

TEST REPORT

Report Number: 101687494DEN-002

Project Number: G101687494

Report Issue Date: August 12, 2014

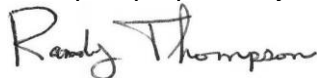
Product Designation: Model: GR-1.5-915

Standards: FCC title 47 CFR part 15 subpart C (Part 15.247)
RSS-210, Issue 8: 2010 (Annex 8)
RSS-GEN, Issue 5: 2012

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

Client:
U Grok It
309 Blackberry Lane
Steamboat Springs, CO 80487

Report prepared by



Randy Thompson
Senior EMC Project Engineer

Report reviewed by



Krishna Vemuri
EMC Senior Staff Engineer

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

TABLE OF CONTENTS

1	<i>Introduction and Conclusion</i>	3
2	<i>Test Summary</i>	3
3	<i>Description of Equipment Under Test.....</i>	5
4	<i>System setup including cable interconnection details, support equipment and simplified block diagram</i>	9
5	<i>Tx Output Power – Tx Fundamental – FCC 15.247(b)(2)</i>	11
6	<i>Conducted Tx Spurious Emissions of the Fundamental – 20dBc – FCC 15.247(d).....</i>	16
7	<i>FCC 15.247(d)/ 15.209(a)/15.205 Radiated Emissions – Tx Harmonics of the Fundamental – Includes Restricted Band</i>	23
8	<i>Tx Band Edge – FCC 15.247(d)/15.209</i>	48
9	<i>20 dB Bandwidth – FCC 15.247 (a)(1)(i)</i>	54
10	<i>Carrier Frequency Separation – FCC 15.247 (a)(1).....</i>	59
11	<i>Number of Hopping Frequencies – FCC 15.247 (a)(1)(i)</i>	62
12	<i>Time of Occupancy (Dwell Time) – FCC 15.247 (a)(1)(i).....</i>	65
13	<i>Occupied Bandwidth (OBW) – RSS-GEN, 4.6.1</i>	68
14	<i>Duty Cycle – Duty Cycle Correction Factor – FCC 15.35(c)</i>	73
15	<i>Tx AC Power Conducted Emissions – Test not Applicable</i>	77
16	<i>Measurement Uncertainty.....</i>	78
17	<i>Appendix A: Product Modifications - Not Required.....</i>	79
18	<i>Revision History</i>	80

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.

2 Test Summary

Section	Test full name	Test date	Result
5	Tx Conducted Output Power of the Fundamental - FCC 247(b)(2) Covers RSS-210 A8.4(1)	06/23/2014	Pass
6	Conducted Spurious Emissions of the Fundamental – 20dBc FCC 247(d) Covers RSS-210 A8.5	06/24/2014	Pass
7	Radiated Spurious Emissions of the Fundamental – Includes Restricted Band Harmonics - FCC 247(d)/ 15.209(a)/15.205 Covers RSS-210 A8.5/ RSS-GEN, 7.2.2	06/24/2014	Pass
8	Tx Band Edge – FCC 15.247(d)/15.209 Covers RSS-210 A8.5/RSS-GEN, 7.2.2	06/24/2014	Pass
9	20 dB Bandwidth – FCC 15.247 (a)(1)(i) Covers RSS-210 A8.1(c)	06/23/2014	Pass
10	Carrier Frequency Separation – FCC 15.247 (a)(1) Covers RSS-210 A8.1(b)	06/25/2014	Pass
11	Number of Hopping Frequencies – FCC 15.247 (a)(1)(i) Covers RSS-210 A8.1(c)	06/25/2014	Pass
12	Time of Occupancy (Dwell Time) – FCC 15.247 (a)(1)(i) Covers RSS-210 A8.1(c)	06/25/2014	Pass
13	Occupied Bandwidth (OBW) – RSS-GEN, Clause 4.6.1	06/25/2014	Pass
14	Duty Cycle – Duty Cycle Correction Factor - FCC 15.35(c) Covers RSS-GEN, Clause 4.5	06/23/2014	Pass
15	Tx AC Power Conducted Emissions – FCC 15.207 Covers RSS-GEN, Clause 7.2.4	-----	Note 1

Notes:

- 1) The product is internal battery-powered – therefore, Tx AC Conducted Emissions do not apply. The product utilizes an ac adapter to charge the battery only. Note the product does not operate when the ac adapter is connected.
- 2) Unintentional Emissions per FCC 15.109/107 (RSS-GEN) are documented in the following Intertek Test Report: 101687494DEN-001.

General Radio Remarks:

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.

FCC CFR47 Part 15.31: Measurement Standards: In any case where the device is powered off a battery, a fresh battery was used during testing.

FCC CFR Part 15.35: Measurement Detector Functions and Bandwidths: FCC Part 15.35 was utilized when performing measurements within this report.

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 utilized in this report for emissions > 1GHz.

Whenever possible, the approved test procedures specified in FCC DA 00-705 for FHSS (Frequency Hopping Spread Spectrum) devices was used for testing.

The product tested is manufactured with an integral antenna – therefore allowing radiated field strength measurements. In addition, the product was configured with an RF port "test" cable, thus allowing RF conducted port measurements – where applicable. This is the preferred method of measurement per FCC 15.247.

2.1 Test Facility

Intertek Denver's testing facilities are located at 1795 Dogwood St. Suite 200 Louisville, CO 80027.

The testing facility is ISO17025:2005 accredited by A2LA, our lab code is 2506.02, our VCCI registration numbers are: R-1643, C-1752 and T-1558, our FCC designation no. US1121 and our IC lab no. 2042N.

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

3 Description of Equipment Under Test

3.1 Product – General Information Summary

Model:	GR-1.5-915
Type of EUT:	DSS - Part 15 Spread Spectrum Transmitter
Serial Number:	140100004
FCC ID:	2ACBR-GR1
Industry Canada ID:	12120A-GR1
Related Submittal(s) Grants:	Not applicable
Company:	U Grok It
Customer:	U Grok it
Address:	309 Blackberry Lane Steamboat Springs, CO 80487
Phone:	(970) 846-6928
Fax:	-----
e-mail:	tony@ugrokit.com
Test Standards:	<input checked="" type="checkbox"/> 47 CFR, Part 15C:§15.247 FHSS <input checked="" type="checkbox"/> RSS-210, Issue 8, 2010 <input checked="" type="checkbox"/> RSS-Gen, Issue 5, 2012 <input checked="" type="checkbox"/> 47 CFR, Part 15C:§15.207 <input type="checkbox"/> 47 CFR, Part 15, §15.107 and §15.109, Class B <input type="checkbox"/> Other
Type of radio:	<input checked="" type="checkbox"/> Stand -alone <input type="checkbox"/> Module <input type="checkbox"/> Hybrid
Date Sample Submitted:	06/23/2014
Test Work Started:	06/23/2014
Test Work Completed:	06/25/2014
Test Sample Conditions:	<input type="checkbox"/> Damaged <input type="checkbox"/> Poor (Usable) <input checked="" type="checkbox"/> Good

Product Description:	Handheld UHF RFID Reader
Transmitter Type:	<input checked="" type="checkbox"/> FHSS <input type="checkbox"/> Digital Modulation <input type="checkbox"/> WiFi <input type="checkbox"/> Blue Tooth
Operating Frequency Range(s):	Range: 902.75 to 927.25 MHz
Number of Channels:	50 – Channels (500kHz/channel)
Modulation:	PR-ASK
Emission Designator:	272KA1D
Antenna(s) Info:	Integral Antenna Type: Micro Flexible PCB Gain: < 6 dBi Connector Type: U.FL
Power settings:	27.45 dBm 0.56 Watt
Antenna Installation:	<input type="checkbox"/> User <input type="checkbox"/> Professional <input checked="" type="checkbox"/> Factory
Transmitter power configuration:	<input checked="" type="checkbox"/> Internal Battery 3.7VDC <input type="checkbox"/> External power source <input type="checkbox"/> 120VAC <input type="checkbox"/> 230VAC <input type="checkbox"/> VDC <input type="checkbox"/> Other: <input type="checkbox"/> <input type="checkbox"/> 50Hz <input type="checkbox"/> 60Hz
Special Test Arrangement:	As a hand-held device the EUT was rotated through three orthogonal axes to determine worst-case maximum radiated emissions
Test Facility Accreditation:	A2LA (Certificate No. 2506.02)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10: 2013 (Guidance FCC Public Notice DA 00-705: 2000)

3.2 Product – Detailed Information Summary:

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Handheld UHF RFID Reader	U Grok It	GR-1.5-915	140100004

Receive Date:	07/02/2014
Received Condition:	Good
Type:	Production Sample

Description of Equipment Under Test (provided by client)

The Model: GR-1.5-915 "Grokker 1" reads passive UHF RFID tags following the EPC Gen2 standard. The product connects to an iOS or Android host device via the audio port. The host device sends commands to start and stop scanning for RFID tags and the product sends results to the host device.

The host device can control some aspects of the Grokker's behavior:

- · Setting power levels lower than the Grokker's maximum power level
- · Controlling what results are returned from the Grokker and how they are returned
- · Controlling what sounds are played on the Grokker's speaker when tags are found

The Grokker's firmware controls many aspects of Grokker behavior:

- Frequency hopping
- 50 channels between 902.75 and 927.25 MHz
- Maximum dwell time on any one frequency
- Duty cycle
- Link frequency (data modulation frequency): 320 KHz
- The EPC Gen2 specification allows several different link frequencies, the Grokker only uses 320 KHz Data encoding: Miller8
- The EPC Gen2 specification allows several different data encodings, the Grokker only uses Miller8

Power is supplied by a 3.7V Li-Ion 1800mAh rechargeable battery. The battery has a built in protection circuit to prevent over-voltage and over-current conditions.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
3.7 V Re-Chargeable Battery	1800mAh	---	---

Descriptions of EUT Exercising

<input type="checkbox"/> Standby/Idle Mode
<input checked="" type="checkbox"/> Continuous transmission, un-modulated carrier (CW)
<input checked="" type="checkbox"/> Continuous transmission, modulated carrier (CW) utilizing worst-case data rate
<input type="checkbox"/> Continuous Receive Mode

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

Clock Frequencies of the EUT:

No.	Descriptions of EUT Exercising
1	20.0 MHz External Oscillator
2	48 MHz MCU Internal Oscillator
3	2MHz ~ 3MHz switching regulator for power amplifier (PA) circuit.

3.3 Product Photo: Model: GR-1.5-915

Product Tested – Top View



Product Tested – Bottom View



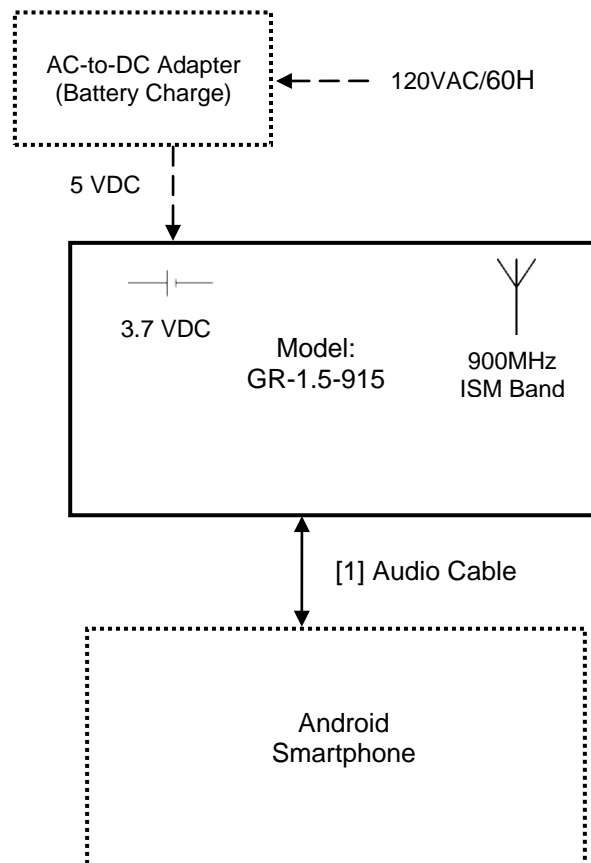
4 System setup including cable interconnection details, support equipment and simplified block diagram

4.1 Method:

The EUT is a stand-alone device powered by an internal battery. No external support cables are necessary for normal operation.

4.2 EUT Block Diagram:

Note: If applicable, dashed-lines indicate auxiliary/support equipment.



4.3 Support Data:

ID	Description/ Function	Shield Type	Length	Connector	Connection	Ferrites
1	Audio Cable	Host	12cm	Audio	Audio Port (GR-1.5-915)	No

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

General notes:

1. Product has a proprietary audio port cable – host interface.
2. Product did not require any support equipment other than Android phone.

5 Tx Output Power – Tx Fundamental – FCC 15.247(b)(2)

5.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

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

5.2 Specification:

§ 15.247(b)(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

§ 15.247(b)(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

5.3 Test Equipment Used:

<u>Asset ID</u>	<u>Description</u>	<u>Manufacture</u>	<u>Model</u>	<u>Serial</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
E2	RF Port Cable	Teledyne	Blue	-----	04/21/2014	04/21/2015
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 1.0	VBUE	VBUE

5.4 Results:

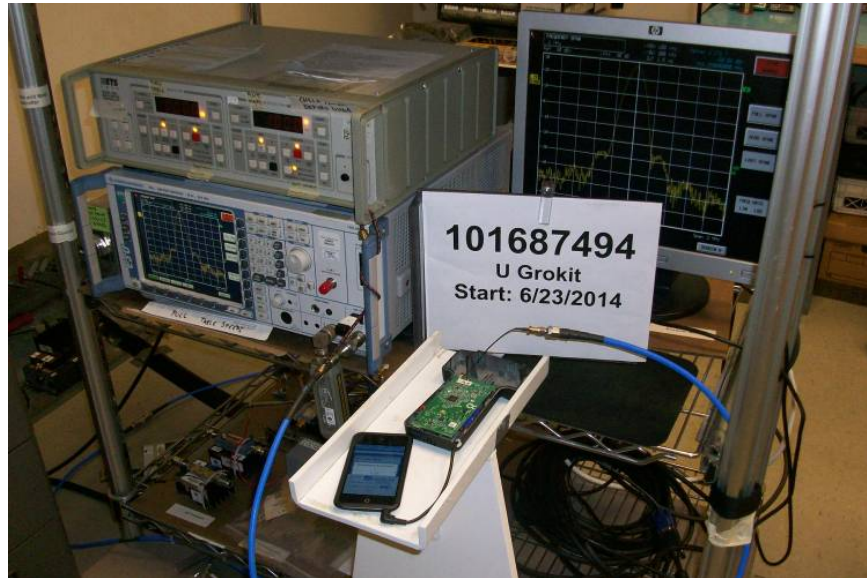
The sample tested was found to Comply.

5.5 Results Summary:

Tx Channel	Frequency (MHz)	Measured Peak Conducted Power (dBm)	RF Port Cable Loss (dB)	Final Peak Conducted Power (dBm)	Peak Conducted Power Limit (dBm)	Margin (dB)	Result
Lowest	902.75	26.05	0.61	26.66	30	-3.34	Pass
Middle	915.25	26.84	0.61	27.45	30	-2.55	Pass
Highest	927.25	26.38	0.61	26.99	30	-3.01	Pass

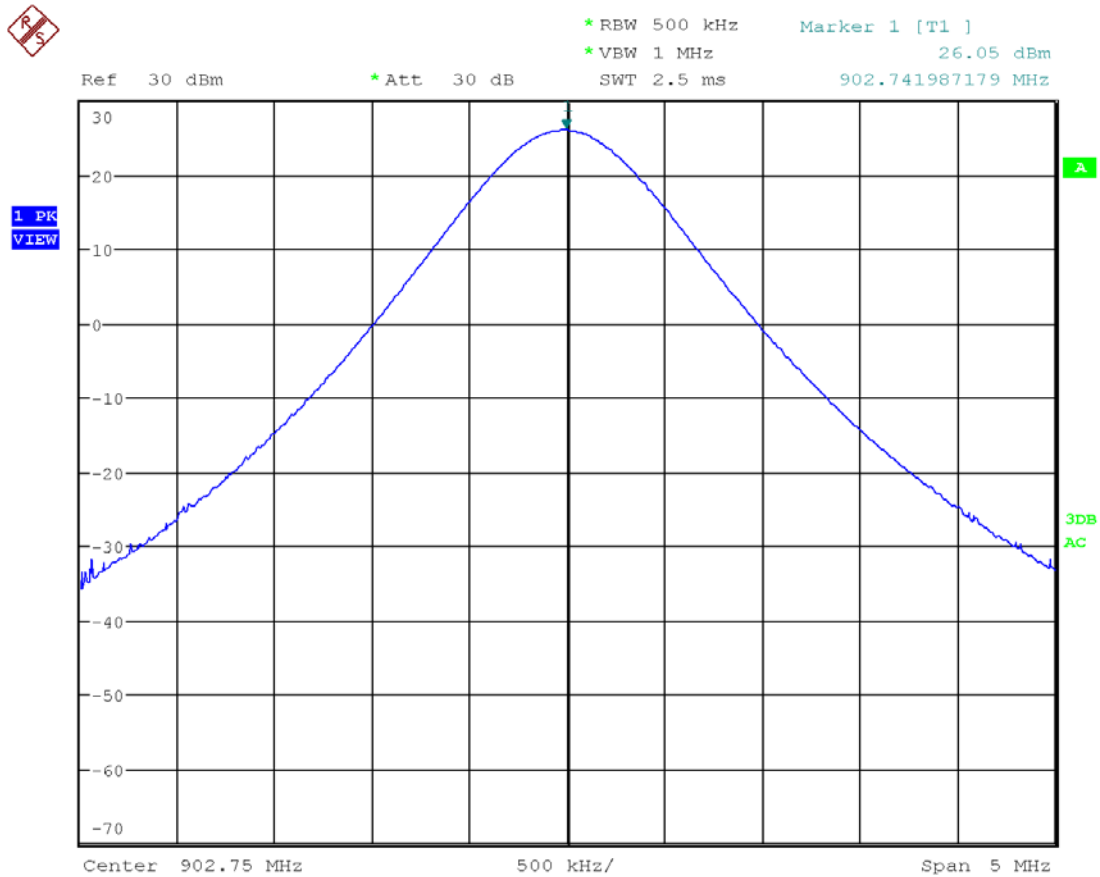
5.6 Setup Photographs:

Test Setup – Tx Maximum Peak Output Power – Fundamental



5.7 Test Data/Plot: Maximum Peak Output Power – Fundamental

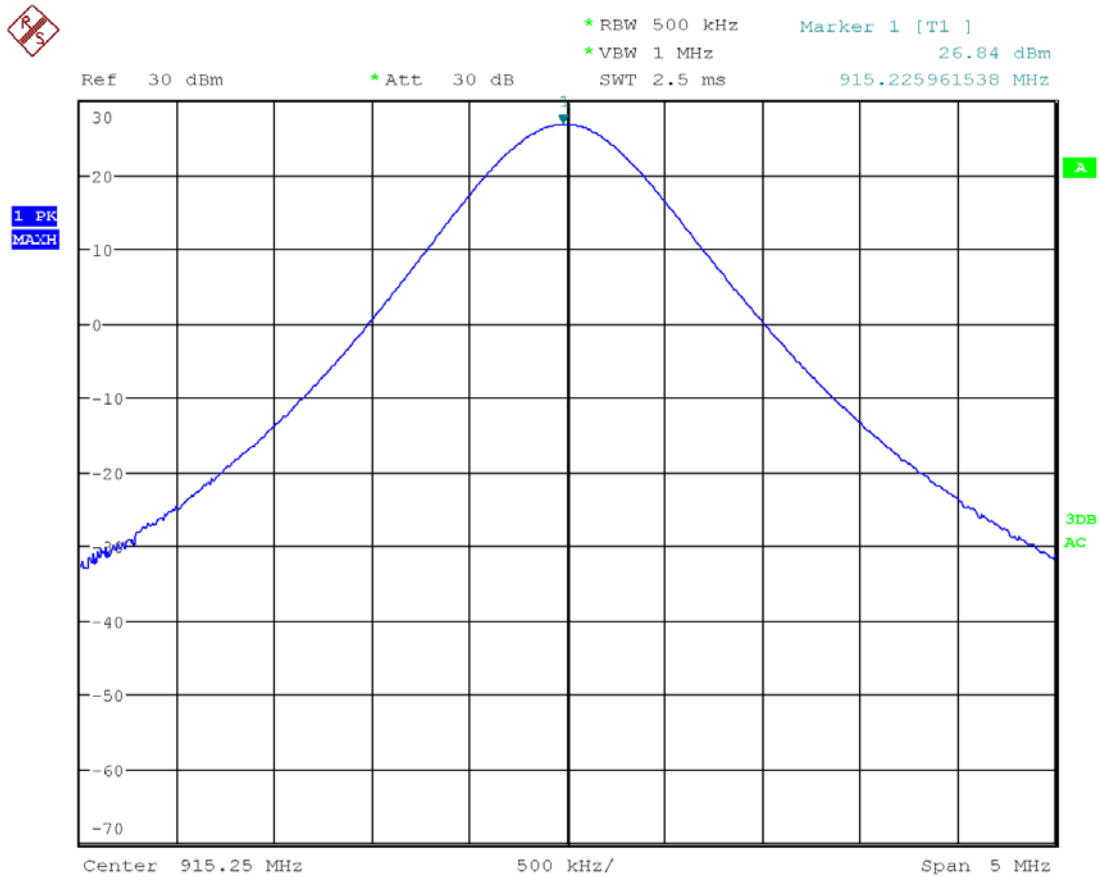
Lowest Channel – 902.75MHz



Date: 23.JUN.2014 09:56:13

5.8 Test Data/Plot: Maximum Peak Output Power – Fundamental

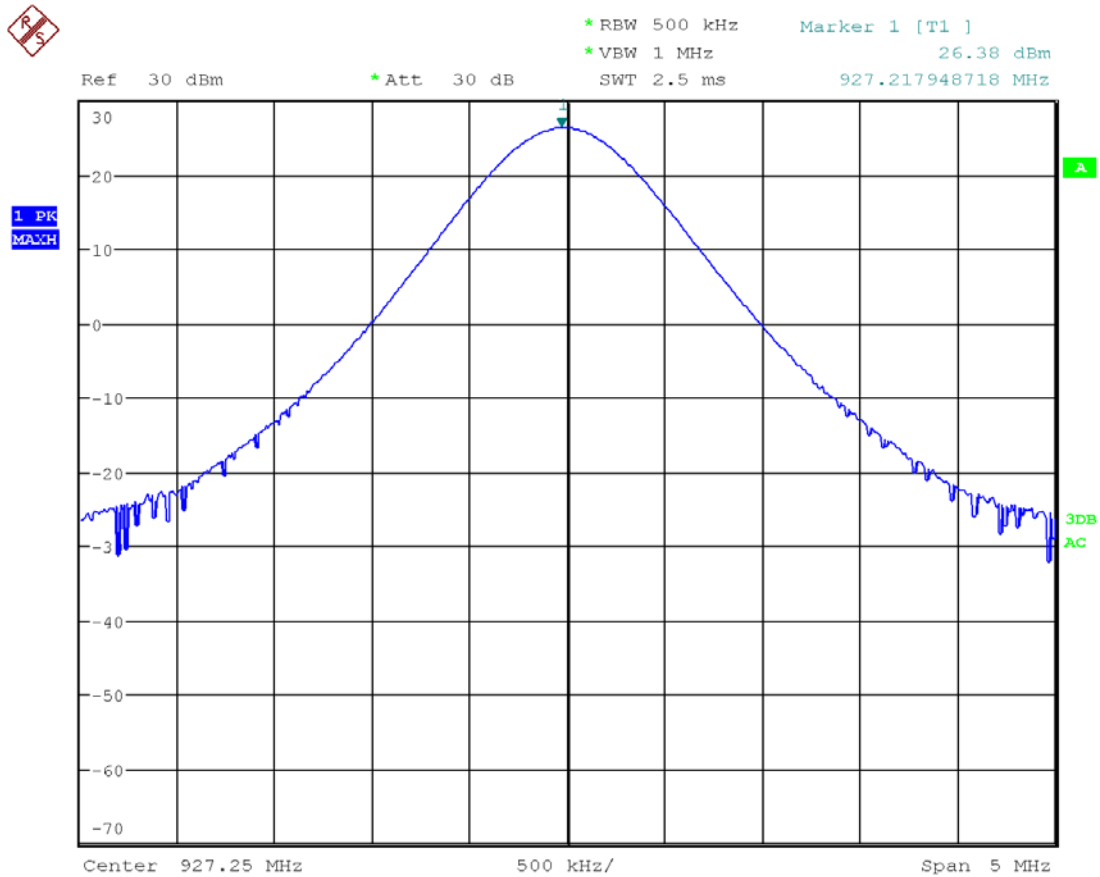
Middle Channel – 915.25MHz



Date: 23.JUN.2014 09:57:05

5.9 Test Data/Plot: Maximum Peak Output Power – Fundamental

Highest Channel – 927.25MHz



Date: 23.JUN.2014 09:57:47

Notes:

1. All Fundamental measurements are RF Conducted Port – max-hold peak detector measurements – 500kHz RBW, which is greater than the 20dB BW.
2. Measurements were corrected for rf port cable loss.

6 Conducted Tx Spurious Emissions of the Fundamental – 20dBc – FCC 15.247(d)

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

- FCC 15.247(d)/ 15.205/209(a)
- RSS-210, A8.5/ RSS-GEN, 7.2.2

6.1 Specification:

§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

6.2 Test Equipment Used:

<u>Asset ID</u>	<u>Description</u>	<u>Manufacture</u>	<u>Model</u>	<u>Serial</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
E2	RF Port Cable	Teledyne	Blue	-----	04/21/2014	04/21/2015
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 1.0	VBV	VBV

6.3 Results:

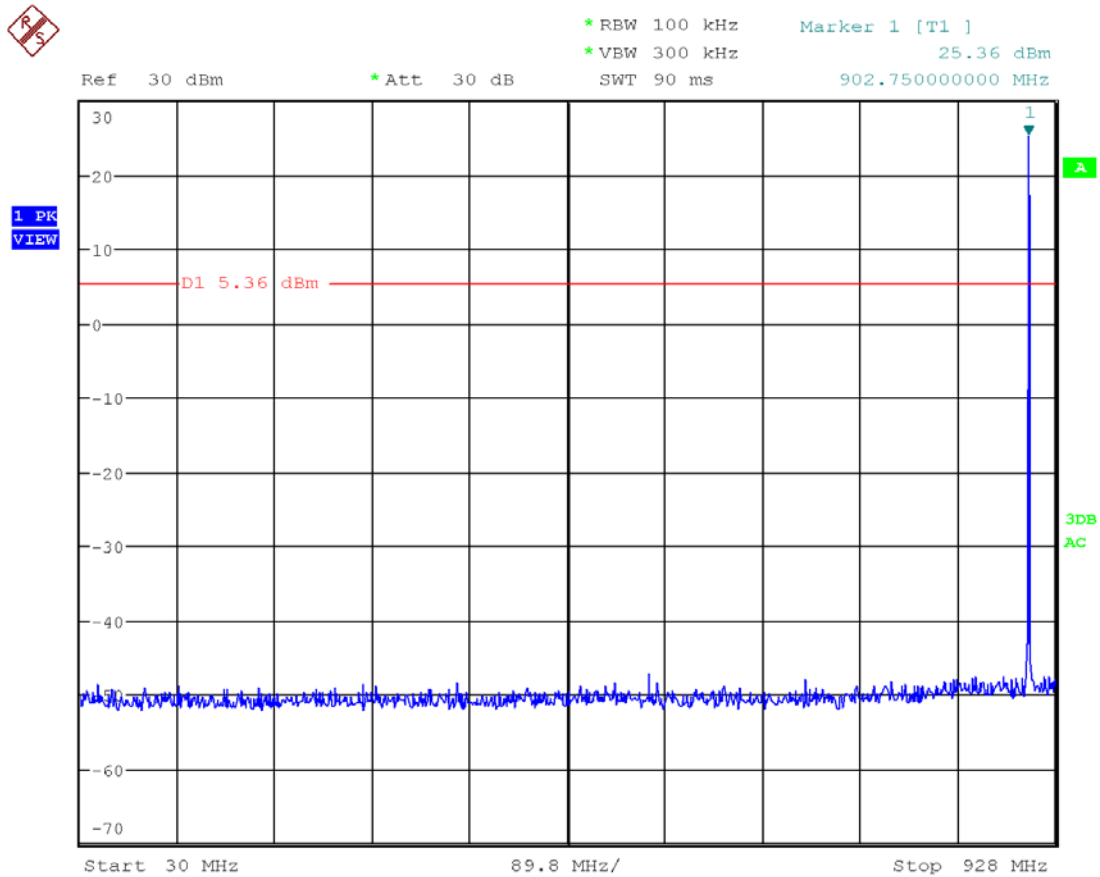
The sample tested was found to Comply.

6.4 Results Summary:

The following plots show that there were no Conducted Tx Spurious emissions exceeding the 20dBc specification.

6.5 Test Plots: Conducted Tx Spurious Emissions of Fundamental – 20dBc

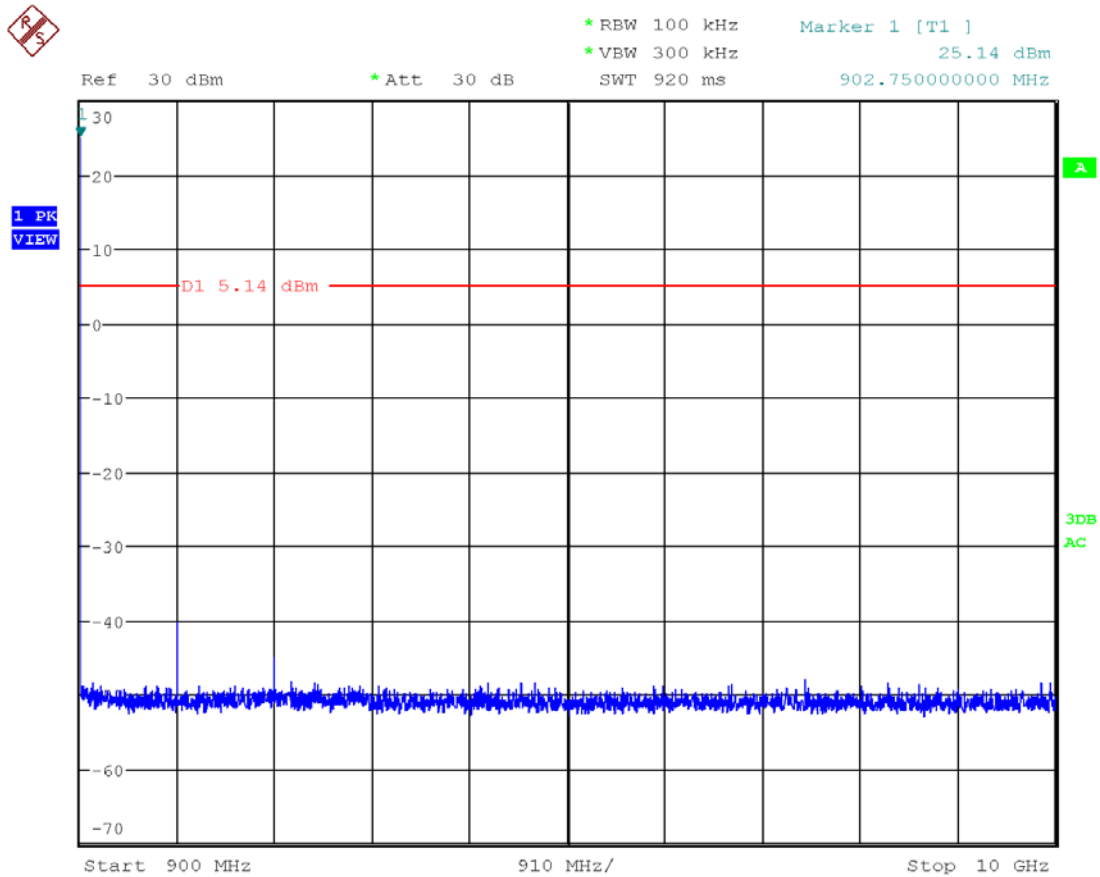
Lowest Channel – 902.75MHz



Date: 24.JUN.2014 16:41:53

6.6 Test Plots: Conducted Tx Spurious Emissions of Fundamental – 20dBc

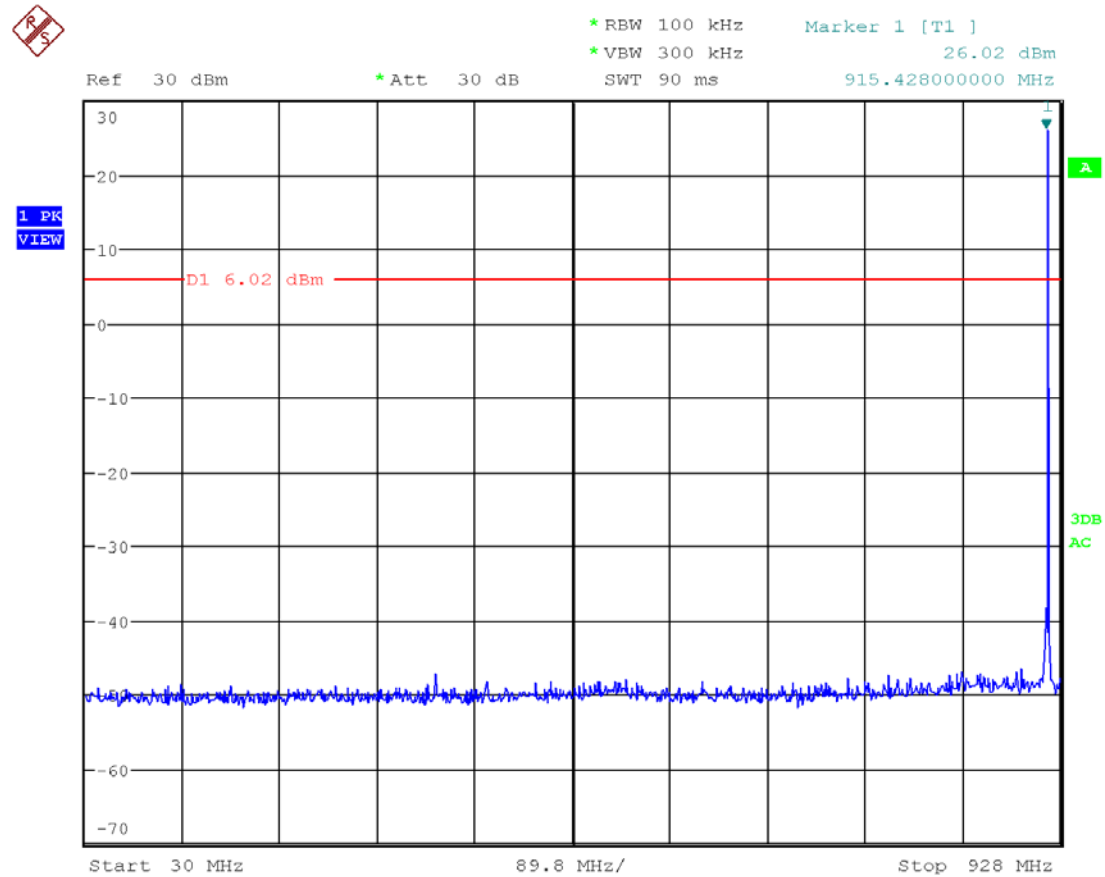
Lowest Channel – 902.75MHz



Date: 24.JUN.2014 16:52:30

6.7 Test Plots: Conducted Tx Spurious Emissions of Fundamental – 20dBc

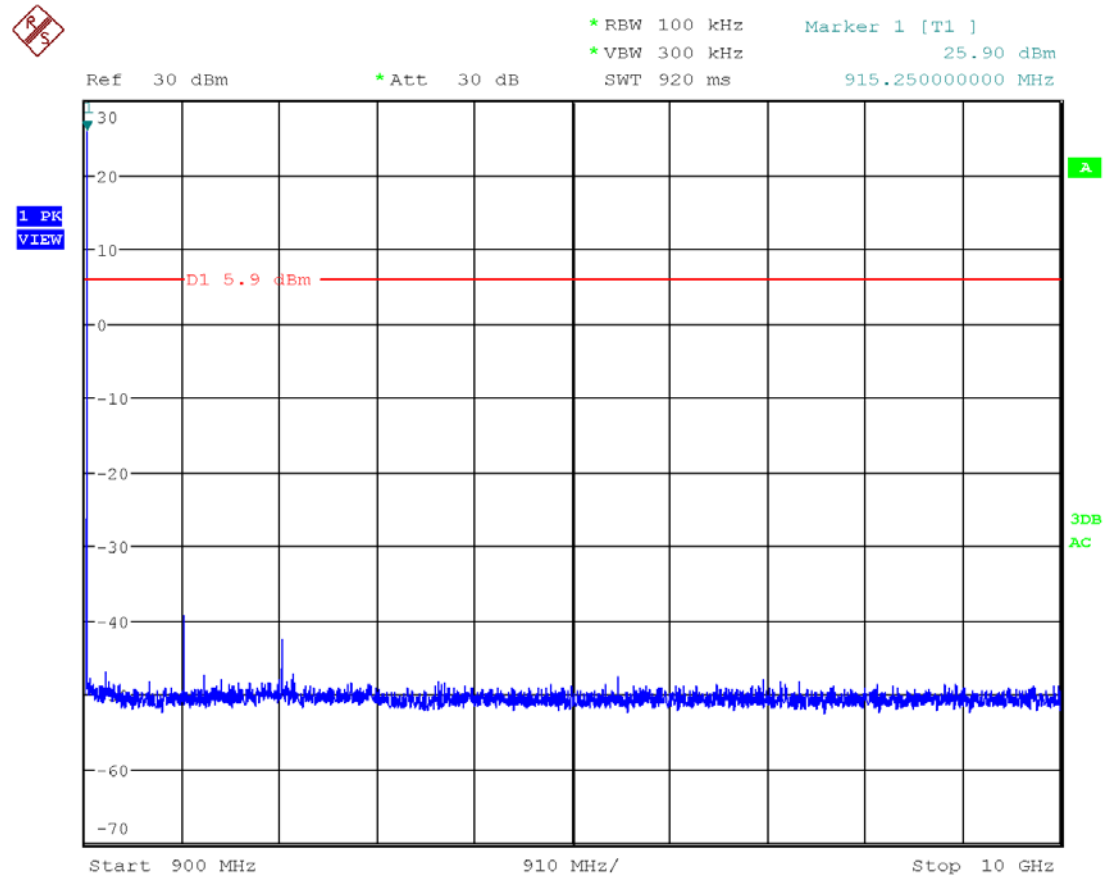
Middle Channel – 915.25MHz



Date: 24.JUN.2014 16:43:23

6.8 Test Plots: Conducted Tx Spurious Emissions of Fundamental – 20dBc

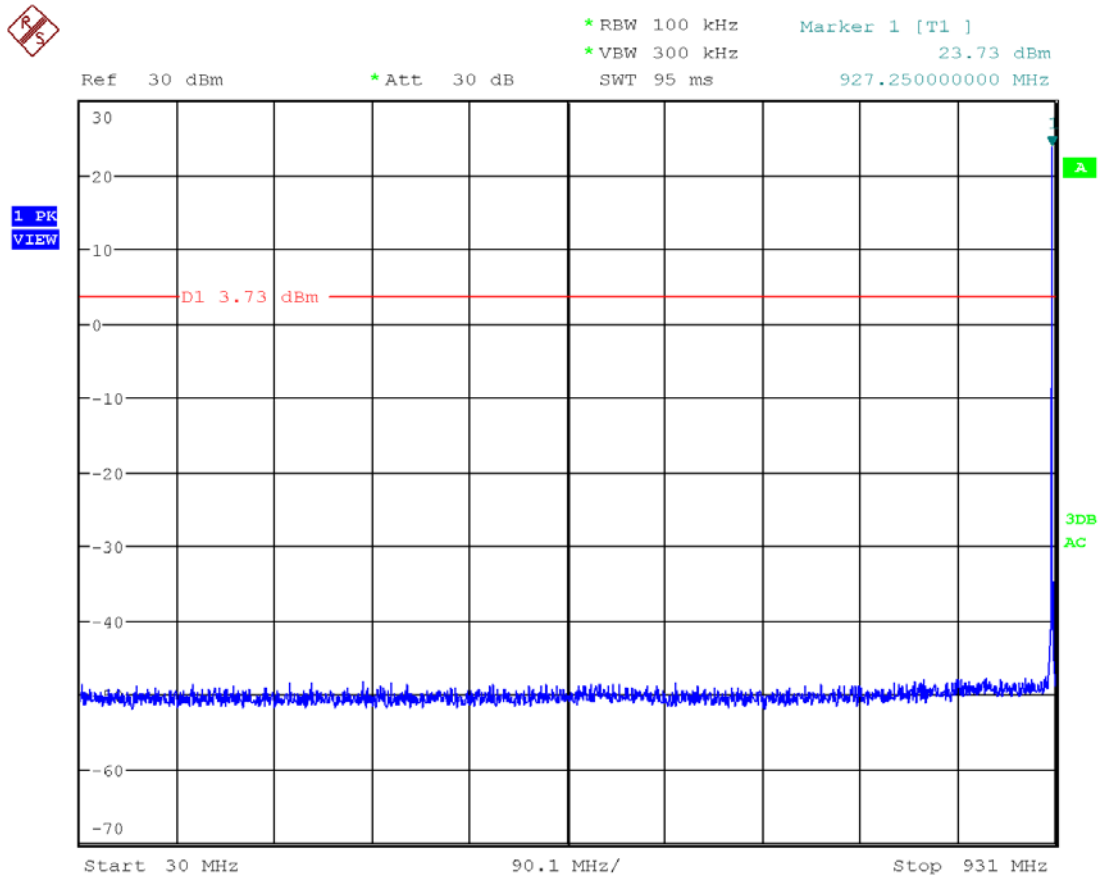
Middle Channel – 915.25MHz



Date: 24.JUN.2014 16:51:18

6.9 Test Plots: Conducted Tx Spurious Emissions of Fundamental – 20dBc

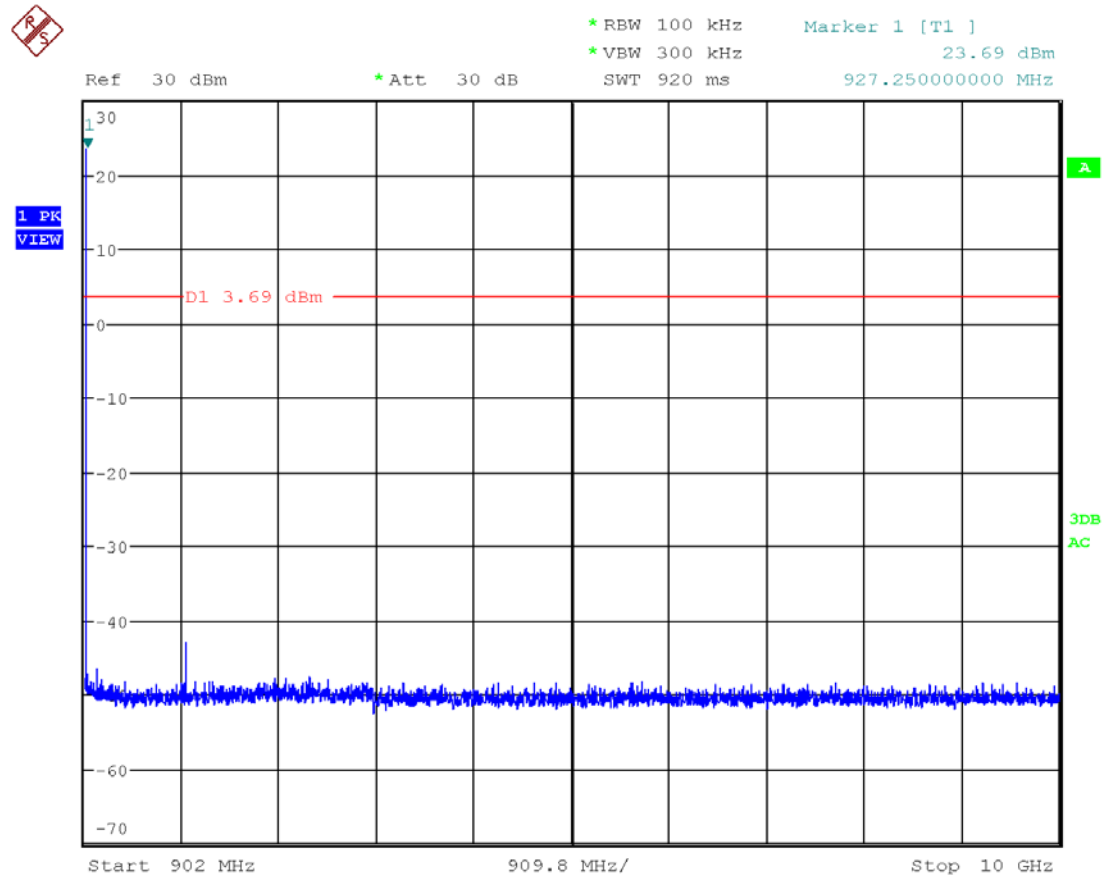
Highest Channel – 927.25MHz



Date: 24.JUN.2014 16:46:57

6.10 Test Plots: Conducted Tx Spurious Emissions of Fundamental – 20dBc

Highest Channel – 927.25MHz



Date: 24.JUN.2014 16:49:56

7 FCC 15.247(d)/ 15.209(a)/15.205 Radiated Emissions – Tx Harmonics of the Fundamental – Includes Restricted Band

7.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

- FCC 15.247(d)/ 15.205/209(a)
- RSS-210, A8.5/ RSS-GEN, 7.2.2

7.2 Specification:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

FCC 15.209(a)/ 15.205/ 15.35(b): Restricted Band, QP ≤ 1GHz, Average/Peak > 1GHz)

7.3 Test Equipment Used:

<u>Asset ID</u>	<u>Description</u>	<u>Manufacture</u>	<u>Model</u>	<u>Serial</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	05/21/2014	05/21/2015
18906	RF Pre-Amp (1-4GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	05/23/2014	05/23/2015
DEN-032	4-18 GHz LNA	NARDA	DBL-0618N615	031	03/08/2014	03/08/2015
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/13/2013	11/13/2014
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	03/20/2014	03/20/2015
DEN-060	1GHz low Pass Filter	Mini-Circuits	VHF-1300+	3 1022	12/19/2013	12/19/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 2.0	VBU	VBU

7.4 Results:

The sample tested was found to Comply.

7.5 Results Summary:

Tx Channel	Frequency (MHz)	Final Radiated Field Strength Peak (dBuV/m)	Final Radiated Field Strength Average (dBuV/m)	Radiated Field Strength Limit Peak (dBuV/m)	Radiated Field Strength Limit Average (dBuV/m)	Limit Margin Peak (dB)	Limit Margin Average (dB)	Result
Harmonics within FCC Restricted Band								
Low	2708.25	56.81	46.30	74.00	54.00	- 17.19	- 7.70	Pass
Middle	2745.75	59.71	49.20	74.00	54.00	- 14.29	- 4.80	Pass
High	2781.75	58.94	48.43	74.00	54.00	15.06	- 5.57	Pass

Note: Final Radiated Field Strength Average includes measured 10.51dB duty-cycle correction for pulsed emissions.

Note: Per FCC 15.35(b) – when an average limit is specified, there is also a peak limit that is 20dB above the average limit.

7.6 Setup Photographs:

Test Setup – Tx Spurious Harmonics of Fundamental

(Front View)



(Front View)



Photo: Product Test Axes

Product Test Axis 1



Product Test Axis 2



Product Test Axis 3



Photo:

Antenna Setup (30-1000 MHz)



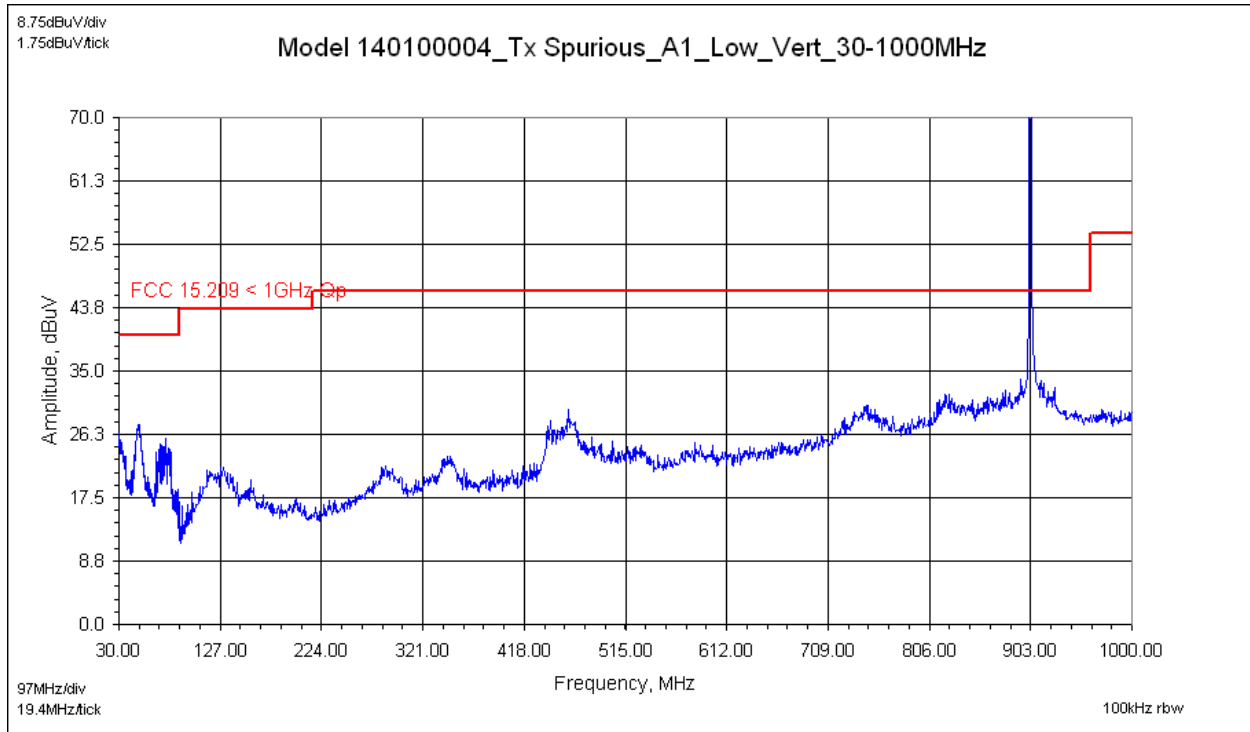
Antenna Setup (1-10 GHz)



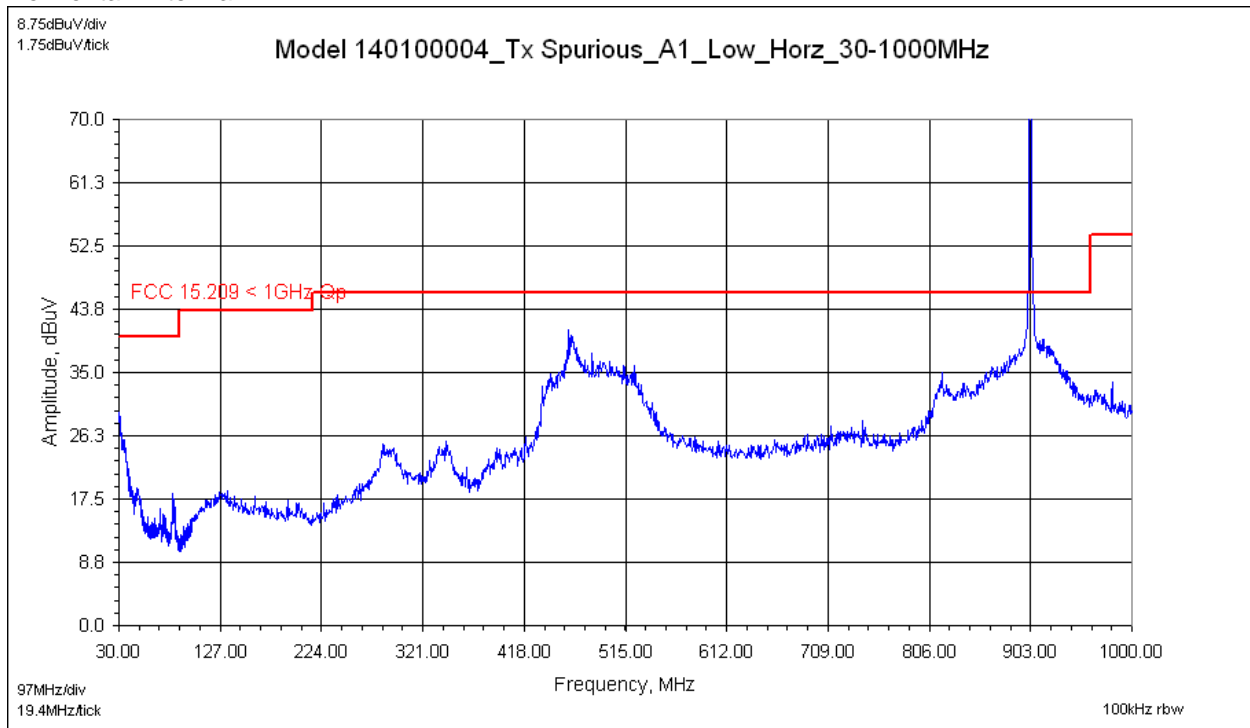
7.7 Test Plots: Low Channel - Product Test Axis 1 – 30MHz to 1000MHz

Low Channel – 902.75MHz

Vertical Antenna



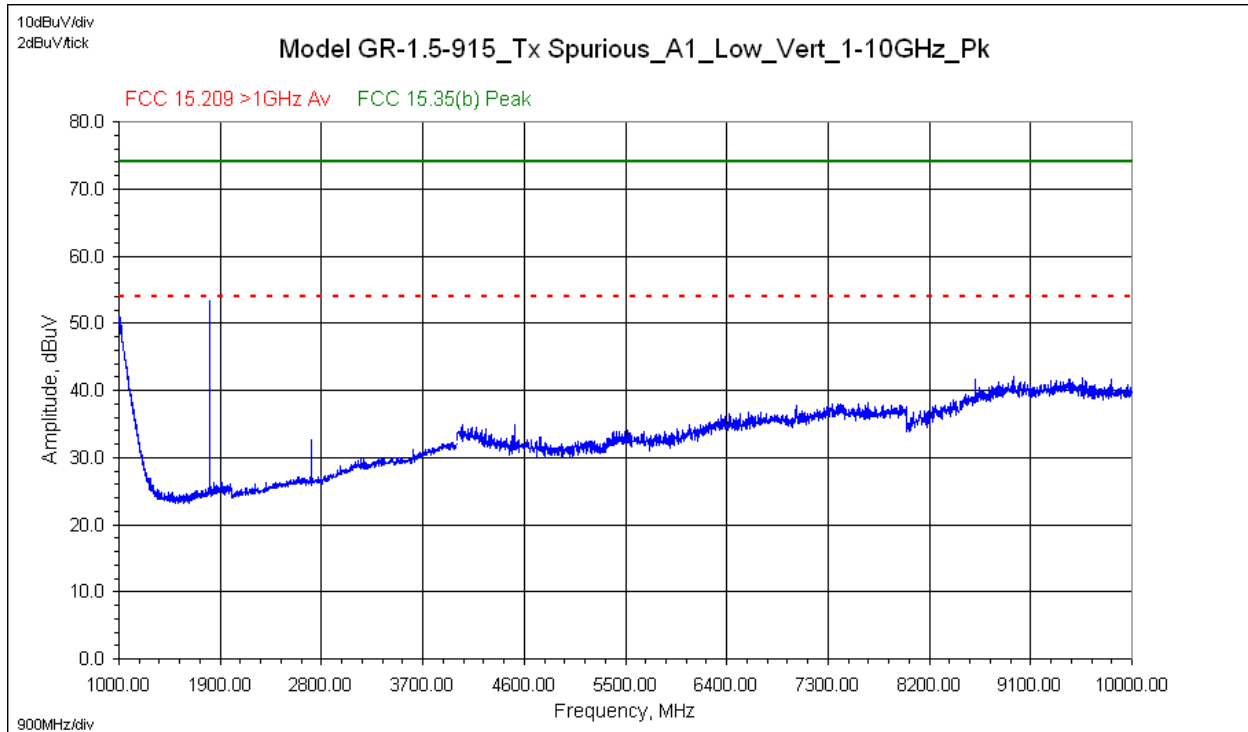
Horizontal Antenna



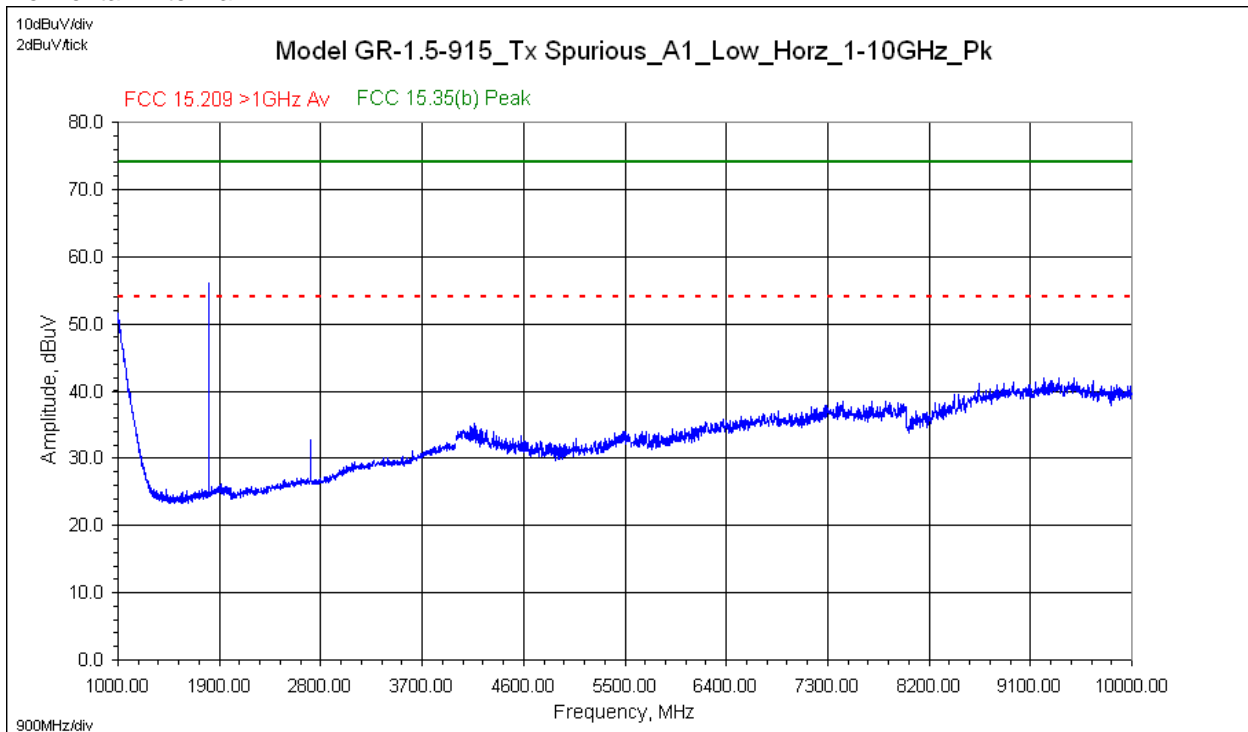
7.8 Test Plots: Low Channel - Product Test Axis 1 – 1GHz to 10GHz

Low Channel – 902.75MHz

Vertical Antenna



Horizontal Antenna

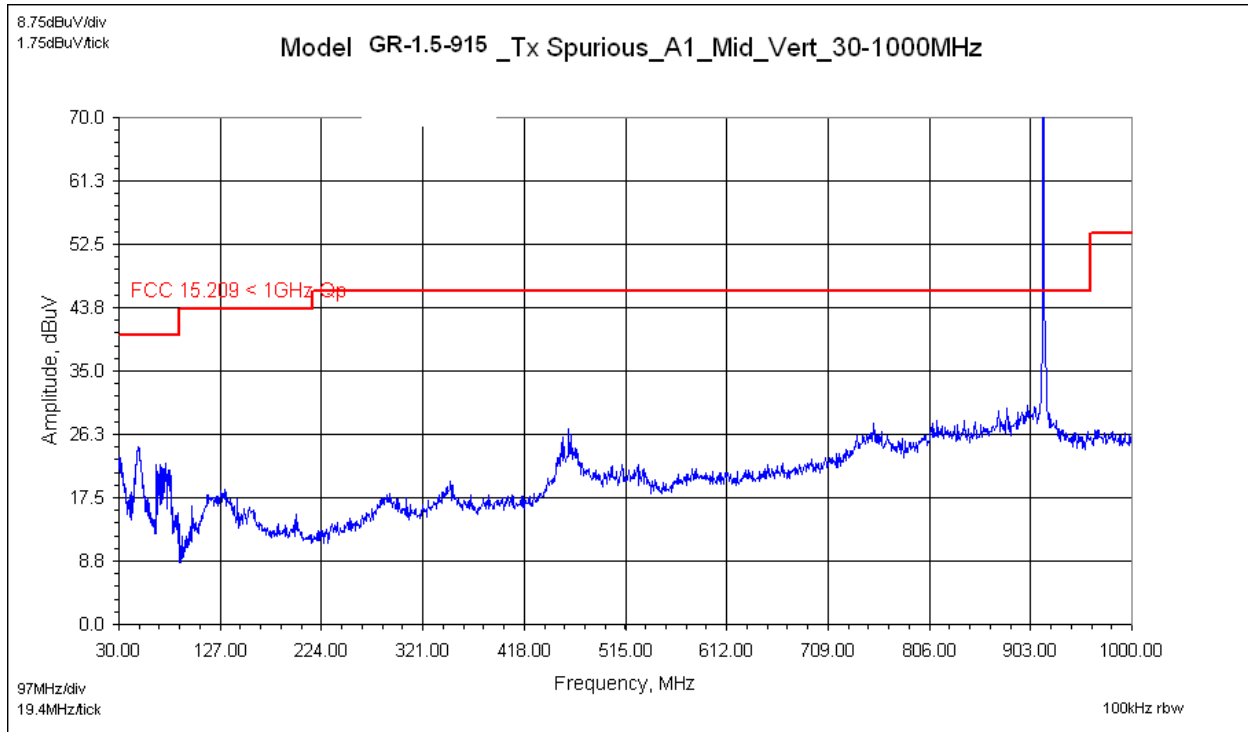


Note: Investigation was performed in other EUT axis. The worst-case data was reported.

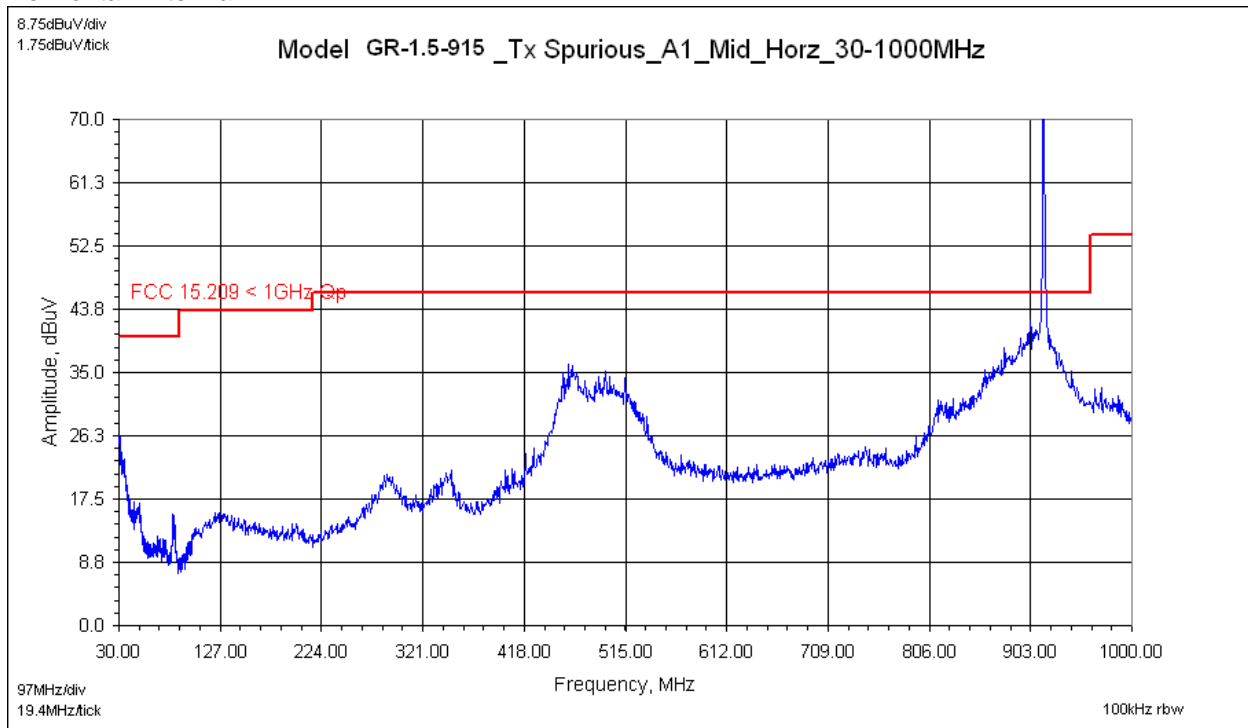
7.9 Test Plots: Mid Channel - Product Test Axis 1 – 30MHz to 1000MHz

Middle Channel – 915.25MHz

Vertical Antenna



Horizontal Antenna

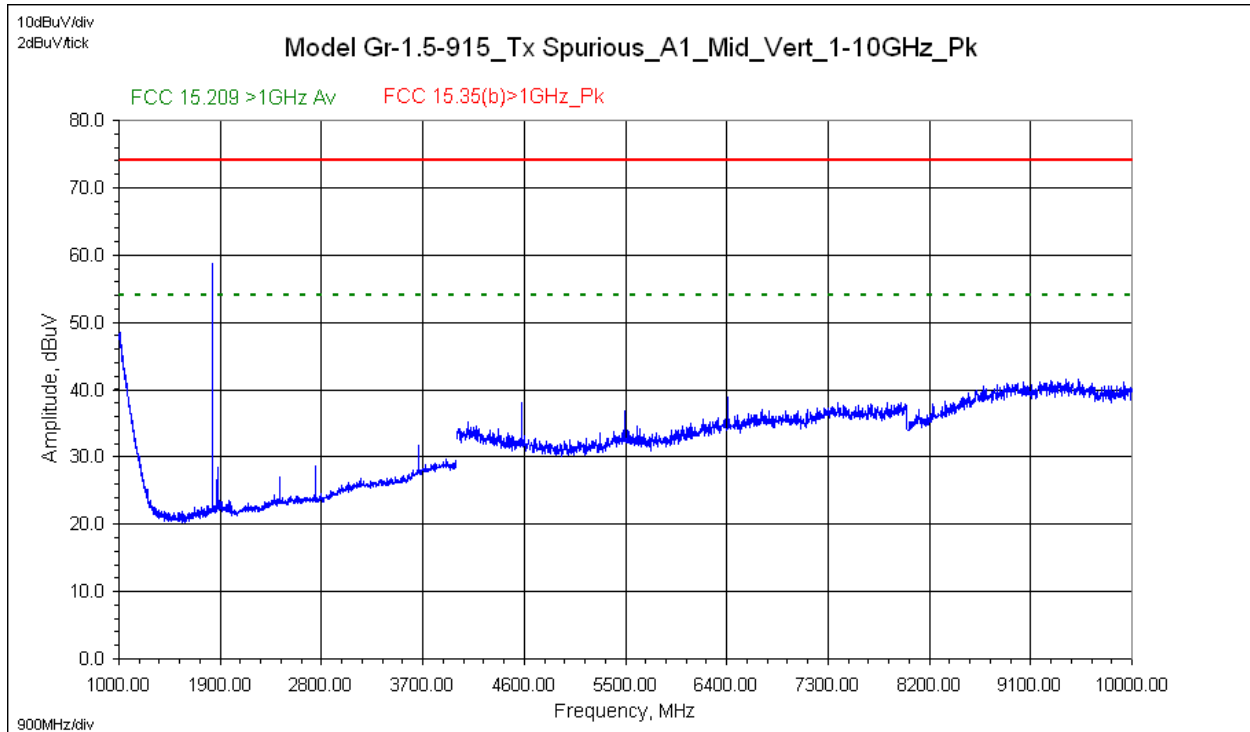


Peak detector, max-hold referenced to QP limit

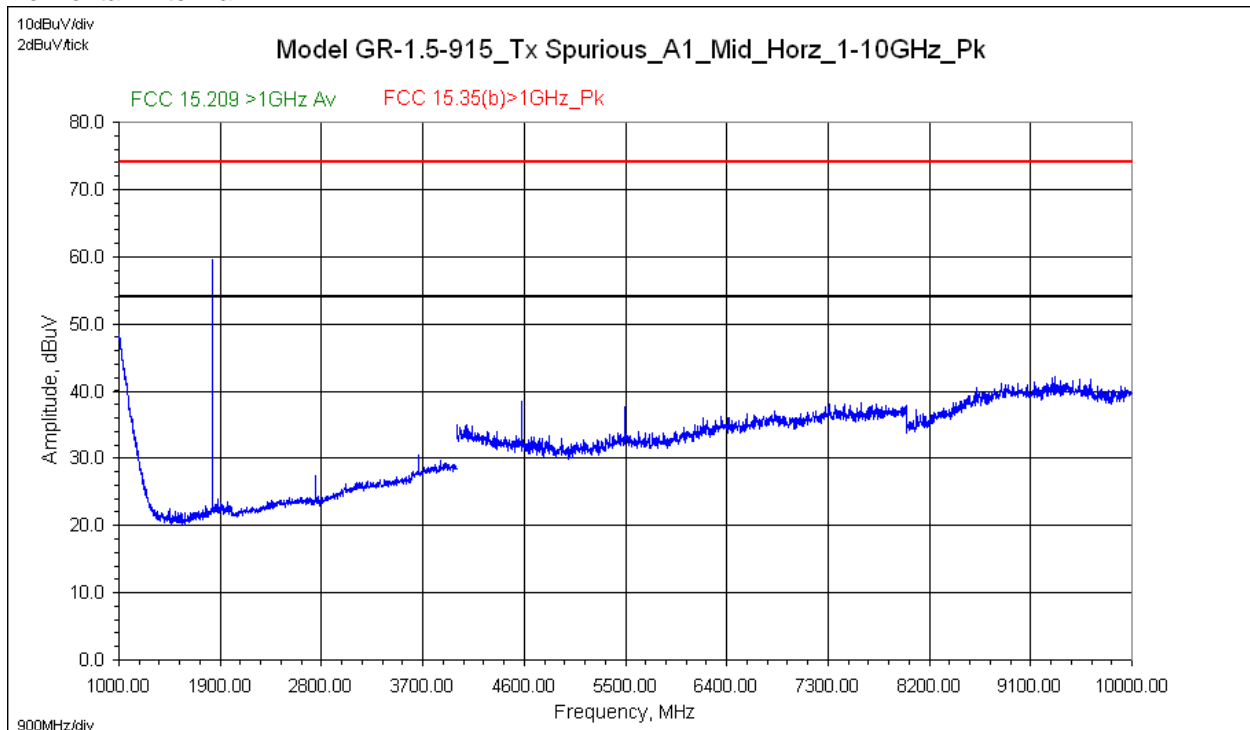
7.10 Test Plots: Mid Channel - Product Test Axis 1 – 1GHz to 10GHz

Middle Channel – 915.25MHz

Vertical Antenna



Horizontal Antenna

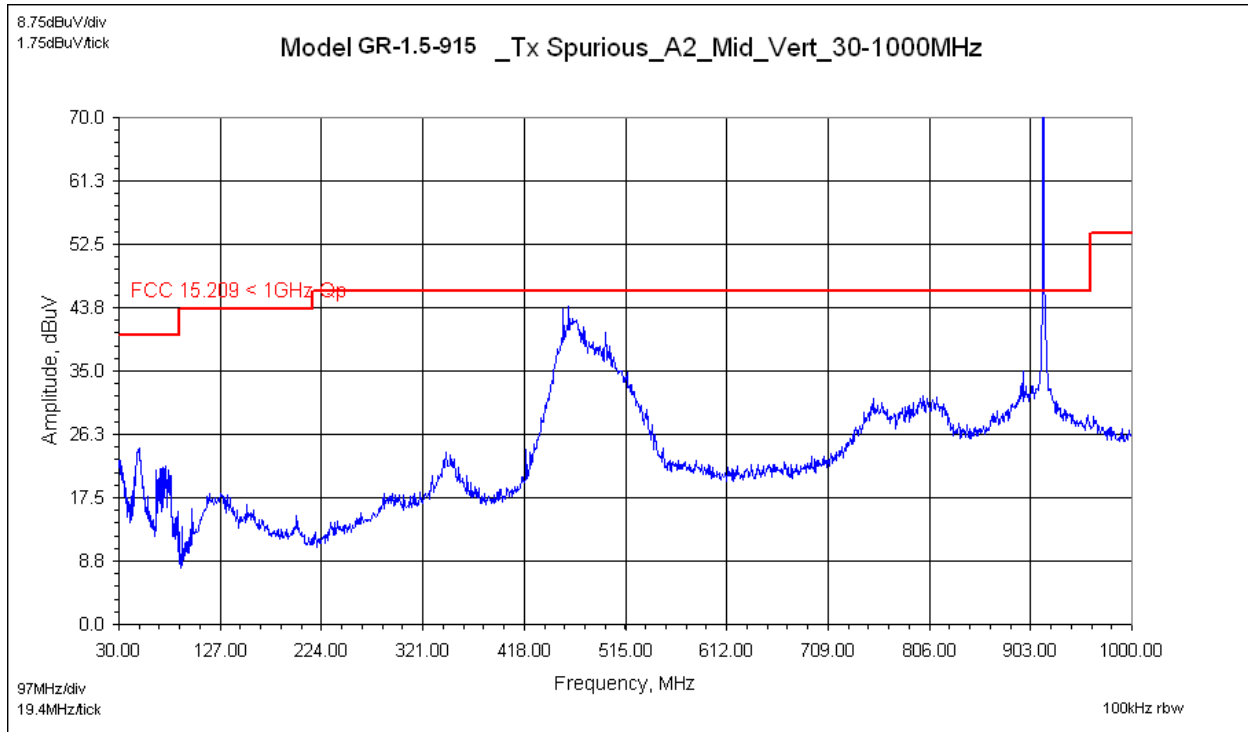


Peak detector, max-hold referenced to average & peak limits

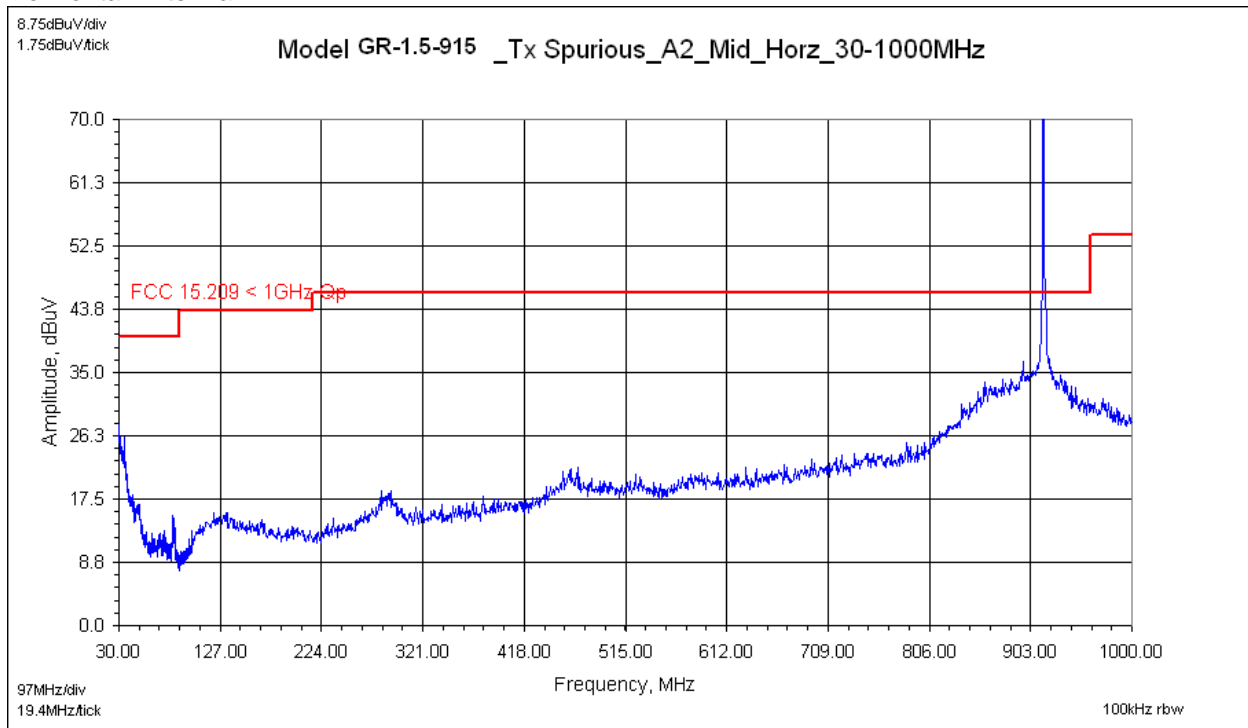
7.11 Test Plots: Mid Channel - Product Test Axis 2 – 30MHz to 1000MHz

Middle Channel – 915.25MHz

Vertical Antenna



Horizontal Antenna

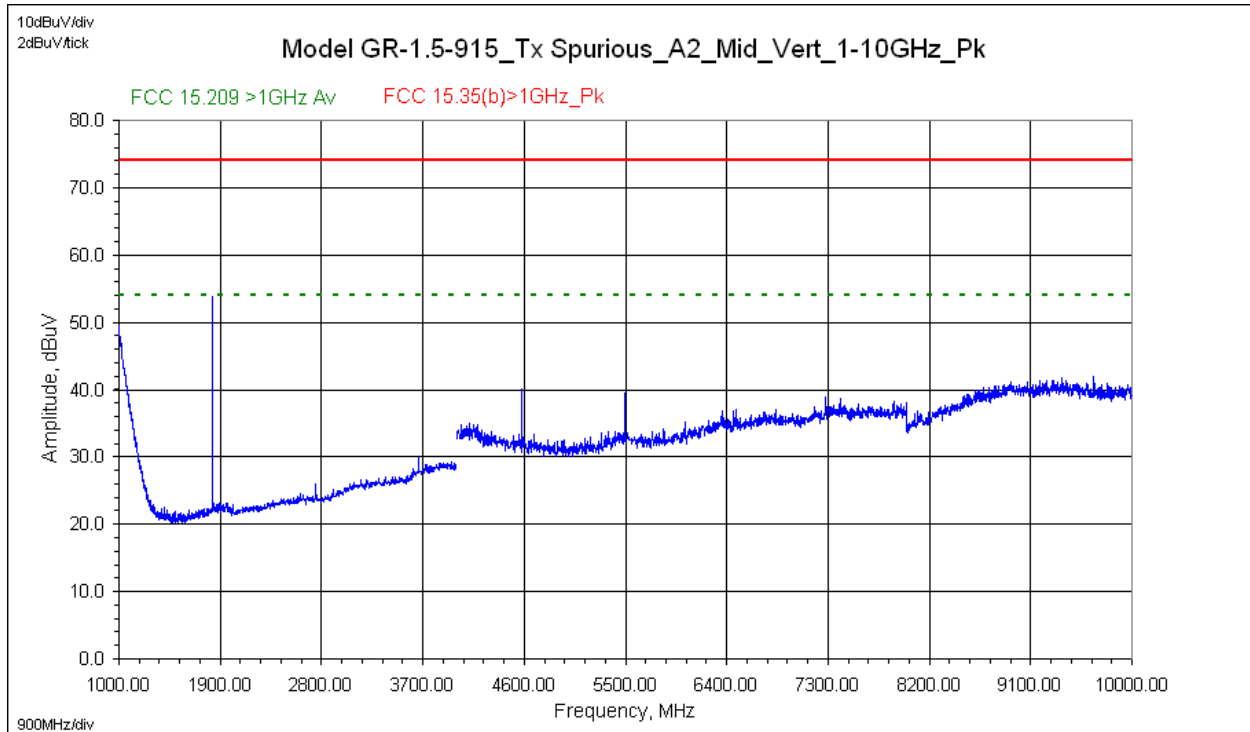


Peak detector, max-hold referenced to QP limit

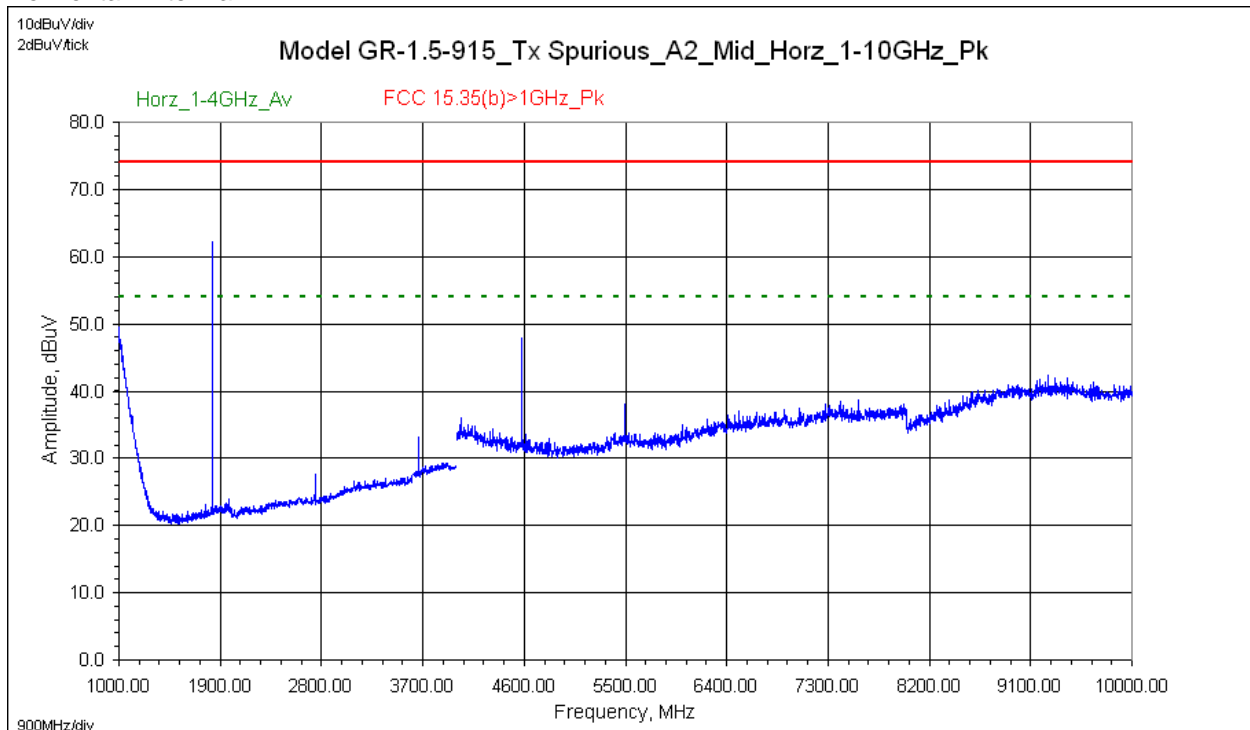
7.12 Test Plots: Mid Channel - Product Test Axis 2 – 1GHz to 10GHz

Middle Channel – 915.25MHz

Vertical Antenna



Horizontal Antenna

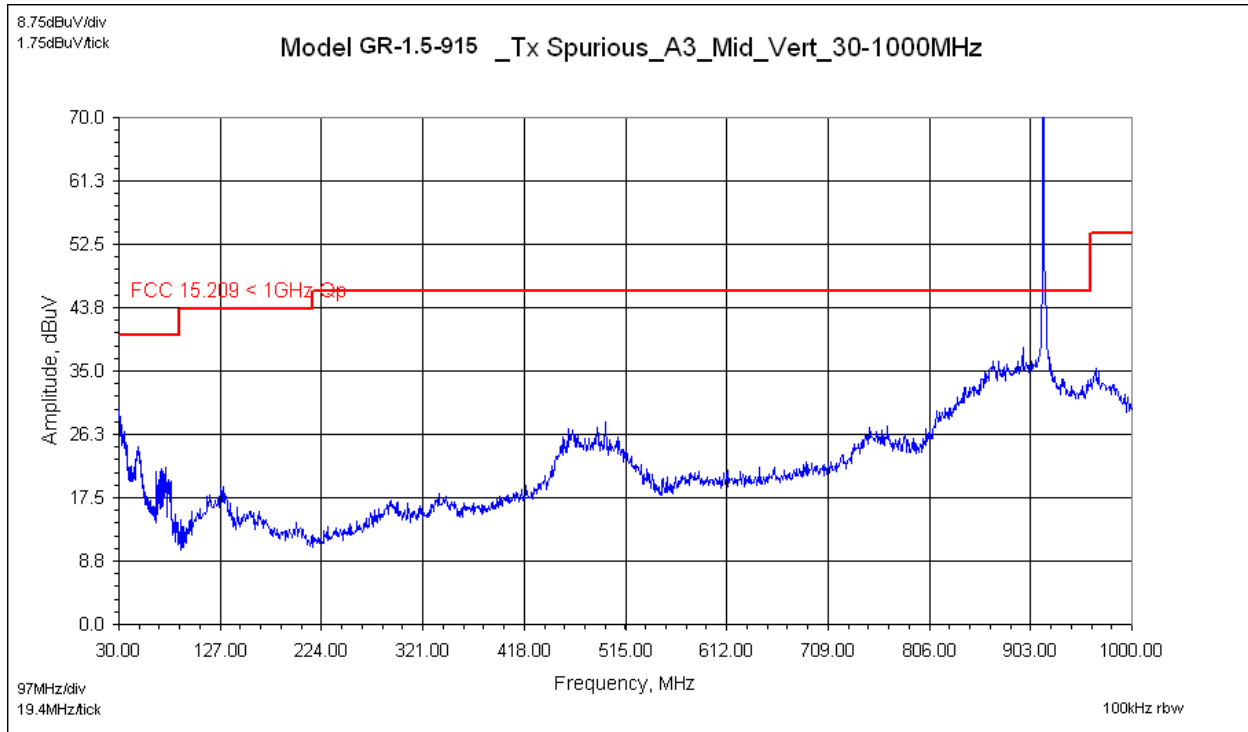


Peak detector, max-hold referenced to average & peak limits

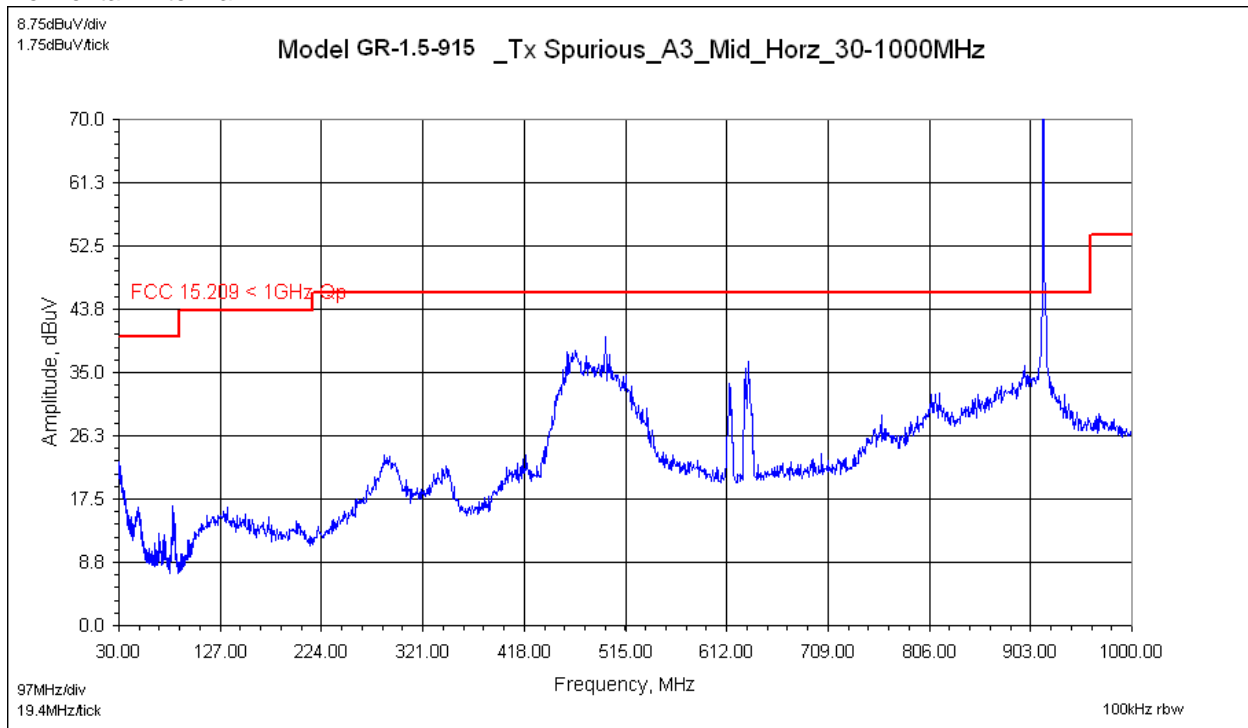
7.13 Test Plots: Mid Channel - Product Test Axis 3 – 30MHz to 1000MHz

Middle Channel – 915.25MHz

Vertical Antenna



Horizontal Antenna

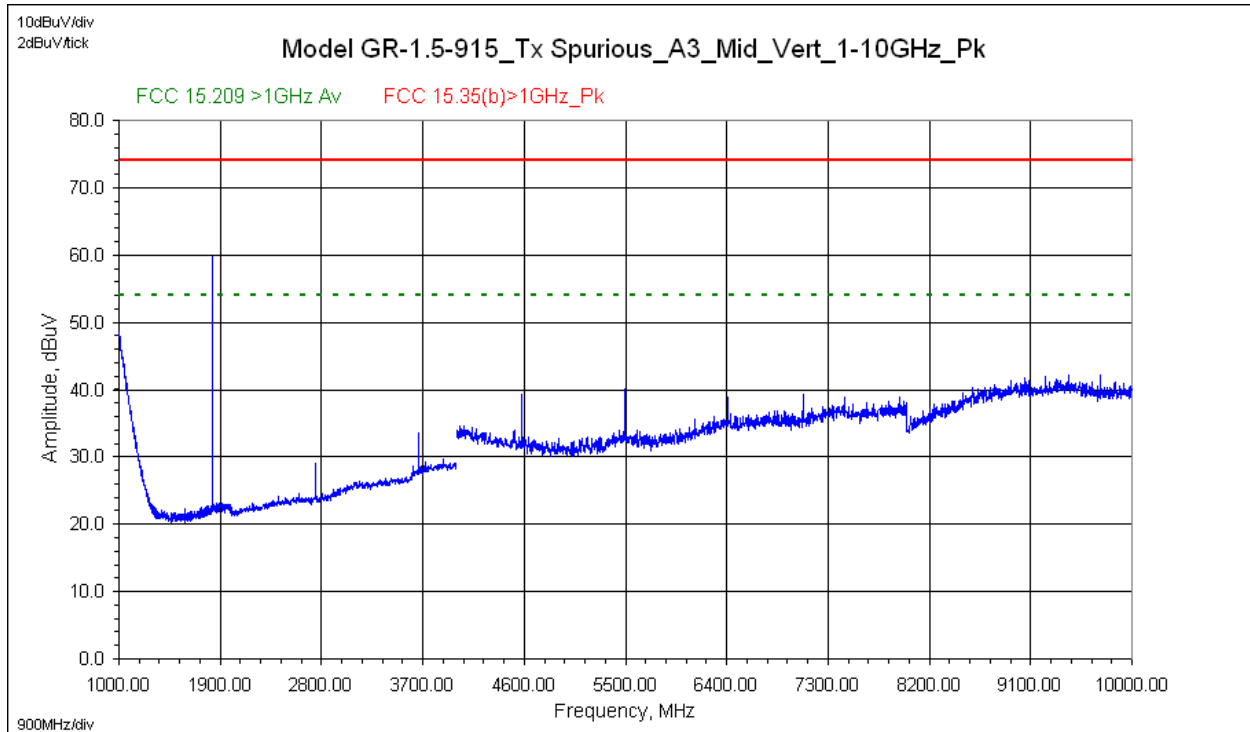


Peak detector, max-hold referenced to QP limit

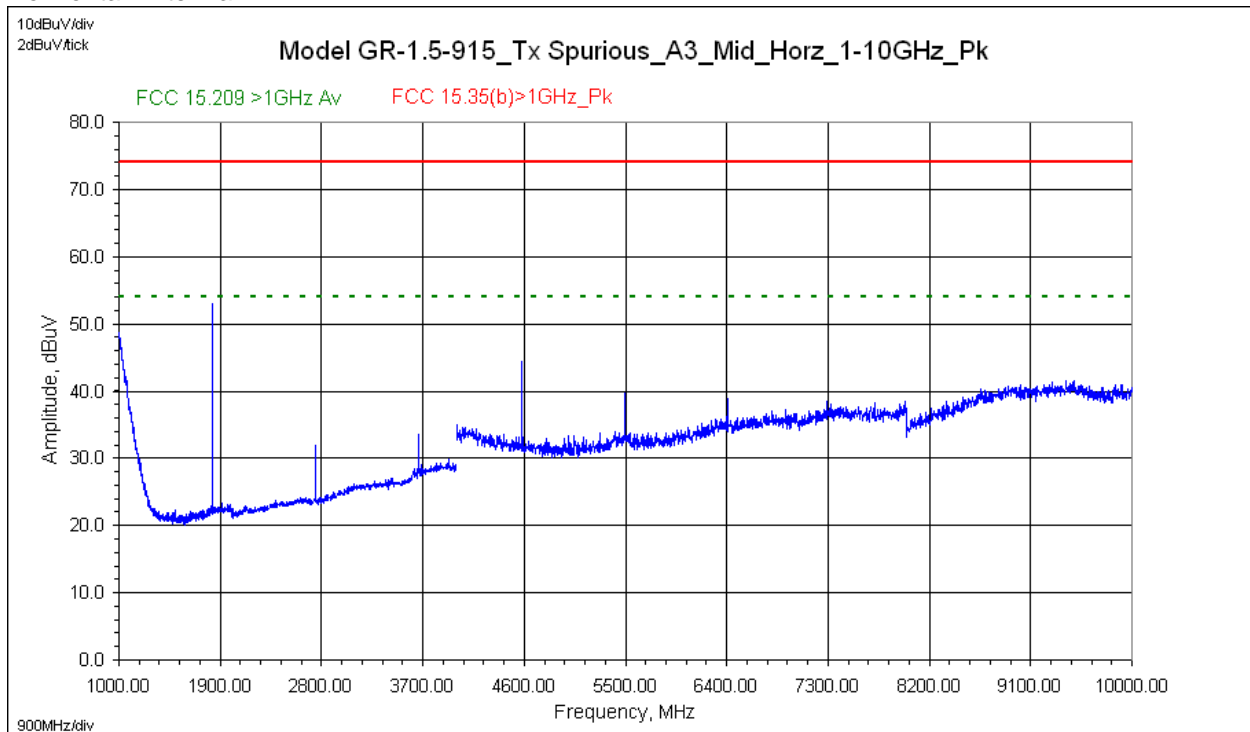
7.14 Test Plots: Mid Channel - Product Test Axis 3 – 1GHz to 10GHz

Middle Channel – 915.25MHz

Vertical Antenna



Horizontal Antenna

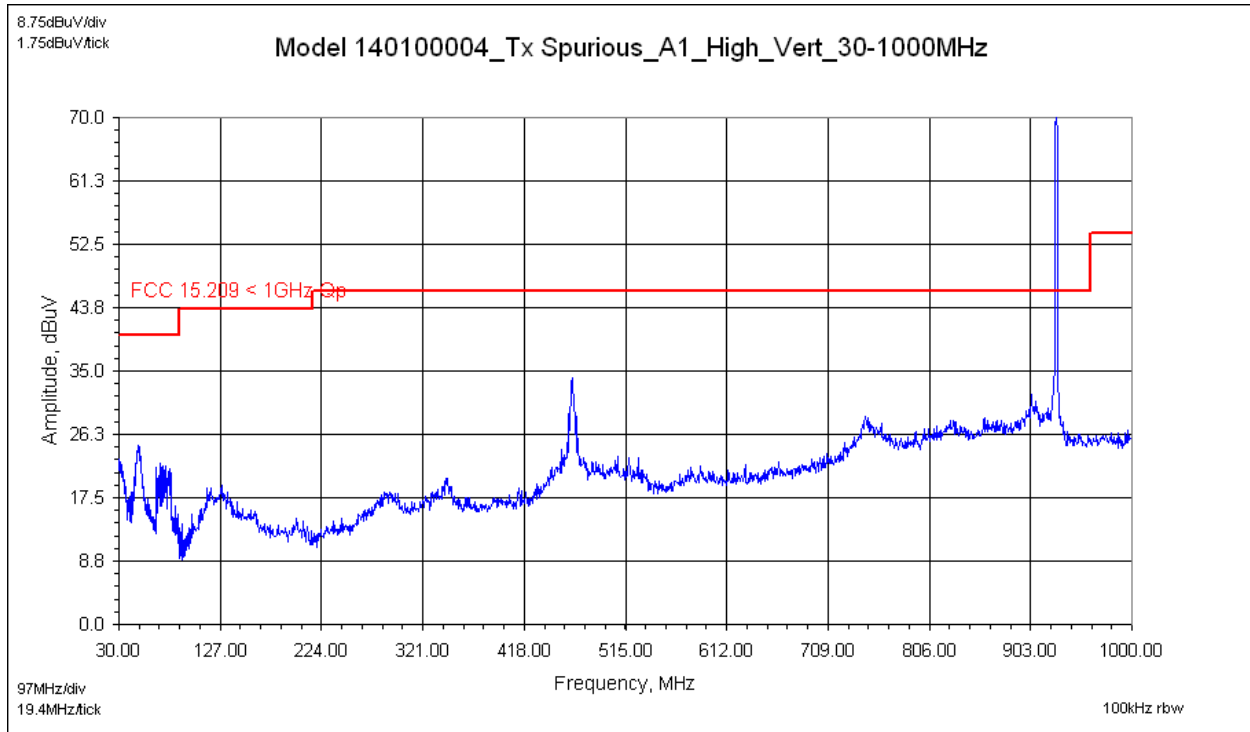


Peak detector, max-hold referenced to average & peak limits

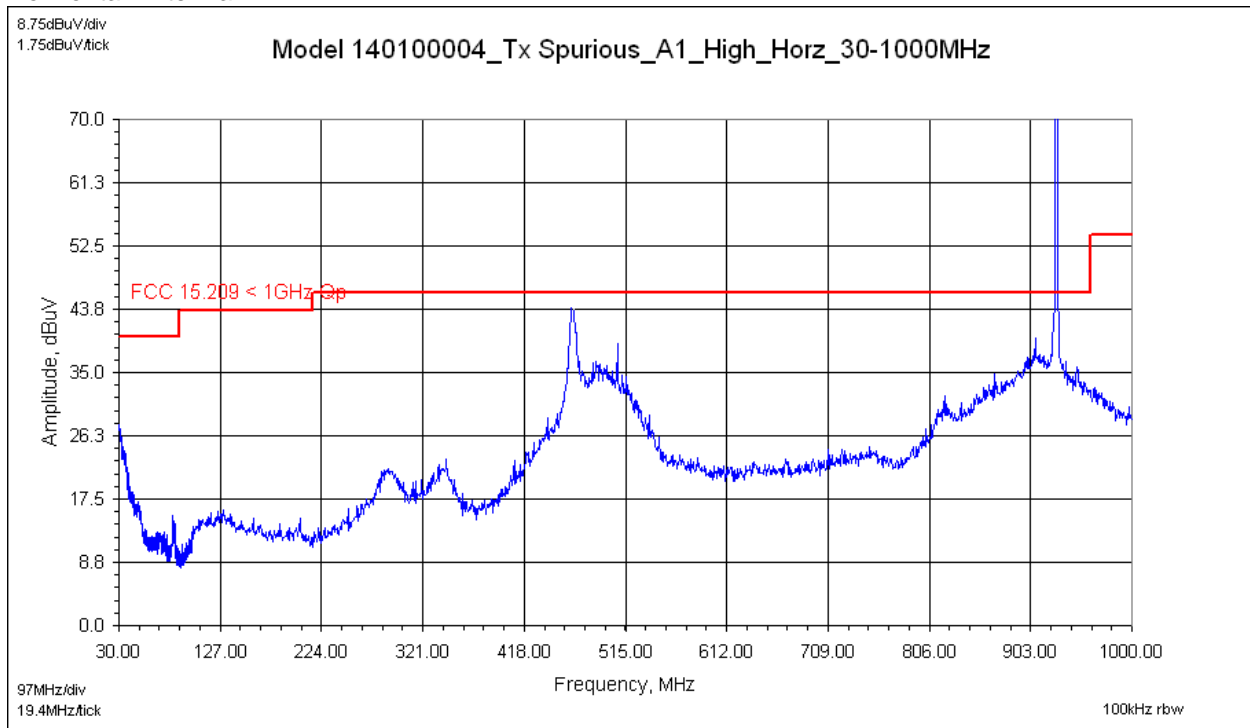
7.15 Test Plots: High Channel - Product Test Axis 1 – 30MHz to 1000MHz

High Channel – 927.25MHz

Vertical Antenna



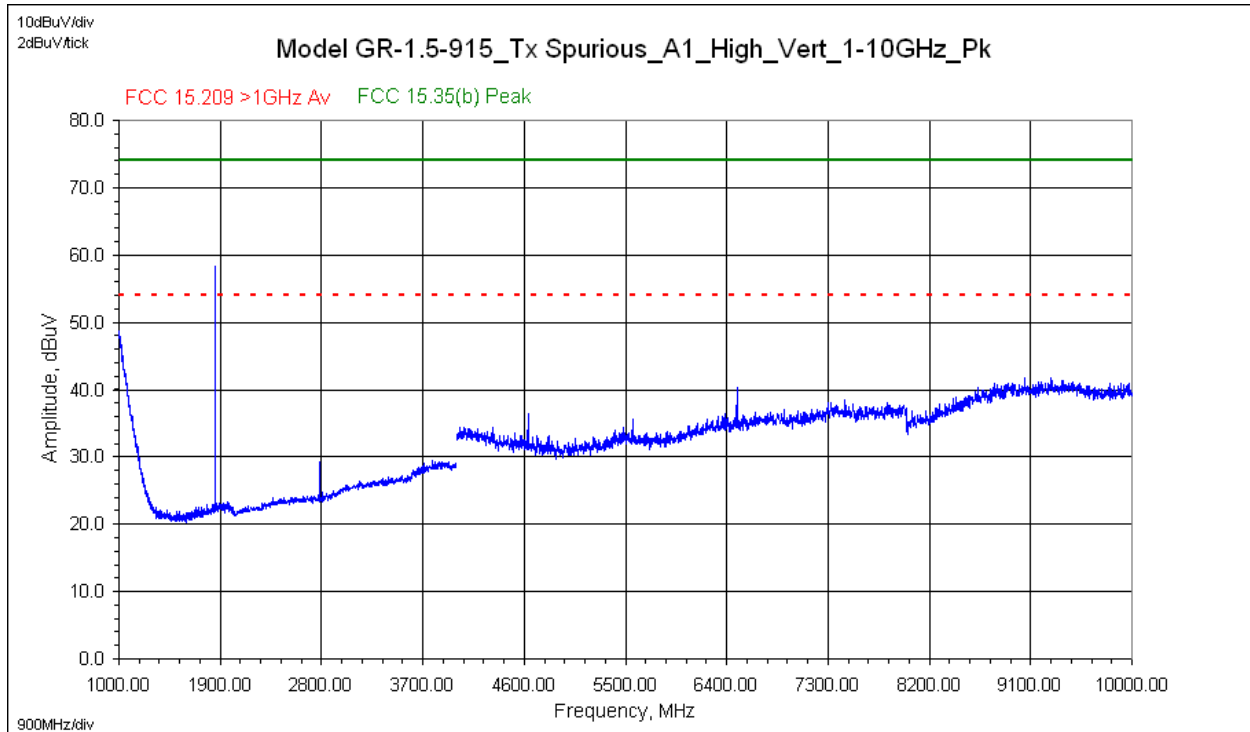
Horizontal Antenna



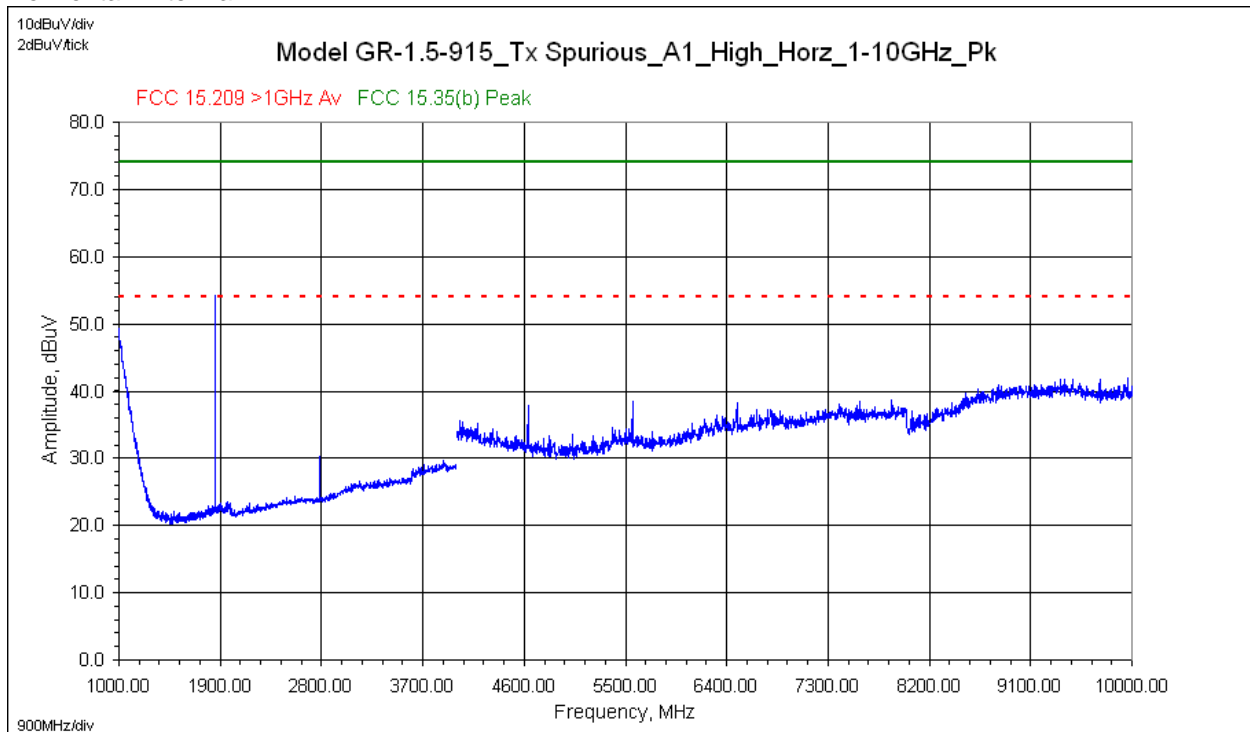
7.16 Test Plots: High Channel - Product Test Axis 1 – 1GHz to 10GHz

High Channel – 927.25MHz

Vertical Antenna



Horizontal Antenna



Note: Investigation was performed in other EUT axis. The worst-case data was reported.

7.17 Test Data: Tx Spurious Harmonics of the Fundamental – Restricted Band

Radiated Electromagnetic Emissions – Low Channel - Average

Test Report #: G101687494	Test Area: CC1 Radiated	Temperature: <u>24.1</u> °C
Test Method: FCC 15.205/ 15.209	Test Date: <u>06/24/2014</u>	Relative Humidity: <u>28.7</u> %
EUT Model #: GR-1.5-915	EUT Power: 3VDC Internal Battery	Air Pressure: <u>83.3</u> kPa
EUT Serial #: DVT102		

Manufacturer: U Grok It	<table border="1"> <tr> <th align="center">Level Key</th> </tr> <tr> <td>Pk – Peak</td> </tr> <tr> <td>Qp – Quasi Peak</td> </tr> <tr> <td>Av - Average</td> </tr> </table>	Level Key	Pk – Peak	Qp – Quasi Peak	Av - Average
Level Key					
Pk – Peak					
Qp – Quasi Peak					
Av - Average					
EUT Description: UHF RFID Reader					
Notes: Product configured in Tx mode of operation, modulated					
Harmonics in the FCC/IC Restricted Bands – Low Channel					
Duty Cycle Correction was utilized					

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	FINAL	DCCF	Average	POL	HGT	AZ	LIMIT	DELTA	RBW
MHz	dBuV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV/m]	-[dB]	Duty Cycle Corrected =[dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.209 Avg	FCC 15.209 Avg	(MHz)
Measurements: Axis 1 (worst-case axis) – Low Channel Restricted Band Harmonics														
2708.25	61.55	Pk	3.76	28.84	37.34	56.81	10.51	46.30	H	2.18	336.2	54.00	- 7.70	1.000
2708.25	59.73	Pk	3.76	28.84	37.34	54.99	10.51	44.48	V	2.38	94.9	54.00	- 9.52	1.000
3611.00	54.28	Pk	4.42	31.65	37.81	52.54	10.51	42.03	V	2.23	275.3	54.00	- 11.97	1.000
3611.00	52.80	Pk	4.42	31.65	37.81	51.06	10.51	40.55	H	1.86	142.2	54.00	- 13.45	1.000
4513.75	37.89	Pk	4.58	32.26	36.93	37.80	10.51	27.29	V	1.98	179.0	54.00	- 26.71	1.000
4513.75	37.71	Pk	4.58	32.26	36.93	37.62	10.51	27.11	H	1.94	181.0	54.00	- 26.89	1.000
5416.50	37.94	Pk	5.82	34.15	45.36	32.55	10.51	22.04	V	1.84	212.0	54.00	- 31.96	1.000
5416.50	38.23	Pk	5.82	34.15	45.36	32.84	10.51	22.33	H	1.84	94.9	54.00	- 31.67	1.000
8124.75	41.55	Pk	6.88	36.92	46.75	38.61	10.51	28.10	V	1.74	275.3	54.00	- 25.90	1.000
8124.75	41.68	Pk	6.88	36.92	46.75	38.74	10.51	28.23	H	1.72	188.0	54.00	- 25.77	1.000
9027.50	46.12	Pk	7.19	38.30	47.91	43.70	10.51	33.19	V	1.83	182.0	54.00	- 20.81	1.000
9027.50	45.66	Pk	7.19	38.30	47.91	43.24	10.51	32.73	H	1.79	212.0	54.00	- 21.27	1.000

Radiated Electromagnetic Emissions – Low Channel - Peak

Test Report #: G101687494	Test Area: CC1 Radiated	Temperature: <u>24.1</u> °C
Test Method: FCC 15.205/ 15.209	Test Date: <u>06/24/2014</u>	Relative Humidity: <u>28.7</u> %
EUT Model #: GR-1.5-915	EUT Power: 3VDC Internal Battery	Air Pressure: <u>83.3</u> kPa

EUT Serial #: DVT102

Manufacturer: U Grok It

EUT Description: UHF RFID Reader

Notes: Product configured in Tx mode of operation, modulated

Harmonics in the FCC/IC Restricted Bands – Low Channel

Duty Cycle Correction was utilized

Level Key

Pk – Peak

Qp – Quasi Peak

Av - Average

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	FINAL	DCCF	Peak	POL	HGT	AZ	LIMIT	DELTA	RBW
MHz	dBuV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV/m]	-[dB]	Duty Cycle Corrected =[dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.209 Pk	FCC 15.209 Pk	(MHz)
Measurements: Axis 1 (worst-case axis) - Low Channel Restricted Band Harmonics														
2708.25	61.55	Pk	3.76	28.84	37.34	56.81	0.00	56.81	H	2.18	336.2	74.00	- 17.19	1.000
2708.25	59.73	Pk	3.76	28.84	37.34	54.99	0.00	54.99	V	2.38	94.9	74.00	- 19.01	1.000
3611.00	54.28	Pk	4.42	31.65	37.81	52.54	0.00	52.54	V	2.23	275.3	74.00	- 21.46	1.000
3611.00	52.80	Pk	4.42	31.65	37.81	51.06	0.00	51.06	H	1.86	142.2	74.00	- 22.94	1.000
4513.75	37.89	Pk	4.58	32.26	36.93	37.80	0.00	37.80	V	1.98	179.0	74.00	- 36.20	1.000
4513.75	37.71	Pk	4.58	32.26	36.93	37.62	0.00	37.62	H	1.94	181.0	74.00	- 36.38	1.000
5416.50	37.94	Pk	5.82	34.15	45.36	32.55	0.00	32.55	V	1.84	212.0	74.00	- 41.45	1.000
5416.50	38.23	Pk	5.82	34.15	45.36	32.84	0.00	32.84	H	1.84	94.9	74.00	- 41.16	1.000
8124.75	41.55	Pk	6.88	36.92	46.75	38.61	0.00	38.61	V	1.74	275.3	74.00	- 35.39	1.000
8124.75	41.68	Pk	6.88	36.92	46.75	38.74	0.00	38.74	H	1.72	188.0	74.00	- 35.26	1.000
9027.50	46.12	Pk	7.19	38.30	47.91	43.70	0.00	43.70	V	1.83	182.0	74.00	- 30.30	1.000
9027.50	45.66	Pk	7.19	38.30	47.91	43.24	0.00	43.24	H	1.79	212.0	74.00	- 30.76	1.000

7.18 Test Data: Tx Spurious Harmonics of the Fundamental – Restricted Band

Radiated Electromagnetic Emissions – Mid Channel - Average

Test Report #: G101687494	Test Area: CC1 Radiated	Temperature: <u>24.1</u> °C
Test Method: FCC 15.205/ 15.209	Test Date: <u>06/24/2014</u>	Relative Humidity: <u>28.7</u> %
EUT Model #: GR-1.5-915	EUT Power: 3.7VDC Internal Battery	Air Pressure: <u>83.3</u> kPa
EUT Serial #: 140100004		

Manufacturer: U Grok It	<table border="1"> <tr><th align="center" colspan="2">Level Key</th></tr> <tr><td>Pk – Peak</td></tr> <tr><td>Qp – Quasi Peak</td></tr> <tr><td>Av - Average</td></tr> </table>	Level Key		Pk – Peak	Qp – Quasi Peak	Av - Average
Level Key						
Pk – Peak						
Qp – Quasi Peak						
Av - Average						
EUT Description: Handheld UHF RFID Reader - 902 to 928MHz Tx Band						
Notes: Product configured in Tx mode of operation, modulated						
Harmonics in the FCC/IC Restricted Bands – Mid Channel						
Duty Cycle Correction was utilized						

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	FINAL	DCCF	Average	POL	HGT	AZ	LIMIT	DELTA	RBW
MHz	dBuV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV/m]	-[dB]	Duty Cycle Corrected =[dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.209 Avg	FCC 15.209 Avg	(MHz)
Measurements: Axis 1 (worst-case axis) - Mid Channel Restricted Band Harmonics														
2745.750	64.40	Pk	3.79	28.90	37.38	59.71	10.51	49.20	H	2.01	160.0	54.00	- 4.80	1.000
2745.750	61.76	Pk	3.79	28.90	37.38	57.07	10.51	46.56	V	2.01	224.0	54.00	- 7.44	1.000
3661.000	57.13	Pk	4.45	31.97	37.90	55.65	10.51	45.14	V	2.00	67.0	54.00	- 8.86	1.000
3661.000	55.92	Pk	4.45	31.97	37.90	54.44	10.51	43.93	H	2.05	145.0	54.00	- 10.07	1.000
4513.750	38.32	Pk	4.58	32.26	36.93	38.24	10.51	27.73	V	2.21	220.0	54.00	- 26.27	1.000
4513.750	37.72	Pk	4.58	32.26	36.93	37.63	10.51	27.12	H	1.98	224.0	54.00	- 26.88	1.000
5416.500	38.04	Pk	5.84	34.15	45.36	32.67	10.51	22.16	V	1.94	67.0	54.00	- 31.84	1.000
5416.500	38.22	Pk	5.84	34.15	45.36	32.85	10.51	22.34	H	2.32	155.0	54.00	- 31.66	1.000
8124.750	41.53	Pk	6.91	36.92	46.75	38.62	10.51	28.11	V	1.78	179.0	54.00	- 25.89	1.000
8124.750	41.61	Pk	6.91	36.92	46.75	38.70	10.51	28.19	H	1.75	181.0	54.00	- 25.81	1.000
9027.500	46.04	Pk	7.21	38.30	47.91	43.64	10.51	33.13	V	1.68	212.0	54.00	- 20.87	1.000
9027.500	45.69	Pk	7.21	38.30	47.91	43.29	10.51	32.78	H	1.67	224.0	54.00	- 21.22	1.000
Measurements: Axis 2 - Mid Channel Restricted Band Harmonics														
2745.750	55.73	Pk	3.79	28.90	37.38	51.04	10.51	40.53	V	2.32	224.0	54.00	- 13.47	1.000
2745.750	61.36	Pk	3.79	28.90	37.38	56.67	10.51	46.16	H	2.04	174.0	54.00	- 7.84	1.000
3661.000	56.13	Pk	4.45	31.97	37.90	54.65	10.51	44.14	H	1.98	226.0	54.00	- 9.86	1.000
3661.000	51.66	Pk	4.45	31.97	37.90	50.18	10.51	39.67	V	1.94	325.0	54.00	- 14.33	1.000
4576.250	46.08	Pk	4.58	32.26	36.93	46.00	10.51	35.49	V	1.95	178.0	54.00	- 18.51	1.000
4576.250	53.78	Pk	4.58	32.26	36.93	53.70	10.51	43.19	H	1.87	155.0	54.00	- 10.81	1.000
7322.000	43.46	Pk	6.58	36.36	47.37	39.03	10.51	28.52	V	1.98	179.0	54.00	- 25.48	1.000
7322.000	43.19	Pk	6.58	36.36	47.37	38.75	10.51	28.24	H	1.94	181.0	54.00	- 25.76	1.000
8237.250	42.52	Pk	6.91	36.98	46.82	39.58	10.51	29.07	V	2.32	213.0	54.00	- 24.93	1.000
8237.250	42.76	Pk	6.91	36.98	46.82	39.82	10.51	29.31	H	1.76	210.0	54.00	- 24.69	1.000
9152.500	46.26	Pk	7.24	38.22	47.91	43.81	10.51	33.30	V	1.79	224.0	54.00	- 20.70	1.000
9152.500	47.50	Pk	7.24	38.22	47.91	45.05	10.51	34.54	H	1.68	67.0	54.00	- 19.46	1.000
Measurements: Axis 3 - Mid Channel Restricted Band Harmonics														

Intertek

Report Number: 101687494DEN-002

Issued: August 12, 2014

2745.750	60.01	Pk	3.79	28.90	37.38	55.32	10.51	44.81	H	1.95	93.0	54.00	- 9.19	1.000
2745.750	57.08	Pk	3.79	28.90	37.38	52.39	10.51	41.88	V	2.20	155.0	54.00	- 12.12	1.000
3661.000	56.79	Pk	4.45	31.97	37.90	55.31	10.51	44.80	H	2.25	179.0	54.00	- 9.20	1.000
3661.000	56.36	Pk	4.45	31.97	37.90	54.88	10.51	44.37	V	2.01	181.0	54.00	- 9.63	1.000
4636.250	37.56	Pk	4.58	32.45	39.36	35.24	10.51	24.73	V	1.87	210.0	54.00	- 29.27	1.000
4636.250	37.48	Pk	4.58	32.45	39.36	35.15	10.51	24.64	H	1.98	155.0	54.00	- 29.36	1.000
7418.000	43.06	Pk	6.59	36.59	47.37	38.87	10.51	28.36	V	1.94	224.0	54.00	- 25.64	1.000
7418.000	43.18	Pk	6.59	36.59	47.37	38.99	10.51	28.48	H	1.84	67.0	54.00	- 25.52	1.000
8345.250	42.43	Pk	6.91	36.98	46.82	39.49	10.51	28.98	V	1.78	188.0	54.00	- 25.02	1.000
8345.250	42.95	Pk	6.91	36.98	46.82	40.01	10.51	29.50	H	1.70	174.0	54.00	- 24.50	1.000

Report Number: 101687494DEN-002

Issued: August 12, 2014

Radiated Electromagnetic Emissions – Mid Channel - Peak

Test Report #: G101687494	Test Area: CC1 Radiated	Temperature: <u>24.1</u> °C
Test Method: FCC 15.205/ 15.209	Test Date: <u>06/24/2014</u>	Relative Humidity: <u>28.7</u> %
EUT Model #: GR-1.5-915	EUT Power: 3.7VDC Internal Battery	Air Pressure: <u>83.3</u> kPa

EUT Serial #: 140100004

Manufacturer: U Grok It

EUT Description: Handheld UHF RFID Reader - 902 to 928MHz Tx Band

Notes: Product configured in Tx mode of operation, modulated

Harmonics in the FCC/IC Restricted Bands

Duty Cycle Correction was utilized

Level Key

Pk – Peak

Qp – Quasi Peak

Av - Average

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	FINAL	DCCF	Peak	POL	HGT	AZ	LIMIT	DELTA	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV]	-[dB]	Duty Cycle Corrected =[dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 Pk	FCC 15.209 Pk	(MHz)
Measurements: Axis 1 - Mid Channel Restricted Band Harmonics														
2745.7500	64.40	Pk	3.79	28.90	37.38	59.71	0.00	59.71	H	2.01	160.0	74.00	- 14.29	1.000
2745.7500	61.76	Pk	3.79	28.90	37.38	57.07	0.00	57.07	V	2.01	224.0	74.00	- 16.93	1.000
3661.0000	57.13	Pk	4.45	31.97	37.90	55.65	0.00	55.65	V	2.00	67.0	74.00	- 18.35	1.000
3661.0000	55.92	Pk	4.45	31.97	37.90	54.44	0.00	54.44	H	2.05	145.0	74.00	- 19.56	1.000
4513.7500	38.32	Pk	4.58	32.26	36.93	38.24	0.00	38.24	V	2.21	220.0	74.00	- 35.76	1.000
4513.7500	37.72	Pk	4.58	32.26	36.93	37.63	0.00	37.63	H	1.98	224.0	74.00	- 36.37	1.000
5416.5000	38.04	Pk	5.84	34.15	45.36	32.67	0.00	32.67	V	1.94	67.0	74.00	- 41.33	1.000
5416.5000	38.22	Pk	5.84	34.15	45.36	32.85	0.00	32.85	H	2.32	155.0	74.00	- 41.15	1.000
8124.7500	41.53	Pk	6.91	36.92	46.75	38.62	0.00	38.62	V	1.78	179.0	74.00	- 35.38	1.000
8124.7500	41.61	Pk	6.91	36.92	46.75	38.70	0.00	38.70	H	1.75	181.0	74.00	- 35.30	1.000
9027.5000	46.04	Pk	7.21	38.30	47.91	43.64	0.00	43.64	V	1.68	212.0	74.00	- 30.36	1.000
9027.5000	45.69	Pk	7.21	38.30	47.91	43.29	0.00	43.29	H	1.67	224.0	74.00	- 30.71	1.000
Measurements: Axis 2 - Mid Channel Restricted Band Harmonics														
3661.0000	56.13	Pk	4.45	31.97	37.90	54.65	0.00	54.65	H	1.98	226.0	74.00	- 19.35	1.000
3661.0000	51.66	Pk	4.45	31.97	37.90	50.18	0.00	50.18	V	1.94	325.0	74.00	- 23.82	1.000
2745.7500	55.73	Pk	3.79	28.90	37.38	51.04	0.00	51.04	V	2.32	224.0	74.00	- 22.96	1.000
2745.7500	61.36	Pk	3.79	28.90	37.38	56.67	0.00	56.67	H	2.04	174.0	74.00	- 17.33	1.000
4576.2500	46.08	Pk	4.58	32.26	36.93	46.00	0.00	46.00	V	1.95	178.0	74.00	- 28.00	1.000
4576.2500	53.78	Pk	4.58	32.26	36.93	53.70	0.00	53.70	H	1.87	155.0	74.00	- 20.30	1.000
7322.0000	43.46	Pk	6.58	36.36	47.37	39.03	0.00	39.03	V	1.98	179.0	74.00	- 34.97	1.000
7322.0000	43.19	Pk	6.58	36.36	47.37	38.75	0.00	38.75	H	1.94	181.0	74.00	- 35.25	1.000
8237.2500	42.52	Pk	6.91	36.98	46.82	39.58	0.00	39.58	V	2.32	213.0	74.00	- 34.42	1.000
8237.2500	42.76	Pk	6.91	36.98	46.82	39.82	0.00	39.82	H	1.76	210.0	74.00	- 34.18	1.000
9152.5000	46.26	Pk	7.24	38.22	47.91	43.81	0.00	43.81	V	1.79	224.0	74.00	- 30.19	1.000
9152.5000	47.50	Pk	7.24	38.22	47.91	45.05	0.00	45.05	H	1.68	67.0	74.00	- 28.95	1.000
Measurements: Axis 3 - Mid Channel Restricted Band Harmonics														
2745.7500	60.01	Pk	3.79	28.90	37.38	55.32	0.00	55.32	H	1.95	93.0	74.00	- 18.68	1.000
2745.7500	57.08	Pk	3.79	28.90	37.38	52.39	0.00	52.39	V	2.20	155.0	74.00	- 21.61	1.000

Intertek

Report Number: 101687494DEN-002

Issued: August 12, 2014

3661.0000	56.79	Pk	4.45	31.97	37.90	55.31	0.00	55.31	H	2.25	179.0	74.00	- 18.69	1.000
3661.0000	56.36	Pk	4.45	31.97	37.90	54.88	0.00	54.88	V	2.01	181.0	74.00	- 19.12	1.000
4636.2500	37.56	Pk	4.58	32.45	39.36	35.24	0.00	35.24	V	1.87	210.0	74.00	- 38.76	1.000
4636.2500	37.48	Pk	4.58	32.45	39.36	35.15	0.00	35.15	H	1.98	155.0	74.00	- 38.85	1.000
7418.0000	43.06	Pk	6.59	36.59	47.37	38.87	0.00	38.87	V	1.94	224.0	74.00	- 35.13	1.000
7418.0000	43.18	Pk	6.59	36.59	47.37	38.99	0.00	38.99	H	1.84	67.0	74.00	- 35.01	1.000
8345.2500	42.43	Pk	6.91	36.98	46.82	39.49	0.00	39.49	V	1.78	188.0	74.00	- 34.51	1.000
8345.2500	42.95	Pk	6.91	36.98	46.82	40.01	0.00	40.01	H	1.70	174.0	74.00	- 33.99	1.000

7.19 Test Data: Tx Spurious Harmonics of the Fundamental – Restricted Band

Radiated Electromagnetic Emissions – High Channel - Average

Test Report #:	G101687494	Test Area:	CC1 Radiated	Temperature:	24.1 °C
Test Method:	FCC 15.205/ 15.209	Test Date:	06/24/2014	Relative Humidity:	28.7 %
EUT Model #:	GR-1.5-915	EUT Power:	3VDC Internal Battery	Air Pressure:	83.3 kPa
EUT Serial #: DVT102					

Manufacturer:	U Grok It	<table border="1"> <tr> <th>Level Key</th> </tr> <tr> <td>Pk – Peak</td> </tr> <tr> <td>Qp – Quasi Peak</td> </tr> <tr> <td>Av - Average</td> </tr> </table>	Level Key	Pk – Peak	Qp – Quasi Peak	Av - Average
Level Key						
Pk – Peak						
Qp – Quasi Peak						
Av - Average						
EUT Description:	UHF RFID Reader					
Notes:	Product configured in Tx mode of operation, modulated					
	Harmonics in the FCC/IC Restricted Bands – High Channel					
Duty Cycle Correction was utilized						

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	FINAL	DCCF	Average	POL	HGT	AZ	LIMIT	DELTA	RBW
MHz	dBuV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV/m]	-[dB]	Duty Cycle Corrected =[dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.209 Avg	FCC 15.209 Avg	(MHz)
Measurements: Axis 1 (worst-case axis) – High Channel Restricted Band Harmonics														
2781.75	63.60	Pk	3.82	28.95	37.43	58.94	10.51	48.43	H	2.03	213.0	54.00	- 5.57	1.000
2781.75	60.12	Pk	3.82	28.95	37.43	55.46	10.51	44.95	V	1.91	199.0	54.00	- 9.05	1.000
3709.00	54.62	Pk	4.48	32.26	37.88	53.48	10.51	42.97	V	1.85	97.0	54.00	- 11.03	1.000
3709.00	51.08	Pk	4.48	32.26	37.88	49.94	10.51	39.43	H	1.84	323.0	54.00	- 14.57	1.000
4636.25	38.97	Pk	4.59	32.26	36.93	38.89	10.51	28.38	V	1.95	179.0	54.00	- 25.62	1.000
4636.25	37.77	Pk	4.59	32.26	36.93	37.69	10.51	27.18	H	1.87	181.0	54.00	- 26.82	1.000
7418.00	41.15	Pk	5.87	34.15	45.36	35.81	10.51	25.30	V	1.98	212.0	54.00	- 28.70	1.000
7418.00	40.87	Pk	5.87	34.15	45.36	35.53	10.51	25.02	H	1.98	275.3	54.00	- 28.98	1.000
8345.25	41.46	Pk	7.03	36.92	46.75	38.67	10.51	28.16	V	1.94	188.0	54.00	- 25.84	1.000
8345.25	41.67	Pk	7.03	36.92	46.75	38.88	10.51	28.37	H	1.84	182.0	54.00	- 25.63	1.000

Report Number: 101687494DEN-002

Issued: August 12, 2014

Radiated Electromagnetic Emissions – High Channel - Peak

Test Report #: G101687494	Test Area: CC1 Radiated	Temperature: <u>24.1</u> °C
Test Method: FCC 15.205/ 15.209	Test Date: 06/24/2014	Relative Humidity: <u>28.7</u> %
EUT Model #: GR-1.5-915	EUT Power: 3VDC Internal Battery	Air Pressure: <u>83.3</u> kPa

EUT Serial #: DVT102

Manufacturer: U Grok It

EUT Description: UHF RFID Reader

Notes: Product configured in Tx mode of operation, modulated

Harmonics in the FCC/IC Restricted Bands – High Channel

Duty Cycle Correction was utilized

Level Key

Pk – Peak

Qp – Quasi Peak

Av - Average

FREQ	LEVEL	DET	CABLE	ANT	PREAMP	FINAL	DCCF	Average	POL	HGT	AZ	LIMIT	DELTA	RBW
MHz	dBuV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	= [dBuV/m]	-[dB]	Duty Cycle Corrected =[dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.209 Pk	FCC 15.209 Pk	(MHz)
Measurements: Axis 1 (worst-case axis) - High Channel Restricted Band Harmonics														
2781.75	63.60	Pk	3.82	28.95	37.43	58.94	0.00	58.94	H	2.03	213.0	74.00	- 15.06	1.000
2781.75	60.12	Pk	3.82	28.95	37.43	55.46	0.00	55.46	V	1.91	199.0	74.00	- 18.54	1.000
3709.00	54.62	Pk	4.48	32.26	37.88	53.48	0.00	53.48	V	1.85	97.0	74.00	- 20.52	1.000
3709.00	51.08	Pk	4.48	32.26	37.88	49.94	0.00	49.94	H	1.84	323.0	74.00	- 24.06	1.000
4636.25	38.97	Pk	4.59	32.26	36.93	38.89	0.00	38.89	V	1.95	179.0	74.00	- 35.11	1.000
4636.25	37.77	Pk	4.59	32.26	36.93	37.69	0.00	37.69	H	1.87	181.0	74.00	- 36.31	1.000
7418.00	41.15	Pk	5.87	34.15	45.36	35.81	0.00	35.81	V	1.98	212.0	74.00	- 38.19	1.000
7418.00	40.87	Pk	5.87	34.15	45.36	35.53	0.00	35.53	H	1.98	275.3	74.00	- 38.47	1.000
8345.25	41.46	Pk	7.03	36.92	46.75	38.67	0.00	38.67	V	1.94	188.0	74.00	- 35.33	1.000
8345.25	41.67	Pk	7.03	36.92	46.75	38.88	0.00	38.88	H	1.84	182.0	74.00	- 35.12	1.000

Reference Only – Restricted Band Harmonics

Fundamental			Harmonics							
MHz0	MHz1	MHz2	MHz3	MHz4	MHz5	MHz6	MHz7	MHz8	MHz9	MHz10
902.75	902.75	1805.50	2708.25	3611.00	4513.75	5416.50	6319.25	7222.00	8124.75	9027.50
915.25	915.25	1830.50	2745.75	3661.00	4576.25	5491.50	6406.75	7322.00	8237.25	9152.50
927.25	927.25	1854.50	2781.75	3709.00	4636.25	5563.50	6490.75	7418.00	8345.25	9272.50

Example calculation for Intentional Radiated Emissions:

Measured Level	+	Transducer, Cable Loss Pre-Amplifier	=	Corrected Reading	-	Duty Cycle Correction	=	FINAL Measurement	-	Specification Limit	=	Delta from Specification Limit
(dBμV)		(dB)		(dBμV/m)		(dBμV/m)		(dBμV/m)		(dBμV/m)		
24.0		14.9		38.9		10.0		28.9		40.0		-11.1

7.20 Test Data: Tx Spurious – 30MHz to 1000MHz

Radiated Electromagnetic Emissions

Test Report #: G101687494	Test Area: CC1 Radiated	Temperature: <u>23.5</u> °C
Test Method: FCC 15.209 (RSS-GEN)	Test Date: <u>06/25/2014</u>	Relative Humidity: <u>21.9</u> %
EUT Model #: GR-1.5-915	EUT Power: <u>3.7VDC Battery</u>	Air Pressure: <u>83.1</u> kPa
EUT Serial #: 140100004		

Manufacturer: U Grok It EUT Description: Handheld UHF RFID Reader – 902 to 928MHz Tx Band Notes: Product configured in Tx mode of operation, modulated Limit = 102.68dBuV/m @ 3-meters (Non-Restricted Band -20dBc) All signals were outside the FCC Restricted Band	<p align="center">Level Key</p> <p>Pk – Peak</p> <p>Qp – Quasi Peak</p> <p>Av - Average</p>
--	---

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	Delta2	RBW
MHz	dBuV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.209 Qp	FCC 15.247(d) Qp	(MHz)
Measurements: Low Channel - Axis 1 (worst-case) - Tx Spurious 30MHz to 1000MHz													
351.6827	30.48	Qp	1.29	14.73	27.77	0.00	18.74	V	1.00	102.0	- 27.28	- 83.94	0.120
460.0000	49.26	Qp	1.47	16.90	28.16	0.00	39.47	V	1.00	214.0	- 6.55	- 63.21	0.120
463.6562	52.39	Qp	1.47	16.97	28.18	0.00	42.66	V	1.00	45.0	- 3.36	- 60.02	0.120
464.3462	51.46	Qp	1.47	16.99	28.18	0.00	41.74	V	1.00	271.0	- 4.28	- 60.94	0.120
503.8462	37.74	Qp	1.54	17.88	28.43	0.00	28.73	V	1.00	265.0	- 17.29	- 73.95	0.120
756.0000	32.28	Qp	1.92	20.70	27.94	0.00	26.96	V	1.84	266.0	- 19.06	- 75.72	0.120
814.1635	31.98	Qp	1.99	21.40	27.63	0.00	27.74	V	1.54	127.0	- 18.28	- 74.94	0.120
Measurements: Mid Channel - Axis 1 (worst-case) - Tx Spurious 30MHz to 1000MHz													
352.0000	29.62	Qp	1.29	14.74	27.77	0.00	17.88	V	1.00	104.0	- 28.14	- 84.80	0.120
460.0000	48.34	Qp	1.47	16.90	28.16	0.00	38.55	V	1.00	220.0	- 7.47	- 64.13	0.120
463.6562	46.51	Qp	1.47	16.97	28.18	0.00	36.78	V	1.00	205.0	- 9.24	- 65.90	0.120
464.3462	45.21	Qp	1.47	16.99	28.18	0.00	35.49	V	1.00	108.0	- 10.53	- 67.19	0.120
503.8462	37.32	Qp	1.54	17.88	28.43	0.00	28.31	V	1.00	259.0	- 17.71	- 74.37	0.120
756.0000	31.87	Qp	1.92	20.70	27.94	0.00	26.55	V	1.41	204.0	- 19.47	- 76.13	0.120
Measurements: High Channel - Axis 1 (worst-case) - Tx Spurious 30MHz to 1000MHz													
352.0000	30.83	Qp	1.29	14.74	27.77	0.00	19.09	V	1.00	121.0	- 26.93	- 83.59	0.120
460.0000	48.23	Qp	1.47	16.90	28.16	0.00	38.44	V	1.00	263.0	- 7.58	- 64.24	0.120
463.6562	40.97	Qp	1.47	16.97	28.18	0.00	31.24	V	1.41	308.0	- 14.78	- 71.44	0.120
464.3462	43.74	Qp	1.47	16.99	28.18	0.00	34.02	V	1.00	109.0	- 12.00	- 68.66	0.120
503.8462	35.98	Qp	1.54	17.88	28.43	0.00	26.97	V	1.44	249.0	- 19.05	- 75.71	0.120
756.0000	31.09	Qp	1.92	20.70	27.94	0.00	25.77	V	1.41	165.0	- 20.25	- 76.91	0.120

The FCC 15.209 delta limit is shown for reference only.

Example calculation:

Measure d Level	+	Cable Loss	+	Antenna Factor	-	Pre- Amp	+	Atten	=	Final Correcte d Reading	Specificatio n Limit	-	Final Correcte d Reading	=	Delta Specificatio n
(dB μ V)		(dB)		(dB)		(dB)		(dB)		(dB μ V/m)	(dB μ V/m)		(dB μ V/m)		
20.0		3.0		5.0		10.0		0.0		18.0	40.0		18.0		- 22.0

Notes:

1. All Tx Spurious measurements are RF Radiated Field – peak detector/average measurements above 1GHz (1MHz RBW) and quasi-peak measurements \leq 1GHz..
2. Measurements above 1GHz were adjusted by the allowed duty cycle correction factor per FCC 15.35(c)/ IC RSS-GEN, Section 4.5. This value is specified as the average measurement.
3. The low, middle and high channels were tested in all three axes. The worst-case test data is represented in this test report.
4. The device was measured at 3 meters measurement antenna-to-product test distance.
5. The device was placed on a turntable 80 cm high, it was rotated 360 degrees and the measurement antenna was raised and lowered between 1 and 4 meters to maximize emissions from this device.

8 Tx Band Edge – FCC 15.247(d)/15.209

8.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

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

8.2 Specification:

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

8.3 Test Equipment Used:

Asset ID	Description	Manufacture	Model	Serial	Cal Date	Cal Due
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	05/21/2014	05/21/2015
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/13/2013	11/13/2014
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 2.0	VBV	VBV

8.4 Results:

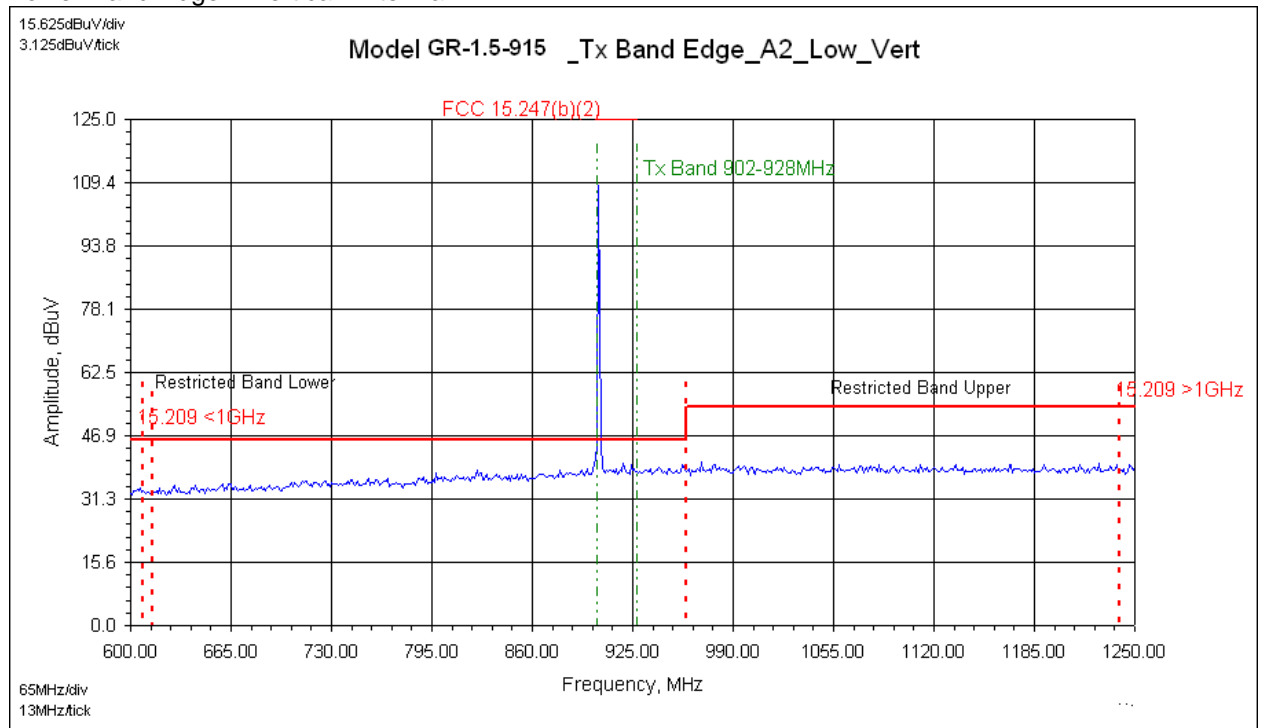
The sample tested was found to Comply.

8.5 Results Summary:

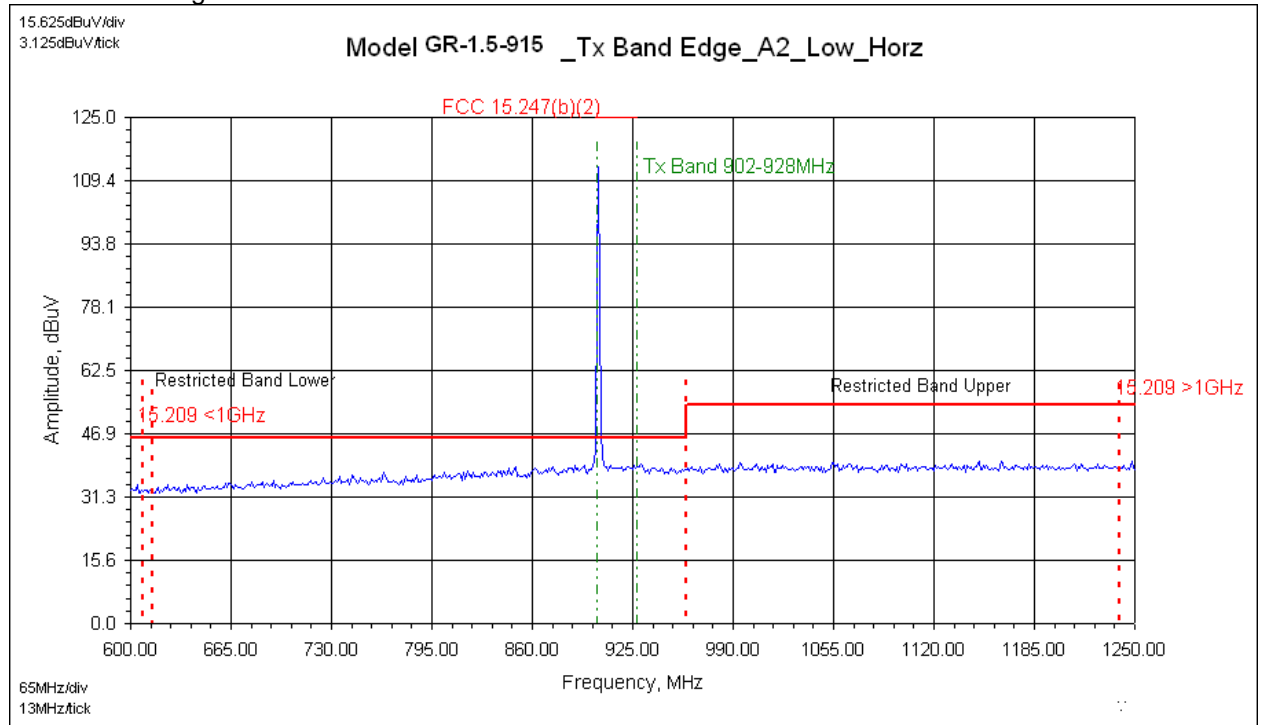
- All Tx Spurious signals within the FCC Restricted Bands were verified to be below the limits for FCC 15.205/209(a).
- All Tx Band Edge signals were verified to be below the FCC 15.209(a) limits.

8.6 Plots: Tx Spurious – Nearest Restricted Band to Tx Band

Lower Band Edge – Vertical Antenna



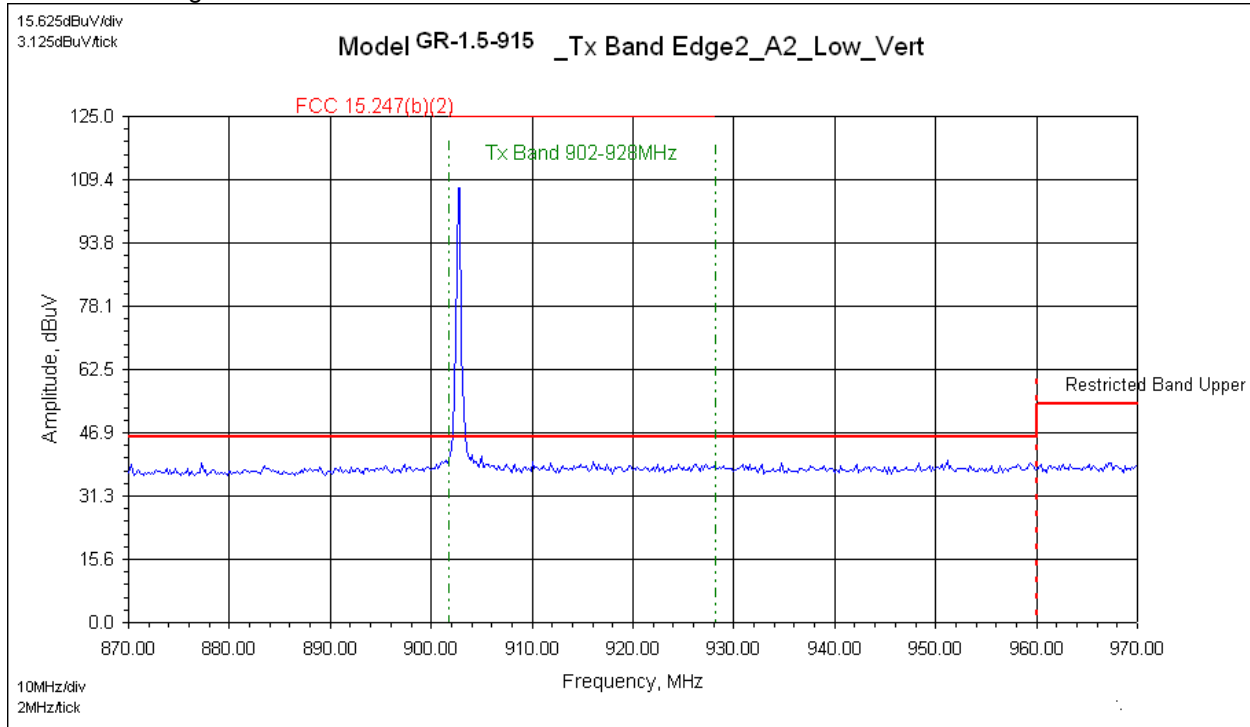
Lower Band Edge – Horizontal Antenna



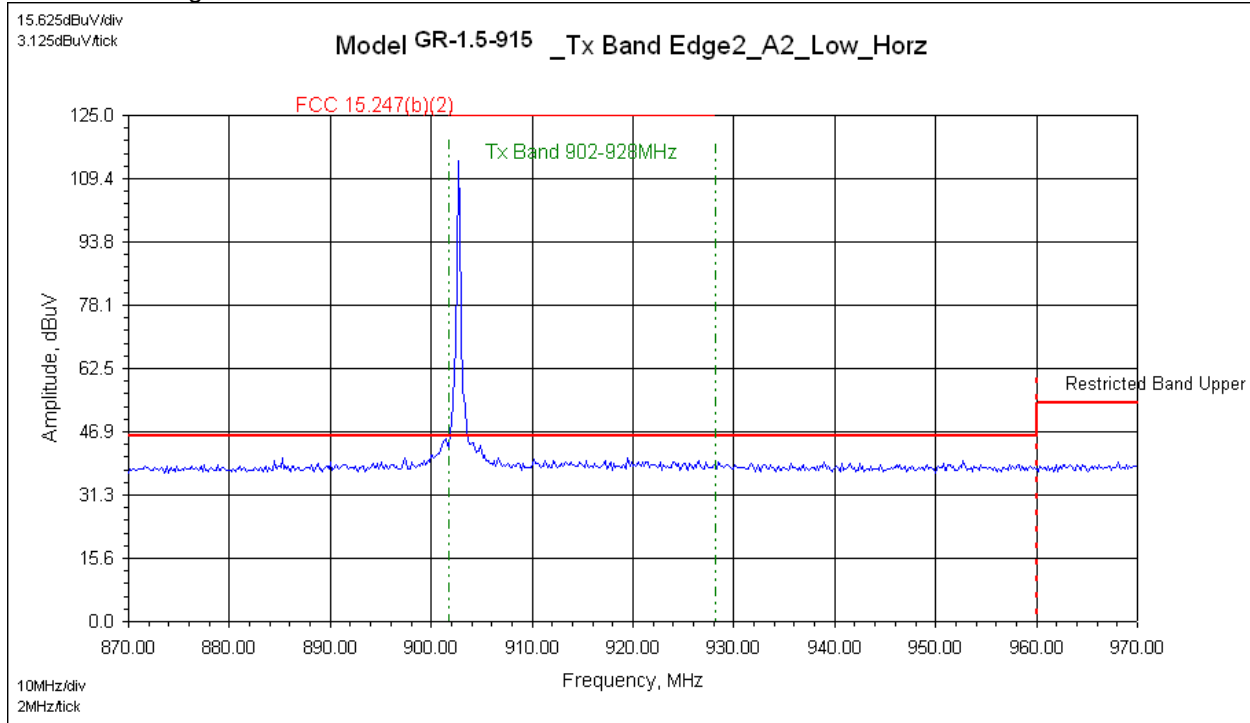
Peak detector, max-hold measurements

8.7 Plots: Tx Spurious - Band Edge

Lower Band Edge – Vertical Antenna



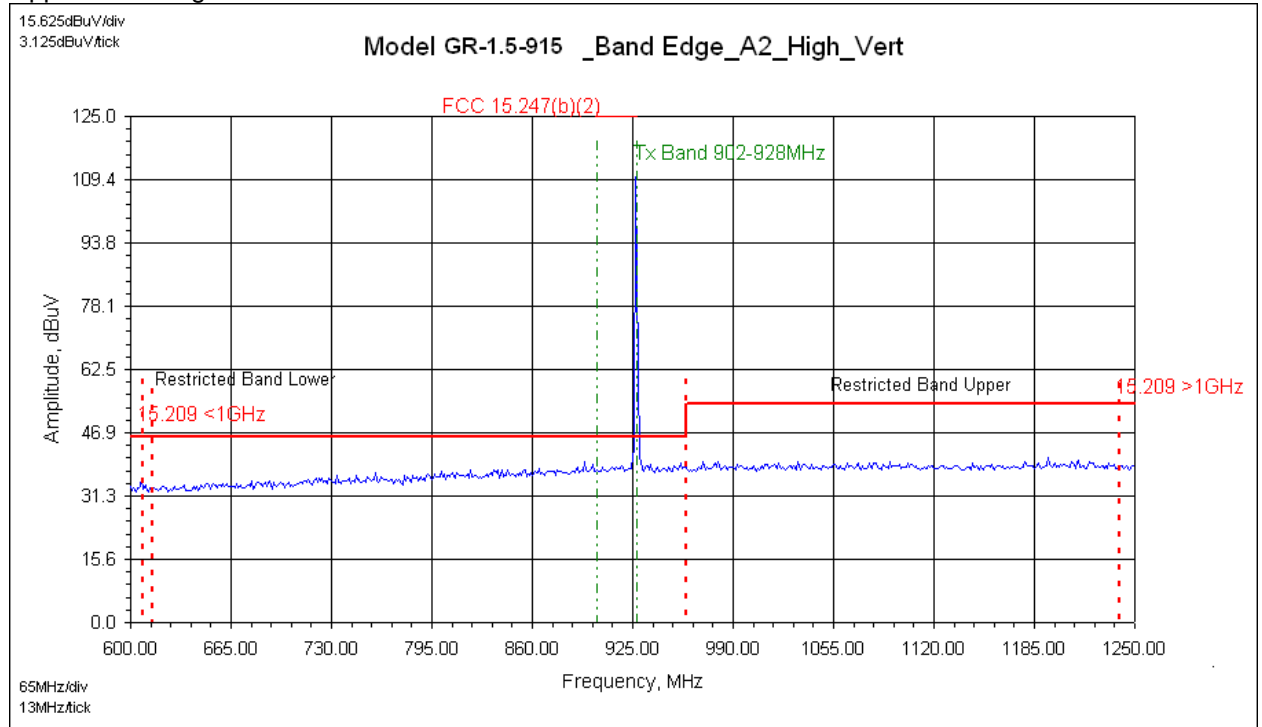
Lower Band Edge – Horizontal Antenna



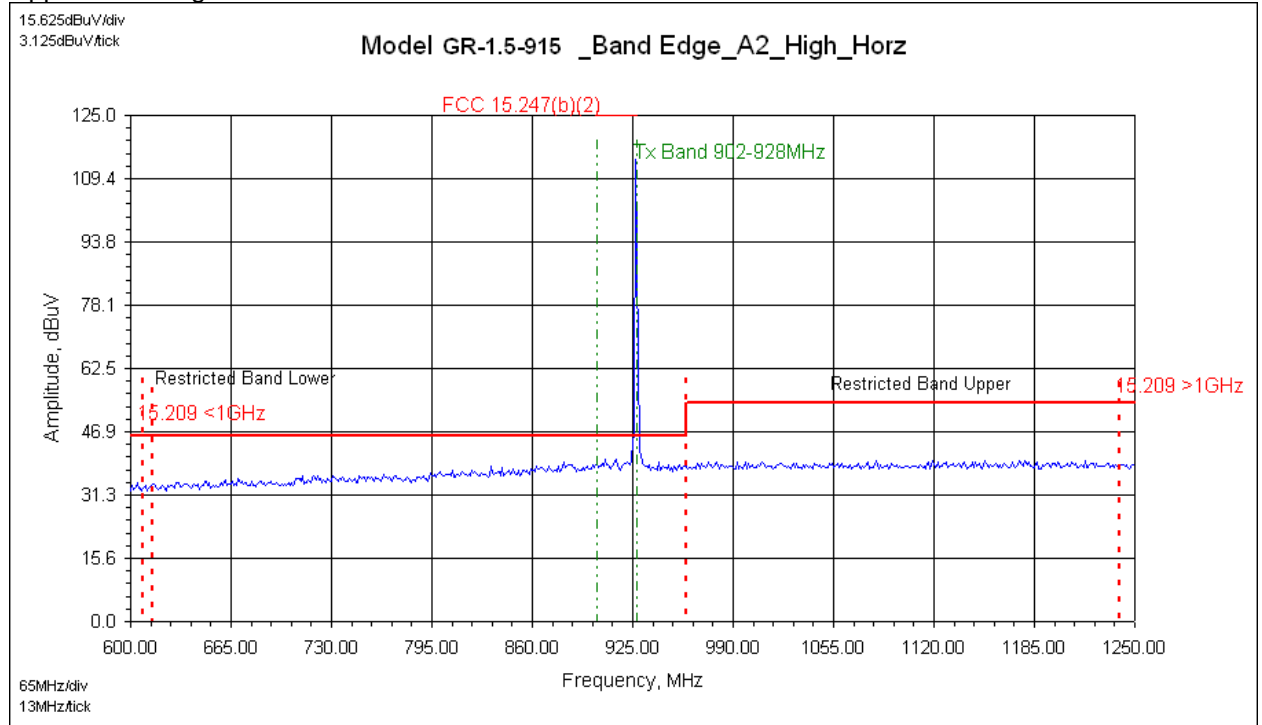
Peak detector, max-hold measurements

8.8 Plots: Tx Spurious – Nearest Restricted Band to Tx Band

Upper Band Edge – Vertical Antenna



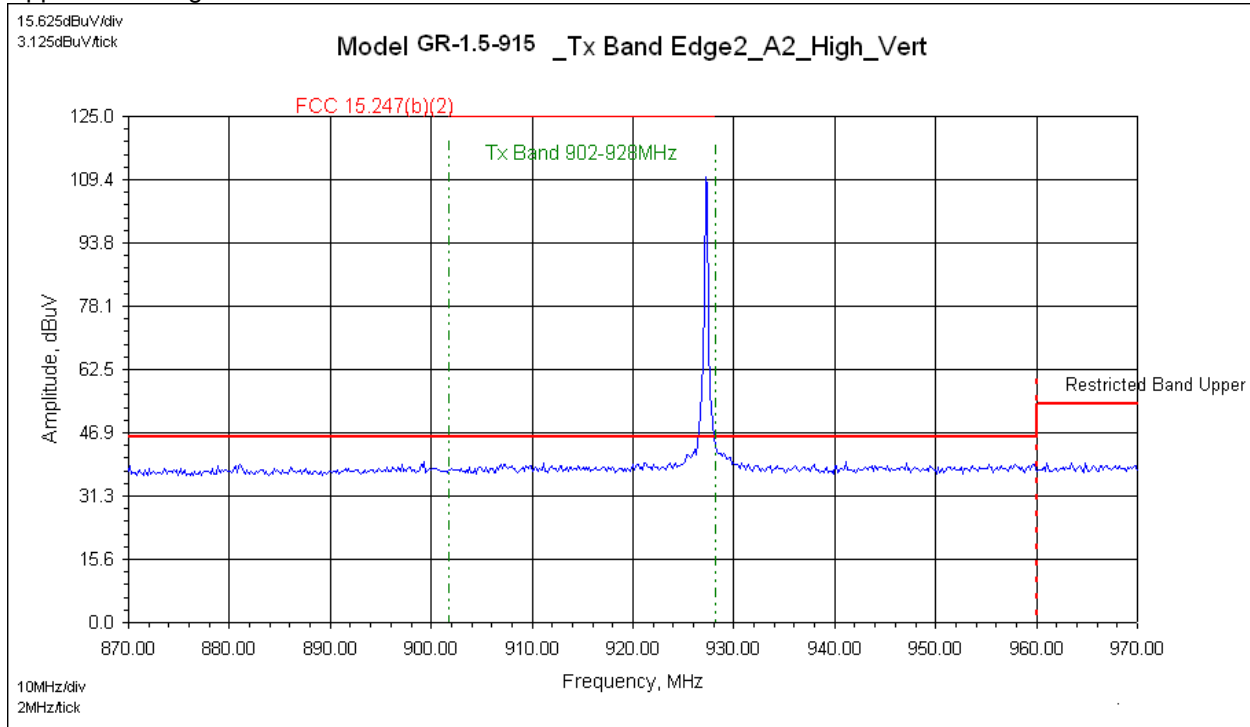
Upper Band Edge – Horizontal Antenna



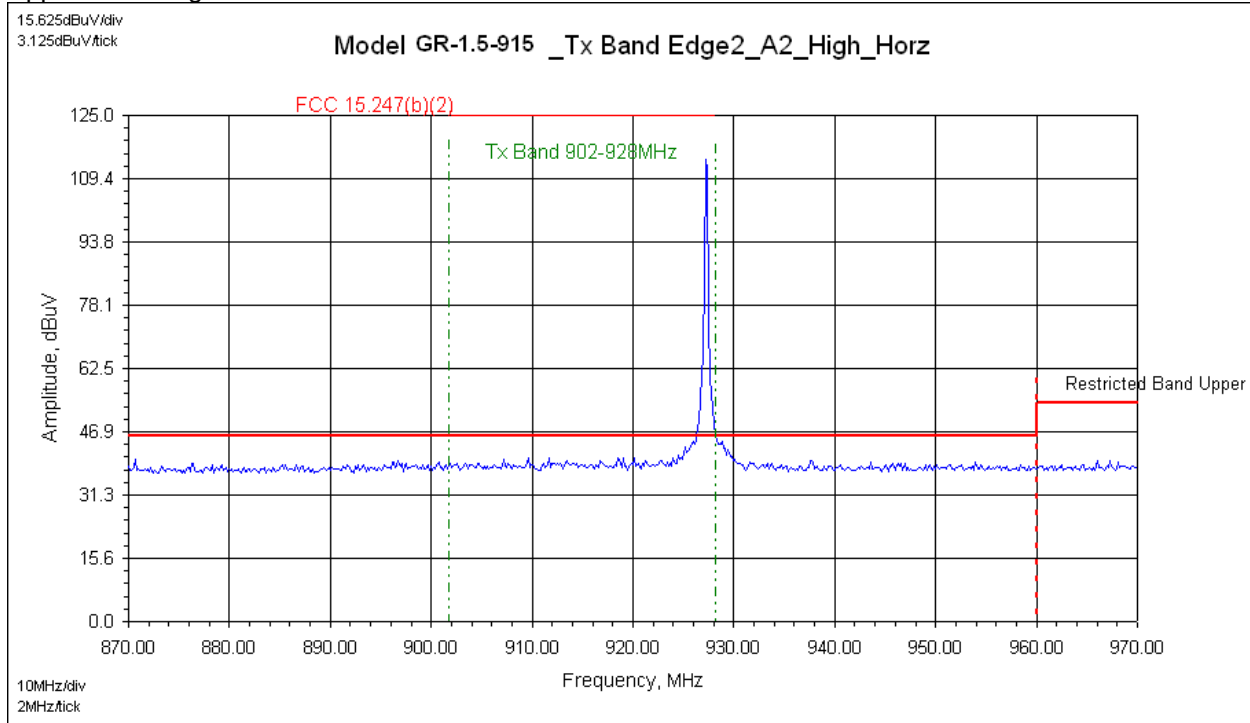
Peak detector, max-hold measurements

8.9 Plots: Tx Spurious - Band Edge

Upper Band Edge – Vertical Antenna



Upper Band Edge – Horizontal Antenna



Peak detector, max-hold measurements

8.10 Data: Band Edge

Radiated Electromagnetic Emissions

Test Report #:	G101687494	Test Area:	CC1 Radiated	Temperature:	23.7 °C
Test Method:	FCC 15.205/ 15.209	Test Date:	06/24/2014	Relative Humidity:	28.1 %
EUT Model #:	GR-1.5-915	EUT Power:	3VDC Internal Battery	Air Pressure:	82.9 kPa
EUT Serial #: 140100004					

Manufacturer:	U Grok It	Level Key Pk – Peak Qp – Quasi Peak Av - Average
EUT Description:	Handheld UHF RFID Reader – 902 to 928MHz Tx Band	
Notes:	Product configured in Tx mode of operation, modulated	
	Band Edge Measurements – Measurement at allowed lower and upper Tx Band - Worst-case axis measured Limit = 102.68dBuV/m @ 3-meters (Non-Restricted Band -20dBc)	

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta Limit	Delta Limit	RBW
MHz	dBuV/m	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV/m]	(V/H)	(m)	(DEG)	FCC 15.209	FCC 15.247(d)	(MHz)
Low Band Edge Measurements – Low Channel – Axis 2													
902.0000	42.76	Qp	2.10	22.44	27.73	0.00	39.57	V	1.39	212.0	- 6.45	-63.11	0.120
902.0000	47.01	Qp	2.10	22.44	27.73	0.00	43.82	H	1.63	340.0	- 2.20	-58.86	0.120
High Band Edge Measurements – High Channel – Axis 2													
928.0000	40.10	Qp	2.13	22.44	27.74	0.00	36.92	V	1.31	98.0	- 9.10	-65.76	0.120
928.0000	43.80	Qp	2.13	22.44	27.74	0.00	40.62	H	1.57	343.0	- 5.40	-62.06	0.120

Example calculation:

Measure d Level	+	Cable Loss	+	Antenna Factor	-	Pre- Amp	+	Atten	=	Final Correcte d Reading	Specificatio n Limit	-	Final Correcte d Reading	=	Delta Specificatio n
(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) The FCC 15.209 delta limit is shown for reference only.
- 2) The device was measured at 3-meter measurement antenna-to-product test distance.
- 3) The device was placed on a turntable 80 cm high, it was rotated 360 degrees and the measurement antenna was raised and lowered between 1 and 4 meters to maximize emissions from this device.

9 20 dB Bandwidth – FCC 15.247 (a)(1)(i)

9.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

- FCC 15.247 (a)(1)(i)
- RSS-210 A8.1(c)

9.2 Specification:

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

9.3 Test Equipment Used:

<u>Asset ID</u>	<u>Description</u>	<u>Manufacture</u>	<u>Model</u>	<u>Serial</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
E2	RF Port Cable	Teledyne	Blue	-----	04/21/2014	04/21/2015
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 1.0	VBV	VBV

9.4 Results:

The sample tested was found to Comply.

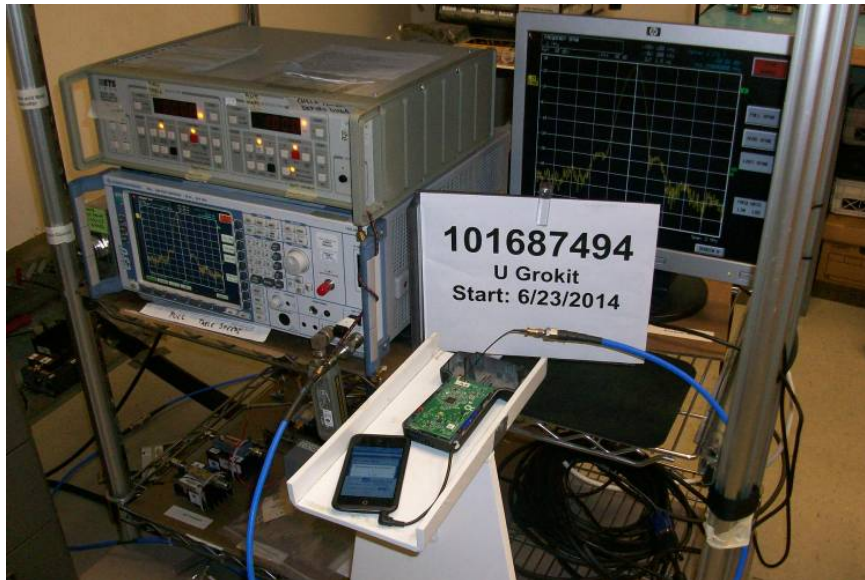
9.5 Measurement Summary:

The maximum 20dB Bandwidth (worst-case margin) was found to be 173.08 kHz: Mid Channel

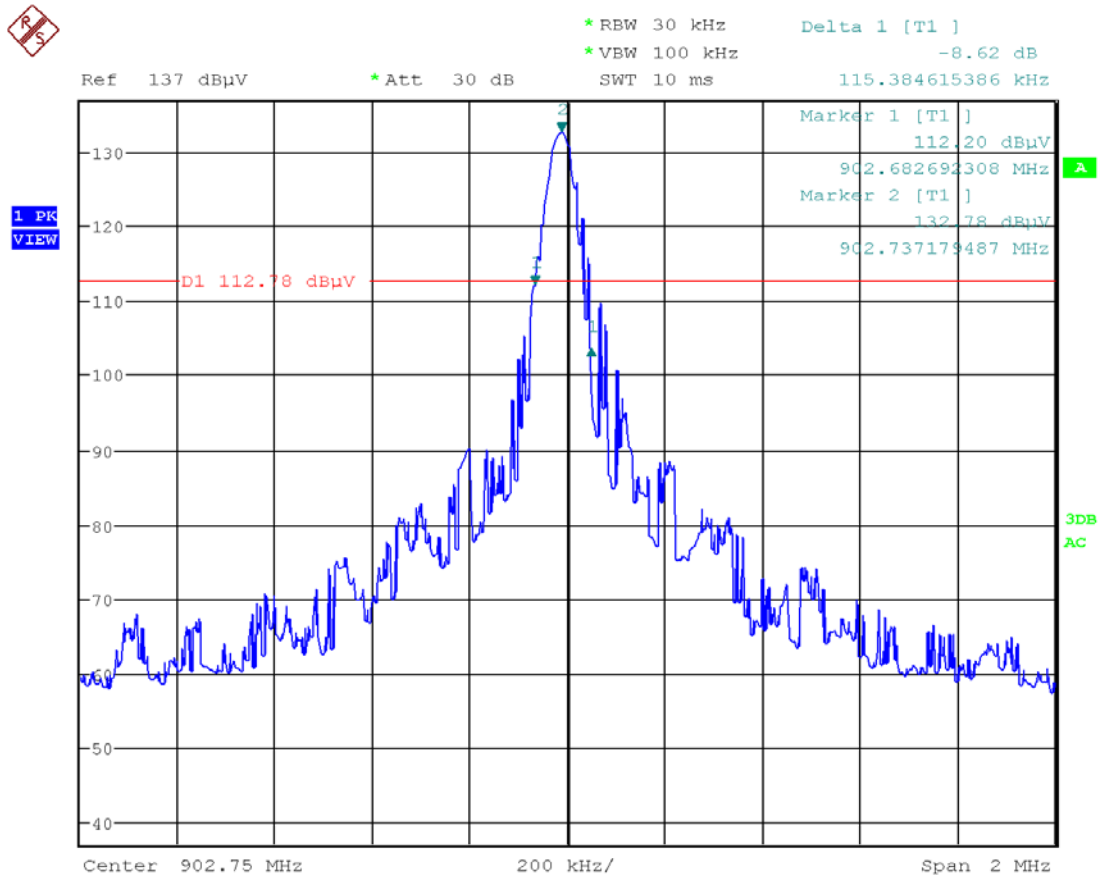
Tx Channel	Frequency (MHz)	Measured 20dB Bandwidth (kHz)	20dB Bandwidth Limit (kHz)	Margin (kHz)	Result
Lowest	902.75	155.38	< 250kHz	94.62	Pass
Middle	915.25	173.08	< 250kHz	76.92	Pass
Highest	927.25	169.87	< 250kHz	80.13	Pass

9.6 Setup Photographs:

Test Setup – 20dB Bandwidth



9.7 Plots: Low Channel

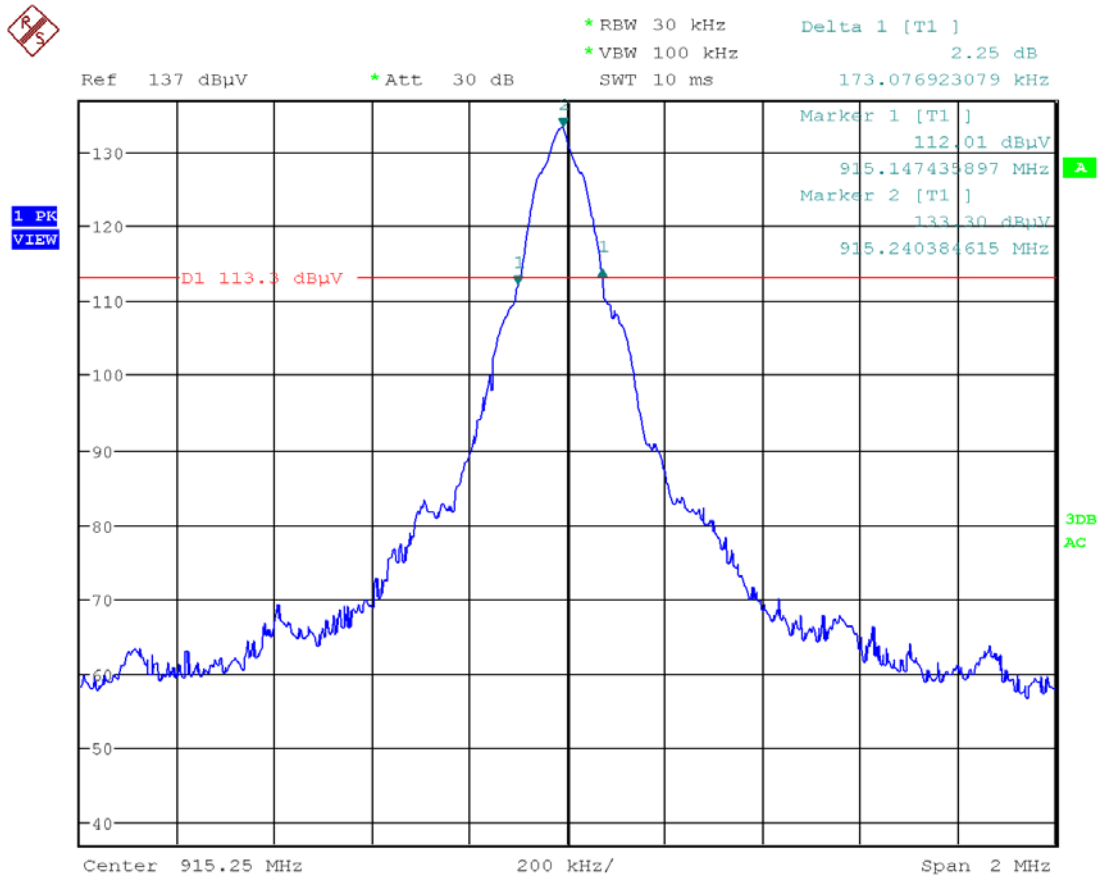


Date: 23.JUN.2014 09:32:23

Requirement: For products with ≥ 50 hopping channels, the allowed 20dB Bandwidth is < 250 kHz.

Test Result: The 20dB Bandwidth was found to be 155.38 kHz: Lowest Channel

9.8 Plots: Mid Channel

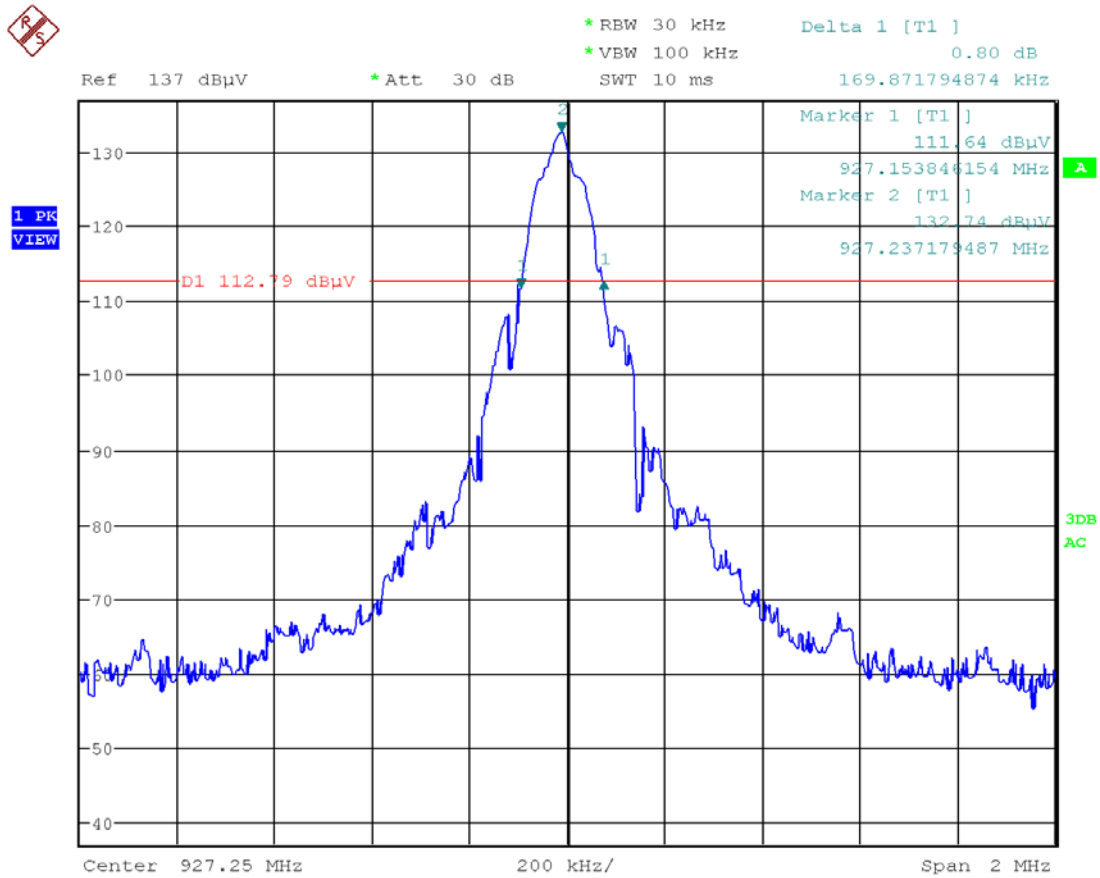


Date: 23.JUN.2014 09:35:43

Requirement: For products with ≥ 50 hopping channels, the allowed 20dB Bandwidth is < 250 kHz.

Test Result: The 20dB Bandwidth was found to be 173.08 kHz: Mid Channel

9.9 Plots High Channel



Date: 23.JUN.2014 09:43:22

Requirement: For products with ≥ 50 hopping channels, the allowed 20dB Bandwidth is < 250 kHz.

Test Result: The 20dB Bandwidth was found to be 169.87 kHz: Highest Channel

Notes: None

10 Carrier Frequency Separation – FCC 15.247 (a)(1)

10.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

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

10.2 Specification:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

10.3 Test Equipment Used:

<u>Asset ID</u>	<u>Description</u>	<u>Manufacture</u>	<u>Model</u>	<u>Serial</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
E2	RF Port Cable	Teledyne	Blue	-----	04/21/2014	04/21/2015
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 1.0	VBV	VBV

10.4 Results:

The sample tested was found to Comply.

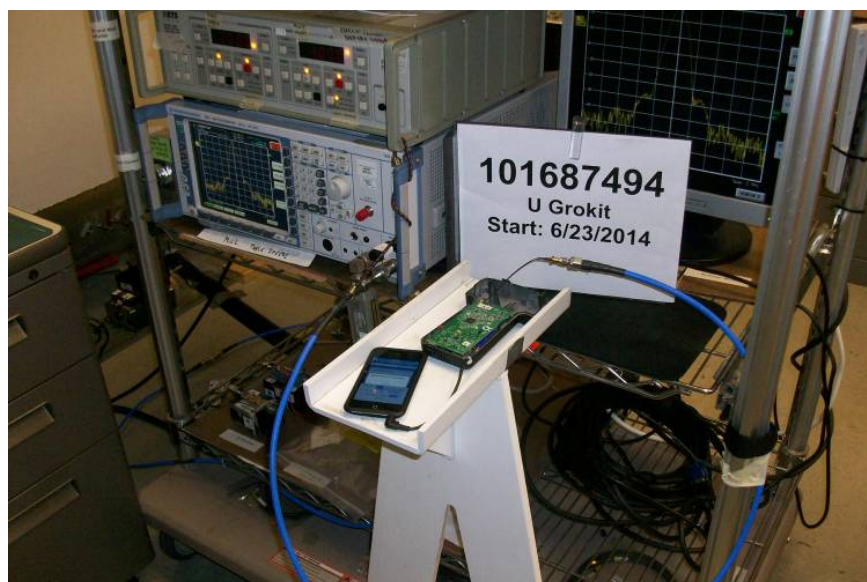
10.5 Results Summary:

The minimum (worst-case) hopping channel frequency separation was found to be 488.78 kHz, which is greater than the measured maximum 20dB Bandwidth of 315.70 kHz.

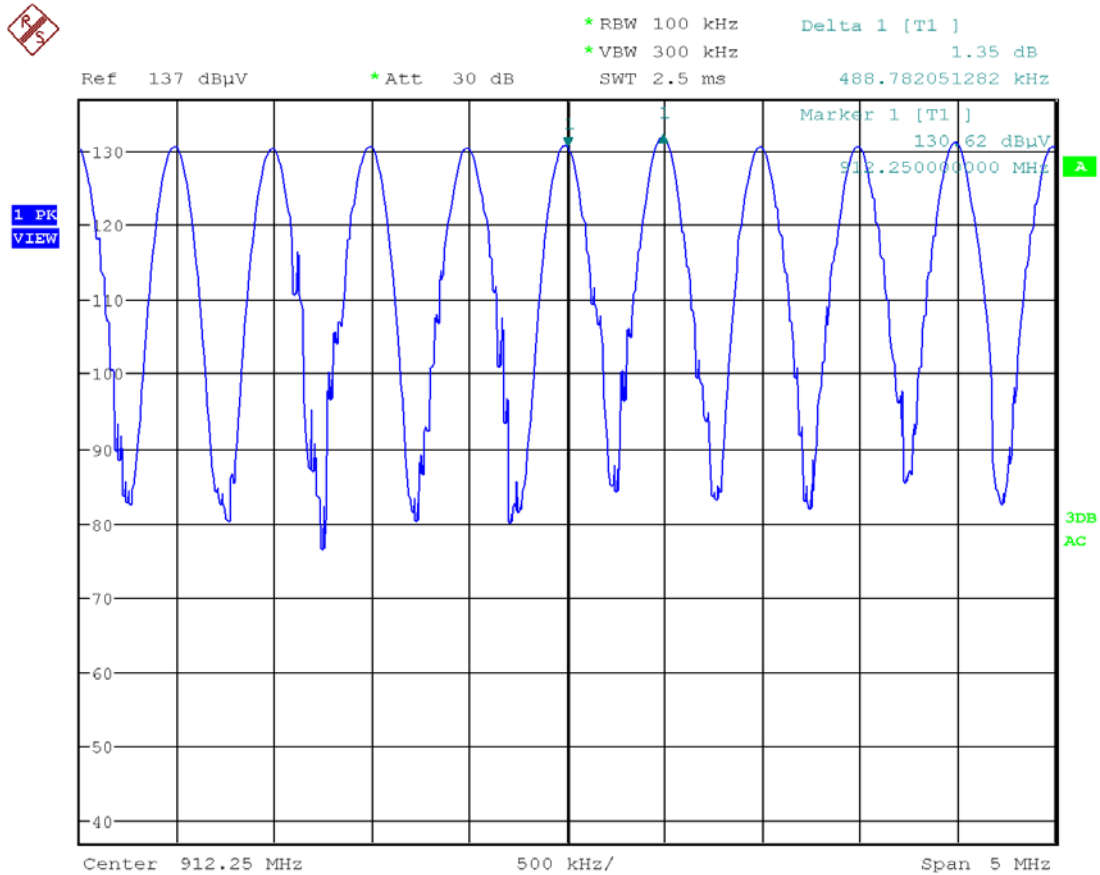
Tx Channel	Frequency (MHz)	Minimum Channel Carrier Frequency Separation (kHz)	Maximum 20dB BW (kHz)	Margin (kHz)	Result
2-Adjacent	~ 915.25	488.78	173.08	315.70	Pass

10.6 Setup Photographs:

Test Setup – Carrier Frequency Separation



10.7 Plots: Hopping Channel Carrier Frequency Separation



Date: 24.JUN.2014 16:28:05

Requirement: The minimum hopping channel carrier frequency separation is the greater of 25kHz or the 20dB Bandwidth.

Test Result: The maximum 20dB Bandwidth was found to be 173.08 kHz. The minimum hopping channel frequency separation was found to be 488.78kHz, which is greater than 173.08 kHz.

11 Number of Hopping Frequencies – FCC 15.247 (a)(1)(i)**11.1 Method**

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

- FCC 15.247 (a)(1)(i)
- RSS-210, A8.1(c)

11.2 Specification:

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

11.3 Test Equipment Used:

<u>Asset ID</u>	<u>Description</u>	<u>Manufacture</u>	<u>Model</u>	<u>Serial</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
E2	RF Port Cable	Teledyne	Blue	-----	04/21/2014	04/21/2015
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 1.0	VBV	VBV

11.4 Results:

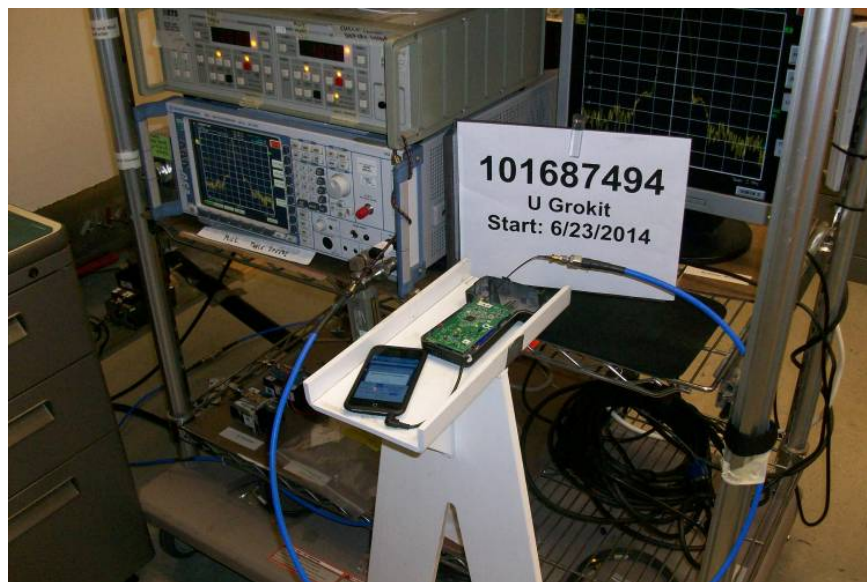
The sample tested was found to Comply.

11.5 Results Summary:

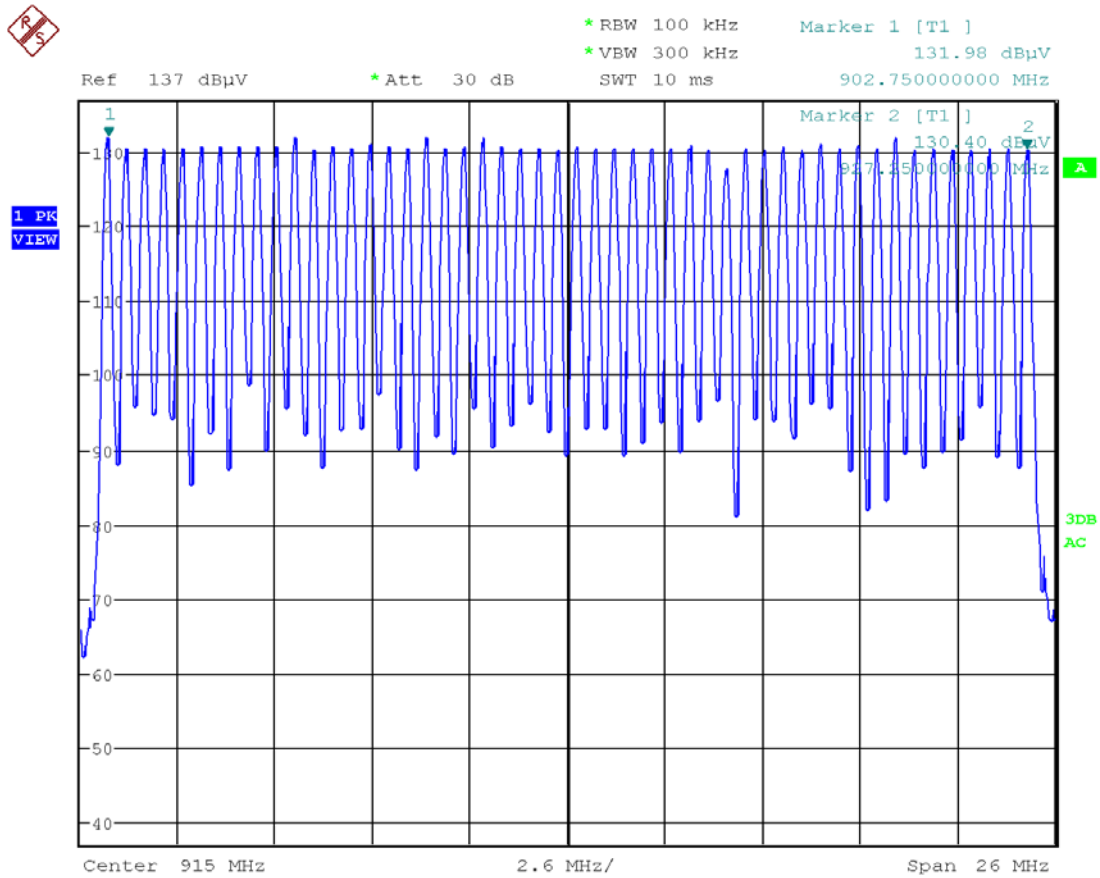
Test Result: The product tested utilized 50-Hopping Channels – starting at 902.75MHz and ending at 927.25MHz.

11.6 Setup Photographs:

Test Setup – Tx Number of Hopping Frequencies



11.7 Plots: Number of Hopping Frequencies



Date: 24.JUN.2014 16:21:32

Requirement: Systems where the 20dB Bandwidth is less than 250 kHz (measured 20dB BW = 173.08 kHz) require the usage of at least 50 hopping frequencies.

12 Time of Occupancy (Dwell Time) – FCC 15.247 (a)(1)(i)**12.1 Method**

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

- FCC 15.247 (a)(1)(i)
- RSS-210, A8.1(c)

12.2 Specification:

§ 15.247(a)(1)(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

12.3 Test Equipment Used:

<u>Asset ID</u>	<u>Description</u>	<u>Manufacture</u>	<u>Model</u>	<u>Serial</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
E2	RF Port Cable	Teledyne	Blue	-----	04/21/2014	04/21/2015
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 1.0	VBU	VBU

12.4 Results:

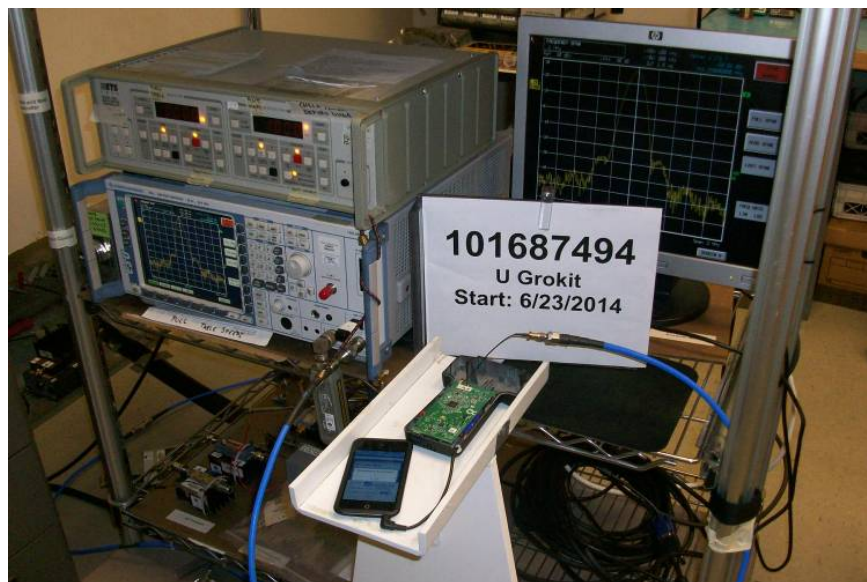
The sample tested was found to Comply.

12.5 Results Summary:

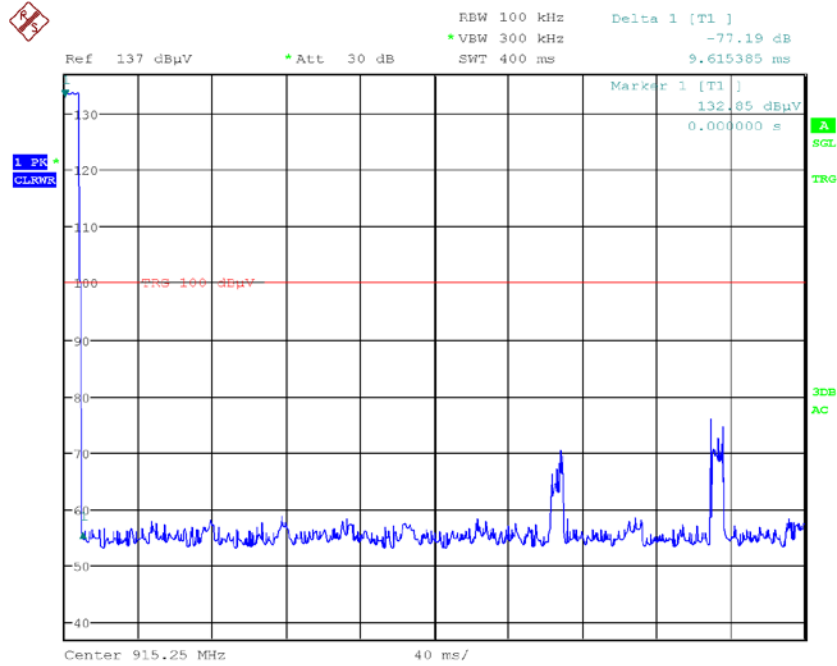
The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20-second period. This device was found to occupy the frequency for 0.087 seconds per 20-sec period.

12.6 Setup Photographs:

Test Setup – Time of Occupancy (Dwell Time)

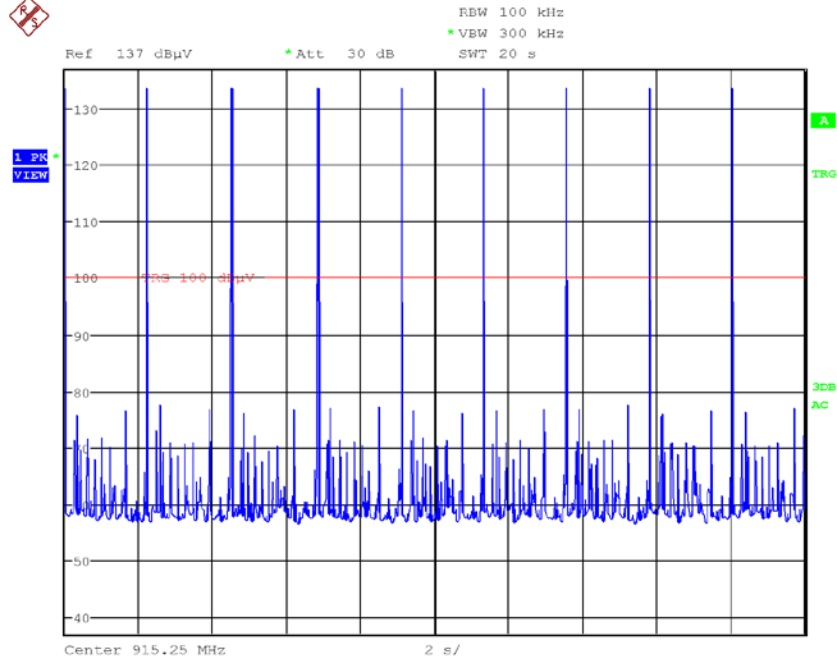


12.7 Plots: Mid Channel



Date: 24.JUN.2014 16:34:27

Time of 1-pulse = 9.62ms



Date: 24.JUN.2014 16:32:49

Note: Requirement: The average time of occupancy on any frequency shall not be greater than 0.4 seconds (400ms) within a 20 second period. This device was found to occupy the frequency for 86.58ms (9.62ms x 9 pulses).

13 Occupied Bandwidth (OBW) – RSS-GEN, 4.6.1

13.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

- RSS-GEN, Clause 4.6.1

13.2 Specification:

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal Occupied Bandwidth to be reported is to be its 99% power emission bandwidth, as calculated or measured.

13.3 Test Equipment Used:

<u>Asset ID</u>	<u>Description</u>	<u>Manufacture</u>	<u>Model</u>	<u>Serial</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	ROHDE & SCHWARZ	ESU 26	100265	01/29/2014	01/29/2015
E2	RF Port Cable	Teledyne	Blue	-----	04/21/2014	04/21/2015
SW-6	Software for Radiated and Conducted emissions.	Intertek	OATS vba	V. 1.0	VBV	VBV

13.4 Results:

The sample tested was found to Comply.

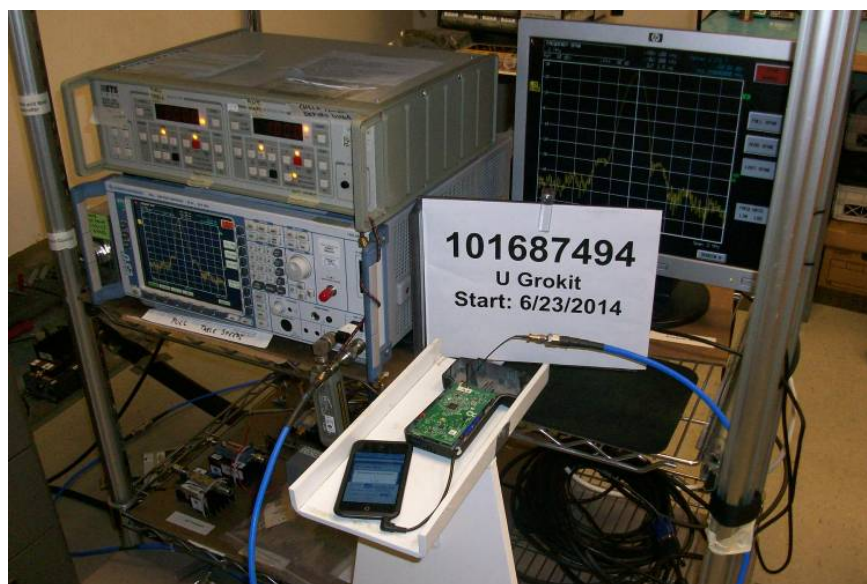
13.5 Measurement Summary:

The minimum OBW (99% power) was found to be 266.03 kHz: Low Channel

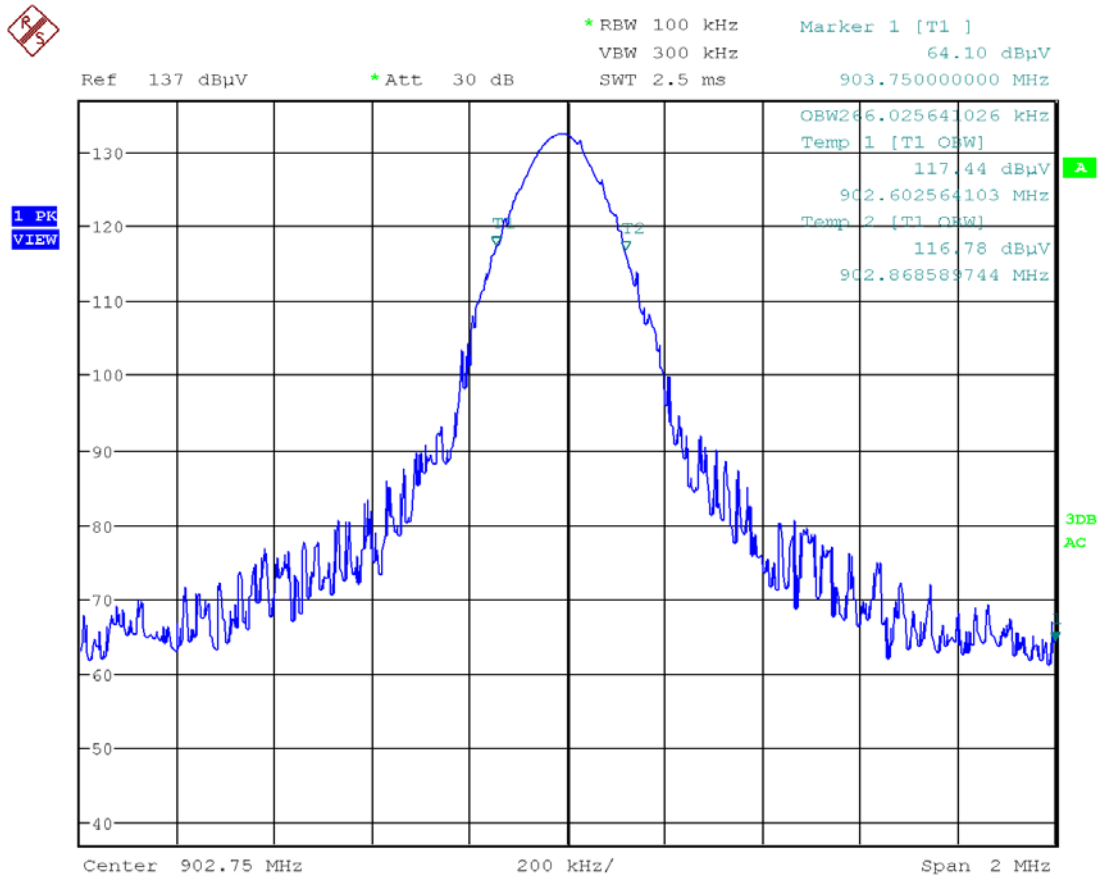
The maximum OBW (99% power) was found to be 272.44 kHz: High Channel

13.6 Setup Photographs:

Test Setup – OBW



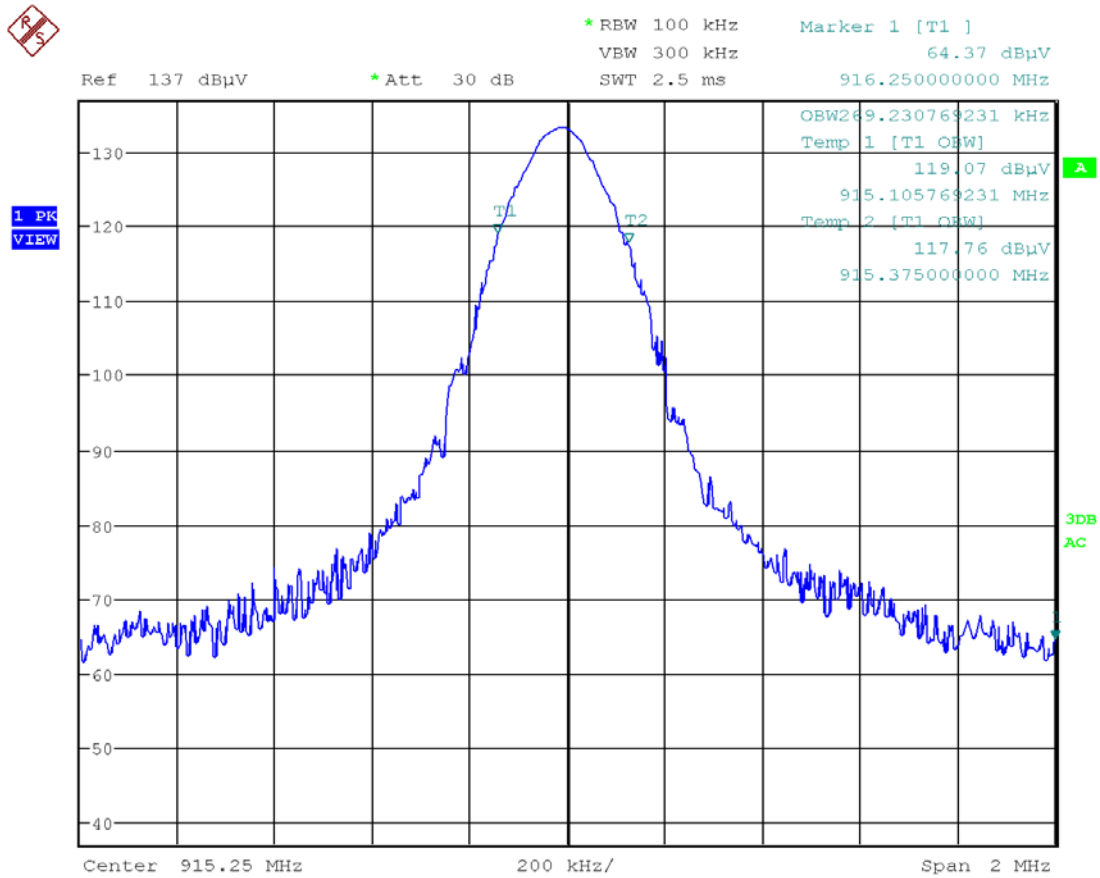
13.7 Plots: Low Channel



Date: 23.JUN.2014 09:51:44

OBW = 266.03 kHz

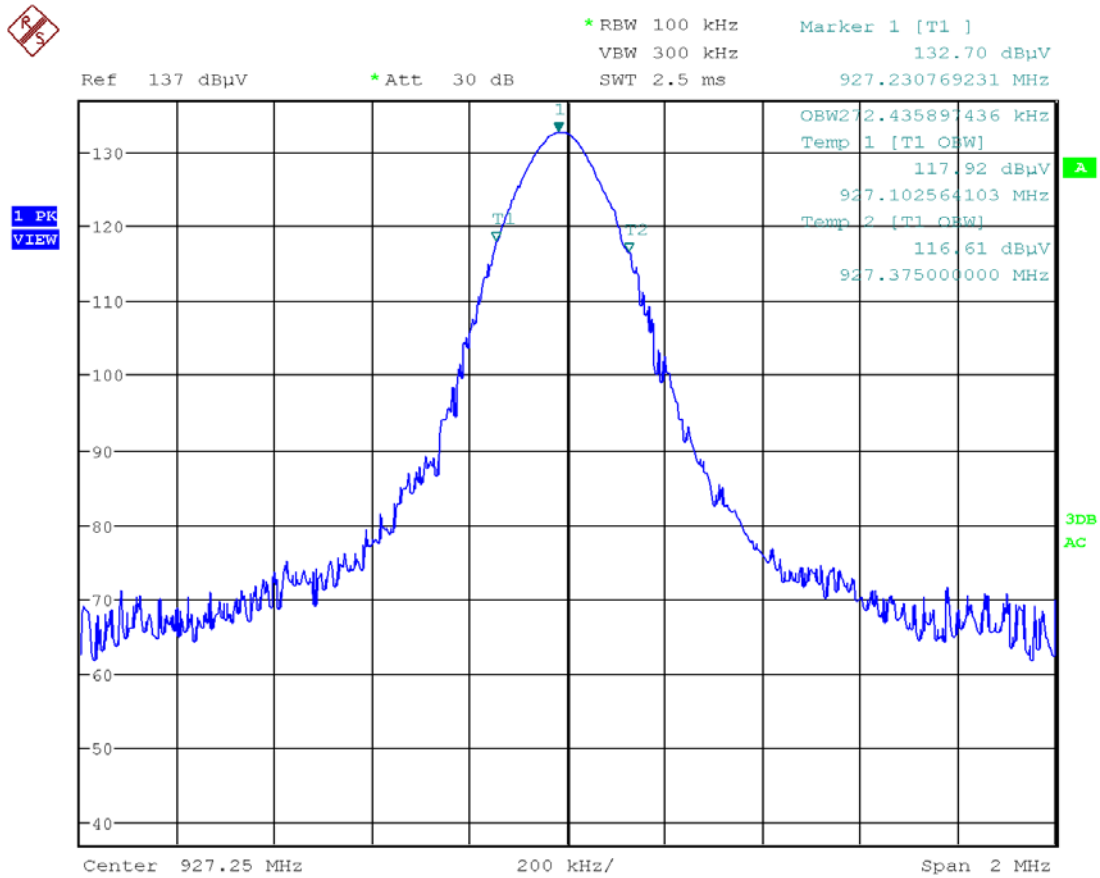
13.8 Plots: Mid Channel



Date: 23.JUN.2014 09:49:39

OBW = 269.23 kHz

13.9 Plots: High Channel



Date: 23.JUN.2014 09:48:08

OBW = 272.44 kHz

Notes: Occupied Bandwidth is for reference only and used to determine the Emissions Designator.

14 Duty Cycle – Duty Cycle Correction Factor – FCC 15.35(c)

14.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC public notice DA 00-705.

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

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

14.2 Specification:

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal Occupied Bandwidth to be reported is to be its 99% power emission bandwidth, as calculated or measured.

14.3 Duty Cycle Correction Factor

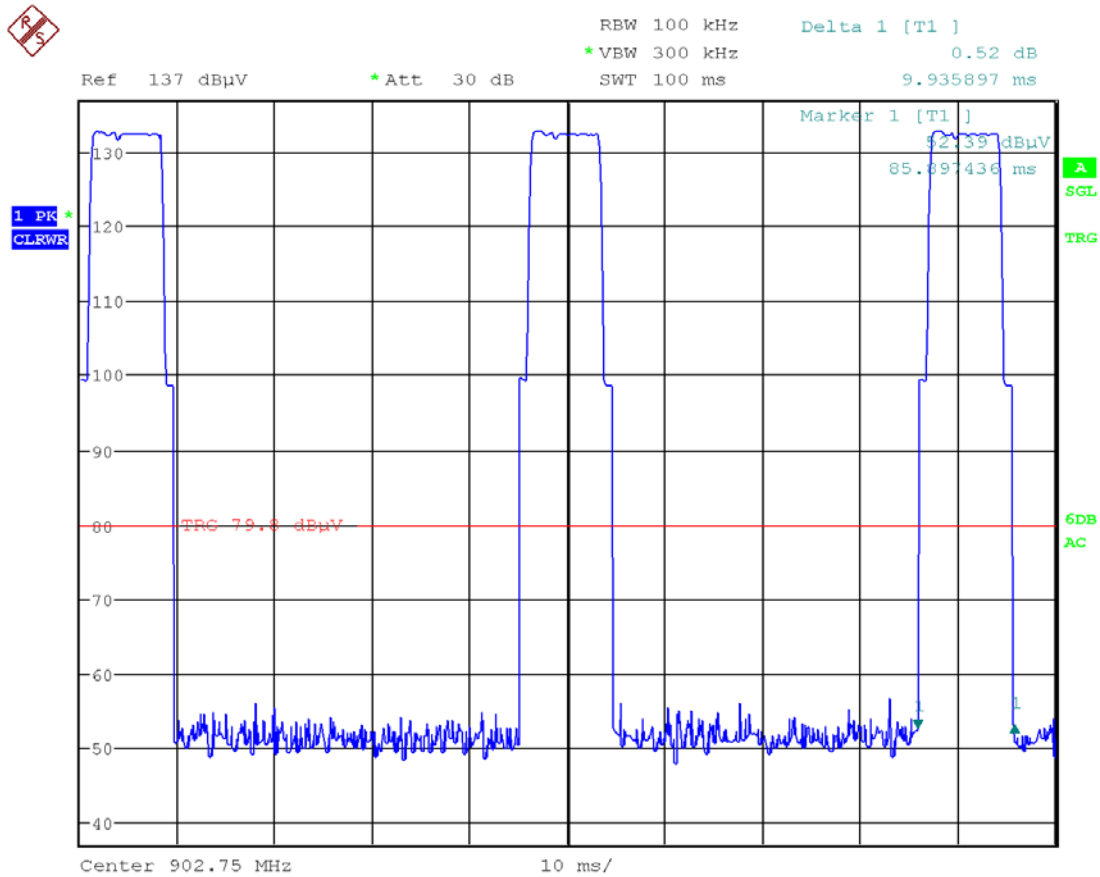
DCCF is calculated as follows $20 \cdot \log_{10}(\text{duty cycle per } 100\text{mS})$ and is “not to exceed 20dB”.

The plots shown in this section show the worst-case Total Duty Cycle Duration:
 $9.94\text{mS} \times 3 \text{ pulses} = 29.82\text{mS}$ per 100mS period, yielding a 10.51dB duty-cycle correction factor.

All measurements above 1GHz were adjusted by the allowed duty cycle correction factor per FCC 15.35/ IC RSS-GEN, Section 4.5.

14.4 Test Plots: Duty Cycle

Lowest Channel – 902.75MHz

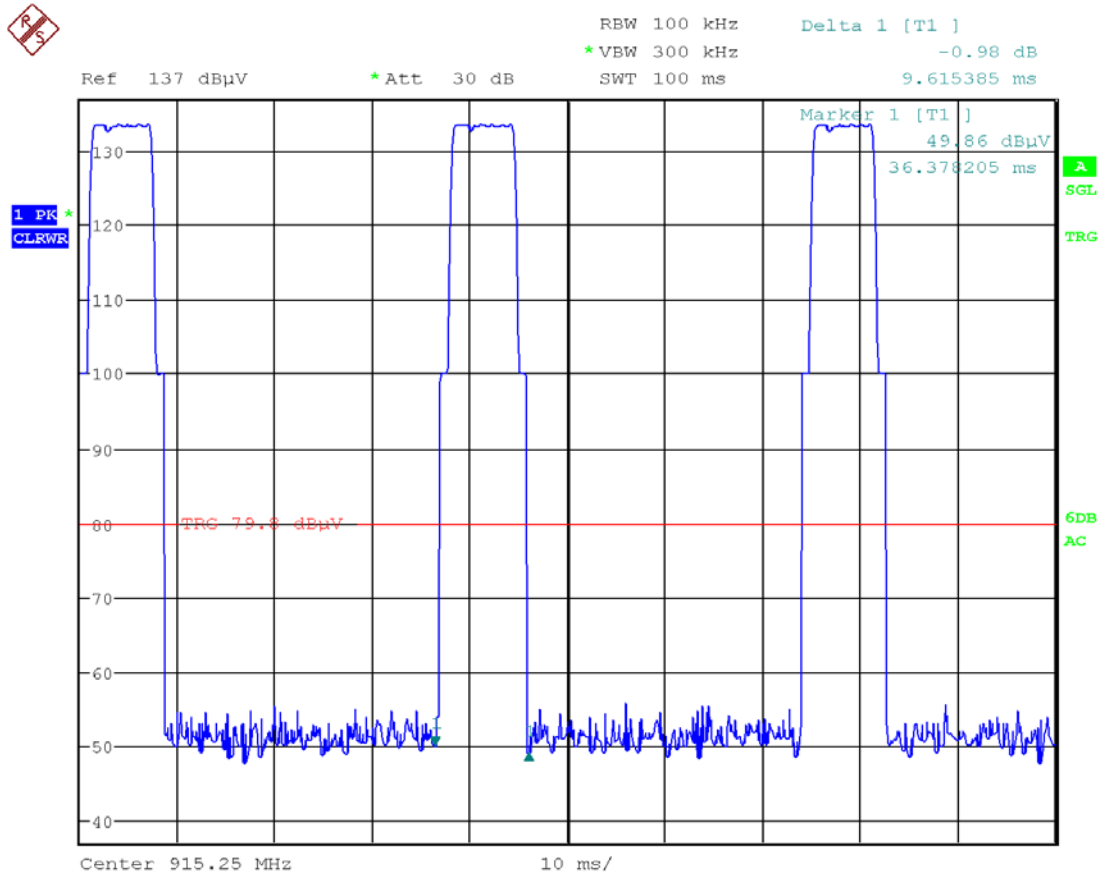


Date: 23.JUN.2014 09:07:58

Total Duty Cycle Duration: 9.94mS x 3 pulses = 29.82mS

14.5 Test Plots: Duty Cycle

Middle Channel – 915.25MHz

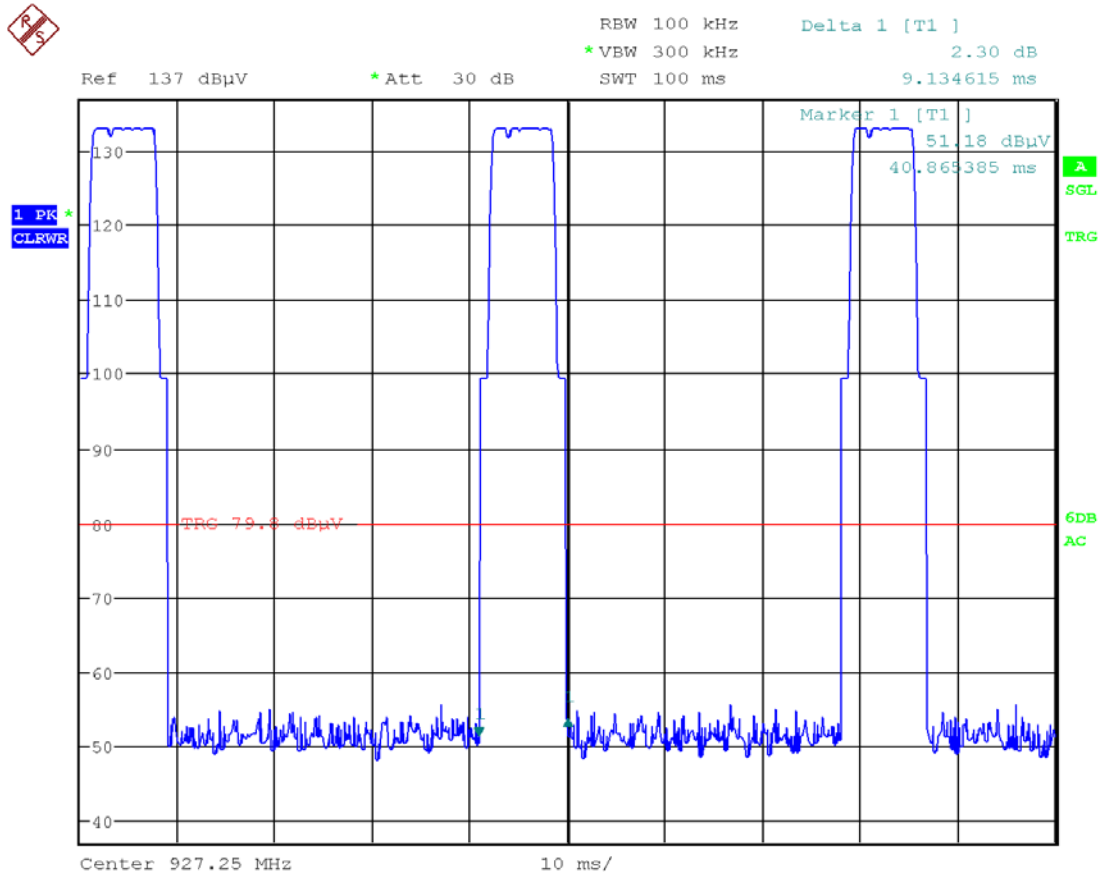


Date: 23.JUN.2014 09:14:09

Total Duty Cycle Duration: 9.62mS x 3 pulses = 28.86mS

14.6 Test Plots: Duty Cycle

Highest Channel – 927.25MHz



Date: 23.JUN.2014 09:16:52

Total Duty Cycle Duration: 9.14mS x 3 pulses = 27.42mS

15 Tx AC Power Conducted Emissions – Test not Applicable

- This test is not applicable – the product is internal battery-powered. The product has an ac adapter that is only used to charge the battery – the product does not operate with the ac adapter connected.
- Refer to Intertek Test Report 101687494DEN-001 for AC Conducted Emissions for the ac adapter – charge battery mode only..

16 Measurement Uncertainty

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

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

Measurement uncertainty Table

Parameter	Uncertainty \pm	Notes
Radiated emissions, 10kHz to 30 MHz	3.4 dB	
Radiated emissions, 30 to 200 MHz HP	2.2 dB	
Radiated emissions, 30 to 200 MHz VP	3.8 dB	
Radiated emissions, 200 to 1000 MHz HP	2.8 dB	
Radiated emissions, 200 to 1000 MHz VP	2.7 dB	
Radiated emissions, 1 to 18 GHz	5.2 dB	
Conducted port emissions 10kHz to 1000 MHz	1.0 dB	
Conducted port emissions 1 – 26.5 GHz	1.6 dB	
AC mains Conducted emissions, 9kHz to 30 MHz	3.14 dB	

17 Appendix A: Product Modifications - Not Required

- No product modifications were required to pass the testing in this report.

18 Revision History

Revision Level	Date	Report Number	Notes
0	August 12, 2014	101687494DEN-002	Original