TEST REPORT

Report Number: 101262612DEN-001G
Project Number: G101262612

Report Issue Date: 10/7/2013

Product Designation: **Model: M1 (Revolv Hub)**

Standards: FCC 47 CFR Part 15 Subpart C, 15.231 – Periodic Operation within the band 40.66-40.70 MHz and above 70MHz

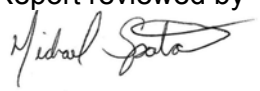
Tested by:
Intertek Testing Services NA, Inc.
1795 Dogwood St. Suite 200
Louisville, CO 80027

Client:
Revolv, Inc.
2060 Broadway, Suite 380
Boulder, CO 80302

Report prepared by

Randy Thompson
Senior EMC Project Engineer

Report reviewed by



Mike 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.

Test Report Scope

The scope of this report was to qualify the "CC1101 #2 Radio" configured within the Revolv Model M1 product. This radio operates within the following Tx Band: 260-470 MHz (Periodic Operation).

Refer to the following Intertek Test Reports for the test results of the following radios configured within the Revolv Model M1 product:

- Unintentional Radiated and Conducted Emissions (DoC): 101262612DEN-001A
- Radio #1 (WiFi): 101262612DEN-001B
- Radio #2 (Insteon): 101262612DEN-001C
- Radio #3 (ZWave): 101262612DEN-001D
- Radio #5 (CC1101 #0): 101262612DEN-001E
- Radio #6 (CC1101 #1): 101262612DEN-001F
- **Radio #7 (CC1101 #2 - 433MHz): 101262612DEN-001G (This report)**

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	FCC 15.31(e)	Variation of AC Power Source	09/11/2013	Pass [1]
6	FCC 15.203	Antenna Requirement	09/03/2013	Pass [2]
7	FCC 15.207(a)	AC Power Transmitter AC Conducted Emissions	08/24/2013	Pass
8	FCC 15.231(a)	Conditions of Periodic Operation – Off Time	09/19/2013	Pass
9	FCC 15.231(b)(1)(2)	Radiated Field Strength Emissions – Tx Fundamental	09/11/2013	Pass
10	FCC 15.231(b)(3) FCC 15.205/209	Radiated Tx Spurious Emissions – Including Out-of-Band & Restricted Band/ Band Edge	09/11/2013 09/18/2013	Pass
11	FCC 15.231(c)	Periodic Operation – Maximum Bandwidth of the Fundamental	09/19/2013	Pass
12	FCC 15.231(d)	Requirements for devices operating within 40.66-40.70MHz band	Note [3]	Not Applicable
13	FCC 15.231(e)	Conditions of Periodic Operation for period transmits at pre-determined intervals	Note [4]	Not Applicable
14	FCC 15.35(c)	Duty Cycle Correction Factor	Note [5]	Not Applicable
15	FCC 15.109	Receiver/ Digital Device Radiated Emissions	08/14/2013	Pass
16	FCC 15.107	Digital Device AC Conducted Emissions	08/14/2013	Pass

Table Notes:

1. The fundamental field strength was measured with the ac supply voltage varied between 85% and 115% of the nominal rated supply voltage of 120V – in this case, 102V and 138V. No change in the fundamental field strength was observed.
2. The product was configured with an integral antenna.
3. The product does not operate in the range of 40.66 – 40.70 MHz – specification is not applicable.
4. The product does not periodically transmit at pre-determined intervals – specification is not applicable.
5. The duty cycle correction factor (pulsed emissions) permitted by FCC 15.35(c) was not utilized in this report.

Notes:

1) The radio is not manually operated or utilized for radio control during emergencies involving fire, security or life. Also, the product is not utilized for security systems.
2) The product is not used for continuous transmissions of voice, video or radio control of toys.
3) The product is ac-powered utilizing an ac power adapter.
4) The 6dB bandwidth was used to determine the minimum RBW used for the fundamental measurement – reference only.

General Radio Test Notes:

- ANSI C63.10, Section 6.3: Testing was performed in 3 different orthogonal axes to determine the worst-case emissions from the device. The worst-case axis and emissions are shown in this report.
- ANSI C63.10, Section 5.13/ FCC CFR Part 15.31(e): For battery-operated equipment, the equipment tests shall be performed using a new battery. For ac-operated equipment, measurements of the fundamental frequency were performed with the supply voltage varied between 85% and 115% of the nominal rated voltage to determine worst-case.
- 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. Duty cycle correction was not utilized in this report.
- 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 5GHz.
- 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:	M1
Type of EUT:	Revolv “Hub” – RF-enabled home automation
Serial Number:	FCC1
FCC ID:	2AAIT-JARVIS1
Industry Canada ID:	N/A
Related Submittal(s) Grants:	W7Z-ZICM357P2 (Zigbee radio)
Company:	Revolv, Inc.
Customer:	Revolv, Inc.
Address:	Revolv, Inc. 2060 Broadway, Suite 380 Boulder, CO 80302
Phone:	(720) 961-5009
Fax:	-----
e-mail:	mbergquist@revolv.com
Test Standards:	☒ 47 CFR, Part 15C:§15.231 ☐ RSS–210, Issue 8, 2010 ☐ RSS-Gen, Issue 3, 2010 ☒ 47 CFR, Part 15B:§15.107 and §15.109, Class B ☐ Other
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	08/11/2013
Test Work Started:	08/14/2013
Test Work Completed:	09/18/2013
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good

Product Description:	Wireless RF-Enabled Home Automation Hub
Transmitter Type:	☐ FHSS ☒ Digital Modulation ☐ WiFi ☐ Blue Tooth
Operating Frequency Range(s):	Range From 431.00 to 437.00 MHz (Multiple Channel)
Number of Channels:	60 maximum
Modulation:	FSK, 62.5 Kbaud
Emission Designator:	354KF1D
Antenna(s) Info:	Antenna: Type: Ceramic Gain: -4.0 dBi Connector Type: N/A Integral Antenna
Rated Power:	80.03 dBuV @ 3-meters -15.20 dBm .030 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. 2506.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2009

Description of Equipment Under Test (provided by client)

The Revolv "Hub" is designed to link a variety of RF-enabled Home Automation products to a Wi-Fi Local Area Network and through that LAN to the cloud.

The product is configured with the following discrete radios:

- Wi-Fi: 2.4GHz ISM Band (802.11 b/g/n HT20)
- Insteon: 915 MHz ISM Band (single channel)
- ZWave: 908.42 MHz ISM Band (single channel)
- Zigbee: 2.4GHz ISM Band (Certified Module)
- CC1101 #0: 903 - 927 MHz ISM Band (multi-channel)
- CC1101 #1: 902.6 - 927.4MHz ISM Band (multi-channel)
- CC1101 #3: 431 – 437 MHz (control signals – multi-channel)

Note the radios do not transmit simultaneously and have (1) dedicated antenna/radio.

There are no signal or I/O ports or cables configured on the product.

The product is powered from an external AC Adapter.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
AC Adapter Input: 120VAC	0.3	50/60	1
AC Adapter Output: 5VDC	2.0	---	---

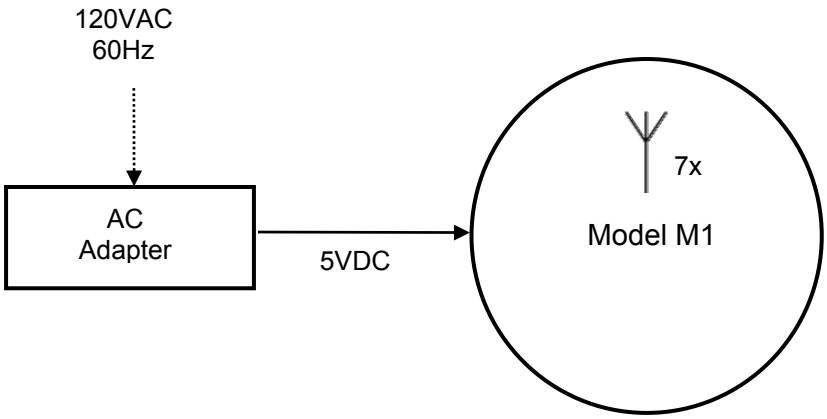
Descriptions of EUT Exercising
☒ Standby/Idle Mode
☒ Continuous transmission, un-modulated carrier (CW)
☒ Continuous transmission, modulated carrier (CW)
☒ Continuous Receive Mode

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.

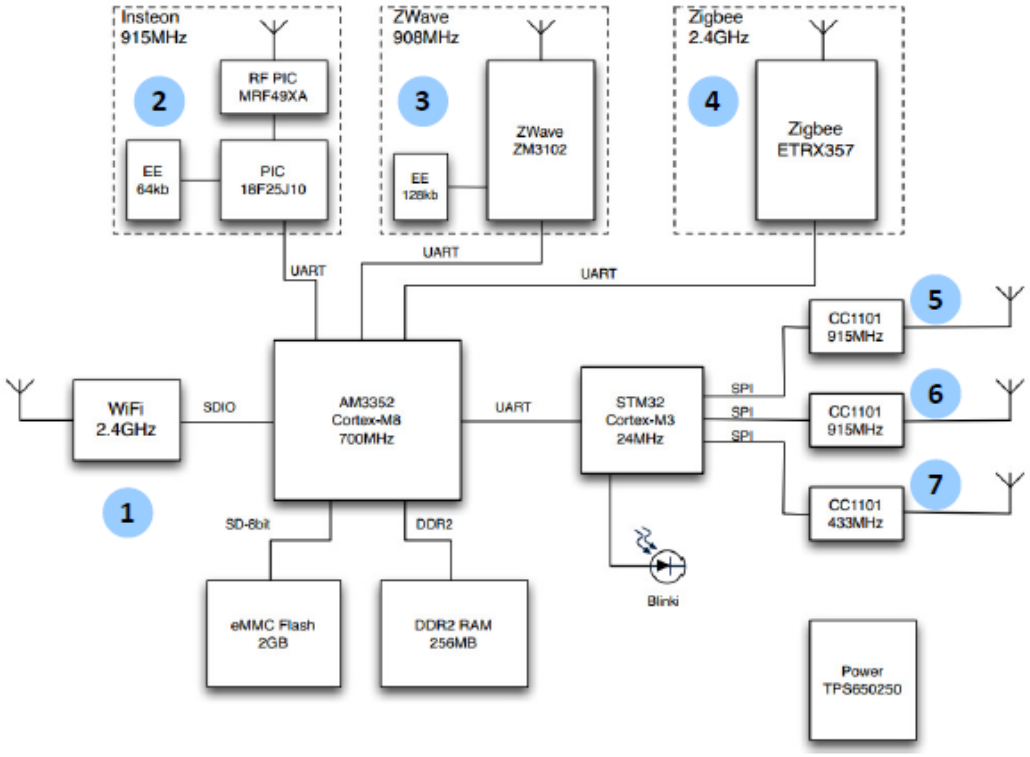
EUT Block Diagram: EMC Perspective



Note: Dashed lines indicate auxiliary/support equipment

EUT Block Diagram: Detailed

The Hub contains a number of discrete radios as shown in this product block diagram:



Purpose of this document is to describe the Hub and describe each radio to facilitate creation of FCC certification test plan and quotation for testing and TCB service to obtain FCC certification.

Support Data:

ID	Description/ Function	Shield Type	Length	Connector	Connection	Ferrites
--	-----	-----	-----	-----	-----	-----

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop	HP	---	---

Notes:

1) The laptop was utilized only to configure the product during testing (i.e. set channel, modulation, data rates, etc.).
2) The product has no signal or I/O cables.

Photograph: Product Tested – Test Axes

Model M1 (Revolv Hub)

Axis 1 – Product Horizontal (Flat on Table)

Axis 2 – Product Vertical (Wall Mount)

Axis 3 – Product Vertical & Rotated 90 degrees CW

5 Variation of AC Power Source

Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.31(e).

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

Test Requirement/Specification

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

- FCC 15.31(e)

Results:

The fundamental field strength was initially measured with the ac supply voltage varied between 85% and 115% of the nominal rated supply voltage of 120V – in this case, 102V and 138V.
No significant change in the fundamental field strength was observed – therefore, all final measurements were taken at nominal ac voltage.

The sample tested was found to comply.

6 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.

7 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.

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

Test Requirement/Specification:

- FCC 15.207

The product must pass the AC Conducted average and quasi-peak Limits defined in FCC Part 15.207.

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

Test Procedure:

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at all frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.
The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.
The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.10.

Results:

The sample tested was found to comply.

Test Summary:

FREQ	LEVEL	DET	CABLE	LISN	PREAMP	ATTEN	FINAL	TEST POINT	DELTA1	DELTA2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	Line 1 Line2 (Neutral)	FCC 15.207 Average	FCC 15.207 Qp	(MHz)
Measured Data – 150kHz to 30MHz (worst-case)											
0.377	24.27	**Av**	0.10	0.03	0.00	9.97	34.37	Line 1	- 13.99	NA	0.009

Test Method:

- ANSI C63.10:2009, Section 6.2

Notes:

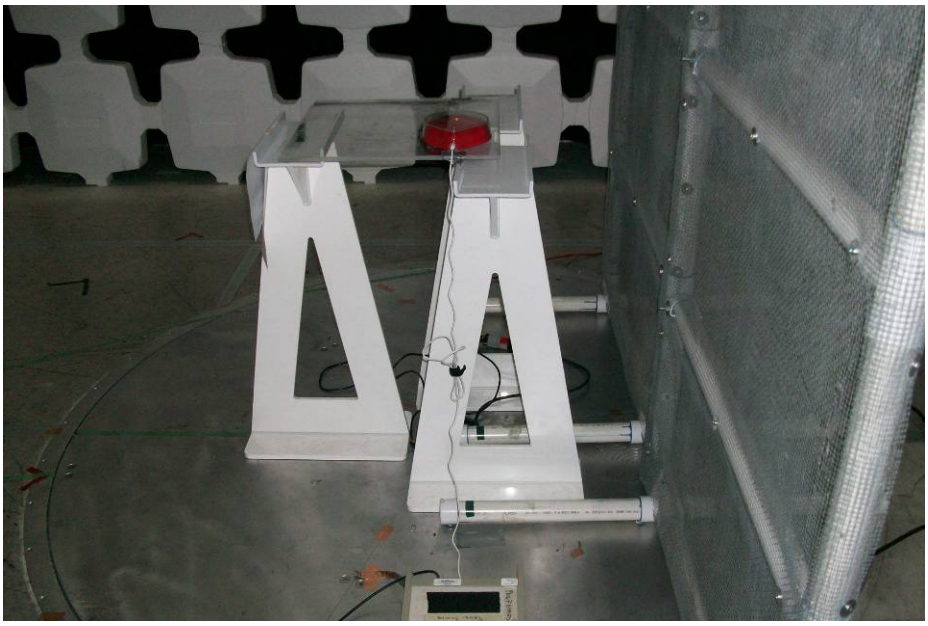
1. All product radios (transmitters) were enabled and continuously transmitting during testing.

Setup Photographs: AC Mains Conducted Emissions – Transmitter

Test Setup – Front View

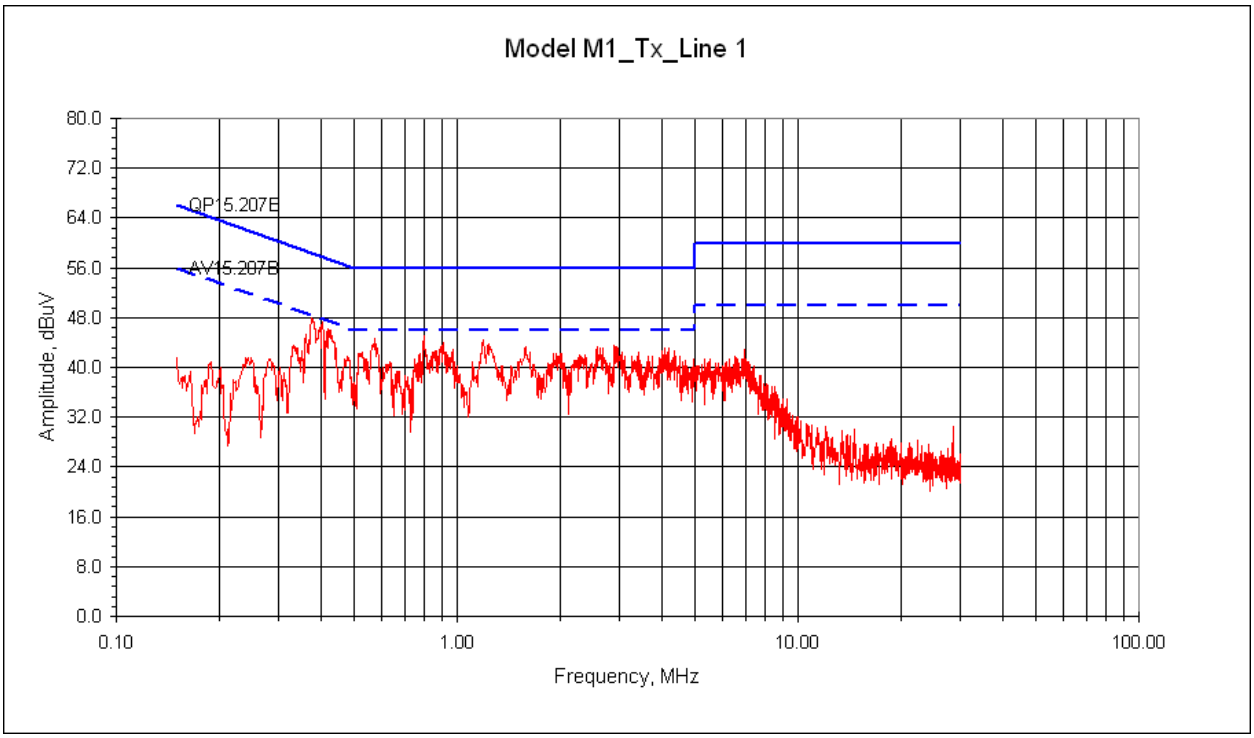
Setup Photographs: AC Mains Conducted Emissions – Transmitter

Test Setup – Rear View

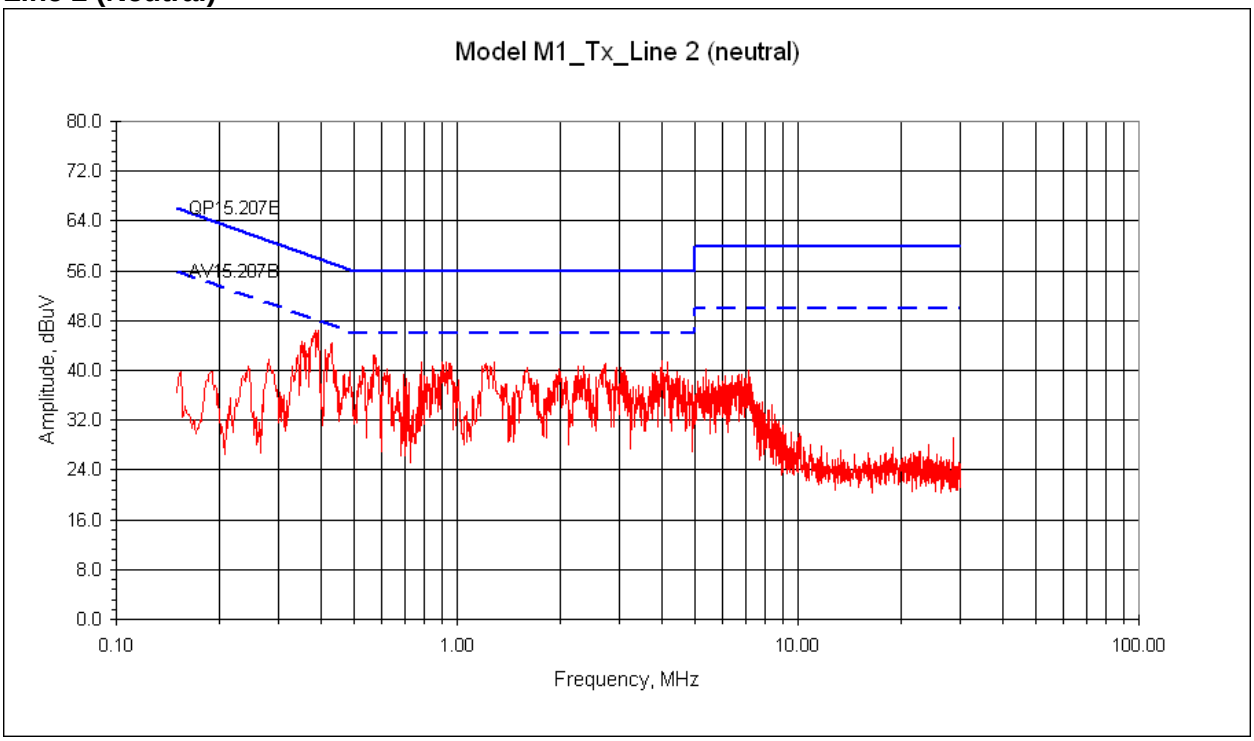


Plots: AC Mains Conducted Emissions - Transmitter

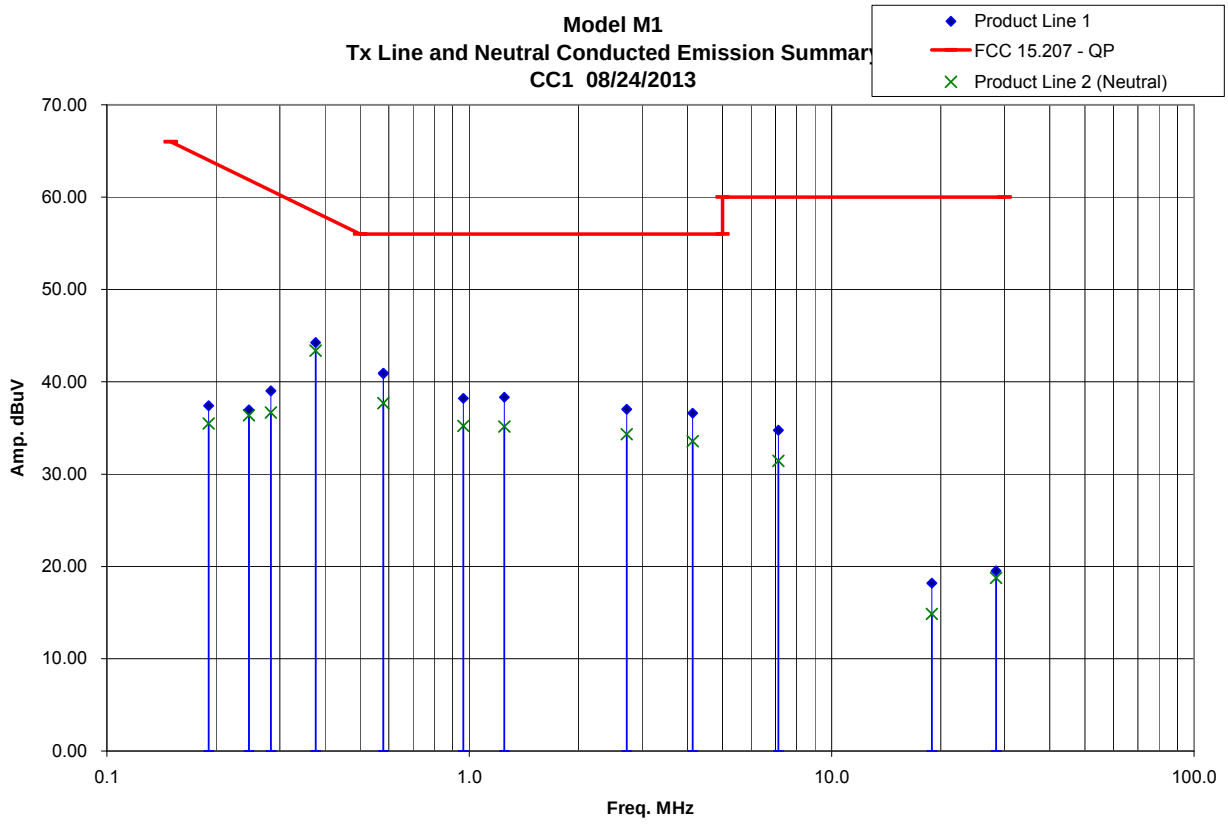
Line 1

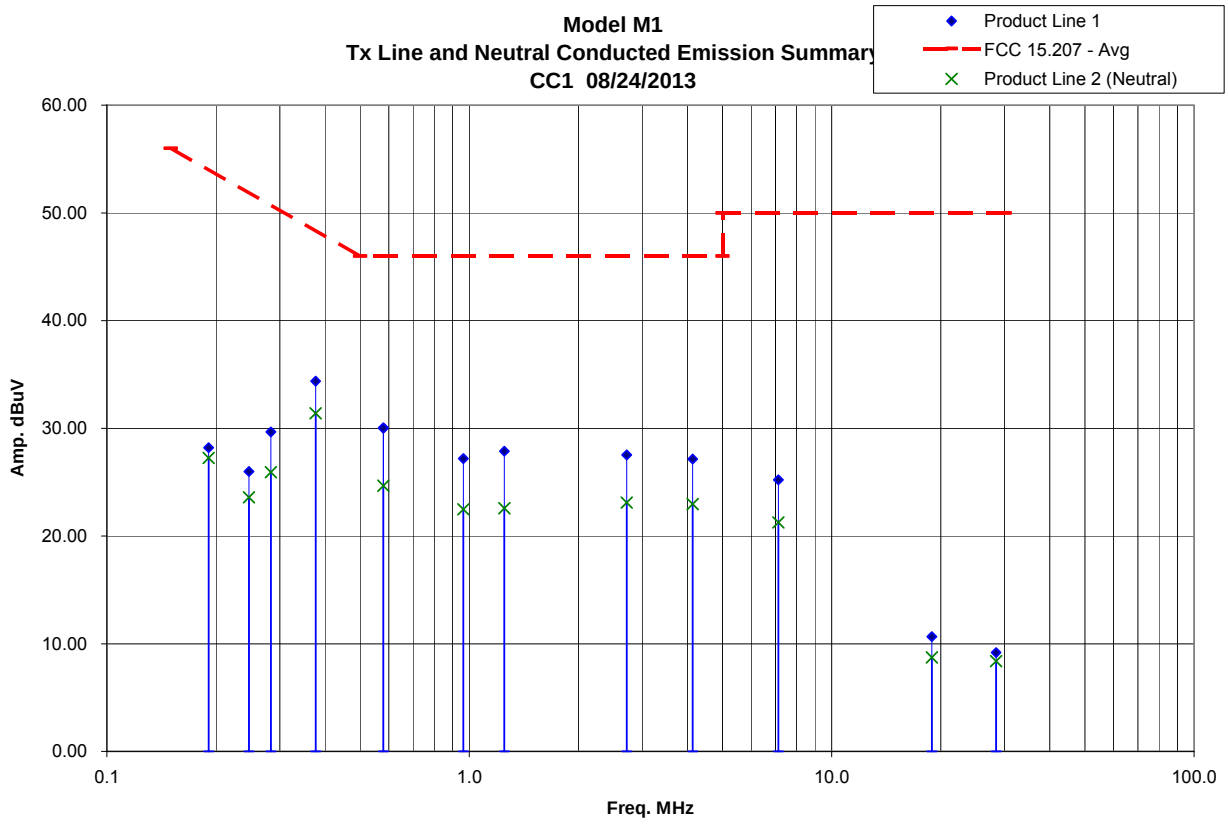


Line 2 (Neutral)



Final Plots: AC Mains Conducted Emissions – Transmitter





Test Data: AC Mains Conducted Emissions – Transmitter

Tx AC Conducted Electromagnetic Emissions

Test Report #:	G101262620	Test Area:	CC1 Conducted		Temperature:	23.5	C
Test Method:	FCC 15.207	Test Date:	24-Aug-2013		Relative Humidity:	22.8	%
EUT Model #:	M1	EUT Power:	**120V/ 60Hz**		Air Pressure:	82.8	kPa
EUT Serial #:	FCC1						
Manufacturer:	Revolv				Level Key		
EUT Description:	Revolv Hub – RF-enabled Home Automation				Pk - Peak	Nb - Narrow Band	
Notes:	AC Adapter: Model UN310-0520				Qp - QuasiPeak	Bb - Broad Band	
	Product tested in Tx mode of operation – all radios active				Av - Average		

FREQ	LEVEL	DET	CABLE	LISN	PREAMP	ATTEN	FINAL	TEST POINT	DELTA1	DELTA2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	Line 1 Line2 (Neutral)	FCC 15.107 Class B Average	FCC 15.107 Class B Qp	(MHz)
Line 1 Data – 150kHz to 30MHz											
0.191	18.11	**Av**	0.10	0.03	0.00	9.96	28.21	Line 1	- 25.79	NA	0.009
0.191	27.31	**Qp**	0.10	0.03	0.00	9.96	37.41	Line 1	NA	- 26.5	0.009
0.247	15.91	**Av**	0.10	0.03	0.00	9.96	26.00	Line 1	- 25.86	NA	0.009
0.247	26.87	**Qp**	0.10	0.03	0.00	9.96	36.96	Line 1	NA	- 24.90	0.009
0.283	19.57	**Av**	0.10	0.03	0.00	9.97	29.66	Line 1	- 21.05	NA	0.009
0.283	28.92	**Qp**	0.10	0.03	0.00	9.97	39.01	Line 1	NA	- 21.70	0.009
0.377	24.27	**Av**	0.10	0.03	0.00	9.97	34.37	Line 1	- 13.99	NA	0.009
0.377	34.15	**Qp**	0.10	0.03	0.00	9.97	44.25	Line 1	NA	- 14.11	0.009
0.579	19.95	**Av**	0.10	0.02	0.00	9.97	30.05	Line 1	- 15.95	NA	0.009
0.579	19.92	**Av**	0.10	0.02	0.00	9.97	30.02	Line 1	- 15.98	NA	0.009
0.579	30.78	**Qp**	0.10	0.02	0.00	9.97	40.88	Line 1	NA	- 15.12	0.009
0.579	30.83	**Qp**	0.10	0.02	0.00	9.97	40.93	Line 1	NA	- 15.07	0.009
0.963	16.99	**Av**	0.20	0.03	0.00	9.98	27.19	Line 1	- 18.81	NA	0.009
0.963	28.02	**Qp**	0.20	0.03	0.00	9.98	38.22	Line 1	NA	- 17.78	0.009
1.250	17.67	**Av**	0.20	0.03	0.00	9.98	27.88	Line 1	- 18.12	NA	0.009
1.250	28.11	**Qp**	0.20	0.03	0.00	9.98	38.32	Line 1	NA	- 17.68	0.009
2.718	17.31	**Av**	0.20	0.03	0.00	9.98	27.53	Line 1	- 18.47	NA	0.009
2.718	26.80	**Qp**	0.20	0.03	0.00	9.98	37.02	Line 1	NA	- 18.98	0.009
4.135	16.83	**Av**	0.30	0.04	0.00	9.98	27.15	Line 1	- 18.85	NA	0.009
4.135	26.29	**Qp**	0.30	0.04	0.00	9.98	36.61	Line 1	NA	- 19.39	0.009
7.131	14.75	**Av**	0.40	0.07	0.00	9.99	25.21	Line 1	- 24.79	NA	0.009
7.131	24.28	**Qp**	0.40	0.07	0.00	9.99	34.74	Line 1	NA	- 25.26	0.009
18.910	- 0.67	**Av**	1.10	0.20	0.00	10.02	10.65	Line 1	- 39.35	NA	0.009
18.910	6.88	**Qp**	1.10	0.20	0.00	10.02	18.20	Line 1	NA	- 41.80	0.009
28.429	- 2.29	**Av**	1.31	0.12	0.00	10.04	9.18	Line 1	- 40.82	NA	0.009
28.429	8.06	**Qp**	1.31	0.12	0.00	10.04	19.53	Line 1	NA	- 40.47	0.009

Line 2 (Neutral) Data – 150kHz to 30MHz											
0.191	17.15	Av	0.10	0.03	0.00	9.96	27.25	Line 2	- 26.75	NA	0.009
0.191	25.38	Qp	0.10	0.03	0.00	9.96	35.48	Line 2	NA	- 28.52	0.009
0.247	13.50	Av	0.10	0.03	0.00	9.96	23.59	Line 2	- 28.28	NA	0.009
0.247	26.28	Qp	0.10	0.03	0.00	9.96	36.37	Line 2	NA	- 25.50	0.009
0.283	15.83	Av	0.10	0.03	0.00	9.97	25.92	Line 2	- 24.79	NA	0.009
0.283	26.57	Qp	0.10	0.03	0.00	9.97	36.66	Line 2	NA	- 24.05	0.009
0.377	21.31	Av	0.10	0.02	0.00	9.97	31.40	Line 2	- 16.95	NA	0.009
0.377	33.28	Qp	0.10	0.02	0.00	9.97	43.37	Line 2	NA	- 14.98	0.009
0.579	14.57	Av	0.10	0.02	0.00	9.97	24.67	Line 2	- 21.33	NA	0.009
0.579	27.59	Qp	0.10	0.02	0.00	9.97	37.69	Line 2	NA	- 18.31	0.009
0.963	12.27	Av	0.20	0.02	0.00	9.98	22.47	Line 2	- 23.53	NA	0.009
0.963	25.03	Qp	0.20	0.02	0.00	9.98	35.23	Line 2	NA	- 20.77	0.009
1.250	12.37	Av	0.20	0.03	0.00	9.98	22.58	Line 2	- 23.42	NA	0.009
1.250	24.95	Qp	0.20	0.03	0.00	9.98	35.16	Line 2	NA	- 20.84	0.009
2.718	12.89	Av	0.20	0.03	0.00	9.98	23.10	Line 2	- 22.90	NA	0.009
2.718	24.11	Qp	0.20	0.03	0.00	9.98	34.32	Line 2	NA	- 21.68	0.009
4.135	12.65	Av	0.30	0.03	0.00	9.98	22.97	Line 2	- 23.03	NA	0.009
4.135	23.24	Qp	0.30	0.03	0.00	9.98	33.56	Line 2	NA	- 22.44	0.009
7.131	10.79	Av	0.40	0.07	0.00	9.99	21.25	Line 2	- 28.75	NA	0.009
7.131	20.98	Qp	0.40	0.07	0.00	9.99	31.44	Line 2	NA	- 28.56	0.009
18.910	- 2.59	Av	1.10	0.20	0.00	10.02	8.73	Line 2	- 41.27	NA	0.009
18.910	3.53	Qp	1.10	0.20	0.00	10.02	14.85	Line 2	NA	- 45.15	0.009
28.429	- 3.17	Av	1.31	0.20	0.00	10.04	8.38	Line 2	- 41.62	NA	0.009
28.429	7.20	Qp	1.31	0.20	0.00	10.04	18.75	Line 2	NA	- 41.25	0.009

Example calculation:

Measured Level	+	Transducer, Cable Loss & Amplifier corrections	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

8 Conditions of Periodic Operation – Transmit Duration / Deactivate Time

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231.

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

Test Requirement/Specification:

(a) The provisions of this section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition

(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

- FCC 15.231(a)

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
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
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 3.0	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary: Periodic Operation – Transmit Duration / Off Time

Fundamental	Transmit Duration/ Off Time		
Frequency Range:	☒ 260-470MHz		
Low Frequency MHz	**Measured Off Time (sec)**	**Limit (sec)**	**Margin (sec)**
431.00	4.84	5.0	-0.16
Mid Frequency MHz			
434.00	4.84	5.0	-0.16
High Frequency MHz			
437.00	4.85	5.0	-0.15

Test Method:

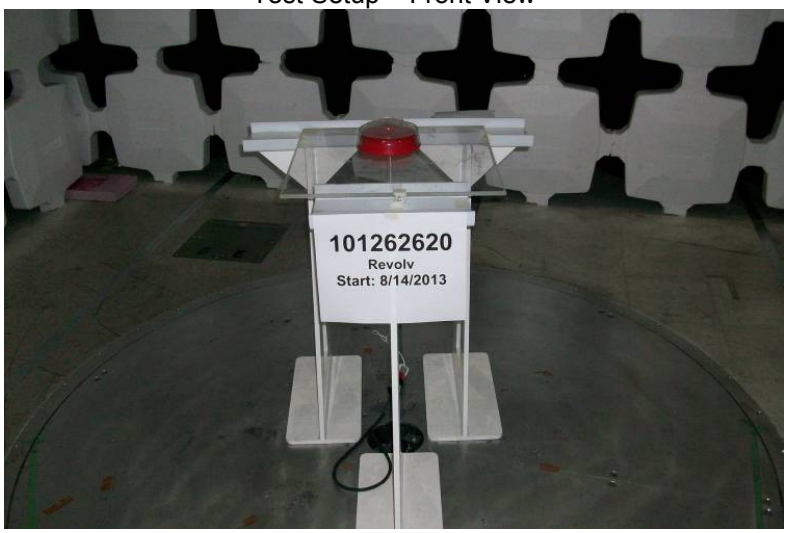
- ANSI C63.10:2009, Section 7.4

Notes:

1. The product does not support wireless continuous transmissions, voice, video or radio control of toys.
2. The product is not utilized in emergency conditions of fire, safety and life.
3. The product does not support manual initiation of wireless transmission.
4. The product does not utilize periodic supervisory signals for security systems. Periodic transmissions at regular predetermined intervals were verified not to occur.
5. The radio a multi-channel transmitter.

Setup Photographs: Periodic Operation – Transmit Duration/ Off time

Test Setup – Front View

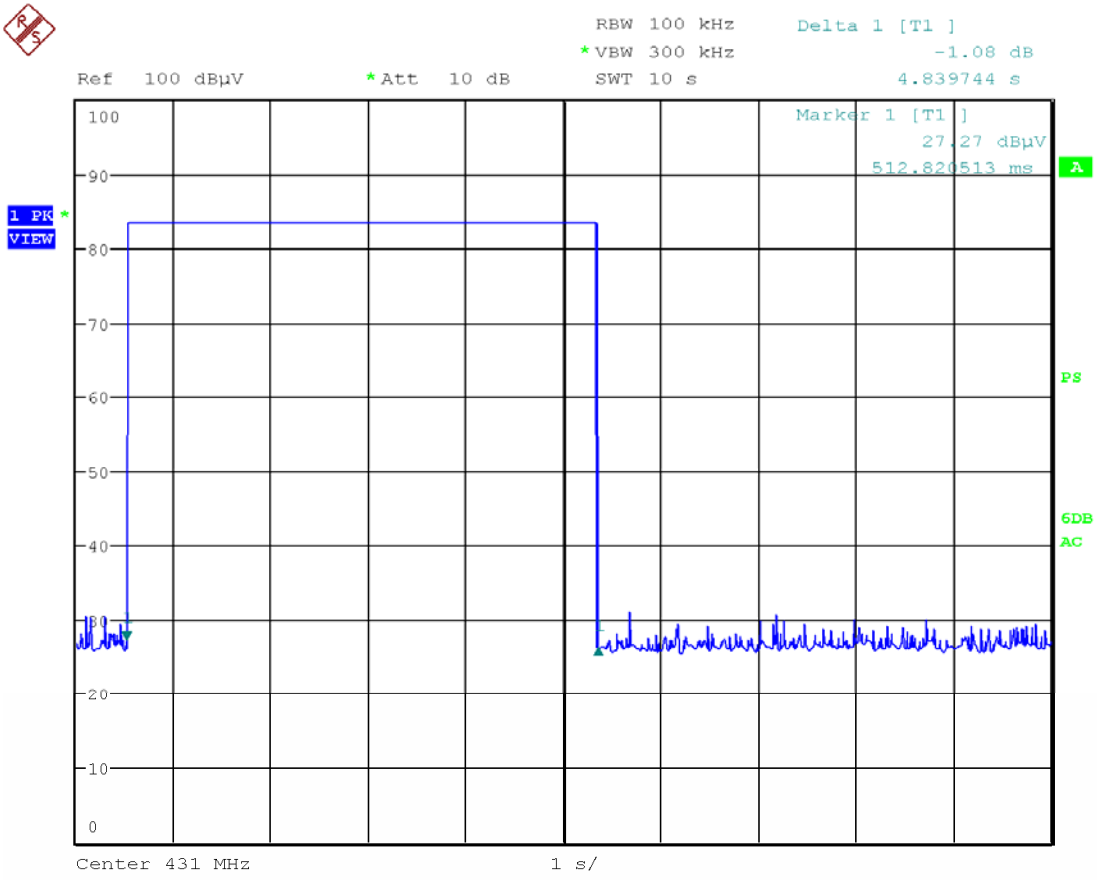


Test Setup – Rear View

Antenna – 30MHz to 1000MHz

Plots: Periodic Operation – Transmit Duration / Off Time

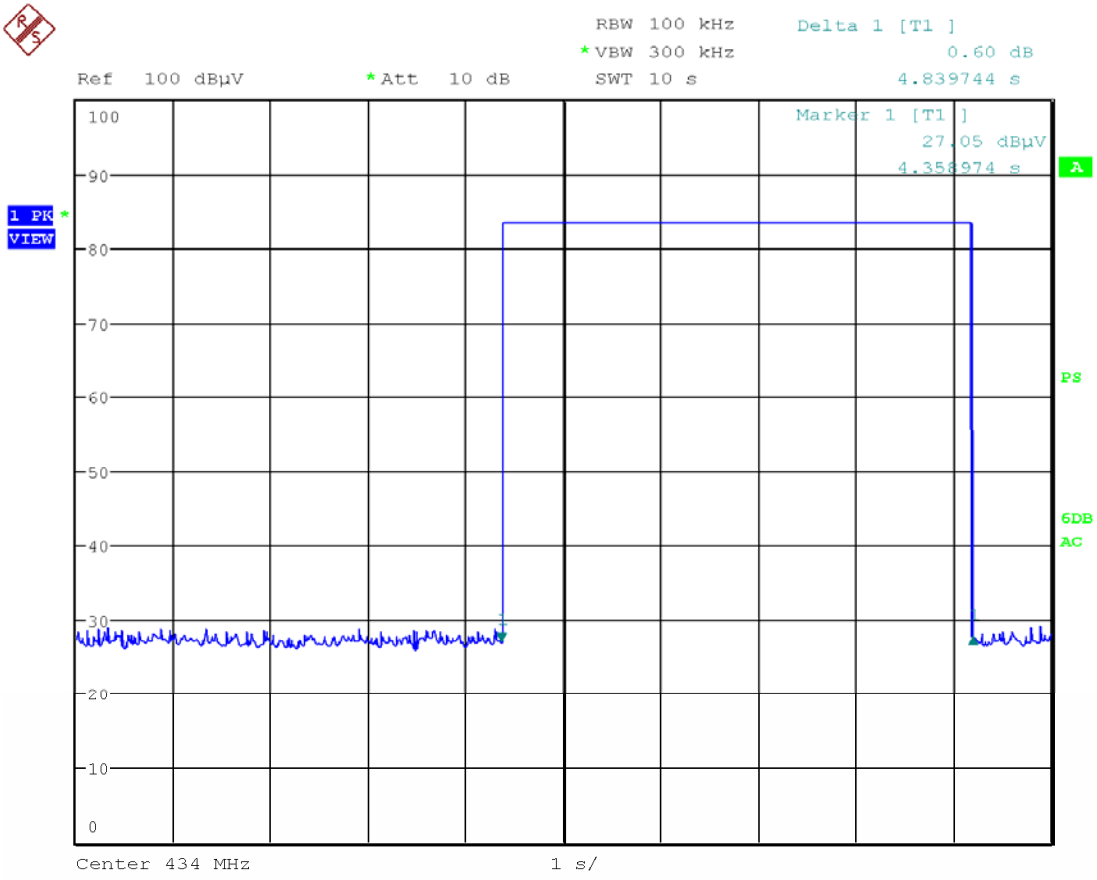
Low Channel



Date: 19.SEP.2013 08:46:17

Plots: Periodic Operation – Transmit Duration / Off Time

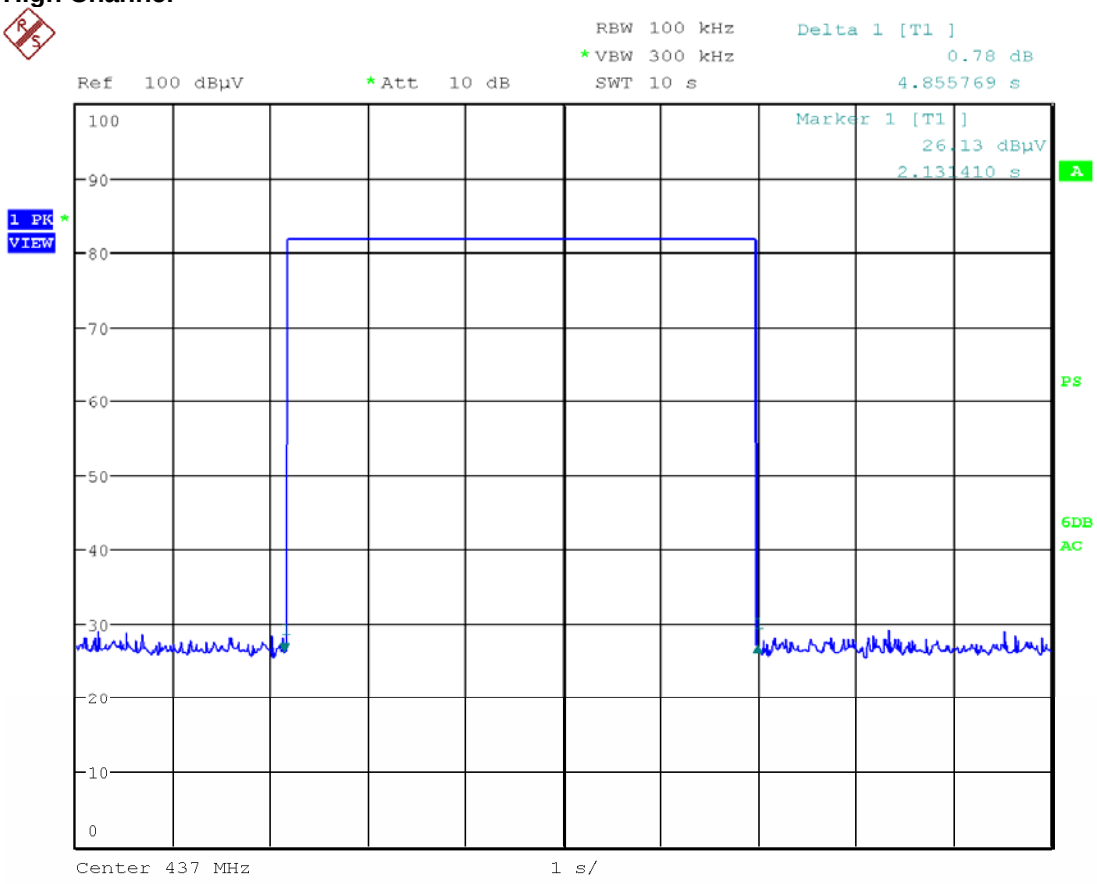
Mid Channel



Date: 19.SEP.2013 08:47:57

Plots: Periodic Operation – Transmit Duration / Off Time

High Channel



Date: 19.SEP.2013 08:49:38

9 Radiated Field Strength Emissions – Tx Fundamental (Periodic Operation)

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231.

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

Test Requirement/Specification:

- FCC 15.231(b)

15.231(b) In addition to the provisions of § 15.205 (restricted band), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Tx Frequency (MHz)	**Field Strength of Fundamental (uV/m)**	Field Strength of Spurious Emissions (uV/m)
40.66 – 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750	125 to 375
174 - 250	3,750	375
260 - 470	3,750 to 12,500 (71.50 to 82.0 dBuV/m)	375 to 1,250
Above 470	12,500	1,250

15.231(b)(1) The above field strength limits are specified at a distance of 3-meters. The tighter limits apply at the band edges.

15.231(b)(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of 15.205 shall be demonstrated using the measurement instrumentation specified in that section.

15.35(b) When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
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
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 3.0	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary: Radiated Field Strength Emissions – Tx Fundamental (Periodic)

Tx Fundamental	Radiated Field Strength @ 3-meters						
Frequency Range:	☒ 260-470MHz						
Low Channel Frequency (MHz)	Peak Field Strength (dBuV/m)	Peak Field Strength Limit (dBuV/m)	Peak Field Strength Margin (dB)	Duty Cycle Correction Factor (dB)	Average Field Strength (dBuV/m)	Average Field Strength Limit (duV/m)	Average Field Strength Margin (dB)
431.00 (Pk)	80.02	100.46	-20.44	0.00	80.02	80.46	-0.44
Mid Channel Frequency (MHz)							
434.00 (Pk)	80.03	100.58	-20.55	0.00	80.03	80.58	-0.55
High Channel Frequency (MHz)							
437.00 (Pk)	79.92	100.71	-20.79	0.00	79.92	80.71	-0.79
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 6.5 & 7.6.1

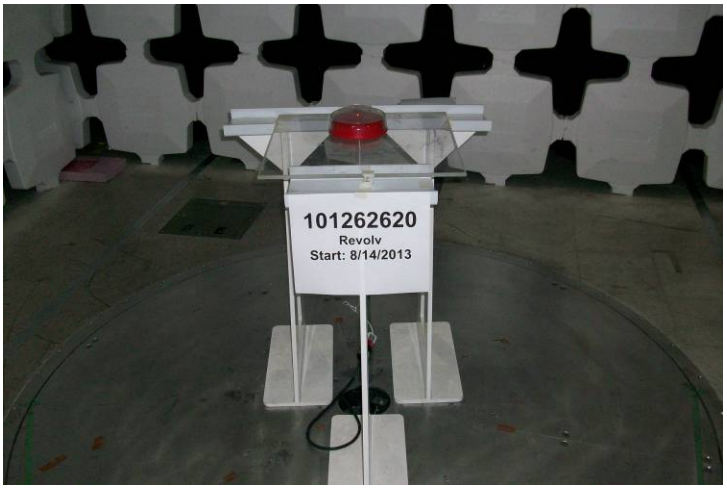
Notes:

1. All Fundamental measurements are radiated field at 3-meters, peak detector, max hold, 300kHz RBW.
2. The measurement alternative of quasi-peak (or peak) detector per FCC 15.231 guidelines was utilized. Note that average detector measurements are also acceptable. If an average detector is used, the provisions of FCC 15.35 for averaging pulsed emissions and limiting peak emissions apply.
3. The measurement bandwidth ≥6dB bandwidth – refer to appendix of this report.
4. Product measured in (3) axes – refer to section 4 for details.
5. The product is a multi-channel transmitter.

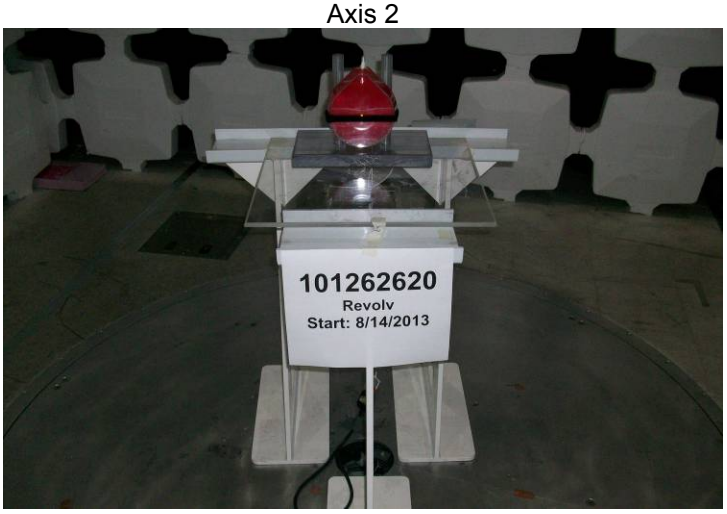
Setup Photographs: Radiated Field Strength Emissions – Tx Fundamental

Test Setup – Front View

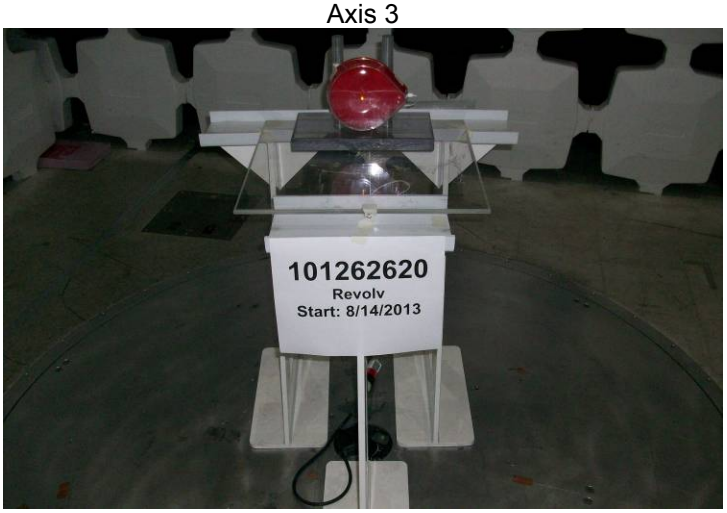
Axis 1



Axis 2



Axis 3

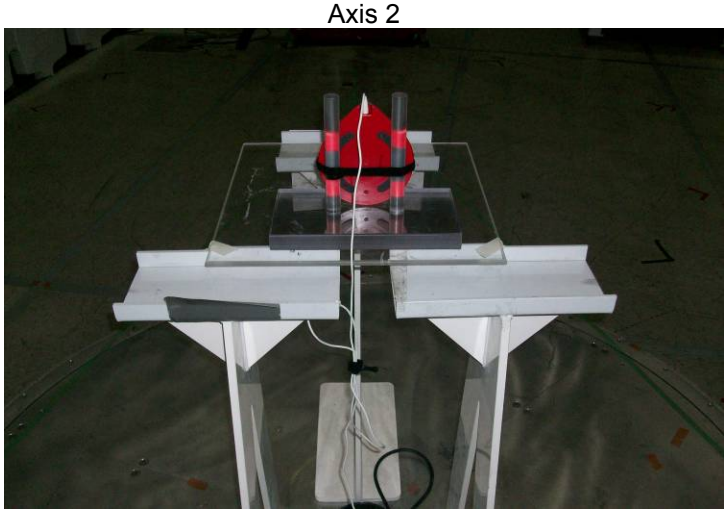


Setup Photographs: Radiated Field Strength Emissions – Tx Fundamental

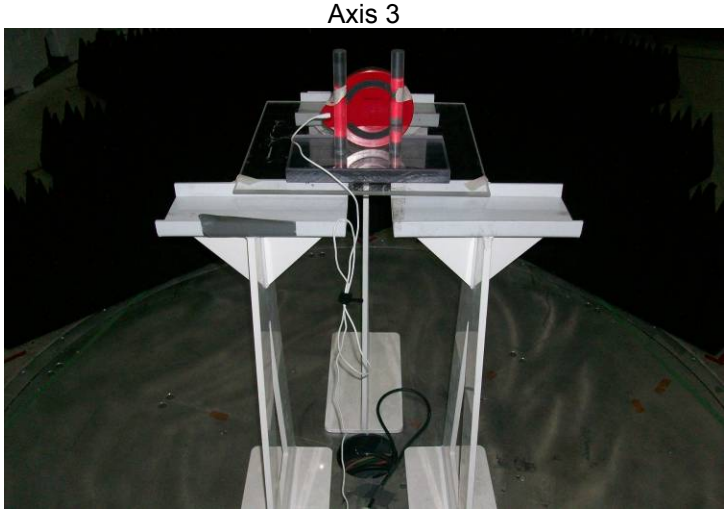
Test Setup – Rear View

Axis 1

Axis 2



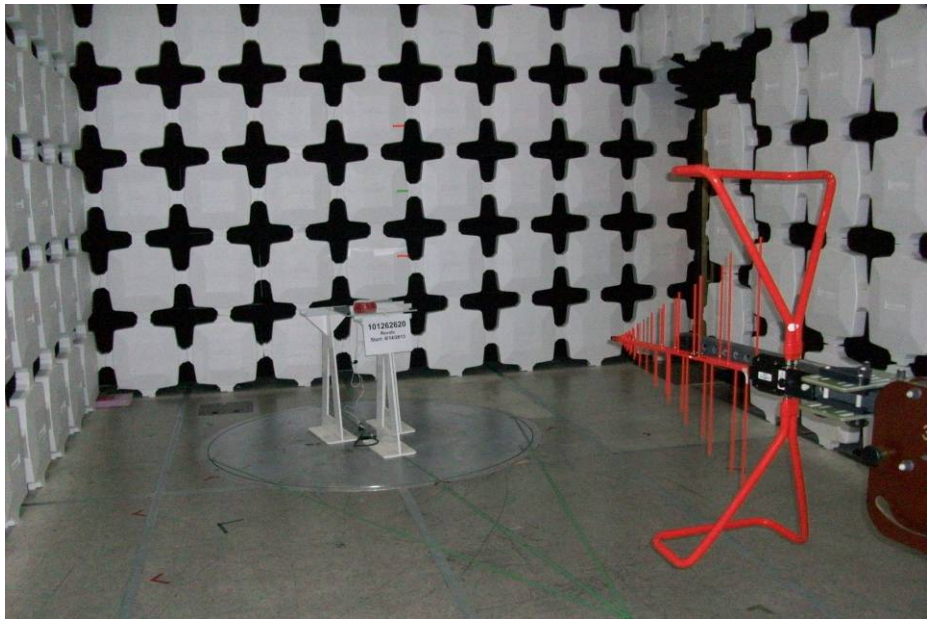
Axis 3



Setup Photographs: Radiated Field Strength Emissions – Tx Fundamental

Test Setup

Antenna – 30MHz to 1000MHz



Test Data: Radiated Field Strength Emissions – Tx Fundamental

Radiated Field Strength – Tx Fundamental - Periodic

Test Report #:	**G101262612**	Test Area:	CC1 Radiated	Temperature:	23.1 °C
Test Method:	FCC 15.231	Test Date:	11-Sep-2013	Relative Humidity:	36.2 %
EUT Model #:	M1	EUT Power:	120VAC/60Hz	Air Pressure:	82.7 kPa
EUT Serial #:	FCC1				
Manufacturer:	Revolv, Inc.				
EUT Description:	Revolv "Hub" – RF-Enabled Home Automation				
Notes:	Product transmitting continuously – 433MHz Radio active – ASK Modulated				
	Radio is multi-channel: Lowest Channel 431.00MHz, Mid Channel 434.00MHz, Highest Channel 437.00MHz				
	All measurements peak detector – RBW > 6dB BW				

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

The following Duty Cycle was verified by Intertek: Not Applicable

No Duty Cycle Correction Applied

Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions.

The testing performed in accordance to FCC CFR47 Part 15.231 and delta limits were calculated as follows:

Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission

The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.231 and the emission/limit delta was calculated.

DTCF is calculated as follows 20*$\log_{10}$(duty cycle in 100mS**)** – not to exceed 20dB.

FCC Part 15.231(b) Limit: Frequency Range 260-470MHz, 3,750 to 12,500 uV/m = 71.5 to 81.94 dBuV/m

FREQ	LEVEL	DET	CABLE	Antenna	PREAMP	FINAL	Duty Cycle CF	Duty Cycle Corrected	POL	HGT	AZ	LIMIT	DELTA LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV]	- [dB]	= [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.231(b)	dB	(MHz)
Fundamental Measurements - Axis 1 - EUT Flat on Table (Horizontal)														
Tx Low Channel														
431.0000	88.37	**Pk**	1.42	16.56	28.11	78.24	0.00	78.24	H	2.36	8.0	80.46	-2.22	0.300
431.0000	82.45	**Pk**	1.42	16.56	28.11	72.32	0.00	72.32	V	1.03	255.0	80.46	-8.14	0.300
Fundamental Measurements - Axis 2 - EUT Vertical on Table														
Tx Low Channel														
431.0000	82.60	**Pk**	1.42	16.56	28.11	72.47	0.00	72.47	V	1.68	259.0	80.46	-7.99	0.300
431.0000	88.60	**Pk**	1.42	16.56	28.11	78.47	0.00	78.47	H	2.02	4.0	80.46	-1.99	0.300
Fundamental Measurements - Axis 3 - EUT Vertical & Rotated 90 Degrees														
Tx Low Channel														
431.0000	81.60	**Pk**	1.42	16.56	28.11	71.47	0.00	71.47	H	2.18	286.0	80.46	-8.99	0.300
431.0000	90.15	**Pk**	1.42	16.56	28.11	80.02	0.00	80.02	V	1.35	185.0	80.46	-0.44	0.300
Fundamental Measurements - Axis 1 - EUT Flat on Table (Horizontal)														
Tx Mid Channel														
434.0000	83.01	**Pk**	1.42	16.74	28.13	73.04	0.00	73.04	V	1.00	262.0	80.58	-7.54	0.300
434.0000	88.84	**Pk**	1.42	16.74	28.13	78.87	0.00	78.87	H	2.12	0.0	80.58	-1.71	0.300
Fundamental Measurements - Axis 2 - EUT Vertical on Table														
Tx Mid Channel														

434.0000	89.24	**Pk**	1.42	16.74	28.13	79.27	0.00	79.27	H	1.90	10.0	80.58	-1.31	0.300
434.0000	82.55	**Pk**	1.42	16.74	28.13	72.58	0.00	72.58	V	1.89	263.0	80.58	-8.00	0.300
Fundamental Measurements - Axis 3 - EUT Vertical & Rotated 90 Degrees														
Tx Mid Channel														
434.0000	90.00	**Pk**	1.42	16.74	28.13	80.03	0.00	80.03	V	1.28	186.0	80.58	-0.55	0.300
434.0000	80.51	**Pk**	1.42	16.74	28.13	70.54	0.00	70.54	H	2.46	283.0	80.58	-10.04	0.300
Fundamental Measurements - Axis 1 - EUT Flat on Table (Horizontal)														
Tx High Channel														
437.0000	88.06	**Pk**	1.43	16.88	28.15	78.22	0.00	78.22	H	2.39	4.0	80.71	-2.49	0.300
437.0000	82.51	**Pk**	1.43	16.88	28.15	72.67	0.00	72.67	V	1.04	254.0	80.71	-8.04	0.300
Fundamental Measurements - Axis 2 - EUT Vertical on Table														
Tx High Channel														
437.0000	88.64	**Pk**	1.43	16.88	28.15	78.80	0.00	78.80	H	1.80	0.0	80.71	-1.91	0.300
437.0000	83.59	**Pk**	1.43	16.88	28.15	73.75	0.00	73.75	V	1.93	355.0	80.71	-6.96	0.300
Fundamental Measurements - Axis 3 - EUT Vertical & Rotated 90 Degrees														
Tx High Channel														
437.0000	89.76	**Pk**	1.43	16.88	28.15	79.92	0.00	79.92	V	1.20	208.0	80.71	-0.79	0.300
437.0000	79.76	**Pk**	1.43	16.88	28.15	69.92	0.00	69.92	H	2.28	285.0	80.71	-10.79	0.300

10 Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231.

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

Test Requirement/Specification

- FCC 15.231(b)

15.231(b) In addition to the provisions of § 15.205 (restricted band), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Tx Frequency	Field Strength of Fundamental (uV/m)	**Field Strength of Spurious Emissions (uV/m)**
40.66 – 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750	125 to 375
174 - 250	3,750	375
260 - 470	3,750 to 12,500	375 to 1,250 (51.50 to 62.00 dBuV/m)
Above 470	12,500	1,250

15.231(b)(1) The above field strength limits are specified at a distance of 3-meters. The tighter limits apply at the band edges.

15.231(b)(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak (or peak) detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of 15.205 shall be demonstrated using the measurement instrumentation specified in that section.

15.231(b)(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in 15.209, whichever limit permits a higher field strength.

15.35(b) When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/07/2013	06/07/2014
18906	RF Pre-Amp (1-4GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/10/2013	06/10/2014
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/10/2014	06/10/2014
18901	RF Pre-Amp (8-18GHz)	Avantek	AWT-18037	1002	06/10/2013	06/10/2014
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/15/2012	11/15/2013
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	03/19/2013	03/19/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 3.0	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary: Radiated Field Strength – Tx Spurious (Non-Restricted Band)

Tx Fundamental	Part 15.231(b) Radiated Field Strength @ 3-meters						
Frequency Range:	☒ 260-470MHz						
Frequency (MHz)	Peak Field Strength (dBuV/m)	Peak Field Strength Limit (dBuV/m)	Peak Field Strength Margin (dB)	Duty Cycle Correction Factor (dB)	Average Field Strength (dBuV/m)	Average Field Strength Limit (duV/m)	Average Field Strength Margin (dB)
1861.57 (Peak)	58.05	80.46	-22.41	0.00	58.05	60.46	-2.41
RBW: ☒ 120kHz ☐ 300kHz ☐ 500kHz ☒ 1MHz ☐ 3MHz ☐ 10MHz VBW: ☒ 300kHz ☐ 1MHz ☐ 1MHz ☒ 3 MHz ☐ 10MHz ☐ 10MHz							

Note: 120kHz RBW 30MHz to 1000MHz, 1MHz RBW above 1GHz

Test Summary: Radiated Field Strength – Tx Spurious (Restricted Band)

Tx Fundamental	Part 15.205/209 Radiated Field Strength @ 3-meters						
Frequency Range:	☒ 260-470MHz						
Frequency (MHz)	Peak Field Strength (dBuV/m)	Peak Field Strength Limit (dBuV/m)	Peak Field Strength Margin (dB)	Duty Cycle Correction Factor (dB)	Average Field Strength (dBuV/m)	Average Field Strength Limit (duV/m)	Average Field Strength Margin (dB)
1329.88 (Average)	---	---	---	---	44.94	54.00	-9.06
1329.88 (Peak)	59.92	74.00	-14.08	---	---	---	---
RBW: ☒ 120kHz ☐ 300kHz ☐ 500kHz ☒ 1MHz ☐ 3MHz ☐ 10MHz VBW: ☒ 300kHz ☐ 1MHz ☐ 1MHz ☒ 3 MHz ☐ 10MHz ☐ 10MHz							

Note: 120kHz RBW 30MHz to 1000MHz, 1MHz RBW above 1GHz

Test Method:

- ANSI C63.10:2009, Section 6.5/6.6 & 7.6.1

An intentional radiator shall be measured in accordance with 47 CFR 15.31-15.35. The detector functions and measuring bandwidths for these measurements are specified in 15.35. For measurements below 1 GHz, a quasi-peak detector shall be used. However, a peak detector may be used, since the measured valve will generally be higher with a peak detector. For measurements above 1 GHz, the limits are in terms of using an instrument with an average detector, unstated otherwise for a specific type of device. For device operating under Section 15.231, the limit is in terms of average with an additional peak limit of 20 dB over the average limit (see 47 CFR 15.231).

Notes:

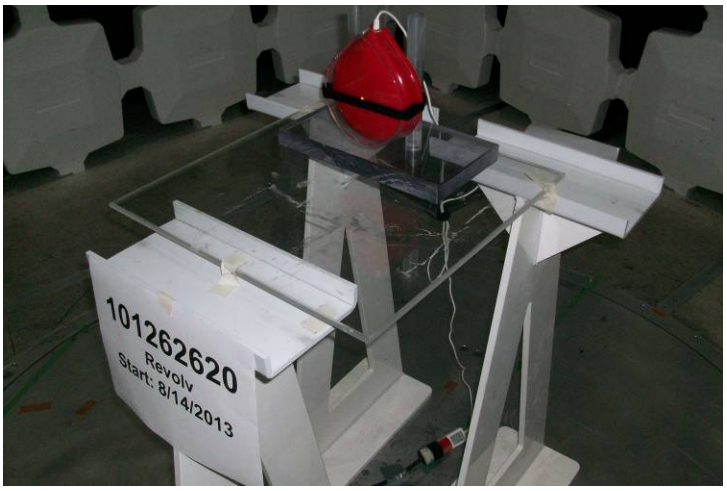
1. All Tx Spurious measurements are radiated field – peak/quasi-peak and/or average detector, max hold measurements.
2. The product was tested in (3) axes – refer to section 4 for details.
3. The transmitter is multi-channel.

Setup Photographs: Radiated Field Strength - Harmonics of the Fundamental (Out-of-Band Emissions)

Test Setup – Front View

Axis 1

Axis 2

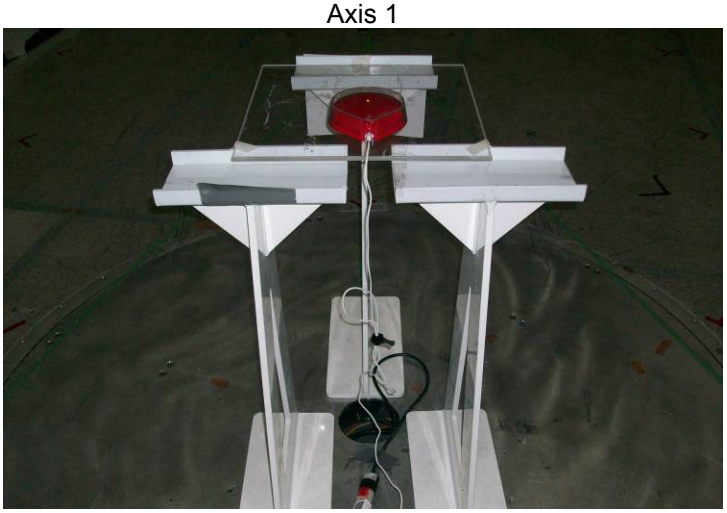


Axis 3

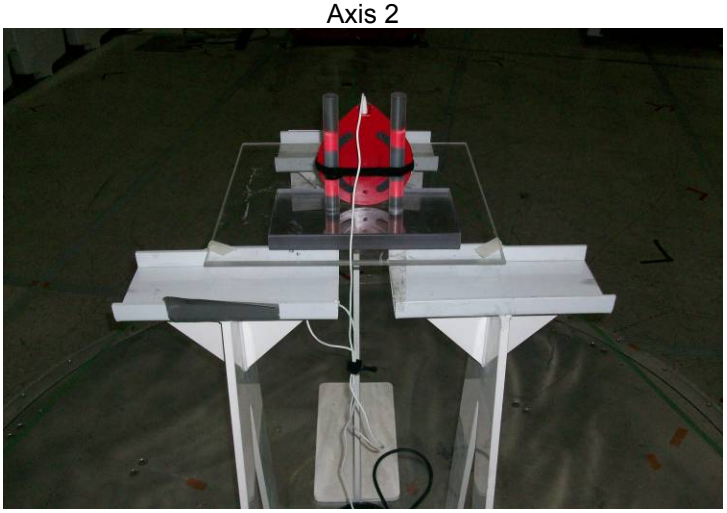
Setup Photographs: Radiated Field Strength - Harmonics of the Fundamental (Out-of-Band Emissions)

Test Setup – Rear View

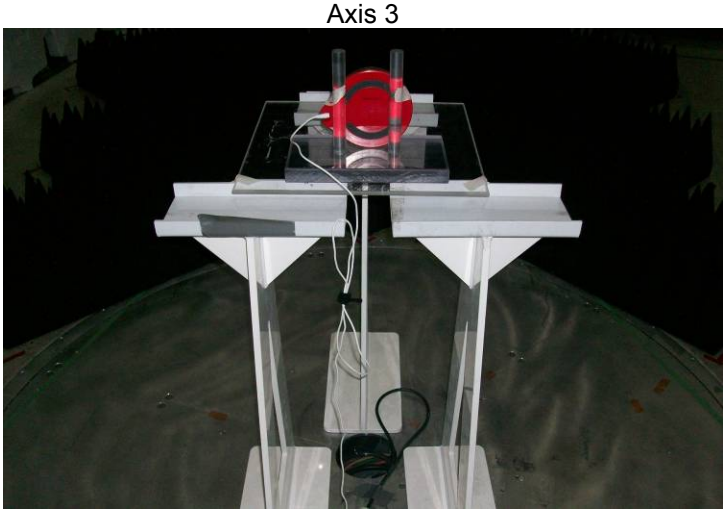
Axis 1



Axis 2



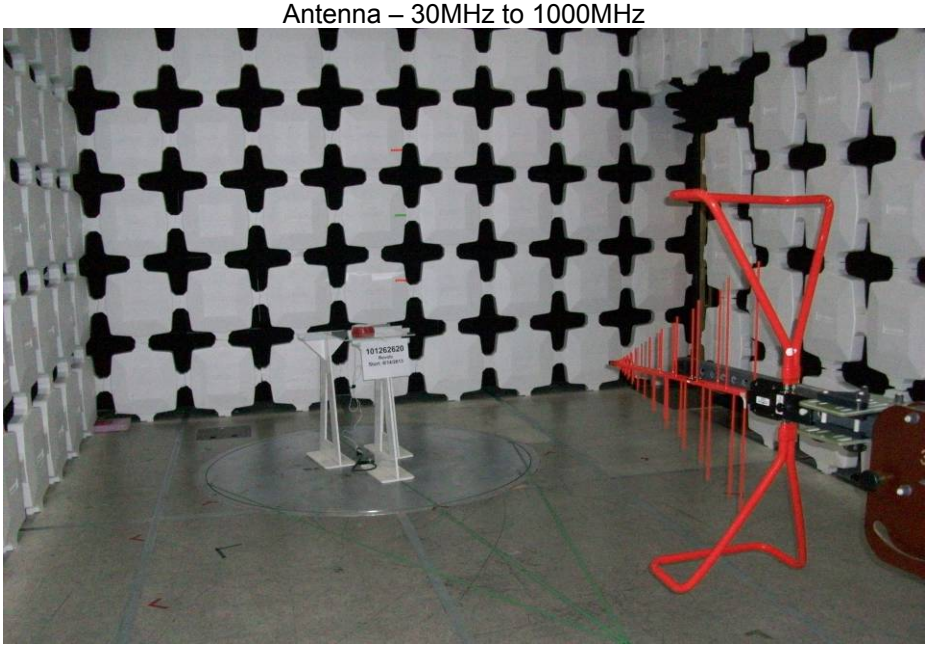
Axis 3



Setup Photographs: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Test Setup

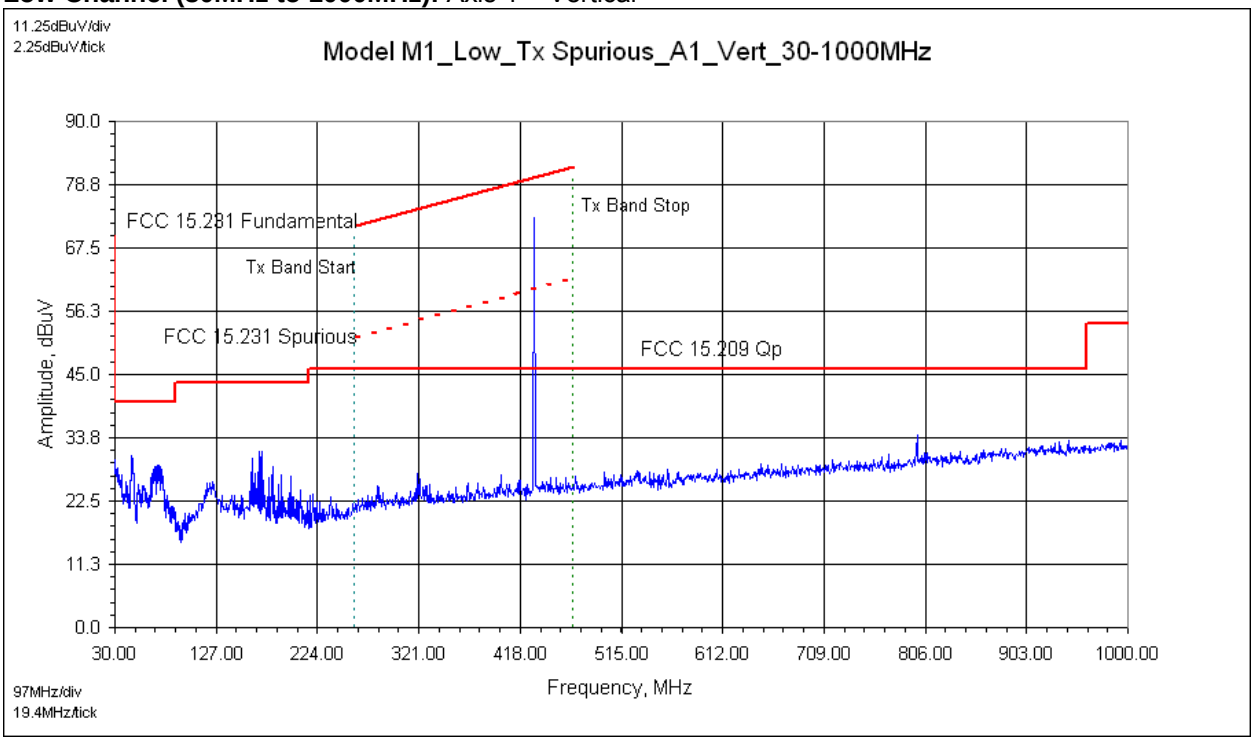
Antenna – 30MHz to 1000MHz



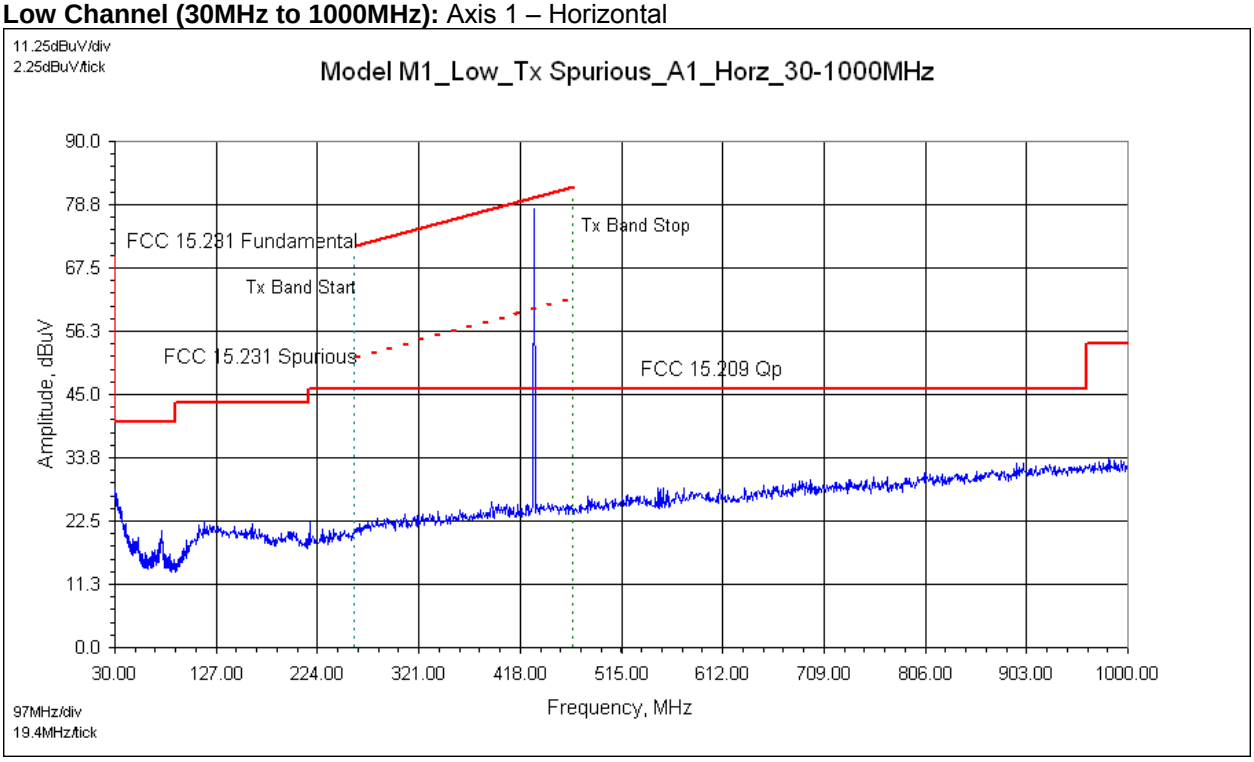
Antenna – 1GHz to 18GHz

Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Low Channel (30MHz to 1000MHz): Axis 1 – Vertical

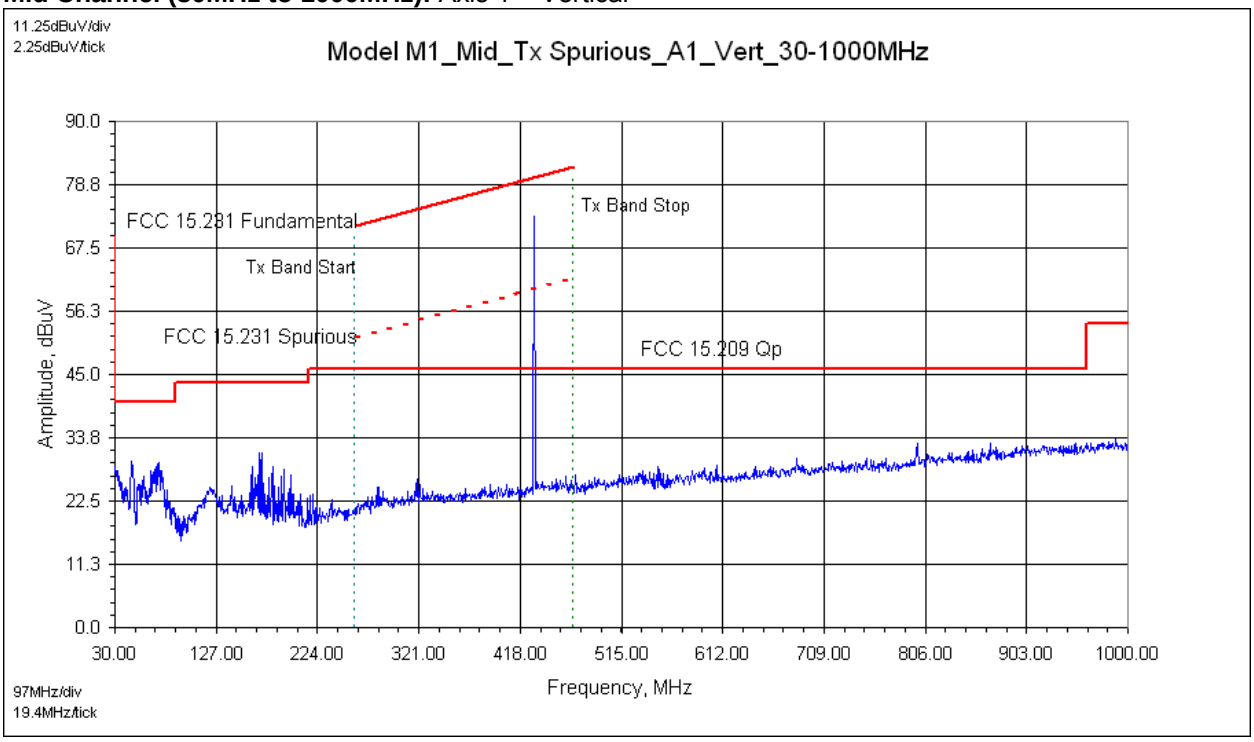


Low Channel (30MHz to 1000MHz): Axis 1 – Horizontal

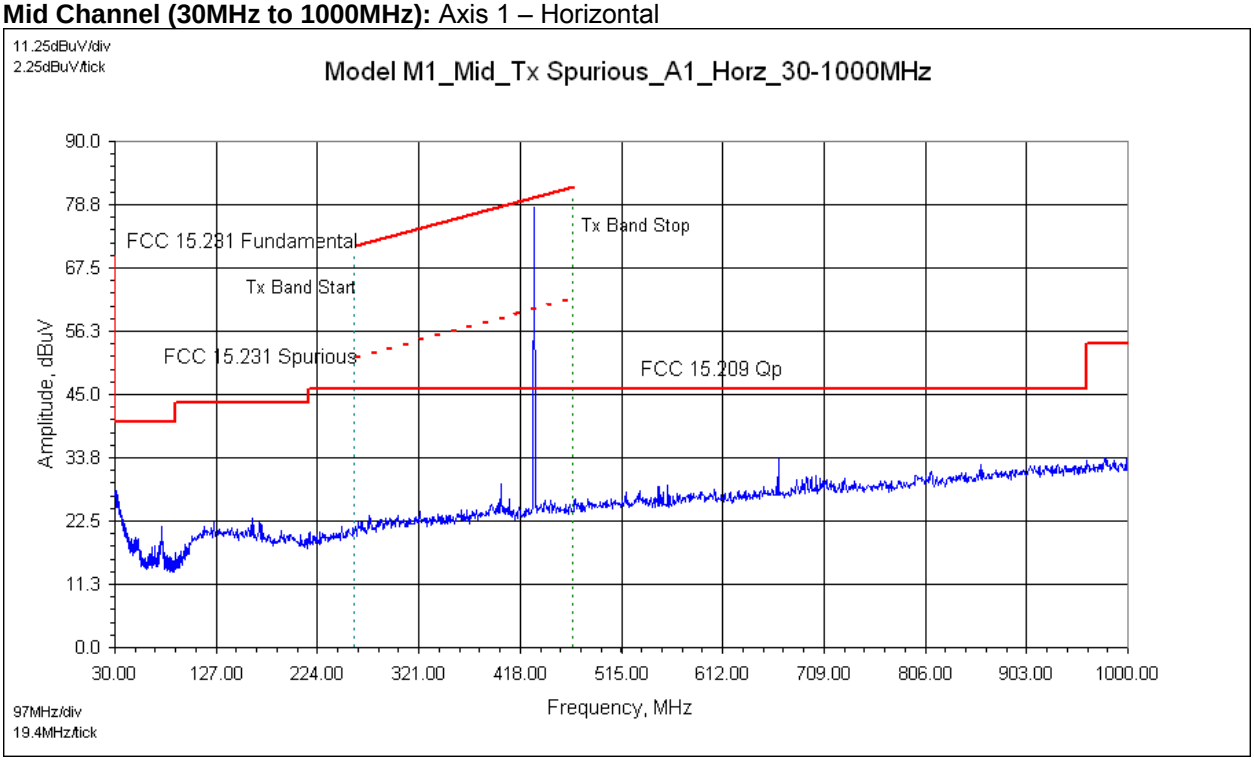


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Mid Channel (30MHz to 1000MHz): Axis 1 – Vertical

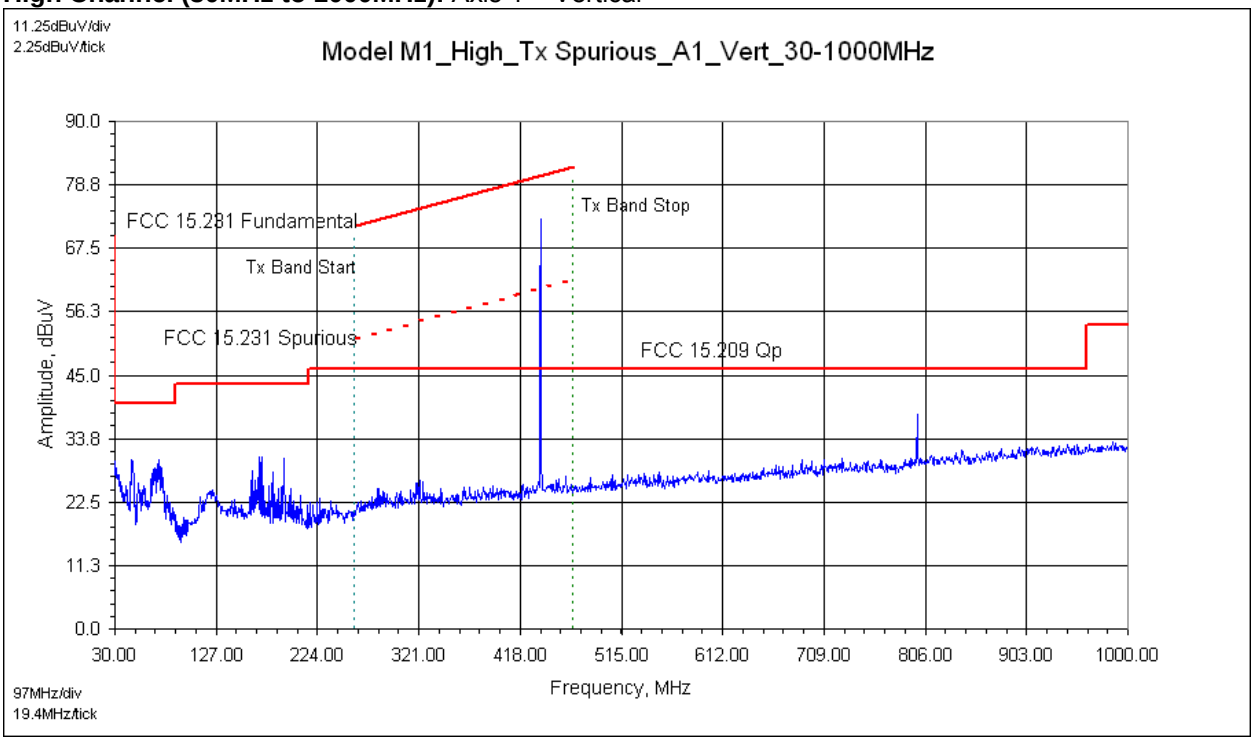


Mid Channel (30MHz to 1000MHz): Axis 1 – Horizontal

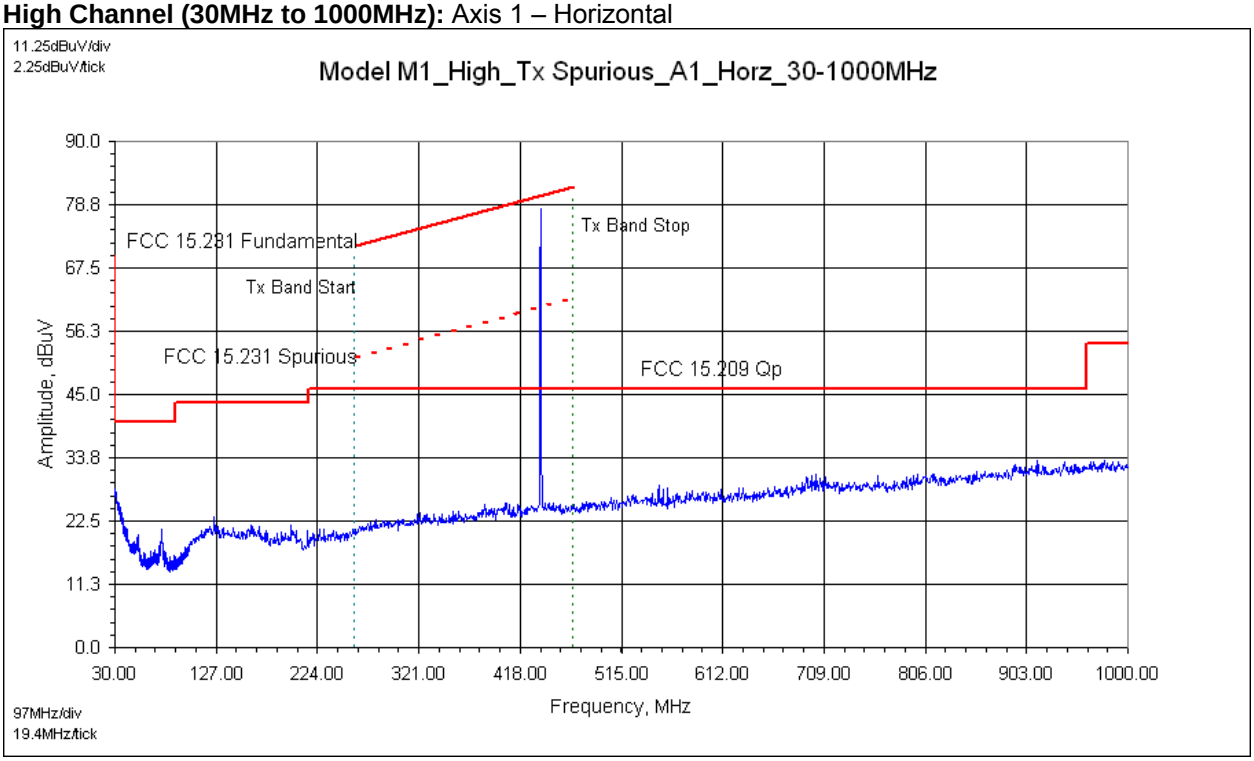


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

High Channel (30MHz to 1000MHz): Axis 1 – Vertical

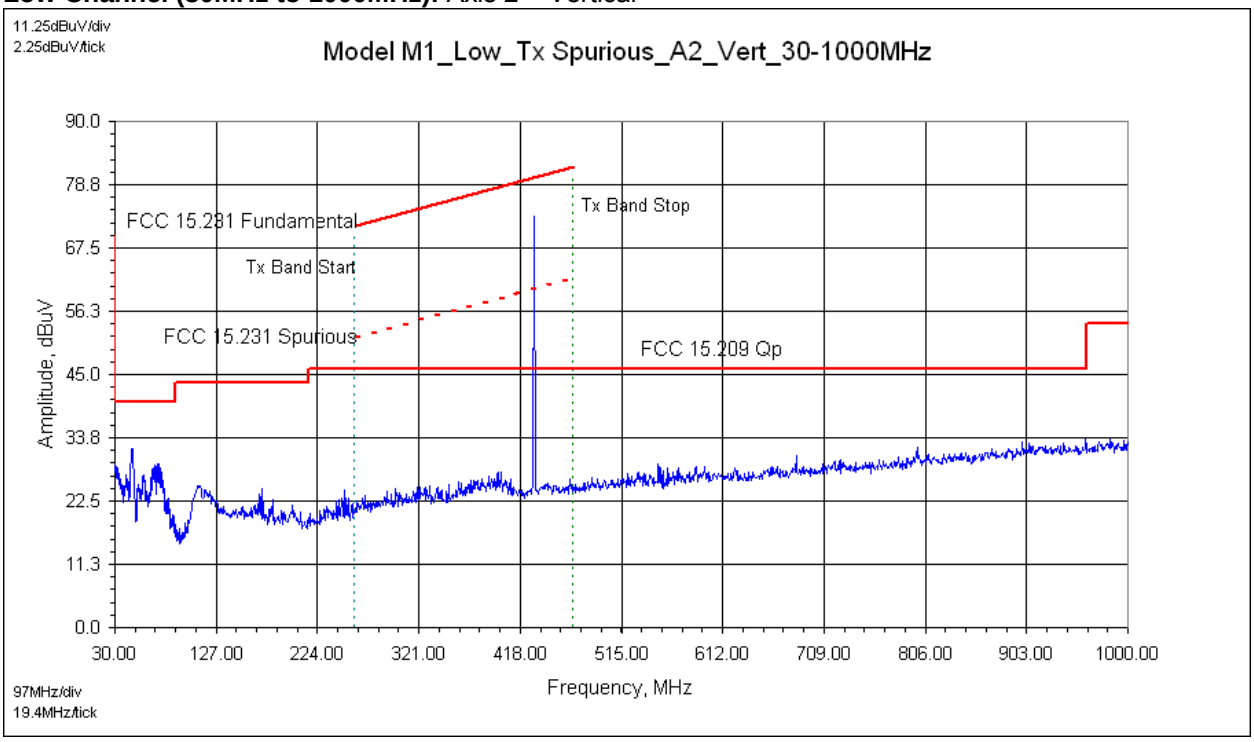


High Channel (30MHz to 1000MHz): Axis 1 – Horizontal

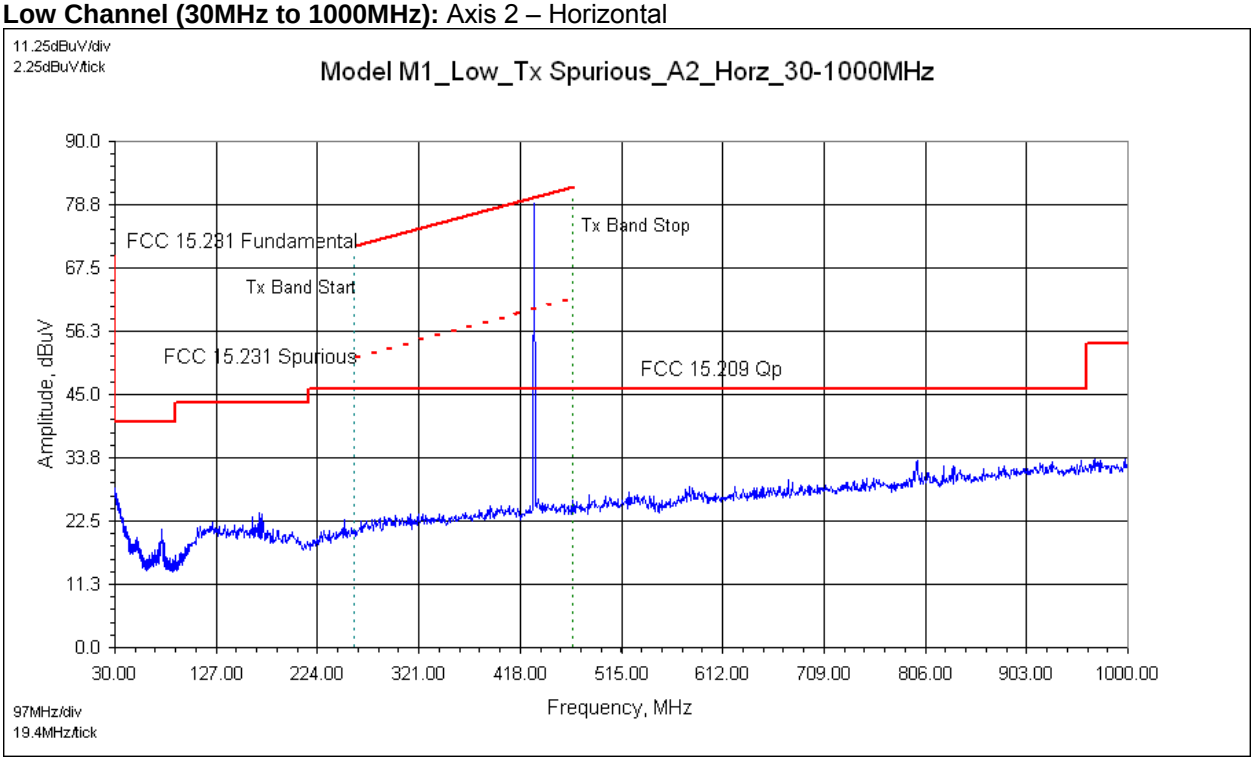


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Low Channel (30MHz to 1000MHz): Axis 2 – Vertical

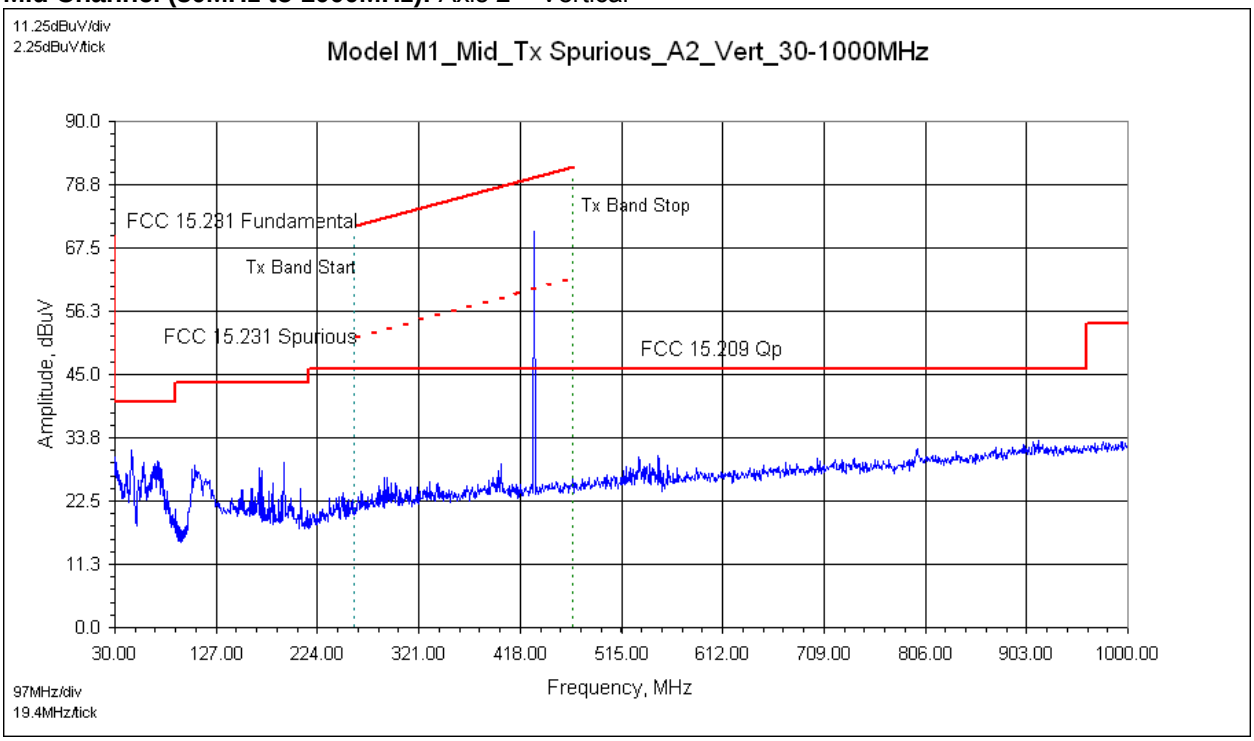


Low Channel (30MHz to 1000MHz): Axis 2 – Horizontal

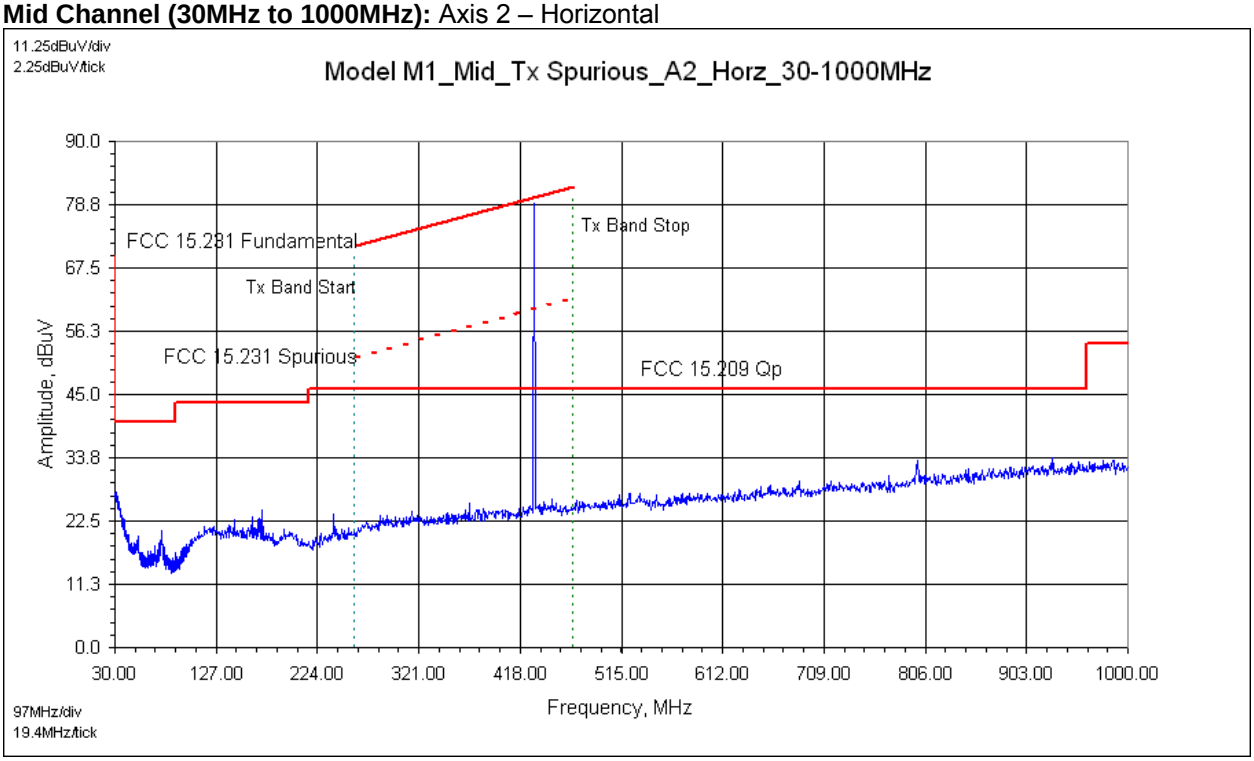


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Mid Channel (30MHz to 1000MHz): Axis 2 – Vertical

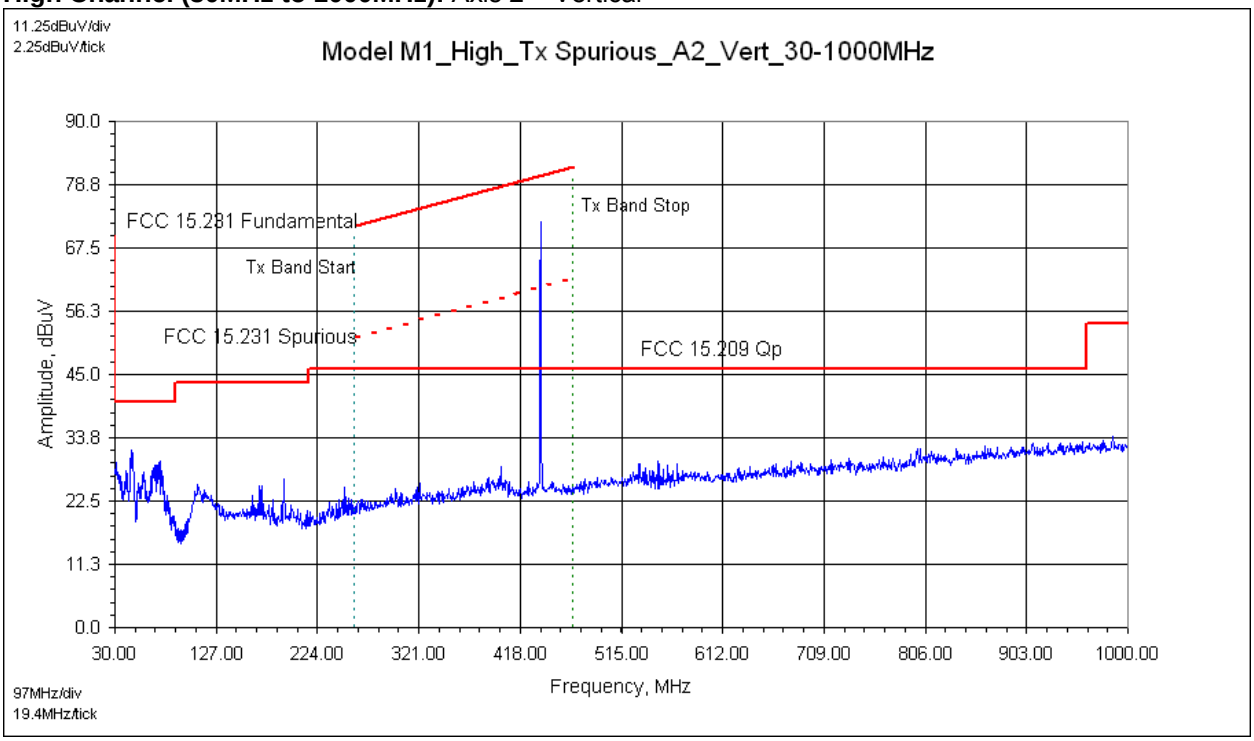


Mid Channel (30MHz to 1000MHz): Axis 2 – Horizontal

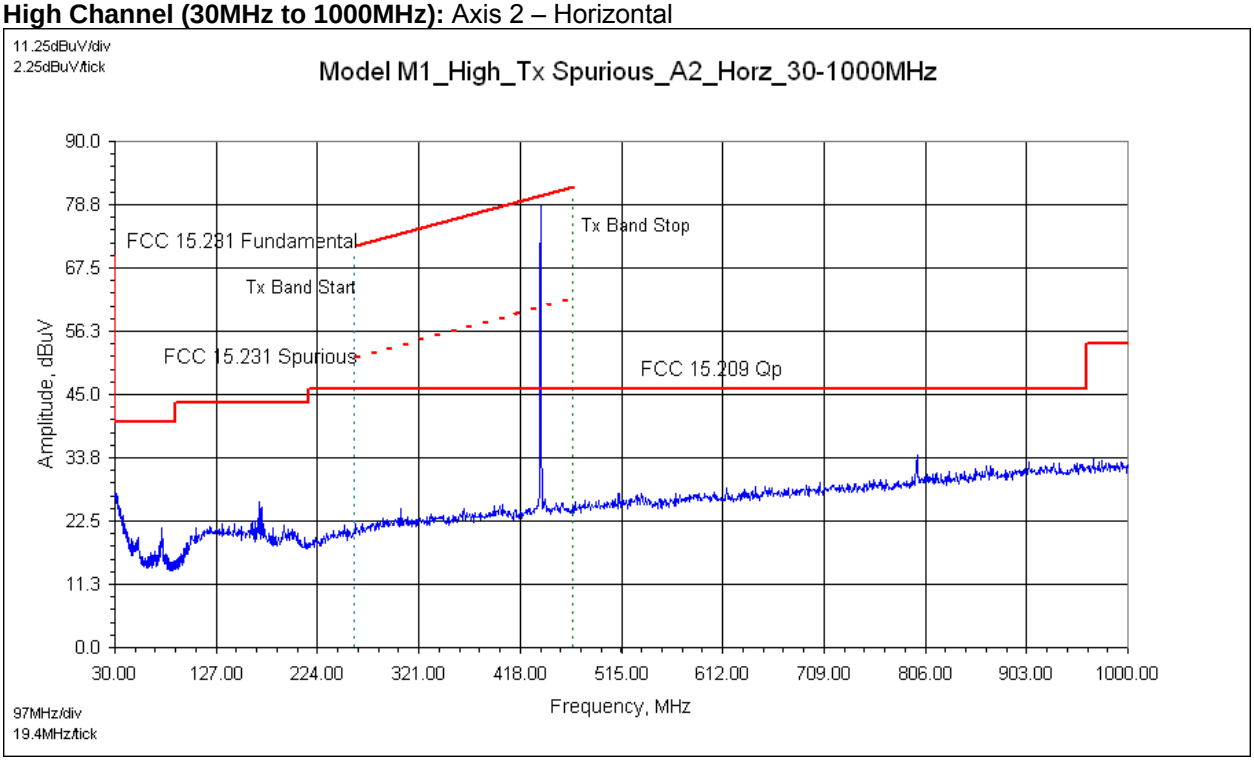


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

High Channel (30MHz to 1000MHz): Axis 2 – Vertical

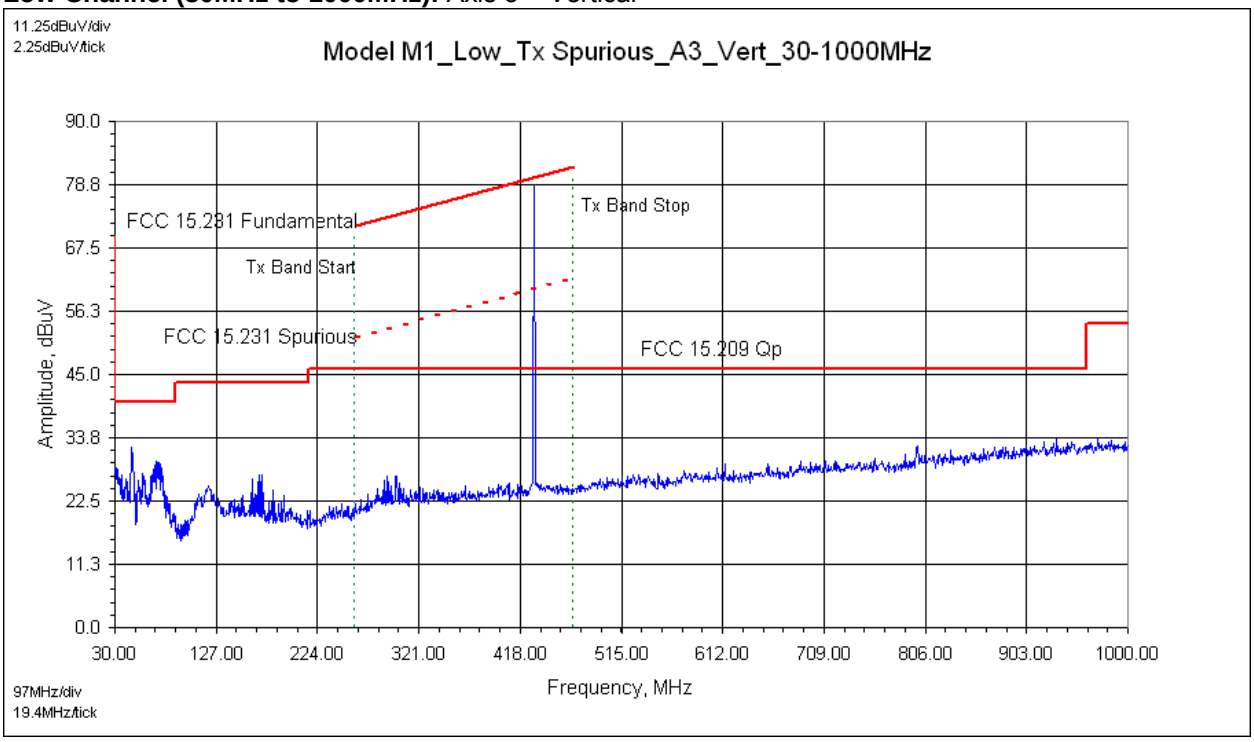


High Channel (30MHz to 1000MHz): Axis 2 – Horizontal

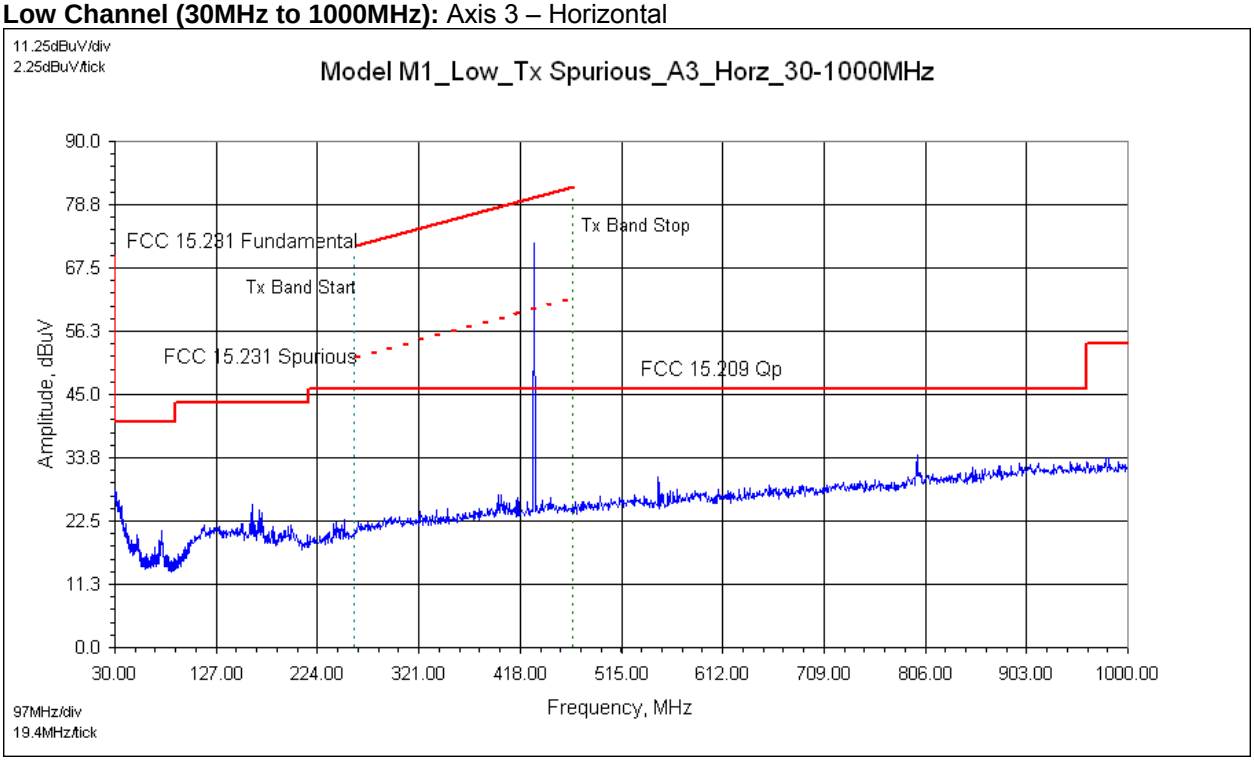


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Low Channel (30MHz to 1000MHz): Axis 3 – Vertical

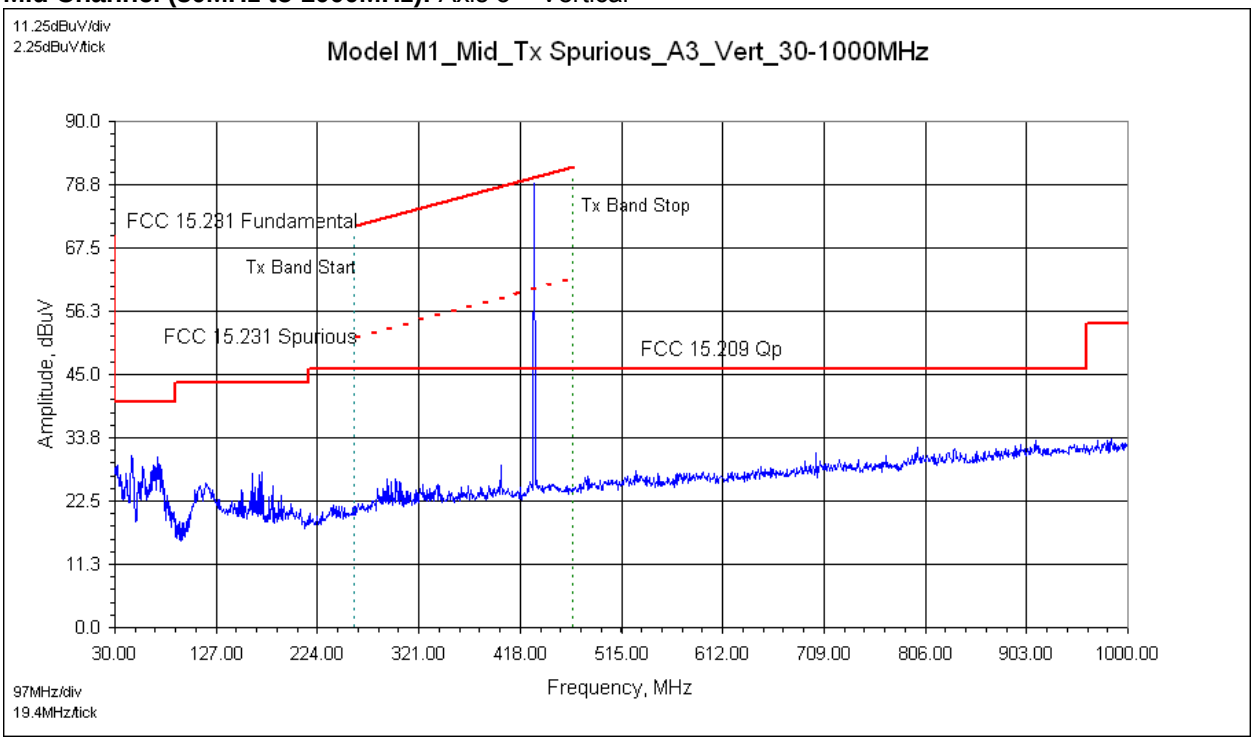


Low Channel (30MHz to 1000MHz): Axis 3 – Horizontal

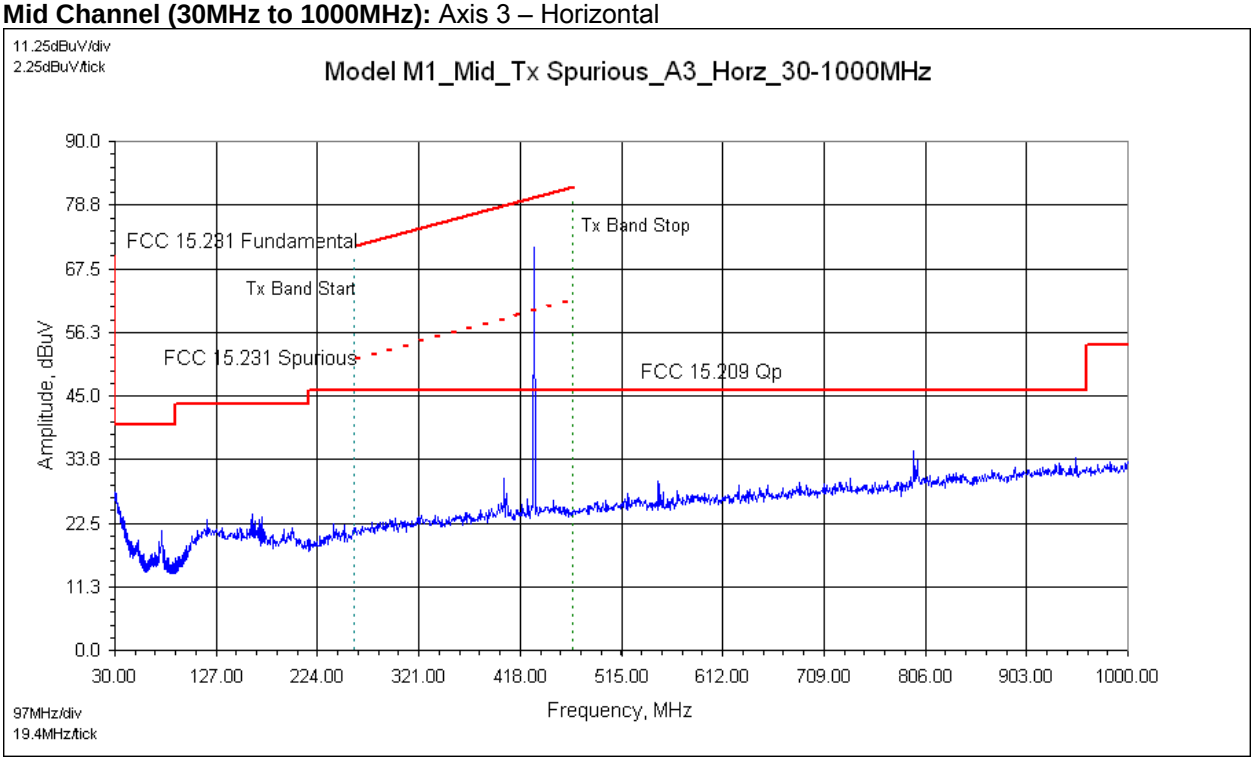


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Mid Channel (30MHz to 1000MHz): Axis 3 – Vertical

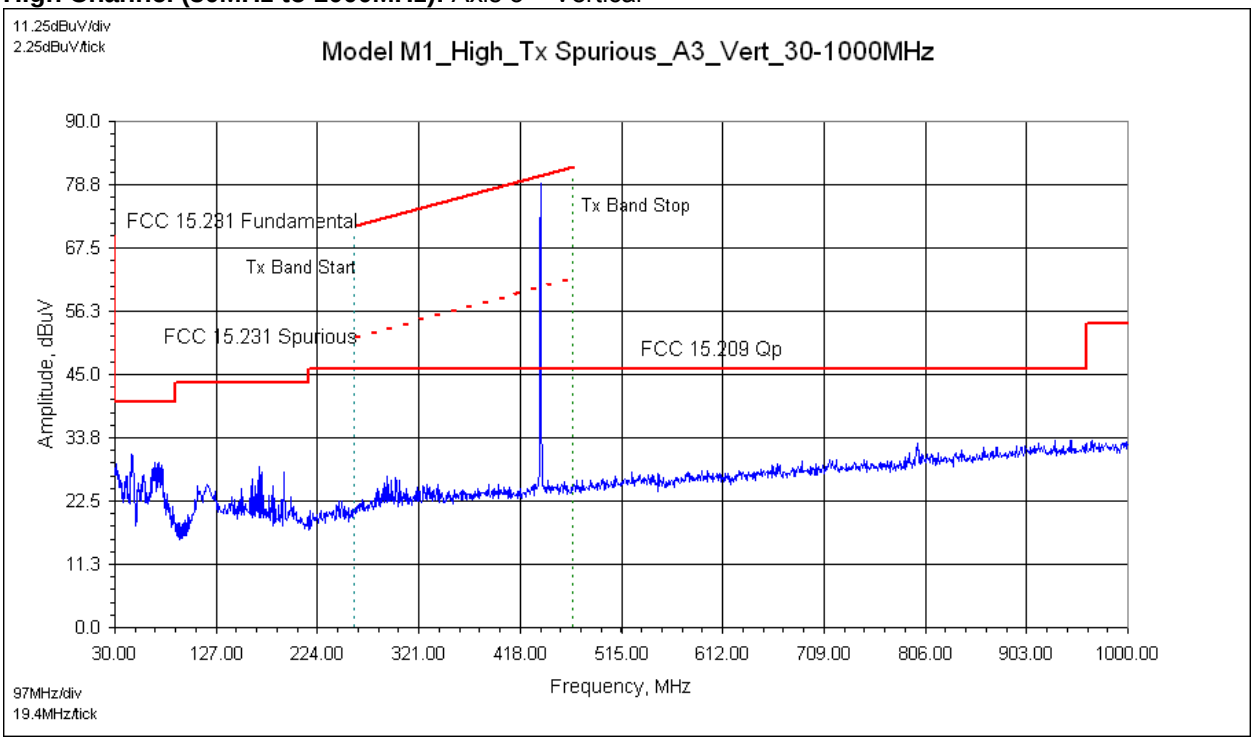


Mid Channel (30MHz to 1000MHz): Axis 3 – Horizontal

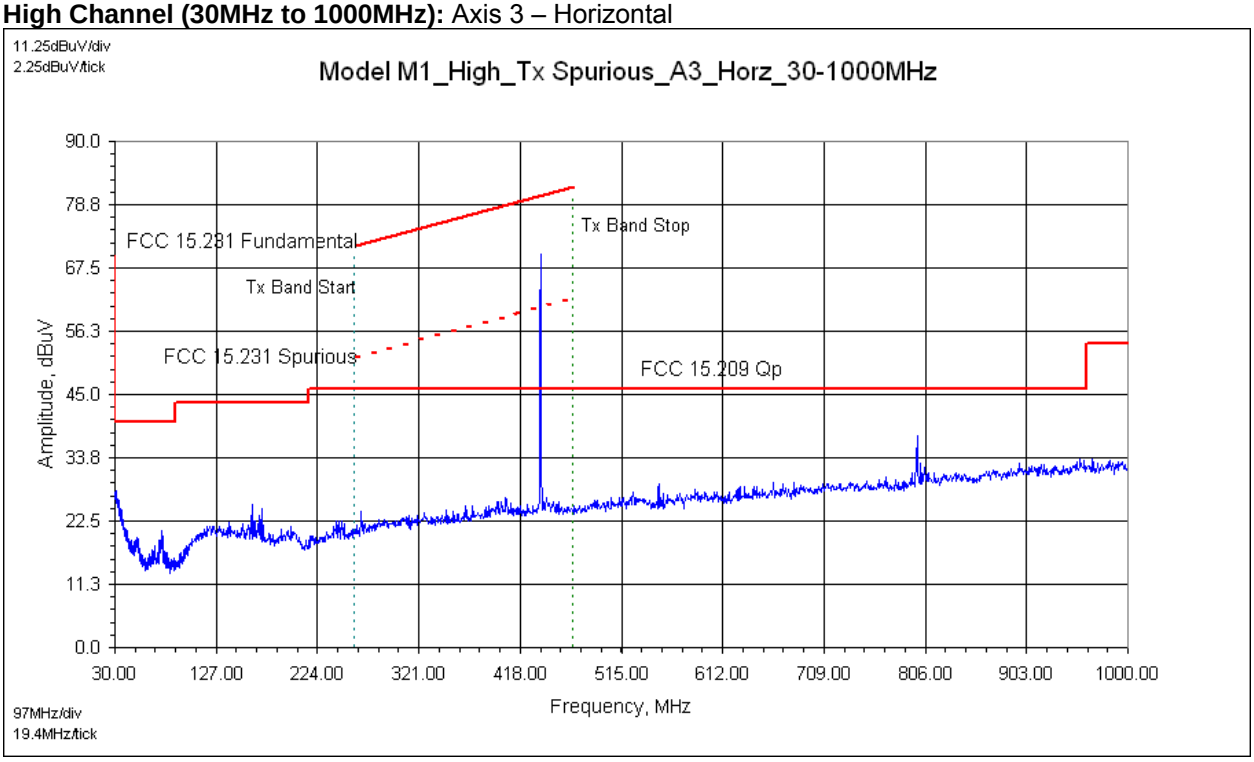


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

High Channel (30MHz to 1000MHz): Axis 3 – Vertical

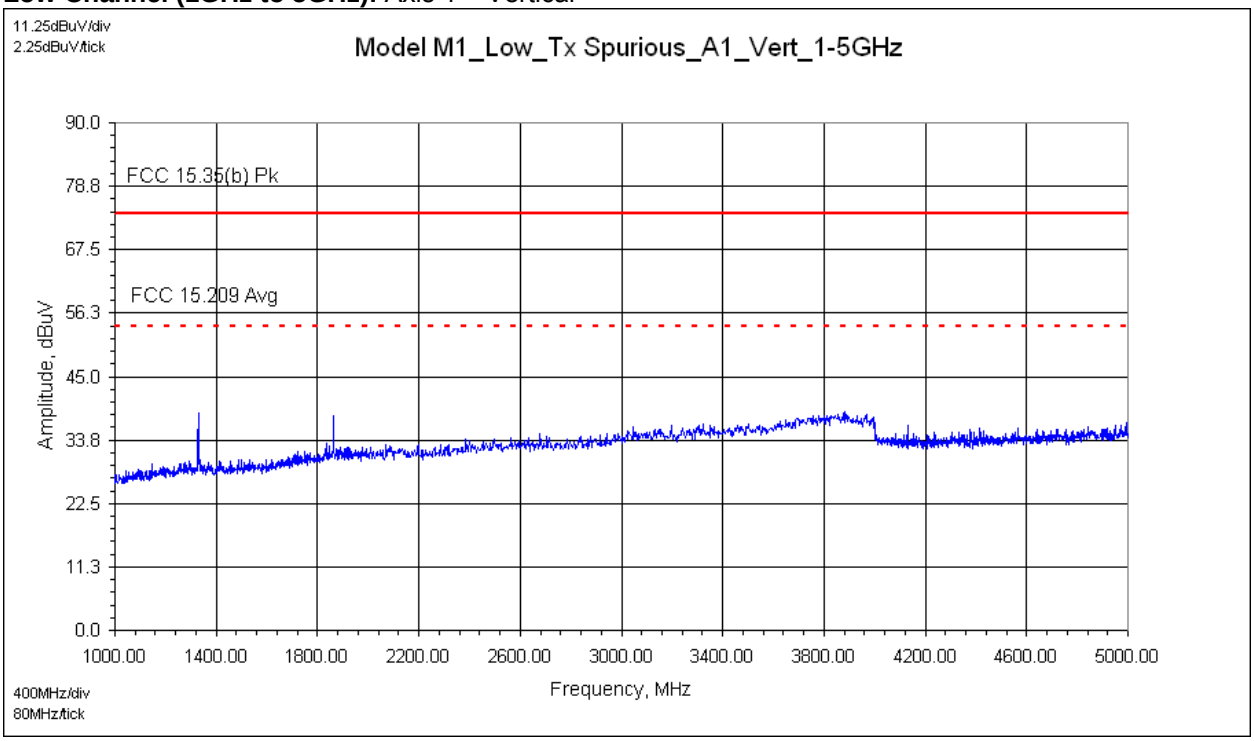


High Channel (30MHz to 1000MHz): Axis 3 – Horizontal

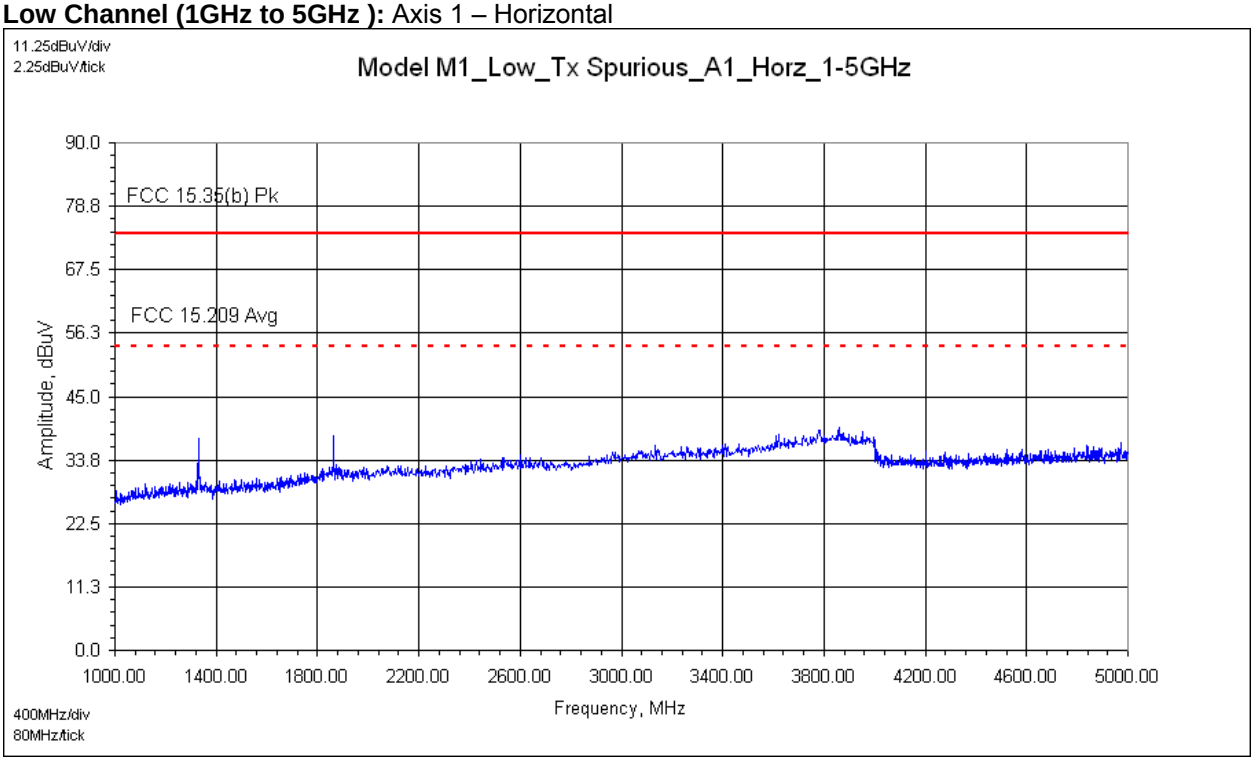


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Low Channel (1GHz to 5GHz): Axis 1 – Vertical

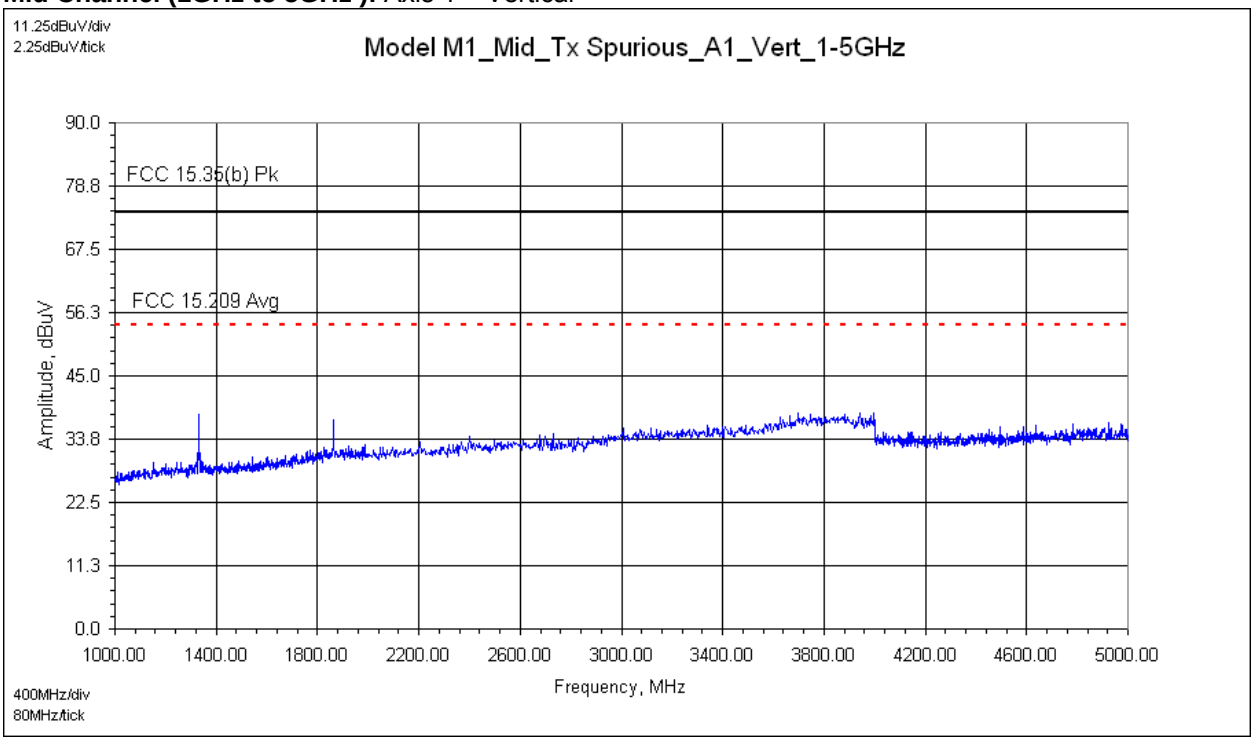


Low Channel (1GHz to 5GHz): Axis 1 – Horizontal

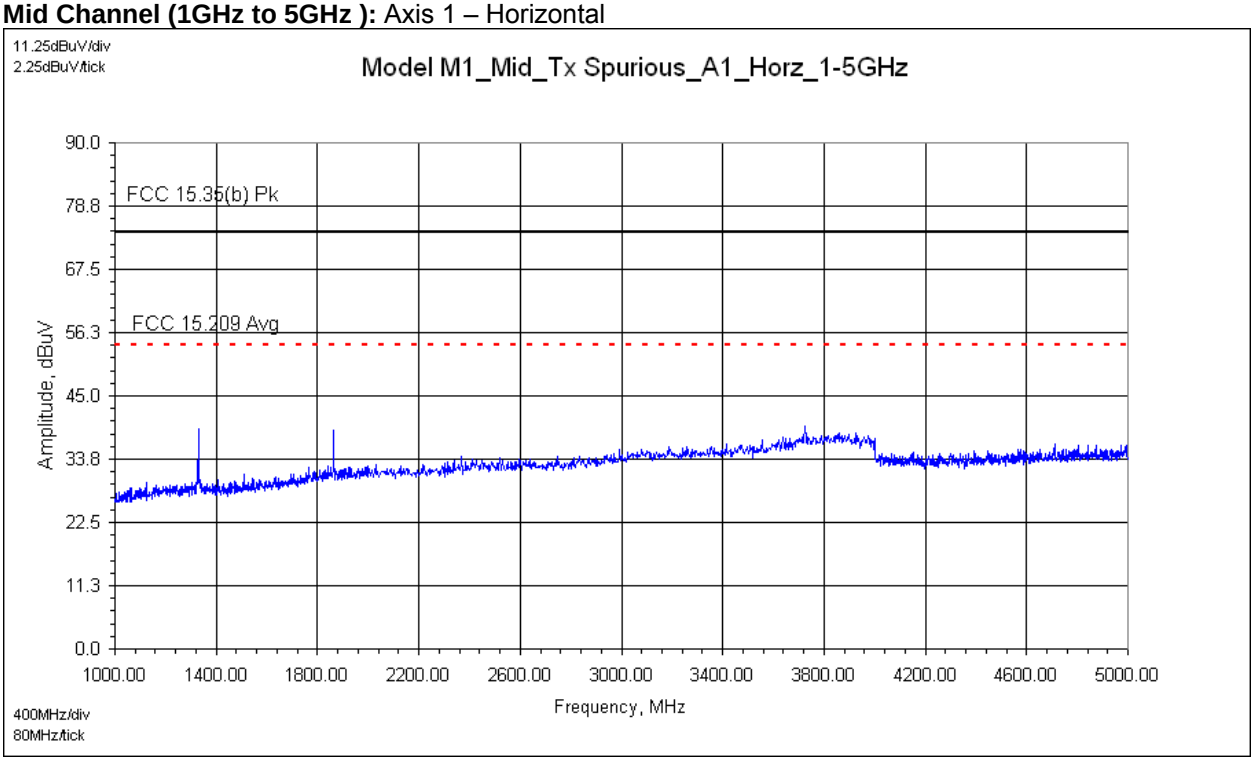


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Mid Channel (1GHz to 5GHz): Axis 1 – Vertical

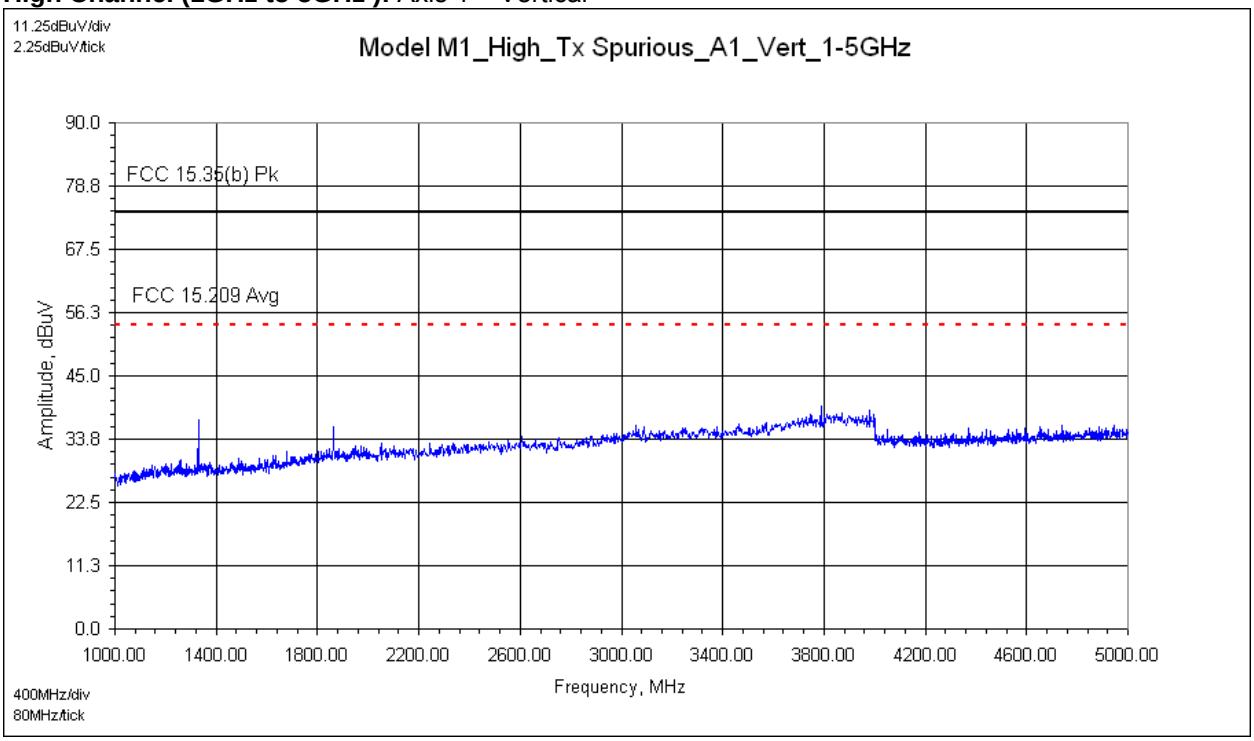


Mid Channel (1GHz to 5GHz): Axis 1 – Horizontal

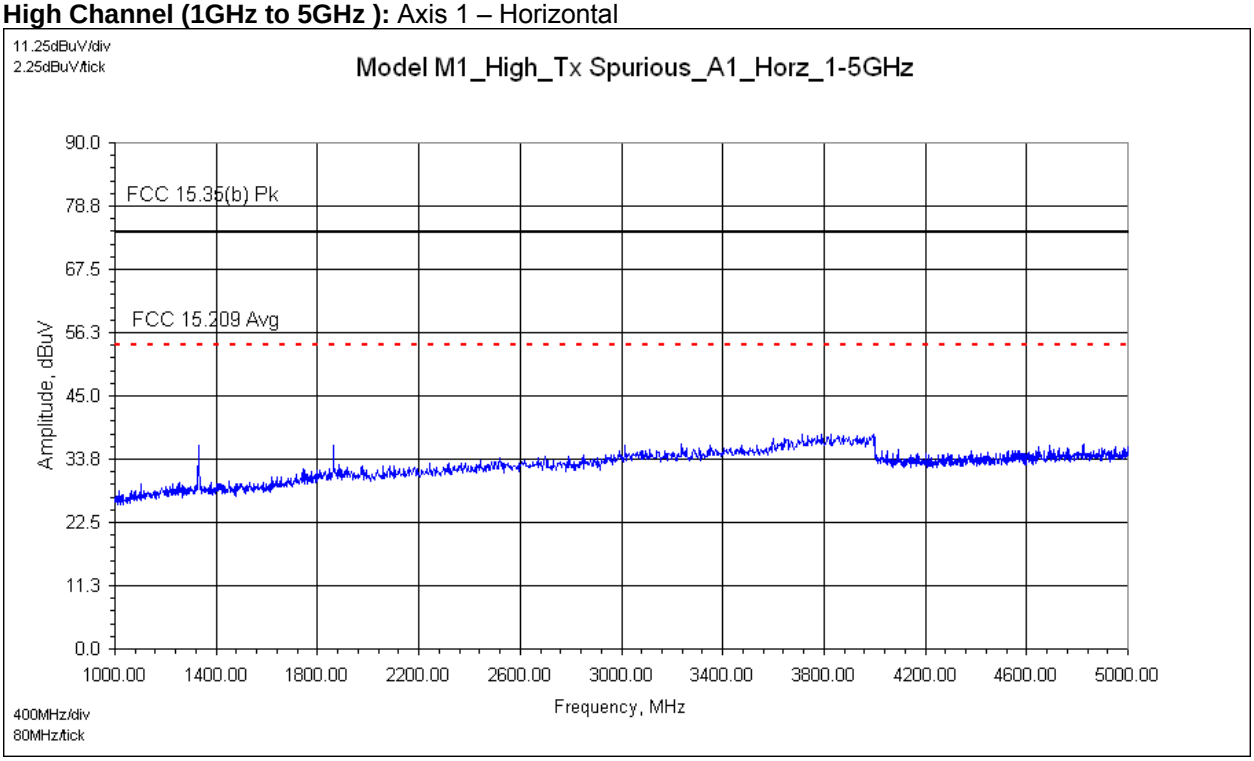


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

High Channel (1GHz to 5GHz): Axis 1 – Vertical

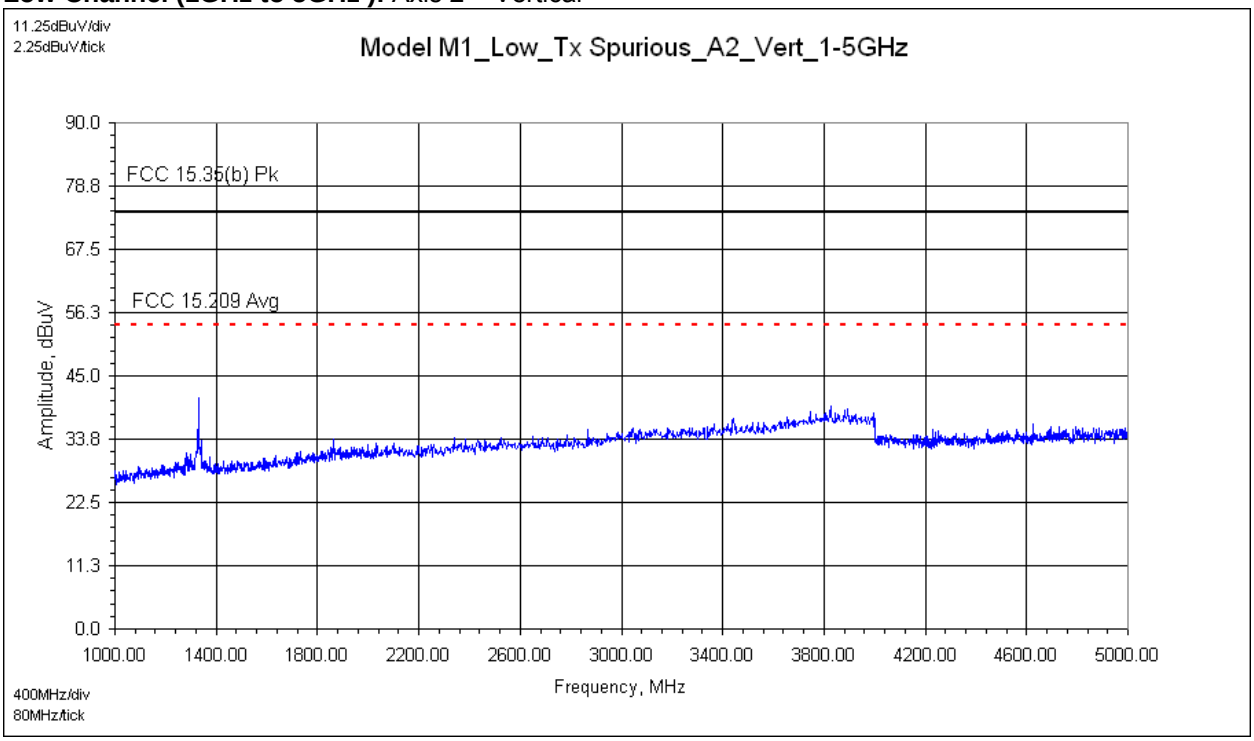


High Channel (1GHz to 5GHz): Axis 1 – Horizontal

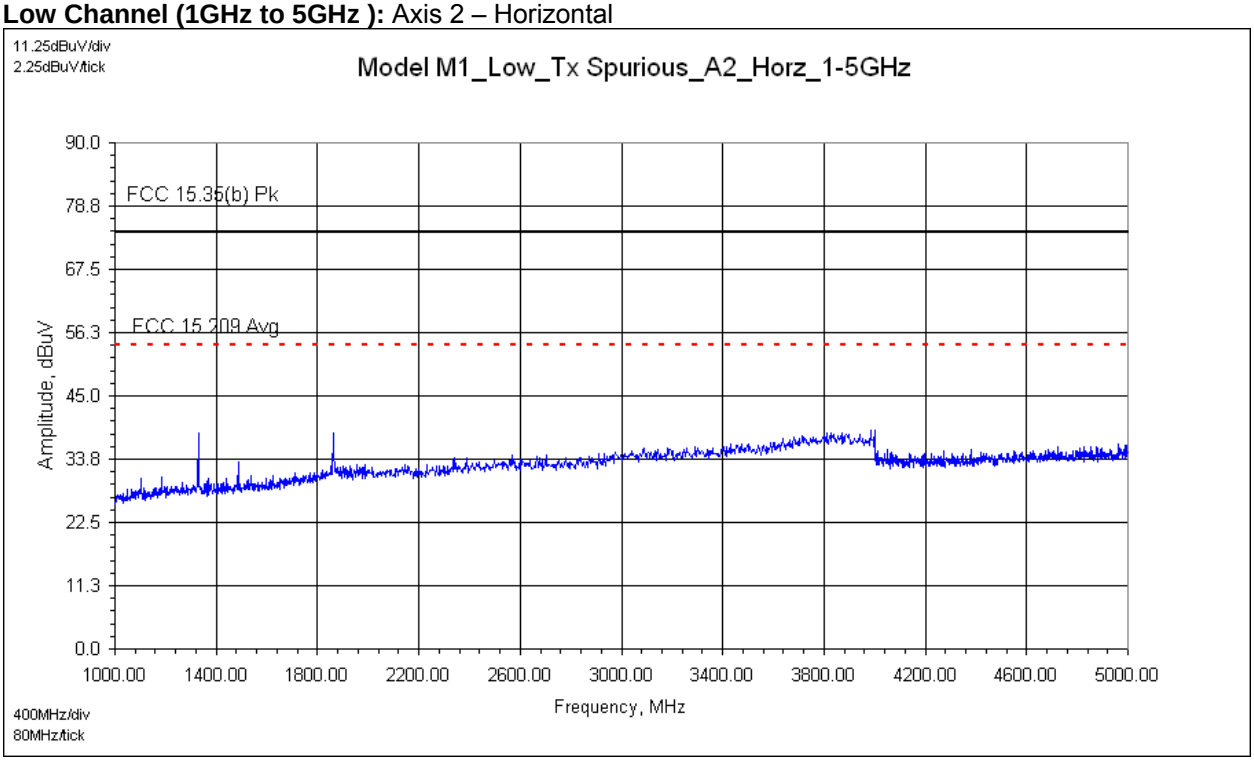


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Low Channel (1GHz to 5GHz): Axis 2 – Vertical

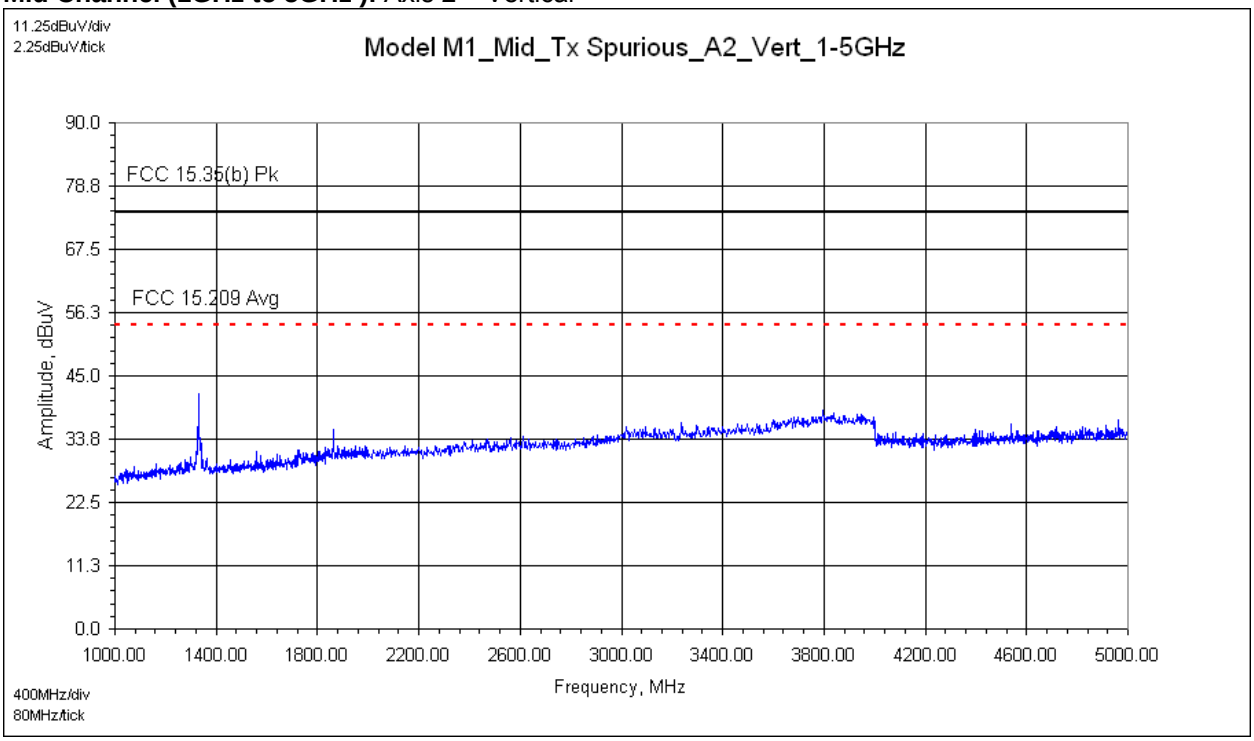


Low Channel (1GHz to 5GHz): Axis 2 – Horizontal

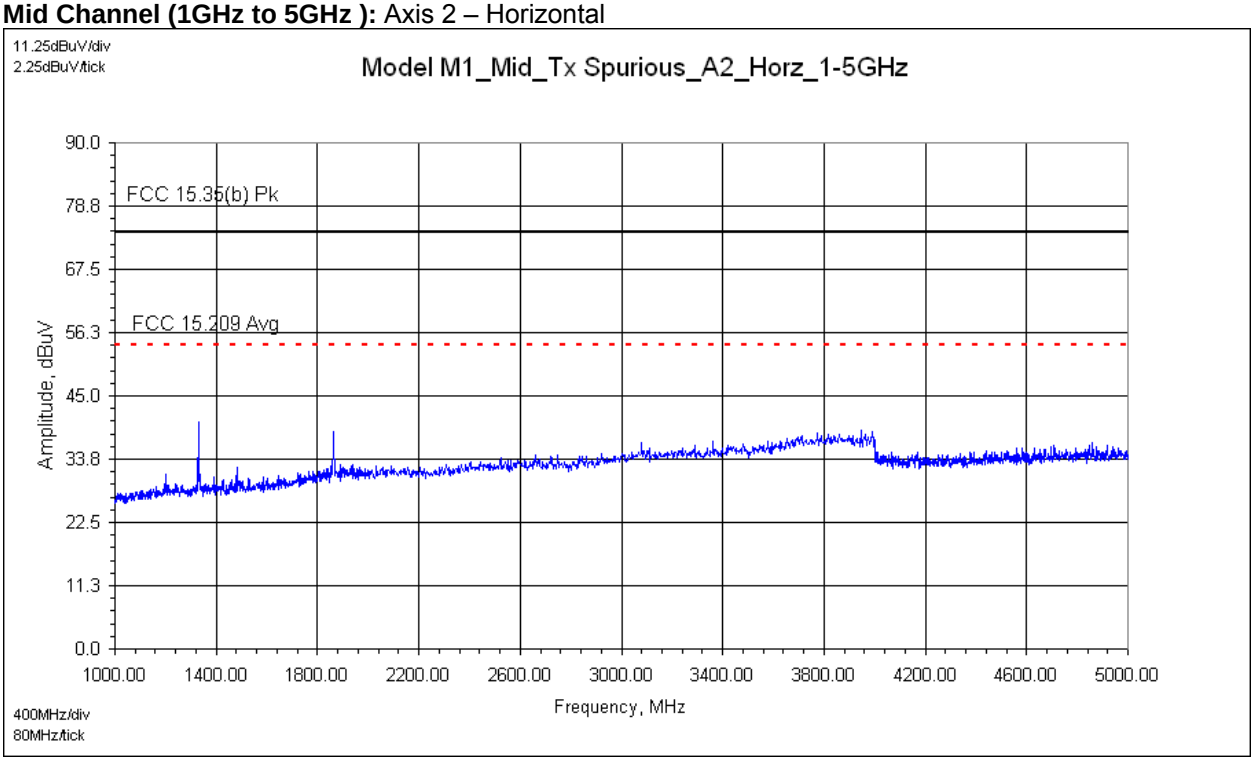


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Mid Channel (1GHz to 5GHz): Axis 2 – Vertical

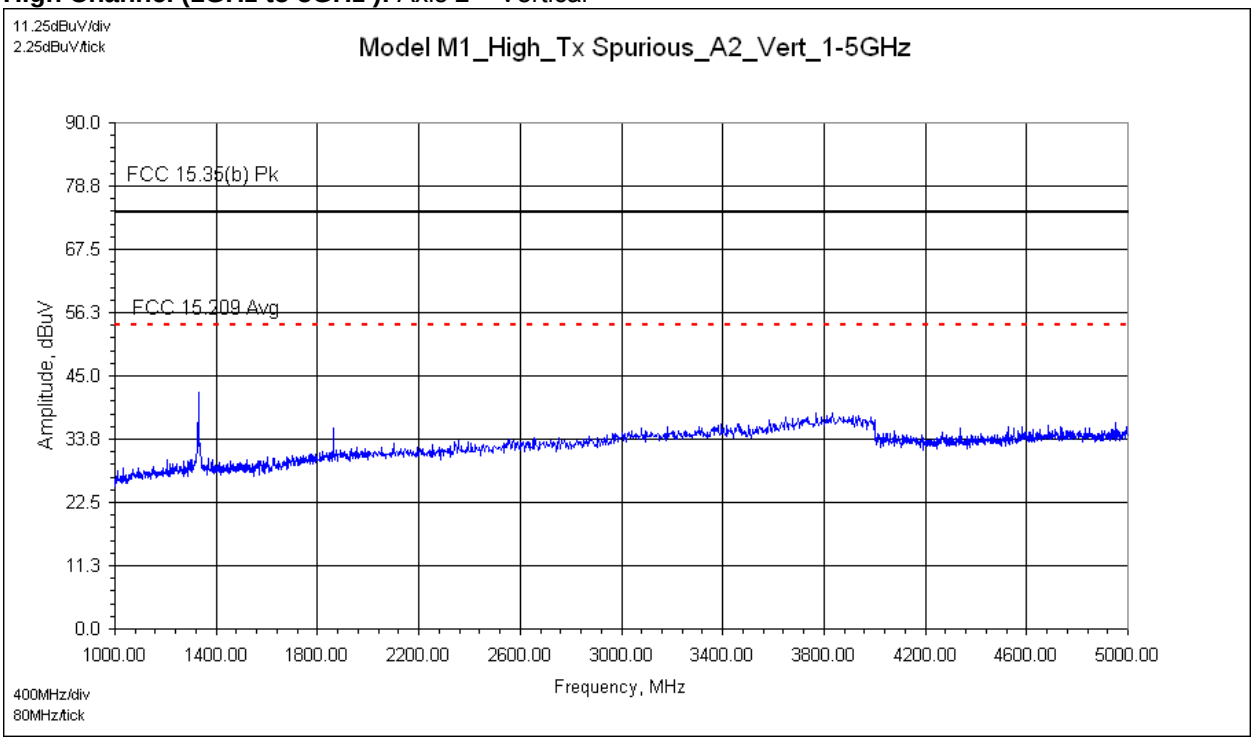


Mid Channel (1GHz to 5GHz): Axis 2 – Horizontal

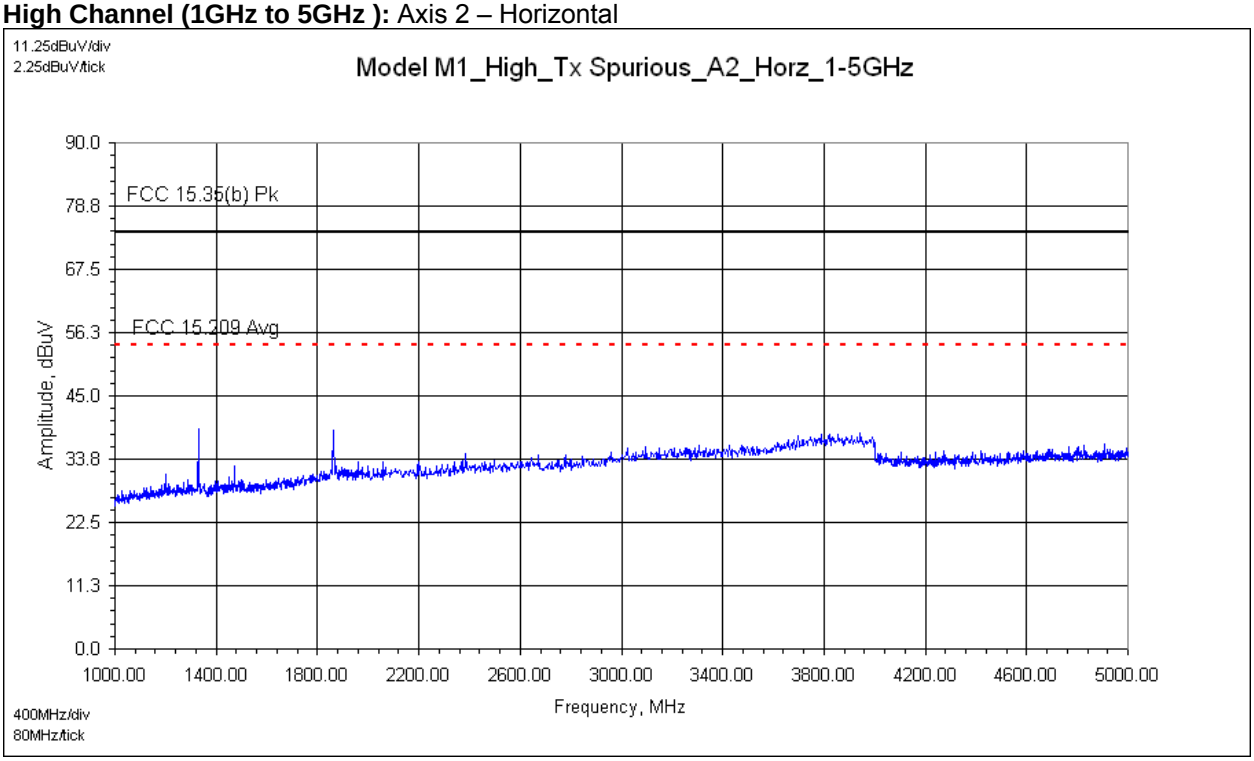


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

High Channel (1GHz to 5GHz): Axis 2 – Vertical

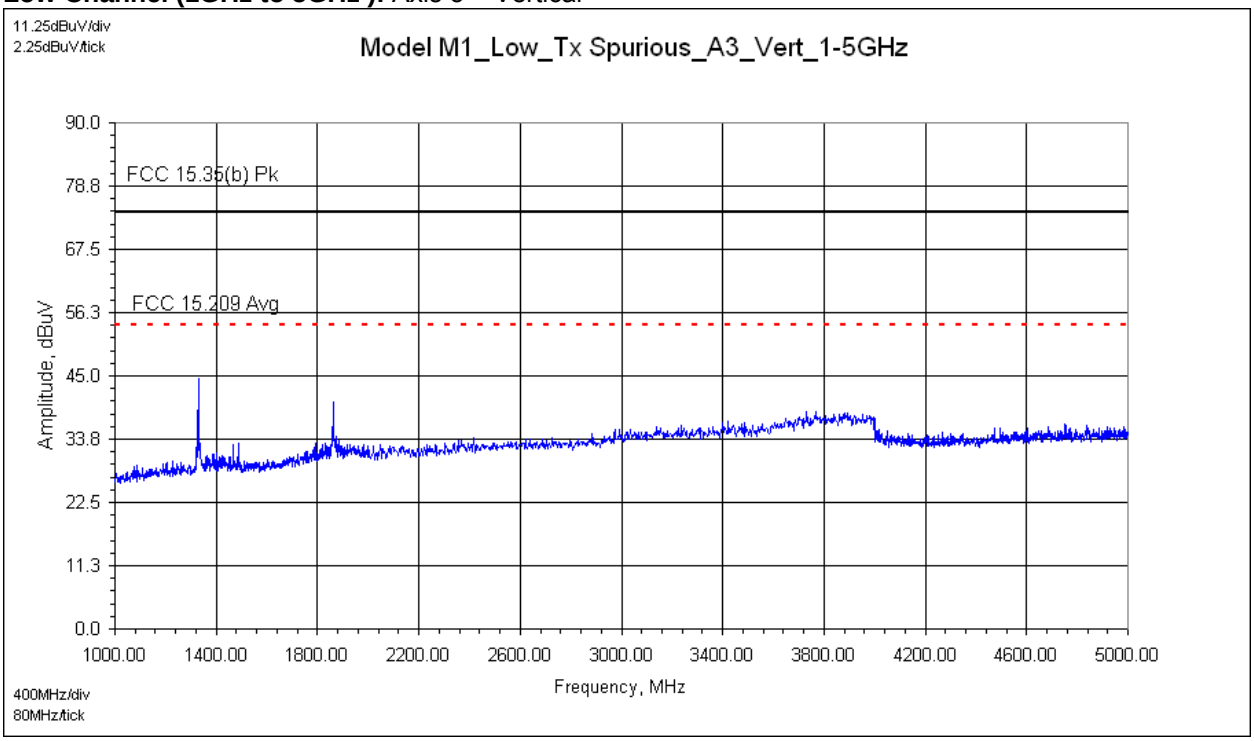


High Channel (1GHz to 5GHz): Axis 2 – Horizontal

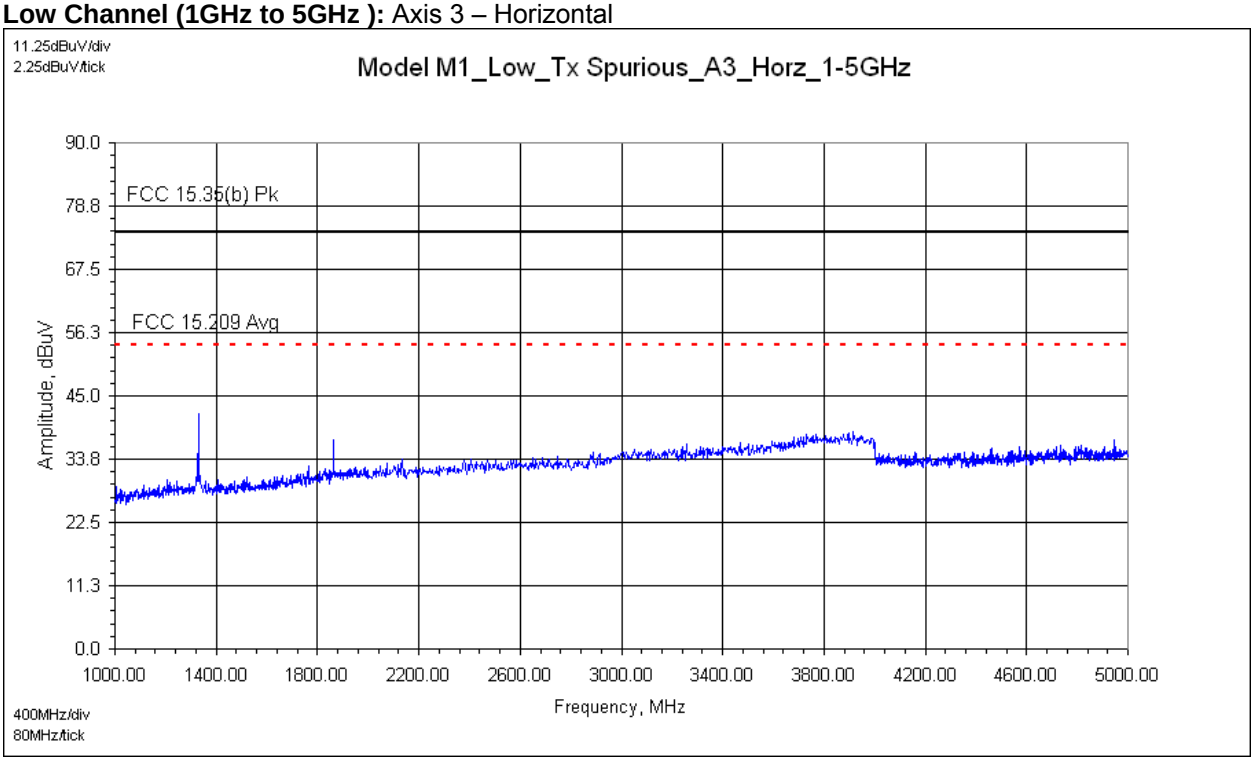


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Low Channel (1GHz to 5GHz): Axis 3 – Vertical

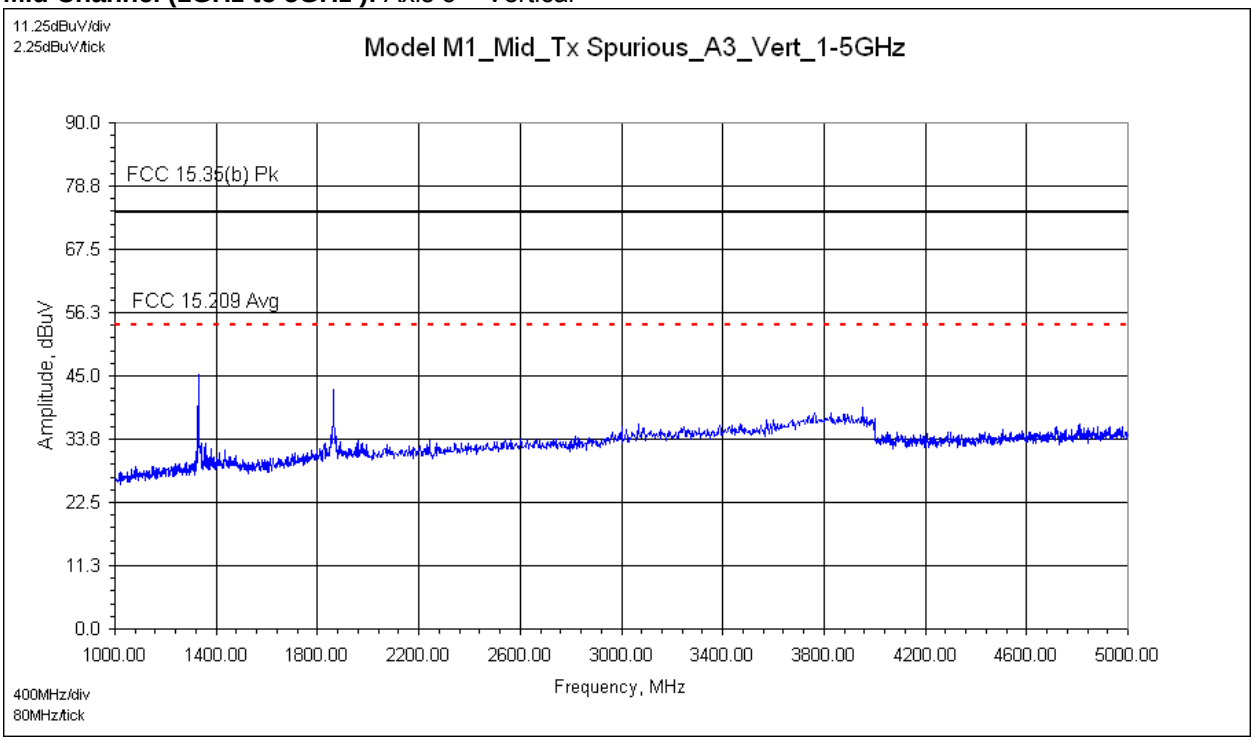


Low Channel (1GHz to 5GHz): Axis 3 – Horizontal

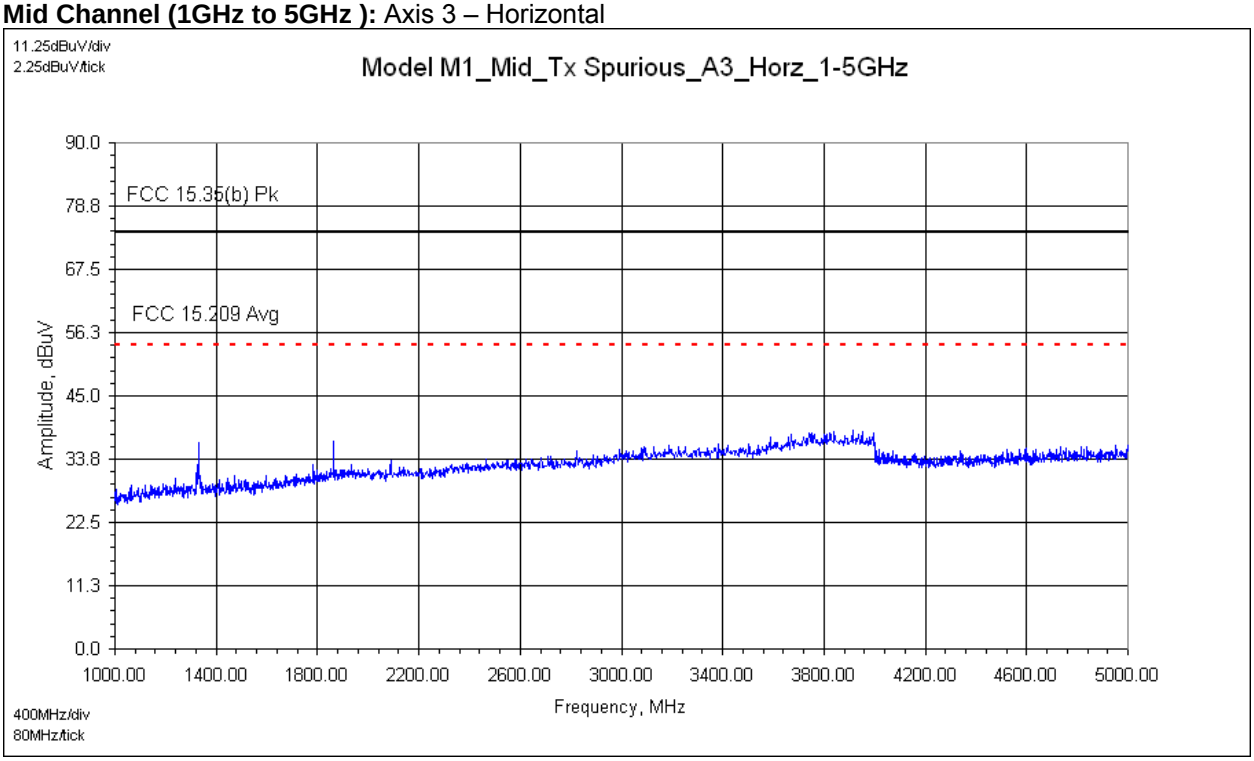


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

Mid Channel (1GHz to 5GHz): Axis 3 – Vertical

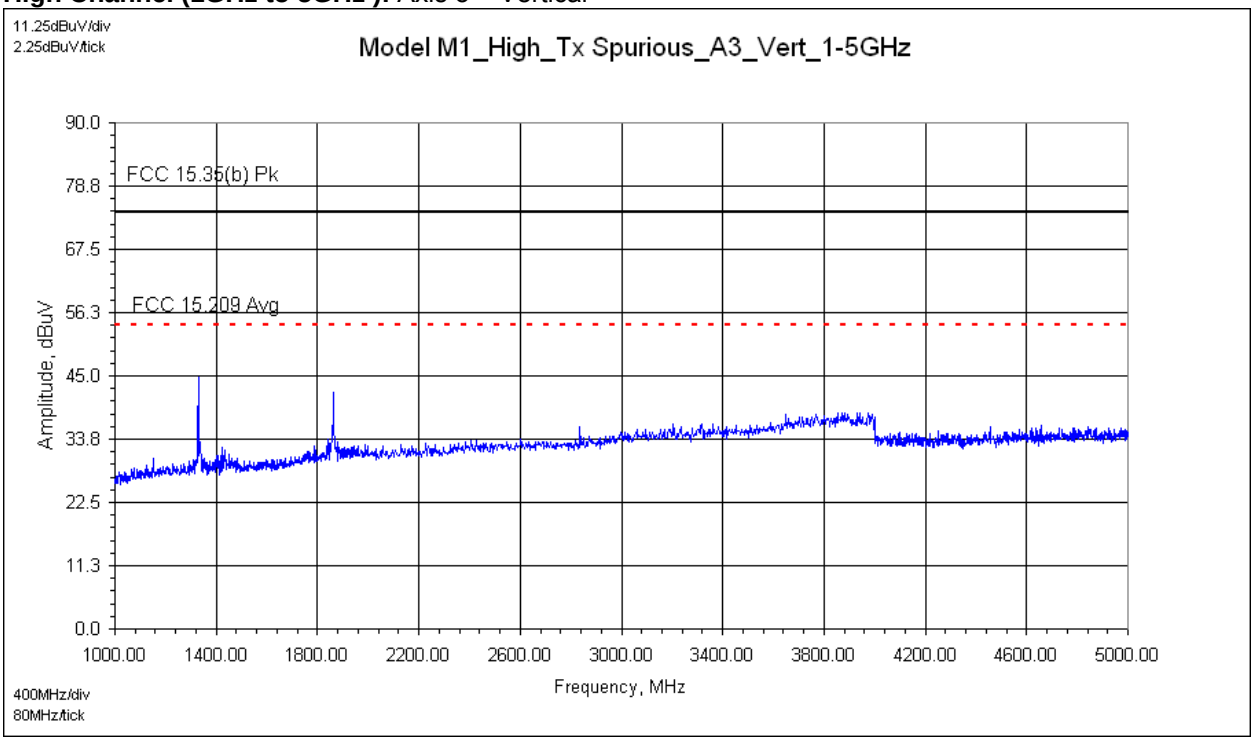


Mid Channel (1GHz to 5GHz): Axis 3 – Horizontal

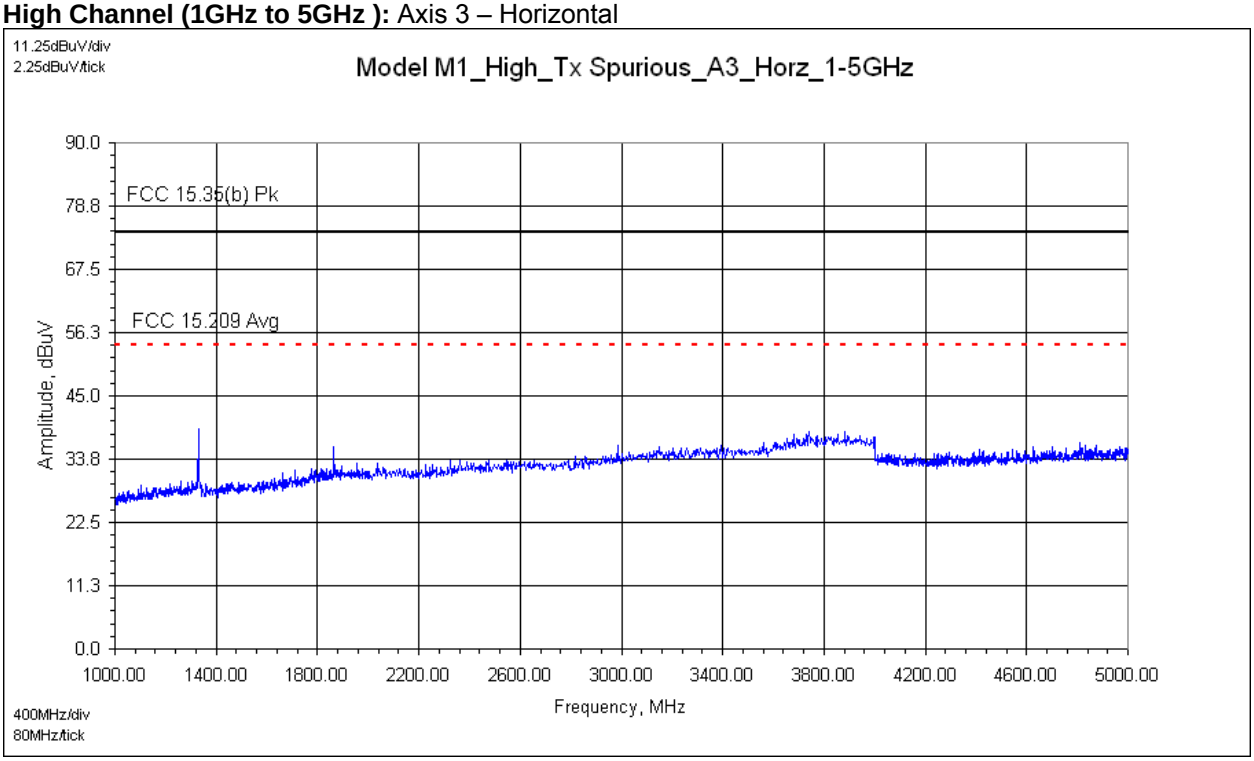


Plots: Radiated Field Strength – Spurious of the Fundamental (Out-of-Band Emissions)

High Channel (1GHz to 5GHz): Axis 3 – Vertical



High Channel (1GHz to 5GHz): Axis 3 – Horizontal



Test Data: Radiated Field Strength – Tx Spurious (Non-Restricted Band)

Tx Spurious (Non-Restricted Band) - Radiated Field Measurements

Test Report #:	**G101262612**	Test Area:	CC1 Radiated	Temperature:	22.2 °C
Test Method:	FCC 15.231(b)(1)(3)	Test Date:	18-Sep-2013	Relative Humidity:	27.3 %
EUT Model #:	M1	EUT Power:	120VAC/60Hz	Air Pressure:	83.0 kPa
EUT Serial #:	FCC1				
Manufacturer:	Revolv, Inc.				
EUT Description:	Revolv "Hub" – RF-Enabled Home Automation				
Notes :	Product transmitting continuously – C1101 #2 Radio active – FSK Modulated				
	Radio is a multi-channel: Lowest Channel 431.00MHz, Mid Channel 434.00MHz, Highest Channel 437.000MHz				
	All measurements peak detector – RBW > 6dB BW				

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

Part 15.231 (b) Table - Limit determined using Tx lowest channel – worst case (3-meter test distance)

FREQ	LEVEL	DET	CABLE	Antenna	PREAMP	FINAL	Duty Cycle CF	Duty Cycle Corrected	POL	HGT	AZ	LIMIT	DELTA LIMIT	RBW
MHz	duV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV/m]	- [dB]	Corrected Final = [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.231(b)	FCC 15.231(b)	(MHz)
Tx Spurious of the Fundamental Measurements – Radiated Field [dBuV/m]														
Tx Spurious 30MHz to 1000MHz: All Channels - Worst-Case Axis														
46.6506	40.67	**Qp**	0.77	9.61	28.25	22.79	0.00	22.79	V	1.00	134.0	60.46	- 37.67	0.120
70.4962	42.32	**Qp**	0.77	8.20	28.17	23.11	0.00	23.11	V	1.00	354.0	60.46	- 37.35	0.120
797.7237	37.94	**Qp**	1.97	21.11	28.13	32.89	0.00	32.89	H	1.90	338.0	60.46	- 27.57	0.120
Tx Spurious 1-5GHz: Mid Channel Axis 3 – Product Vertical & Rotated 90 degrees														
1861.5690	59.87	**Pk**	3.07	27.13	37.09	52.98	0.00	52.98	V	1.50	199.0	60.46	- 7.48	1.000
Tx Spurious 1-5GHz: High Channel Axis 3 – Product Vertical & rotated 90 degrees														
1861.5690	64.94	**Pk**	3.07	27.13	37.09	58.05	0.00	58.05	V	1.75	193.0	60.46	- 2.41	1.000
1861.5690	58.87	**Pk**	3.07	27.13	37.09	51.98	0.00	51.98	V	1.75	193.0	60.46	- 8.48	1.000

Notes:

1. Per 15.231(b)(3): The limits on the field strength of spurious emissions (non-restricted) are based upon the fundamental frequency of the intentional radiator. Spurious emissions should be attenuated to the limits shown in the table OR to the general limits in 15.209, whichever limit permits the higher field strength. Therefore, the limit used will be the lowest limit from the following:

   - Limit Low Channel: 60.46dBuV/m
   - Limit Mid Channel: 60.58 dBuV/m
   - Limit High Channel: 60.71 dBuV/m

Test Data: Radiated Field Strength – Tx Spurious (Restricted Band)

Tx Spurious (Restricted Band) - Radiated Field Measurements

Test Report #:	**G101262612**	Test Area:	CC1 Radiated	Temperature:	22.2 °C
Test Method:	FCC 15.205/209	Test Date:	18-Sep-2013	Relative Humidity:	27.3 %
EUT Model #:	M1	EUT Power:	120VAC/60Hz	Air Pressure:	83.0 kPa
EUT Serial #:	FCC1				
Manufacturer:	Revolv, Inc.				
EUT Description:	Revolv "Hub" – RF-Enabled Home Automation				
Notes :	Product transmitting continuously – C1101 #2 Radio active – FSK Modulated				
	Radio is a multi-channel: Lowest Channel 431.00MHz, Mid Channel 434.00MHz, Highest Channel 437.000MHz				
	All measurements peak detector – RBW > 6dB BW				

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

Part 15.209 (a) Table (3-meter test distance)

FREQ	LEVEL	DET	CABLE	Antenna	PREAMP	FINAL	Duty Cycle CF	Duty Cycle Corrected	POL	HGT	AZ	DELTA LIMIT	DELTA2 LIMIT	RBW
MHz	duV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV/m]	- [dB]	Corrected Final = [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.209 Qp	NA	(MHz)
Tx Spurious of the Fundamental Measurements – Radiated Field [dBuV/m]														
Tx Spurious 30MHz to 1000MHz: All Channels - Worst-Case Axis														
171.3742	46.08	**Qp**	0.88	12.06	27.71	31.31	0.00	31.31	V	1.00	300.0	- 12.21	NA	0.120
162.2300	43.29	**Qp**	0.85	12.62	27.76	29.01	0.00	29.01	V	1.00	114.0	- 14.51	NA	0.120

Part 15.209 (a) Limit: Average 500uV/m = 54 dBuV/m / Peak 74 dBuV/m (3-meter test distance)

FREQ	LEVEL	DET	CABLE	Antenna	PREAMP	FINAL	Duty Cycle CF	Duty Cycle Corrected	POL	HGT	AZ	DELTA LIMIT	DELTA2 LIMIT	RBW
MHz	duV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV/m]	- [dB]	Corrected Final = [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.209 Average 54dBuV/m	FCC 15.35(b) Peak 74dBuV/m	(MHz)
Tx Spurious 1-5GHz: Low Channel Axis 1 – Product Flat on Table														
1330.4282	44.96	**Av**	2.56	25.21	36.87	35.87	0.00	35.87	V	1.33	139.0	- 18.13	NA	1.000
1330.4282	54.57	**Pk**	2.56	25.21	36.87	45.48	0.00	45.48	V	1.33	139.0	NA	- 28.52	1.000
1330.5580	48.61	**Av**	2.56	25.21	36.87	39.52	0.00	39.52	H	1.39	358.0	- 14.48	NA	1.000
1330.5580	66.66	**Pk**	2.56	25.21	36.87	57.57	0.00	57.57	H	1.39	358.0	NA	- 16.43	1.000
Tx Spurious 1-5GHz: Low Channel Axis 3 – Product Vertical & rotated 90 degrees														
1329.9280	48.11	**Av**	2.56	25.21	36.87	39.02	0.00	39.02	H	1.72	52.0	- 14.98	NA	1.000
1329.9280	56.71	**Pk**	2.56	25.21	36.87	47.62	0.00	47.62	H	1.72	52.0	NA	- 26.38	1.000
1330.1280	52.99	**Av**	2.56	25.21	36.87	43.90	0.00	43.90	V	1.72	201.0	- 10.10	NA	1.000
1330.1280	67.40	**Pk**	2.56	25.21	36.87	58.31	0.00	58.31	V	1.72	201.0	NA	- 15.69	1.000
Tx Spurious 1-5GHz: Mid Channel Axis 3 - Product Vertical & rotated 90 degrees														

1329.8780	54.03	Av	2.56	25.21	36.87	44.94	0.00	44.94	V	1.67	185.0	- 9.06	NA	1.000
1329.8780	50.11	Av	2.56	25.21	36.87	41.02	0.00	41.02	H	1.39	178.0	- 12.98	NA	1.000
1329.8780	69.01	Pk	2.56	25.21	36.87	59.92	0.00	59.92	V	1.67	185.0	NA	- 14.08	1.000
1329.8780	65.62	Pk	2.56	25.21	36.87	56.53	0.00	56.53	H	1.39	178.0	NA	- 17.47	1.000
Tx Spurious 1-5GHz: High Channel Axis 3 - Product Vertical & rotated 90 degrees														
1329.7780	53.77	Av	2.56	25.21	36.87	44.68	0.00	44.68	V	1.74	176.0	- 9.32	NA	1.000
1329.7780	66.70	Pk	2.56	25.21	36.87	57.61	0.00	57.61	V	1.74	176.0	NA	- 16.39	1.000

Tx Harmonics in Restricted Bands – Reference Only

fundamental	Harmonics									
MHz0	MHz1	MHz2	MHz3	MHz4	MHz5	MHz6	MHz7	MHz8	MHz9	MHz10
431	431.00	862.00	1293.00	1724.00	2155.00	2586.00	3017.00	3448.00	**3879.00**	**4310.00**
434	434.00	868.00	**1302.00**	1736.00	2170.00	2604.00	3038.00	3472.00	**3906.00**	**4340.00**
437	437.00	874.00	**1311.00**	1748.00	2185.00	2622.00	3059.00	3496.00	**3933.00**	**4370.00**

FCC Part 15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	[2]
13.36–13.41.			

11 Periodic Operation – Maximum Fundamental Emission Bandwidth Requirement

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231.

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

Test Requirement/Specification:

(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

- FCC 15.231(c)

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
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
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 3.0	VBU	VBU

Results:

The sample tested was found to comply.

Test Summary: Periodic Operation – Maximum Bandwidth Requirement

Fundamental	Periodic Operation – Maximum Bandwidth Requirement		
Frequency Range:	☒ 260-470MHz		
Low Frequency MHz	**Measured Bandwidth (kHz)**	**Limit 0.25% Center Frequency (kHz)**	**Margin (kHz)**
431.00	349.36	873.40	-524.04
Mid Frequency MHz			
434.00	352.56	881.40	-528.84
High Frequency MHz			
437.00	349.36	873.40	-524.04

Test Method:

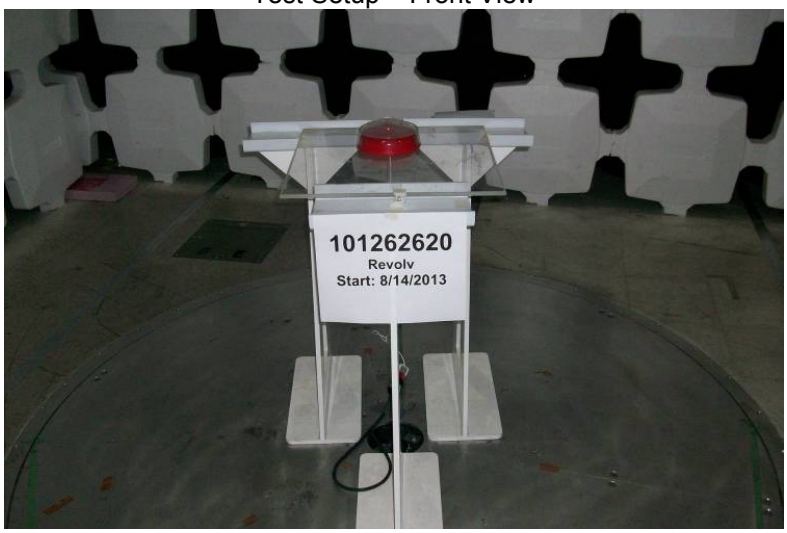
- ANSI C63.10:2009, Section 6.9

Notes:

1. All Fundamental measurements are radiated field - peak detector, max hold – 100kHz RBW.

Setup Photographs: Periodic Operation – Maximum Bandwidth requirement

Test Setup – Front View

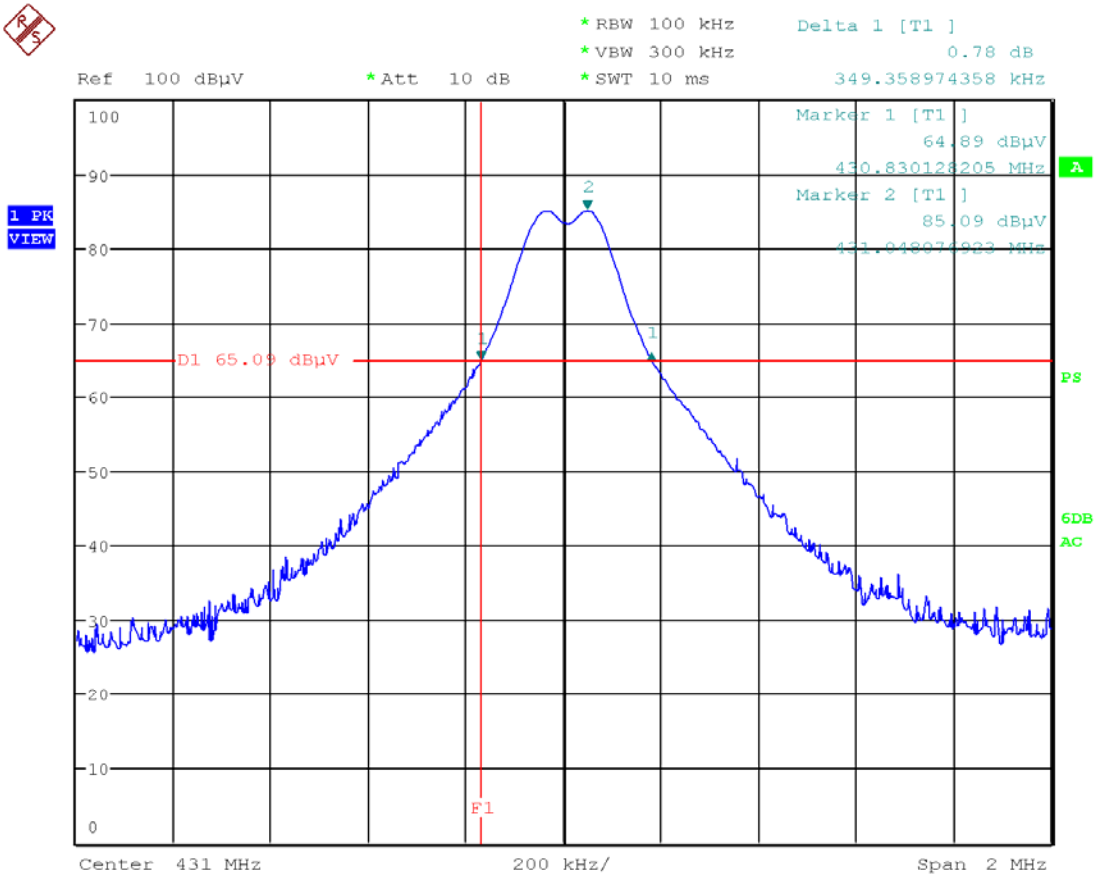


Test Setup – Rear View

Antenna – 30MHz to 1000MHz

Plots: Periodic Operation – Maximum Bandwidth Requirement

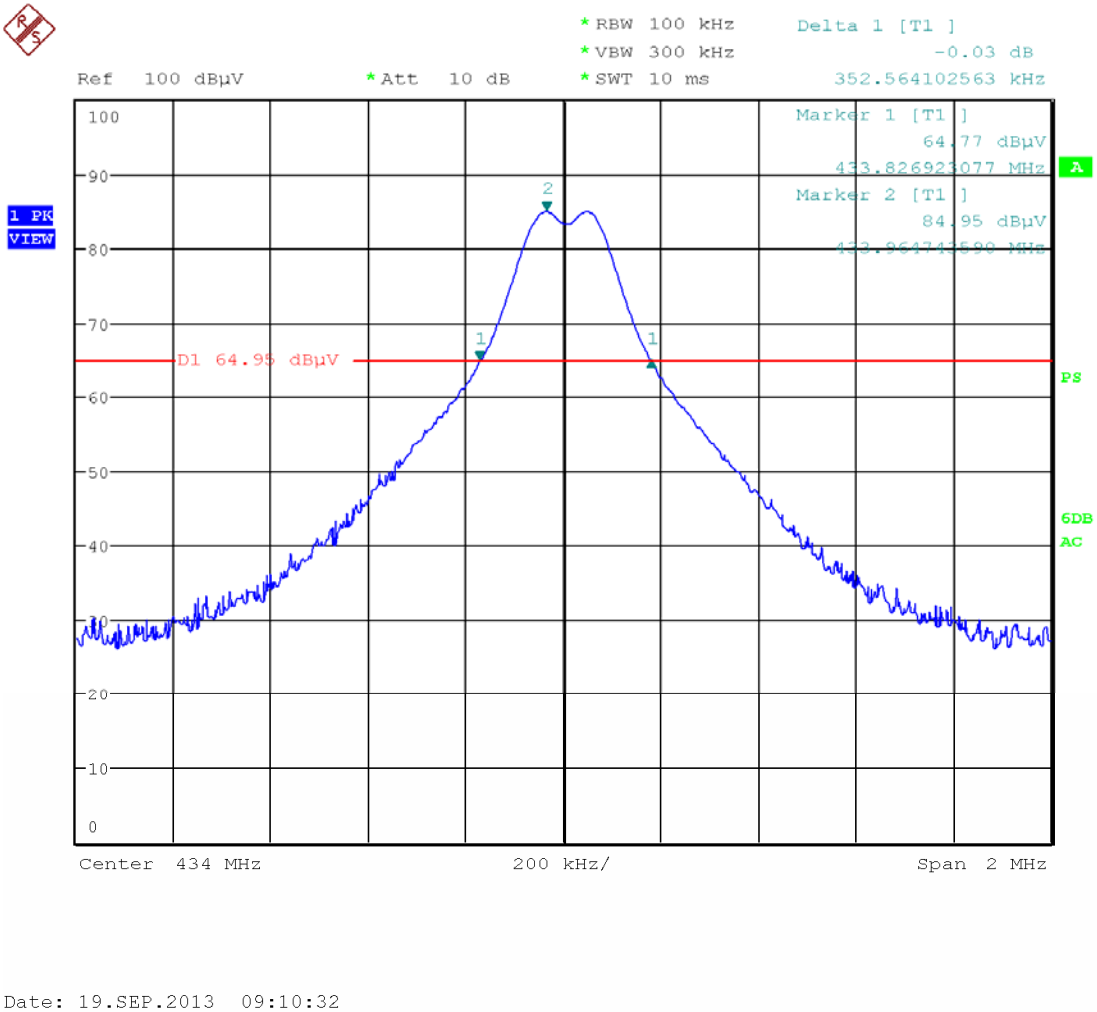
Low Channel



Date: 19.SEP.2013 09:04:34

Plots: Periodic Operation – Maximum Bandwidth Requirement

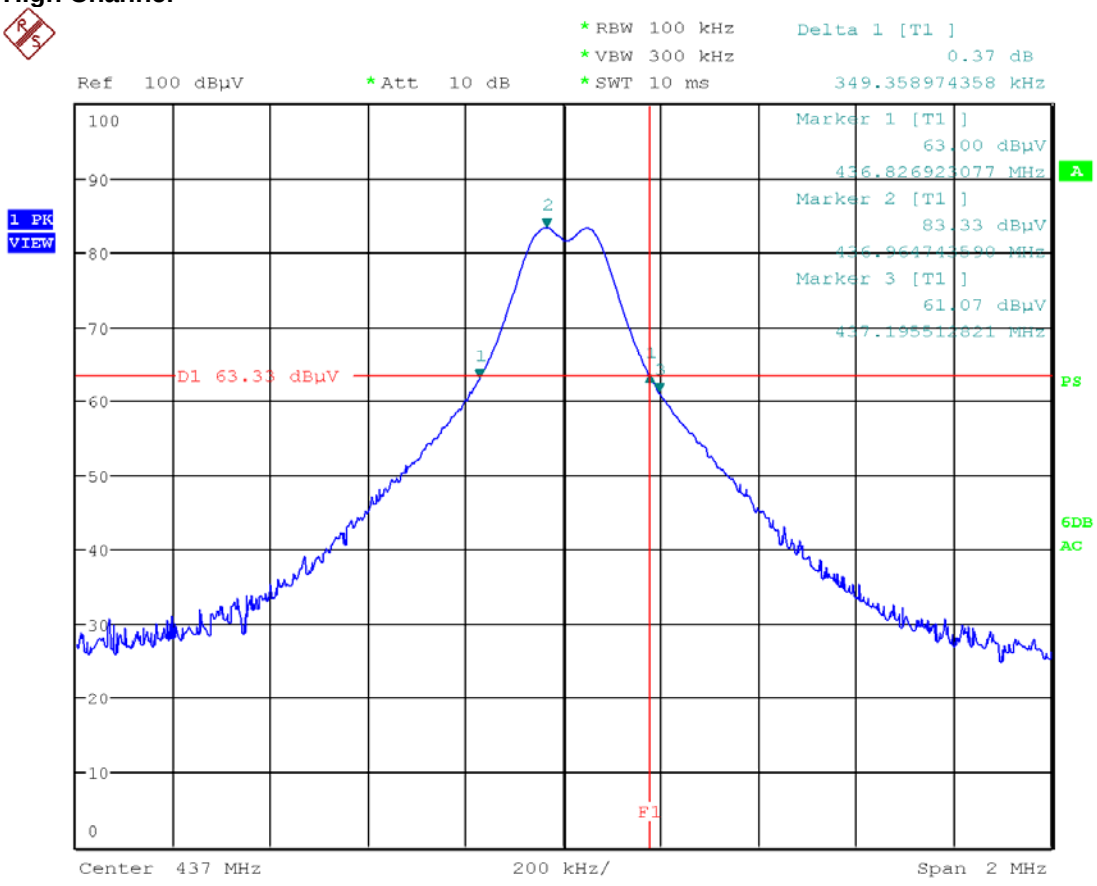
Mid Channel



Date: 19.SEP.2013 09:10:32

Plots: Periodic Operation – Maximum Bandwidth Requirement

High Channel



Date: 19.SEP.2013 09:17:28

12 Requirements for devices operating within the 40.66 – 40.70MHz band

Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.231(d).

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

Test Requirement/Specification

15.231(d) For devices operating within the frequency band 40.66-40.70 MHz, the bandwidth of the emission shall be confined within the band edges and the frequency tolerance of the carrier shall be ±0.01%. This frequency tolerance shall be maintained for a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

- FCC 15.231(d)

Results:

The product tested does not transmit at regular pre-determined intervals – therefore, this specification is not applicable.

13 Conditions of Periodic Operation (periodic transmits at pre-determined intervals)

Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC CFR47 15.231(e).

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

Test Requirement/Specification

15.231(e) Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500 [1]	50 to 150 [1]
174-260	1,500	150
260-470	1,500 to 5,000 [1]	150 to 500 [1]
Above 470	5,000	500

[1] Linear interpolations.

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

- FCC 15.231(e)

Results:

The product tested does not transmit at regular pre-determined intervals – therefore, this specification is not applicable.

14 Duty Cycle Correction Factor – Not Used

No duty cycle correction factor was utilized during this testing – therefore, product duty cycle verification was not applicable.

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:

Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

Determine the period of the pulse train, T, in mSec and record the results. T is defined as the time from the beginning of one pulse train to the beginning of the next pulse train.
Count the number of different types of pulses, N and record the results.
For each of the different types of pulses, count the number of occurrences within one pulse train.
Use the Duty Cycle Correction Factor, DCCF, from the results table and use it to adjust the field strength measurements recorded for radiated emissions.

- FCC 15.35(c)
- RSS-GEN, Clause 4.5

Test Equipment Used:

Results:

Not applicable

Test Method:

- ANSI C63.10: 2009, Clause 7.5

Test Summary:

Duty Cycle Measurements	

Plots:

Test Data:

Notes: None

15 Unintentional Radiated Emissions (Digital Part of Receiver)

Method:

Unless otherwise stated no deviations were made from FCC Part 15.109 – Class B.

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

Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/07/2013	06/07/2014
18906	RF Pre-Amp (1-4GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/10/2013	06/10/2014
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/15/2012	11/15/2013
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	03/19/2013	03/19/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 3.0	VBU	VBU

Test Requirement:

The product must pass Unintentional Radiated Emissions – Class B.
Unwanted emissions below 1GHz must comply with the general field strength limits defined in FCC Part 15.109, when measured with a quasi-peak detector. Unwanted emissions above 1GHz are measured with an average detector.

Test Procedure:

The Resolution Bandwidth is 120 kHz for frequencies 30 MHz -1000 MHz and 1 MHz for frequencies above 1000 MHz.

The EUT is placed on a plastic turntable that is 80 cm in height. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables are manipulated to produce worst-case emissions. The signal is maximized by rotating the turntable through a 360º rotation. The antenna height is varied from 1-4 meters. Both vertical and horizontal antenna configurations are utilized in the testing.

Radiated emissions are taken at 3-meter antenna-to-product test distance for all measurements.

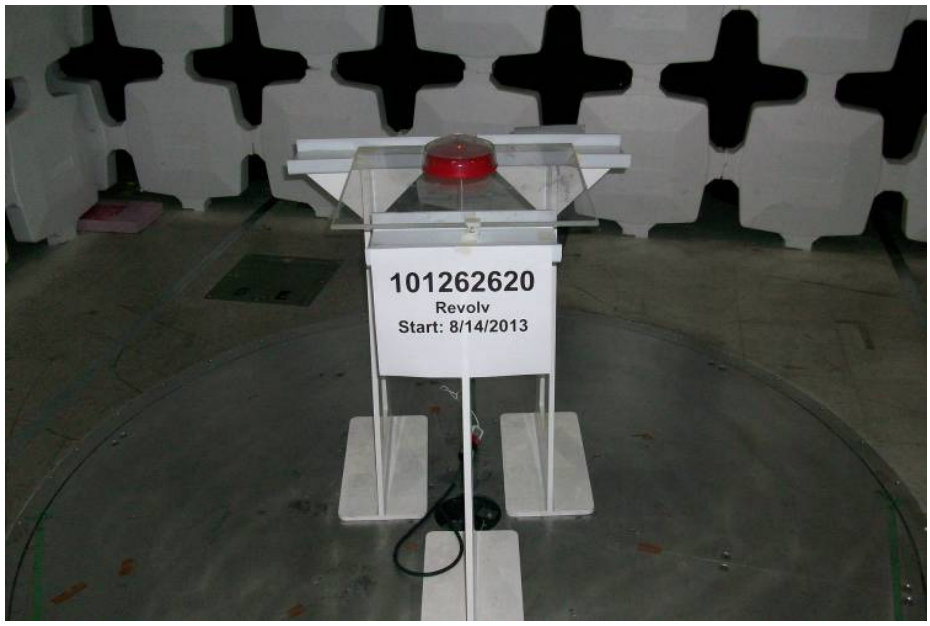
Data is included for the worst-case configuration (the configuration which resulted in the highest emission levels).

Test Results:

The sample tested was found to Comply.

Setup Photographs: Product Axis 1 – Horizontal Position (Product Flat on Table)

Unintentional Radiated Emissions - Test setup (Front View)

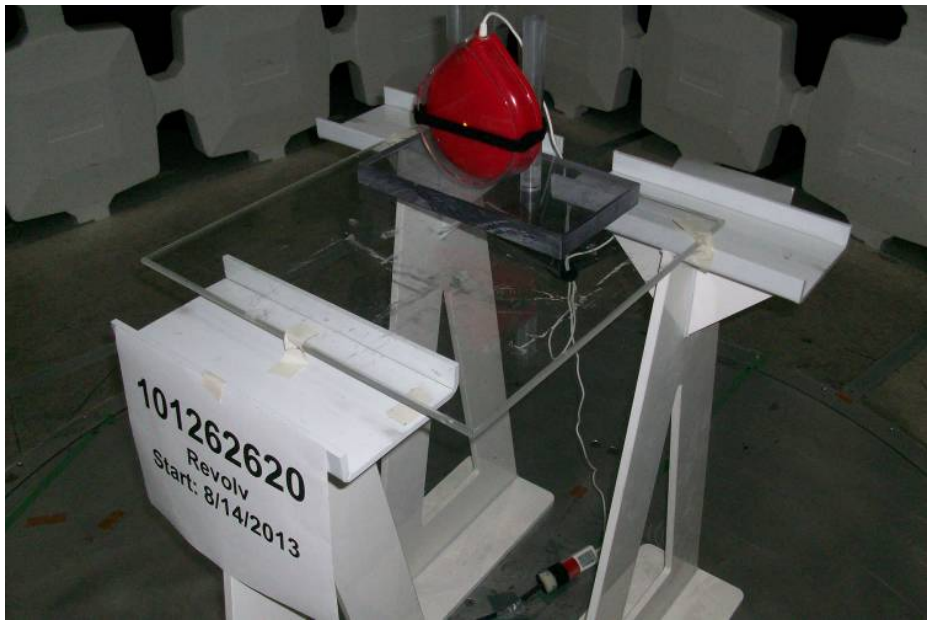


Setup Photographs: Product Axis 1 – Horizontal Position (Product Flat on Table)

Unintentional Radiated Emissions - Test setup (Rear View)

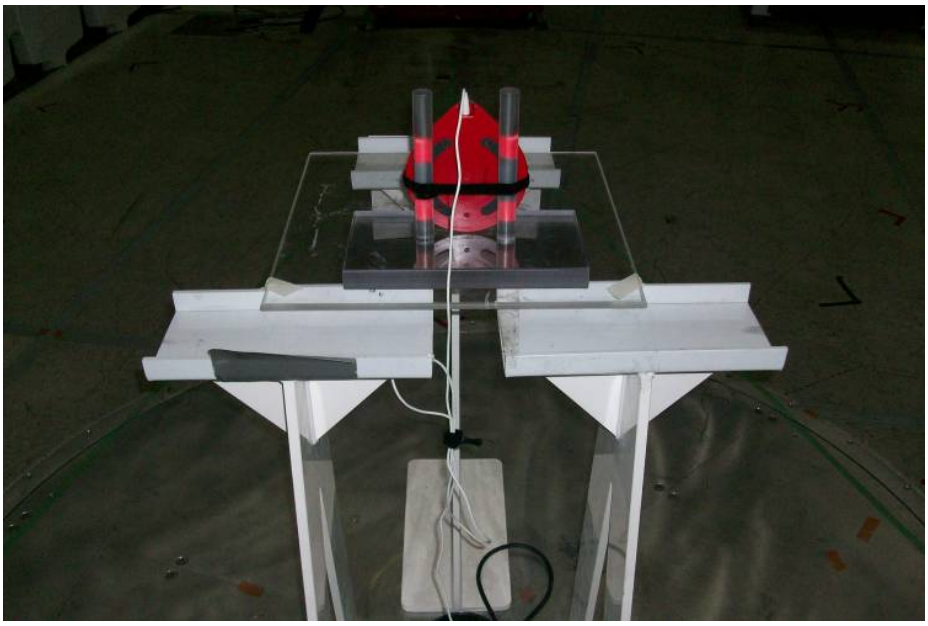
Setup Photographs: Product Axis 2 – Product Vertical on Table (Wall Mount)

Unintentional Radiated Emissions - Test setup (Front View)



Setup Photographs: Product Axis 2 – Product Vertical on Table (Wall Mount)

Unintentional Radiated Emissions - Test setup (Rear View)

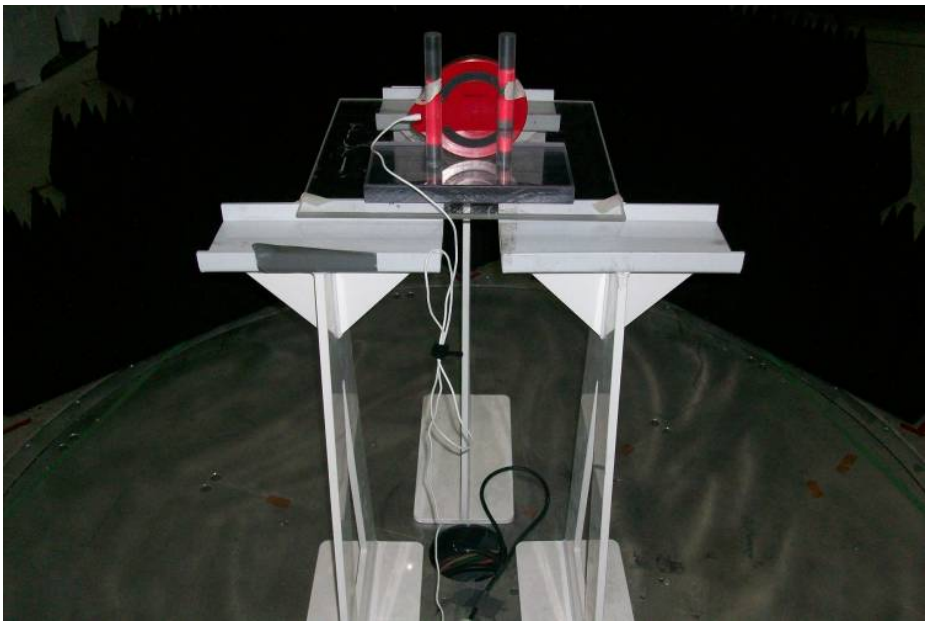


Setup Photographs: Product Axis 3 – Product Vertical & Rotated 90 Degrees

Unintentional Radiated Emissions - Test setup (Front View)

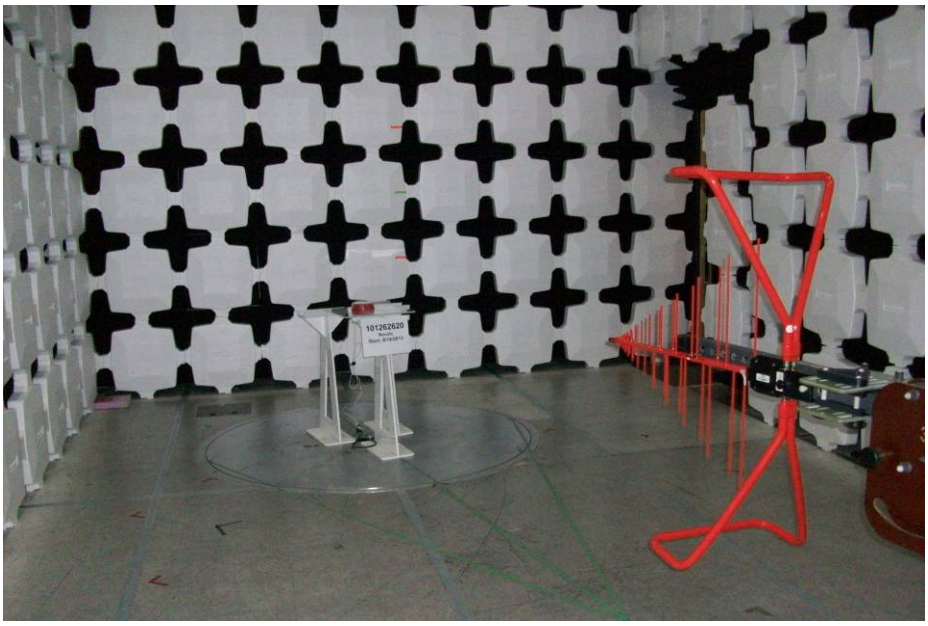
Setup Photographs: Product Axis 3 – Product Vertical & Rotated 90 Degrees

Unintentional Radiated Emissions - Test setup (Rear View)

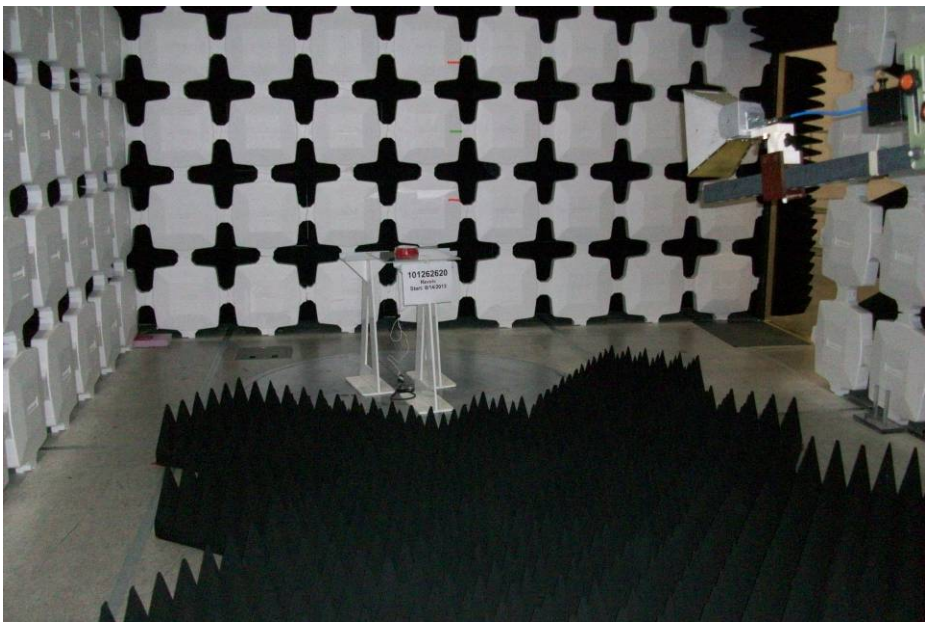


Setup Photographs: Antennas

Antenna Setup – 30MHz to 1000MHz



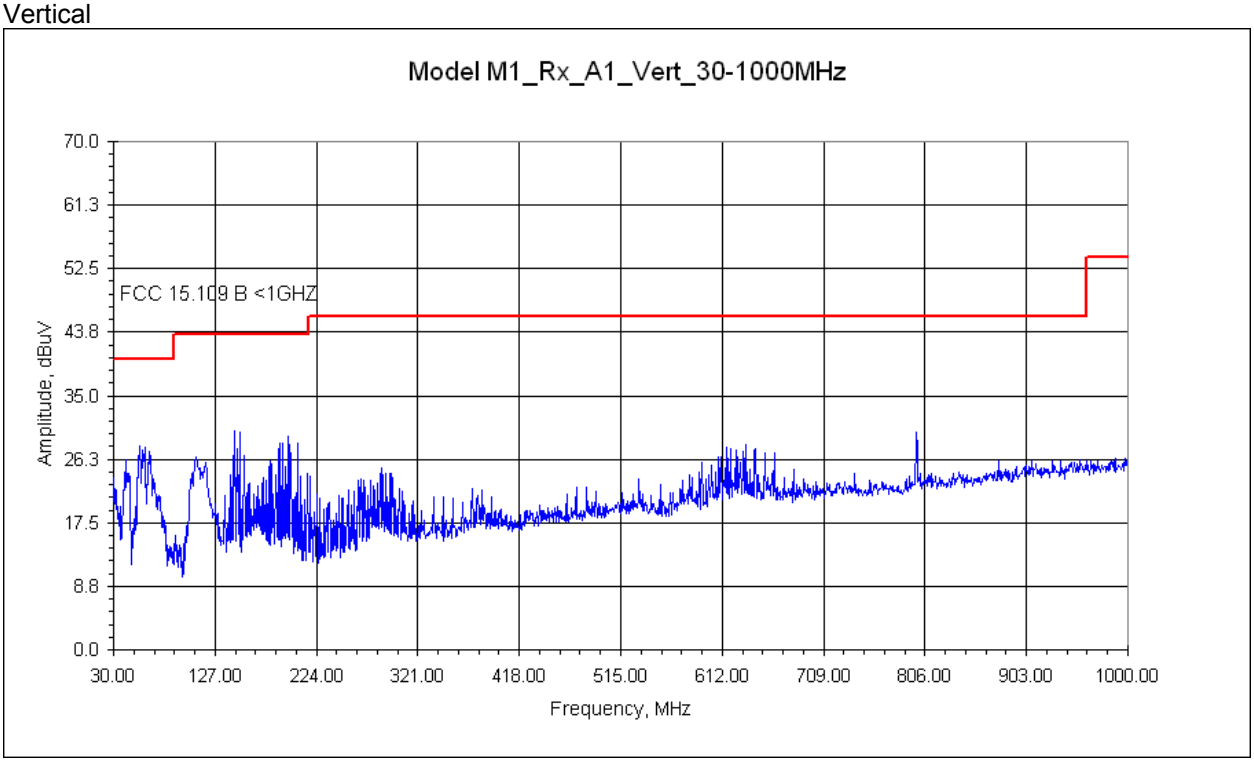
Antenna Setup – 1GHz to 2GHz



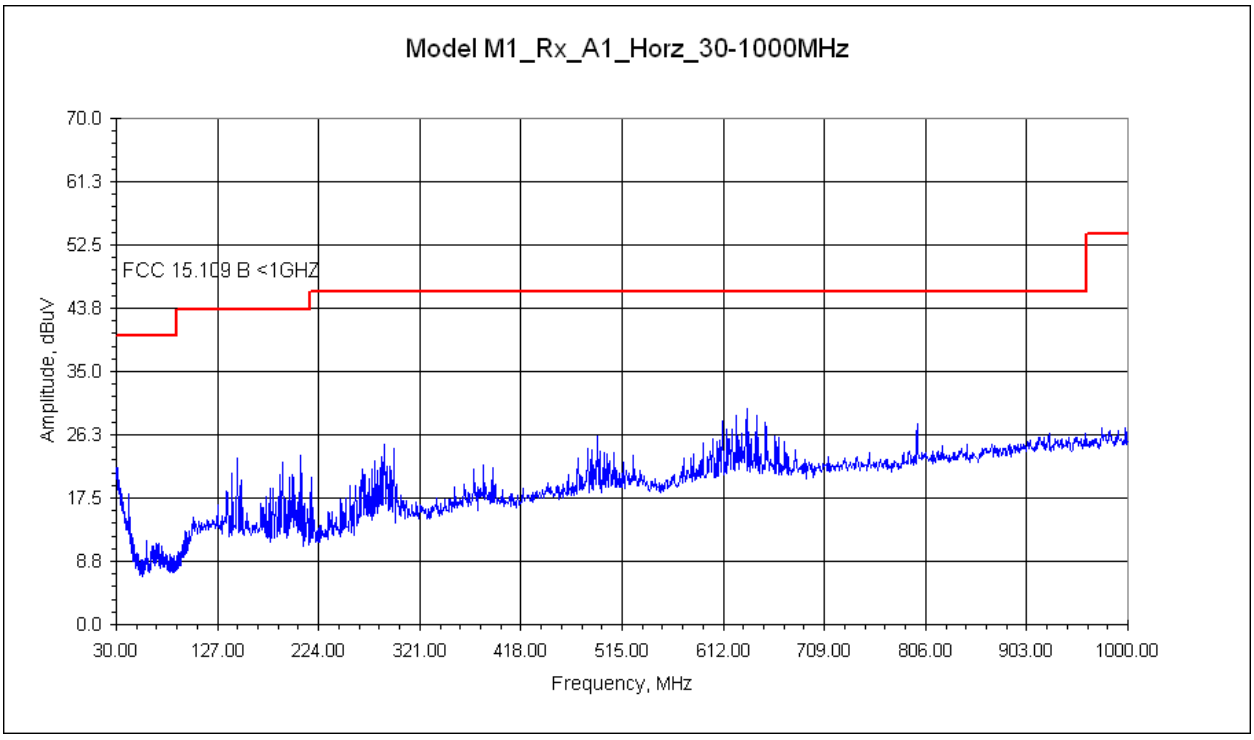
Pre-scan Plots: Product Axis 1 – Horizontal Position (Product Flat on Table)

30MHz to 1000MHz

Vertical



Horizontal

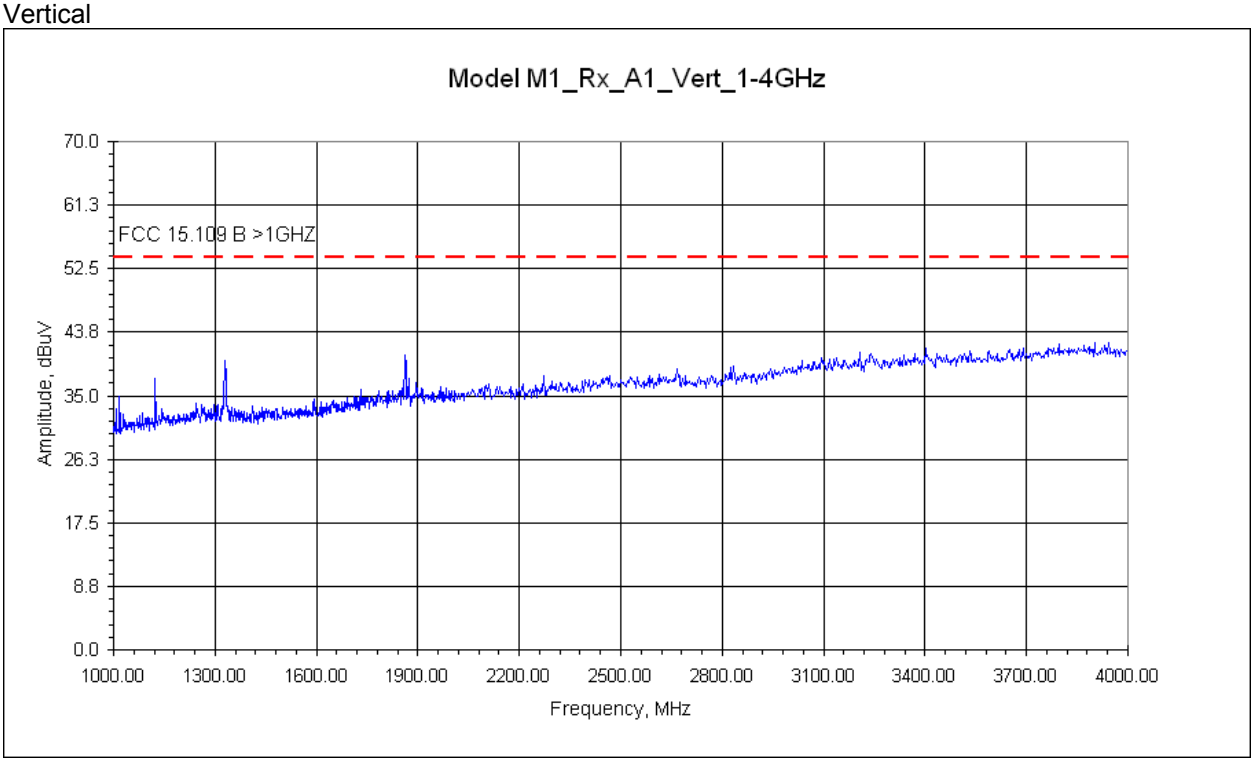


Reference only – to determine signals to be maximized

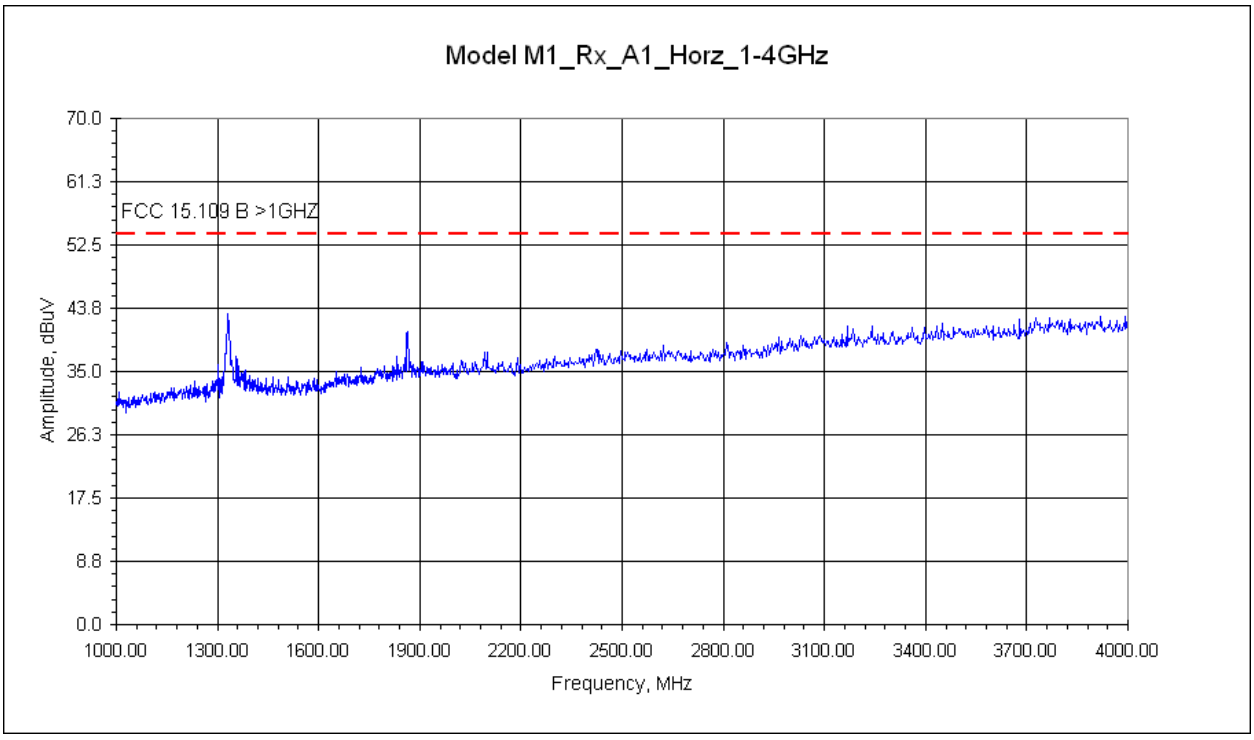
Pre-scan Plots: Product Axis 1 – Horizontal Position (Product Flat on Table)

1GHz to 4GHz

Vertical



Horizontal

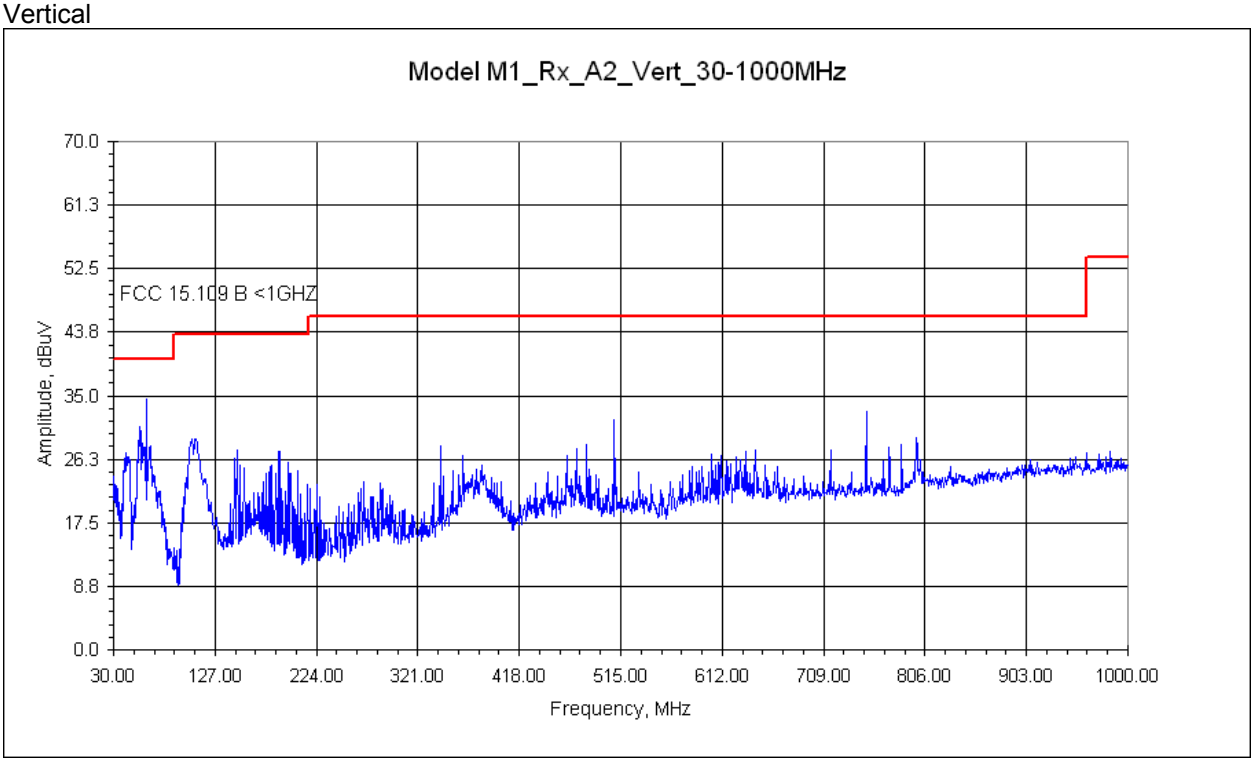


Reference only – to determine signals to be maximized

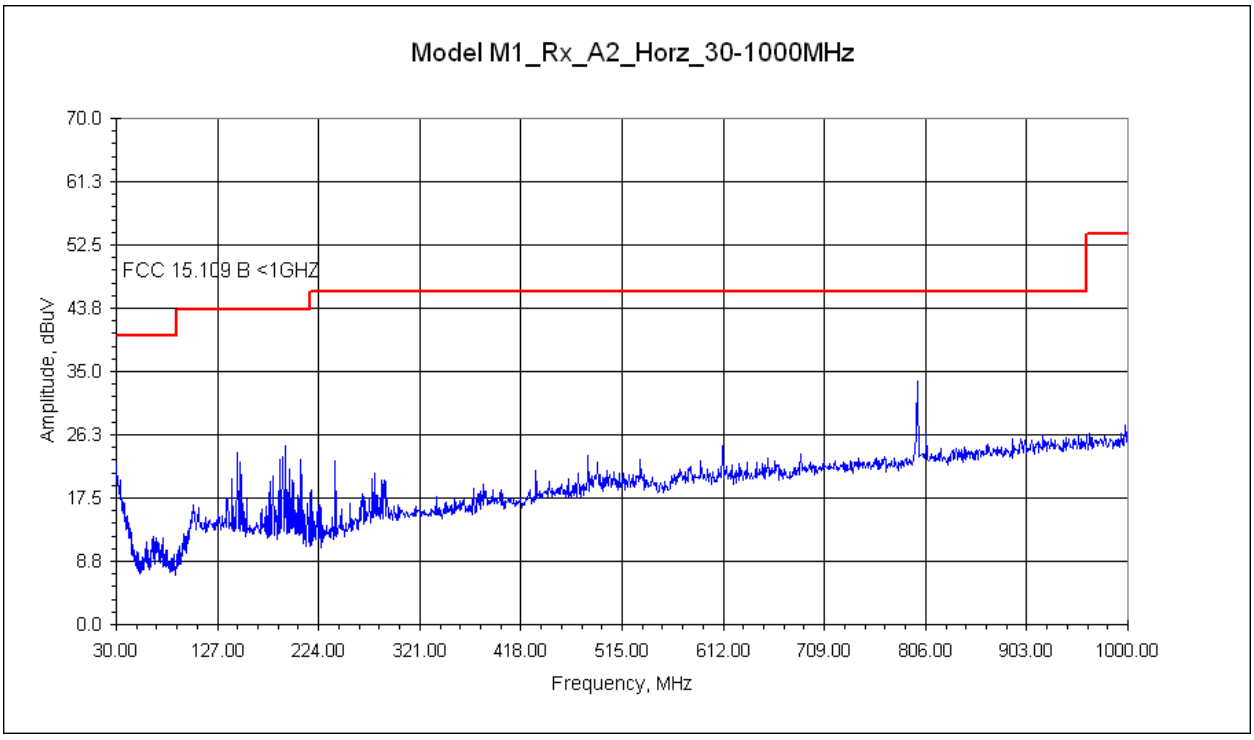
Pre-scan Plots: Product Axis 2 – Product Vertical on Table (Wall Mount)

30MHz to 1000MHz

Vertical



Horizontal

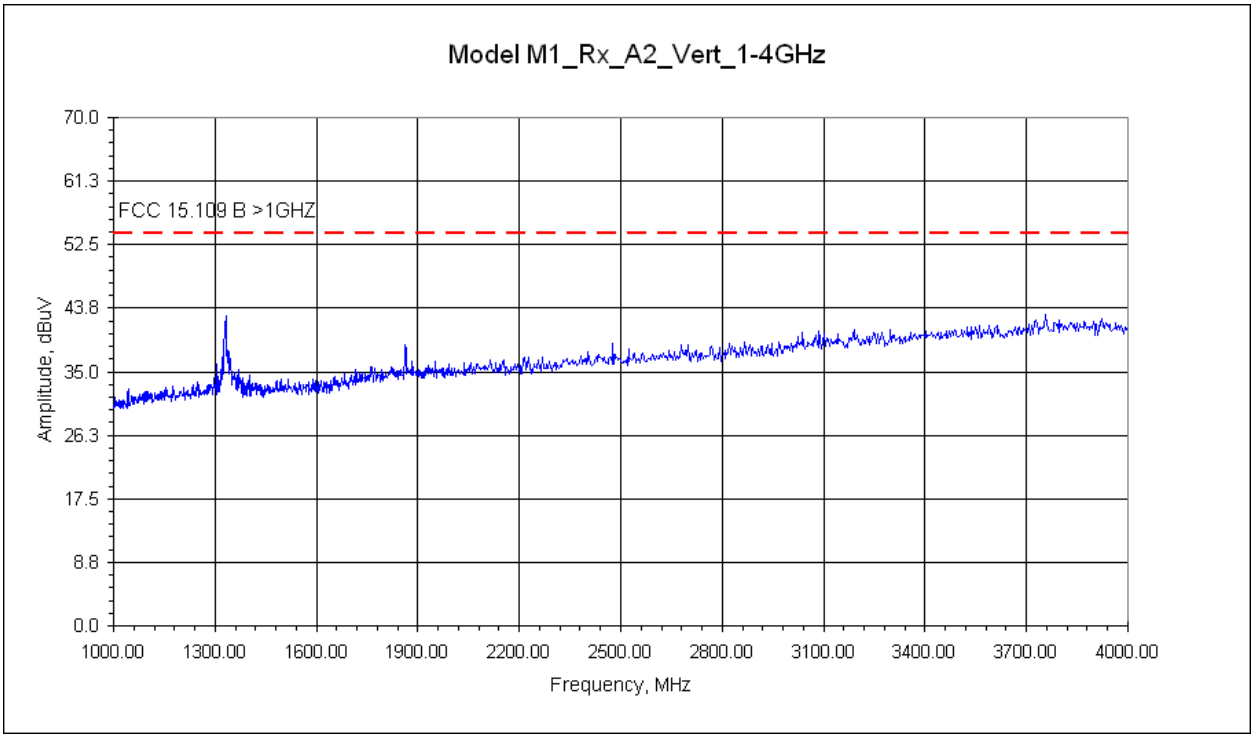


Reference only – to determine signals to be maximized

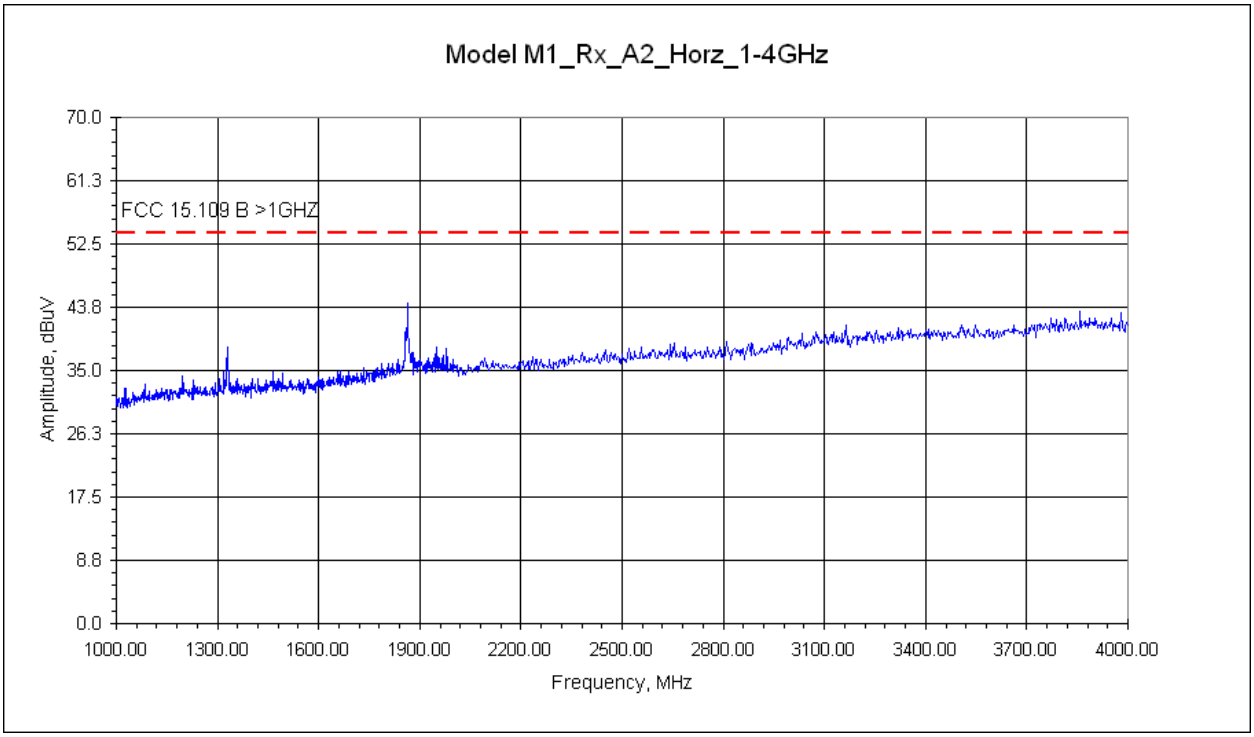
Pre-scan Plots: Product Axis 2 – Product Vertical on Table (Wall Mount)

1GHz to 4GHz

Vertical



Horizontal

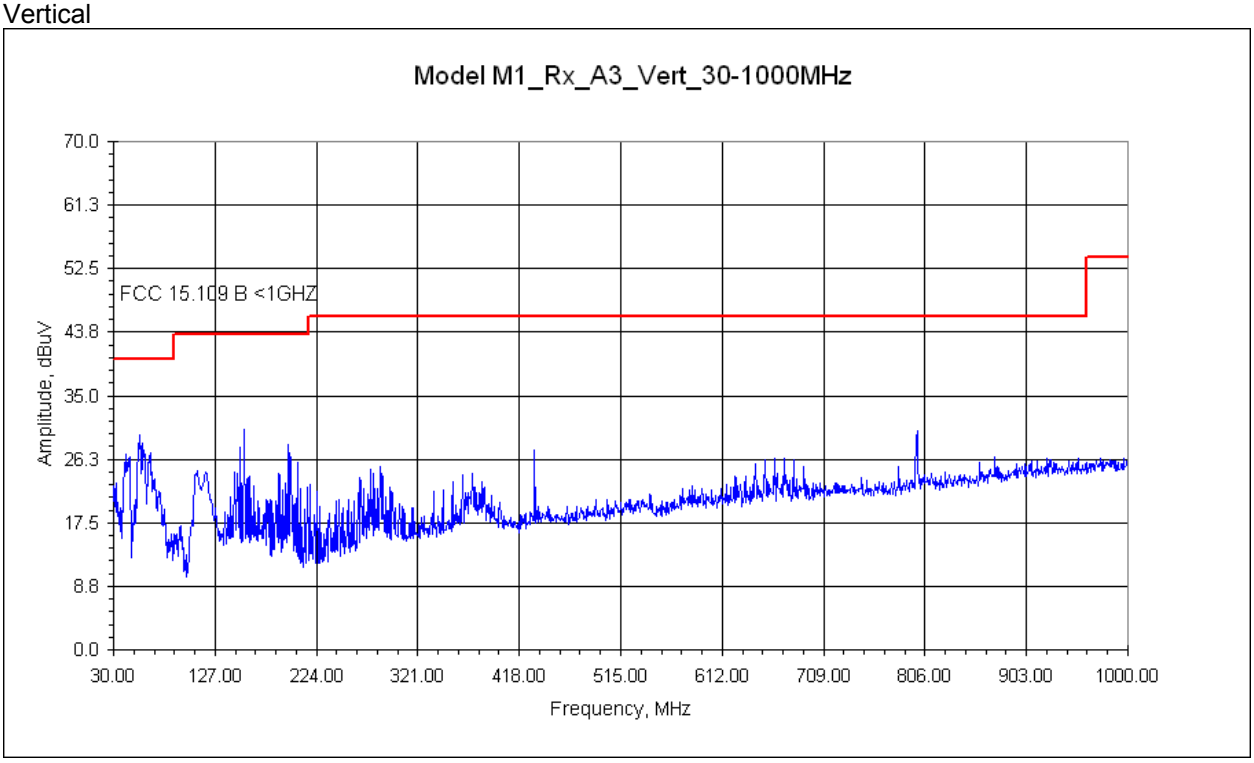


Reference only – to determine signals to be maximized

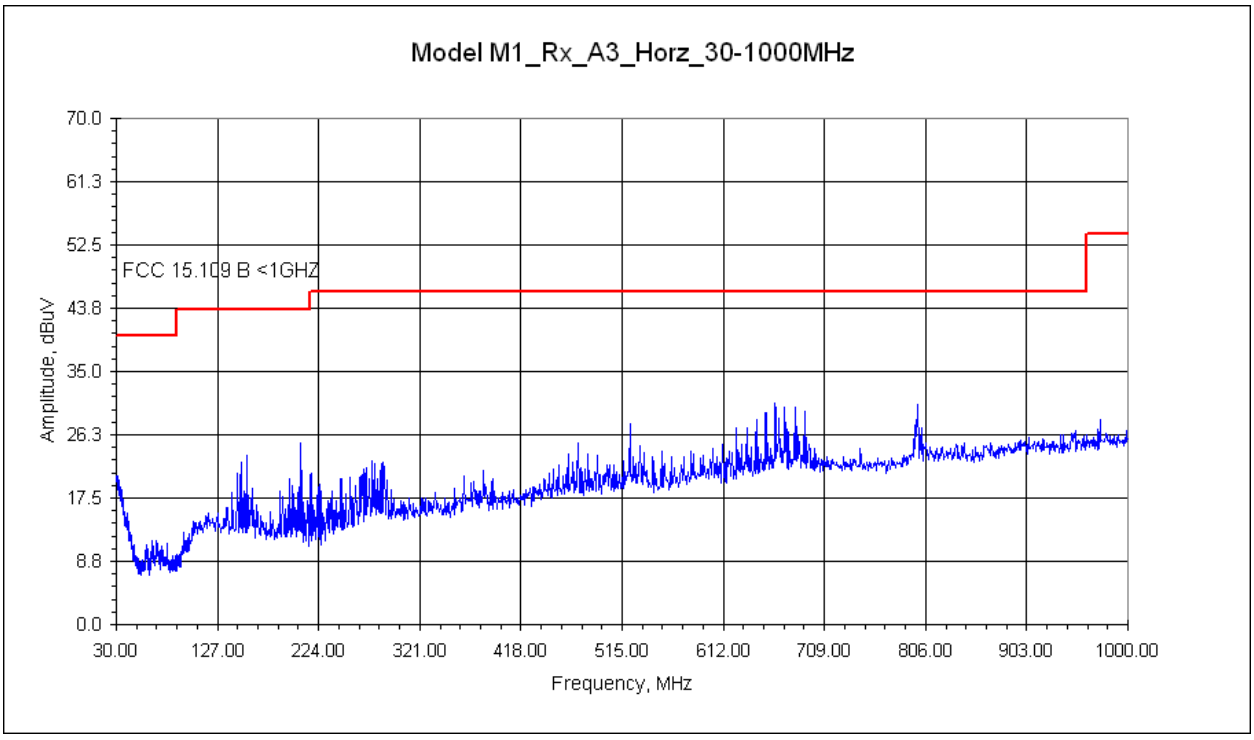
Pre-scan Plots: Product Axis 3 – Product Vertical & Rotated 90 Degrees

30MHz to 1000MHz

Vertical



Horizontal

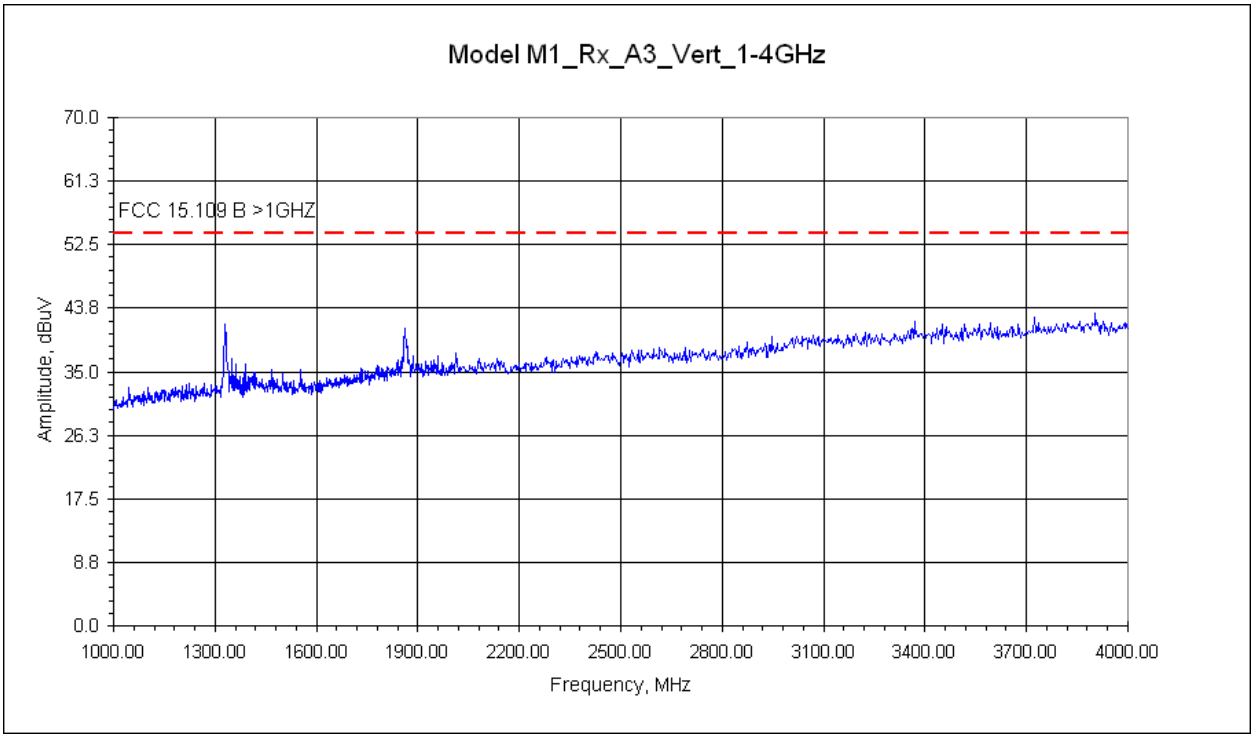


Reference only – to determine signals to be maximized

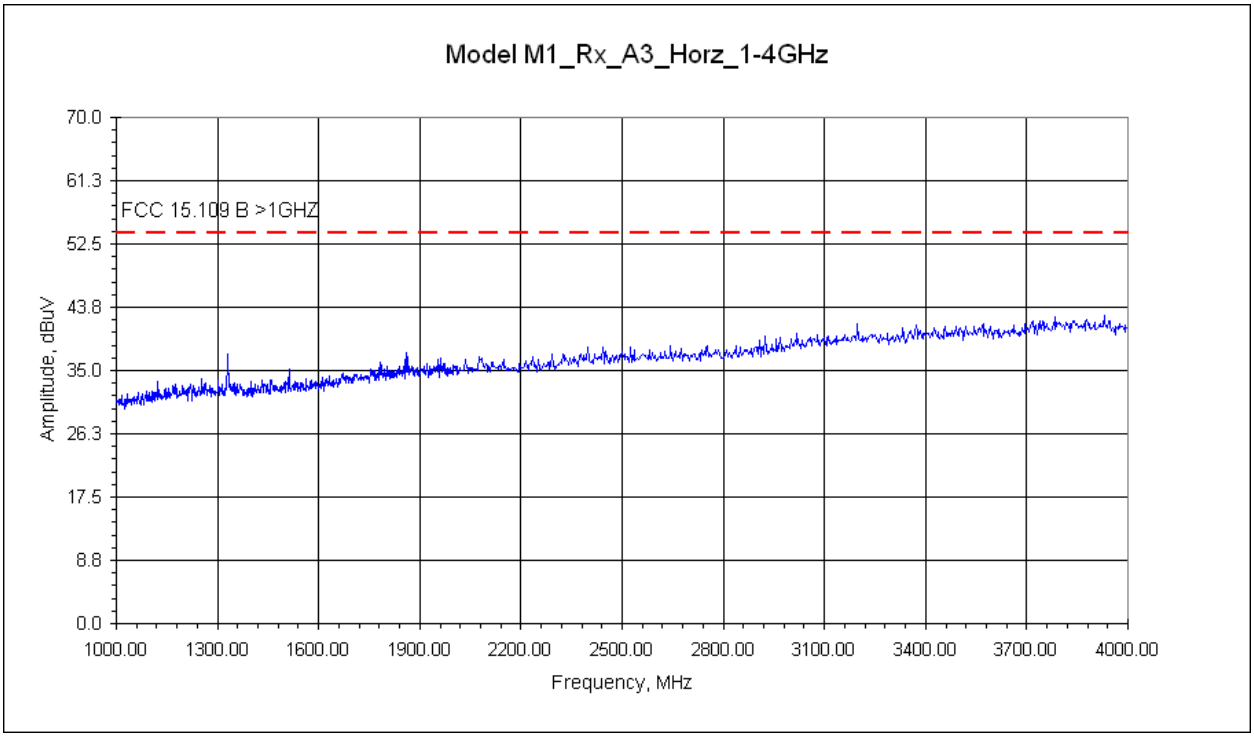
Pre-scan Plots: Product Axis 3 – Product Vertical & Rotated 90 Degrees

1GHz to 4GHz

Vertical



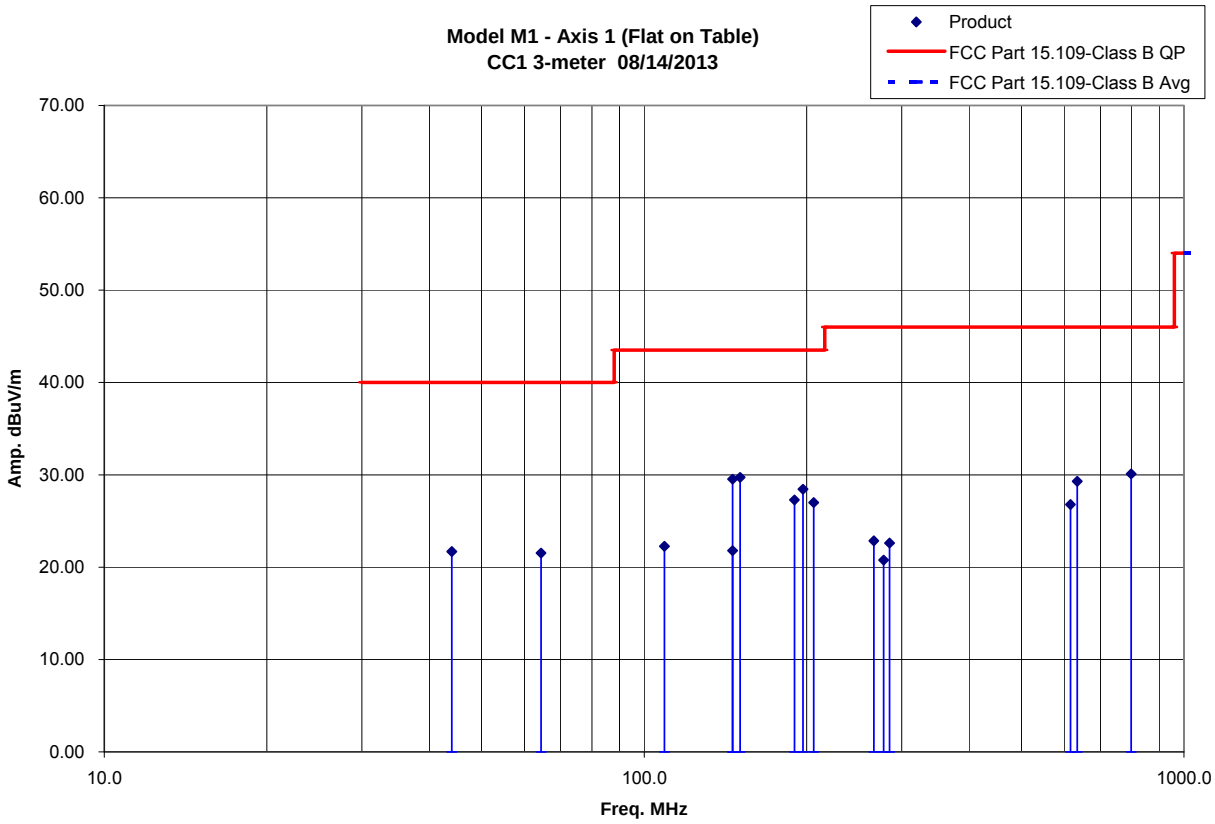
Horizontal



Reference only – to determine signals to be maximized

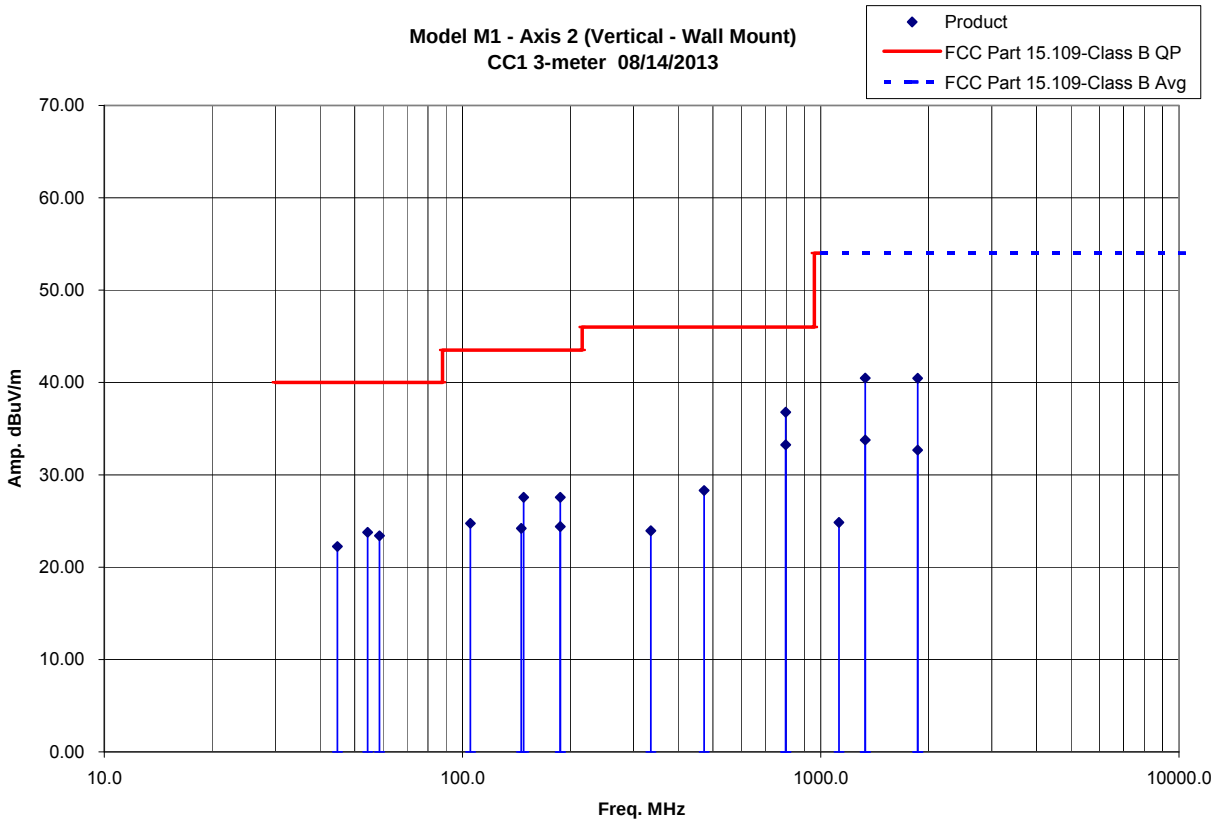
Final Plots: Product Axis 1 – Horizontal (Product Flat on Table)

FCC 15.109-Class B (30MHz to 1000MHz)



Final Plots: Product Axis 2 – Product Vertical on Table (Wall Mount)

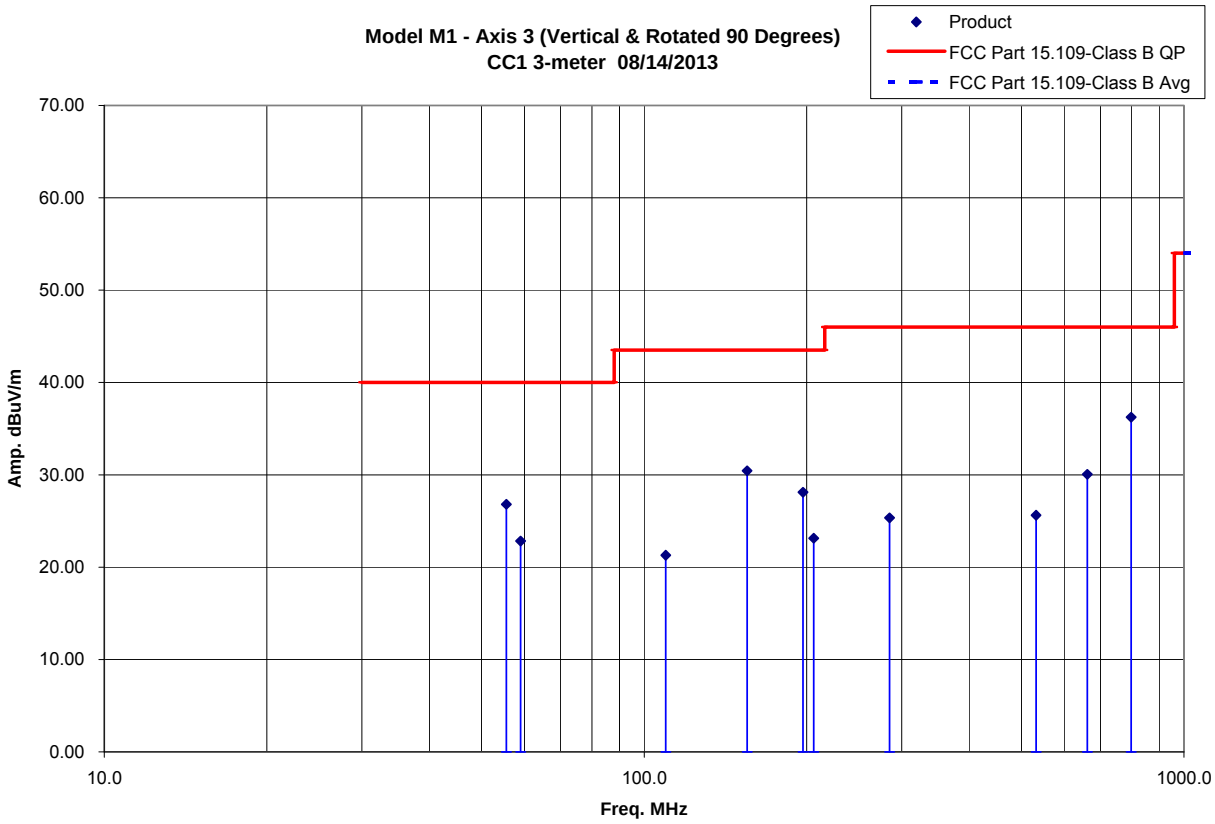
FCC 15.109-Class B (30MHz to 2GHz)



Note: Axis 2 was worst-case above 1GHz as determined from pre-scans

Final Plots: Product Axis 3 – Product Vertical & Rotated 90 Degrees

FCC 15.109-Class B (30MHz to 1000MHz)



Test Data: Axis 1 – Horizontal (Product Flat on Table)

Radiated Electromagnetic Emissions

Test Report #:	**G101262620**	Test Area:	CC1 Radiated	Temperature:	23.4 °C
Test Method:	FCC 15.109 – Class B	Test Date:	08/14/2013	Relative Humidity:	33.5 %
EUT Model #:	M1	EUT Power:	120V/ 60Hz	Air Pressure:	82.7 kPa
EUT Serial #:	FCC1				
Manufacturer:	Revolv				
EUT Description:	Revolv Hub – RF-enabled Home Automation wireless hub				
Notes	AC Adapter: Unifive Model UN310-0520				
	Product tested in normal idle/standby receive mode of operation				

Level Key
Pk – Peak
Qp – Quasi Peak
Av - Average

Measurements: Axis 1 (Product flat on table – horizontal position)

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	Delta2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.109 Class B	N/A	(MHz)
Measurements: 30MHz to 1000MHz - Product Axis 1 (Product flat on table – horizontal) – Vertical Antenna													
44.0000	38.02	Qp	0.77	11.10	28.20	0.00	21.69	V	1.00	250.7	- 18.31	NA	0.120
64.4000	40.99	Qp	0.77	7.90	28.13	0.00	21.53	V	1.00	184.5	- 18.47	NA	0.120
109.0000	36.81	Qp	0.77	12.60	27.92	0.00	22.26	V	1.00	246.2	- 21.24	NA	0.120
145.8665	43.84	Qp	0.81	12.61	27.74	0.00	29.53	V	1.00	168.7	- 13.97	NA	0.120
150.4965	43.98	Qp	0.82	12.65	27.72	0.00	29.74	V	1.00	198.4	- 13.76	NA	0.120
189.8565	42.40	Qp	0.92	11.49	27.53	0.00	27.28	V	1.00	319.7	- 16.22	NA	0.120
196.7965	42.96	Qp	0.94	12.06	27.50	0.00	28.46	V	1.00	311.5	- 15.04	NA	0.120
206.0665	42.30	Qp	0.96	11.21	27.45	0.00	27.01	V	1.10	14.6	- 16.49	NA	0.120
284.7865	34.91	Qp	1.15	13.69	27.12	0.00	22.63	V	1.34	205.5	- 23.37	NA	0.120
615.8487	34.53	Qp	1.72	18.88	28.34	0.00	26.79	V	1.27	61.7	- 19.21	NA	0.120
266.2500	35.77	Qp	1.10	13.15	27.16	0.00	22.86	V	1.00	358.2	- 23.14	NA	0.120
798.5000	34.97	Qp	1.97	21.14	27.97	0.00	30.12	V	1.80	239.0	- 15.88	NA	0.120
Measurements: 30MHz to 1000MHz Horizontal Antenna													
145.8700	36.10	**Qp**	0.81	12.61	27.74	0.00	21.79	H	2.42	96.0	- 21.71	NA	0.120
277.8635	33.23	**Qp**	1.13	13.51	27.11	0.00	20.77	H	1.70	285.0	- 25.23	NA	0.120
634.4100	36.86	**Qp**	1.75	19.01	28.33	0.00	29.30	H	1.56	99.7	- 16.70	NA	0.120

Test Data: Axis 2 – Product Vertical on Table (Wall Mount)

Radiated Electromagnetic Emissions

Test Report #:	**G101262620**	Test Area:	CC1 Radiated	Temperature:	23.4 °C
Test Method:	FCC 15.109 – Class B	Test Date:	08/14/2013	Relative Humidity:	33.5 %
EUT Model #:	M1	EUT Power:	120V/ 60Hz	Air Pressure:	82.7 kPa
EUT Serial #:	FCC1				
Manufacturer:	Revolv				
EUT Description:	Revolv Hub – RF-enabled Home Automation wireless hub				
Notes	AC Adapter: Unifive Model UN310-0520				
	Product tested in normal idle/standby mode of operation				

Level Key
Pk – Peak
Qp – Quasi Peak
Av - Average

Measurements: Axis 2 (Product vertical – wall mount)

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	Delta2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.109 Class B	N/A	(MHz)
Measurements: 30MHz to 1000MHz - Product Axis 2 (Product vertical – wall mount) – Vertical Antenna													
44.7000	39.00	Qp	0.77	10.68	28.20	0.00	22.25	V	1.00	334.6	- 17.75	NA	0.120
54.3000	43.66	Qp	0.77	7.53	28.18	0.00	23.78	V	1.00	90.0	- 16.22	NA	0.120
58.6333	43.24	Qp	0.77	7.56	28.16	0.00	23.41	V	1.00	282.3	- 16.59	NA	0.120
105.2679	39.96	Qp	0.77	11.95	27.94	0.00	24.75	V	1.00	37.1	- 18.75	NA	0.120
148.1879	41.87	Qp	0.82	12.62	27.73	0.00	27.58	V	1.00	165.1	- 15.92	NA	0.120
187.5562	42.85	Qp	0.91	11.36	27.54	0.00	27.58	V	1.00	229.1	- 15.92	NA	0.120
335.7262	35.58	Qp	1.26	14.41	27.31	0.00	23.95	V	1.65	159.4	- 22.05	NA	0.120
472.3447	37.97	Qp	1.49	17.05	28.21	0.00	28.30	V	1.00	168.6	- 17.70	NA	0.120
798.1000	41.67	Qp	1.97	21.12	27.97	0.00	36.80	V	1.30	104.0	- 9.20	NA	0.120
Measurements: 30MHz to 1000MHz Horizontal Antenna													
145.8600	38.51	Qp	0.81	12.61	27.74	0.00	24.20	H	1.70	99.8	- 19.30	NA	0.120
187.5327	39.67	Qp	0.91	11.35	27.54	0.00	24.40	H	2.12	263.4	- 19.10	NA	0.120
798.4000	38.11	Qp	1.97	21.14	27.97	0.00	33.25	H	1.87	187.8	- 12.75	NA	0.120

Radiated Electromagnetic Emissions

Test Report #:	**G101262620**	Test Area:	CC1 Radiated	Temperature:	23.4 °C
Test Method:	FCC 15.109 – Class B	Test Date:	08/14/2013	Relative Humidity:	33.5 %
EUT Model #:	M1	EUT Power:	120V/ 60Hz	Air Pressure:	82.7 kPa
EUT Serial #:	FCC1				
Manufacturer:	Revolv				
EUT Description:	Revolv Hub – RF-enabled Home Automation wireless hub				
Notes	AC Adapter: Unifive Model UN310-0520				
	Product tested in normal idle/standby receive mode of operation				

Level Key
Pk – Peak
Qp – Quasi Peak
Av - Average

Measurements: Axis 2 (Product vertical – wall mount) worst-case axis above 1GHz per pre-scans

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	Delta2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.109 Class B Average	N/A	(MHz)
Measurements: 1GHz to 2GHz - Product Axis 2 (Product vertical – wall mount) – Vertical Antenna													
1123.9000	35.06	Av	2.36	24.62	37.19	0.00	24.85	V	1.59	176.5	- 29.15	N/A	1.000
1331.0000	42.89	Av	2.57	25.21	36.89	0.00	33.78	V	1.53	140.8	- 20.22	N/A	1.000
1863.1000	39.46	Av	3.07	27.14	36.97	0.00	32.70	V	1.53	140.8	- 21.30	N/A	1.000
Measurements: 1GHz to 2GHz - Horizontal Antenna													
1330.8000	49.60	Av	2.56	25.21	36.89	0.00	40.49	H	1.90	184.8	- 13.51	N/A	1.000
1863.0000	47.22	Av	3.07	27.14	36.97	0.00	40.46	H	1.90	137.5	- 13.54	N/A	1.000

Test Data: Axis 3 – Product Vertical & Rotated 90 Degrees

Radiated Electromagnetic Emissions

Test Report #:	**G101262620**	Test Area:	CC1 Radiated	Temperature:	23.4 °C
Test Method:	FCC 15.109 – Class B	Test Date:	08/14/2013	Relative Humidity:	33.5 %
EUT Model #:	M1	EUT Power:	120V/ 60Hz	Air Pressure:	82.7 kPa
EUT Serial #:	FCC1				
Manufacturer:	Revolv				
EUT Description:	Revolv Hub – RF-enabled Home Automation wireless hub				
Notes	AC Adapter: Unifive Model UN310-0520				
	Product tested in normal idle/standby receive mode of operation				

Level Key
Pk – Peak
Qp – Quasi Peak
Av - Average

Measurements: Axis 3 (Product vertical & rotated 90 degrees – wall mount)

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	Delta2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.109 Class B	N/A	(MHz)
Measurements: 30MHz to 1000MHz - Product Axis 3 (Product vertical & rotated 90 degrees) – Vertical Antenna													
55.5700	46.74	Qp	0.77	7.49	28.17	0.00	26.82	V	1.00	292.6	- 13.18	NA	0.120
59.0700	42.62	Qp	0.77	7.60	28.16	0.00	22.83	V	1.00	84.4	- 17.17	NA	0.120
109.6758	35.63	Qp	0.77	12.80	27.91	0.00	21.29	V	1.10	212.7	- 22.21	NA	0.120
155.1258	44.60	Qp	0.84	12.70	27.70	0.00	30.44	V	1.00	289.7	- 13.06	NA	0.120
196.7958	42.61	Qp	0.94	12.06	27.50	0.00	28.11	V	1.07	333.0	- 15.39	NA	0.120
284.7841	37.62	Qp	1.15	13.69	27.12	0.00	25.34	V	1.54	273.6	- 20.66	NA	0.120
798.3000	41.11	Qp	1.97	21.13	27.97	0.00	36.25	V	1.38	203.0	- 9.75	NA	0.120
Measurements: 30MHz to 1000MHz Horizontal Antenna													
206.0800	38.44	Qp	0.96	11.20	27.45	0.00	23.15	H	2.35	111.6	- 20.35	NA	0.120
532.0646	33.76	Qp	1.58	18.70	28.41	0.00	25.64	H	1.85	308.0	- 20.36	NA	0.120
662.1772	36.91	Qp	1.80	19.66	28.30	0.00	30.06	H	1.43	352.1	- 15.94	NA	0.120

Example calculation:

Measured Level	+	Cable Loss	+	Antenna Factor	-	Pre-Amp	+	Atten	=	Final Corrected Reading	Specification Limit	-	Final Corrected Reading	=	Delta Specification
(dBμV)		(dB)		(dB)		(dB)		(dB)		(dBμV/m)	(dBμV/m)		(dBμV/m)		
20.0		**3.0**		**5.0**		**10.0**		**0.0**		**18.0**	**40.0**		**18.0**		**- 22.0**

Notes:

1) For due diligence, the product fully tested in (3) axes (product orientations).
2) The highest product clock was 266MHz – testing up to 2GHz required per standard.
3) Product tested in idle/standby receive mode of operation.

Deviations, Additions, or Exclusions: None

16 AC Mains Conducted Emissions

Method:

Unless otherwise stated no deviations were made from FCC Part 15.107 – Class B.

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

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

Test Requirement:

The product must pass the AC Conducted average and quasi-peak Class B Limits defined in FCC Part 15.107.

Test Procedure:

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at all frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.
The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.
The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.4.

Test Results:

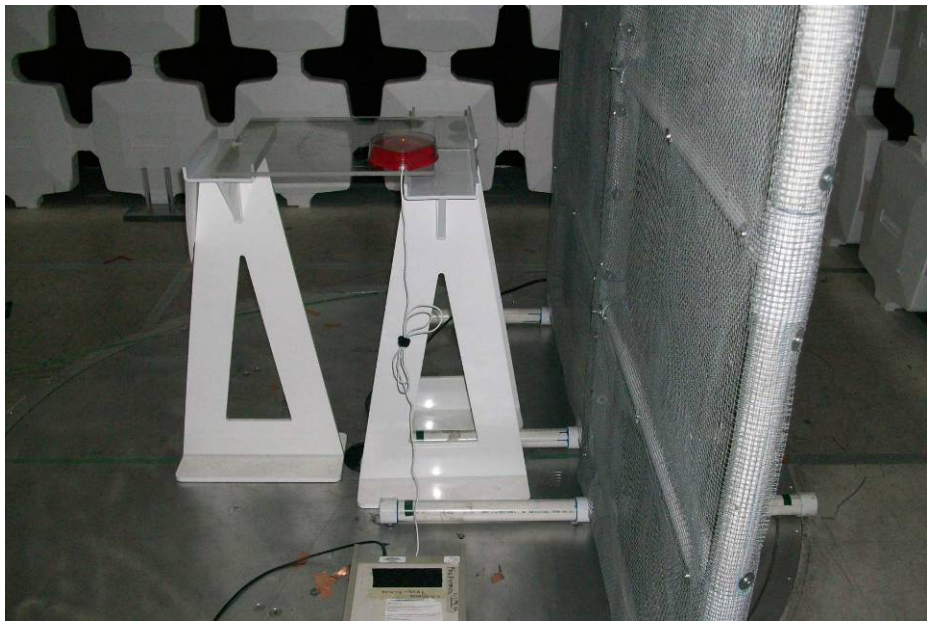
The sample tested was found to Comply.

Setup Photographs:

AC Conducted Emissions – Test Setup (Front View)

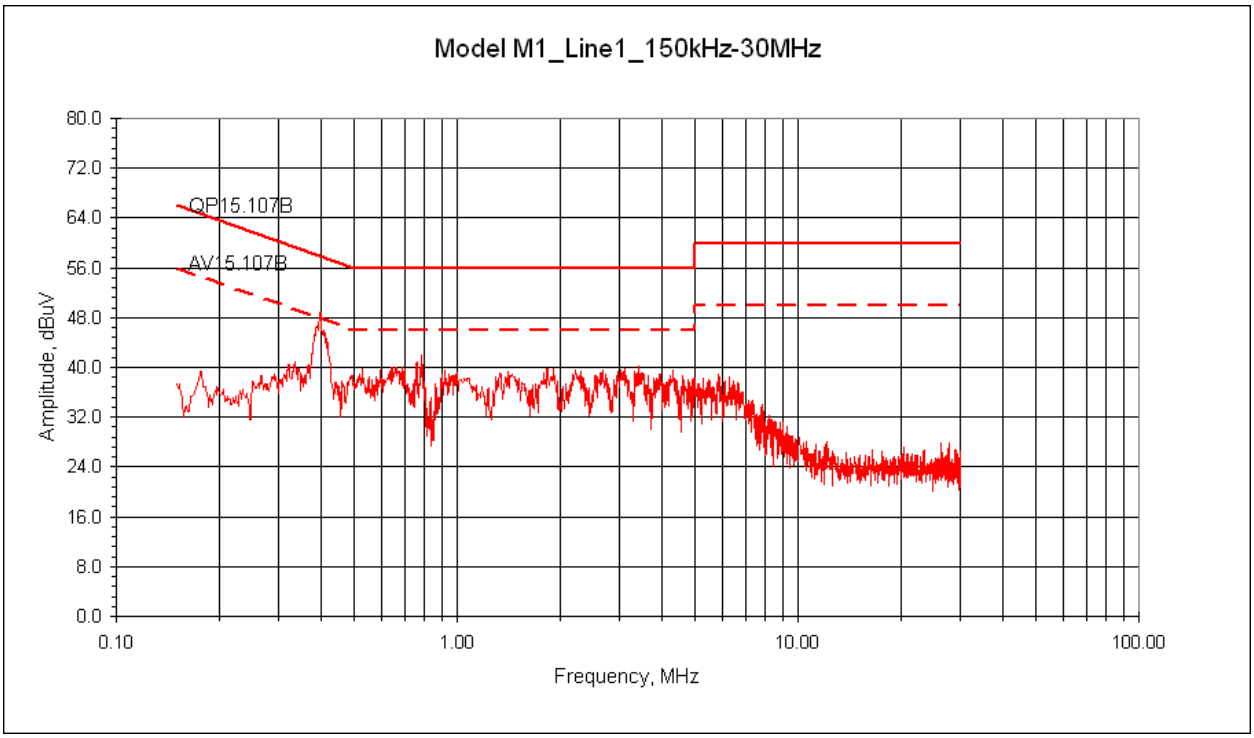
Set-up Photographs:

AC Conducted Emissions – Test Setup (Side View)

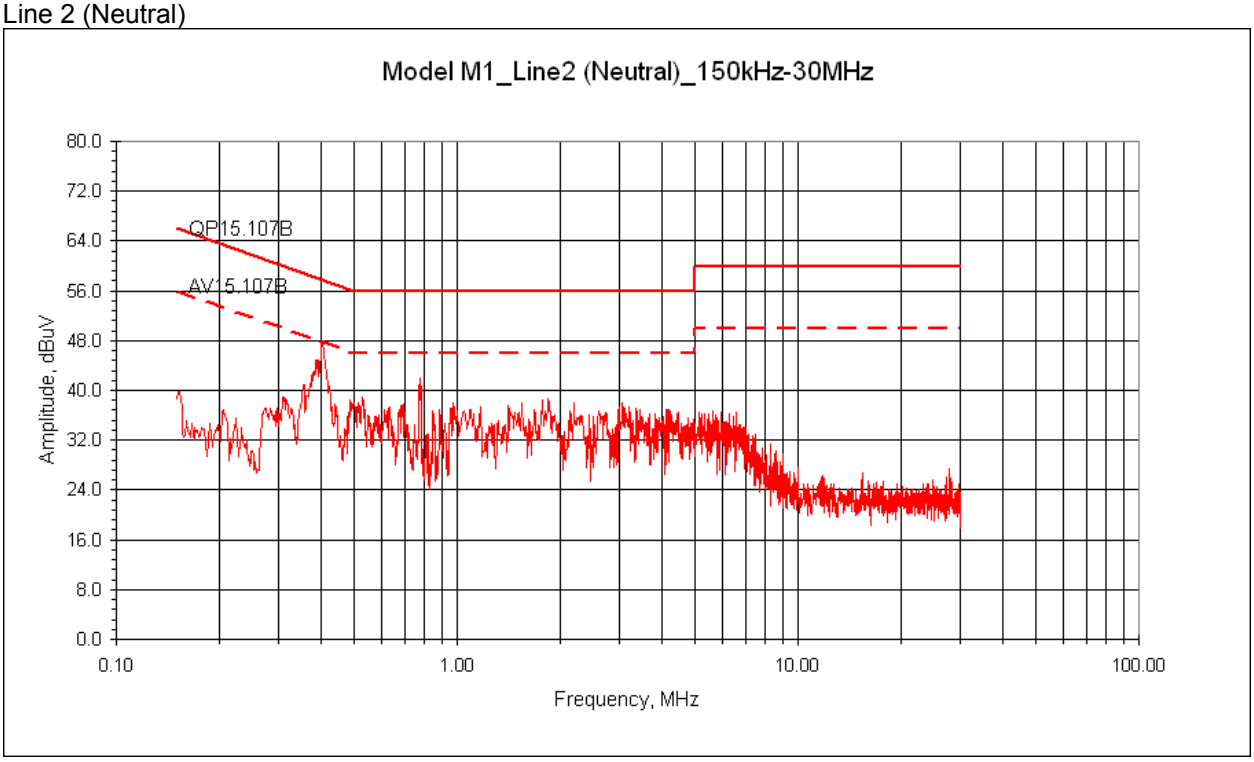


Pre-scan Plots: Reference Only

Line 1

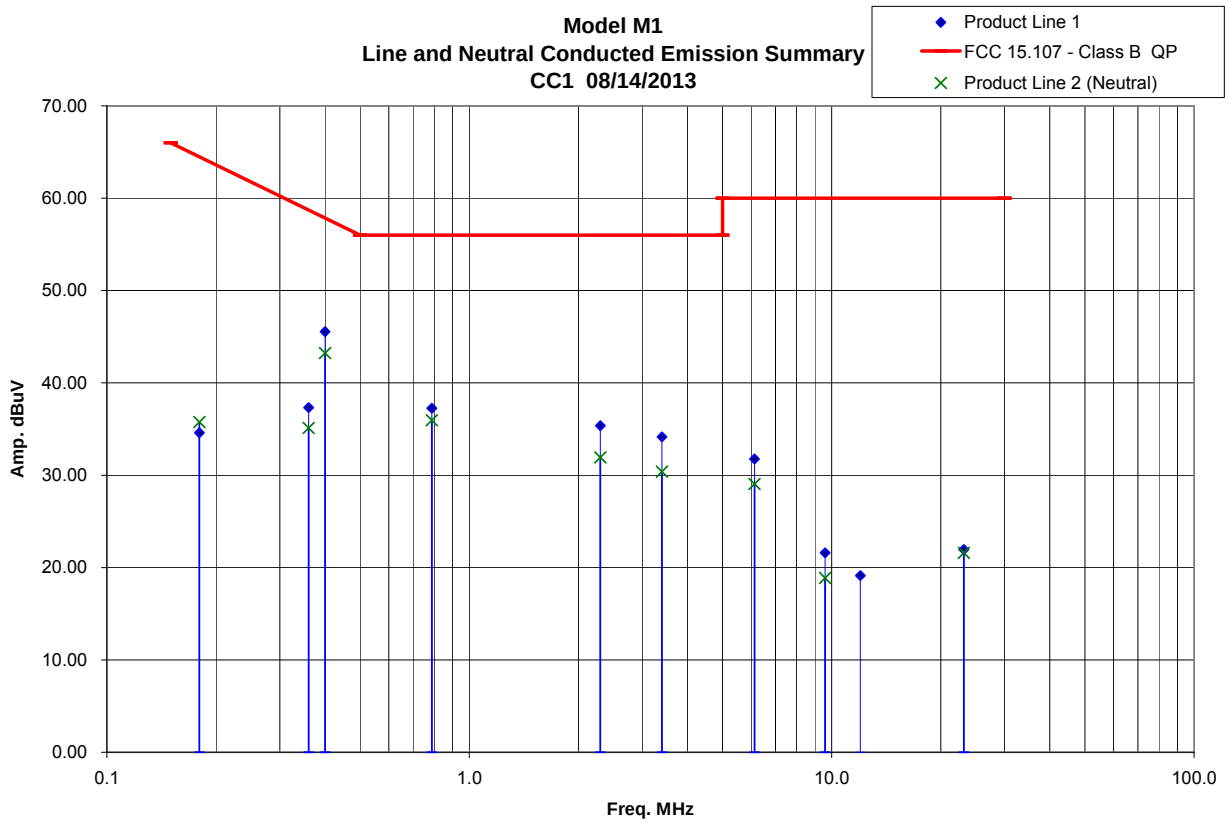


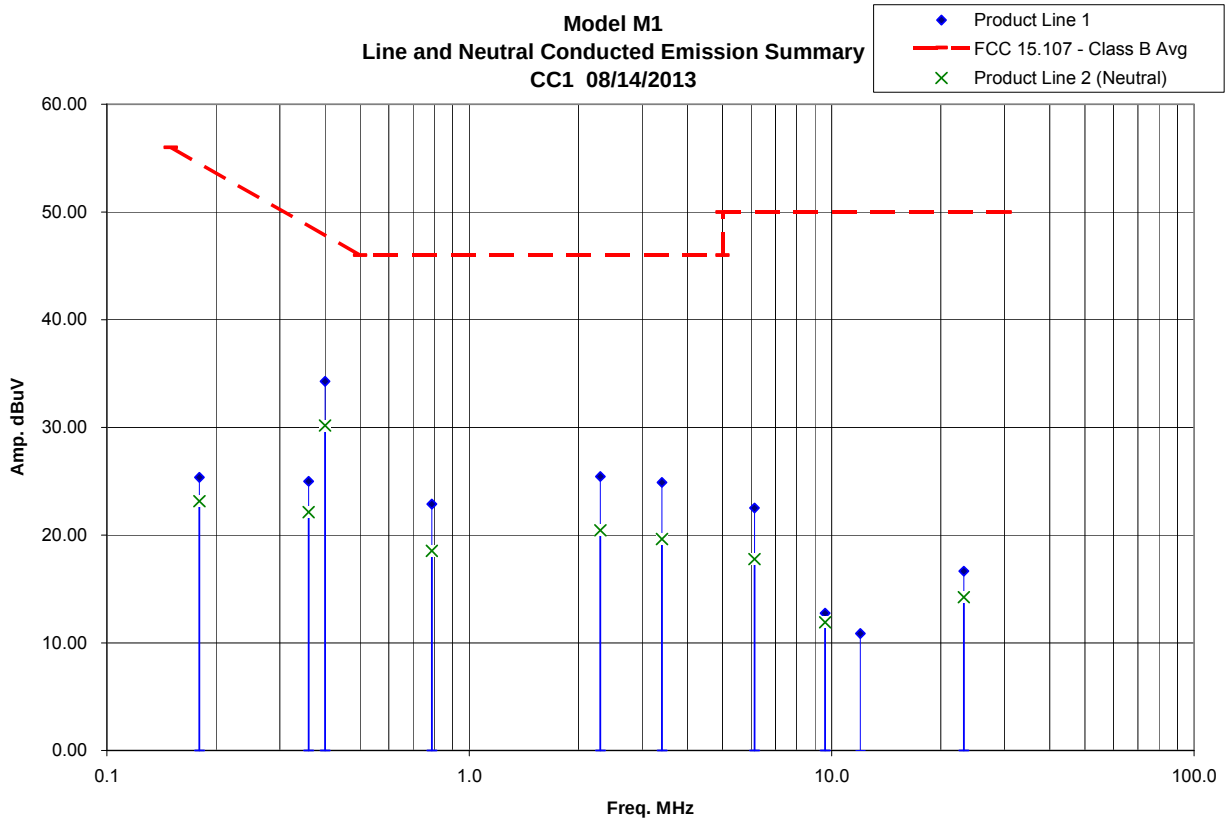
Line 2 (Neutral)



Reference only – to determine signals to be maximized

Final Plots:
FCC 15.107 – Class B (150kHz to 30MHz)





Test Data:

AC Conducted Electromagnetic Emissions

Test Report #:	G101262620	Test Area:	CC1 Conducted		Temperature:	23.1	C
Test Method:	FCC 15.107 – Class B	Test Date:	14-Aug-2013		Relative Humidity:	32.8	%
EUT Model #:	M1	EUT Power:	**120V/ 60Hz**		Air Pressure:	83.1	kPa
EUT Serial #:	FCC1						
Manufacturer:	Revolv				Level Key		
EUT Description:	Revolv Hub – RF-enabled Home Automation				Pk - Peak	Nb - Narrow Band	
Notes:	AC Adapter: Unifive Model UN310-0520				Qp - QuasiPeak	Bb - Broad Band	
	Product tested in normal standby/idle receive mode of operation				Av - Average		

FREQ	LEVEL	DET	CABLE	LISN	PREAMP	ATTEN	FINAL	TEST POINT	DELTA1	DELTA2	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	Line 1 Line2 (Neutral)	FCC 15.107 Class B Average	FCC 15.107 Class B Qp	(MHz)
Line 1 Data – 150kHz to 30MHz											
0.180	15.26	Av	0.10	0.03	0.00	9.96	25.36	Line 1	- 29.13	NA	0.009
0.180	24.51	Qp	0.10	0.03	0.00	9.96	34.61	Line 1	NA	- 29.88	0.009
0.360	14.89	Av	0.10	0.03	0.00	9.97	24.99	Line 1	- 23.74	NA	0.009
0.360	27.23	Qp	0.10	0.03	0.00	9.97	37.33	Line 1	NA	- 21.40	0.009
0.400	24.18	Av	0.10	0.03	0.00	9.97	34.28	Line 1	- 13.58	NA	0.009
0.400	35.45	Qp	0.10	0.03	0.00	9.97	45.55	Line 1	NA	- 12.31	0.009
0.788	12.68	Av	0.20	0.03	0.00	9.98	22.88	Line 1	- 23.12	NA	0.009
0.788	27.06	Qp	0.20	0.03	0.00	9.98	37.26	Line 1	NA	- 18.74	0.009
2.301	15.23	Av	0.20	0.03	0.00	9.98	25.44	Line 1	- 20.56	NA	0.009
2.301	25.15	Qp	0.20	0.03	0.00	9.98	35.36	Line 1	NA	- 20.64	0.009
3.402	14.58	Av	0.30	0.03	0.00	9.98	24.90	Line 1	- 21.10	NA	0.009
3.402	23.85	Qp	0.30	0.03	0.00	9.98	34.17	Line 1	NA	- 21.83	0.009
6.122	12.08	Av	0.40	0.05	0.00	9.99	22.52	Line 1	- 27.48	NA	0.009
6.122	21.33	Qp	0.40	0.05	0.00	9.99	31.77	Line 1	NA	- 28.23	0.009
9.596	2.04	Av	0.60	0.11	0.00	10.00	12.75	Line 1	- 37.25	NA	0.009
9.596	10.90	Qp	0.60	0.11	0.00	10.00	21.61	Line 1	NA	- 38.39	0.009
12.000	- 0.05	Av	0.80	0.12	0.00	10.00	10.87	Line 1	- 39.13	NA	0.009
12.000	8.23	Qp	0.80	0.12	0.00	10.00	19.15	Line 1	NA	- 40.85	0.009
23.157	5.29	Av	1.10	0.22	0.00	10.03	16.64	Line 1	- 33.36	NA	0.009
23.157	10.60	Qp	1.10	0.22	0.00	10.03	21.95	Line 1	NA	- 38.05	0.009
Line 2 (Neutral) Data – 150kHz to 30MHz											
0.180	13.04	Av	0.10	0.03	0.00	9.96	23.14	Line 2	- 31.35	NA	0.009
0.180	25.67	Qp	0.10	0.03	0.00	9.96	35.77	Line 2	NA	- 28.72	0.009
0.360	12.04	Av	0.10	0.02	0.00	9.97	22.13	Line 2	- 26.60	NA	0.009
0.360	25.04	Qp	0.10	0.02	0.00	9.97	35.13	Line 2	NA	- 23.60	0.009
0.400	20.08	Av	0.10	0.02	0.00	9.97	30.17	Line 2	- 17.68	NA	0.009
0.400	33.14	Qp	0.10	0.02	0.00	9.97	43.23	Line 2	NA	- 14.62	0.009

0.788	8.33	Av	0.20	0.02	0.00	9.98	18.53	Line 2	- 27.47	NA	0.009
0.788	25.75	Qp	0.20	0.02	0.00	9.98	35.95	Line 2	NA	- 20.05	0.009
2.301	10.24	Av	0.20	0.03	0.00	9.98	20.45	Line 2	- 25.55	NA	0.009
2.301	21.73	Qp	0.20	0.03	0.00	9.98	31.94	Line 2	NA	- 24.06	0.009
3.402	9.33	Av	0.30	0.03	0.00	9.98	19.64	Line 2	- 26.36	NA	0.009
3.402	20.09	Qp	0.30	0.03	0.00	9.98	30.40	Line 2	NA	- 25.60	0.009
6.122	7.33	Av	0.40	0.05	0.00	9.99	17.77	Line 2	- 32.23	NA	0.009
6.122	18.62	Qp	0.40	0.05	0.00	9.99	29.06	Line 2	NA	- 30.94	0.009
9.596	- 1.30	Av	0.60	0.11	0.00	10.00	9.41	Line 2	- 40.59	NA	0.009
9.596	8.17	Qp	0.60	0.11	0.00	10.00	18.88	Line 2	NA	- 41.12	0.009
23.157	2.75	Av	1.10	0.36	0.00	10.03	14.24	Line 2	- 35.76	NA	0.009
23.157	10.12	Qp	1.10	0.36	0.00	10.03	21.61	Line 2	NA	- 38.39	0.009

Example calculation:

Measured Level	+	**Transducer, Cable Loss & Amplifier corrections**	=	**Corrected Reading**	**Specification Limit**	-	**Corrected Reading**	=	**Delta Specification**
(dBμV)		(dB)		(dBμV/m)	(dBμV/m)		(dBμV/m)		
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

Notes:
1) Product tested in idle/standby receive mode of operation.

Deviations, Additions, or Exclusions: None

17 Appendix - 6dB Bandwidth (Reference Only)

Method:

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from FCC 15.231 & IC RSS-210.

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 6.3.1

Radiated measurements of the fundamental-signal peak field strength shall be made using instrumentation with a bandwidth equal to or greater than the 6 dB bandwidth of the emission.

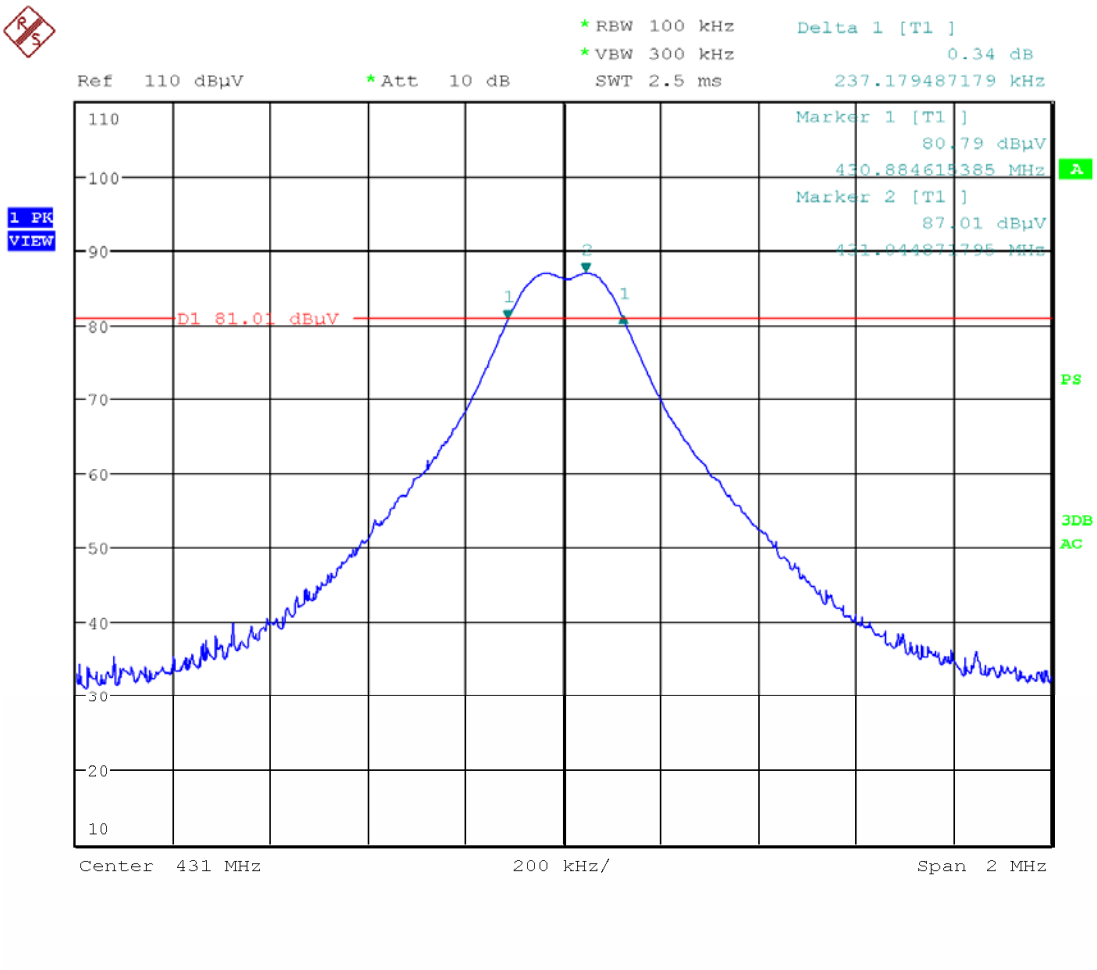
Test Equipment Used:

Asset ID	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver (10Hz – 26.5GHz)	RHODE & SCHWARZ	ESU 26	100265	01/23/2013	01/23/2014
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
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 3.0	VBU	VBU

Results:

Not applicable – measurement used for reference only – to determine minimum RBW required for testing fundamental.

Plot: 6dB Bandwidth



Date: 11.SEP.2013 16:28:07

Test Data: Reference Only – To determine RBW required for testing fundamental emissions.

FREQ	LEVEL	DET	CABLE	Antenna	PREAMP	FINAL	POL	HGT	AZ	LIMIT	DELTA LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.231(b) dBuV/m	FCC 15.231(b)	(MHz)
Measurements to verify the 6dB bandwidth – used to determine the RBW used for measuring fundamental emissions												
431.0000	88.00	**Pk**	1.42	16.56	28.11	0.00	77.87	H	2.21	80.46	- 2.59	0.100
431.0000	88.54	**Pk**	1.42	16.56	28.11	0.00	78.41	H	2.21	80.46	- 2.05	0.300
431.0000	88.51	**Pk**	1.42	16.56	28.11	0.00	78.38	H	2.21	80.46	- 2.08	0.500

Test Method:

- N/A

Test Summary:

6dB Bandwidth Summary	
Channel/ Mode	**6dB Bandwidth**
431.00	237.18kHz

Specification: Not applicable

Notes:

1) Measurements were taken using worst-case modulated (maximum bandwidth) mode, using maximum data packet length.
2) All measurements are radiated field strength taken at 3-meters.
3) For fundamental measurements, a RBW of 300kHz will be utilized per the plot and measurements above. No significant increase in field strength was measured when using a higher bandwidth.

18 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 26.5 GHz	1.6 dB	
AC mains Conducted emissions, 9kHz to 30 MHz	3.14 dB	

19 Revision History

Revision Level	Date	Report Number	Notes
0	10/7/2013	101262612DEN-001G	Original Issue