/A	73.98	N/A					-22.37	1
9024.904	52.63	PK	9.22	37.42	47.28	0	N/A	51.99	V	1.144	86.7	N/A	73.98	N/A					-21.99	1
2707.152	62.58	PK	4.79	29.11	37.94	0.52	N/A	59.06	H	1.918	86.4	N/A	73.98	N/A					-14.92	1
3609.535	57.23	PK	5.56	31.75	38.4	0.51	N/A	56.64	H	1.785	75.6	N/A	73.98	N/A					-17.34	1
4511.917	46.7	PK	6.25	32.69	34.84	0	N/A	50.8	H	1.845	124.4	N/A	73.98	N/A					-23.18	1
5414.301	58.1	PK	6.94	34.3	43.03	0	N/A	56.32	H	1.676	267.4	N/A	73.98	N/A					-17.66	1
8122.709	52.21	PK	8.84	36.98	46.22	0	N/A	51.82	H	1.643	76	N/A	73.98	N/A					-22.16	1
9024.904	53.11	PK	9.22	37.42	47.28	0	N/A	52.47	H	1.311	112.2	N/A	73.98	N/A					-21.51	1
2707.152	60.53	Av	4.79	29.11	37.94	0.52	13.7	43.31	V	1.302	27.2	53.98	N/A	N/A					-10.67	N/A
3609.535	56.82	Av	5.56	31.75	38.4	0.51	13.7	42.54	V	1.287	135.7	53.98	N/A	N/A					-11.44	N/A
4511.917	49.25	Av	6.25	32.69	34.84	0	13.7	39.65	V	1.219	359.9	53.98	N/A	N/A					-14.33	N/A
5414.301	58.1	Av	6.94	34.3	43.03	0	13.7	42.61	V	1.411	41.9	53.98	N/A	N/A					-11.37	N/A
8122.709	52	Av	8.84	36.98	46.22	0	13.7	37.9	V	1.155	33.2	53.98	N/A	N/A					-16.08	N/A
9024.904	52.63	Av	9.22	37.42	47.28	0	13.7	38.29	V	1.144	86.7	53.98	N/A	N/A					-15.69	N/A
2707.152	62.58	Av	4.79	29.11	37.94	0.52	13.7	45.36	H	1.918	86.4	53.98	N/A	N/A					-8.62	N/A
3609.535	57.23	Av	5.56	31.75	38.4	0.51	13.7	42.95	H	1.785	75.6	53.98	N/A	N/A					-11.03	N/A
4511.917	46.7	Av	6.25	32.69	34.84	0	13.7	37.1	H	1.845	124.4	53.98	N/A	N/A					-16.88	N/A
5414.301	58.1	Av	6.94	34.3	43.03	0	13.7	42.61	H	1.676	267.4	53.98	N/A	N/A					-11.37	N/A
8122.709	52.21	Av	8.84	36.98	46.22	0	13.7	38.11	H	1.643	76	53.98	N/A	N/A					-15.87	N/A
9024.904	53.11	Av	9.22	37.42	47.28	0	13.7	38.77	H	1.311	112.2	53.98	N/A	N/A					-15.21	N/A
<b>LC_Axis 3 EN1244</b>																				
2707.152	62.48	PK	4.79	29.11	37.94	0.52	N/A	58.96	V	1.257	89.2	N/A	73.98	N/A					-15.02	1
3609.534	57.84	PK	5.56	31.75	38.4	0.51	N/A	57.25	V	1	123.7	N/A	73.98	N/A					-16.73	1
4512.601	43.41	PK	6.26	32.69	34.85	0	N/A	47.5	V	1.253	80	N/A	73.98	N/A					-26.48	1
5414.407	50.17	PK	6.94	34.3	43.03	0	N/A	48.39	V	1.125	43.2	N/A	73.98	N/A					-25.59	1
8119.84	51.72	PK	8.84	36.98	46.22	0	N/A	51.33	V	1.191	131.5	N/A	73.98	N/A					-22.65	1
9025.737	52.64	PK	9.22	37.41	47.28	0	N/A	51.99	V	1.156	17.4	N/A	73.98	N/A					-21.99	1
2707.152	63.97	PK	4.79	29.11	37.94	0.52	N/A	60.45	H	1.889	163	N/A	73.98	N/A					-13.53	1
3609.534	58.4	PK	5.56	31.75	38.4	0.51	N/A	57.81	H	1.605	205.4	N/A	73.98	N/A					-16.17	1
4512.601	44.22	PK	6.26	32.69	34.85	0	N/A	48.31	H	1.518	131.3	N/A	73.98	N/A					-25.67	1
5414.407	50.67	PK	6.94	34.3	43.03	0	N/A	48.89	H	1.792	60.7	N/A	73.98	N/A					-25.09	1
8119.84	51.72	PK	8.84	36.98	46.22	0	N/A	51.33	H	1.696	172.2	N/A	73.98	N/A					-22.65	1
9025.737	53.53	PK	9.22	37.41	47.28	0	N/A	52.88	H	1.761	53.1	N/A	73.98	N/A					-21.1	1
2707.152	62.48	Av	4.79	29.11	37.94	0.52	13.7	45.26	V	1.257	89.2	53.98	N/A	N/A					-8.72	N/A
3609.534	57.84	Av	5.56	31.75	38.4	0.51	13.7	43.56	V	1	123.7	53.98	N/A	N/A					-10.42	N/A
4512.601	43.41	Av	6.26	32.69	34.85	0	13.7	33.81	V	1.253	80	53.98	N/A	N/A					-20.17	N/A
5414.407	50.17	Av	6.94	34.3	43.03	0	13.7	34.68	V	1.125	43.2	53.98	N/A	N/A					-19.3	N/A
8119.84	51.72	Av	8.84	36.98	46.22	0	13.7	37.62	V	1.191	131.5	53.98	N/A	N/A					-16.36	N/A
9025.737	52.64	Av	9.22	37.41	47.28	0	13.7	38.29	V	1.156	17.4	53.98	N/A	N/A					-15.69	N/A
2707.152	63.97	Av	4.79	29.11	37.94	0.52	13.7	46.75	H	1.889	163	53.98	N/A	N/A					-7.23	N/A
3609.534	58.4	Av	5.56	31.75	38.4	0.51	13.7	44.12	H	1.605	205.4	53.98	N/A	N/A					-9.86	N/A
4512.601	44.22	Av	6.26	32.69	34.85	0	13.7	34.62	H	1.518	131.3	53.98	N/A	N/A					-19.36	N/A
5414.407	50.67	Av	6.94	34.3	43.03	0	13.7	35.18	H	1.792	60.7	53.98	N/A	N/A				</		

# Intertek

Report Number: 102654813DEN-001

Issued: 7/26/2016

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	DUTY CC	FINAL	POL	HGT	AZ	LIMIT 1	LIMIT 2	DELTA 1	DELTA 2	RBW
MHz	dBuV	Qp Av Pk Rms	+ [dB]	+ [dBm]	- [dB]	+ [dB]	- [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 >1GHz Av	FCC 15.209 >1GHz Pk	FCC 15.209 >1GHz Av	FCC 15.209 >1GHz Pk	(MHz)
MC Axis 1 EN1244																
2744.35	59.26	Pk	4.80	29.24	37.94	0.52	N/A	55.88	V	1.31	246.80	N/A	73.98	N/A	-18.10	1.00
3659.13	58.18	Pk	5.60	31.94	38.45	0.54	N/A	57.82	V	1.12	139.20	N/A	73.98	N/A	-16.16	1.00
4573.83	44.95	Pk	6.30	32.68	35.58	0.00	N/A	48.35	V	1.21	29.50	N/A	73.98	N/A	-25.63	1.00
7318.22	52.82	Pk	8.31	36.79	47.06	0.00	N/A	50.86	V	1.17	40.70	N/A	73.98	N/A	-23.12	1.00
8233.17	51.67	Pk	8.89	36.97	46.26	0.00	N/A	51.28	V	1.17	57.10	N/A	73.98	N/A	-22.70	1.00
9147.78	52.47	Pk	9.27	37.33	47.38	0.00	N/A	51.69	V	1.12	104.80	N/A	73.98	N/A	-22.29	1.00
2744.35	64.63	Pk	4.80	29.24	37.94	0.52	N/A	61.25	H	1.95	114.40	N/A	73.98	N/A	-12.73	1.00
3659.13	58.18	Pk	5.60	31.94	38.45	0.54	N/A	57.82	H	2.21	341.70	N/A	73.98	N/A	-16.16	1.00
4573.83	47.86	Pk	6.30	32.68	35.58	0.00	N/A	51.26	H	1.93	56.20	N/A	73.98	N/A	-22.72	1.00
7318.22	52.85	Pk	8.31	36.79	47.06	0.00	N/A	50.89	H	1.50	38.70	N/A	73.98	N/A	-23.09	1.00
8233.17	51.67	Pk	8.89	36.97	46.26	0.00	N/A	51.28	H	1.65	85.40	N/A	73.98	N/A	-22.70	1.00
9147.78	52.47	Pk	9.27	37.33	47.38	0.00	N/A	51.69	H	1.66	118.20	N/A	73.98	N/A	-22.29	1.00
2744.35	59.26	Av	4.80	29.24	37.94	0.52	13.70	42.18	V	1.31	246.80	53.98	N/A	-11.80	N/A	1.00
3659.13	58.18	Av	5.60	31.94	38.45	0.54	13.70	44.11	V	1.12	139.20	53.98	N/A	-9.87	N/A	1.00
4573.83	44.95	Av	6.30	32.68	35.58	0.00	13.70	34.65	V	1.21	29.50	53.98	N/A	-19.33	N/A	1.00
7318.22	52.82	Av	8.31	36.79	47.06	0.00	13.70	37.16	V	1.17	40.70	53.98	N/A	-16.82	N/A	1.00
8233.17	51.67	Av	8.89	36.97	46.26	0.00	13.70	37.57	V	1.17	57.10	53.98	N/A	-16.41	N/A	1.00
9147.78	52.47	Av	9.27	37.33	47.38	0.00	13.70	37.99	V	1.12	104.80	53.98	N/A	-15.99	N/A	1.00
2744.35	64.63	Av	4.80	29.24	37.94	0.52	13.70	47.55	H	1.95	114.40	53.98	N/A	-6.43	N/A	1.00
3659.13	58.18	Av	5.60	31.94	38.45	0.54	13.70	44.11	H	2.21	341.70	53.98	N/A	-9.87	N/A	1.00
4573.83	47.86	Av	6.30	32.68	35.58	0.00	13.70	37.56	H	1.93	56.20	53.98	N/A	-16.82	N/A	1.00
7318.22	52.85	Av	8.31	36.79	47.06	0.00	13.70	37.19	H	1.50	38.70	53.98	N/A	-16.79	N/A	1.00
8233.17	51.67	Av	8.89	36.97	46.26	0.00	13.70	37.57	H	1.65	85.40	53.98	N/A	-16.41	N/A	1.00
9147.78	52.47	Av	9.27	37.33	47.38	0.00	13.70	37.99	H	1.66	118.20	53.98	N/A	-15.99	N/A	1.00
MC Axis 2 EN1244																
2744.35	65.15	Pk	4.80	29.24	37.94	0.52	N/A	61.77	V	1.30	285.60	N/A	73.98	N/A	-12.21	1.00
3659.13	57.82	Pk	5.60	31.94	38.45	0.54	N/A	57.46	V	1.29	201.60	N/A	73.98	N/A	-16.52	1.00
4573.99	44.04	Pk	6.30	32.68	35.58	0.00	N/A	47.44	V	1.20	39.60	N/A	73.98	N/A	-26.54	1.00
7318.61	52.68	Pk	8.31	36.79	47.06	0.00	N/A	50.72	V	1.10	78.80	N/A	73.98	N/A	-23.26	1.00
8232.84	51.86	Pk	8.89	36.97	46.26	0.00	N/A	51.47	V	1.14	35.60	N/A	73.98	N/A	-22.51	1.00
9148.13	52.76	Pk	9.27	37.33	47.38	0.00	N/A	51.98	V	1.09	153.00	N/A	73.98	N/A	-22.00	1.00
2744.35	65.15	Pk	4.80	29.24	37.94	0.52	N/A	61.77	H	1.86	68.40	N/A	73.98	N/A	-12.21	1.00
3659.13	57.82	Pk	5.60	31.94	38.45	0.54	N/A	57.46	H	1.75	14.20	N/A	73.98	N/A	-16.52	1.00
4573.99	45.40	Pk	6.30	32.68	35.58	0.00	N/A	48.80	H	1.49	77.10	N/A	73.98	N/A	-25.18	1.00
7318.61	52.68	Pk	8.31	36.79	47.06	0.00	N/A	50.72	H	1.50	103.60	N/A	73.98	N/A	-23.26	1.00
8232.84	51.95	Pk	8.89	36.97	46.26	0.00	N/A	51.56	H	1.61	64.80	N/A	73.98	N/A	-22.42	1.00
9148.13	52.76	Pk	9.27	37.33	47.38	0.00	N/A	51.98	H	1.21	112.70	N/A	73.98	N/A	-22.00	1.00
2744.35	65.15	Av	4.80	29.24	37.94	0.52	13.70	48.07	V	1.30	285.60	53.98	N/A	-5.91	N/A	1.00
3659.13	57.82	Av	5.60	31.94	38.45	0.54	13.70	43.75	V	1.29	201.60	53.98	N/A	-10.23	N/A	1.00
4573.99	44.04	Av	6.30	32.68	35.58	0.00	13.70	33.74	V	1.20	39.60	53.98	N/A	-20.24	N/A	1.00
7318.61	52.68	Av	8.31	36.79	47.06	0.00	13.70	37.02	V	1.10	78.80	53.98	N/A	-16.96	N/A	1.00
8232.84	51.86	Av	8.89	36.97	46.26	0.00	13.70	37.76	V	1.14	35.60	53.98	N/A	-16.22	N/A	1.00
9148.13	52.76	Av	9.27	37.33	47.38	0.00	13.70	38.28	V	1.09	153.00	53.98	N/A	-15.70	N/A	1.00
2744.35	65.15	Av	4.80	29.24	37.94	0.52	13.70	48.07	H	1.86	68.40	53.98	N/A	-5.91	N/A	1.00
3659.13	57.82	Av	5.60	31.94	38.45	0.54	13.70	43.75	H	1.75	14.20	53.98	N/A	-10.23	N/A	1.00
4573.99	45.40	Av	6.30	32.68	35.58	0.00	13.70	35.10	H	1.49	77.10	53.98	N/A	-18.88	N/A	1.00
7318.61	52.68	Av	8.31	36.79	47.06	0.00	13.70	37.02	H	1.50	103.60	53.98	N/A	-16.96	N/A	1.00
8232.84	51.95	Av	8.89	36.97	46.26	0.00	13.70	37.85	H	1.61	64.80	53.98	N/A	-16.13	N/A	1.00
9148.13	52.76	Av	9.27	37.33	47.38	0.00	13.70	38.28	H	1.21	112.70	53.98	N/A	-15.70	N/A	1.00
MC Axis 3 EN1244																
2744.35	64.57	Pk	4.80	29.24	37.94	0.52	N/A	61.19	V	1.56	359.90	N/A	73.98	N/A	-12.79	1.00
3659.13	59.45	Pk	5.60	31.94	38.45	0.54	N/A	59.09	V	1.22	29.50	N/A	73.98	N/A	-14.89	1.00
4573.86	49.20	Pk	6.30	32.68	35.58	0.00	N/A	52.60	V	1.32	131.50	N/A	73.98	N/A	-21.38	1.00
7318.28	52.29	Pk	8.31	36.79	47.06	0.00	N/A	50.33	V	1.18	57.10	N/A	73.98	N/A	-23.65	1.00
8233.31	51.55	Pk	8.89	36.97	46.26	0.00	N/A	51.16	V	1.22	39.80	N/A	73.98	N/A	-22.82	1.00
9147.92	52.27	Pk	9.27	37.33	47.38	0.00	N/A	51.49	V	1.16	124.00	N/A	73.98	N/A	-22.49	1.00
2744.35	64.57	Pk	4.80	29.24	37.94	0.52	N/A	61.19	H	1.64	261.60	N/A	73.98	N/A	-12.79	1.00
3659.13	59.45	Pk	5.60	31.94	38.45	0.54	N/A	59.09	H	1.67	149.80	N/A	73.98	N/A	-14.89	1.00
4573.86	49.20	Pk	6.30	32.68	35.58	0.00	N/A	52.60	H	1.83	94.90	N/A	73.98	N/A	-21.38	1.00
7318.28	53.01	Pk	8.31	36.79	47.06	0.00	N/A	51.05	H	1.61	96.50	N/A	73.98	N/A	-22.93	1.00
8233.31	51.55	Pk	8.89	36.97	46.26	0.00	N/A	51.16	H	1.66	98.50	N/A	73.98	N/A	-22.82	1.00
9147.92	52.45	Pk	9.27	37.33	47.38	0.00	N/A	51.67	H	1.73	191.50	N/A	73.98	N/A	-22.31	1.00
2744.35	64.57	Av	4.80	29.24	37.94	0.52	13.70	47.49	V	1.56	359.90	53.98	N/A	-6.49	N/A	1.00
3659.13	59.45	Av	5.60	31.94	38.45	0.54	13.70	45.38	V	1.22	29.50	53.98	N/A	-8.60	N/A	1.00
4573.86	49.20	Av	6.30	32.68	35.58	0.00	13.70	38.90	V	1.32	131.50	53.98	N/A	-15.08	N/A	1.00
7318.28	52.29	Av	8.31	36.79	47.06	0.00	13.70	36.63	V	1.18	57.10	53.98	N/A	-17.35	N/A	1.00
8233.31	51.55	Av	8.89	36.97	46.26	0.00	13.70	37.45	V	1.22	39.80	53.98	N/A	-16.53	N/A	1.00
9147.92	52.27	Av	9.27	37.33	47.38	0.00	13.70	37.79	V	1.16	124.00	53.98	N/A	-16.19	N/A	1.00
2744.35	64.57	Av	4.80	29.24	37.94	0.52	13.70	47.49	H	1.64	261.60	53.98	N/A	-6.49	N/A	1.00
3659.13	59.45	Av	5.60	31.94	38.45	0.54	13.70	45.38	H	1.67	149.80	53.98	N/A	-8.60	N/A	1.00
4573.86	49.20	Av	6.30	32.68	35.58	0.00	13.70	38.90	H	1.83	94.90	53.98	N/A	-15.08	N/A	1.00
7318.28	53.01	Av	8.31	36.79	47.06	0.00	13.70	37.35	H	1.61	96.50	53.98	N/A	-16.63	N/A	1.00
8233.31	51.55	Av	8.89	36.97	46.26	0.00	13.70	37.45	H	1.66	98.50	53.98	N/A	-16.53	N/A	1.00
9147.92	52.45	Av	9.27	37.33	47.38	0.00	13.70	37.97	H	1.73	191.50	53.98	N/A	-16.01	N/A	1.00

# Intertek

Report Number: 102654813DEN-001

Issued: 7/26/2016

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	ATTEN	DUTY CC	FINAL	POL	HGT	AZ	LIMIT 1	LIMIT 2	DELTA 1	DELTA 2	RBW
MHz	dBuV	Qp Av Pk Rms	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	- [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 >1GHz Av	FCC 15.209 >1GHz Pk	FCC 15.209 >1GHz Av	FCC 15.209 >1GHz Pk	(MHz)
HC Axis 1 EN1244																
2782.75	61.07	Pk	4.85	29.38	38.00	0.52	N/A	57.82	V	1.56	235.00	N/A	73.98	N/A	-16.16	1.00
3710.33	58.94	Pk	5.64	32.16	38.39	0.58	N/A	58.93	V	1.43	256.30	N/A	73.98	N/A	-15.05	1.00
4637.92	54.38	Pk	6.34	32.81	36.31	0.00	N/A	57.22	V	1.40	177.90	N/A	73.98	N/A	-16.76	1.00
7420.67	56.47	Pk	8.38	36.82	46.88	0.00	N/A	54.79	V	1.28	33.10	N/A	73.98	N/A	-19.19	1.00
8348.25	52.47	Pk	8.91	37.02	46.41	0.00	N/A	51.99	V	1.48	151.10	N/A	73.98	N/A	-21.99	1.00
2782.75	59.89	Pk	4.85	29.38	38.00	0.52	N/A	56.64	H	2.70	103.90	N/A	73.98	N/A	-17.34	1.00
3710.33	59.75	Pk	5.64	32.16	38.39	0.58	N/A	59.74	H	3.08	139.40	N/A	73.98	N/A	-14.24	1.00
4637.92	55.80	Pk	6.34	32.81	36.31	0.00	N/A	58.64	H	2.94	305.30	N/A	73.98	N/A	-15.34	1.00
7420.67	56.47	Pk	8.38	36.82	46.88	0.00	N/A	54.79	H	1.73	113.50	N/A	73.98	N/A	-19.19	1.00
8348.25	52.47	Pk	8.91	37.02	46.41	0.00	N/A	51.99	H	1.76	205.80	N/A	73.98	N/A	-21.99	1.00
2782.75	61.07	Av	4.85	29.38	38.00	0.52	13.70	44.12	V	1.56	235.00	N/A	N/A	-9.86	N/A	1.00
3710.33	58.94	Av	5.64	32.16	38.39	0.58	13.70	45.23	V	1.43	256.30	N/A	N/A	-8.75	N/A	1.00
4637.92	54.38	Av	6.34	32.81	36.31	0.00	13.70	43.52	V	1.40	177.90	53.98	N/A	-10.46	N/A	1.00
7420.67	56.47	Av	8.38	36.82	46.88	0.00	13.70	41.09	V	1.28	33.10	53.98	N/A	-12.89	N/A	1.00
8348.25	52.47	Av	8.91	37.02	46.41	0.00	13.70	38.29	V	1.48	151.10	53.98	N/A	-15.69	N/A	1.00
2782.75	59.89	Av	4.85	29.38	38.00	0.52	13.70	42.94	H	2.70	103.90	53.98	N/A	-11.04	N/A	1.00
3710.33	59.75	Av	5.64	32.16	38.39	0.58	13.70	46.04	H	3.08	139.40	53.98	N/A	-7.94	N/A	1.00
4637.92	55.80	Av	6.34	32.81	36.31	0.00	13.70	44.94	H	2.94	305.30	53.98	N/A	-9.04	N/A	1.00
7420.67	56.47	Av	8.38	36.82	46.88	0.00	13.70	41.09	H	1.73	113.50	53.98	N/A	-12.89	N/A	1.00
8348.25	52.47	Av	8.91	37.02	46.41	0.00	13.70	38.29	H	1.76	205.80	53.98	N/A	-15.69	N/A	1.00
HC Axis 2 EN1244																
2782.75	60.94	Pk	4.85	29.38	38.00	0.52	N/A	57.69	V	1.21	10.70	N/A	73.98	N/A	-16.29	1.00
3710.34	59.11	Pk	5.64	32.16	38.39	0.58	N/A	59.10	V	1.24	10.70	N/A	73.98	N/A	-14.88	1.00
4637.92	54.38	Pk	6.34	32.81	36.31	0.00	N/A	57.22	V	3.62	60.00	N/A	73.98	N/A	-16.76	1.00
7420.67	56.24	Pk	8.38	36.82	46.88	0.00	N/A	54.56	V	1.80	76.40	N/A	73.98	N/A	-19.42	1.00
8348.25	53.34	Pk	8.91	37.02	46.41	0.00	N/A	52.86	V	1.46	26.30	N/A	73.98	N/A	-21.12	1.00
2782.75	59.03	Pk	4.85	29.38	38.00	0.52	N/A	55.78	H	2.23	167.10	N/A	73.98	N/A	-18.20	1.00
3710.34	60.14	Pk	5.64	32.16	38.39	0.58	N/A	60.13	H	1.12	260.20	N/A	73.98	N/A	-13.85	1.00
4637.92	54.19	Pk	6.34	32.81	36.31	0.00	N/A	57.03	H	2.52	7.30	N/A	73.98	N/A	-16.95	1.00
7420.67	57.56	Pk	8.38	36.82	46.88	0.00	N/A	55.88	H	2.81	217.20	N/A	73.98	N/A	-18.10	1.00
8348.25	53.34	Pk	8.91	37.02	46.41	0.00	N/A	52.86	H	1.98	54.90	N/A	73.98	N/A	-21.12	1.00
2782.75	60.94	Av	4.85	29.38	38.00	0.52	13.70	43.99	V	1.21	10.70	N/A	N/A	-9.99	N/A	1.00
3710.34	59.11	Av	5.64	32.16	38.39	0.58	13.70	45.40	V	1.24	10.70	N/A	N/A	-8.58	N/A	1.00
4637.92	54.38	Av	6.34	32.81	36.31	0.00	13.70	43.52	V	3.62	60.00	53.98	N/A	-10.46	N/A	1.00
7420.67	56.24	Av	8.38	36.82	46.88	0.00	13.70	40.86	V	1.80	76.40	53.98	N/A	-13.12	N/A	1.00
8348.25	53.34	Av	8.91	37.02	46.41	0.00	13.70	39.16	V	1.46	26.30	53.98	N/A	-14.82	N/A	1.00
2782.75	59.03	Av	4.85	29.38	38.00	0.52	13.70	42.08	H	2.23	167.10	53.98	N/A	-11.90	N/A	1.00
3710.34	60.14	Av	5.64	32.16	38.39	0.58	13.70	46.43	H	1.12	260.20	53.98	N/A	-7.55	N/A	1.00
4637.92	54.19	Av	6.34	32.81	36.31	0.00	13.70	43.33	H	2.52	7.30	53.98	N/A	-10.65	N/A	1.00
7420.67	57.56	Av	8.38	36.82	46.88	0.00	13.70	42.18	H	2.81	217.20	53.98	N/A	-11.80	N/A	1.00
8348.25	53.34	Av	8.91	37.02	46.41	0.00	13.70	39.16	H	1.98	54.90	53.98	N/A	-14.82	N/A	1.00
HC Axis 3 EN1244																
2782.75	63.92	Pk	4.85	29.38	38.00	0.52	N/A	60.67	V	1.56	182.20	N/A	73.98	N/A	-13.31	1.00
3710.33	59.16	Pk	5.64	32.16	38.39	0.58	N/A	59.15	V	1.94	153.10	N/A	73.98	N/A	-14.83	1.00
4637.92	52.63	Pk	6.34	32.81	36.31	0.00	N/A	55.47	V	1.72	92.10	N/A	73.98	N/A	-18.51	1.00
7420.67	56.76	Pk	8.38	36.82	46.88	0.00	N/A	55.08	V	1.57	187.00	N/A	73.98	N/A	-18.90	1.00
8348.25	53.92	Pk	8.91	37.02	46.41	0.00	N/A	53.44	V	1.48	124.00	N/A	73.98	N/A	-20.54	1.00
2782.75	63.92	Pk	4.85	29.38	38.00	0.52	N/A	60.67	H	1.62	312.60	N/A	73.98	N/A	-13.31	1.00
4637.92	56.51	Pk	6.34	32.81	36.31	0.00	N/A	59.35	H	4.00	284.00	N/A	73.98	N/A	-14.63	1.00
7420.67	56.76	Pk	8.38	36.82	46.88	0.00	N/A	55.08	H	2.01	218.00	N/A	73.98	N/A	-18.90	1.00
8348.25	53.92	Pk	8.91	37.02	46.41	0.00	N/A	53.44	H	1.94	182.00	N/A	73.98	N/A	-20.54	1.00
2782.75	63.92	Av	4.85	29.38	38.00	0.52	13.70	46.97	V	1.56	182.20	N/A	N/A	-7.01	N/A	1.00
3710.33	59.16	Av	5.64	32.16	38.39	0.58	13.70	45.45	V	1.94	153.10	N/A	N/A	-8.53	N/A	1.00
4637.92	52.63	Av	6.34	32.81	36.31	0.00	13.70	41.77	V	1.72	92.10	N/A	N/A	-12.21	N/A	1.00
7420.67	56.76	Av	8.38	36.82	46.88	0.00	13.70	41.38	V	1.57	187.00	53.98	N/A	-12.60	N/A	1.00
8348.25	53.92	Av	8.91	37.02	46.41	0.00	13.70	39.74	V	1.48	124.00	53.98	N/A	-14.24	N/A	1.00
2782.75	63.92	Av	4.85	29.38	38.00	0.52	13.70	46.97	H	1.62	312.60	53.98	N/A	-7.01	N/A	1.00
4637.92	56.51	Av	6.34	32.81	36.31	0.00	13.70	45.65	H	4.00	284.00	53.98	N/A	-8.33	N/A	1.00
7420.67	56.76	Av	8.38	36.82	46.88	0.00	13.70	41.38	H	2.01	218.00	53.98	N/A	-12.60	N/A	1.00
8348.25	53.92	Av	8.91	37.02	46.41	0.00	13.70	39.74	H	1.94	182.00	53.98	N/A	-14.24	N/A	1.00

### **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 – Not Applicable**

## 15 RF Exposure Requirements

### Method

Unless otherwise stated no deviations were made from FCC Part 2.1091/2.093.

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

### Test Requirement/ Specification:

- Power Density Limit for Frequency Range: 1500 to 100,000 MHz = 3 mW/cm<sup>2</sup>

### Test Results:

The sample tested was found to comply.

## RF Exposure Requirements - MPE

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: 300 to 1500 MHz =  $f/1500 = 0.6 \text{ mW/cm}^2$

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

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

Where:

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

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 rf output power = 20.4dBm = 109 mW

Maximum typical gain declared by the manufacture = -1 dBi = 0.79 (numeric gain)

### Power Density

Power (mW)	Gain (dbi)	Gain numeric	Distance (cm)	Power Density (mW/cm <sup>2</sup> )
109	-1	0.79	20	0.017

**Therefore: Power Density Margin ( $\Delta$  Limit) =  $0.017 - 0.6 = -0.583 \text{ mW/cm}^2$**

**To determine what minimum distance the product can satisfy the Power Density Limit:**

$$R(\text{cm}) = \text{SQRT}[(P \cdot G)/(4 \cdot \pi \cdot S)] = 3.4 \text{ cm}$$

## 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 $\pm$	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	

# Intertek

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## 17 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	7/26/2016	102654813DEN-001	SL	MAS	Original Issue
1	9/20/2016	102654813DEN-001	SL	MAS	Modified RF exposure calculation on page 50.
2	10/25/2016	102654813DEN-001	SL	MAS	Modified RF exposure calculation on page 50.