

TEST REPORT

Report Number: 100781715DEN-001

Project Number: G100781715

Report Issue Date: 11/07/2013

Product Designation: Model: RC-03-MCT-K

**Standards: FCC 47CFR Part 15C
RSS-210 - Issue 8: 2010
RSS-Gen - Issue 3: 2010**

Tested by:

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

Client:

ISONAS Security Systems
4720 Walnut Street, Suite 200
Boulder, CO 80301

Report prepared by



Randy Thompson
Senior EMC Project Engineer

Report reviewed by



Michael Spataro
Engineering Team Leader

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>	8
5	<i>Radiated Unintentional & Tx Spurious Emissions</i>	10
6	<i>Tx Voltage Variation</i>	53
7	<i>Tx Frequency Tolerance (Stability)</i>	56
8	<i>Radiated Tx Intentional Emissions – Fundamental & Harmonics of the Fundamental</i>	59
9	<i>AC Mains Conducted Emissions</i>	84
10	<i>Telecom Port Conducted Emissions (CISPR 22) – Test not Applicable</i>	104
11	<i>Occupied Bandwidth (OBW) – RSS-GEN, Section 4.6.1</i>	105
12	<i>Product Modifications Required to Pass</i>	111
13	<i>Measurement Uncertainty</i>	112
14	<i>Revision History</i>	113

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	Radiated Unintentional & Tx Spurious Emissions - FCC 15.209/15.225(d) Covers IC RSS-Gen 7.2.5/ RSS-210 A2.6(b)(c)(d)	07/02/2012 07/03/2012	Pass
6	Tx Voltage Variation - FCC 15.31(e)	07/05/2012	N/A
7	Tx Frequency Tolerance (Stability) – FCC 15.225(e) Covers RSS-Gen, Section 7.2.6/RSS-210 A2.6	07/19/2012	Pass
8	Tx Radiated Emissions - FCC 15.209/15.225(a) Covers IC RSS-Gen 7.2.5/RSS-210 A2.6(a)	07/05/2012 07/06/2012	Pass
9	AC Conducted Emissions - FCC 15.207 Covers RSS-Gen, Section 7.2.4	07/06/2012	Pass
10	Telecom Port Conducted Emissions - CISPR 22: 2008	-----	N/A
11	Occupied Bandwidth Measurement (OBW) - RSS-Gen, Section 4.6.1	09/06/2012	Pass

General Notes:

- 1) The testing in this report covers the following product models: RC-03-MCT (non-keypad) and RC-03-MCT-K (keypad). Both models are multi-frequency Tx operation – 122.8kHz and 13.56MHz.
- 2) The following product options were covered in this testing:
 - Power Over Ethernet (POE)
 - 12/24VDC
- 3) Product is RSS-210 Category 1 equipment.

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

Radio Notes:

- 1) FCC CFR47 Part 15.31: Measurement Standards: In any case where the device is powered off a battery, a fresh battery was used during test. In cases where the device is powered off an AC supply, voltage was varied per Part 15.31 to find worst case emissions.
- 2) FCC CFR47 Part 15.35 and IC RSS-Gen 4.4/ 7.2.1: Measurement Detector Functions and Bandwidths were utilized when performing the measurements within this report.
- 3) Limits below 30 MHz were extrapolated using FCC 15.31(f) and RSS-GEN section 4.11.
At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations. When performing measurements at a closer distance than specified, the results are extrapolated to the specified distance using the square of an inverse linear distance extrapolation factor (40dB/decade).
- 4) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified. When performing measurements at a distance other than that specified, the results are extrapolated to the specified distance using the inverse linear distance extrapolation factor (20dB/decade).
- 5) FCC 15.35 and IC RSS-Gen 4.5: No duty cycle correction for pulsed-signals was utilized in this report.

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

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
RC-03 Multitech Keypad Reader	Isonas	RC-03-MCT-K	FCC2

Receive Date:	07/02/2012
Received Condition:	Good
Type:	Production Sample

Description of Equipment Under Test (provided by client)

The product tested is a Dual-Frequency, network-enabled, RFID Security Access Reader.

The RC-03-MCT-K is a Radio Frequency Identification Device (RFID) Reader / Controller that can be hardware configured with or without a 12 position numeric keypad for manual PIN entry. It can further be hardware configured to operate either as a low frequency device or a multi frequency unit combining low frequency and high frequency operation.

The RC-03-MCT-K intended uses are instances where items of value requiring the ability to control access to said items is desired, also known as "Access Control". The RC-03MM provides a way to input access credentials either in the form of a RFID transponder (credential) operating in the low frequency band of the radio spectrum or in the High Frequency band of the radio spectrum by powering the credential and receiving said information via magnetic induction or by manual input of a PIN via keypad for the controller portion of the device to either act on or pass on via Ethernet connectivity to a control program resident elsewhere.

The RC-03M has provision to be powered via IEEE802.3 Power Over Ethernet (POE) or by external DC voltage. It also has provision to source power out to and control or receive input from other external devices such as electromagnetic door locks and motion sensors. The RC-03M can operate either in "Standalone" mode where all access rules and allowable credentials are stored on board the unit locally with access decisions being made exclusively by the unit locally or in "Host" mode where the RC-03M is connected to a controlling computer via Ethernet. In this case all the access rules and credentials are handled by the remote computer, which could be handling many RC-03M controllers in different locations.

Specific Product Option tested in this report: MultiTech (122.8kHz & 13.56MHz), POE and VDC.

Clocks: 32.768kHz, 14.7456MHz and 25MHz

Radio: Tx Frequency 122.8kHz (+/- 100Hz) and 13.56MHz (+/- 7kHz), inductive loop single integral antenna, carrier duty-cycled (no modulation)

Product will marketed in the US and Canada.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
Power Over Ethernet (POE) 48VDC	0.26A	----	----
12/24VDC	0.130A/ 0.07A max	----	----

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Verify transponder read.
2	Exercise communications with the UUT from a PC via serial command test scripts.

3.1 Photo: Product Under Test

Model: RC-03-MCT-K



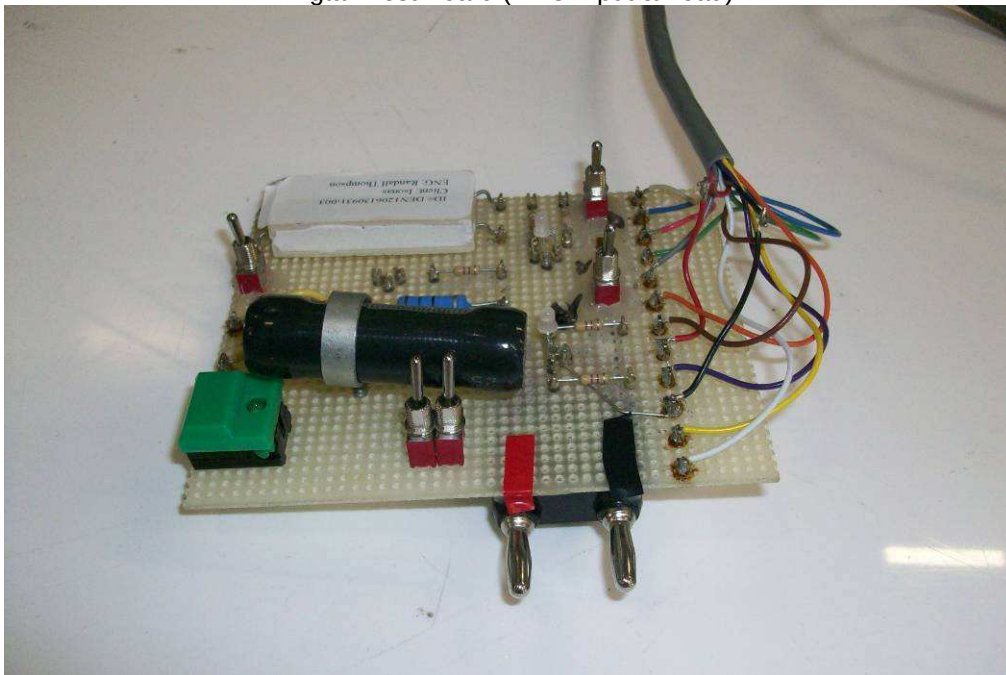
Photo: Product Under Test

RC-03-MCT-K

Ethernet Cable (Ferrite Required for Radiated Emissions)



Pigtail Test Board (VDC Input & Load)

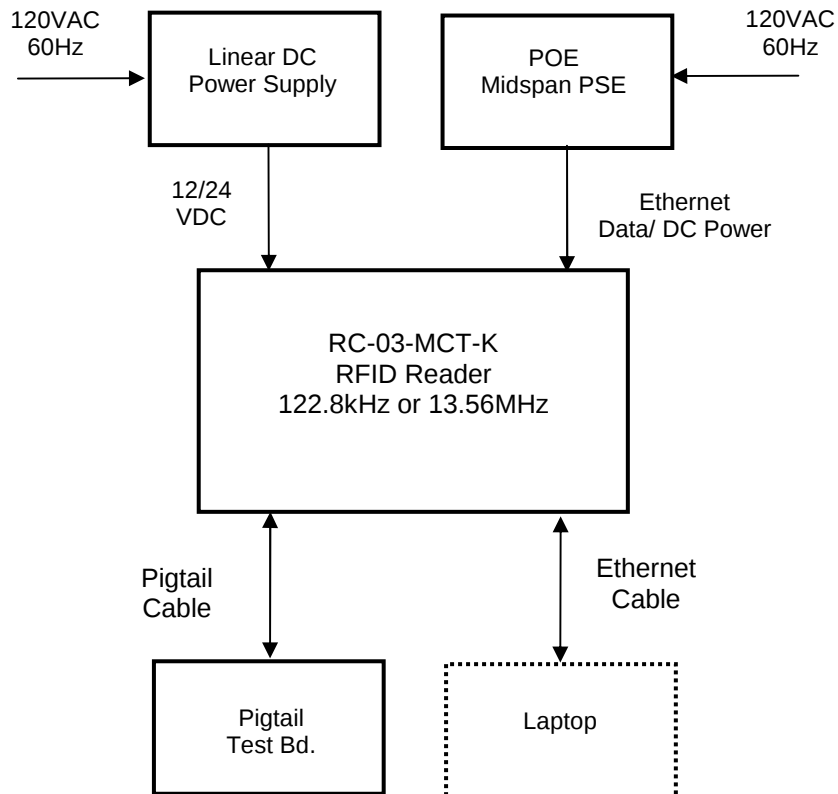


4 System setup including cable interconnection details, support equipment and simplified block diagram

4.1 Method:

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

4.2 EUT Block Diagram:



Notes:

1. Items in dashed line are support equipment – not directly tested.
2. Product tested in (2) configurations: Power over Ethernet (POE) & 12/24VDC

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

4.3 Support Data:

ID	Description/ Function	Shield	Length	Connector	Connection	Ferrites
1	AC Cable	None	1.2 meter	AC	Midspan PSE	None
2	AC Cable	None	1.2 meter	AC	Linear DC Supply	None
3	Ethernet	None	3 meter	RJ45	Midspan PSE	Yes
4	Ethernet	None	3 meter	RJ45	Laptop	No
5	Pigtail Load	None	1 meter	RC-03M	-----	Yes

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Midspan PSE	PowerDsine	PowerDsine 3001	R07066050004C2
Linear Power supply +24V / +48VDC out.	Isonas	Engineering only	N/A
Linear Power supply +12VDC out.	Isonas	Engineering only	N/A
Pigtail Test Board	Isonas	Engineering only	N/A
Tablet PC	HP	HP-300RT	Unknown

Notes:

Support equipment was required for testing - The linear power supply provided DC power, the Midspan PSE provided DC power and data. The pigtail test board provided typical loading and data feedback to the product under test.

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

5 Radiated Unintentional & Tx Spurious Emissions

5.1 Method

Unless otherwise stated no deviations were made from FCC 15.209/15.225(d) and IC RSS-Gen 7.2.5/RSS-210 A2.6.

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

5.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	RHODE & SCHWARZ	ESU 26	100265	01/11/2012	01/11/2013
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/06/2012	06/06/2013
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/15/2011	11/15/2012
18897	Active Loop Antenna	EMCO	6502	9205-2738	11/22/2011	11/22/2012
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_Vba	V003	VBV	VBV

5.3 Results:

The sample tested was found to Comply.

5.4 Setup Photographs: Product Configuration – POE

Test setup – Front view (Axis 1-EUT Horizontal)



Test setup – Front View (Axis 1-EUT Horizontal)



Photo: POE

Test setup – Front View (Axis 2-EUT Vertical)



Photo: POE

Test setup – Rear view (Axis 1-EUT Horizontal)

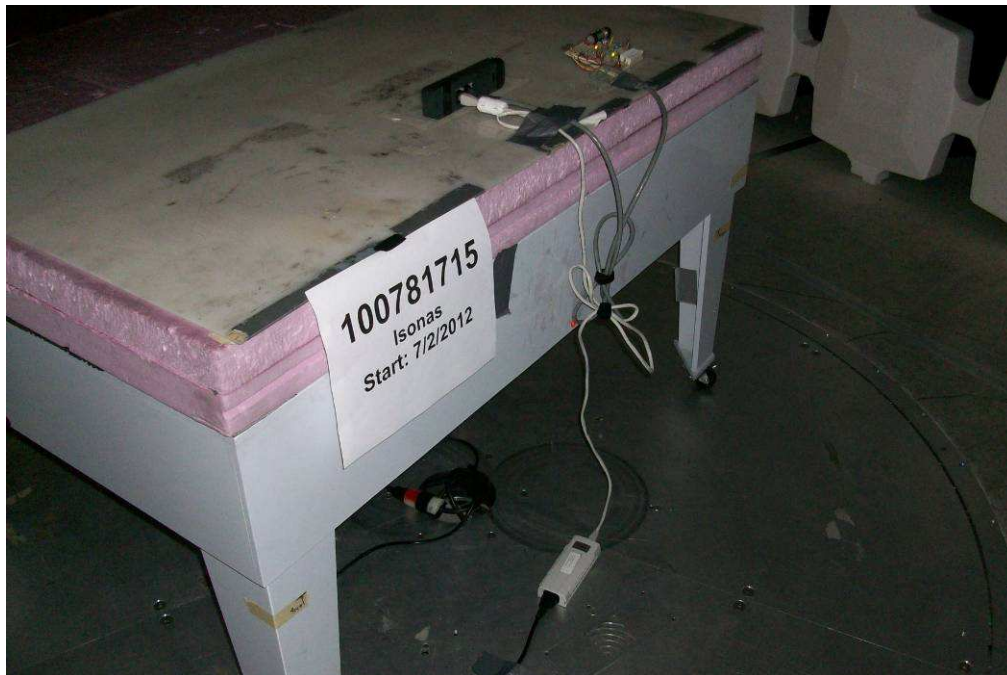


Photo: POE

Test setup – Rear view (Axis 2-EUT Vertical)



5.5 Setup Photographs: Product Configuration – 12/24VDC

Test setup – Front view (Axis 1-EUT Horizontal)



Photo: 12/24VDC

Test setup – Front view (Axis 2 – EUT Vertical)



Photo: 12/24VDC

Test setup – Rear view (Axis 1 – EUT Horizontal)

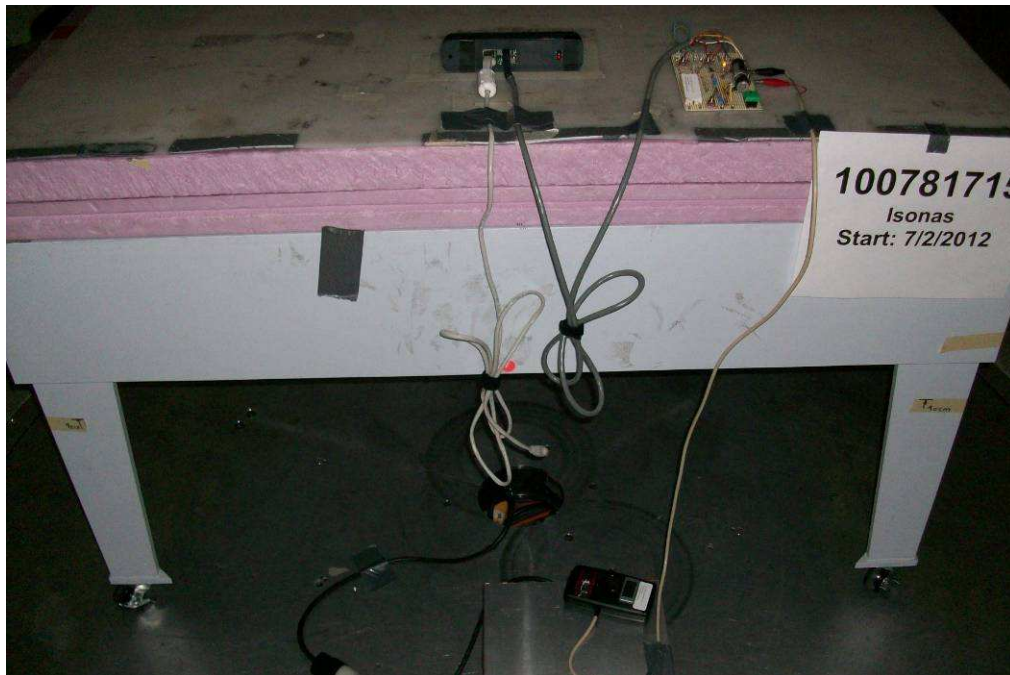


Photo: 12/24VDC

Test setup – Rear view (Axis 2 – EUT Vertical)

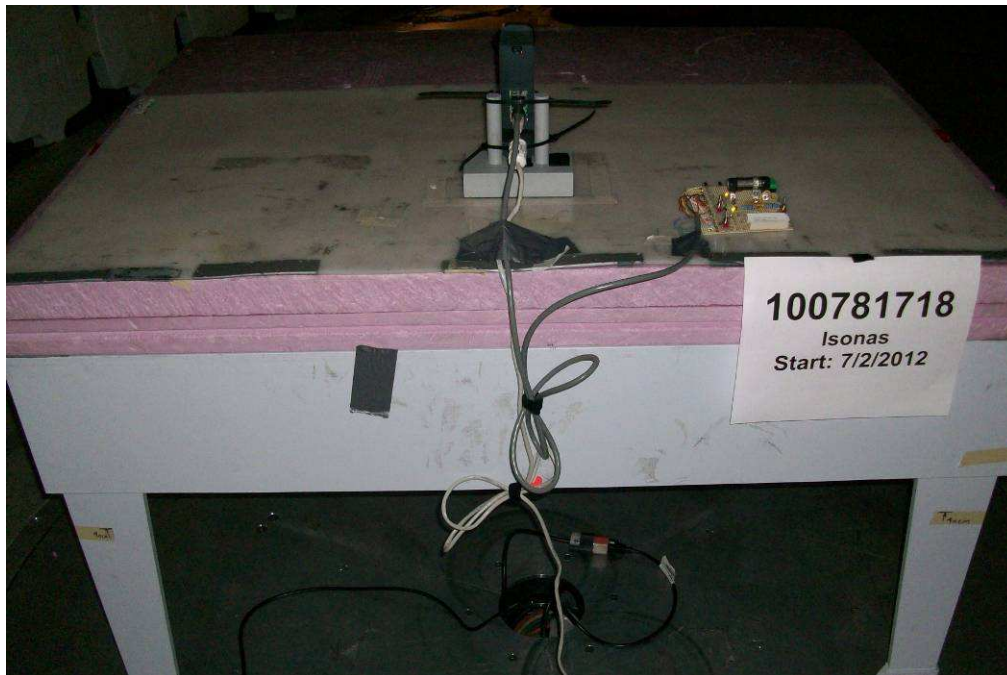


Photo: Antenna Setup

Antenna Setup: Active Loop Antenna - 10kHz to 30MHz



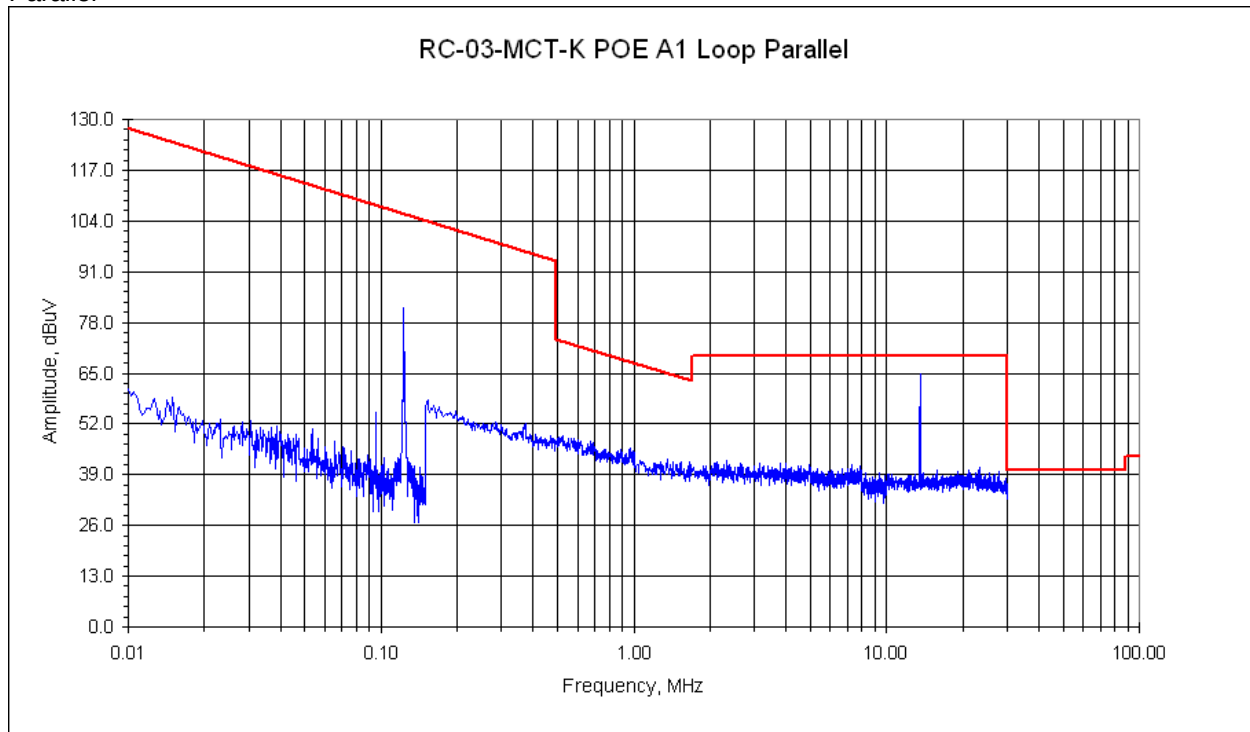
Antenna Setup: BiLog Antenna - 30MHz to 1000MHz



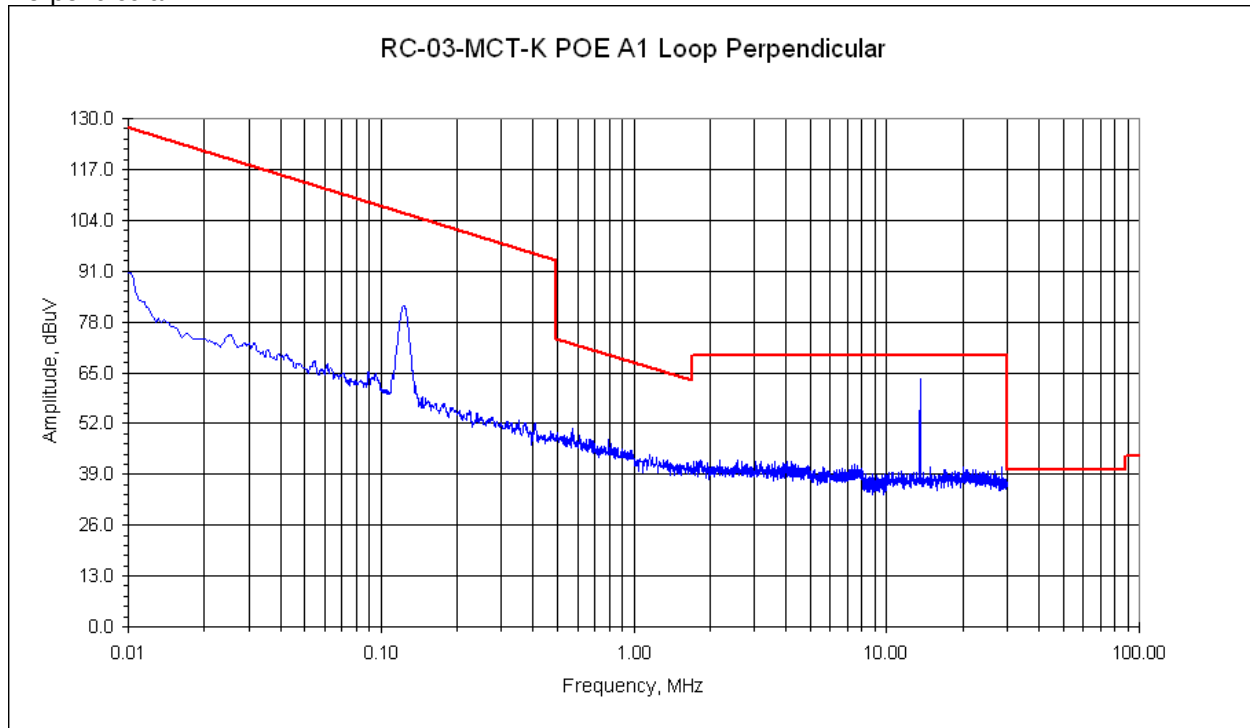
5.6 Pre-scan Plots: Reference Only – Not Final Data: POE-Axis 1

Radiated Emissions – FCC 15.209/15.225/IC RSS-Gen/RSS-210 (10kHz to 30MHz)

Parallel



Perpendicular

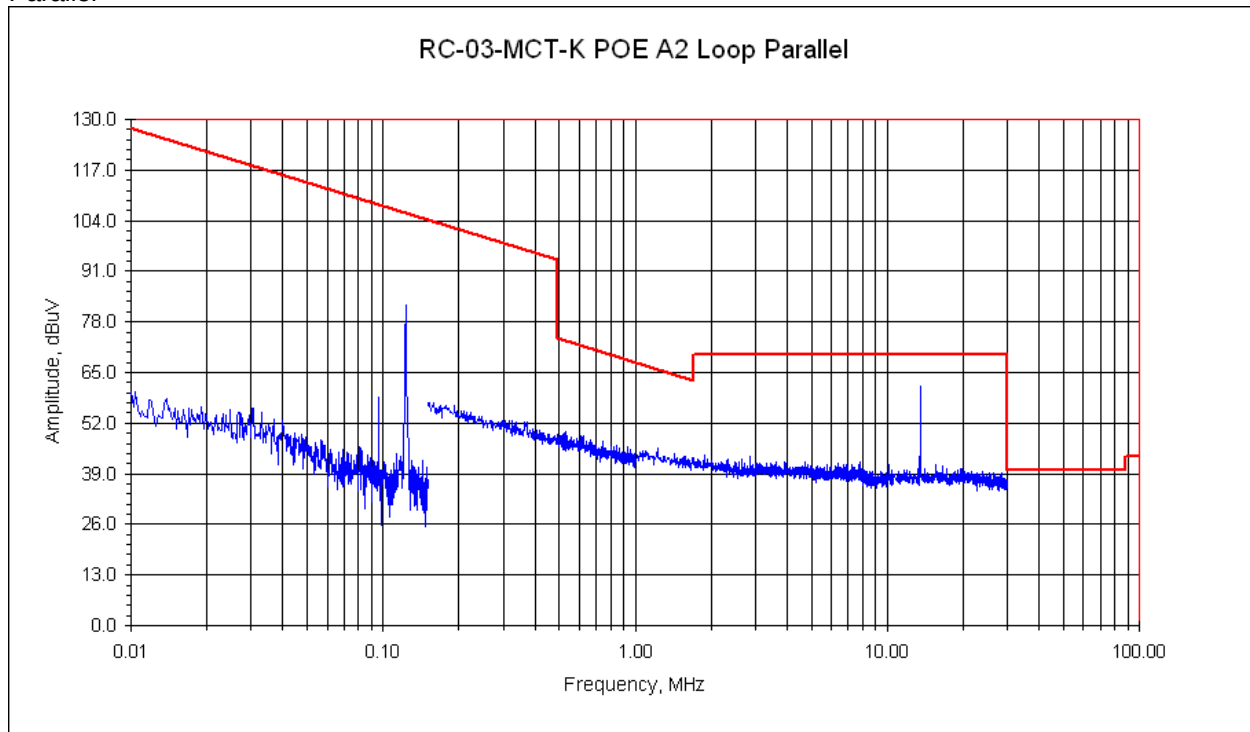


Note: Peak detector measurements plotted against quasi-peak limits

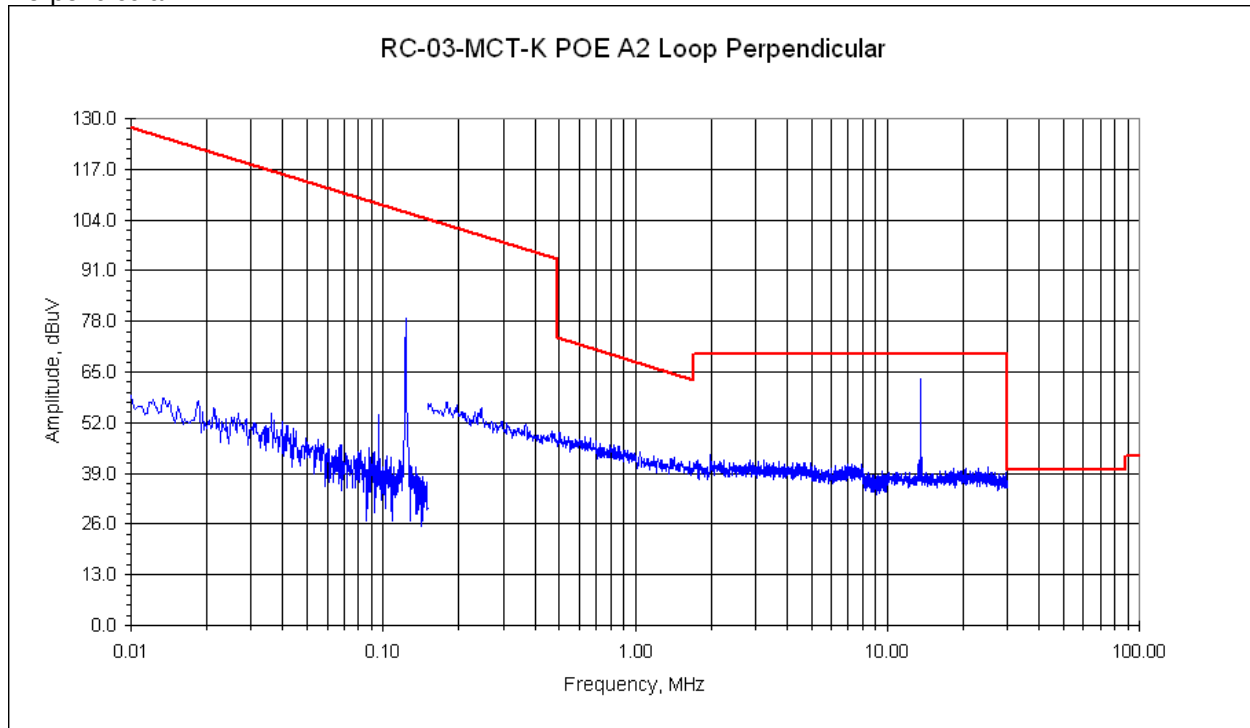
5.7 Pre-scan Plots: Reference Only – Not Final Data: POE-Axis 2

Radiated Emissions – FCC 15.209/15.225/IC RSS-Gen/RSS-210 (10kHz to 30MHz)

Parallel



Perpendicular

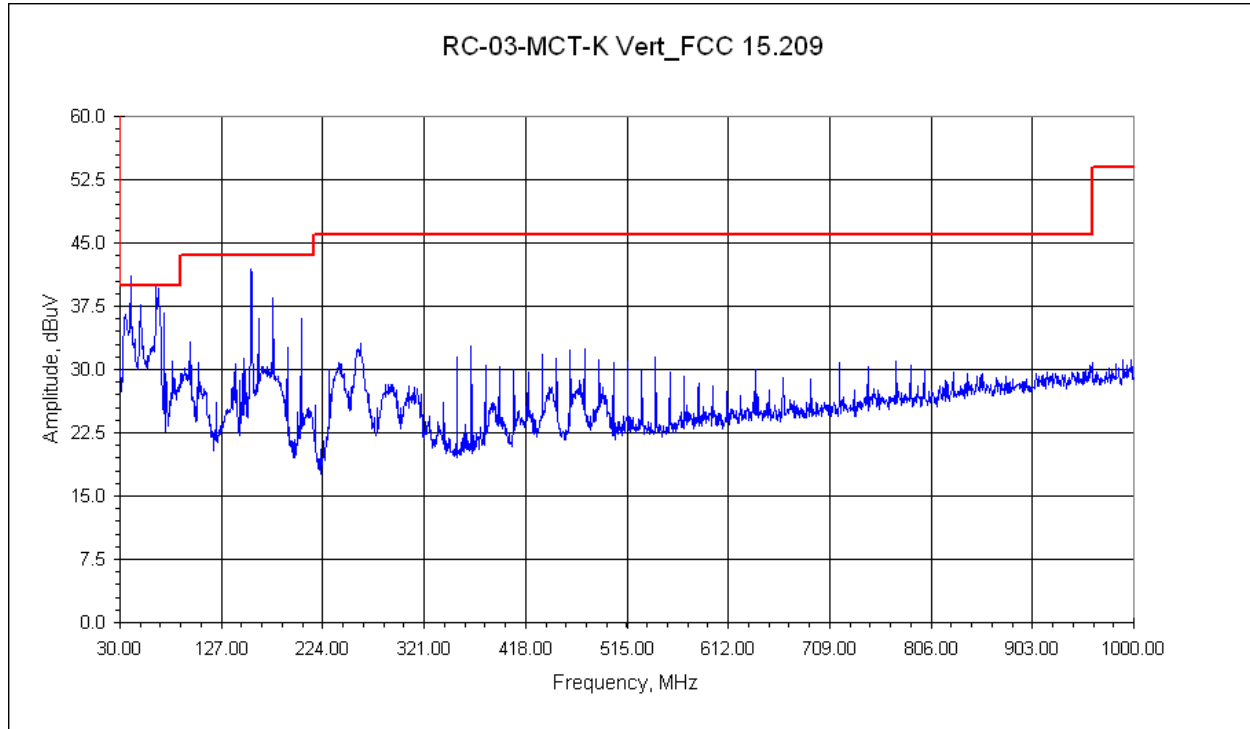


Note: Peak detector measurements plotted against quasi-peak limits

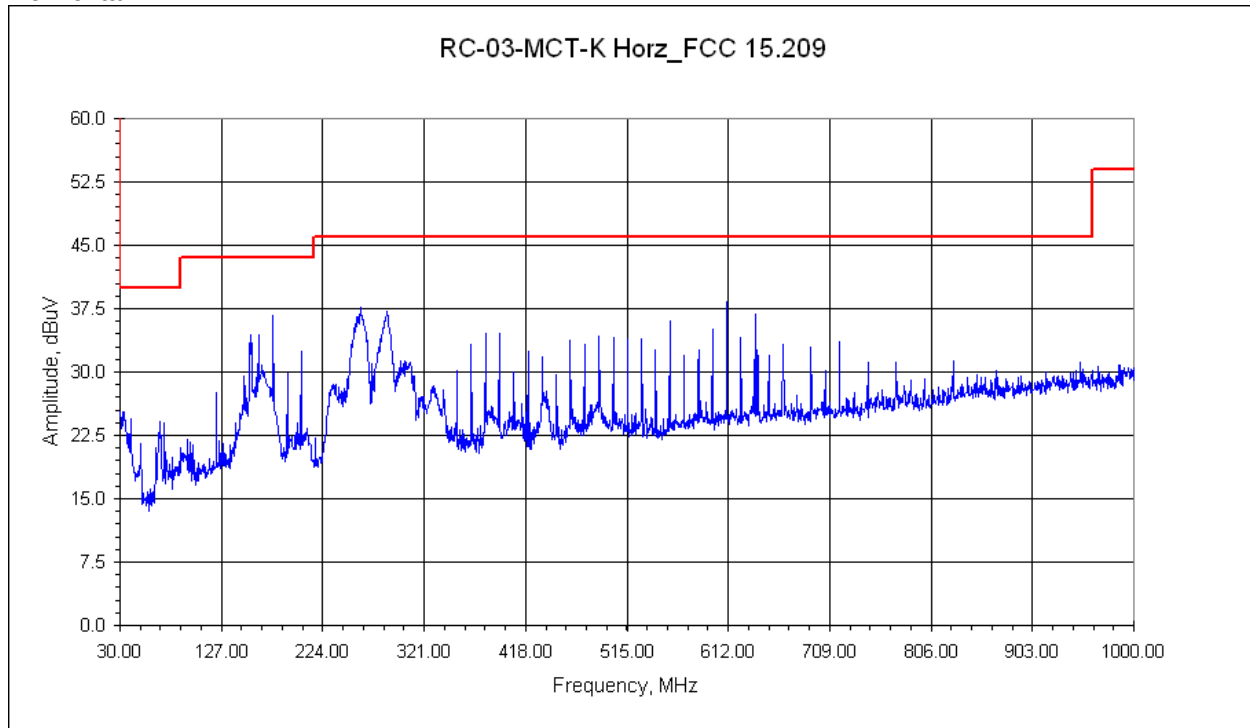
5.8 Pre-scan Plots: Reference Only – Not Final Data: POE – Axis 1

Radiated Emissions – FCC 15.209/15.225/IC RSS-Gen/RSS-210 (30MHz to 1000MHz)

Vertical.



Horizontal

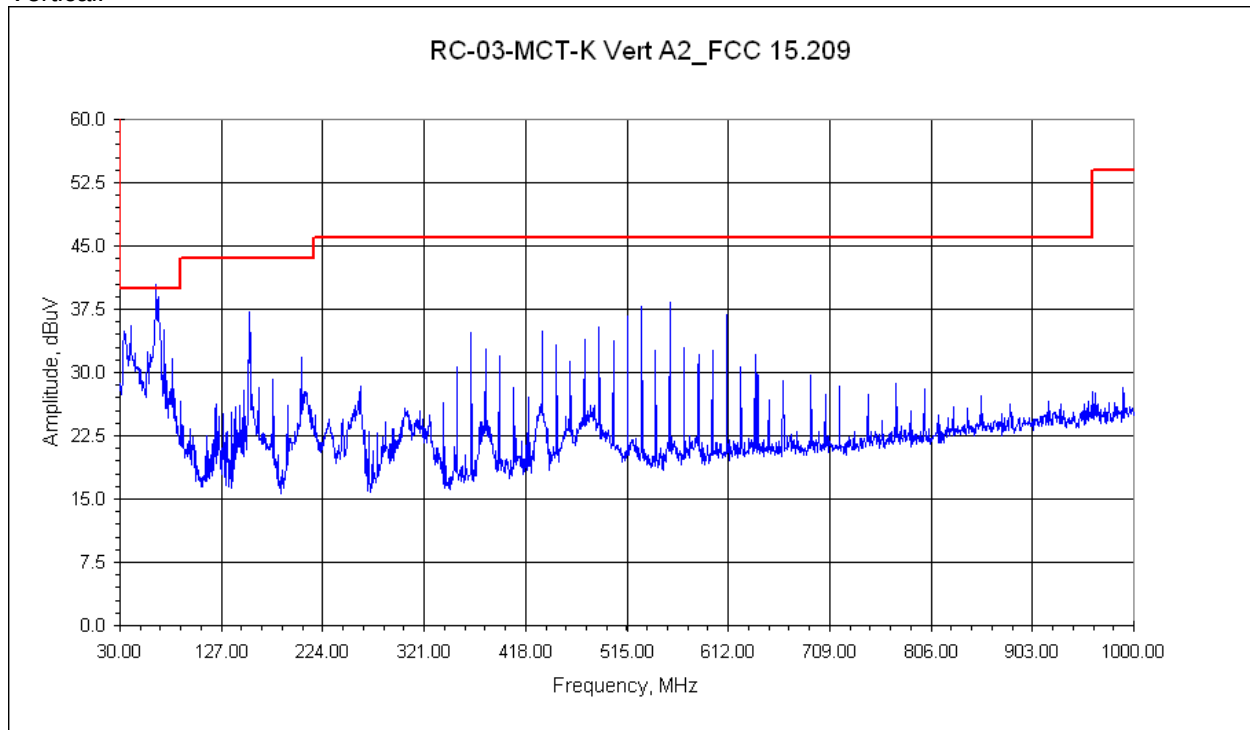


Note: Peak detector measurements plotted against quasi-peak limits

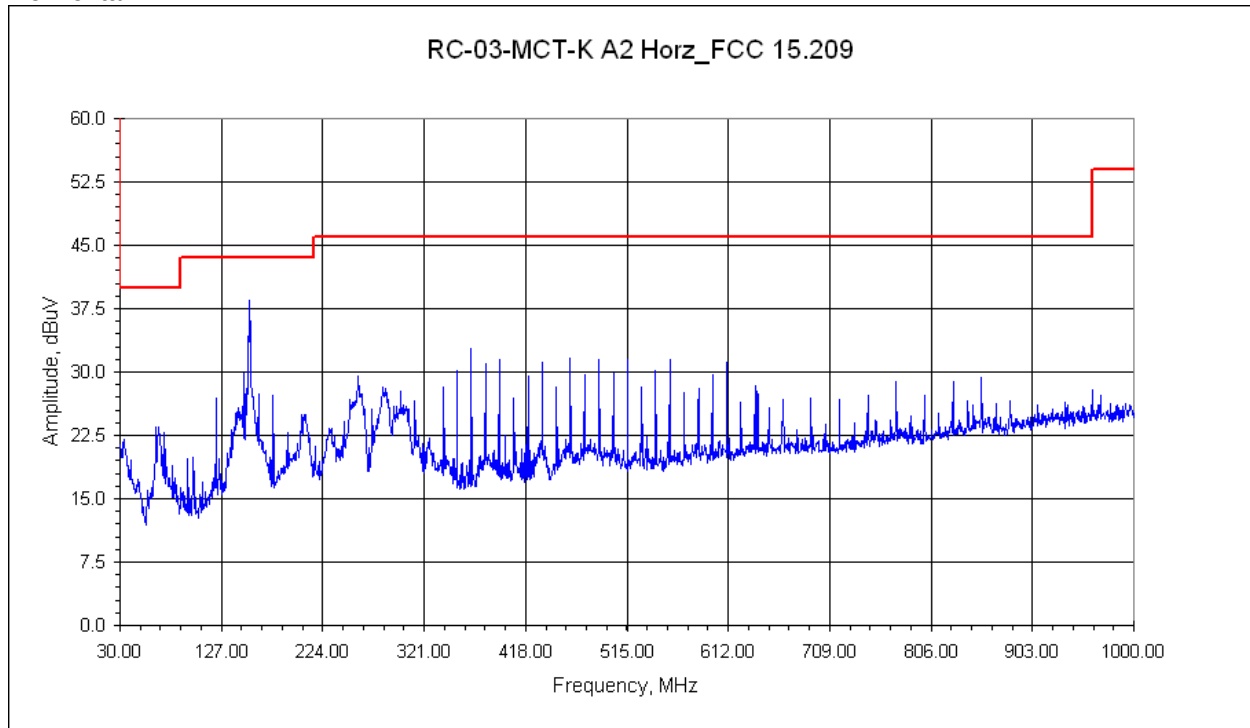
5.9 Pre-scan Plots: Reference Only – Not Final Data: POE – Axis 2

Radiated Emissions – FCC 15.209/15.225/IC RSS-Gen/RSS-210 (30MHz to 1000MHz)

Vertical.



Horizontal

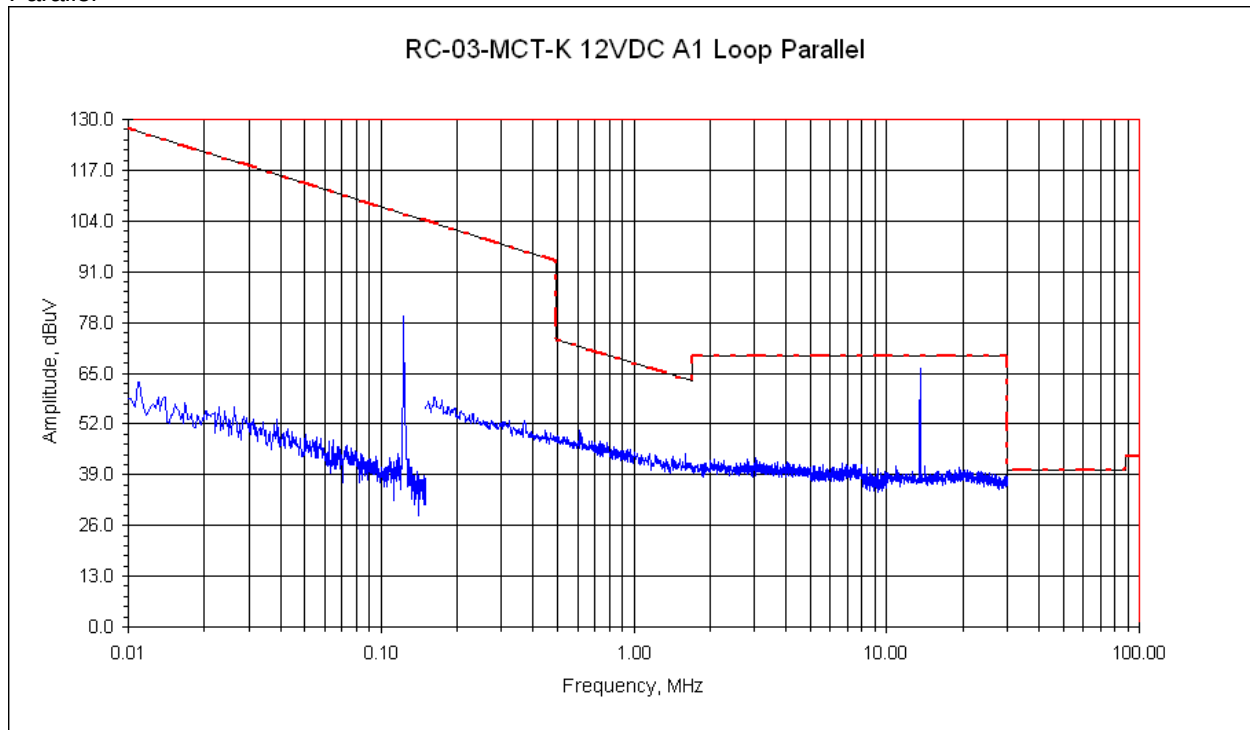


Note: Peak detector measurements plotted against quasi-peak limits

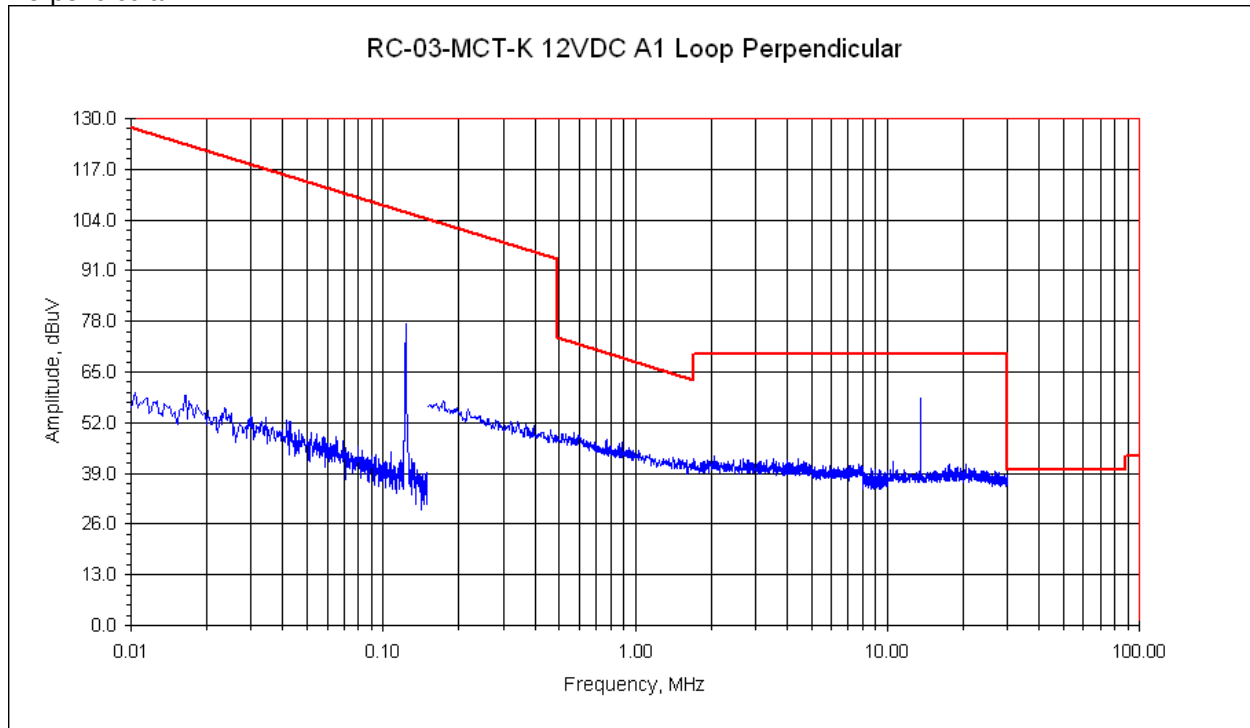
5.10 Pre-scan Plots: Reference only – Not Final Data: 12VDC-Axis 1

Radiated Emissions – FCC 15.209/15.225/ IC RSS-Gen/RSS-210 (10kHz to 30MHz)

Parallel



Perpendicular

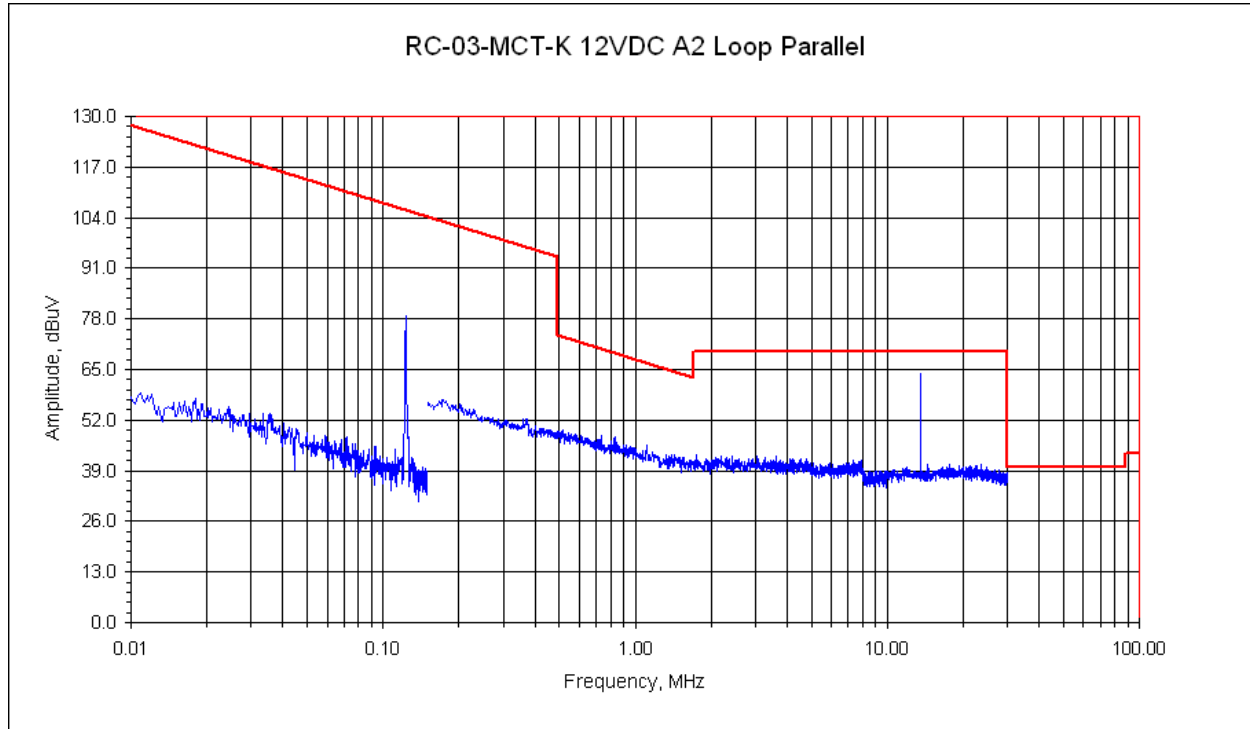


Note: Peak detector measurements plotted against quasi-peak limits

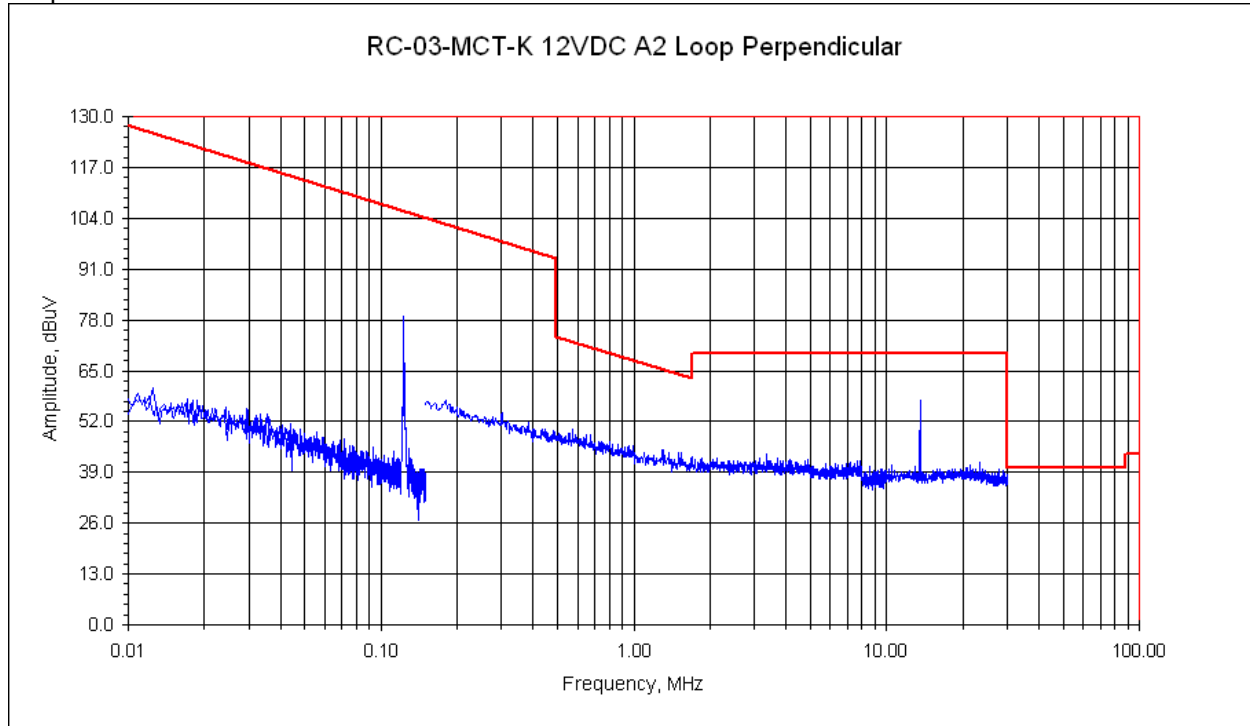
5.11 Pre-scan Plots: Reference only – Not Final Data: 12VDC-Axis 2

Radiated Emissions – FCC 15.209/15.225/ IC RSS-Gen/RSS-210 (10kHz to 30MHz)

Parallel



Perpendicular

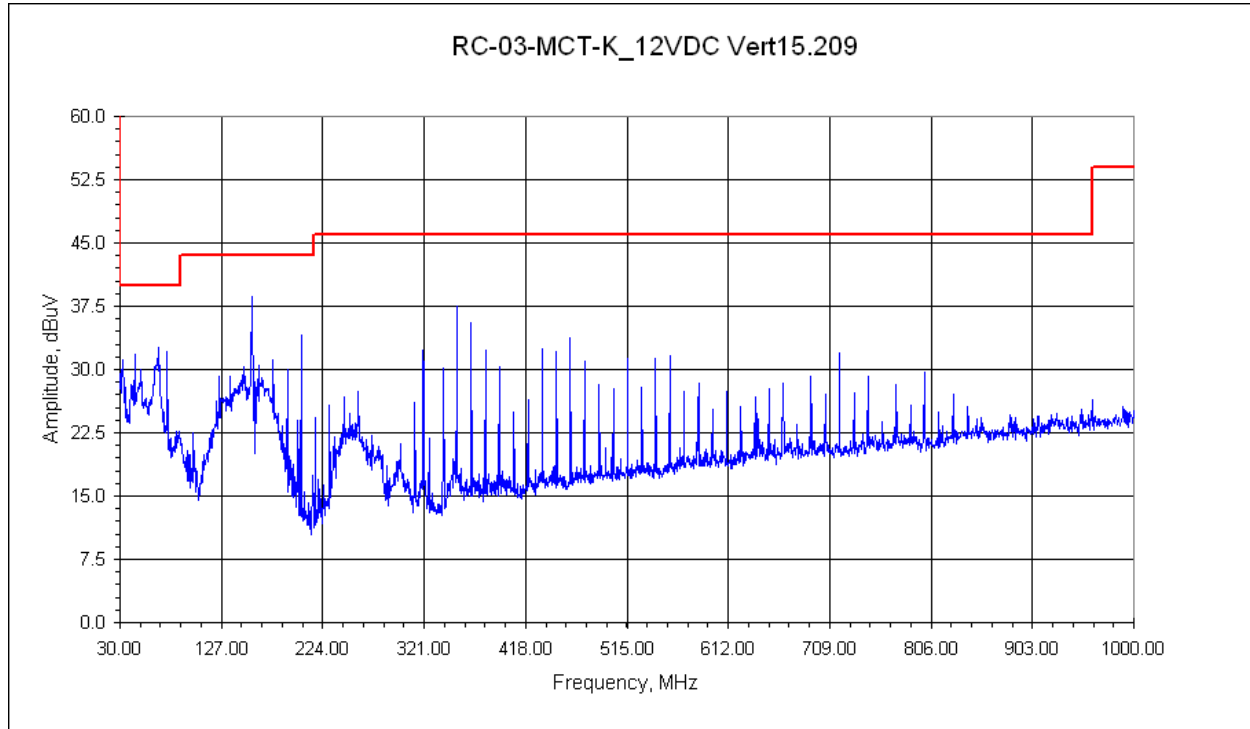


Note: Peak detector measurements plotted against quasi-peak limits

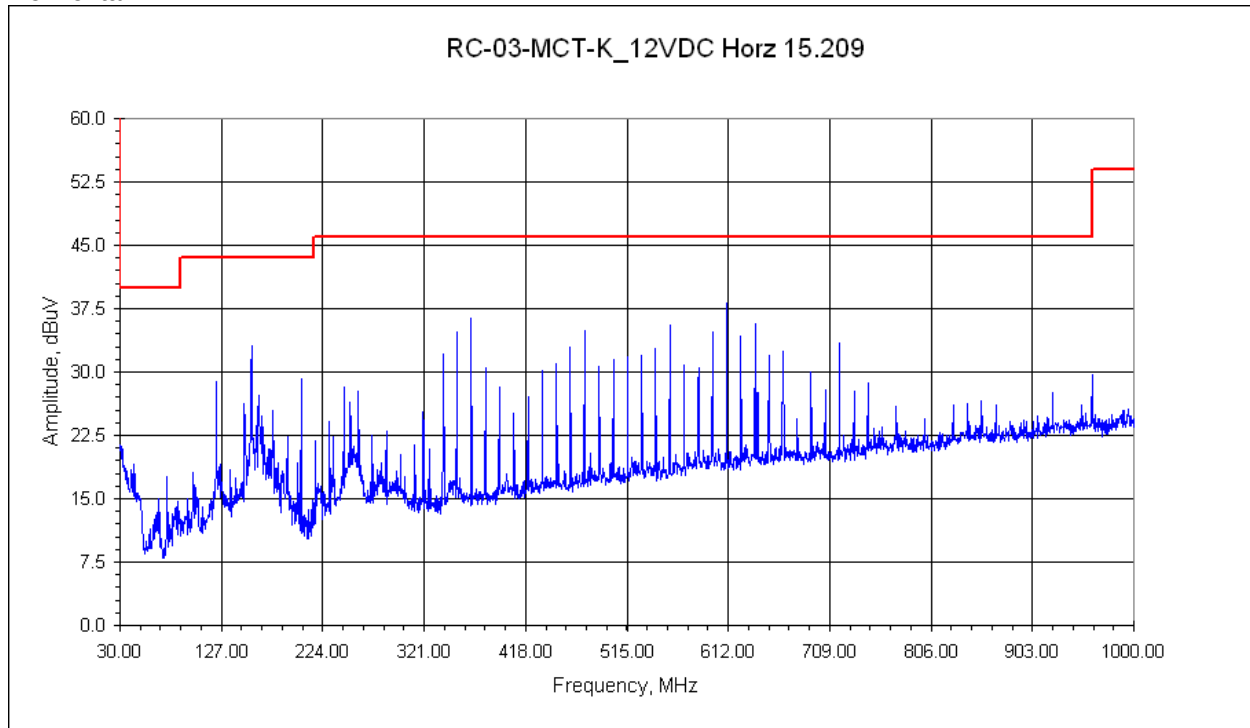
5.12 Pre-scan Plots: Reference only – Not Final Data: 12VDC-Axis 1

Radiated Emissions – FCC 15.209/15.225 IC RSS-Gen/RSS-210 (30MHz to 1000MHz)

Vertical.



Horizontal

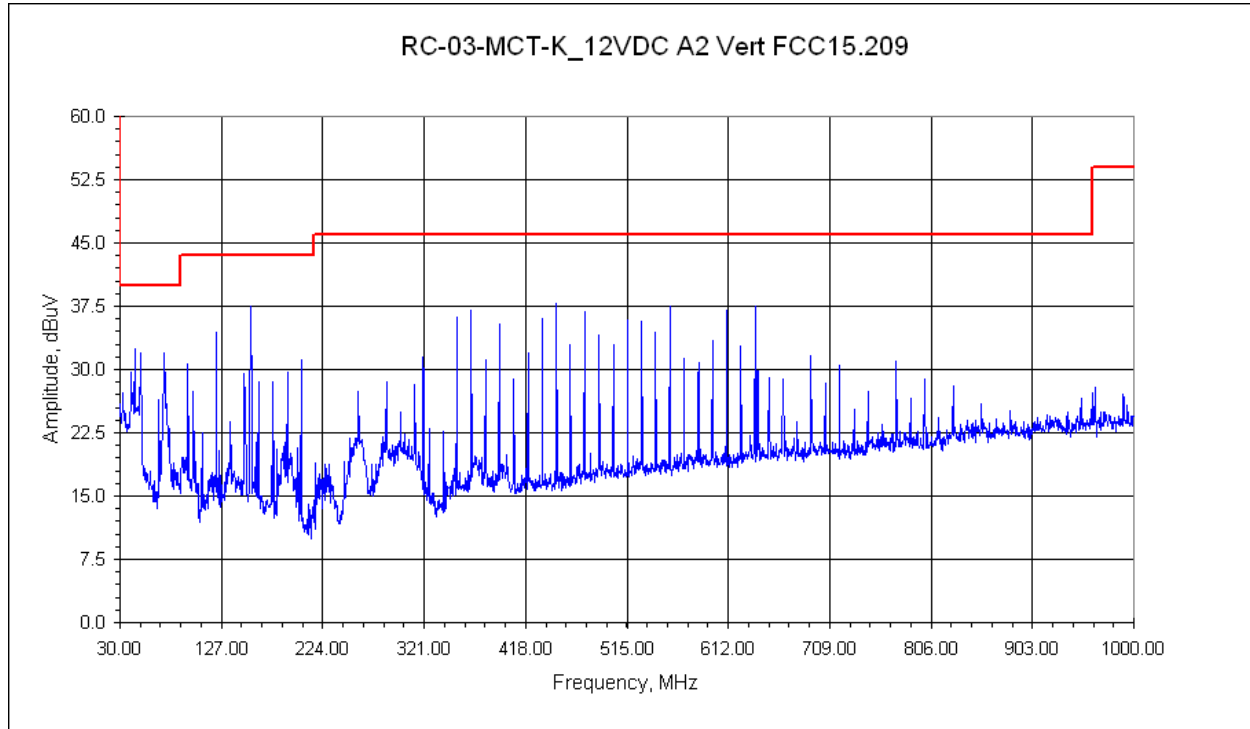


Note: Peak detector measurements plotted against quasi-peak limits

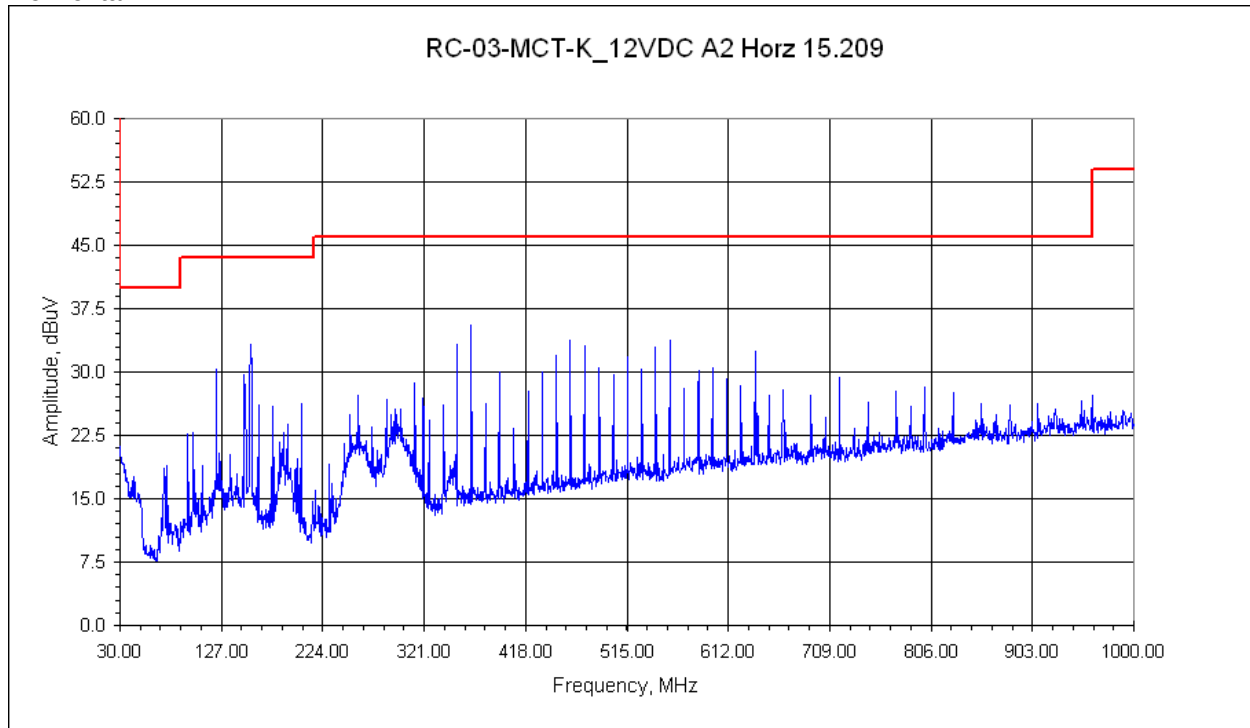
5.13 Pre-scan Plots: Reference only – Not Final Data: 12VDC-Axis 2

Radiated Emissions – FCC 15.209/15.225 IC RSS-Gen/RSS-210 (30MHz to 1000MHz)

Vertical.



Horizontal

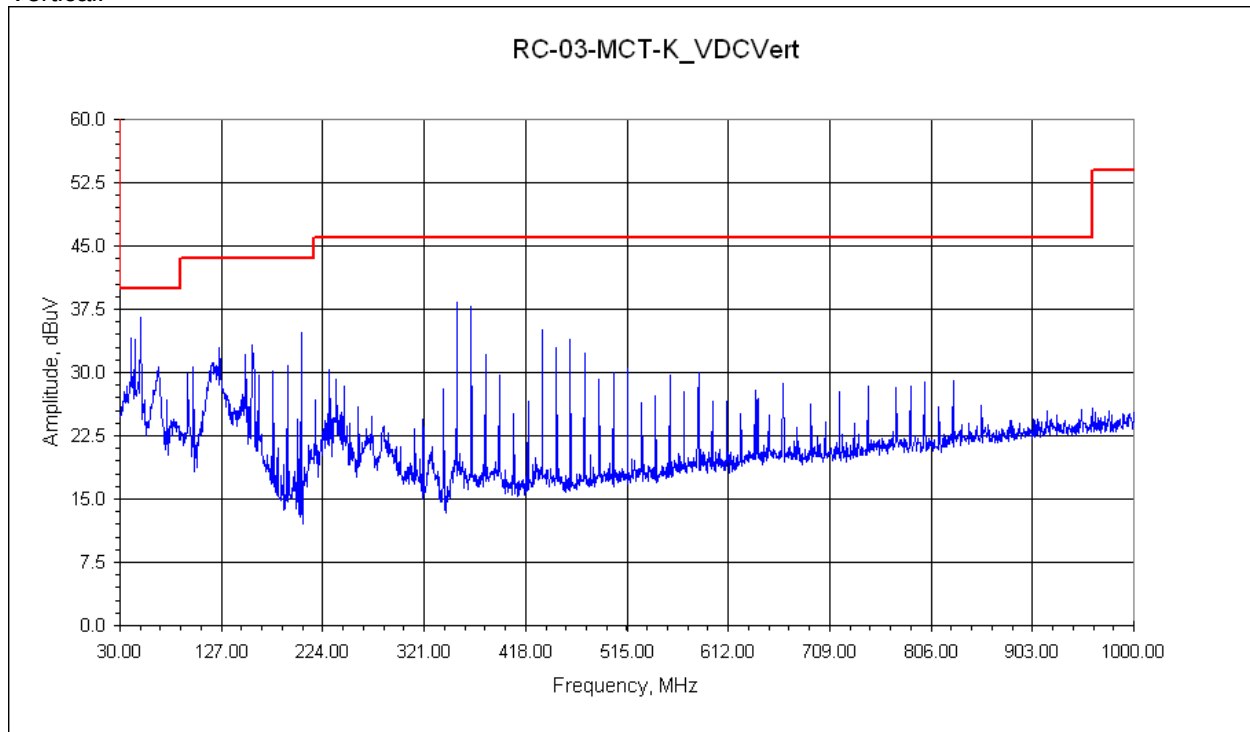


Note: Peak detector measurements plotted against quasi-peak limits

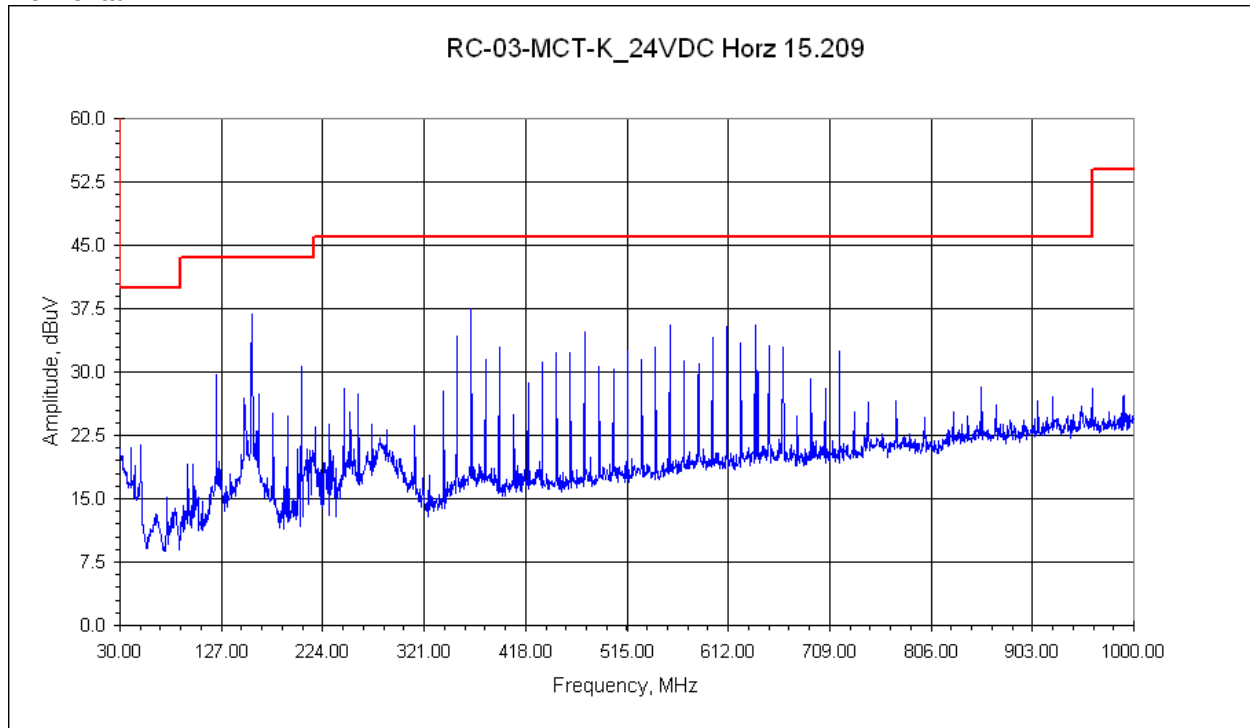
5.14 Pre-scan Plots: Reference only – Not Final Data: 24VDC

Radiated Emissions – FCC 15.209/15.225 IC RSS-Gen/RSS-210 (10kHz to 30MHz)

Vertical.



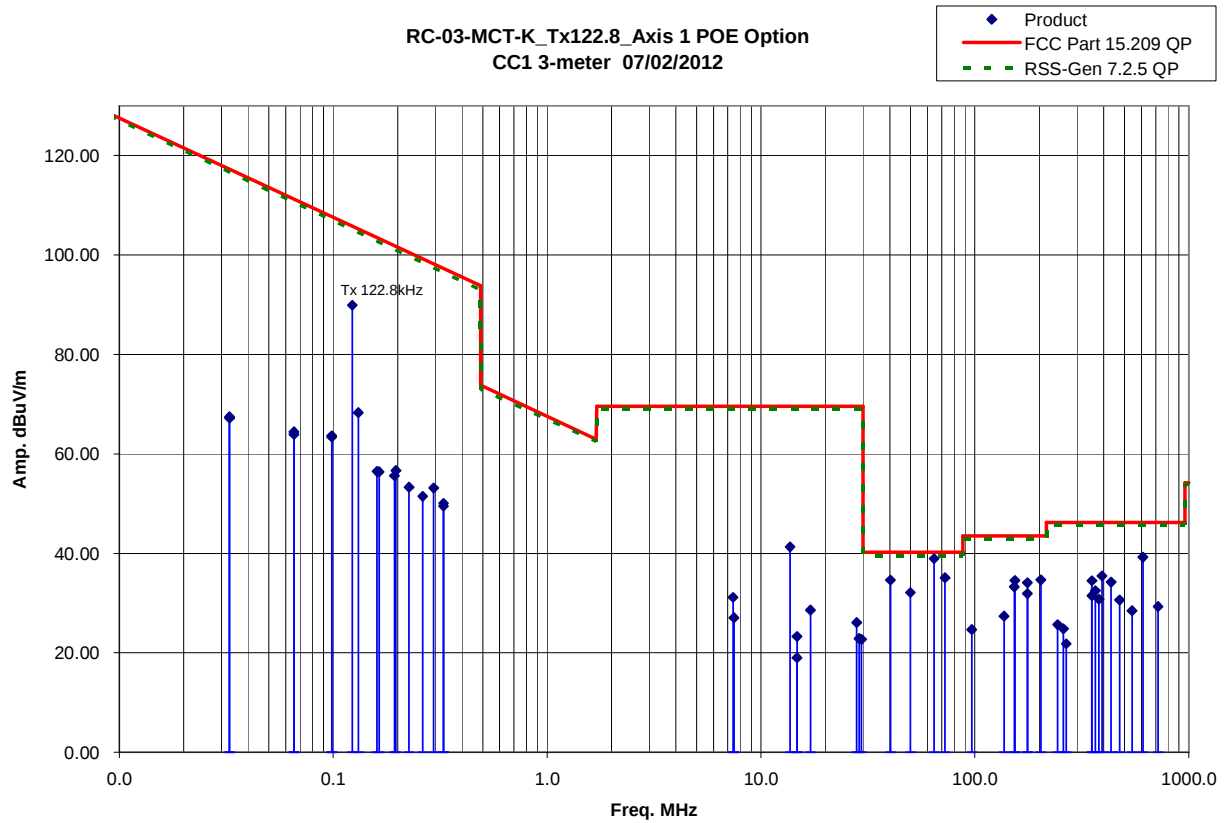
Horizontal



Note: Peak detector measurements plotted against quasi-peak limits

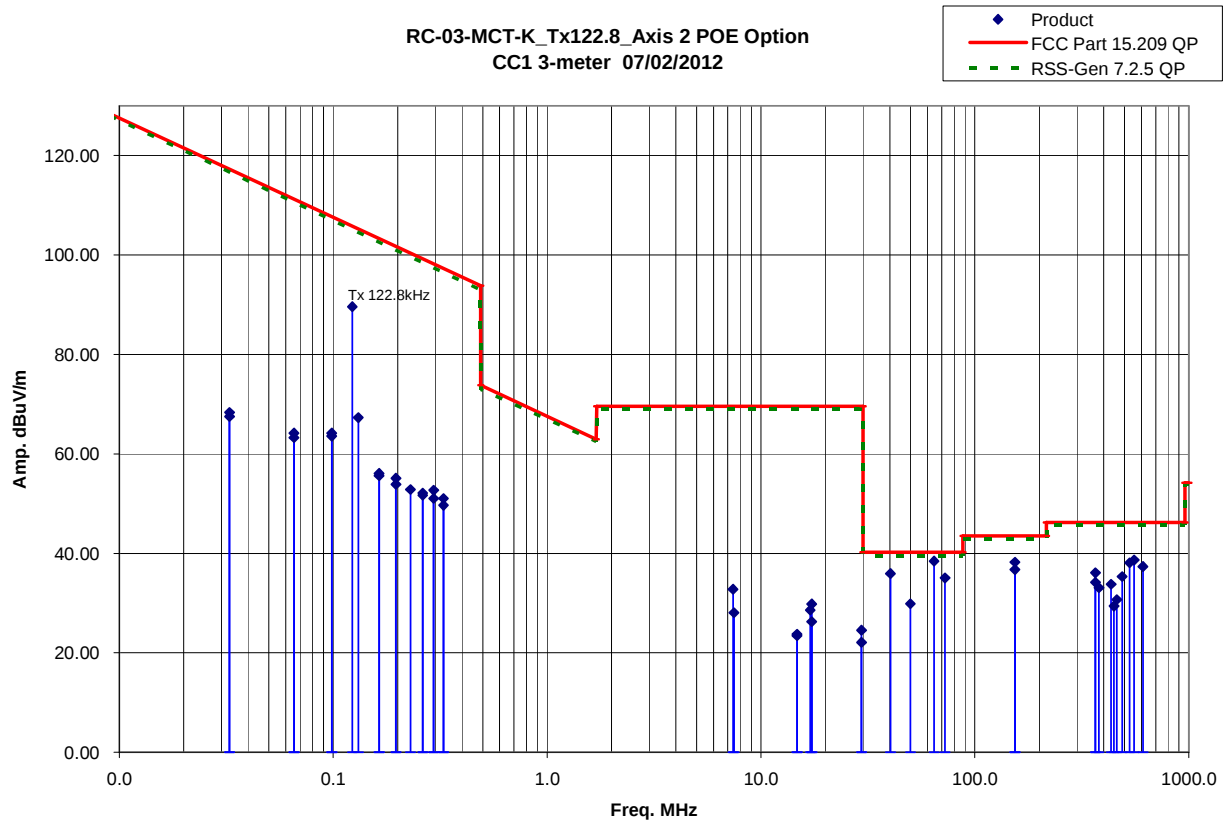
5.15 Final Plots: Tx 122.8kHz POE – Axis 1

Radiated Emissions – FCC 15.209/ IC RSS-Gen 7.2.5 (10kHz to 1000MHz)



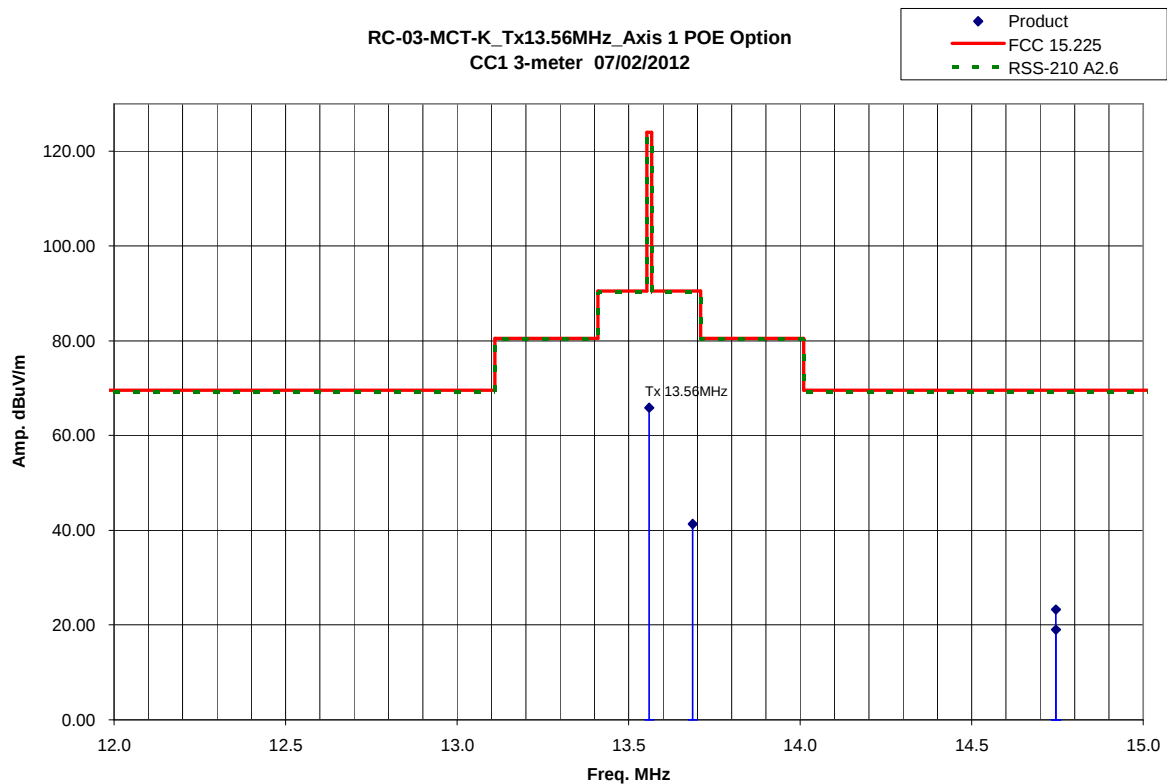
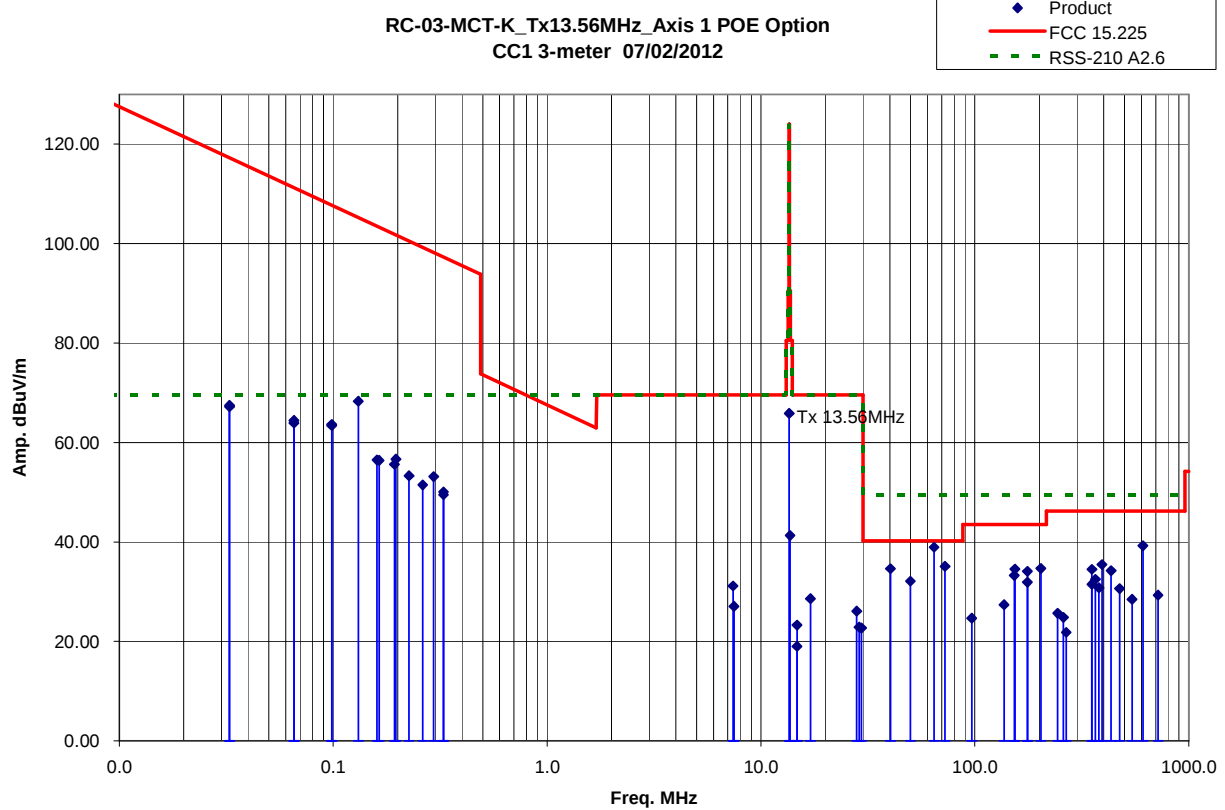
5.16 Final Plots: Tx 122.8kHz POE – Axis 2

Radiated Emissions – FCC 15.209/ IC RSS-Gen 7.2.5 (10kHz to 1000MHz)



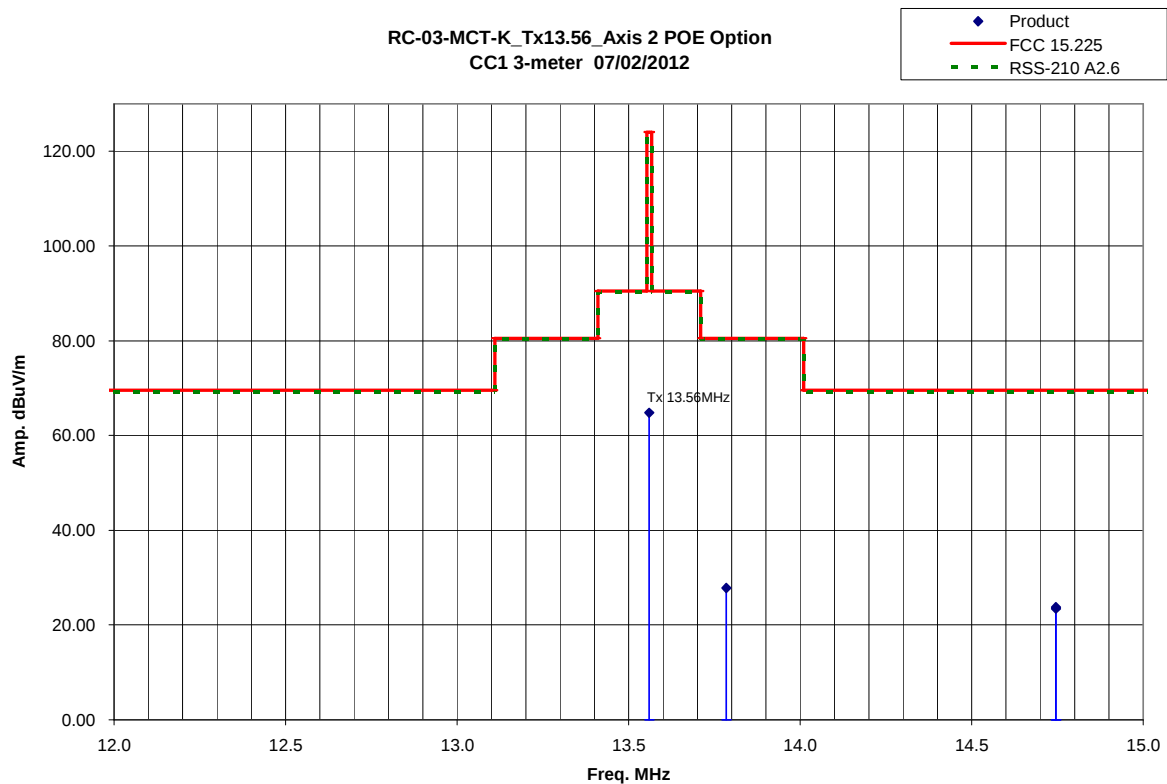
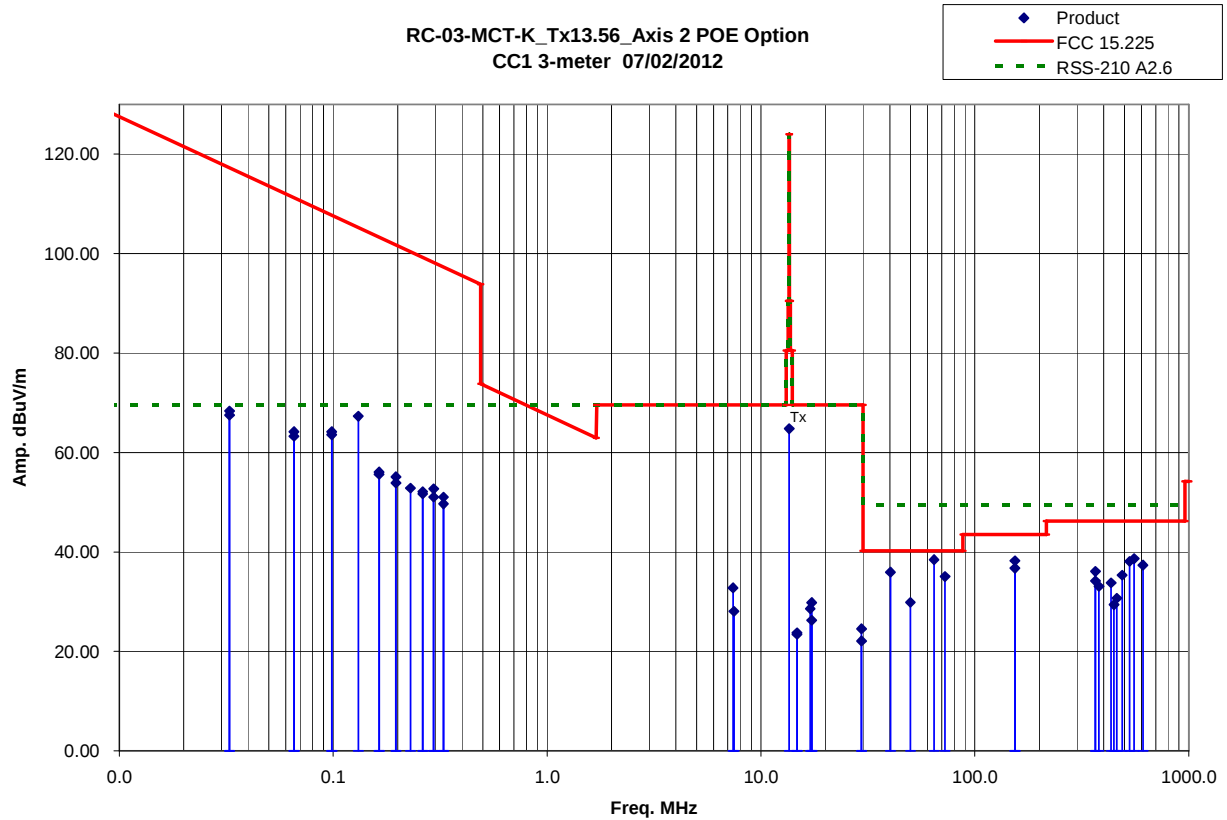
5.17 Final Plots: Tx 13.56MHz POE – Axis 1

Radiated Emissions – FCC 15.225/ IC RSS-210 A2.6 (10kHz to 1000MHz)



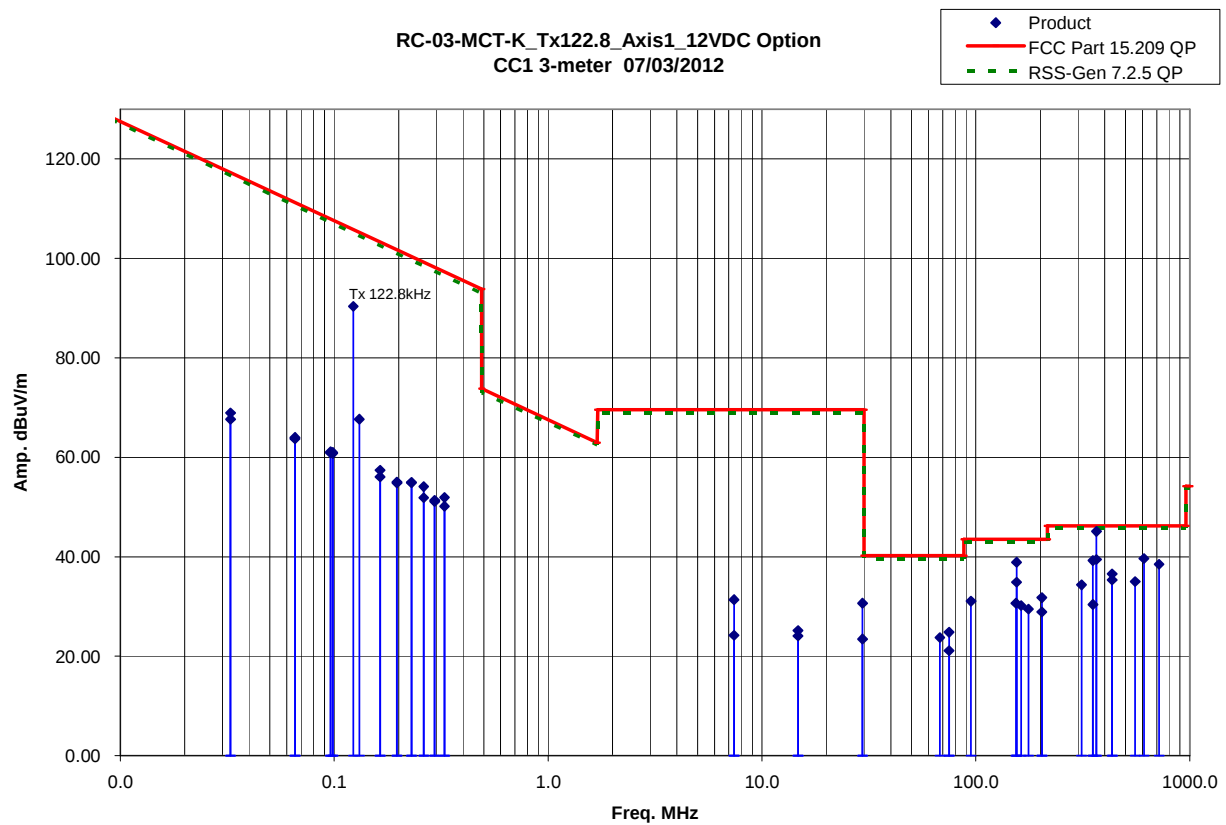
5.18 Final Plots: Tx 13.56MHz POE – Axis 2

Radiated Emissions – FCC 15.225/ IC RSS-210 A2.6 (10kHz to 1000MHz)



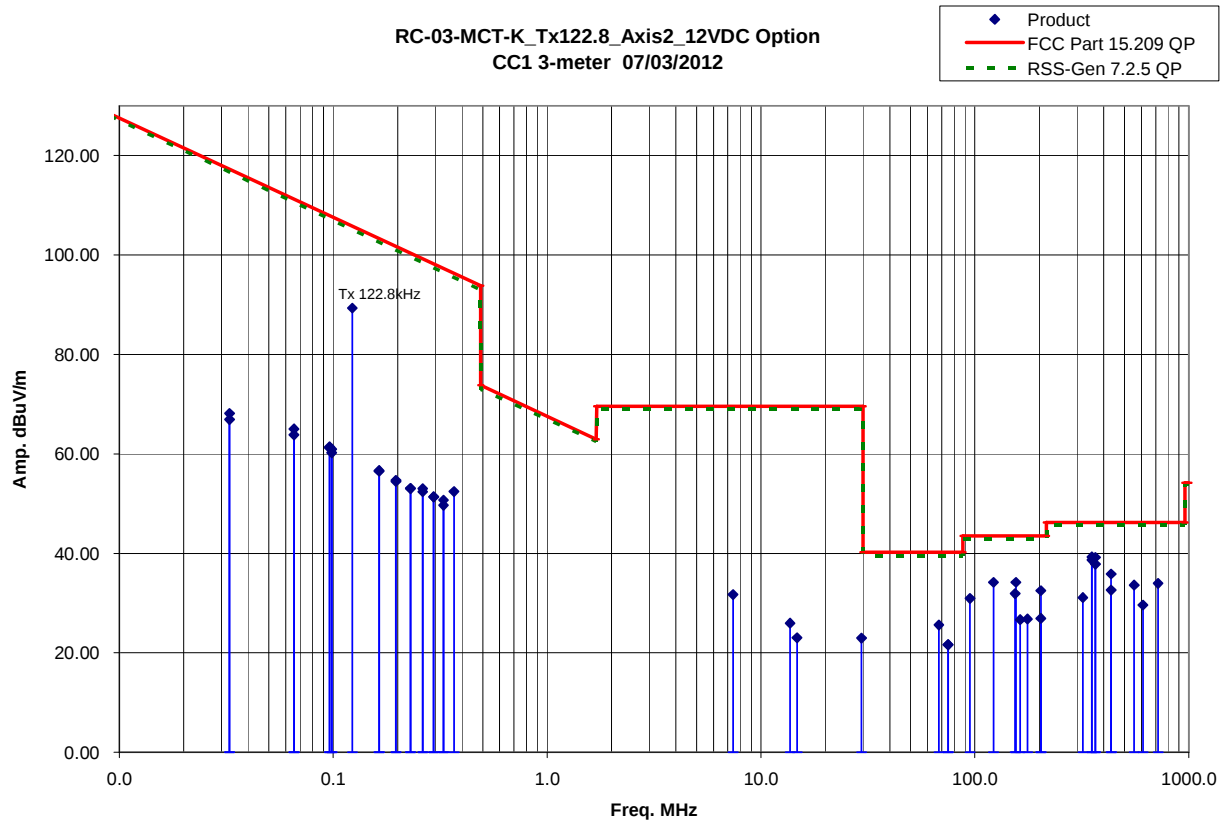
5.19 Final Plots: 12VDC – Axis 1

Radiated Emissions – FCC 15.209 / IC RSS-Gen 7.2.5 (10kHz to 1000MHz)



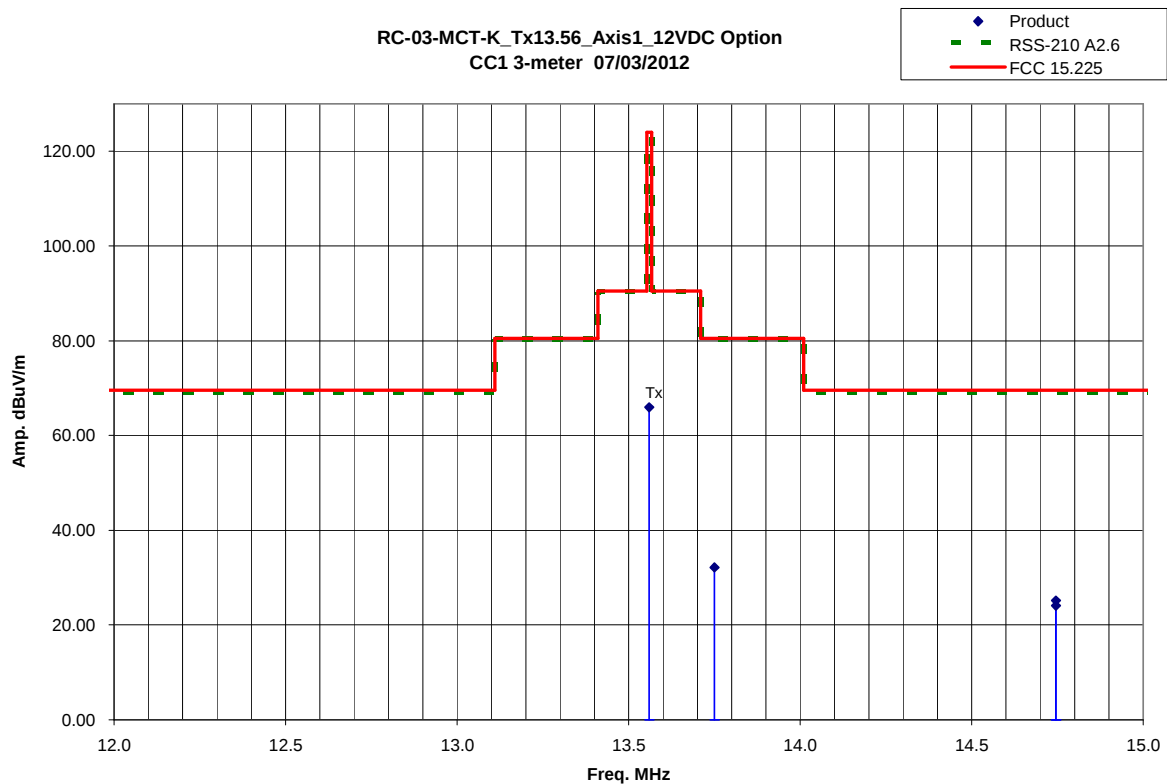
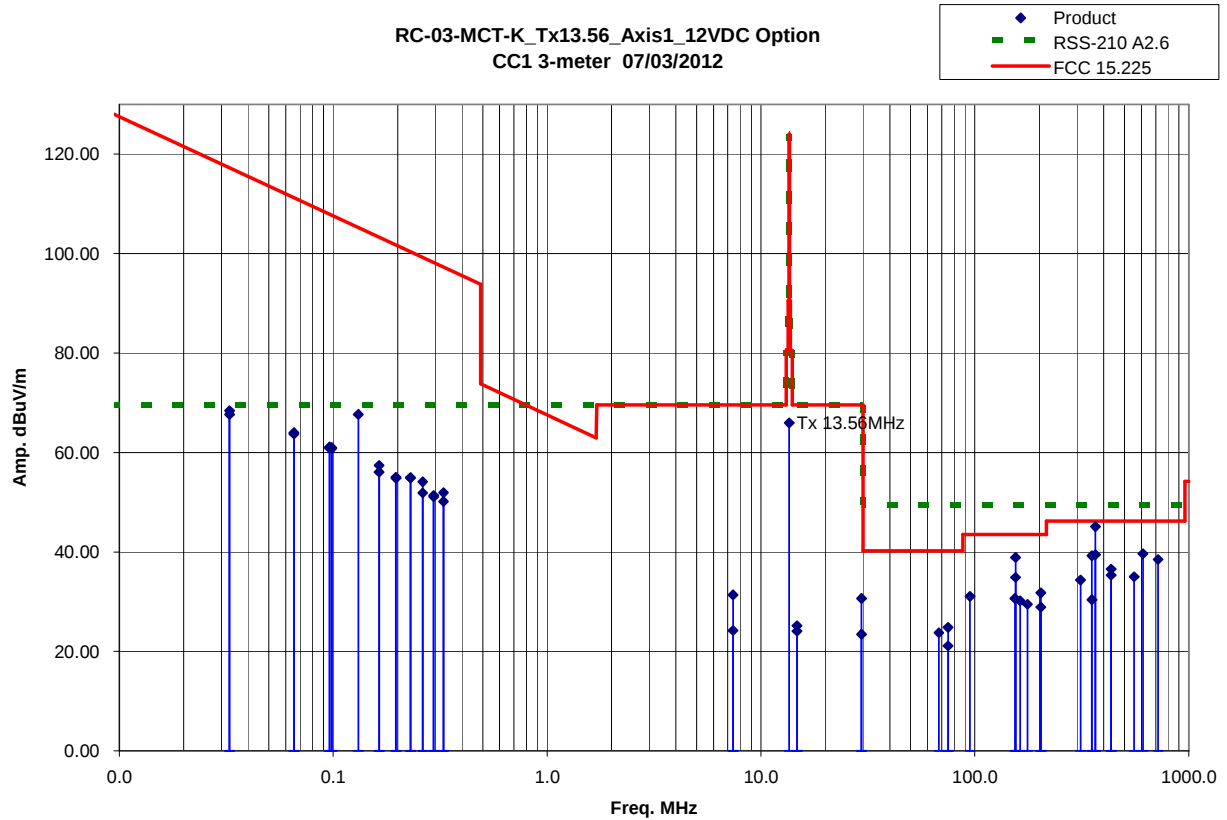
5.20 Final Plots: Tx 122.8kHz 12VDC – Axis 2

Radiated Emissions – FCC 15.209/ IC RSS-Gen 7.2.5 (10kHz to 1000MHz)



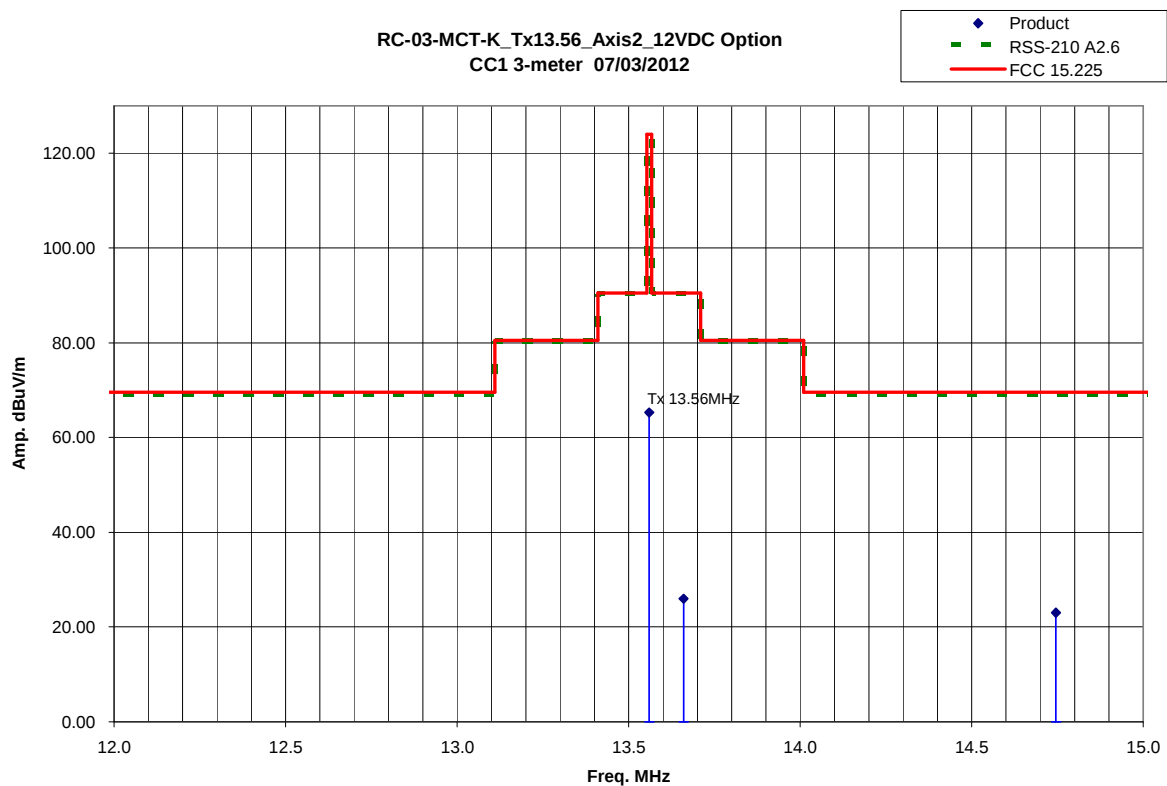
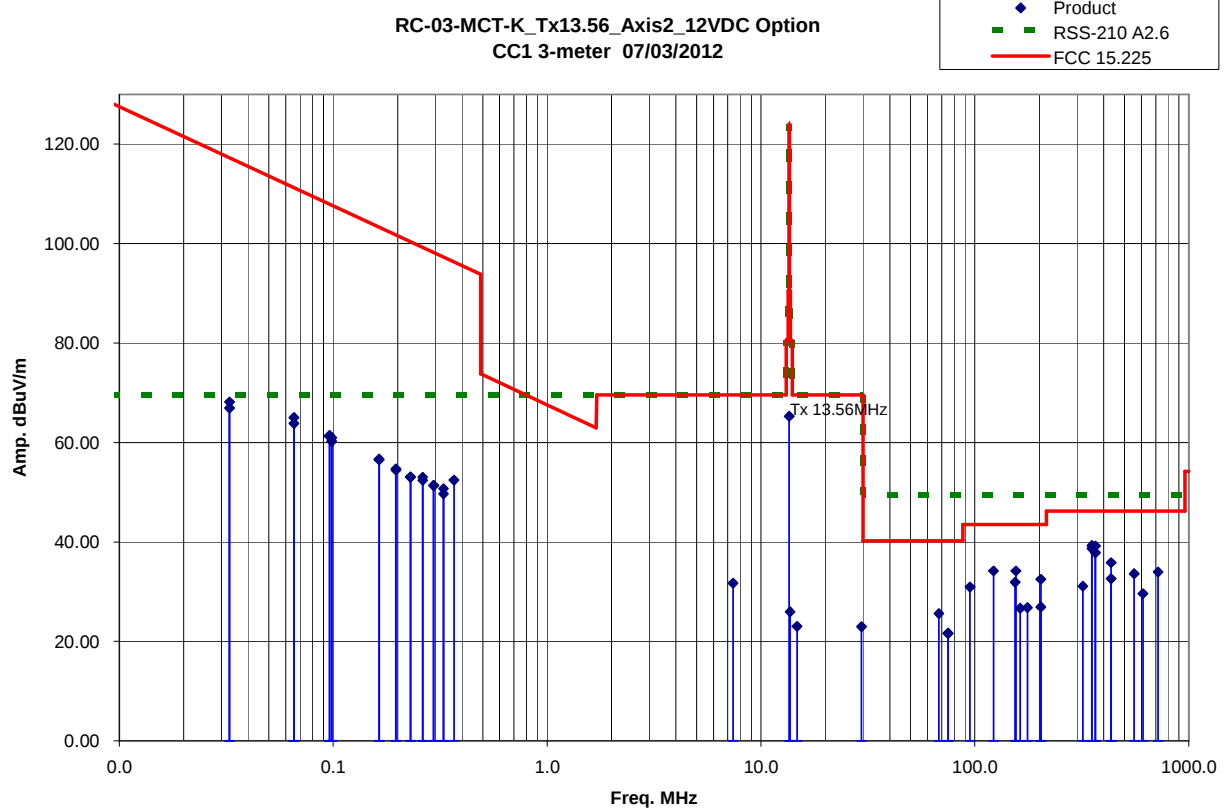
5.21 Final Plots: Tx 13.56MHz 12VDC – Axis 1

Radiated Emissions – FCC 15.225 / IC RSS-210 A2.6 (10kHz to 1000MHz)



5.22 Final Plots: Tx 13.56MHz 12VDC – Axis 2

Radiated Emissions – FCC 15.225 / IC RSS-210 A2.6 (10kHz to 1000MHz)



5.23 Test Data: Tx 122.8kHz POE – Axis 1

Radiated Unintentional & Tx Spurious Electromagnetic Emissions

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: <u>22.8</u> °C
Test Method: FCC 15.209 IC RSS-210/ RSS-GEN 7.2.5	Test Date: 07/02/2012 07/03/2012	Relative Humidity: <u>34.7</u> %
EUT Model #: RC-03-MCT-K	EUT Power: POE	Air Pressure: <u>83.3</u> kPa

EUT Serial #: FCC2

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi Channel Option
122.8kHz & 13.56MHz

Notes: Product Tested in the following configuration: Power Over Ethernet (POE)

Product continuously operating/active during all testing – normal operation

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

Product tested in Axis 1: Product horizontal on table

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 15.209	IC RSS-Gen 7.2.5	(MHz)
Tx 122.8kHz Product POE Option – Axis 1													
Loop Antenna Perpendicular: 10kHz to 30MHz Data													
0.0328	53.92	Qp	0.10	13.21	0.00	0.00	67.23	V	1.00	47.0	- 49.38	- 49.38	0.009
0.0655	53.27	Qp	0.10	11.08	0.00	0.00	64.45	V	1.00	256.0	- 46.31	- 46.31	0.009
0.0983	52.87	Qp	0.10	10.42	0.00	0.00	63.39	V	1.00	177.0	- 43.96	- 43.96	0.009
0.1606	46.02	Qp	0.10	10.36	0.00	0.00	56.48	V	1.00	252.0	- 46.73	- 46.73	0.009
0.1933	45.12	Qp	0.10	10.39	0.00	0.00	55.61	V	1.00	4.0	- 46.03	- 46.03	0.009
0.2261	42.86	Qp	0.10	10.37	0.00	0.00	53.33	V	1.00	352.0	- 46.99	- 46.99	0.009
0.3277	39.17	Qp	0.10	10.24	0.00	0.00	49.51	V	1.00	107.0	- 47.68	- 47.68	0.009
7.4670	15.97	Qp	0.44	10.65	0.00	0.00	27.06	V	1.00	360.0	- 42.48	- 42.48	0.009
14.7456	12.23	Qp	1.00	10.03	0.00	0.00	23.26	V	1.00	360.0	- 46.28	- 46.28	0.009
28.0216	15.97	Qp	1.30	8.81	0.00	0.00	26.08	V	1.00	92.0	- 43.46	- 43.46	0.009
Loop Antenna Parallel : 10kHz to 30MHz Data													
0.0328	54.19	Qp	0.10	13.21	0.00	0.00	67.50	H	1.00	114.0	- 49.11	- 49.11	0.009
0.0655	52.76	Qp	0.10	11.08	0.00	0.00	63.94	H	1.00	160.0	- 46.82	- 46.82	0.009
0.0983	53.15	Qp	0.10	10.42	0.00	0.00	63.67	H	1.00	240.0	- 43.68	- 43.68	0.009
0.1311	56.88	Qp	0.10	10.33	0.00	0.00	67.31	H	1.00	198.0	- 37.61	- 37.61	0.009
0.1638	45.92	Qp	0.10	10.36	0.00	0.00	56.38	H	1.00	292.0	- 46.65	- 46.65	0.009
0.1966	46.15	Qp	0.10	10.40	0.00	0.00	56.65	H	1.00	135.0	- 44.85	- 44.85	0.009
0.2621	41.03	Qp	0.10	10.34	0.00	0.00	51.47	H	1.05	182.0	- 47.61	- 47.61	0.009
0.2949	42.73	Qp	0.10	10.31	0.00	0.00	53.14	H	1.05	182.0	- 44.95	- 44.95	0.009
0.3277	39.73	Qp	0.10	10.24	0.00	0.00	50.07	H	1.05	182.0	- 47.12	- 47.12	0.009
7.4070	20.07	Qp	0.43	10.66	0.00	0.00	31.16	H	1.00	229.0	- 38.38	- 38.38	0.009
13.6870	30.29	Qp	0.90	10.13	0.00	0.00	41.32	H	1.00	180.0	- 28.22	- 28.22	0.009
14.7456	7.98	Qp	1.00	10.03	0.00	0.00	19.01	H	1.05	264.0	- 50.53	- 50.53	0.009
17.0220	17.24	Qp	1.10	10.24	0.00	0.00	28.58	H	1.00	69.0	- 40.96	- 40.96	0.009
28.7320	12.85	Qp	1.38	8.63	0.00	0.00	22.86	H	1.00	154.0	- 46.68	- 46.68	0.009
29.4912	12.89	Qp	1.40	8.43	0.00	0.00	22.72	H	1.06	140.0	- 46.82	- 46.82	0.009

Note: Signals 10kHz to 150kHz were measured with 9kHz RBW instead of specified 200Hz RBW.
Therefore measurements are higher than required.

Intertek													
Report Number: 100781715DEN-001								Issued: 11/7/2013					

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 15.209	IC RSS-Gen 7.2.5	(MHz)
Tx 122.8 kHz Product POE Option – Axis 1													
BiLog Antenna Vertical: 30MHz to 1000MHz Data													
40.2500	48.69	Qp	0.77	13.35	28.20	0.00	34.61	V	1.00	265.0	- 5.39	- 5.39	0.120
50.0000	51.63	Qp	0.77	7.90	28.20	0.00	32.10	V	1.00	123.0	- 7.90	- 7.90	0.120
64.4000	58.60	Qp	0.77	7.68	28.13	0.00	38.92	V	1.00	246.0	- 1.08	- 1.08	0.120
72.4500	54.29	Qp	0.77	8.14	28.09	0.00	35.11	V	1.00	293.0	- 4.89	- 4.89	0.120
96.6100	42.45	Qp	0.77	9.42	27.98	0.00	24.66	V	1.00	282.0	- 18.86	- 18.86	0.120
136.8600	41.63	Qp	0.79	12.71	27.78	0.00	27.35	V	1.00	163.0	- 16.17	- 16.17	0.120
153.8200	49.07	Qp	0.83	12.32	27.70	0.00	34.52	V	1.00	225.0	- 9.00	- 9.00	0.120
176.2800	49.47	Qp	0.89	11.34	27.59	0.00	34.11	V	1.00	225.0	- 9.41	- 9.41	0.120
203.3900	49.70	Qp	0.95	11.49	27.47	0.00	34.68	V	1.02	18.0	- 8.84	- 8.84	0.120
259.6100	38.46	Qp	1.09	12.46	27.20	0.00	24.81	V	1.30	282.0	- 21.21	- 21.21	0.120
267.6700	34.78	Qp	1.11	13.11	27.16	0.00	21.84	V	1.50	57.0	- 24.18	- 24.18	0.120
352.5500	42.90	Qp	1.29	14.70	27.41	0.00	31.48	V	1.71	242.0	- 14.54	- 14.54	0.120
366.1100	43.80	Qp	1.31	14.92	27.51	0.00	32.52	V	1.90	360.0	- 13.50	- 13.50	0.120
433.9100	44.15	Qp	1.42	16.68	28.04	0.00	34.21	V	1.53	234.0	- 11.81	- 11.81	0.120
474.6000	40.16	Qp	1.49	17.19	28.22	0.00	30.63	V	1.26	83.0	- 15.39	- 15.39	0.120
542.3900	37.52	Qp	1.60	17.75	28.40	0.00	28.47	V	1.72	177.0	- 17.55	- 17.55	0.120
718.6700	35.67	Qp	1.88	19.97	28.22	0.00	29.30	V	1.89	121.0	- 16.72	- 16.72	0.120
BiLog Antenna Horizontal: 30MHz to 1000MHz Data													
152.9000	47.73	Qp	0.83	12.40	27.71	0.00	33.25	H	1.63	30.0	- 10.27	- 10.27	0.120
176.2800	47.25	Qp	0.89	11.34	27.59	0.00	31.89	H	1.74	299.0	- 11.63	- 11.63	0.120
244.0700	40.15	Qp	1.05	11.70	27.27	0.00	25.63	H	1.63	239.0	- 20.39	- 20.39	0.120
352.5500	45.89	Qp	1.29	14.70	27.41	0.00	34.47	H	1.51	241.0	- 11.55	- 11.55	0.120
379.6700	41.68	Qp	1.34	15.38	27.62	0.00	30.78	H	1.14	13.0	- 15.24	- 15.24	0.120
393.2400	46.29	Qp	1.36	15.53	27.72	0.00	35.45	H	1.23	249.0	- 10.57	- 10.57	0.120
610.1900	47.09	Qp	1.71	18.80	28.34	0.00	39.26	H	1.60	28.0	- 6.76	- 6.76	0.120

Example calculation:

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

5.24 Test Data: Tx 122.8kHz POE – Axis 2

Radiated Electromagnetic Emissions

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: <u>22.8</u> °C
Test Method: FCC 15.209 IC RSS-210/ RSS-GEN 7.2.5	Test Date: 07/02/2012 07/03/2012	Relative Humidity: <u>34.7</u> %
EUT Model #: RC-03-MCT-K	EUT Power: POE	Air Pressure: <u>83.3</u> kPa

EUT Serial #: FCC2

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi Channel Option
122.8kHz & 13.56MHz

Notes: Product Tested in the following configuration: Power Over Ethernet (POE)

Product continuously operating/active during all testing – normal operation

Product tested in Axis 2: Product Vertical on table

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

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 15.209	IC RSS-Gen 7.2.5	(MHz)
Tx 122.8kHz Product POE Option – Axis 2													
Loop Antenna Perpendicular: 10kHz to 30MHz Data													
0.0328	55.08	Qp	0.10	13.21	0.00	0.00	68.37	V	1.00	312.0	- 48.24	- 48.24	0.009
0.0655	52.10	Qp	0.10	11.08	0.00	0.00	63.28	V	1.00	316.0	- 47.48	- 47.48	0.009
0.0983	53.05	Qp	0.10	10.42	0.00	0.00	63.57	V	1.00	157.0	- 43.78	- 43.78	0.009
0.1311	56.89	Qp	0.10	10.33	0.00	0.00	67.32	V	1.00	259.0	- 37.60	- 37.60	0.009
0.1638	45.15	Qp	0.10	10.36	0.00	0.00	55.61	V	1.00	316.0	- 47.42	- 47.42	0.009
0.1966	43.38	Qp	0.10	10.40	0.00	0.00	53.88	V	1.00	316.0	- 47.62	- 47.62	0.009
0.2621	41.27	Qp	0.10	10.34	0.00	0.00	51.71	V	1.00	182.0	- 47.37	- 47.37	0.009
0.2949	40.63	Qp	0.10	10.31	0.00	0.00	51.04	V	1.00	251.0	- 47.05	- 47.05	0.009
0.3277	39.35	Qp	0.10	10.24	0.00	0.00	49.69	V	1.00	326.0	- 47.50	- 47.50	0.009
7.4650	16.97	Qp	0.44	10.65	0.00	0.00	28.06	V	1.00	70.0	- 41.48	- 41.48	0.009
14.7456	12.43	Qp	1.00	10.03	0.00	0.00	23.46	V	1.00	177.0	- 46.08	- 46.08	0.009
17.2900	14.90	Qp	1.10	10.27	0.00	0.00	26.27	V	1.00	323.0	- 43.27	- 43.27	0.009
29.4912	14.74	Qp	1.40	8.43	0.00	0.00	24.57	V	1.00	342.0	- 44.97	- 44.97	0.009
Loop Antenna Parallel : 10kHz to 30MHz Data													
0.0328	54.23	Qp	0.10	13.21	0.00	0.00	67.54	H	1.00	198.0	- 49.07	- 49.07	0.009
0.0655	53.01	Qp	0.10	11.08	0.00	0.00	64.19	H	1.00	196.0	- 46.57	- 46.57	0.009
0.0983	53.66	Qp	0.10	10.42	0.00	0.00	64.18	H	1.00	254.0	- 43.17	- 43.17	0.009
0.1638	45.63	Qp	0.10	10.36	0.00	0.00	56.09	H	1.00	212.0	- 46.94	- 46.94	0.009
0.1966	44.64	Qp	0.10	10.40	0.00	0.00	55.14	H	1.00	339.0	- 46.36	- 46.36	0.009
0.2294	42.38	Qp	0.10	10.37	0.00	0.00	52.85	H	1.00	186.0	- 47.35	- 47.35	0.009
0.2621	41.67	Qp	0.10	10.34	0.00	0.00	52.11	H	1.00	188.0	- 46.97	- 46.97	0.009
0.2949	42.30	Qp	0.10	10.31	0.00	0.00	52.71	H	1.00	188.0	- 45.38	- 45.38	0.009
0.3277	40.69	Qp	0.10	10.24	0.00	0.00	51.03	H	1.00	292.0	- 46.16	- 46.16	0.009
7.4000	21.69	Qp	0.43	10.66	0.00	0.00	32.78	H	1.00	224.0	- 36.76	- 36.76	0.009
14.7456	12.74	Qp	1.00	10.03	0.00	0.00	23.77	H	1.00	111.0	- 45.77	- 45.77	0.009
16.9900	17.26	Qp	1.10	10.24	0.00	0.00	28.60	H	1.00	346.0	- 40.94	- 40.94	0.009
17.2620	18.44	Qp	1.10	10.27	0.00	0.00	29.81	H	1.00	63.0	- 39.73	- 39.73	0.009
29.4912	12.27	Qp	1.40	8.43	0.00	0.00	22.10	H	1.00	269.0	- 47.44	- 47.44	0.009

Intertek													
Report Number: 100781715DEN-001								Issued: 11/7/2013					

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 15.209	IC RSS-Gen 7.2.5	(MHz)
Tx 122.8 kHz Product POE Option – Axis 2													
BiLog Antenna Vertical: 30MHz to 1000MHz Data													
40.2600	50.02	Qp	0.77	13.34	28.20	0.00	35.93	V	1.00	95.0	- 4.07	- 4.07	0.120
50.0000	49.39	Qp	0.77	7.90	28.20	0.00	29.86	V	1.00	246.0	- 10.14	- 10.14	0.120
64.3800	58.16	Qp	0.77	7.68	28.13	0.00	38.47	V	1.06	42.0	- 1.53	- 1.53	0.120
72.4400	54.24	Qp	0.77	8.14	28.09	0.00	35.06	V	1.00	329.0	- 4.94	- 4.94	0.120
153.8100	51.27	Qp	0.83	12.32	27.70	0.00	36.72	V	1.00	182.0	- 6.80	- 6.80	0.120
366.1100	47.36	Qp	1.31	14.92	27.51	0.00	36.08	V	1.40	208.0	- 9.94	- 9.94	0.120
379.6700	43.99	Qp	1.34	15.38	27.62	0.00	33.09	V	1.37	30.0	- 12.93	- 12.93	0.120
433.9100	43.73	Qp	1.42	16.68	28.04	0.00	33.79	V	1.49	208.0	- 12.23	- 12.23	0.120
488.1500	44.53	Qp	1.51	17.55	28.26	0.00	35.33	V	1.12	8.0	- 10.69	- 10.69	0.120
528.8300	46.72	Qp	1.58	18.20	28.41	0.00	38.09	V	1.00	353.0	- 7.93	- 7.93	0.120
555.9500	47.38	Qp	1.62	18.06	28.39	0.00	38.67	V	1.00	41.0	- 7.35	- 7.35	0.120
610.1800	45.19	Qp	1.71	18.80	28.34	0.00	37.36	V	1.03	0.0	- 8.66	- 8.66	0.120
BiLog Antenna Horizontal: 30MHz to 1000MHz Data													
153.7800	52.79	Qp	0.83	12.32	27.70	0.00	38.24	H	1.58	335.0	- 5.28	- 5.28	0.120
366.1100	45.47	Qp	1.31	14.92	27.51	0.00	34.19	H	1.79	175.0	- 11.83	- 11.83	0.120
447.4700	39.24	Qp	1.45	16.80	28.12	0.00	29.37	H	1.68	327.0	- 16.65	- 16.65	0.120
461.0300	40.63	Qp	1.47	16.76	28.17	0.00	30.69	H	1.92	252.0	- 15.33	- 15.33	0.120

Example calculation:

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

5.25 Test Data: Tx 13.56MHz POE – Axis 1

Radiated Electromagnetic Emissions

Test Report #:	G100781715	Test Area:	CC1 Radiated	Temperature:	22.8 °C
Test Method:	FCC 15.225/15.209 IC RSS-210 A2.6	Test Date:	07/02/2012 07/03/2012	Relative Humidity:	34.7 %
EUT Model #:	RC-03-MCT-K	EUT Power:	POE	Air Pressure:	83.3 kPa

EUT Serial #: FCC2

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi Channel Option
122.8kHz & 13.56MHz

Notes: Product Tested in the following configuration: Power Over Ethernet (POE)

Product continuously operating/active during all testing – normal operation

Product tested in Axis 1: Product Horizontal on table

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

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 15.225 15.209	IC RSS-210 A2.6	(MHz)
Tx 13.56MHz Product POE Option – Axis 1													
Loop Antenna Perpendicular: 10kHz to 30MHz Data													
0.0328	53.92	Qp	0.10	13.21	0.00	0.00	67.23	H	1.00	47.0	- 49.38	- 2.31	0.009
0.0655	53.27	Qp	0.10	11.08	0.00	0.00	64.45	H	1.00	256.0	- 46.31	- 5.09	0.009
0.0983	52.87	Qp	0.10	10.42	0.00	0.00	63.39	H	1.00	177.0	- 43.96	- 6.15	0.009
0.1606	46.02	Qp	0.10	10.36	0.00	0.00	56.48	H	1.00	252.0	- 46.73	- 13.06	0.009
0.1933	45.12	Qp	0.10	10.39	0.00	0.00	55.61	H	1.00	4.0	- 46.03	- 13.93	0.009
0.2261	42.86	Qp	0.10	10.37	0.00	0.00	53.33	H	1.00	352.0	- 46.99	- 16.21	0.009
0.3277	39.17	Qp	0.10	10.24	0.00	0.00	49.51	H	1.00	107.0	- 47.68	- 20.03	0.009
7.4670	15.97	Qp	0.44	10.65	0.00	0.00	27.06	H	1.00	360.0	- 42.48	- 42.48	0.009
14.7456	12.23	Qp	1.00	10.03	0.00	0.00	23.26	H	1.00	360.0	- 46.28	- 46.28	0.009
28.0216	15.97	Qp	1.30	8.81	0.00	0.00	26.08	H	1.00	92.0	- 43.46	- 43.46	0.009
Loop Antenna Parallel : 10kHz to 30MHz Data													
0.0328	54.19	Qp	0.10	13.21	0.00	0.00	67.50	H	1.00	114.0	- 49.11	- 2.04	0.009
0.0655	52.76	Qp	0.10	11.08	0.00	0.00	63.94	H	1.00	160.0	- 46.82	- 5.60	0.009
0.0983	53.15	Qp	0.10	10.42	0.00	0.00	63.67	H	1.00	240.0	- 43.68	- 5.87	0.009
0.1311	56.88	Qp	0.10	10.33	0.00	0.00	67.31	H	1.00	198.0	- 37.61	- 2.23	0.009
0.1638	45.92	Qp	0.10	10.36	0.00	0.00	56.38	H	1.00	292.0	- 46.65	- 13.16	0.009
0.1966	46.15	Qp	0.10	10.40	0.00	0.00	56.65	H	1.00	135.0	- 44.85	- 12.89	0.009
0.2621	41.03	Qp	0.10	10.34	0.00	0.00	51.47	H	1.05	182.0	- 47.61	- 18.07	0.009
0.2949	42.73	Qp	0.10	10.31	0.00	0.00	53.14	H	1.05	182.0	- 44.95	- 16.40	0.009
0.3277	39.73	Qp	0.10	10.24	0.00	0.00	50.07	H	1.05	182.0	- 47.12	- 19.47	0.009
7.4070	20.07	Qp	0.43	10.66	0.00	0.00	31.16	H	1.00	229.0	- 38.38	- 38.38	0.009
13.6870	30.29	Qp	0.90	10.13	0.00	0.00	41.32	H	1.00	180.0	- 49.18	- 49.18	0.009
14.7456	7.98	Qp	1.00	10.03	0.00	0.00	19.01	H	1.05	264.0	- 50.53	- 50.53	0.009
17.0220	17.24	Qp	1.10	10.24	0.00	0.00	28.58	H	1.00	69.0	- 40.96	- 40.96	0.009
28.7320	12.85	Qp	1.38	8.63	0.00	0.00	22.86	H	1.00	154.0	- 46.68	- 46.68	0.009
29.4912	12.89	Qp	1.40	8.43	0.00	0.00	22.72	H	1.06	140.0	- 46.82	- 46.82	0.009

Note: Signals 10kHz to 150kHz were measured with 9kHz RBW instead of specified 200Hz RBW. Therefore measurements are higher than what is required.

Intertek													
Report Number: 100781715DEN-001										Issued: 11/7/2013			

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 15.225 15.209	IC RSS-210 A2.6	(MHz)
Tx 13.56MHz Product POE Option – Axis 1													
BiLog Antenna Vertical: 30MHz to 1000MHz Data													
40.2500	48.69	Qp	0.77	13.35	28.20	0.00	34.61	V	1.00	265.0	- 5.39	- 14.93	0.120
50.0000	51.63	Qp	0.77	7.90	28.20	0.00	32.10	V	1.00	123.0	- 7.90	- 17.44	0.120
64.4000	58.60	Qp	0.77	7.68	28.13	0.00	38.92	V	1.00	246.0	- 1.08	- 10.62	0.120
72.4500	54.29	Qp	0.77	8.14	28.09	0.00	35.11	V	1.00	293.0	- 4.89	- 14.43	0.120
96.6100	42.45	Qp	0.77	9.42	27.98	0.00	24.66	V	1.00	282.0	- 18.86	- 24.88	0.120
136.8600	41.63	Qp	0.79	12.71	27.78	0.00	27.35	V	1.00	163.0	- 16.17	- 22.19	0.120
153.8200	49.07	Qp	0.83	12.32	27.70	0.00	34.52	V	1.00	225.0	- 9.00	- 15.02	0.120
176.2800	49.47	Qp	0.89	11.34	27.59	0.00	34.11	V	1.00	225.0	- 9.41	- 15.43	0.120
203.3900	49.70	Qp	0.95	11.49	27.47	0.00	34.68	V	1.02	18.0	- 8.84	- 14.86	0.120
259.6100	38.46	Qp	1.09	12.46	27.20	0.00	24.81	V	1.30	282.0	- 21.21	- 24.73	0.120
267.6700	34.78	Qp	1.11	13.11	27.16	0.00	21.84	V	1.50	57.0	- 24.18	- 27.70	0.120
352.5500	42.90	Qp	1.29	14.70	27.41	0.00	31.48	V	1.71	242.0	- 14.54	- 18.06	0.120
366.1100	43.80	Qp	1.31	14.92	27.51	0.00	32.52	V	1.90	360.0	- 13.50	- 17.02	0.120
433.9100	44.15	Qp	1.42	16.68	28.04	0.00	34.21	V	1.53	234.0	- 11.81	- 15.33	0.120
474.6000	40.16	Qp	1.49	17.19	28.22	0.00	30.63	V	1.26	83.0	- 15.39	- 18.91	0.120
542.3900	37.52	Qp	1.60	17.75	28.40	0.00	28.47	V	1.72	177.0	- 17.55	- 21.07	0.120
718.6700	35.67	Qp	1.88	19.97	28.22	0.00	29.30	V	1.89	121.0	- 16.72	- 20.24	0.120
BiLog Antenna Horizontal: 30MHz to 1000MHz Data													
152.9000	47.73	Qp	0.83	12.40	27.71	0.00	33.25	H	1.63	30.0	- 10.27	- 16.29	0.120
176.2800	47.25	Qp	0.89	11.34	27.59	0.00	31.89	H	1.74	299.0	- 11.63	- 17.65	0.120
244.0700	40.15	Qp	1.05	11.70	27.27	0.00	25.63	H	1.63	239.0	- 20.39	- 23.91	0.120
352.5500	45.89	Qp	1.29	14.70	27.41	0.00	34.47	H	1.51	241.0	- 11.55	- 15.07	0.120
379.6700	41.68	Qp	1.34	15.38	27.62	0.00	30.78	H	1.14	13.0	- 15.24	- 18.76	0.120
393.2400	46.29	Qp	1.36	15.53	27.72	0.00	35.45	H	1.23	249.0	- 10.57	- 14.09	0.120
610.1900	47.09	Qp	1.71	18.80	28.34	0.00	39.26	H	1.60	28.0	- 6.76	- 10.28	0.120

Example calculation:

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

5.26 Test Data: Tx 13.56MHz POE – Axis 2

Radiated Electromagnetic Emissions

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: <u>22.8</u> °C
Test Method: FCC 15.225/15.209 IC RSS-210 A2.6	Test Date: 07/02/2012 07/03/2012	Relative Humidity: <u>34.7</u> %
EUT Model #: RC-03-MCT-K	EUT Power: <u>POE</u>	Air Pressure: <u>83.3</u> kPa

EUT Serial #: FCC2

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi Channel Option
122.8kHz & 13.56MHz

Notes: Product Tested in the following configuration: Power Over Ethernet (POE)

Product continuously operating/active during all testing – normal operation

Level Key

Pk – Peak

Qp – Quasi Peak

Av - Average

Product tested in Axis 2: Product Vertical on table

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 15.225 15.209	IC RSS-210 A2.6	(MHz)
Tx 13.56MHz Product POE Option – Axis 2													
Loop Antenna Perpendicular: 10kHz to 30MHz Data													
0.0328	55.08	Qp	0.10	13.21	0.00	0.00	68.37	V	1.00	312.0	- 48.24	- 1.17	0.009
0.0655	52.10	Qp	0.10	11.08	0.00	0.00	63.28	V	1.00	316.0	- 47.48	- 6.26	0.009
0.0983	53.05	Qp	0.10	10.42	0.00	0.00	63.57	V	1.00	157.0	- 43.78	- 5.97	0.009
0.1311	56.89	Qp	0.10	10.33	0.00	0.00	67.32	V	1.00	259.0	- 37.60	- 2.22	0.009
0.1638	45.15	Qp	0.10	10.36	0.00	0.00	55.61	V	1.00	316.0	- 47.42	- 13.93	0.009
0.1966	43.38	Qp	0.10	10.40	0.00	0.00	53.88	V	1.00	316.0	- 47.62	- 15.66	0.009
0.2621	41.27	Qp	0.10	10.34	0.00	0.00	51.71	V	1.00	182.0	- 47.37	- 17.83	0.009
0.2949	40.63	Qp	0.10	10.31	0.00	0.00	51.04	V	1.00	251.0	- 47.05	- 18.50	0.009
0.3277	39.35	Qp	0.10	10.24	0.00	0.00	49.69	V	1.00	326.0	- 47.50	- 19.85	0.009
7.4650	16.97	Qp	0.44	10.65	0.00	0.00	28.06	V	1.00	70.0	- 41.48	- 41.48	0.009
13.7850	16.77	Qp	0.98	10.05	0.00	0.00	27.80	V	1.00	172.0	- 52.70	- 52.70	0.009
14.7456	12.43	Qp	1.00	10.03	0.00	0.00	23.46	V	1.00	177.0	- 46.08	- 46.08	0.009
17.2900	14.90	Qp	1.10	10.27	0.00	0.00	26.27	V	1.00	323.0	- 43.27	- 43.27	0.009
29.4912	14.74	Qp	1.40	8.43	0.00	0.00	24.57	V	1.00	342.0	- 44.97	- 44.97	0.009
Loop Antenna Parallel : 10kHz to 30MHz Data													
0.0328	54.23	Qp	0.10	13.21	0.00	0.00	67.54	H	1.00	198.0	- 49.07	- 2.00	0.009
0.0655	53.01	Qp	0.10	11.08	0.00	0.00	64.19	H	1.00	196.0	- 46.57	- 5.35	0.009
0.0983	53.66	Qp	0.10	10.42	0.00	0.00	64.18	H	1.00	254.0	- 43.17	- 5.36	0.009
0.1638	45.63	Qp	0.10	10.36	0.00	0.00	56.09	H	1.00	212.0	- 46.94	- 13.45	0.009
0.1966	44.64	Qp	0.10	10.40	0.00	0.00	55.14	H	1.00	339.0	- 46.36	- 14.40	0.009
0.2294	42.38	Qp	0.10	10.37	0.00	0.00	52.85	H	1.00	186.0	- 47.35	- 16.69	0.009
0.2621	41.67	Qp	0.10	10.34	0.00	0.00	52.11	H	1.00	188.0	- 46.97	- 17.43	0.009
0.2949	42.30	Qp	0.10	10.31	0.00	0.00	52.71	H	1.00	188.0	- 45.38	- 16.83	0.009
0.3277	40.69	Qp	0.10	10.24	0.00	0.00	51.03	H	1.00	292.0	- 46.16	- 18.51	0.009
7.4000	21.69	Qp	0.43	10.66	0.00	0.00	32.78	H	1.00	224.0	- 36.76	- 36.76	0.009
14.7456	12.74	Qp	1.00	10.03	0.00	0.00	23.77	H	1.00	111.0	- 45.77	- 45.77	0.009

Note: Signals 10kHz to 150kHz were measured with 9kHz RBW instead of specified 200Hz RBW.
Therefore measurements are higher than required.

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

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 15.225 15.209	IC RSS-210 A2.6	(MHz)
Tx 13.56MHz Product POE Option – Axis 2													
BiLog Antenna Vertical: 30MHz to 1000MHz Data													
40.2600	50.02	Qp	0.77	13.34	28.20	0.00	35.93	V	1.00	95.0	- 4.07	- 13.61	0.120
50.0000	49.39	Qp	0.77	7.90	28.20	0.00	29.86	V	1.00	246.0	- 10.14	- 19.68	0.120
64.3800	58.16	Qp	0.77	7.68	28.13	0.00	38.47	V	1.06	42.0	- 1.53	- 11.07	0.120
72.4400	54.24	Qp	0.77	8.14	28.09	0.00	35.06	V	1.00	329.0	- 4.94	- 14.48	0.120
153.8100	51.27	Qp	0.83	12.32	27.70	0.00	36.72	V	1.00	182.0	- 6.80	- 12.82	0.120
366.1100	47.36	Qp	1.31	14.92	27.51	0.00	36.08	V	1.40	208.0	- 9.94	- 13.46	0.120
379.6700	43.99	Qp	1.34	15.38	27.62	0.00	33.09	V	1.37	30.0	- 12.93	- 16.45	0.120
433.9100	43.73	Qp	1.42	16.68	28.04	0.00	33.79	V	1.49	208.0	- 12.23	- 15.75	0.120
488.1500	44.53	Qp	1.51	17.55	28.26	0.00	35.33	V	1.12	8.0	- 10.69	- 14.21	0.120
528.8300	46.72	Qp	1.58	18.20	28.41	0.00	38.09	V	1.00	353.0	- 7.93	- 11.45	0.120
555.9500	47.38	Qp	1.62	18.06	28.39	0.00	38.67	V	1.00	41.0	- 7.35	- 10.87	0.120
610.1800	45.19	Qp	1.71	18.80	28.34	0.00	37.36	V	1.03	0.0	- 8.66	- 12.18	0.120
BiLog Antenna Horizontal: 30MHz to 1000MHz Data													
153.7800	52.79	Qp	0.83	12.32	27.70	0.00	38.24	H	1.58	335.0	- 5.28	- 11.30	0.120
366.1100	45.47	Qp	1.31	14.92	27.51	0.00	34.19	H	1.79	175.0	- 11.83	- 15.35	0.120
447.4700	39.24	Qp	1.45	16.80	28.12	0.00	29.37	H	1.68	327.0	- 16.65	- 20.17	0.120
461.0300	40.63	Qp	1.47	16.76	28.17	0.00	30.69	H	1.92	252.0	- 15.33	- 18.85	0.120

Example calculation:

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

5.27 Test Data: Tx 122.8kHz VDC – Axis 1

Radiated Electromagnetic Emissions

Test Report #:	G100781715	Test Area:	CC1 Radiated	Temperature:	<u>22.8</u>	°C
Test Method:	FCC 15.209 IC RSS-210/ RSS-Gen 7.2.5	Test Date:	07/02/2012 07/03/2012	Relative Humidity:	<u>34.7</u>	%
EUT Model #:	RC-03-MCT-K	EUT Power:	<u>12VDC</u>	Air Pressure:	<u>83.3</u>	kPa

EUT Serial #: FCC2

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi Channel Option
122.8kHz & 13.56MHz

Notes: Product Tested in the following configuration: 12VDC

Product continuously operating/active during all testing – normal operation

Level Key

Pk – Peak

Qp – Quasi Peak

Av - Average

Product Tested in Axis 1: Product Horizontal on table

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 15.209	IC RSS-Gen 7.2.5	(MHz)
Tx 122.8kHz Product 12VDC Option – Axis 1													
Loop Antenna Perpendicular: 10kHz to 30MHz Data													
0.0328	51.34	Qp	0.10	13.21	0.00	0.00	67.66	V	1.00	350.0	- 51.95	- 51.95	0.009
0.0655	52.82	Qp	0.10	11.08	0.00	0.00	64.00	V	1.00	278.0	- 46.76	- 46.76	0.009
0.0960	50.21	Qp	0.10	10.58	0.00	0.00	60.89	V	1.00	19.0	- 46.66	- 46.66	0.009
0.0983	50.46	Qp	0.10	10.42	0.00	0.00	60.98	V	1.00	357.0	- 46.37	- 46.37	0.009
0.1311	57.23	Qp	0.10	10.33	0.00	0.00	67.66	V	1.00	80.0	- 37.26	- 37.26	0.009
0.1638	45.65	Qp	0.10	10.36	0.00	0.00	56.11	V	1.00	350.0	- 46.92	- 46.92	0.009
0.1966	44.55	Qp	0.10	10.40	0.00	0.00	55.05	V	1.00	35.0	- 46.45	- 46.45	0.009
0.2294	44.47	Qp	0.10	10.37	0.00	0.00	54.94	V	1.00	269.0	- 45.26	- 45.26	0.009
0.2621	41.45	Qp	0.10	10.34	0.00	0.00	51.89	V	1.00	57.0	- 47.19	- 47.19	0.009
0.2949	40.70	Qp	0.10	10.31	0.00	0.00	51.11	V	1.00	241.0	- 46.98	- 46.98	0.009
0.3277	41.58	Qp	0.10	10.24	0.00	0.00	51.92	V	1.00	15.0	- 45.27	- 45.27	0.009
7.4000	13.09	Qp	0.43	10.66	0.00	0.00	24.18	V	1.00	17.0	- 45.36	- 45.36	0.009
14.7456	14.13	Qp	1.00	10.03	0.00	0.00	25.16	V	1.00	66.0	- 44.38	- 44.38	0.009
29.4932	20.85	Qp	1.40	8.43	0.00	0.00	30.68	V	1.00	114.0	- 38.86	- 38.86	0.009
Loop Antenna Parallel : 10kHz to 30MHz Data													
0.0328	55.12	Qp	0.10	13.21	0.00	0.00	68.53	H	1.00	241.0	- 48.08	- 48.08	0.009
0.0655	52.58	Qp	0.10	11.08	0.00	0.00	63.76	H	1.00	63.0	- 47.00	- 47.00	0.009
0.0960	50.43	Qp	0.10	10.58	0.00	0.00	61.11	H	1.00	305.0	- 46.44	- 46.44	0.009
0.0983	50.28	Qp	0.10	10.42	0.00	0.00	60.80	H	1.00	257.0	- 46.55	- 46.55	0.009
0.1638	46.93	Qp	0.10	10.36	0.00	0.00	57.39	H	1.00	100.0	- 45.64	- 45.64	0.009
0.2294	44.44	Qp	0.10	10.37	0.00	0.00	54.91	H	1.00	14.0	- 45.29	- 45.29	0.009
0.2621	43.67	Qp	0.10	10.34	0.00	0.00	54.11	H	1.00	318.0	- 44.97	- 44.97	0.009
0.2949	40.91	Qp	0.10	10.31	0.00	0.00	51.32	H	1.00	124.0	- 46.77	- 46.77	0.009
0.3277	39.82	Qp	0.10	10.24	0.00	0.00	50.16	H	1.00	347.0	- 47.03	- 47.03	0.009
7.3980	20.29	Qp	0.43	10.66	0.00	0.00	31.38	H	1.00	31.0	- 38.16	- 38.16	0.009
14.7456	13.03	Qp	1.00	10.03	0.00	0.00	24.06	H	1.00	151.0	- 45.48	- 45.48	0.009
29.4912	13.60	Qp	1.40	8.43	0.00	0.00	23.43	H	1.00	283.0	- 46.11	- 46.11	0.009

Note: Signals 10kHz to 150kHz were measured with 9kHz RBW instead of specified 200Hz RBW.
Therefore measurements are higher than required.

Intertek													
Report Number: 100781715DEN-001								Issued: 11/7/2013					

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 15.209	IC RSS-Gen 7.2.5	(MHz)
Tx 122.8kHz Product 12VDC Option – Axis 1													
BiLog Antenna Vertical: 30MHz to 1000MHz Data													
67.8000	43.09	Qp	0.77	8.00	28.11	0.00	23.74	V	1.00	141.1	- 16.26	- 16.26	0.120
75.0000	43.93	Qp	0.77	8.20	28.08	0.00	24.82	V	1.00	4.7	- 15.18	- 15.18	0.120
94.9200	49.27	Qp	0.77	8.98	27.98	0.00	31.04	V	1.00	320.5	- 12.48	- 12.48	0.120
154.9200	49.35	Qp	0.84	12.39	27.70	0.00	34.88	V	1.00	107.9	- 8.64	- 8.64	0.120
203.3900	46.78	Qp	0.95	11.49	27.47	0.00	31.76	V	1.26	256.8	- 11.76	- 11.76	0.120
352.5500	41.82	Qp	1.29	14.70	27.41	0.00	30.40	V	1.48	6.8	- 15.62	- 15.62	0.120
366.1100	50.75	Qp	1.31	14.92	27.51	0.00	39.47	V	1.63	167.9	- 6.55	- 6.55	0.120
433.9100	46.49	Qp	1.42	16.68	28.04	0.00	36.55	V	1.30	128.8	- 9.47	- 9.47	0.120
BiLog Antenna Horizontal: 30MHz to 1000MHz Data													
74.9900	40.21	Qp	0.77	8.20	28.08	0.00	21.10	H	2.09	353.0	- 18.90	- 18.90	0.120
154.0600	45.23	Qp	0.83	12.31	27.70	0.00	30.67	H	1.75	303.1	- 12.85	- 12.85	0.120
154.8600	53.39	Qp	0.84	12.39	27.70	0.00	38.91	H	1.74	295.6	- 4.61	- 4.61	0.120
162.7100	44.70	Qp	0.85	12.30	27.66	0.00	30.19	H	1.57	124.6	- 13.33	- 13.33	0.120
176.2800	44.85	Qp	0.89	11.34	27.59	0.00	29.49	H	1.50	327.8	- 14.03	- 14.03	0.120
203.3800	43.93	Qp	0.95	11.49	27.47	0.00	28.91	H	1.55	130.6	- 14.61	- 14.61	0.120
311.8800	46.54	Qp	1.21	13.84	27.22	0.00	34.37	H	1.21	219.9	- 11.65	- 11.65	0.120
352.5500	50.65	Qp	1.29	14.70	27.41	0.00	39.23	H	1.06	262.9	- 6.79	- 6.79	0.120
366.1200	56.38	Qp	1.31	14.92	27.52	0.00	45.10	H	1.08	267.2	- 0.92	- 0.92	0.120
433.9200	45.28	Qp	1.42	16.68	28.04	0.00	35.34	H	1.00	257.5	- 10.68	- 10.68	0.120
555.9500	43.75	Qp	1.62	18.06	28.39	0.00	35.04	H	1.50	92.7	- 10.98	- 10.98	0.120
610.1900	47.45	Qp	1.71	18.80	28.34	0.00	39.62	H	1.36	359.6	- 6.40	- 6.40	0.120
718.6700	44.88	Qp	1.88	19.97	28.22	0.00	38.51	H	1.22	2.0	- 7.51	- 7.51	0.120

Example calculation:

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

5.28 Test Data: Tx 122.8kHz VDC – Axis 2

Radiated Electromagnetic Emissions

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: <u>22.8</u> °C
Test Method: FCC 15.209 IC RSS-210/ RSS-Gen 7.2.5	Test Date: 07/02/2012 07/03/2012	Relative Humidity: <u>34.7</u> %
EUT Model #: RC-03-MCT-K	EUT Power: 12VDC	Air Pressure: <u>83.3</u> kPa

EUT Serial #: FCC2

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi Channel Option
122.8kHz & 13.56MHz

Notes: Product Tested in the following configuration: 12VDC

Product continuously operating/active during all testing – normal operation

Product Tested in Axis 2: Product Vertical on table

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

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 15.209	IC RSS-Gen 7.2.5	(MHz)
Tx 122.8kHz Product 12VDC Option – Axis 2													
Loop Antenna Perpendicular: 10kHz to 30MHz Data													
0.0328	54.82	Qp	0.10	13.21	0.00	0.00	68.13	V	1.00	131.0	- 48.48	- 48.48	0.009
0.0655	53.84	Qp	0.10	11.08	0.00	0.00	65.02	V	1.00	93.0	- 45.74	- 45.74	0.009
0.0960	50.56	Qp	0.10	10.58	0.00	0.00	61.24	V	1.00	20.0	- 46.31	- 46.31	0.009
0.0983	50.47	Qp	0.10	10.42	0.00	0.00	60.99	V	1.00	22.0	- 46.36	- 46.36	0.009
0.1638	46.22	Qp	0.10	10.36	0.00	0.00	56.68	V	1.00	115.0	- 46.35	- 46.35	0.009
0.1966	43.95	Qp	0.10	10.40	0.00	0.00	54.45	V	1.00	53.0	- 47.05	- 47.05	0.009
0.2294	42.53	Qp	0.10	10.37	0.00	0.00	53.00	V	1.00	308.0	- 47.20	- 47.20	0.009
0.2621	42.56	Qp	0.10	10.34	0.00	0.00	53.00	V	1.00	278.0	- 46.08	- 46.08	0.009
0.2949	40.98	Qp	0.10	10.31	0.00	0.00	51.39	V	1.00	219.0	- 46.70	- 46.70	0.009
0.3277	39.34	Qp	0.10	10.24	0.00	0.00	49.68	V	1.00	22.0	- 47.51	- 47.51	0.009
Loop Antenna Parallel : 10kHz to 30MHz Data													
0.0328	53.61	Qp	0.10	13.21	0.00	0.00	66.92	H	1.00	45.0	- 49.69	- 49.69	0.009
0.0655	52.66	Qp	0.10	11.08	0.00	0.00	63.84	H	1.00	242.0	- 46.92	- 46.92	0.009
0.0960	50.74	Qp	0.10	10.58	0.00	0.00	61.42	H	1.00	20.0	- 46.13	- 46.13	0.009
0.0983	49.71	Qp	0.10	10.42	0.00	0.00	60.23	H	1.00	224.0	- 47.12	- 47.12	0.009
0.1638	46.06	Qp	0.10	10.36	0.00	0.00	56.52	H	1.00	353.0	- 46.51	- 46.51	0.009
0.1966	44.20	Qp	0.10	10.40	0.00	0.00	54.70	H	1.00	57.0	- 46.80	- 46.80	0.009
0.2294	42.61	Qp	0.10	10.37	0.00	0.00	53.08	H	1.00	190.0	- 47.12	- 47.12	0.009
0.2621	41.97	Qp	0.10	10.34	0.00	0.00	52.41	H	1.00	183.0	- 46.67	- 46.67	0.009
0.2949	40.95	Qp	0.10	10.31	0.00	0.00	51.36	H	1.00	211.0	- 46.73	- 46.73	0.009
0.3277	40.40	Qp	0.10	10.24	0.00	0.00	50.74	H	1.00	105.0	- 46.45	- 46.45	0.009
0.3670	42.16	Qp	0.10	10.17	0.00	0.00	52.43	H	1.00	356.0	- 43.81	- 43.81	0.009
7.4000	20.65	Qp	0.43	10.66	0.00	0.00	31.74	H	1.00	112.0	- 37.80	- 37.80	0.009
13.6600	14.91	Qp	0.90	10.13	0.00	0.00	25.94	H	1.00	230.0	- 43.60	- 43.60	0.009
14.7456	11.99	Qp	1.00	10.03	0.00	0.00	23.02	H	1.00	217.0	- 46.52	- 46.52	0.009
29.4912	13.13	Qp	1.40	8.43	0.00	0.00	22.96	H	1.00	47.0	- 46.58	- 46.58	0.009

Note: Signals 10kHz to 150kHz were measured with 9kHz RBW instead of specified 200Hz RBW.
Therefore measurements are higher than required.

Intertek													
Report Number: 100781715DEN-001								Issued: 11/7/2013					

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 15.209	IC RSS-Gen 7.2.5	(MHz)
Tx 122.8kHz Product 12VDC Option – Axis 2													
BiLog Antenna Vertical: 30MHz to 1000MHz Data													
67.8000	44.95	Qp	0.77	8.00	28.11	0.00	25.60	V	1.00	51.7	- 14.40	- 14.40	0.120
75.0000	40.73	Qp	0.77	8.20	28.08	0.00	21.62	V	1.00	21.9	- 18.38	- 18.38	0.120
94.9100	49.15	Qp	0.77	8.98	27.98	0.00	30.92	V	1.00	249.6	- 12.60	- 12.60	0.120
122.0300	47.86	Qp	0.77	13.40	27.85	0.00	34.17	V	1.00	147.1	- 9.35	- 9.35	0.120
155.2200	48.67	Qp	0.84	12.38	27.70	0.00	34.19	V	1.00	247.5	- 9.33	- 9.33	0.120
203.4000	47.54	Qp	0.95	11.49	27.47	0.00	32.51	V	1.00	45.8	- 11.01	- 11.01	0.120
319.9900	43.12	Qp	1.23	14.00	27.25	0.00	31.10	V	1.00	48.0	- 14.92	- 14.92	0.120
352.5500	50.69	Qp	1.29	14.70	27.41	0.00	39.27	V	1.42	138.7	- 6.75	- 6.75	0.120
366.1200	49.11	Qp	1.31	14.92	27.52	0.00	37.83	V	1.17	133.5	- 8.19	- 8.19	0.120
433.9100	45.78	Qp	1.42	16.68	28.04	0.00	35.84	V	1.34	146.7	- 10.18	- 10.18	0.120
BiLog Antenna Horizontal: 30MHz to 1000MHz Data													
75.0000	40.76	Qp	0.77	8.20	28.08	0.00	21.65	H	2.38	335.4	- 18.35	- 18.35	0.120
154.4200	46.43	Qp	0.83	12.34	27.70	0.00	31.91	H	1.71	134.9	- 11.61	- 11.61	0.120
162.7200	41.15	Qp	0.85	12.30	27.66	0.00	26.64	H	2.04	315.6	- 16.88	- 16.88	0.120
176.2700	42.17	Qp	0.89	11.35	27.59	0.00	26.81	H	1.79	176.9	- 16.71	- 16.71	0.120
203.3900	41.94	Qp	0.95	11.49	27.47	0.00	26.92	H	1.79	337.5	- 16.60	- 16.60	0.120
352.5600	50.09	Qp	1.29	14.70	27.41	0.00	38.67	H	1.12	245.6	- 7.35	- 7.35	0.120
366.1100	50.49	Qp	1.31	14.92	27.51	0.00	39.21	H	1.06	31.6	- 6.81	- 6.81	0.120
433.9200	42.56	Qp	1.42	16.68	28.04	0.00	32.62	H	1.95	147.7	- 13.40	- 13.40	0.120
555.9400	42.34	Qp	1.62	18.06	28.39	0.00	33.63	H	1.75	80.2	- 12.39	- 12.39	0.120
610.1800	37.45	Qp	1.71	18.80	28.34	0.00	29.62	H	1.37	114.7	- 16.40	- 16.40	0.120
718.6700	40.35	Qp	1.88	19.97	28.22	0.00	33.98	H	1.08	236.4	- 12.04	- 12.04	0.120

Example calculation:

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

5.29 Test Data: Tx 13.56MHz VDC – Axis 1

Radiated Electromagnetic Emissions

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: <u>22.8</u> °C
Test Method: FCC 15.225/15.209 IC RSS-210 A2.6	Test Date: 07/02/2012 07/03/2012	Relative Humidity: <u>34.7</u> %
EUT Model #: RC-03-MCT-K	EUT Power: VDC	Air Pressure: <u>83.3</u> kPa

EUT Serial #: FCC2

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi Channel Option
122.8kHz & 13.56MHz

Notes: Product Tested in the following configuration: Power Over Ethernet (POE)

Product continuously operating/active during all testing – normal operation

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

Product tested in Axis 1: Product Horizontal on table

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 15.225 15.209	IC RSS-210 A2.6	(MHz)
Tx 13.56MHz Product VDC Option – Axis 1													
Loop Antenna Perpendicular: 10kHz to 30MHz Data													
0.0328	51.34	Qp	0.10	13.21	0.00	0.00	67.66	V	1.00	350.0	- 51.95	- 1.88	0.009
0.0655	52.82	Qp	0.10	11.08	0.00	0.00	64.00	V	1.00	278.0	- 46.76	- 5.54	0.009
0.0960	50.21	Qp	0.10	10.58	0.00	0.00	60.89	V	1.00	19.0	- 46.66	- 8.65	0.009
0.0983	50.46	Qp	0.10	10.42	0.00	0.00	60.98	V	1.00	357.0	- 46.37	- 8.56	0.009
0.1311	57.23	Qp	0.10	10.33	0.00	0.00	67.66	V	1.00	80.0	- 37.26	- 1.88	0.009
0.1638	45.65	Qp	0.10	10.36	0.00	0.00	56.11	V	1.00	350.0	- 46.92	- 13.43	0.009
0.2621	41.45	Qp	0.10	10.34	0.00	0.00	51.89	V	1.00	57.0	- 47.19	- 17.65	0.009
0.2949	40.70	Qp	0.10	10.31	0.00	0.00	51.11	V	1.00	241.0	- 46.98	- 18.43	0.009
0.3277	41.58	Qp	0.10	10.24	0.00	0.00	51.92	V	1.00	15.0	- 45.27	- 17.62	0.009
7.4000	13.09	Qp	0.43	10.66	0.00	0.00	24.18	V	1.00	17.0	- 45.36	- 45.36	0.009
14.7456	14.13	Qp	1.00	10.03	0.00	0.00	25.16	V	1.00	66.0	- 44.38	- 44.38	0.009
29.4932	20.85	Qp	1.40	8.43	0.00	0.00	30.68	V	1.00	114.0	- 38.86	- 38.86	0.009
Loop Antenna Parallel : 10kHz to 30MHz Data													
0.0328	55.12	Qp	0.10	13.21	0.00	0.00	68.53	H	1.00	241.0	- 48.08	- 1.01	0.009
0.0655	52.58	Qp	0.10	11.08	0.00	0.00	63.76	H	1.00	63.0	- 47.00	- 5.78	0.009
0.0960	50.43	Qp	0.10	10.58	0.00	0.00	61.11	H	1.00	305.0	- 46.44	- 8.43	0.009
0.0983	50.28	Qp	0.10	10.42	0.00	0.00	60.80	H	1.00	257.0	- 46.55	- 8.74	0.009
0.1638	46.93	Qp	0.10	10.36	0.00	0.00	57.39	H	1.00	100.0	- 45.64	- 12.15	0.009
0.1966	44.37	Qp	0.10	10.40	0.00	0.00	54.87	H	1.00	296.0	- 46.63	- 14.67	0.009
0.2294	44.44	Qp	0.10	10.37	0.00	0.00	54.91	H	1.00	14.0	- 45.29	- 14.63	0.009
0.2621	43.67	Qp	0.10	10.34	0.00	0.00	54.11	H	1.00	318.0	- 44.97	- 15.43	0.009
0.2949	40.91	Qp	0.10	10.31	0.00	0.00	51.32	H	1.00	124.0	- 46.77	- 18.22	0.009
0.3277	39.82	Qp	0.10	10.24	0.00	0.00	50.16	H	1.00	347.0	- 47.03	- 19.38	0.009
7.3980	20.29	Qp	0.43	10.66	0.00	0.00	31.38	H	1.00	31.0	- 38.16	- 38.16	0.009
14.7456	13.03	Qp	1.00	10.03	0.00	0.00	24.06	H	1.00	151.0	- 45.48	- 45.48	0.009
29.4912	13.60	Qp	1.40	8.43	0.00	0.00	23.43	H	1.00	283.0	- 46.11	- 46.11	0.009

Note: Signals 10kHz to 150kHz were measured with 9kHz RBW instead of specified 200Hz RBW.
Therefore measurements are higher than required.

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

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 15.225 15.209	IC RSS-210 A2.6	(MHz)
Tx 13.56MHz ProductVDC Option – Axis 1													
BiLog Antenna Vertical: 30MHz to 1000MHz Data													
67.8000	43.09	Qp	0.77	8.00	28.11	0.00	23.74	V	1.00	141.1	- 16.26	- 25.80	0.120
75.0000	43.93	Qp	0.77	8.20	28.08	0.00	24.82	V	1.00	4.7	- 15.18	- 24.72	0.120
94.9200	49.27	Qp	0.77	8.98	27.98	0.00	31.04	V	1.00	320.5	- 12.48	- 18.50	0.120
154.9200	49.35	Qp	0.84	12.39	27.70	0.00	34.88	V	1.00	107.9	- 8.64	- 14.66	0.120
203.3900	46.78	Qp	0.95	11.49	27.47	0.00	31.76	V	1.26	256.8	- 11.76	- 17.78	0.120
352.5500	41.82	Qp	1.29	14.70	27.41	0.00	30.40	V	1.48	6.8	- 15.62	- 19.14	0.120
366.1100	50.75	Qp	1.31	14.92	27.51	0.00	39.47	V	1.63	167.9	- 6.55	- 10.07	0.120
433.9100	46.49	Qp	1.42	16.68	28.04	0.00	36.55	V	1.30	128.8	- 9.47	- 12.99	0.120
BiLog Antenna Horizontal: 30MHz to 1000MHz Data													
74.9900	40.21	Qp	0.77	8.20	28.08	0.00	21.10	H	2.09	353.0	- 18.90	- 28.44	0.120
154.0600	45.23	Qp	0.83	12.31	27.70	0.00	30.67	H	1.75	303.1	- 12.85	- 18.87	0.120
154.8600	53.39	Qp	0.84	12.39	27.70	0.00	38.91	H	1.74	295.6	- 4.61	- 10.63	0.120
162.7100	44.70	Qp	0.85	12.30	27.66	0.00	30.19	H	1.57	124.6	- 13.33	- 19.35	0.120
176.2800	44.85	Qp	0.89	11.34	27.59	0.00	29.49	H	1.50	327.8	- 14.03	- 20.05	0.120
203.3800	43.93	Qp	0.95	11.49	27.47	0.00	28.91	H	1.55	130.6	- 14.61	- 20.63	0.120
311.8800	46.54	Qp	1.21	13.84	27.22	0.00	34.37	H	1.21	219.9	- 11.65	- 15.17	0.120
352.5500	50.65	Qp	1.29	14.70	27.41	0.00	39.23	H	1.06	262.9	- 6.79	- 10.31	0.120
366.1200	56.38	Qp	1.31	14.92	27.52	0.00	45.10	H	1.08	267.2	- 0.92	- 4.44	0.120
433.9200	45.28	Qp	1.42	16.68	28.04	0.00	35.34	H	1.00	257.5	- 10.68	- 14.20	0.120
555.9500	43.75	Qp	1.62	18.06	28.39	0.00	35.04	H	1.50	92.7	- 10.98	- 14.50	0.120
610.1900	47.45	Qp	1.71	18.80	28.34	0.00	39.62	H	1.36	359.6	- 6.40	- 9.92	0.120
718.6700	44.88	Qp	1.88	19.97	28.22	0.00	38.51	H	1.22	2.0	- 7.51	- 11.03	0.120

Example calculation:

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

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

5.30 Test Data: Tx 13.56MHz VDC – Axis 2

Radiated Electromagnetic Emissions

Test Report #: **G100781715** Test Area: **CC1 Radiated** Temperature: **22.8** °C
 Test Method: **FCC 15.225/15.209** Test Date: **07/02/2012** Relative Humidity: **34.7** %
IC RSS-210 A2.6 **07/03/2012**
 EUT Model #: **RC-03-MCT-K** EUT Power: **VDC** Air Pressure: **83.3** kPa
 EUT Serial #: **FCC2**

Manufacturer: **ISONAS Security Systems**

EUT Description: **Network-Enabled RFID Reader/Controller – Multi Channel Option**
122.8kHz & 13.56MHz

Notes: Product Tested in the following configuration: Power Over Ethernet (POE)

Product continuously operating/active during all testing – normal operation

Level Key

Pk – Peak

Qp – Quasi Peak

Av - Average

Product tested in Axis 2: Product Vertical on table

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 15.225 15.209	IC RSS-210 A2.6	(MHz)
Tx 13.56MHz Product VDC Option – Axis 2													
Loop Antenna Perpendicular: 10kHz to 30MHz Data													
0.0328	54.82	Qp	0.10	13.21	0.00	0.00	68.13	V	1.00	131.0	- 48.48	- 1.41	0.009
0.0655	53.84	Qp	0.10	11.08	0.00	0.00	65.02	V	1.00	93.0	- 45.74	- 4.52	0.009
0.0960	50.56	Qp	0.10	10.58	0.00	0.00	61.24	V	1.00	20.0	- 46.31	- 8.30	0.009
0.0983	50.47	Qp	0.10	10.42	0.00	0.00	60.99	V	1.00	22.0	- 46.36	- 8.55	0.009
0.1638	46.22	Qp	0.10	10.36	0.00	0.00	56.68	V	1.00	115.0	- 46.35	- 12.86	0.009
0.1966	43.95	Qp	0.10	10.40	0.00	0.00	54.45	V	1.00	53.0	- 47.05	- 15.09	0.009
0.2294	42.53	Qp	0.10	10.37	0.00	0.00	53.00	V	1.00	308.0	- 47.20	- 16.54	0.009
0.2621	42.56	Qp	0.10	10.34	0.00	0.00	53.00	V	1.00	278.0	- 46.08	- 16.54	0.009
0.2949	40.98	Qp	0.10	10.31	0.00	0.00	51.39	V	1.00	219.0	- 46.70	- 18.15	0.009
0.3277	39.34	Qp	0.10	10.24	0.00	0.00	49.68	V	1.00	22.0	- 47.51	- 19.86	0.009
Loop Antenna Parallel : 10kHz to 30MHz Data													
0.0328	53.61	Qp	0.10	13.21	0.00	0.00	66.92	H	1.00	45.0	- 49.69	- 2.62	0.009
0.0655	52.66	Qp	0.10	11.08	0.00	0.00	63.84	H	1.00	242.0	- 46.92	- 5.70	0.009
0.0960	50.74	Qp	0.10	10.58	0.00	0.00	61.42	H	1.00	20.0	- 46.13	- 8.12	0.009
0.0983	49.71	Qp	0.10	10.42	0.00	0.00	60.23	H	1.00	224.0	- 47.12	- 9.31	0.009
0.1638	46.06	Qp	0.10	10.36	0.00	0.00	56.52	H	1.00	353.0	- 46.51	- 13.02	0.009
0.1966	44.20	Qp	0.10	10.40	0.00	0.00	54.70	H	1.00	57.0	- 46.80	- 14.84	0.009
0.2294	42.61	Qp	0.10	10.37	0.00	0.00	53.08	H	1.00	190.0	- 47.12	- 16.46	0.009
0.2621	41.97	Qp	0.10	10.34	0.00	0.00	52.41	H	1.00	183.0	- 46.67	- 17.13	0.009
0.2949	40.95	Qp	0.10	10.31	0.00	0.00	51.36	H	1.00	211.0	- 46.73	- 18.18	0.009
0.3277	40.40	Qp	0.10	10.24	0.00	0.00	50.74	H	1.00	105.0	- 46.45	- 18.80	0.009
0.3670	42.16	Qp	0.10	10.17	0.00	0.00	52.43	H	1.00	356.0	- 43.81	- 17.11	0.009
7.4000	20.65	Qp	0.43	10.66	0.00	0.00	31.74	H	1.00	112.0	- 37.80	- 37.80	0.009
13.6600	14.91	Qp	0.90	10.13	0.00	0.00	25.94	H	1.00	230.0	- 64.56	- 64.56	0.009
14.7456	11.99	Qp	1.00	10.03	0.00	0.00	23.02	H	1.00	217.0	- 46.52	- 46.52	0.009

Note: Signals 10kHz to 150kHz were measured with 9kHz RBW instead of specified 200Hz RBW.
 Therefore measurements are higher than required.

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

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 15.225 15.209	IC RSS-210 A2.6	(MHz)
Tx 13.56MHz Product VDC Option – Axis 2													
BiLog Antenna Vertical: 30MHz to 1000MHz Data													
67.8000	44.95	Qp	0.77	8.00	28.11	0.00	25.60	V	1.00	51.7	- 14.40	- 23.94	0.120
75.0000	40.73	Qp	0.77	8.20	28.08	0.00	21.62	V	1.00	21.9	- 18.38	- 27.92	0.120
94.9100	49.15	Qp	0.77	8.98	27.98	0.00	30.92	V	1.00	249.6	- 12.60	- 18.62	0.120
122.0300	47.86	Qp	0.77	13.40	27.85	0.00	34.17	V	1.00	147.1	- 9.35	- 15.37	0.120
155.2200	48.67	Qp	0.84	12.38	27.70	0.00	34.19	V	1.00	247.5	- 9.33	- 15.35	0.120
203.4000	47.54	Qp	0.95	11.49	27.47	0.00	32.51	V	1.00	45.8	- 11.01	- 17.03	0.120
319.9900	43.12	Qp	1.23	14.00	27.25	0.00	31.10	V	1.00	48.0	- 14.92	- 18.44	0.120
352.5500	50.69	Qp	1.29	14.70	27.41	0.00	39.27	V	1.42	138.7	- 6.75	- 10.27	0.120
366.1200	49.11	Qp	1.31	14.92	27.52	0.00	37.83	V	1.17	133.5	- 8.19	- 11.71	0.120
433.9100	45.78	Qp	1.42	16.68	28.04	0.00	35.84	V	1.34	146.7	- 10.18	- 13.70	0.120
BiLog Antenna Horizontal: 30MHz to 1000MHz Data													
75.0000	40.76	Qp	0.77	8.20	28.08	0.00	21.65	H	2.38	335.4	- 18.35	- 27.89	0.120
154.4200	46.43	Qp	0.83	12.34	27.70	0.00	31.91	H	1.71	134.9	- 11.61	- 17.63	0.120
162.7200	41.15	Qp	0.85	12.30	27.66	0.00	26.64	H	2.04	315.6	- 16.88	- 22.90	0.120
176.2700	42.17	Qp	0.89	11.35	27.59	0.00	26.81	H	1.79	176.9	- 16.71	- 22.73	0.120
203.3900	41.94	Qp	0.95	11.49	27.47	0.00	26.92	H	1.79	337.5	- 16.60	- 22.62	0.120
352.5600	50.09	Qp	1.29	14.70	27.41	0.00	38.67	H	1.12	245.6	- 7.35	- 10.87	0.120
366.1100	50.49	Qp	1.31	14.92	27.51	0.00	39.21	H	1.06	31.6	- 6.81	- 10.33	0.120
433.9200	42.56	Qp	1.42	16.68	28.04	0.00	32.62	H	1.95	147.7	- 13.40	- 16.92	0.120
555.9400	42.34	Qp	1.62	18.06	28.39	0.00	33.63	H	1.75	80.2	- 12.39	- 15.91	0.120
610.1800	37.45	Qp	1.71	18.80	28.34	0.00	29.62	H	1.37	114.7	- 16.40	- 19.92	0.120
718.6700	40.35	Qp	1.88	19.97	28.22	0.00	33.98	H	1.08	236.4	- 12.04	- 15.56	0.120

Example calculation:

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

Notes:

- 1) The following product options were tested: Power-Over-Ethernet (POE) and 12/24VDC.
- 2) For the 12/24 VDC product option, pre-scans were taken for both 12VDC & 24VDC. The worst-case VDC product option was fully tested.
- 3) Per client, the product is never operated in receive/standby-mode only. Therefore, all unintentional radiated emissions testing was performed with the product configured for normal operation – with the transmit function active.
- 4) 32kHz oscillator is a digital circuitry signal and not associated with the transmitter HF RFID, which is a self-contained module.

Deviations, Additions, or Exclusions: None

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

6 Tx Voltage Variation

6.1 Method

Unless otherwise stated no deviations were made from FCC 15.31(e).

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

6.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	RHODE & SCHWARZ	ESU 26	100265	01/11/2012	01/11/2013
18897	Active Loop Antenna	EMCO	6502	9205-2738	11/22/2011	11/22/2012
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_Vba	V003	VBU	VBU

6.3 Test Data:

Tx Voltage Variation - POE

Test Report #: G100781715 Test Method: FCC 15.31(e) EUT Model #: RC-03-MCT-K EUT Serial #: FCC2 Manufacturer: ISONAS Security Systems EUT Description: Network-Enabled RFID Reader/Controller – Dual-Frequency Option 122.8kHz & 13.56MHz Notes: Product Tested in the following configuration: POE Product continuously operating/active during all testing – normal operation 	Test Area: CC1 Radiated Test Date: 07/05/2012 EUT Power: 12VDC 	Temperature: 23.2 °C Relative Humidity: 21.1 % Air Pressure: 83.7 kPa
--	---	--

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

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)			(MHz)
Product @ 23.2 degrees C													
Voltage Nominal: 230VAC													
0.1228	79.87	Pk	0.02	10.32	0.00	0.00	90.22	H	1.22	192.0	N/A	N/A	.009
13.5600	55.43	Pk	0.30	10.14	0.00	0.00	65.87	H	1.00	170.0	N/A	N/A	.009
85% of Nominal: 196VAC													
0.1228	79.68	Qp	0.02	10.32	0.00	0.00	90.03	H	1.22	192.0	N/A	N/A	.009
13.5600	55.21	Pk	0.30	10.14	0.00	0.00	65.65	H	1.00	170.0	N/A	N/A	.009
115% of Nominal: 265VAC													
0.1228	79.74	Pk	0.02	10.32	0.00	0.00	90.09	H	1.22	192.0	N/A	N/A	.009
13.5600	55.39	Pk	0.30	10.14	0.00	0.00	65.83	H	1.00	170.0	N/A	N/A	.009

Note: All Intentional Radiated Emissions testing for the POE product configuration performed at the nominal ac voltage: 230VAC (worst-case)

6.4 Test Data:

Tx Voltage Variation - VDC

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: 20.1 °C
Test Method: FCC 15.31(e)	Test Date: 07/05/2012	Relative Humidity: 21.1 %
EUT Model #: RC-03-MCT-K	EUT Power: 12VDC	Air Pressure: 83.7 kPa
EUT Serial #: FCC2		
Manufacturer: ISONAS Security Systems		Level Key Pk – Peak Qp – Quasi Peak Av - Average
EUT Description: Network-Enabled RFID Reader/Controller – Dual-Frequency Option 122.8kHz & 13.56MHz		
Notes: Product Tested in the following configuration: 12VDC		
Product continuously operating/active during all testing – normal operation		

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)			(MHz)
Product @ 23.2 degrees C													
Voltage Nominal: 12VDC													
0.1228	79.68	Pk	0.02	10.32	0.00	0.00	90.03	H	1.16	199.0	N/A	N/A	.009
13.5600	55.47	Pk	0.30	10.14	0.00	0.00	65.91	H	1.00	248.0	N/A	N/A	.009
85% of Nominal: 10.2VDC													
0.1228	79.68	Pk	0.02	10.32	0.00	0.00	90.03	H	1.16	199.0	N/A	N/A	.009
13.5600	55.01	Pk	0.30	10.14	0.00	0.00	65.45	H	1.00	189.0	N/A	N/A	.009
115% of Nominal: 13.8VDC													
0.1228	79.62	Pk	0.02	10.32	0.00	0.00	89.97	H	1.16	199.0	N/A	N/A	.009
13.5600	55.12	Pk	0.30	10.14	0.00	0.00	65.56	H	1.00	189.0	N/A	N/A	.009

Note: All Intentional Radiated Emissions testing for the VDC product option performed at the nominal dc voltage: 12VDC (worst-case)

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

7 Tx Frequency Tolerance (Stability)

7.1 Method

Unless otherwise stated no deviations were made from FCC 15.31(e)/15.225(e) and IC RSS-Gen 7.2.6/RSS-210 A2.6.

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

7.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	07/16/2012	07/16/2013
18784	Loop Antenna	SOLAR	7334-1	927606	12/29/2011	12/29/2012
18648	Environmental Chamber	Envirotronics	System Plus	---	VBV	VBV

7.3 Results:

The sample tested was found to Comply.

7.4 Test Data: Temperature Variation

Tx Frequency Tolerance (Stability)

Test Report #: G100781715 Test Method: FCC 15.225 (e) IC RSS-GEN 7.2.6 RSS-210 A2.6 EUT Model #: RC-03-MCT-K EUT Serial #: FCC2 Manufacturer: ISONAS Security Systems EUT Description: Network-Enabled RFID Reader/Controller – Dual-Frequency Option 122.8kHz & 13.56MHz Notes: Product Tested in the following configuration: 12VDC Product continuously operating/active during all testing – normal operation	Test Area: CC1 Radiated Test Date: 07/05/2012 EUT Power: 12VDC 	Temperature: 20.1 °C Relative Humidity: 21.1 % Air Pressure: 83.7 kPa
---	---	--

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

Nominal Frequency @ +20°C	Measured Frequency @ -20°C	% of Nominal	Actual Delta %	Spec Delta %	Pass/ Fail
MHz	MHz	%	%	%	
0.122751	0.122759	100.006599%	0.006599%	0.01%	Pass
13.559680	13.560300	100.004572%	0.004572%	0.01%	Pass

Nominal Frequency @ +20°C	Measured Frequency @ +50°C	% of Nominal	Actual Delta %	Spec Delta %	Pass/ Fail
MHz	MHz	%	%	%	
0.122751	0.122761	100.008310%	0.008310%	0.01%	Pass
13.559680	13.559150	99.996091%	0.003909%	0.01%	Pass

Spec: Frequency tolerance of the carrier signal $\pm 0.01\%$ nominal operating frequency over a temperature variation of -20°C to +50°C.

7.5 Test Data: Voltage Variation

Tx Frequency Tolerance (Stability)

Test Report #: G100781715 Test Method: FCC 15.225 (e) IC RSS-GEN 7.2.6 RSS-210 A2.6 EUT Model #: RC-03M-MCT-K EUT Serial #: FCC2 Manufacturer: ISONAS Security Systems EUT Description: Network-Enabled RFID Reader/Controller – Dual-Frequency Option 122.8kHz & 13.56MHz Notes: Product Tested in the following configuration: 12VDC Product continuously operating/active during all testing – normal operation	Test Area: CC1 Radiated Test Date: 07/05/2012 EUT Power: 12VDC 	Temperature: 20.2 °C Relative Humidity: 21.6 % Air Pressure: 83.7 kPa
--	---	--

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

Nominal Frequency @ 12VDC	Measured Frequency @ 10.2 VDC	% of Nominal	Actual Delta %	Spec Delta %	Pass/ Fail
MHz	MHz	%	%	%	
0.122751	0.122752	100.000815%	0.000815%	0.01%	Pass
13.559680	13.560700	100.007522%	0.007522%	0.01%	Pass

Nominal Frequency @ 12VDC	Measured Frequency @ 13.8VDC	% of Nominal	Actual Delta %	Spec Delta %	Pass/ Fail
MHz	MHz	%	%	%	
0.122751	0.122753	100.001629%	0.001629%	0.01%	Pass
13.559680	13.559520	99.998820%	0.001180%	0.01%	Pass

Spec: Frequency tolerance of the carrier signal $\pm 0.01\%$ nominal operating frequency over a voltage variation of $\pm 15\%$ of the rated operating voltage.

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

8 Radiated Tx Intentional Emissions – Fundamental & Harmonics of the Fundamental

8.1 Method

Unless otherwise stated no deviations were made from FCC 15.209/15.225(a) & IC RSS-210(A2.6).

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

8.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	RHODE & SCHWARZ	ESU 26	100265	01/11/2012	01/11/2013
18897	Active Loop Antenna	EMCO	6502	9205-2738	11/22/2011	11/22/2012
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/06/2012	06/06/2013
19936	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-1	11/15/2011	11/15/2012
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_Vba	V003	VBV	VBV

8.3 Results:

The sample tested was found to Comply.

8.4 Product Test Orientations:

Axis 1 (Horizontal)



Axis 2 (Vertical - Normal Product Orientation)



Axis 3 (Flat on Table)



8.5 Setup Photographs: POE

Test setup – Front view



(Axis 2 Shown)

Photo: POE

Test setup – Rear view



8.6 Setup Photographs: 12/24VDC

Test setup – Front view



(Axis 1 shown)

Photo: 12/24VDC

Test setup – Rear view

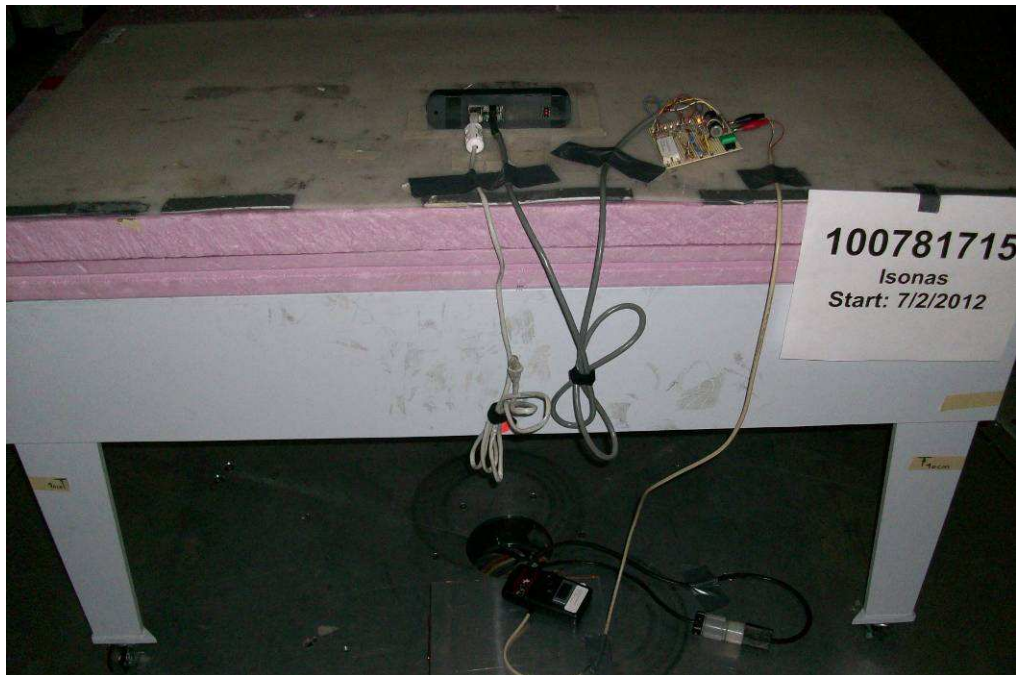


Photo: Antenna Setup

Antenna Setup: Active Loop Antenna - 10kHz to 30MHz



Antenna Setup: BiLog – 30MHz to 1000MHz



Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

8.7 Test Data: Tx 122.8kHz (POE) – FCC & IC

Tx Intentional Radiated Electromagnetic Emissions

Test Report #:	G100781715	Test Area:	CC1 Radiated	Temperature:	23.2 °C
Test Method:	FCC 15.209 RSS-210/RSS-Gen 7.2.5	Test Date:	07/05/2012 07/06/2012	Relative Humidity:	% 36.8
EUT Model #:	RC-03-MCT-K	EUT Power:	POE	Air Pressure:	kPa 83.5
EUT Serial #:	FCC2				

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi-Frequency Option
Tx = 122.8 kHz & 13.56 MHz (Inductive Loop Antenna)

Notes: Product Tested in the following configuration: Power Over Ethernet (POE)

Product continuously operating/active during all testing – normal operation

Level Key

Pk – Peak

Qp – Quasi Peak

Av - Average

Limits below 30 MHz were extrapolated using 15.31(f)(2) and RSS-GEN section 4.11. No duty-cycle correction for pulsed-signals was utilized.

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 IC RSS- 210 RSS-Gen	FCC 15.209 IC RSS- 210 RSS-Gen	(MHz)
Tx 122.8 kHz Fundamental & Harmonics Measurements – Axis 1													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
0.1228	71.88	Pk	0.02	10.32	0.00	0.00	82.23	V	1.03	87.0	- 23.24	105.47	0.009
Harmonics measurements													
0.2456	45.12	Pk	0.03	10.35	0.00	0.00	55.50	V	1.10	259.0	- 44.12	99.62	0.009
0.3684	43.05	Pk	0.04	10.16	0.00	0.00	53.25	V	1.10	104.0	- 42.96	96.21	0.009
0.4912	40.01	Pk	0.10	10.46	0.00	0.00	50.57	V	1.13	245.0	- 23.20	73.77	0.009
0.6140	38.68	Pk	0.10	10.47	0.00	0.00	49.25	V	1.07	95.0	- 22.58	71.83	0.009
0.7368	37.01	Pk	0.10	10.37	0.00	0.00	47.48	V	1.04	289.0	- 22.75	70.23	0.009
0.8596	36.53	Pk	0.10	10.56	0.00	0.00	47.19	V	1.00	98.0	- 21.70	68.89	0.009
0.9824	35.54	Pk	0.10	10.60	0.00	0.00	46.24	V	1.05	328.0	- 21.48	67.72	0.009
1.1052	34.80	Pk	0.10	10.59	0.00	0.00	45.49	V	1.02	292.0	- 21.20	66.69	0.009
1.2280	33.97	Pk	0.10	10.58	0.00	0.00	44.65	V	1.02	240.0	- 21.12	65.77	0.009
Loop antenna parallel to EUT													
Fundamental Measurement													
0.1228	75.62	Pk	0.02	10.32	0.00	0.00	85.97	H	1.05	173.0	- 19.50	105.47	0.009
Harmonics measurements													
0.2456	45.28	Pk	0.03	10.35	0.00	0.00	55.66	H	1.06	163.0	- 43.96	99.62	0.009
0.3684	44.08	Pk	0.04	10.16	0.00	0.00	54.28	H	1.17	185.0	- 41.93	96.21	0.009
0.4912	39.69	Pk	0.10	10.46	0.00	0.00	50.25	H	1.06	16.0	- 23.52	73.77	0.009
0.6140	38.89	Pk	0.10	10.47	0.00	0.00	49.46	H	1.06	174.0	- 22.37	71.83	0.009
0.7368	37.80	Pk	0.10	10.37	0.00	0.00	48.27	H	1.09	235.0	- 21.96	70.23	0.009
0.8596	36.64	Pk	0.10	10.56	0.00	0.00	47.30	H	1.04	161.0	- 21.59	68.89	0.009
0.9824	35.24	Pk	0.10	10.60	0.00	0.00	45.94	H	1.04	301.0	- 21.78	67.72	0.009
1.1052	34.60	Pk	0.10	10.59	0.00	0.00	45.29	H	1.06	195.0	- 21.40	66.69	0.009

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

1.2280	33.70	Pk	0.10	10.58	0.00	0.00	44.38	H	1.06	1.0	- 21.39	65.77	0.009
--------	-------	----	------	-------	------	------	-------	---	------	-----	---------	-------	-------

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 IC RSS- 210 RSS-Gen	FCC 15.209 IC RSS- 210 RSS-Gen	(MHz)
Tx 122.8 kHz Fundamental & Harmonics Measurements – Axis 2													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
0.1228	71.33	Pk	0.02	10.32	0.00	0.00	81.68	V	1.13	266.0	- 23.79	105.47	0.009
Harmonics measurements													
0.2456	45.66	Pk	0.03	10.35	0.00	0.00	56.04	V	1.11	100.0	- 43.58	99.62	0.009
0.3684	43.63	Pk	0.04	10.16	0.00	0.00	53.83	V	1.20	259.0	- 42.38	96.21	0.009
0.4912	40.85	Pk	0.10	10.46	0.00	0.00	51.41	V	1.00	331.0	- 22.36	73.77	0.009
0.6140	40.83	Pk	0.10	10.47	0.00	0.00	51.40	V	1.10	287.0	- 20.43	71.83	0.009
0.7368	37.63	Pk	0.10	10.37	0.00	0.00	48.10	V	1.08	0.0	- 22.13	70.23	0.009
0.8596	36.38	Pk	0.10	10.56	0.00	0.00	47.04	V	1.18	82.0	- 21.85	68.89	0.009
0.9824	35.28	Pk	0.10	10.60	0.00	0.00	45.98	V	1.18	129.0	- 21.74	67.72	0.009
1.1052	35.28	Pk	0.10	10.59	0.00	0.00	45.97	V	1.17	253.0	- 20.72	66.69	0.009
1.2280	34.30	Pk	0.10	10.58	0.00	0.00	44.98	V	1.16	42.0	- 20.79	65.77	0.009
Loop antenna parallel to EUT													
Fundamental Measurement													
0.1228	75.24	Pk	0.02	10.32	0.00	0.00	85.59	H	1.16	42.0	- 19.88	105.47	0.009
Harmonics measurements													
0.2456	45.41	Pk	0.03	10.35	0.00	0.00	55.79	H	1.01	360.0	- 43.83	99.62	0.009
0.3684	45.03	Pk	0.04	10.16	0.00	0.00	55.23	H	1.10	182.0	- 40.98	96.21	0.009
0.4912	39.40	Pk	0.10	10.46	0.00	0.00	49.96	H	1.10	343.0	- 23.81	73.77	0.009
0.6140	39.40	Pk	0.10	10.47	0.00	0.00	49.97	H	1.09	190.0	- 21.86	71.83	0.009
0.7368	38.21	Pk	0.10	10.37	0.00	0.00	48.68	H	1.09	360.0	- 21.55	70.23	0.009
0.8596	36.54	Pk	0.10	10.56	0.00	0.00	47.20	H	1.05	305.0	- 21.69	68.89	0.009
0.9824	35.39	Pk	0.10	10.60	0.00	0.00	46.09	H	1.02	182.0	- 21.63	67.72	0.009
1.1052	34.97	Pk	0.10	10.59	0.00	0.00	45.66	H	1.02	182.0	- 21.03	66.69	0.009
1.2280	33.70	Pk	0.10	10.58	0.00	0.00	44.38	H	1.02	182.0	- 21.39	65.77	0.009

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 IC RSS- 210 RSS-Gen	FCC 15.209 IC RSS- 210 RSS-Gen	(MHz)
Tx 122.8 kHz Fundamental & Harmonics Measurements – Axis 3													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
0.1228	52.59	Pk	0.02	10.32	0.00	0.00	62.94	V	1.00	360.0	- 42.53	105.47	0.009
Harmonics measurements													
0.2456	41.97	Pk	0.03	10.35	0.00	0.00	52.35	V	1.00	360.0	- 47.27	99.62	0.009
0.3684	39.68	Pk	0.04	10.16	0.00	0.00	49.88	V	1.00	360.0	- 46.33	96.21	0.009
0.4912	36.27	Pk	0.10	10.46	0.00	0.00	46.83	V	1.00	360.0	- 26.94	73.77	0.009
0.6140	36.32	Pk	0.10	10.47	0.00	0.00	46.89	V	1.00	360.0	- 24.94	71.83	0.009
0.7368	32.68	Pk	0.10	10.37	0.00	0.00	43.15	V	1.00	360.0	- 27.08	70.23	0.009
0.8596	31.74	Pk	0.10	10.56	0.00	0.00	42.40	V	1.00	360.0	- 26.49	68.89	0.009
0.9824	29.97	Pk	0.10	10.60	0.00	0.00	40.67	V	1.00	360.0	- 27.05	67.72	0.009
1.1052	29.30	Pk	0.10	10.59	0.00	0.00	39.99	V	1.00	360.0	- 26.70	66.69	0.009
1.2280	29.49	Pk	0.10	10.58	0.00	0.00	40.17	V	1.00	360.0	- 25.60	65.77	0.009
Loop antenna parallel to EUT													
Fundamental Measurement													
0.1228	64.59	Pk	0.02	10.32	0.00	0.00	74.94	H	1.00	0.0	- 30.53	105.47	0.009
Harmonics measurements													
0.2456	42.08	Pk	0.03	10.35	0.00	0.00	52.46	H	1.00	0.0	- 47.16	99.62	0.009
0.3684	39.55	Pk	0.04	10.16	0.00	0.00	49.75	H	1.00	0.0	- 46.46	96.21	0.009
0.4912	37.51	Pk	0.10	10.46	0.00	0.00	48.07	H	1.00	0.0	- 25.70	73.77	0.009
0.6140	34.71	Pk	0.10	10.47	0.00	0.00	45.28	H	1.00	0.0	- 26.55	71.83	0.009
0.7368	33.36	Pk	0.10	10.37	0.00	0.00	43.83	H	1.00	0.0	- 26.40	70.23	0.009
0.8596	31.78	Pk	0.10	10.56	0.00	0.00	42.44	H	1.00	0.0	- 26.45	68.89	0.009
0.9824	30.14	Pk	0.10	10.60	0.00	0.00	40.84	H	1.00	0.0	- 26.88	67.72	0.009
1.1052	29.71	Pk	0.10	10.59	0.00	0.00	40.40	H	1.00	0.0	- 26.29	66.69	0.009
1.2280	29.86	Pk	0.10	10.58	0.00	0.00	40.54	H	1.00	0.0	- 25.23	65.77	0.009

Example calculation:

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

8.8 Test Data: Tx 122.8kHz (VDC) – FCC & IC

Tx Intentional Radiated Electromagnetic Emissions

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: <u>22.1</u> °C
Test Method: FCC 15.209 RSS-210/RSS-Gen 7.2.5	Test Date: 07/05/2012 07/06/2012	Relative Humidity: <u>32.9</u> %
EUT Model #: RC-03-MCT-K	EUT Power: 12VDC	Air Pressure: <u>83.4</u> kPa
EUT Serial #: FCC2		

Manufacturer: ISONAS Security Systems EUT Description: Network-Enabled RFID Reader/Controller – Multi- Frequency Option Tx = 122.8 kHz & 13.56 MHz (Inductive Loop Antenna) Notes: Product Tested in the following configuration: 12VDC Product continuously operating/active during all testing – normal operation	Level Key Pk – Peak Qp – Quasi Peak Av - Average
--	--

Limits below 30 MHz were extrapolated using 15.31(f)(2) and RSS-GEN section 4.11. No duty cycle correction for pulsed signals was utilized.

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 IC RSS-210 RSS-Gen	FCC 15.209 IC RSS-210 RSS-Gen	(MHz)
Tx 122.8 kHz Fundamental & Harmonics Measurements – Axis 1													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
0.1228	71.76	Pk	0.02	10.32	0.00	0.00	82.11	V	1.00	82.0	- 23.36	105.47	0.010
Harmonics measurements													
0.2456	45.00	Pk	0.03	10.35	0.00	0.00	55.38	V	1.00	297.0	- 44.24	99.62	0.009
0.3684	43.24	Pk	0.04	10.16	0.00	0.00	53.44	V	1.00	103.0	- 42.77	96.21	0.009
0.4912	39.92	Pk	0.10	10.46	0.00	0.00	50.48	V	1.00	270.0	- 23.29	73.77	0.009
0.6140	38.99	Pk	0.10	10.47	0.00	0.00	49.56	V	1.02	85.0	- 22.27	71.83	0.009
0.7368	36.74	Pk	0.10	10.37	0.00	0.00	47.21	V	1.02	81.0	- 23.02	70.23	0.009
0.8596	35.77	Pk	0.10	10.56	0.00	0.00	46.43	V	1.02	69.0	- 22.46	68.89	0.009
0.9824	35.07	Pk	0.10	10.60	0.00	0.00	45.77	V	1.02	228.0	- 21.95	67.72	0.009
1.1052	34.12	Pk	0.10	10.59	0.00	0.00	44.81	V	1.02	287.0	- 21.88	66.69	0.009
1.2280	34.92	Pk	0.10	10.58	0.00	0.00	45.60	V	1.02	103.0	- 20.17	65.77	0.009
Loop antenna parallel to EUT													
Fundamental Measurement													
0.1228	75.78	Pk	0.02	10.32	0.00	0.00	86.13	H	1.01	174.0	- 19.34	105.47	0.010
Harmonics measurements													
0.2456	45.37	Pk	0.03	10.35	0.00	0.00	55.75	H	1.04	198.0	- 43.87	99.62	0.009
0.3684	44.01	Pk	0.04	10.16	0.00	0.00	54.21	H	1.04	198.0	- 42.00	96.21	0.009
0.4912	40.31	Pk	0.10	10.46	0.00	0.00	50.87	H	1.01	19.0	- 22.90	73.77	0.009
0.6140	39.57	Pk	0.10	10.47	0.00	0.00	50.14	H	1.01	1.0	- 21.69	71.83	0.009
0.7368	37.16	Pk	0.10	10.37	0.00	0.00	47.63	H	1.01	15.0	- 22.60	70.23	0.009
0.8596	36.48	Pk	0.10	10.56	0.00	0.00	47.14	H	1.01	159.0	- 21.75	68.89	0.009
0.9824	34.98	Pk	0.10	10.60	0.00	0.00	45.68	H	1.01	1.0	- 22.04	67.72	0.009
1.1052	34.76	Pk	0.10	10.59	0.00	0.00	45.45	H	1.01	359.0	- 21.24	66.69	0.009
1.2280	33.62	Pk	0.10	10.58	0.00	0.00	44.30	H	1.01	194.0	- 21.47	65.77	0.009

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 IC RSS-210 RSS-Gen	FCC 15.209 IC RSS-210 RSS-Gen	(MHz)
Tx 122.8 kHz Fundamental & Harmonics Measurements – Axis 2													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
0.1228	72.73	Pk	0.02	10.32	0.00	0.00	83.08	V	1.17	219.0	- 22.39	105.47	0.000
Harmonics measurements													
0.2456	45.00	Pk	0.03	10.35	0.00	0.00	55.38	V	1.11	235.0	- 44.24	99.62	0.009
0.3684	43.49	Pk	0.04	10.16	0.00	0.00	53.69	V	1.09	241.0	- 42.52	96.21	0.009
0.4912	40.79	Pk	0.10	10.46	0.00	0.00	51.35	V	1.09	61.0	- 22.42	73.77	0.009
0.6140	38.93	Pk	0.10	10.47	0.00	0.00	49.50	V	1.15	74.0	- 22.33	71.83	0.009
0.7368	37.63	Pk	0.10	10.37	0.00	0.00	48.10	V	1.15	98.0	- 22.13	70.23	0.009
0.8596	36.95	Pk	0.10	10.56	0.00	0.00	47.61	V	1.07	38.0	- 21.28	68.89	0.009
0.9824	35.14	Pk	0.10	10.60	0.00	0.00	45.84	V	1.07	327.0	- 21.88	67.72	0.009
1.1052	34.72	Pk	0.10	10.59	0.00	0.00	45.41	V	1.07	73.0	- 21.28	66.69	0.009
1.2280	33.92	Pk	0.10	10.58	0.00	0.00	44.60	V	1.11	360.0	- 21.17	65.77	0.009
Loop antenna parallel to EUT													
Fundamental Measurement													
0.1228	72.78	Pk	0.02	10.32	0.00	0.00	83.13	H	1.00	180.0	- 22.34	105.47	0.009
Harmonics measurements													
0.2456	46.00	Pk	0.03	10.35	0.00	0.00	56.38	H	1.00	193.0	- 43.24	99.62	0.009
0.3684	43.92	Pk	0.04	10.16	0.00	0.00	54.12	H	1.00	185.0	- 42.09	96.21	0.009
0.4912	39.78	Pk	0.10	10.46	0.00	0.00	50.34	H	1.00	187.0	- 23.43	73.77	0.009
0.6140	39.25	Pk	0.10	10.47	0.00	0.00	49.82	H	1.00	360.0	- 22.01	71.83	0.009
0.7368	37.29	Pk	0.10	10.37	0.00	0.00	47.76	H	1.00	218.0	- 22.47	70.23	0.009
0.8596	37.71	Pk	0.10	10.56	0.00	0.00	48.37	H	1.00	193.0	- 20.52	68.89	0.009
0.9824	35.11	Pk	0.10	10.60	0.00	0.00	45.81	H	1.00	284.0	- 21.91	67.72	0.009
1.1052	34.28	Pk	0.10	10.59	0.00	0.00	44.97	H	1.00	203.0	- 21.72	66.69	0.009
1.2280	33.73	Pk	0.10	10.58	0.00	0.00	44.41	H	1.00	306.0	- 21.36	65.77	0.009

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.209 IC RSS-210 RSS-Gen	FCC 15.209 IC RSS-210 RSS-Gen	(MHz)
Tx 122.8 kHz Fundamental & Harmonics Measurements – Axis 3													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
0.1228	50.26	Pk	0.02	10.32	0.00	0.00	60.61	V	1.00	0.0	- 44.86	105.47	0.009
Harmonics measurements													
0.2456	42.64	Pk	0.03	10.35	0.00	0.00	53.02	V	1.00	0.0	- 46.60	99.62	0.009
0.3684	38.92	Pk	0.04	10.16	0.00	0.00	49.12	V	1.00	0.0	- 47.09	96.21	0.009
0.4912	35.69	Pk	0.10	10.46	0.00	0.00	46.25	V	1.00	0.0	- 27.52	73.77	0.009
0.6140	36.06	Pk	0.10	10.47	0.00	0.00	46.63	V	1.00	0.0	- 25.20	71.83	0.009
0.7368	32.67	Pk	0.10	10.37	0.00	0.00	43.14	V	1.00	0.0	- 27.09	70.23	0.009
0.8596	32.28	Pk	0.10	10.56	0.00	0.00	42.94	V	1.00	0.0	- 25.95	68.89	0.009
0.9824	30.68	Pk	0.10	10.60	0.00	0.00	41.38	V	1.00	0.0	- 26.34	67.72	0.009
1.1052	30.52	Pk	0.10	10.59	0.00	0.00	41.21	V	1.00	0.0	- 25.48	66.69	0.009
1.2280	27.71	Pk	0.10	10.58	0.00	0.00	38.39	V	1.00	0.0	- 27.38	65.77	0.009
Loop antenna parallel to EUT													
Fundamental Measurement													
0.1228	64.42	Pk	0.02	10.32	0.00	0.00	74.77	H	1.00	0.0	- 30.70	105.47	0.009
Harmonics measurements													
0.2456	42.80	Pk	0.03	10.35	0.00	0.00	53.18	H	1.00	0.0	- 46.44	99.62	0.009
0.3684	38.86	Pk	0.04	10.16	0.00	0.00	49.06	H	1.00	0.0	- 47.15	96.21	0.009
0.4912	35.71	Pk	0.10	10.46	0.00	0.00	46.27	H	1.00	0.0	- 27.50	73.77	0.009
0.6140	35.17	Pk	0.10	10.47	0.00	0.00	45.74	H	1.00	0.0	- 26.09	71.83	0.009
0.7368	33.80	Pk	0.10	10.37	0.00	0.00	44.27	H	1.00	0.0	- 25.96	70.23	0.009
0.8596	32.66	Pk	0.10	10.56	0.00	0.00	43.32	H	1.00	0.0	- 25.57	68.89	0.009
0.9824	30.63	Pk	0.10	10.60	0.00	0.00	41.33	H	1.00	0.0	- 26.39	67.72	0.009
1.1052	30.26	Pk	0.10	10.59	0.00	0.00	40.95	H	1.00	0.0	- 25.74	66.69	0.009
1.2280	29.07	Pk	0.10	10.58	0.00	0.00	39.75	H	1.00	0.0	- 26.02	65.77	0.009

Example calculation:

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

8.9 Test Data: Tx 13.56MHz (POE) – FCC

Tx Intentional Radiated Electromagnetic Emissions

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: <u>22.1</u> °C
Test Method: FCC 15.225(a)(d)/ 15.209	Test Date: <u>07/05/2012</u> <u>07/06/2012</u>	Relative Humidity: <u>32.9</u> %
EUT Model #: RC-03-MCT-K	EUT Power: POE	Air Pressure: <u>83.4</u> kPa
EUT Serial #: FCC2		

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi- Frequency Option
Tx = 122.8 kHz & 13.56 MHz (Inductive Loop Antenna)

Notes: Product Tested in the following configuration: POE

Product continuously operating/active during all testing – normal operation

Limits below 30 MHz were extrapolated using FCC 15.31(f)(2) and RSS-GEN section 4.11. No duty-cycle correction for pulsed-signals was utilized.

Level Key

Pk – Peak

Qp – Quasi Peak

Av - Average

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.225(a)(d) 15.209	FCC 15.225(a)(d) 15.209	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 1													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	55.01	Pk	0.30	10.14	0.00	0.00	65.45	V	1.00	222.0	- 58.55	124.00	0.009
Harmonics measurements - Vertical													
27.1200	27.96	Pk	0.40	9.05	0.00	0.00	37.41	V	1.00	80.0	- 32.13	69.54	0.009
40.6800	45.61	Pk	0.77	13.09	28.20	0.00	31.27	V	1.16	255.2	- 8.73	40.00	0.120
54.2400	42.89	Pk	0.77	7.18	28.18	0.00	22.66	V	1.21	146.6	- 17.34	40.00	0.120
67.8000	47.01	Pk	0.77	8.00	28.11	0.00	27.67	V	1.11	93.7	- 12.33	40.00	0.120
81.3600	42.58	Pk	0.77	7.76	28.05	0.00	23.06	V	1.27	345.4	- 16.94	40.00	0.120
94.9200	50.97	Pk	0.77	8.98	27.98	0.00	32.74	V	1.07	159.5	- 10.78	43.52	0.120
108.4800	40.21	Pk	0.77	12.20	27.92	0.00	25.26	V	1.24	126.9	- 18.26	43.52	0.120
122.0400	44.78	Pk	0.77	13.40	27.85	0.00	31.10	V	1.03	144.4	- 12.42	43.52	0.120
135.6000	40.88	Pk	0.79	12.80	27.79	0.00	26.68	V	1.00	190.4	- 16.84	43.52	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	55.43	Pk	0.30	10.14	0.00	0.00	65.87	H	1.00	170.0	- 58.13	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	28.48	Pk	0.40	9.05	0.00	0.00	37.93	H	1.00	191.0	- 31.61	69.54	0.009
40.6800	45.21	Pk	0.77	13.09	28.20	0.00	30.87	H	2.23	175.4	- 9.13	40.00	0.120
54.2400	39.84	Pk	0.77	7.18	28.18	0.00	19.61	H	2.09	10.1	- 20.39	40.00	0.120
67.8000	48.54	Pk	0.77	8.00	28.11	0.00	29.20	H	3.17	18.5	- 10.80	40.00	0.120
81.3600	46.83	Pk	0.77	7.76	28.05	0.00	27.31	H	2.05	222.3	- 12.69	40.00	0.120
94.9200	47.55	Pk	0.77	8.98	27.98	0.00	29.32	H	1.69	85.5	- 14.20	43.52	0.120
108.4800	46.83	Pk	0.77	12.20	27.92	0.00	31.88	H	2.11	90.3	- 11.64	43.52	0.120
122.0400	45.81	Pk	0.77	13.40	27.85	0.00	32.13	H	2.44	115.5	- 11.39	43.52	0.120
135.6000	47.21	Pk	0.79	12.80	27.79	0.00	33.01	H	2.74	278.3	- 10.51	43.52	0.120

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.225(a)(d) 15.209	FCC 15.225(a)(d) 15.209	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 2													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	52.15	Pk	0.30	10.14	0.00	0.00	62.59	V	1.00	255.0	- 61.41	124.00	0.009
Harmonics measurements - Vertical													
27.1200	27.81	Pk	0.40	9.05	0.00	0.00	37.26	V	1.00	187.0	- 32.28	69.54	0.009
40.6800	46.78	Pk	0.77	13.09	28.20	0.00	32.44	V	1.00	207.1	- 7.56	40.00	0.120
54.2400	42.52	Pk	0.77	7.18	28.18	0.00	22.29	V	1.34	57.8	- 17.71	40.00	0.120
67.8000	46.01	Pk	0.77	8.00	28.11	0.00	26.67	V	1.17	71.9	- 13.33	40.00	0.120
81.3600	42.35	Pk	0.77	7.76	28.05	0.00	22.83	V	1.27	165.5	- 17.17	40.00	0.120
94.9200	50.21	Pk	0.77	8.98	27.98	0.00	31.98	V	1.22	291.3	- 11.54	43.52	0.120
108.4800	40.42	Pk	0.77	12.20	27.92	0.00	25.47	V	1.26	119.7	- 18.05	43.52	0.120
122.0400	46.64	Pk	0.77	13.40	27.85	0.00	32.96	V	1.00	144.1	- 10.56	43.52	0.120
135.6000	40.93	Pk	0.79	12.80	27.79	0.00	26.73	V	1.13	157.0	- 16.79	43.52	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	54.37	Pk	0.30	10.14	0.00	0.00	64.81	H	1.00	180.0	- 59.19	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	28.03	Pk	0.40	9.05	0.00	0.00	37.48	H	1.00	129.0	- 32.06	69.54	0.009
40.6800	40.95	Pk	0.77	13.09	28.20	0.00	26.61	H	2.46	140.8	- 13.39	40.00	0.120
54.2400	39.14	Pk	0.77	7.18	28.18	0.00	18.91	H	1.57	117.2	- 21.09	40.00	0.120
67.8000	48.63	Pk	0.77	8.00	28.11	0.00	29.29	H	3.25	139.2	- 10.71	40.00	0.120
81.3600	43.57	Pk	0.77	7.76	28.05	0.00	24.05	H	2.23	32.8	- 15.95	40.00	0.120
94.9200	49.51	Pk	0.77	8.98	27.98	0.00	31.28	H	2.06	230.1	- 12.24	43.52	0.120
108.4800	47.11	Pk	0.77	12.20	27.92	0.00	32.16	H	2.49	70.8	- 11.36	43.52	0.120
122.0400	45.96	Pk	0.77	13.40	27.85	0.00	32.28	H	2.63	102.7	- 11.24	43.52	0.120
135.6000	50.73	Pk	0.79	12.80	27.79	0.00	36.53	H	3.03	259.8	- 6.99	43.52	0.120

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.225(a)(d) FCC 15.209	FCC 15.225(a)(d) FCC 15.209	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 3													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	47.32	Pk	0.30	10.14	0.00	0.00	57.76	V	1.00	247.1	- 66.24	124.00	0.009
Harmonics measurements - Vertical													
27.1200	14.90	Pk	0.40	9.05	0.00	0.00	24.35	V	1.00	359.9	- 45.19	69.54	0.009
40.6800	45.61	Pk	0.77	13.09	28.20	0.00	31.27	V	1.16	255.2	- 8.73	40.00	0.120
54.2400	42.89	Pk	0.77	7.18	28.18	0.00	22.66	V	1.21	146.6	- 17.34	40.00	0.120
67.8000	47.01	Pk	0.77	8.00	28.11	0.00	27.67	V	1.11	93.7	- 12.33	40.00	0.120
81.3600	42.58	Pk	0.77	7.76	28.05	0.00	23.06	V	1.27	345.4	- 16.94	40.00	0.120
94.9200	50.97	Pk	0.77	8.98	27.98	0.00	32.74	V	1.07	159.5	- 10.78	43.52	0.120
108.4800	40.21	Pk	0.77	12.20	27.92	0.00	25.26	V	1.24	126.9	- 18.26	43.52	0.120
122.0400	44.78	Pk	0.77	13.40	27.85	0.00	31.10	V	1.03	144.4	- 12.42	43.52	0.120
135.6000	40.88	Pk	0.79	12.80	27.79	0.00	26.68	V	1.00	190.4	- 16.84	43.52	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	43.43	Pk	0.30	10.14	0.00	0.00	53.87	H	1.00	176.2	- 70.13	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	11.62	Pk	0.40	9.05	0.00	0.00	21.07	H	1.00	176.2	- 48.47	69.54	0.009
40.6800	45.21	Pk	0.77	13.09	28.20	0.00	30.87	H	2.23	175.4	- 9.13	40.00	0.120
54.2400	39.84	Pk	0.77	7.18	28.18	0.00	19.61	H	2.09	10.1	- 20.39	40.00	0.120
67.8000	48.54	Pk	0.77	8.00	28.11	0.00	29.20	H	3.17	18.5	- 10.80	40.00	0.120
81.3600	46.83	Pk	0.77	7.76	28.05	0.00	27.31	H	2.05	222.3	- 12.69	40.00	0.120
94.9200	47.55	Pk	0.77	8.98	27.98	0.00	29.32	H	1.69	85.5	- 14.20	43.52	0.120
108.4800	46.83	Pk	0.77	12.20	27.92	0.00	31.88	H	2.11	90.3	- 11.64	43.52	0.120
122.0400	45.81	Pk	0.77	13.40	27.85	0.00	32.13	H	2.44	115.5	- 11.39	43.52	0.120
135.6000	47.21	Pk	0.79	12.80	27.79	0.00	33.01	H	2.74	278.3	- 10.51	43.52	0.120

Example calculation:

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

8.10 Test Data: Tx 13.56MHz (POE) – IC

Tx Intentional Radiated Electromagnetic Emissions

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: 22.1 °C
Test Method: IC RSS-210 (A2.6)	Test Date: 07/05/2012 07/06/2012	Relative Humidity: 32.9 %
EUT Model #: RC-03-MCT-K	EUT Power: POE	Air Pressure: 83.4 kPa
EUT Serial #: FCC2		

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi- Frequency Option
Tx = 122.8 kHz & 13.56 MHz (Inductive Loop Antenna)

Notes: Product Tested in the following configuration: POE

Product continuously operating/active during all testing – normal operation

Limits below 30 MHz were extrapolated using FCC 15.31(f)(2) and RSS-GEN section 4.11. No duty-cycle correction for pulsed-signals was utilized.

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

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	IC RSS-210 A2.6	IC RSS-210 A2.6	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 1													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	55.01	Pk	0.30	10.14	0.00	0.00	65.45	V	1.00	222.0	- 58.55	124.00	0.009
Harmonics measurements - Vertical													
27.1200	27.96	Pk	0.40	9.05	0.00	0.00	37.41	V	1.00	80.0	- 32.09	69.50	0.009
40.6800	45.61	Pk	0.77	13.09	28.20	0.00	31.27	V	1.16	255.2	- 18.23	49.50	0.120
54.2400	42.89	Pk	0.77	7.18	28.18	0.00	22.66	V	1.21	146.6	- 26.84	49.50	0.120
67.8000	47.01	Pk	0.77	8.00	28.11	0.00	27.67	V	1.11	93.7	- 21.83	49.50	0.120
81.3600	42.58	Pk	0.77	7.76	28.05	0.00	23.06	V	1.27	345.4	- 26.44	49.50	0.120
94.9200	50.97	Pk	0.77	8.98	27.98	0.00	32.74	V	1.07	159.5	- 16.76	49.50	0.120
108.4800	40.21	Pk	0.77	12.20	27.92	0.00	25.26	V	1.24	126.9	- 24.24	49.50	0.120
122.0400	44.78	Pk	0.77	13.40	27.85	0.00	31.10	V	1.03	144.4	- 18.40	49.50	0.120
135.6000	40.88	Pk	0.79	12.80	27.79	0.00	26.68	V	1.00	190.4	- 22.82	49.50	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	55.43	Pk	0.30	10.14	0.00	0.00	65.87	H	1.00	170.0	- 58.13	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	28.48	Pk	0.40	9.05	0.00	0.00	37.93	H	1.00	191.0	- 31.57	69.50	0.009
40.6800	45.21	Pk	0.77	13.09	28.20	0.00	30.87	H	2.23	175.4	- 18.63	49.50	0.120
54.2400	39.84	Pk	0.77	7.18	28.18	0.00	19.61	H	2.09	10.1	- 29.89	49.50	0.120
67.8000	48.54	Pk	0.77	8.00	28.11	0.00	29.20	H	3.17	18.5	- 20.30	49.50	0.120
81.3600	46.83	Pk	0.77	7.76	28.05	0.00	27.31	H	2.05	222.3	- 22.19	49.50	0.120
94.9200	47.55	Pk	0.77	8.98	27.98	0.00	29.32	H	1.69	85.5	- 20.18	49.50	0.120
108.4800	46.83	Pk	0.77	12.20	27.92	0.00	31.88	H	2.11	90.3	- 17.62	49.50	0.120
122.0400	45.81	Pk	0.77	13.40	27.85	0.00	32.13	H	2.44	115.5	- 17.37	49.50	0.120

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

135.6000	47.21	Pk	0.79	12.80	27.79	0.00	33.01	H	2.74	278.3	- 16.49	49.50	0.120
----------	-------	----	------	-------	-------	------	-------	---	------	-------	---------	-------	-------

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	IC RSS-210 A2.6	IC RSS-210 A2.6	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 2													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	52.15	Pk	0.30	10.14	0.00	0.00	62.59	V	1.00	255.0	- 61.41	124.00	0.009
Harmonics measurements - Vertical													
27.1200	27.81	Pk	0.40	9.05	0.00	0.00	37.26	V	1.00	187.0	- 32.24	69.50	0.009
40.6800	46.78	Pk	0.77	13.09	28.20	0.00	32.44	V	1.00	207.1	- 17.06	49.50	0.120
54.2400	42.52	Pk	0.77	7.18	28.18	0.00	22.29	V	1.34	57.8	- 27.21	49.50	0.120
67.8000	46.01	Pk	0.77	8.00	28.11	0.00	26.67	V	1.17	71.9	- 22.83	49.50	0.120
81.3600	42.35	Pk	0.77	7.76	28.05	0.00	22.83	V	1.27	165.5	- 26.67	49.50	0.120
94.9200	50.21	Pk	0.77	8.98	27.98	0.00	31.98	V	1.22	291.3	- 17.52	49.50	0.120
108.4800	40.42	Pk	0.77	12.20	27.92	0.00	25.47	V	1.26	119.7	- 24.03	49.50	0.120
122.0400	46.64	Pk	0.77	13.40	27.85	0.00	32.96	V	1.00	144.1	- 16.54	49.50	0.120
135.6000	40.93	Pk	0.79	12.80	27.79	0.00	26.73	V	1.13	157.0	- 22.77	49.50	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	54.37	Pk	0.30	10.14	0.00	0.00	64.81	H	1.00	180.0	- 59.19	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	28.03	Pk	0.40	9.05	0.00	0.00	37.48	H	1.00	129.0	- 32.02	69.50	0.009
40.6800	40.95	Pk	0.77	13.09	28.20	0.00	26.61	H	2.46	140.8	- 22.89	49.50	0.120
54.2400	39.14	Pk	0.77	7.18	28.18	0.00	18.91	H	1.57	117.2	- 30.59	49.50	0.120
67.8000	48.63	Pk	0.77	8.00	28.11	0.00	29.29	H	3.25	139.2	- 20.21	49.50	0.120
81.3600	43.57	Pk	0.77	7.76	28.05	0.00	24.05	H	2.23	32.8	- 25.45	49.50	0.120
94.9200	49.51	Pk	0.77	8.98	27.98	0.00	31.28	H	2.06	230.1	- 18.22	49.50	0.120
108.4800	47.11	Pk	0.77	12.20	27.92	0.00	32.16	H	2.49	70.8	- 17.34	49.50	0.120
122.0400	45.96	Pk	0.77	13.40	27.85	0.00	32.28	H	2.63	102.7	- 17.22	49.50	0.120
135.6000	50.73	Pk	0.79	12.80	27.79	0.00	36.53	H	3.03	259.8	- 12.97	49.50	0.120

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	IC RSS-210 A2.6	IC RSS-210 A2.6	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 3													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	47.32	Pk	0.30	10.14	0.00	0.00	57.76	V	1.00	247.1	- 66.24	124.00	0.009
Harmonics measurements - Vertical													
27.1200	14.90	Pk	0.40	9.05	0.00	0.00	24.35	V	1.00	359.9	- 45.15	69.50	0.009
40.6800	45.61	Pk	0.77	13.09	28.20	0.00	31.27	V	1.16	255.2	- 18.23	49.50	0.120
54.2400	42.89	Pk	0.77	7.18	28.18	0.00	22.66	V	1.21	146.6	- 26.84	49.50	0.120
67.8000	47.01	Pk	0.77	8.00	28.11	0.00	27.67	V	1.11	93.7	- 21.83	49.50	0.120
81.3600	42.58	Pk	0.77	7.76	28.05	0.00	23.06	V	1.27	345.4	- 26.44	49.50	0.120
94.9200	50.97	Pk	0.77	8.98	27.98	0.00	32.74	V	1.07	159.5	- 16.76	49.50	0.120
108.4800	40.21	Pk	0.77	12.20	27.92	0.00	25.26	V	1.24	126.9	- 24.24	49.50	0.120
122.0400	44.78	Pk	0.77	13.40	27.85	0.00	31.10	V	1.03	144.4	- 18.40	49.50	0.120
135.6000	40.88	Pk	0.79	12.80	27.79	0.00	26.68	V	1.00	190.4	- 22.82	49.50	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	43.43	Pk	0.30	10.14	0.00	0.00	53.87	H	1.00	176.2	- 70.13	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	11.62	Pk	0.40	9.05	0.00	0.00	21.07	H	1.00	176.2	- 48.43	69.50	0.009
40.6800	45.21	Pk	0.77	13.09	28.20	0.00	30.87	H	2.23	175.4	- 18.63	49.50	0.120
54.2400	39.84	Pk	0.77	7.18	28.18	0.00	19.61	H	2.09	10.1	- 29.89	49.50	0.120
67.8000	48.54	Pk	0.77	8.00	28.11	0.00	29.20	H	3.17	18.5	- 20.30	49.50	0.120
81.3600	46.83	Pk	0.77	7.76	28.05	0.00	27.31	H	2.05	222.3	- 22.19	49.50	0.120
94.9200	47.55	Pk	0.77	8.98	27.98	0.00	29.32	H	1.69	85.5	- 20.18	49.50	0.120
108.4800	46.83	Pk	0.77	12.20	27.92	0.00	31.88	H	2.11	90.3	- 17.62	49.50	0.120
122.0400	45.81	Pk	0.77	13.40	27.85	0.00	32.13	H	2.44	115.5	- 17.37	49.50	0.120
135.6000	47.21	Pk	0.79	12.80	27.79	0.00	33.01	H	2.74	278.3	- 16.49	49.50	0.120

Example calculation:

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

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

8.11 Test Data: Tx 13.56MHz (VDC) – FCC

Tx Intentional Radiated Electromagnetic Emissions

Test Report #: G100781715	Test Area: CC1 Radiated	Temperature: 22.1 °C
Test Method: FCC 15.225(a)(d)/ FCC 15.209	Test Date: 07/05/2012 07/06/2012	Relative Humidity: 32.9 %
EUT Model #: RC-03-MCT-K	EUT Power: 12 VDC	Air Pressure: 83.4 kPa
EUT Serial #: FCC2		

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi- Frequency Option
Tx = 122.8 kHz & 13.56 MHz (Inductive Loop Antenna)

Notes: Product Tested in the following configuration: VDC

Product continuously operating/active during all testing – normal operation

Limits below 30 MHz were extrapolated using FCC 15.31(f)(2) and RSS-GEN section 4.11. No duty-cycle correction for pulsed-signals was utilized.

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

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.225(a) 15.209	FCC 15.225(a) 15.209	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 1													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	55.49	Pk	0.30	10.14	0.00	0.00	65.93	V	1.00	248.0	- 58.07	124.00	0.009
Harmonics measurements - Vertical													
27.1200	28.24	Pk	0.40	9.05	0.00	0.00	37.69	V	1.00	222.0	- 31.85	69.54	0.009
40.6800	45.30	Pk	0.77	13.09	28.20	0.00	30.96	V	1.16	255.2	- 9.04	40.00	0.120
54.2400	42.22	Pk	0.77	7.18	28.18	0.00	21.98	V	1.21	146.6	- 18.02	40.00	0.120
67.8000	46.79	Pk	0.77	8.00	28.11	0.00	27.44	V	1.11	93.7	- 12.56	40.00	0.120
81.3600	42.29	Pk	0.77	7.76	28.05	0.00	22.77	V	1.27	345.4	- 17.23	40.00	0.120
94.9200	50.33	Pk	0.77	8.98	27.98	0.00	32.10	V	1.07	159.5	- 11.42	43.52	0.120
108.4800	39.17	Pk	0.77	12.20	27.92	0.00	24.22	V	1.24	126.9	- 19.30	43.52	0.120
122.0400	44.42	Pk	0.77	13.40	27.85	0.00	30.73	V	1.03	144.4	- 12.79	43.52	0.120
135.6000	40.29	Pk	0.79	12.80	27.79	0.00	26.09	V	1.00	190.4	- 17.43	43.52	0.120
Loop antenna parallel to EUT													
Fundamental Measurement - Horizontal													
13.5600	55.01	Pk	0.30	10.14	0.00	0.00	65.45	H	1.00	189.0	- 58.55	124.00	0.009
Harmonics measurements													
27.1200	27.82	Pk	0.40	9.05	0.00	0.00	37.27	H	1.00	136.0	- 32.27	69.54	0.009
40.6800	44.47	Pk	0.77	13.09	28.20	0.00	30.13	H	2.23	175.4	- 9.87	40.00	0.120
54.2400	39.00	Pk	0.77	7.18	28.18	0.00	18.76	H	2.09	10.1	- 21.24	40.00	0.120
67.8000	48.88	Pk	0.77	8.00	28.11	0.00	29.53	H	3.17	18.5	- 10.47	40.00	0.120
81.3600	46.11	Pk	0.77	7.76	28.05	0.00	26.59	H	2.05	222.3	- 13.41	40.00	0.120
94.9200	47.47	Pk	0.77	8.98	27.98	0.00	29.24	H	1.69	85.5	- 14.28	43.52	0.120
108.4800	46.24	Pk	0.77	12.20	27.92	0.00	31.29	H	2.11	90.3	- 12.23	43.52	0.120
122.0400	45.05	Pk	0.77	13.40	27.85	0.00	31.36	H	2.44	115.5	- 12.16	43.52	0.120

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

135.6000	46.88	Pk	0.79	12.80	27.79	0.00	32.68	H	2.74	278.3	- 10.84	43.52	0.120
----------	-------	----	------	-------	-------	------	-------	---	------	-------	---------	-------	-------

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.225(a) 15.209	FCC 15.225(a) 15.209	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 2													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	55.61	Pk	0.30	10.14	0.00	0.00	66.05	V	1.00	237.0	- 57.95	124.00	0.009
Harmonics measurements - Vertical													
27.1200	28.43	Pk	0.40	9.05	0.00	0.00	37.88	V	1.00	274.0	- 31.66	69.54	0.009
40.6800	46.67	Pk	0.77	13.09	28.20	0.00	32.33	V	1.00	207.1	- 7.67	40.00	0.120
54.2400	42.74	Pk	0.77	7.18	28.18	0.00	22.50	V	1.34	57.8	- 17.50	40.00	0.120
67.8000	45.87	Pk	0.77	8.00	28.11	0.00	26.52	V	1.17	71.9	- 13.48	40.00	0.120
81.3600	42.18	Pk	0.77	7.76	28.05	0.00	22.66	V	1.27	165.5	- 17.34	40.00	0.120
94.9200	50.05	Pk	0.77	8.98	27.98	0.00	31.82	V	1.22	291.3	- 11.70	43.52	0.120
108.4800	40.42	Pk	0.77	12.20	27.92	0.00	25.47	V	1.26	119.7	- 18.05	43.52	0.120
122.0400	46.64	Pk	0.77	13.40	27.85	0.00	32.95	V	1.00	144.1	- 10.57	43.52	0.120
135.6000	40.33	Pk	0.79	12.80	27.79	0.00	26.13	V	1.13	157.0	- 17.39	43.52	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	54.83	Pk	0.30	10.14	0.00	0.00	65.27	H	1.00	176.0	- 58.73	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	29.12	Pk	0.40	9.05	0.00	0.00	38.57	H	1.00	58.0	- 30.97	69.54	0.009
40.6800	40.26	Pk	0.77	13.09	28.20	0.00	25.92	H	2.46	140.8	- 14.08	40.00	0.120
54.2400	38.90	Pk	0.77	7.18	28.18	0.00	18.66	H	1.57	117.2	- 21.34	40.00	0.120
67.8000	48.50	Pk	0.77	8.00	28.11	0.00	29.15	H	3.25	139.2	- 10.85	40.00	0.120
81.3600	43.29	Pk	0.77	7.76	28.05	0.00	23.77	H	2.23	32.8	- 16.23	40.00	0.120
94.9200	48.92	Pk	0.77	8.98	27.98	0.00	30.69	H	2.06	230.1	- 12.83	43.52	0.120
108.4800	46.71	Pk	0.77	12.20	27.92	0.00	31.76	H	2.49	70.8	- 11.76	43.52	0.120
122.0400	45.51	Pk	0.77	13.40	27.85	0.00	31.82	H	2.63	102.7	- 11.70	43.52	0.120
135.6000	50.14	Pk	0.79	12.80	27.79	0.00	35.94	H	3.03	259.8	- 7.58	43.52	0.120

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	FCC 15.225(a) 15.209	FCC 15.225(a) 15.209	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 3													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	47.45	Pk	0.30	10.14	0.00	0.00	57.89	V	1.00	210.3	- 66.11	124.00	0.009
Harmonics measurements - Vertical													
27.1200	13.10	Pk	0.40	9.05	0.00	0.00	22.55	V	1.14	73.3	- 46.99	69.54	0.009
40.6800	47.93	Pk	0.77	13.42	28.20	0.00	33.92	V	1.00	261.0	- 6.08	40.00	0.120
54.2400	48.48	Pk	0.77	7.75	28.18	0.00	28.82	V	1.13	33.0	- 11.18	40.00	0.120
67.8000	45.21	Pk	0.77	8.20	28.11	0.00	26.06	V	1.06	102.0	- 13.94	40.00	0.120
81.3600	45.62	Pk	0.77	7.80	28.05	0.00	26.14	V	1.04	134.0	- 13.86	40.00	0.120
94.9200	38.01	Pk	0.77	9.18	27.98	0.00	19.98	V	1.16	116.0	- 23.54	43.52	0.120
108.4800	34.39	Pk	0.77	12.50	27.92	0.00	19.73	V	1.00	108.0	- 23.79	43.52	0.120
122.0400	42.66	Pk	0.77	13.50	27.85	0.00	29.07	V	1.01	147.0	- 14.45	43.52	0.120
135.6000	35.15	Pk	0.79	12.86	27.79	0.00	21.01	V	1.04	315.0	- 22.51	43.52	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	41.55	Pk	0.30	10.14	0.00	0.00	51.99	H	1.00	172.0	- 72.01	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	12.38	Pk	0.40	9.05	0.00	0.00	21.83	H	1.52	328.8	- 47.71	69.54	0.009
40.6800	38.59	Pk	0.77	13.42	28.20	0.00	24.58	H	2.42	283.0	- 15.42	40.00	0.120
54.2400	35.32	Pk	0.77	7.75	28.18	0.00	15.66	H	2.42	254.0	- 24.34	40.00	0.120
67.8000	38.33	Pk	0.77	8.20	28.11	0.00	19.18	H	2.36	331.0	- 20.82	40.00	0.120
81.3600	41.60	Pk	0.77	7.80	28.05	0.00	22.12	H	1.85	182.0	- 17.88	40.00	0.120
94.9200	38.57	Pk	0.77	9.18	27.98	0.00	20.54	H	2.01	322.0	- 22.98	43.52	0.120
108.4800	36.74	Pk	0.77	12.50	27.92	0.00	22.08	H	2.50	123.0	- 21.44	43.52	0.120
122.0400	40.81	Pk	0.77	13.50	27.85	0.00	27.22	H	2.39	140.0	- 16.30	43.52	0.120
135.6000	31.85	Pk	0.79	12.86	27.79	0.00	17.71	H	1.81	294.0	- 25.81	43.52	0.120

Example calculation:

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

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

8.12 Test Data: Tx 13.56MHz (VDC) – IC

Tx Intentional Radiated Electromagnetic Emissions

Test Report #:	G100781715	Test Area:	CC1 Radiated	Temperature:	22.1 °C
Test Method:	IC RSS-210 (A2.6)	Test Date:	07/05/2012 07/06/2012	Relative Humidity:	32.9 %
EUT Model #:	RC-03-MCT-K	EUT Power:	12 VDC	Air Pressure:	83.4 kPa
EUT Serial #:	FCC2				

Manufacturer: ISONAS Security Systems

EUT Description: Network-Enabled RFID Reader/Controller – Multi- Frequency Option
Tx = 122.8 kHz & 13.56 MHz (Inductive Loop Antenna)

Notes: Product Tested in the following configuration: VDC

Product continuously operating/active during all testing – normal operation

Limits below 30 MHz were extrapolated using FCC 15.31(f)(2) and RSS-GEN section 4.11. No duty-cycle correction for pulsed-signals was utilized.

Level Key

Pk – Peak

Qp – Quasi Peak

Av - Average

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	RSS-210 A2.6	RSS-210 A2.6	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 1													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	55.49	Pk	0.30	10.14	0.00	0.00	65.93	V	1.00	248.0	- 58.07	124.00	0.009
Harmonics measurements - Vertical													
27.1200	28.24	Pk	0.40	9.05	0.00	0.00	37.69	V	1.00	222.0	- 31.81	69.50	0.009
40.6800	45.30	Pk	0.77	13.09	28.20	0.00	30.96	V	1.16	255.2	- 18.54	49.50	0.120
54.2400	42.22	Pk	0.77	7.18	28.18	0.00	21.98	V	1.21	146.6	- 27.52	49.50	0.120
67.8000	46.79	Pk	0.77	8.00	28.11	0.00	27.44	V	1.11	93.7	- 22.06	49.50	0.120
81.3600	42.29	Pk	0.77	7.76	28.05	0.00	22.77	V	1.27	345.4	- 26.73	49.50	0.120
0.5000	50.33	Pk	0.77	8.98	27.98	0.00	32.10	V	1.07	159.5	- 17.40	49.50	0.120
108.4800	39.17	Pk	0.77	12.20	27.92	0.00	24.22	V	1.24	126.9	- 25.28	49.50	0.120
122.0400	44.42	Pk	0.77	13.40	27.85	0.00	30.73	V	1.03	144.4	- 18.77	49.50	0.120
135.6000	40.29	Pk	0.79	12.80	27.79	0.00	26.09	V	1.00	190.4	- 23.41	49.50	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	55.01	Pk	0.30	10.14	0.00	0.00	65.45	H	1.00	189.0	- 58.55	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	27.82	Pk	0.40	9.05	0.00	0.00	37.27	H	1.00	136.0	- 32.23	69.50	0.009
40.6800	44.47	Pk	0.77	13.09	28.20	0.00	30.13	H	2.23	175.4	- 19.37	49.50	0.120
54.2400	39.00	Pk	0.77	7.18	28.18	0.00	18.76	H	2.09	10.1	- 30.74	49.50	0.120
67.8000	48.88	Pk	0.77	8.00	28.11	0.00	29.53	H	3.17	18.5	- 19.97	49.50	0.120
81.3600	46.11	Pk	0.77	7.76	28.05	0.00	26.59	H	2.05	222.3	- 22.91	49.50	0.120
94.9200	47.47	Pk	0.77	8.98	27.98	0.00	29.24	H	1.69	85.5	- 20.26	49.50	0.120
108.4800	46.24	Pk	0.77	12.20	27.92	0.00	31.29	H	2.11	90.3	- 18.21	49.50	0.120
122.0400	45.05	Pk	0.77	13.40	27.85	0.00	31.36	H	2.44	115.5	- 18.14	49.50	0.120

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

135.6000	46.88	Pk	0.79	12.80	27.79	0.00	32.68	H	2.74	278.3	- 16.82	49.50	0.120
----------	-------	----	------	-------	-------	------	-------	---	------	-------	---------	-------	-------

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	RSS-210 A2.6	RSS-210 A2.6	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 2													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	55.61	Pk	0.30	10.14	0.00	0.00	66.05	V	1.00	237.0	- 57.95	124.00	0.009
Harmonics measurements - Vertical													
27.1200	28.43	Pk	0.40	9.05	0.00	0.00	37.88	V	1.00	274.0	- 31.62	69.50	0.009
40.6800	46.67	Pk	0.77	13.09	28.20	0.00	32.33	V	1.00	207.1	- 17.17	49.50	0.120
54.2400	42.74	Pk	0.77	7.18	28.18	0.00	22.50	V	1.34	57.8	- 27.00	49.50	0.120
67.8000	45.87	Pk	0.77	8.00	28.11	0.00	26.52	V	1.17	71.9	- 22.98	49.50	0.120
81.3600	42.18	Pk	0.77	7.76	28.05	0.00	22.66	V	1.27	165.5	- 26.84	49.50	0.120
94.9200	50.05	Pk	0.77	8.98	27.98	0.00	31.82	V	1.22	291.3	- 17.68	49.50	0.120
108.4800	40.42	Pk	0.77	12.20	27.92	0.00	25.47	V	1.26	119.7	- 24.03	49.50	0.120
122.0400	46.64	Pk	0.77	13.40	27.85	0.00	32.95	V	1.00	144.1	- 16.55	49.50	0.120
135.6000	40.33	Pk	0.79	12.80	27.79	0.00	26.13	V	1.13	157.0	- 23.37	49.50	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	54.83	Pk	0.30	10.14	0.00	0.00	65.27	H	1.00	176.0	- 58.73	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	29.12	Pk	0.40	9.05	0.00	0.00	38.57	H	1.00	58.0	- 30.93	69.50	0.009
40.6800	40.26	Pk	0.77	13.09	28.20	0.00	25.92	H	2.46	140.8	- 23.58	49.50	0.120
54.2400	38.90	Pk	0.77	7.18	28.18	0.00	18.66	H	1.57	117.2	- 30.84	49.50	0.120
67.8000	48.50	Pk	0.77	8.00	28.11	0.00	29.15	H	3.25	139.2	- 20.35	49.50	0.120
81.3600	43.29	Pk	0.77	7.76	28.05	0.00	23.77	H	2.23	32.8	- 25.73	49.50	0.120
94.9200	48.92	Pk	0.77	8.98	27.98	0.00	30.69	H	2.06	230.1	- 18.81	49.50	0.120
108.4800	46.71	Pk	0.77	12.20	27.92	0.00	31.76	H	2.49	70.8	- 17.74	49.50	0.120
122.0400	45.51	Pk	0.77	13.40	27.85	0.00	31.82	H	2.63	102.7	- 17.68	49.50	0.120
135.6000	50.14	Pk	0.79	12.80	27.79	0.00	35.94	H	3.03	259.8	- 13.56	49.50	0.120

Freq	Level	Det	Cable	Ant	Preamp	Atten	Final	Pol	Hgt	Az	Delta1	LIMIT	RBW
MHz	dBuV	Qp Av Pk	+ [dB]	+ [dB/m]	- [dB]	+ [dB]	= [dBuV]	(V/H)	(m)	(DEG)	RSS-210 A2.6	RSS-210 A2.6	(MHz)
Tx 13.56 MHz Fundamental & Harmonics Measurements – Axis 3													
Loop antenna perpendicular to EUT													
Fundamental Measurement													
13.5600	47.45	Pk	0.30	10.14	0.00	0.00	57.89	V	1.00	210.3	- 66.11	124.00	0.009
Harmonics measurements - Vertical													
27.1200	13.10	Pk	0.40	9.05	0.00	0.00	22.55	V	1.14	73.3	- 46.95	69.50	0.009
40.6800	47.93	Pk	0.77	13.42	28.20	0.00	33.92	V	1.00	261.0	- 15.58	49.50	0.120
54.2400	48.48	Pk	0.77	7.75	28.18	0.00	28.82	V	1.13	33.0	- 20.68	49.50	0.120
67.8000	45.21	Pk	0.77	8.20	28.11	0.00	26.06	V	1.06	102.0	- 23.44	49.50	0.120
81.3600	45.62	Pk	0.77	7.80	28.05	0.00	26.14	V	1.04	134.0	- 23.36	49.50	0.120
94.9200	38.01	Pk	0.77	9.18	27.98	0.00	19.98	V	1.16	116.0	- 29.52	49.50	0.120
108.4800	34.39	Pk	0.77	12.50	27.92	0.00	19.73	V	1.00	108.0	- 29.77	49.50	0.120
122.0400	42.66	Pk	0.77	13.50	27.85	0.00	29.07	V	1.01	147.0	- 20.43	49.50	0.120
135.6000	35.15	Pk	0.79	12.86	27.79	0.00	21.01	V	1.04	315.0	- 28.49	49.50	0.120
Loop antenna parallel to EUT													
Fundamental Measurement													
13.5600	41.55	Pk	0.30	10.14	0.00	0.00	51.99	H	1.00	172.0	- 72.01	124.00	0.009
Harmonics measurements - Horizontal													
27.1200	12.38	Pk	0.40	9.05	0.00	0.00	21.83	H	1.52	328.8	- 47.67	69.50	0.009
40.6800	38.59	Pk	0.77	13.42	28.20	0.00	24.58	H	2.42	283.0	- 24.92	49.50	0.120
54.2400	35.32	Pk	0.77	7.75	28.18	0.00	15.66	H	2.42	254.0	- 33.84	49.50	0.120
67.8000	38.33	Pk	0.77	8.20	28.11	0.00	19.18	H	2.36	331.0	- 30.32	49.50	0.120
81.3600	41.60	Pk	0.77	7.80	28.05	0.00	22.12	H	1.85	182.0	- 27.38	49.50	0.120
94.9200	38.57	Pk	0.77	9.18	27.98	0.00	20.54	H	2.01	322.0	- 28.96	49.50	0.120
108.4800	36.74	Pk	0.77	12.50	27.92	0.00	22.08	H	2.50	123.0	- 27.42	49.50	0.120
122.0400	40.81	Pk	0.77	13.50	27.85	0.00	27.22	H	2.39	140.0	- 22.28	49.50	0.120
135.6000	31.85	Pk	0.79	12.86	27.79	0.00	17.71	H	1.81	294.0	- 31.79	49.50	0.120

Example calculation:

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

Notes:

- 1) The product is typically mounted in (1) orientation. However, all axes were tested.
- 2) The product was tested in the following product options: Power Over Ethernet (POE) and 12/24VDC.

Deviations, Additions, or Exclusions: None

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

9 AC Mains Conducted Emissions

9.1 Method

Unless otherwise stated no deviations were made from FCC 15.207 and RSS-Gen.

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

9.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
DEN-073	EMI Receiver	RHODE & SCHWARZ	ESU 26	100265	01/11/2012	01/11/2013
18885	Transient Limiter	Hewlett-Packard	11947A	3107A00700	05/03/2012	05/03/2013
18914	Single Phase LISN	EMCO	3816/NM	9408-1003	04/05/2012	04/05/2013
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_Vba	V002	VBV	VBV

9.3 Results:

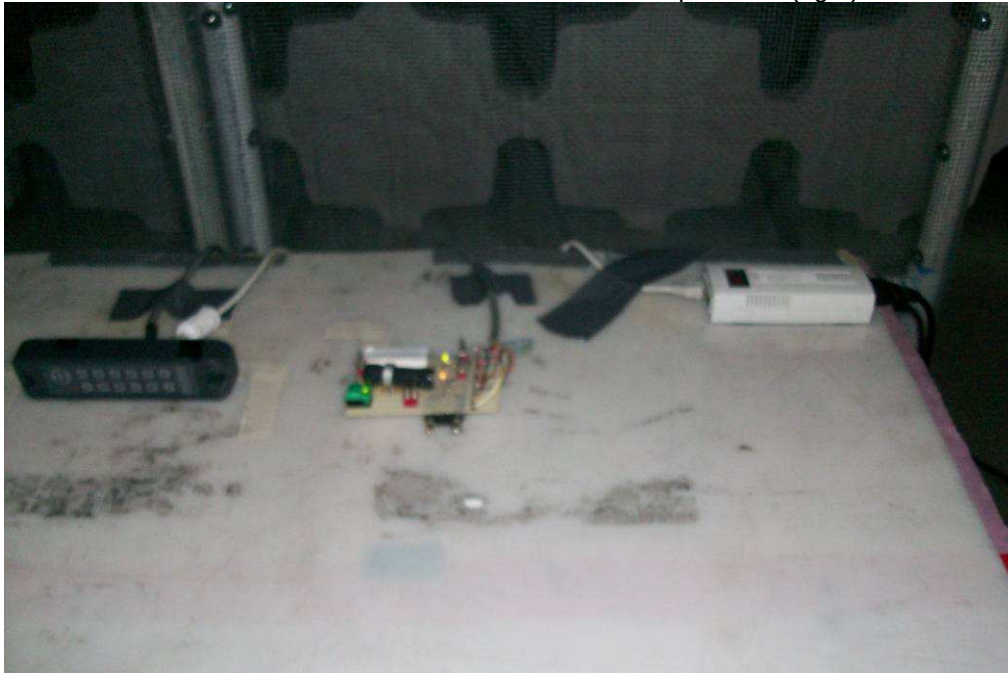
The product tested was found to comply.

9.4 Setup Photographs: POE

Test Setup (Front View)

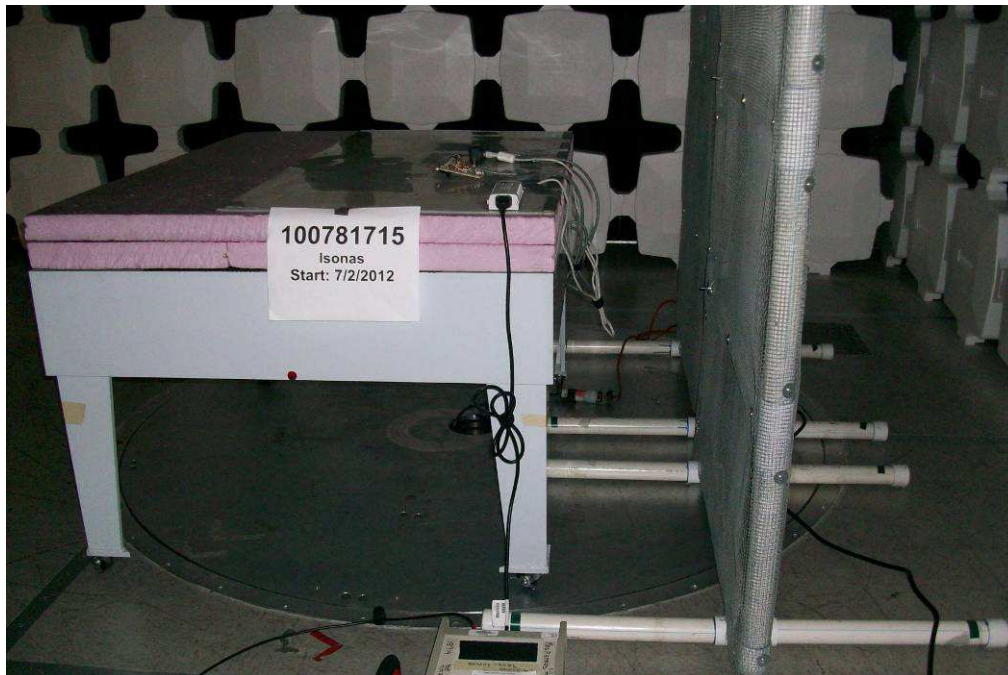


RC-03M-MCT-K Product Under Test & Midspan PSE (right)



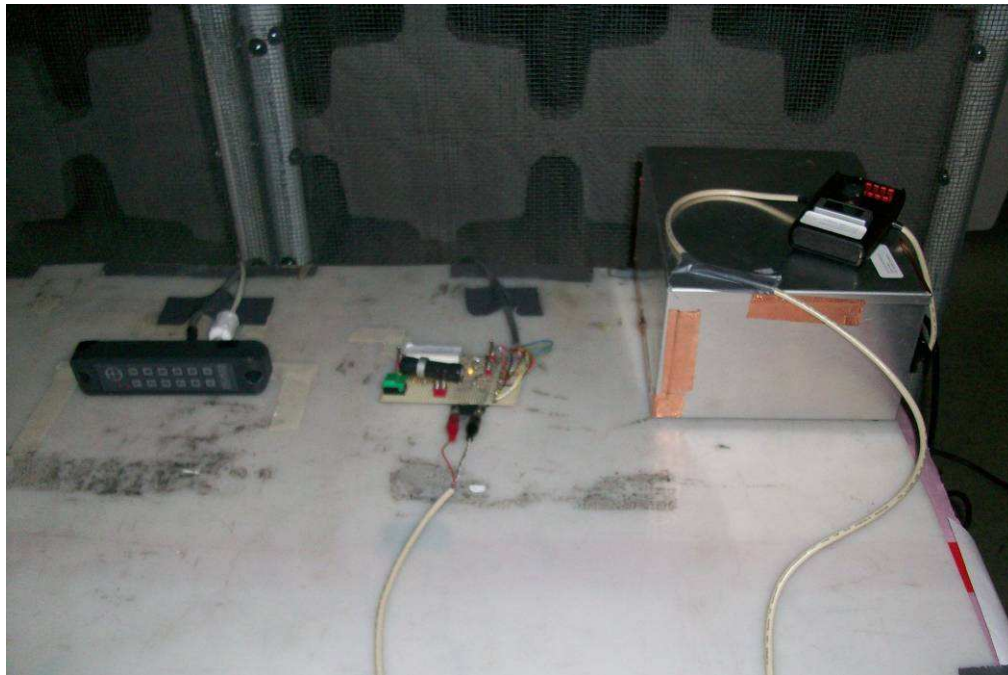
Setup Photographs: POE

Test Setup (Side View)



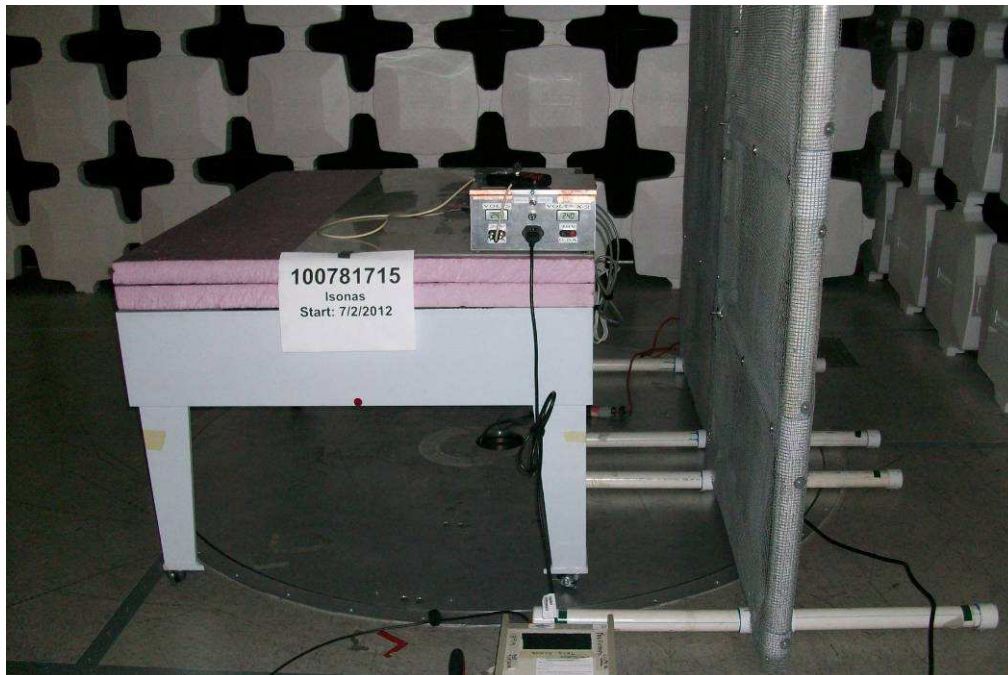
9.5 Setup Photographs: 12/24VDC

Test Setup (Front View)



Setup Photographs: 12/24VDC

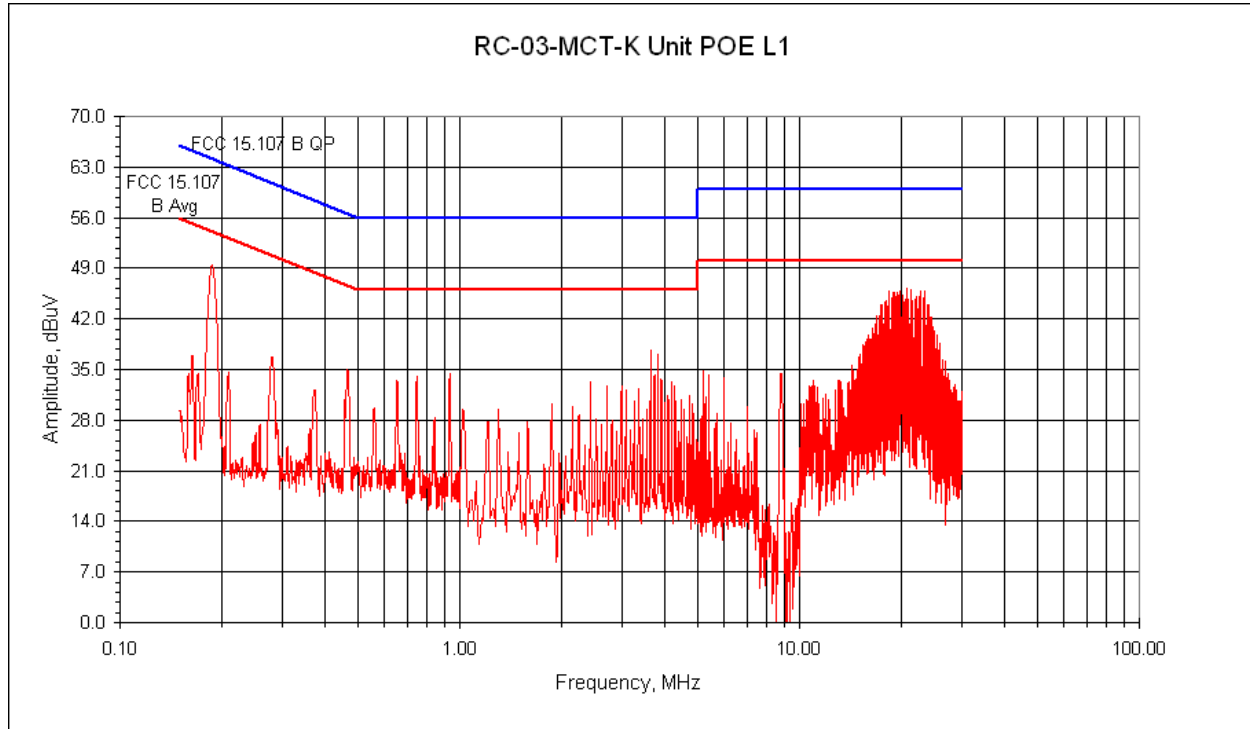
Test Setup (Side View)



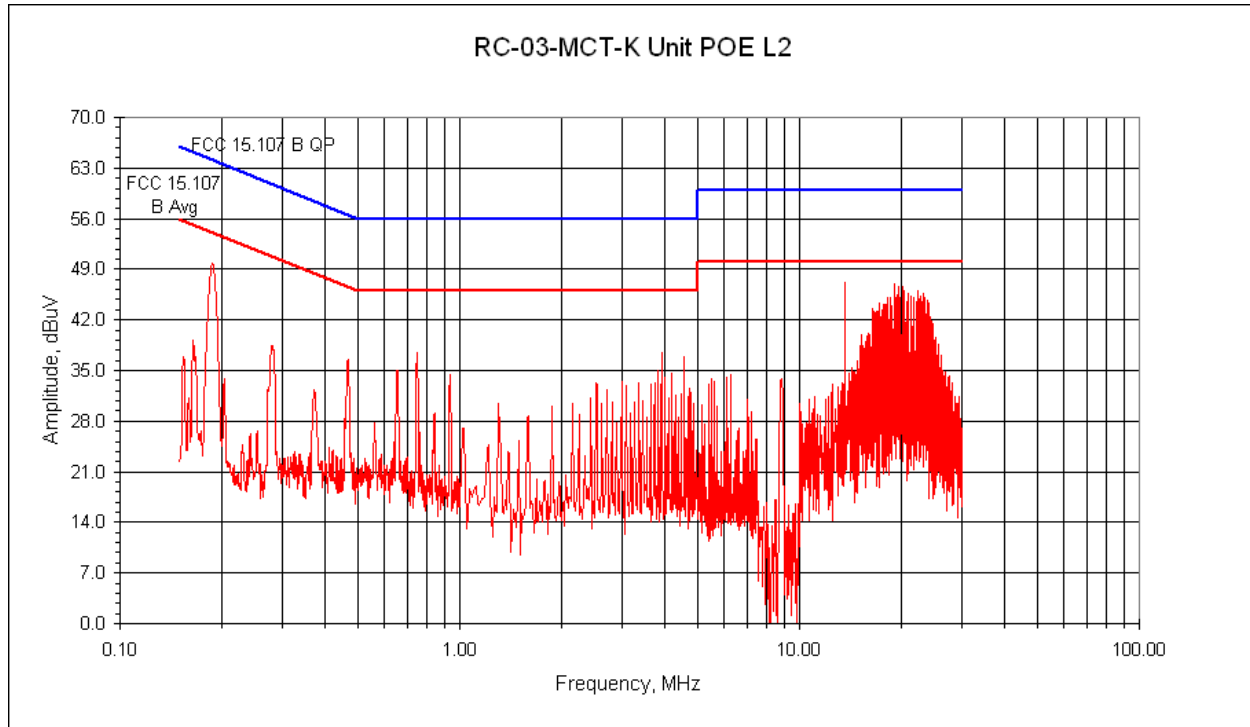
9.6 Pre-scan Plots: Reference Only – Not Final Data: POE

Radiated Emissions – FCC 15.207/ IC RSS-Gen 7.2.4 (150kHz to 30MHz)

Line 1



Line 2

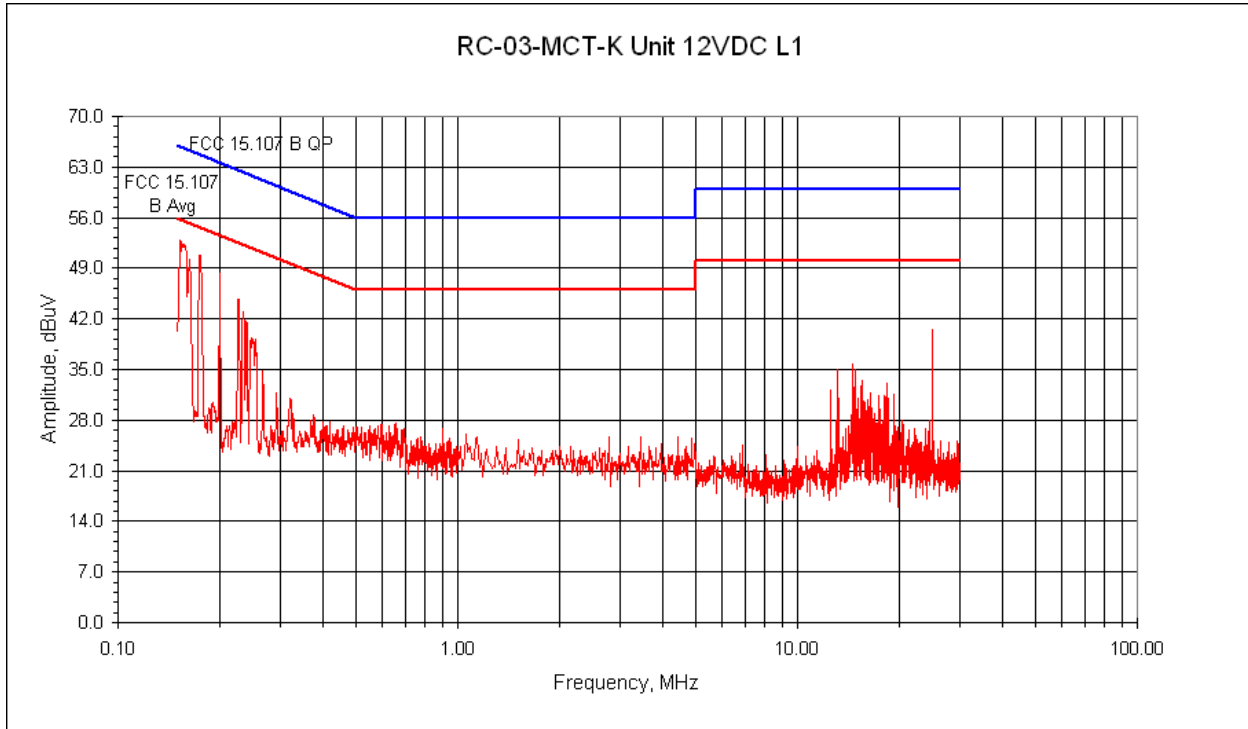


Note: Peak measurements plotted against Average and QP limits

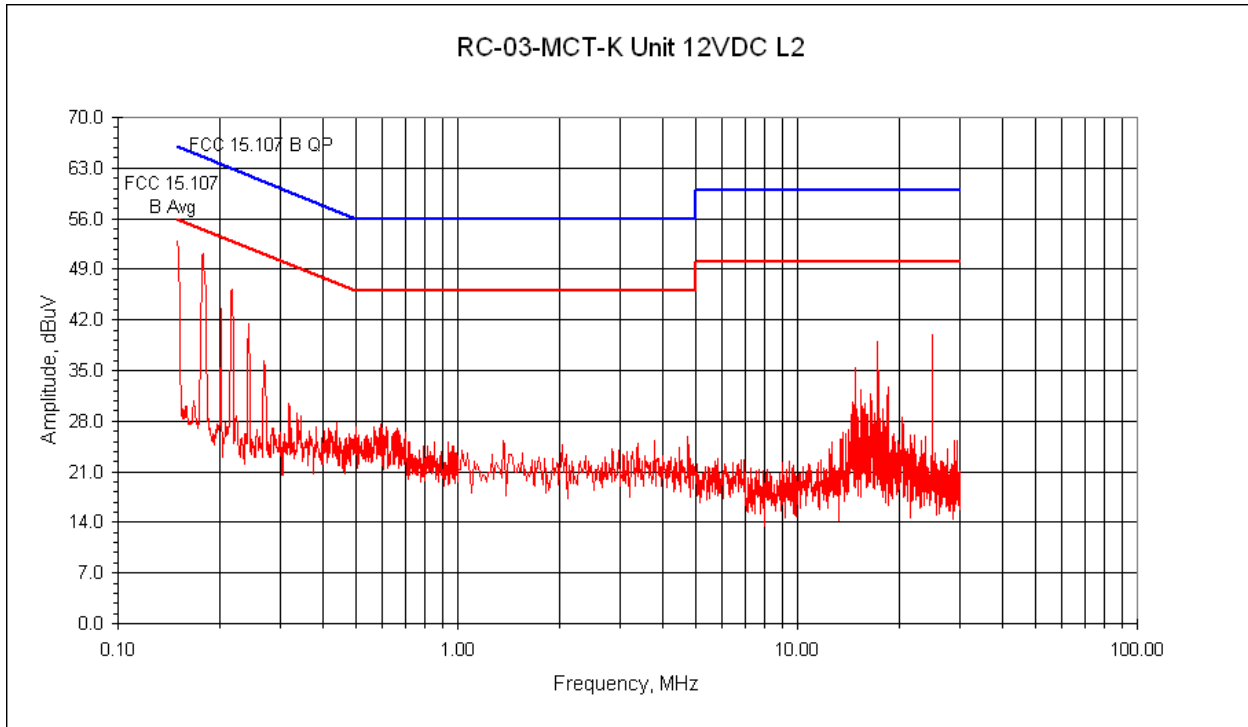
9.7 Pre-scan Plots: Reference Only - Not Final Data: 12VDC

Radiated Emissions – FCC 15.207/ IC RSS-Gen 7.2.4 (150kHz to 30MHz)

Line 1



Line 2

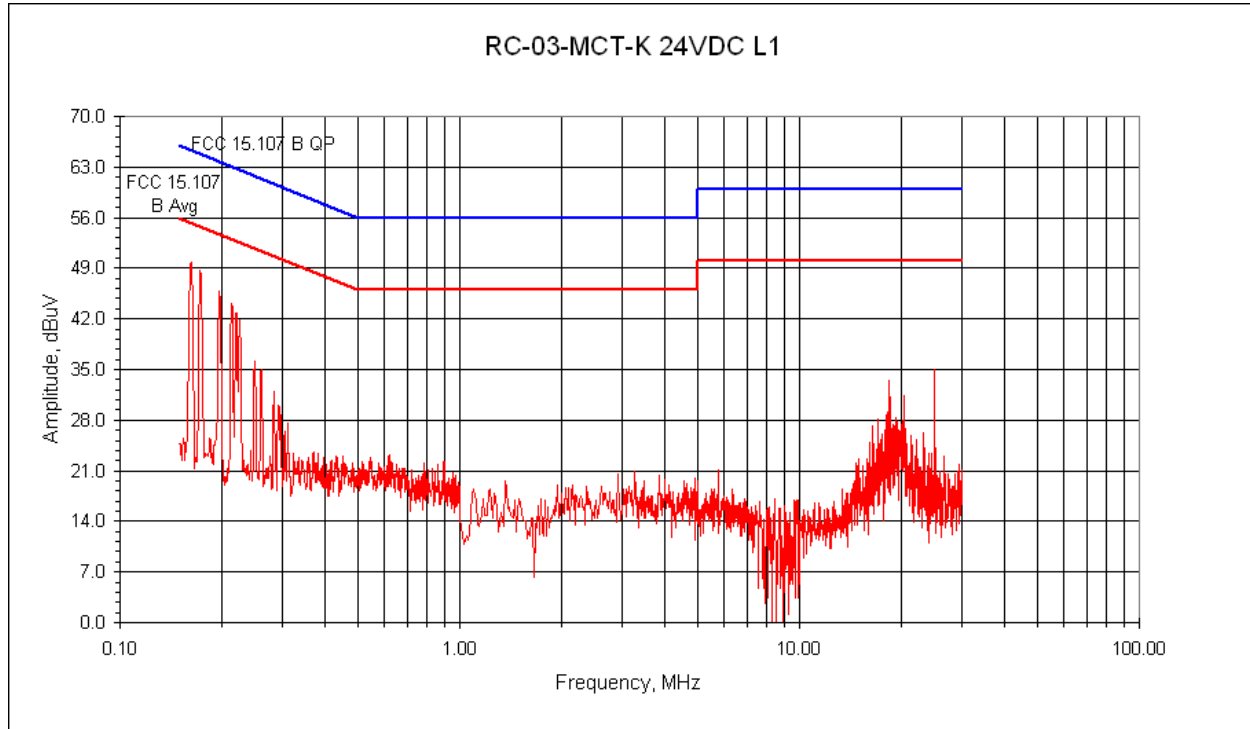


Note: Peak measurements plotted against Average and QP limits

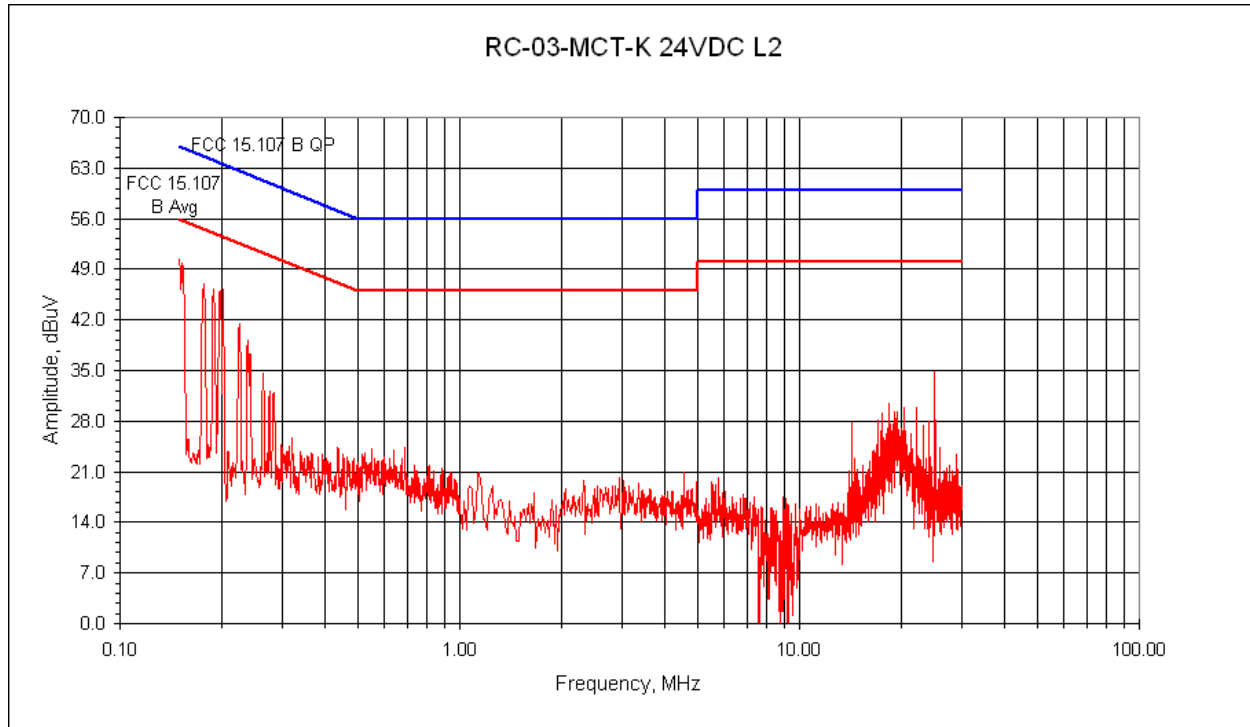
9.8 Pre-scan Plots: Reference Only - Not Final Data: 24VDC

Radiated Emissions – FCC 15.207/ IC RSS-Gen 7.2.4 (150kHz to 30MHz)

Line 1



Line 2

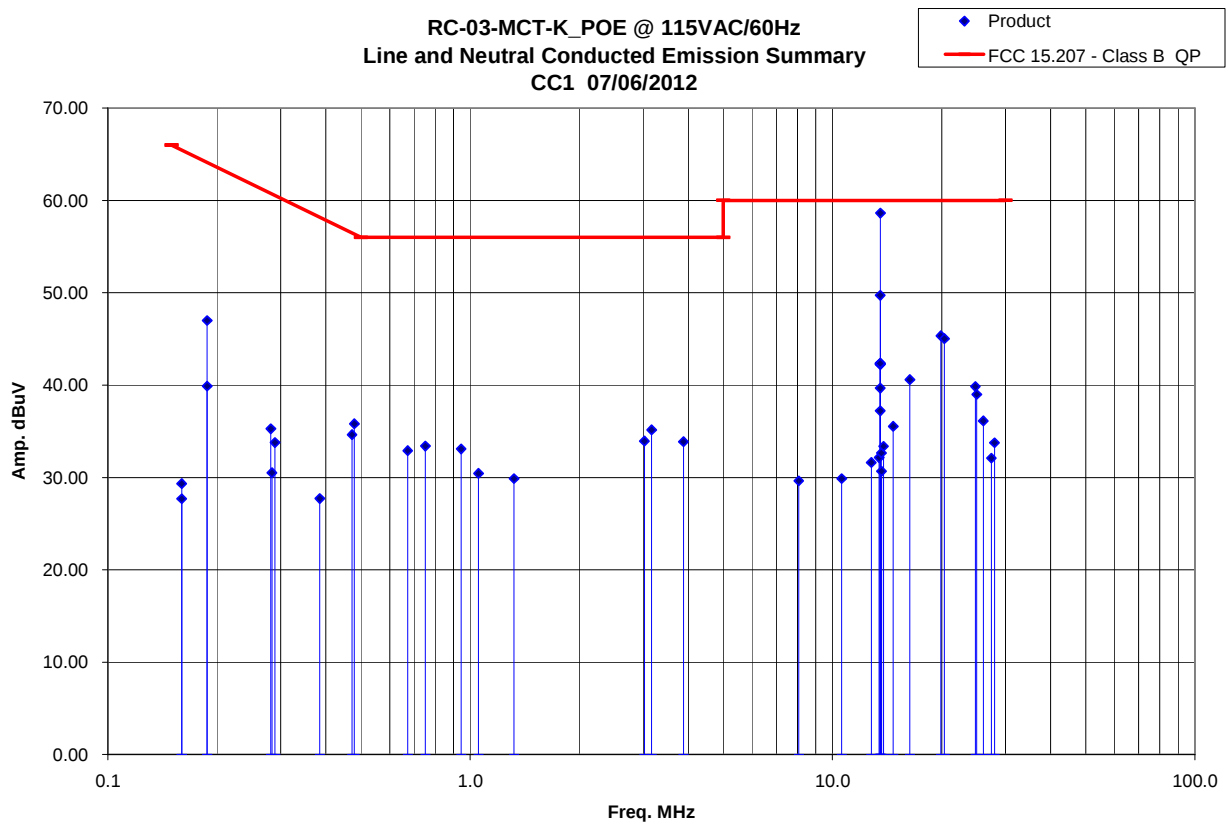


Note: Peak measurements plotted against Average and QP limits

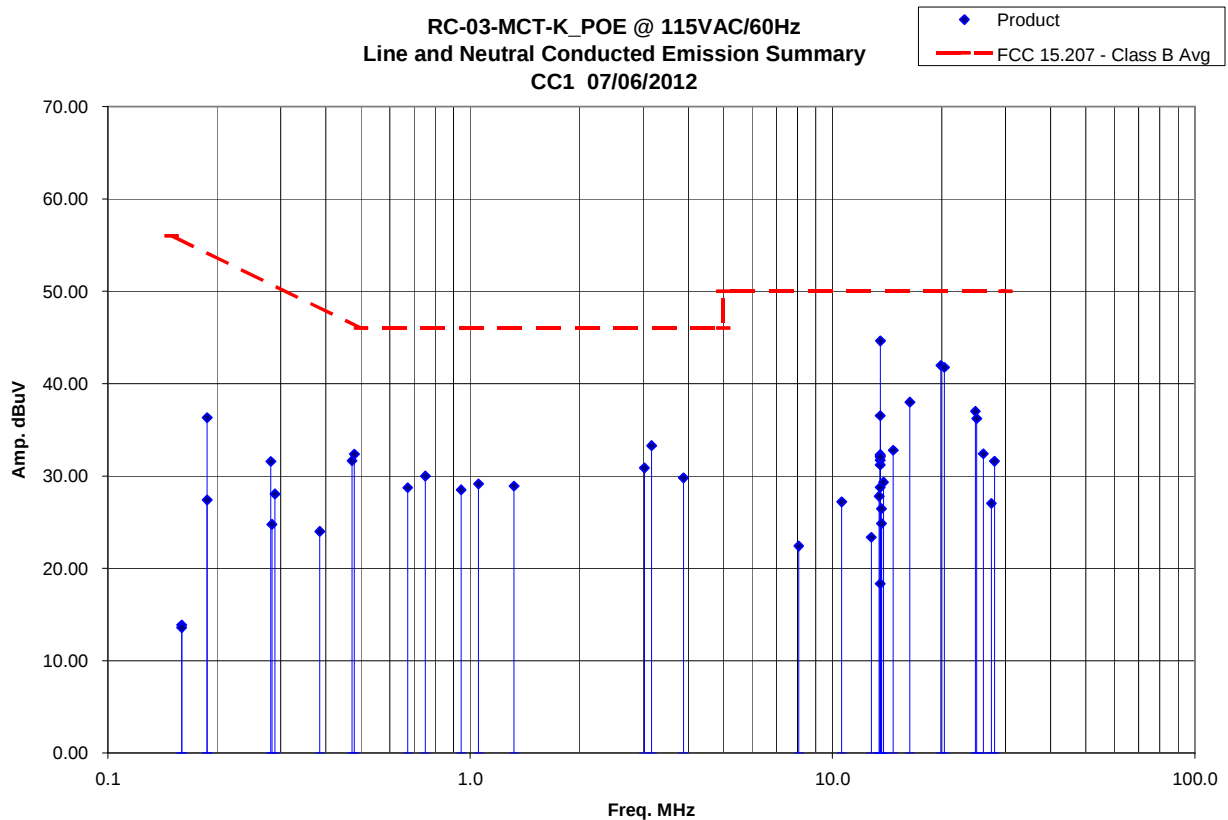
9.9 Final Plots: POE

Conducted Emissions – FCC 15.207/ IC RSS-Gen 7.2.4 (150kHz to 30MHz)

RC-03-MCT-K_POE @ 115VAC/60Hz
Line and Neutral Conducted Emission Summary
CC1 07/06/2012



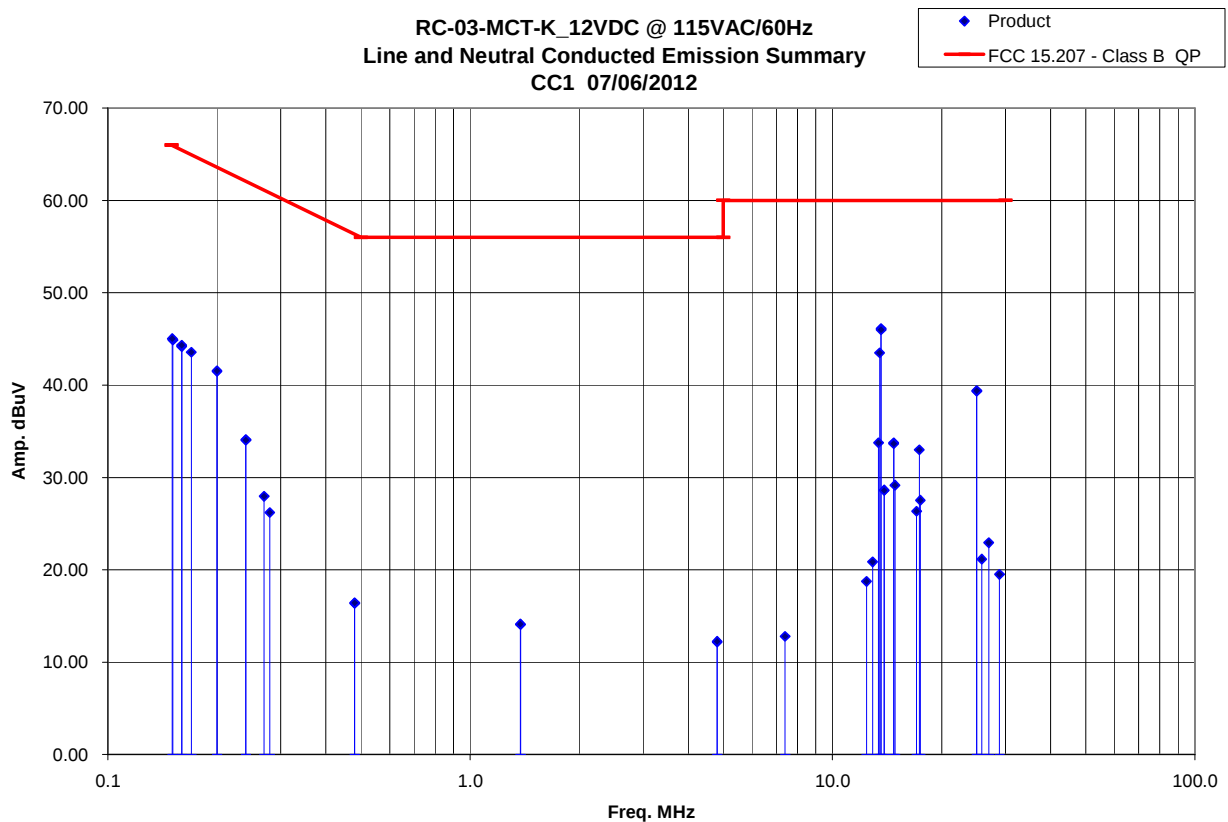
RC-03-MCT-K_POE @ 115VAC/60Hz
Line and Neutral Conducted Emission Summary
CC1 07/06/2012



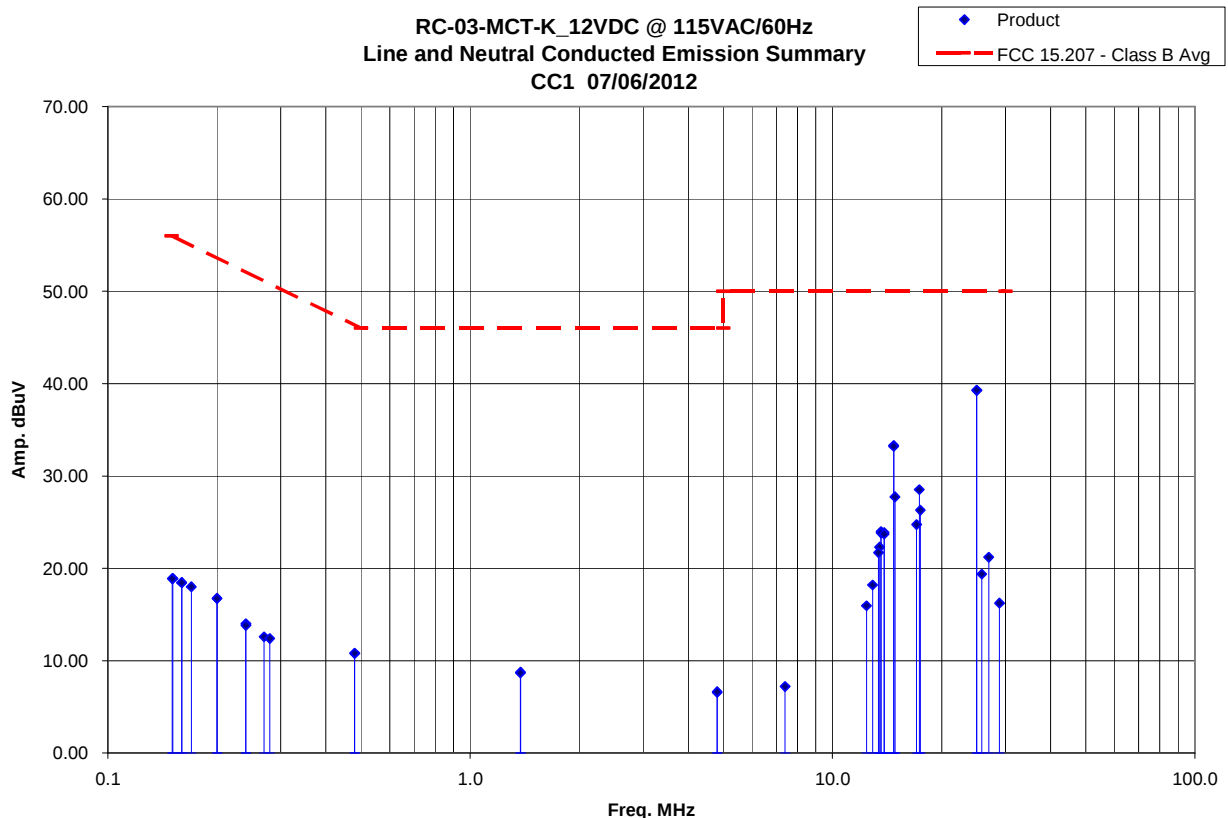
9.10 Final Plots: 12VDC

Conducted Emissions – FCC 15.207/ IC RSS-Gen 7.2.4 (150kHz to 30MHz)

RC-03-MCT-K_12VDC @ 115VAC/60Hz
Line and Neutral Conducted Emission Summary
CC1 07/06/2012



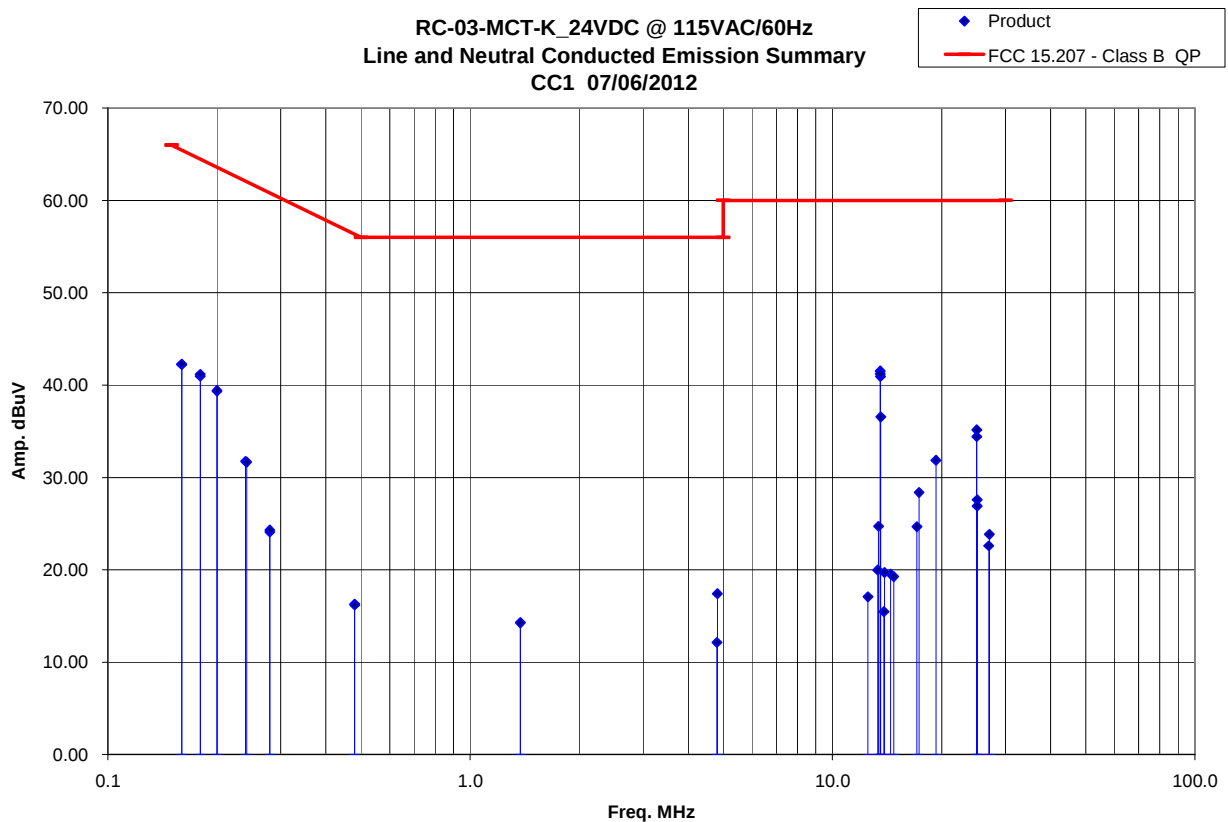
RC-03-MCT-K_12VDC @ 115VAC/60Hz
Line and Neutral Conducted Emission Summary
CC1 07/06/2012



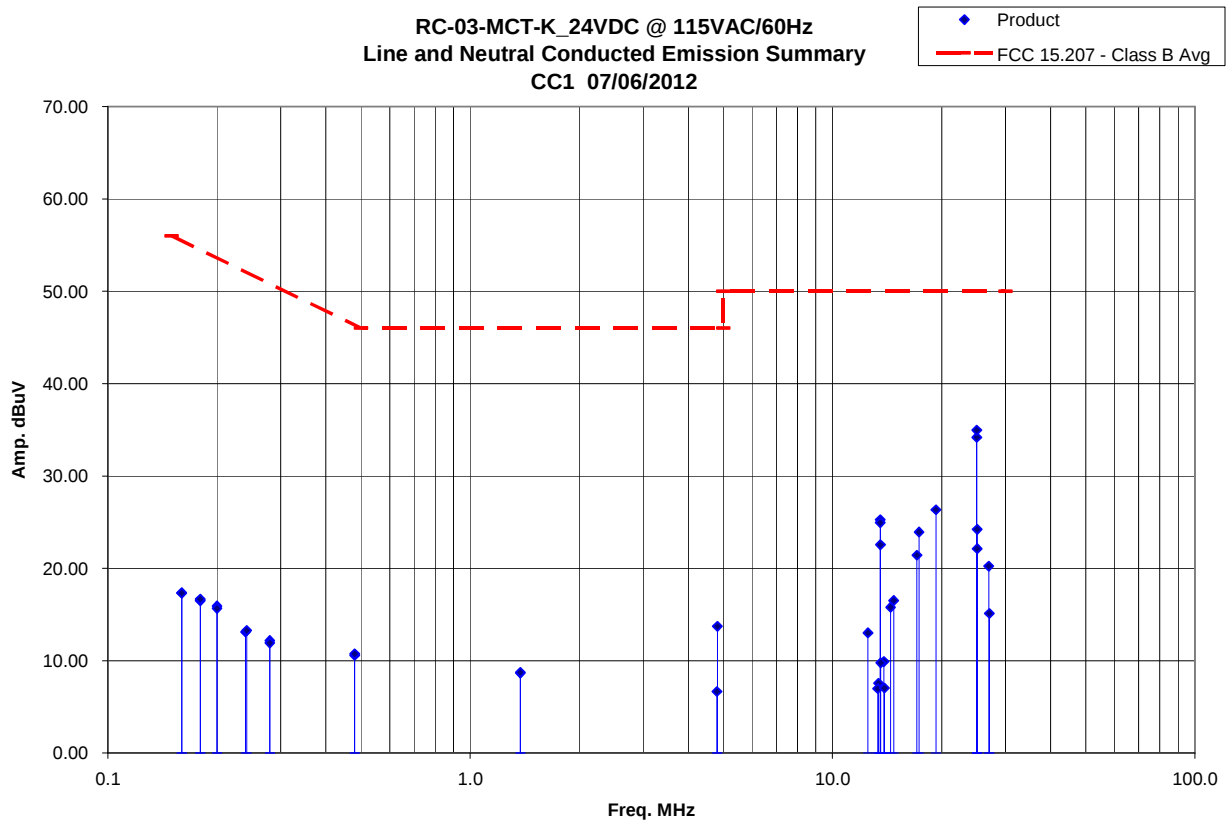
9.11 Final Plots: 24VDC

Conducted Emissions – FCC 15.207/ IC RSS-Gen 7.2.4 (150kHz to 30MHz)

RC-03-MCT-K_24VDC @ 115VAC/60Hz
Line and Neutral Conducted Emission Summary
CC1 07/06/2012



RC-03-MCT-K_24VDC @ 115VAC/60Hz
Line and Neutral Conducted Emission Summary
CC1 07/06/2012



9.12 Test Data: POE

AC Conducted Electromagnetic Emissions

Test Report #:	G100781715	Test Area:	CC1 Radiated	Temperature:	23.2	C
Test Method:	FCC 15.207/RSS-Gen, Section 7.2.4	Test Date:	06-July 2012	Relative Humidity:	39.1	%
EUT Model #:	RC-03-MCT-K	EUT Power:	POE	Air Pressure:	83.1	kPa
EUT Serial #:	FCC2					
Manufacturer:	ISONAS Security Systems			Level Key		
EUT Description:	Network-Enabled RFID Reader/Controller – Multi Frequency 122.8kHz & 13.56MHz			Pk - Peak		
Notes:	Product continuously active during testing – normal operation			Qp - QuasiPeak		
	Product Configuration: Power Over Ethernet (POE)			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 Line 2 (Neutral)	FCC15.207 RSS-Gen Average	FCC15.207 RSS-Gen QP	(MHz)
Multitech Unit @ 115VAC/60Hz											
Line 1 Data											
0.160	3.77	Av	0.10	0.04	0.00	9.95	13.86	Line 1	- 51.61	NA	0.009
0.160	19.24	Qp	0.10	0.04	0.00	9.95	29.33	Line 1	NA	- 36.14	0.009
0.188	26.23	Av	0.10	0.03	0.00	9.95	36.31	Line 1	- 27.81	NA	0.009
0.188	36.93	Qp	0.10	0.03	0.00	9.95	47.01	Line 1	NA	- 17.11	0.009
0.282	21.49	Av	0.10	0.03	0.00	9.96	31.57	Line 1	- 29.18	NA	0.009
0.282	25.19	Qp	0.10	0.03	0.00	9.96	35.27	Line 1	NA	- 25.48	0.009
0.472	21.56	Av	0.10	0.03	0.00	9.96	31.65	Line 1	- 24.83	NA	0.009
0.472	24.54	Qp	0.10	0.03	0.00	9.96	34.63	Line 1	NA	- 21.85	0.009
0.753	19.86	Av	0.13	0.03	0.00	9.97	29.99	Line 1	- 26.01	NA	0.009
0.753	23.28	Qp	0.13	0.03	0.00	9.97	33.41	Line 1	NA	- 22.59	0.009
0.945	18.30	Av	0.20	0.03	0.00	9.97	28.50	Line 1	- 27.50	NA	0.009
0.945	22.90	Qp	0.20	0.03	0.00	9.97	33.10	Line 1	NA	- 22.90	0.009
1.321	18.71	Av	0.20	0.03	0.00	9.97	28.91	Line 1	- 27.09	NA	0.009
1.321	19.67	Qp	0.20	0.03	0.00	9.97	29.87	Line 1	NA	- 26.13	0.009
3.025	20.59	Av	0.27	0.03	0.00	9.97	30.87	Line 1	- 25.13	NA	0.009
3.025	23.66	Qp	0.27	0.03	0.00	9.97	33.94	Line 1	NA	- 22.06	0.009
3.877	19.49	Av	0.30	0.04	0.00	9.97	29.80	Line 1	- 26.20	NA	0.009
3.877	23.57	Qp	0.30	0.04	0.00	9.97	33.88	Line 1	NA	- 22.12	0.009
10.602	16.44	Av	0.64	0.12	0.00	9.99	27.19	Line 1	- 32.81	NA	0.009
10.602	19.11	Qp	0.64	0.12	0.00	9.99	29.86	Line 1	NA	- 30.14	0.009
12.792	12.40	Av	0.82	0.12	0.00	10.00	23.35	Line 1	- 36.65	NA	0.009
12.792	20.68	Qp	0.82	0.12	0.00	10.00	31.63	Line 1	NA	- 28.37	0.009
13.552	25.51	Av	0.90	0.12	0.00	10.00	36.53	Line 1	- 23.47	NA	0.009
13.552	38.70	Qp	0.90	0.12	0.00	10.00	49.72	Line 1	NA	- 10.28	0.009
13.562	40.68	Av	0.90	0.12	0.00	10.00	51.70	Line 1	- 8.30	NA	0.009
13.565	33.61	Av	0.90	0.12	0.00	10.00	44.63	Line 1	- 15.37	NA	0.009
13.565	47.62	Qp	0.90	0.12	0.00	10.00	58.64	Line 1	NA	- 1.36	0.009

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

13.657	13.83	Av	0.90	0.12	0.00	10.00	24.86	Line 1	- 35.14	NA	0.009
19.937	30.64	Av	1.10	0.22	0.00	10.02	41.98	Line 1	- 18.02	NA	0.009
19.937	34.01	Qp	1.10	0.22	0.00	10.02	45.35	Line 1	NA	- 14.65	0.009
24.790	25.56	Av	1.20	0.21	0.00	10.03	37.00	Line 1	- 23.00	NA	0.009
24.790	28.41	Qp	1.20	0.21	0.00	10.03	39.85	Line 1	NA	- 20.15	0.009
27.465	15.55	Av	1.30	0.15	0.00	10.04	27.03	Line 1	- 32.97	NA	0.009
27.465	20.61	Qp	1.30	0.15	0.00	10.04	32.09	Line 1	NA	- 27.91	0.009
Multitech Unit @ 115VAC/60Hz											
Line 2 (Neutral) Data											
0.160	3.49	Av	0.10	0.04	0.00	9.95	13.58	Line 2	- 51.89	NA	0.009
0.160	17.61	Qp	0.10	0.04	0.00	9.95	27.70	Line 2	NA	- 37.77	0.009
0.188	17.32	Av	0.10	0.03	0.00	9.95	27.40	Line 2	- 36.72	NA	0.009
0.188	29.80	Qp	0.10	0.03	0.00	9.95	39.88	Line 2	NA	- 24.24	0.009
0.284	14.68	Av	0.10	0.03	0.00	9.96	24.76	Line 2	- 35.94	NA	0.009
0.284	20.42	Qp	0.10	0.03	0.00	9.96	30.50	Line 2	NA	- 30.20	0.009
0.290	17.96	Av	0.10	0.03	0.00	9.96	28.04	Line 2	- 32.49	NA	0.009
0.290	23.70	Qp	0.10	0.03	0.00	9.96	33.78	Line 2	NA	- 26.75	0.009
0.385	13.91	Av	0.10	0.02	0.00	9.96	23.99	Line 2	- 34.19	NA	0.009
0.385	17.63	Qp	0.10	0.02	0.00	9.96	27.71	Line 2	NA	- 30.47	0.009
0.480	22.28	Av	0.10	0.02	0.00	9.96	32.37	Line 2	- 23.98	NA	0.009
0.480	25.73	Qp	0.10	0.02	0.00	9.96	35.82	Line 2	NA	- 20.53	0.009
0.672	18.65	Av	0.10	0.02	0.00	9.97	28.74	Line 2	- 27.26	NA	0.009
0.672	22.81	Qp	0.10	0.02	0.00	9.97	32.90	Line 2	NA	- 23.10	0.009
1.055	18.93	Av	0.20	0.02	0.00	9.97	29.13	Line 2	- 26.87	NA	0.009
1.055	20.25	Qp	0.20	0.02	0.00	9.97	30.45	Line 2	NA	- 25.55	0.009
3.170	22.98	Av	0.30	0.03	0.00	9.97	33.28	Line 2	- 22.72	NA	0.009
3.170	24.85	Qp	0.30	0.03	0.00	9.97	35.15	Line 2	NA	- 20.85	0.009
8.070	11.83	Av	0.50	0.09	0.00	9.99	22.41	Line 2	- 37.59	NA	0.009
8.070	19.06	Qp	0.50	0.09	0.00	9.99	29.64	Line 2	NA	- 30.36	0.009
13.450	16.77	Av	0.90	0.13	0.00	10.00	27.80	Line 2	- 32.20	NA	0.009
13.450	21.11	Qp	0.90	0.13	0.00	10.00	32.14	Line 2	NA	- 27.86	0.009
13.540	7.31	Av	0.90	0.13	0.00	10.00	18.34	Line 2	- 41.66	NA	0.009
13.540	26.18	Qp	0.90	0.13	0.00	10.00	37.21	Line 2	NA	- 22.79	0.009
13.545	17.74	Av	0.90	0.13	0.00	10.00	28.77	Line 2	- 31.23	NA	0.009
13.545	28.64	Qp	0.90	0.13	0.00	10.00	39.67	Line 2	NA	- 20.33	0.009
13.550	20.16	Av	0.90	0.13	0.00	10.00	31.19	Line 2	- 28.81	NA	0.009
13.550	20.68	Av	0.90	0.13	0.00	10.00	31.71	Line 2	- 28.29	NA	0.009
13.550	21.13	Av	0.90	0.13	0.00	10.00	32.16	Line 2	- 27.84	NA	0.009
13.550	21.28	Av	0.90	0.13	0.00	10.00	32.31	Line 2	- 27.69	NA	0.009
13.550	21.03	Av	0.90	0.13	0.00	10.00	32.06	Line 2	- 27.94	NA	0.009
13.550	31.30	Qp	0.90	0.13	0.00	10.00	42.33	Line 2	NA	- 17.67	0.009
13.550	31.20	Qp	0.90	0.13	0.00	10.00	42.23	Line 2	NA	- 17.77	0.009
13.550	31.24	Qp	0.90	0.13	0.00	10.00	42.27	Line 2	NA	- 17.73	0.009
13.550	31.34	Qp	0.90	0.13	0.00	10.00	42.37	Line 2	NA	- 17.63	0.009
13.550	31.32	Qp	0.90	0.13	0.00	10.00	42.35	Line 2	NA	- 17.65	0.009
13.645	15.42	Av	0.90	0.13	0.00	10.00	26.45	Line 2	- 33.55	NA	0.009
13.645	21.61	Qp	0.90	0.13	0.00	10.00	32.64	Line 2	NA	- 27.36	0.009

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

13.840	18.28	Av	0.90	0.13	0.00	10.00	29.32	Line 2	- 30.68	NA	0.009
13.840	22.33	Qp	0.90	0.13	0.00	10.00	33.37	Line 2	NA	- 26.63	0.009
14.710	21.63	Av	1.00	0.14	0.00	10.01	32.78	Line 2	- 27.22	NA	0.009
14.710	24.38	Qp	1.00	0.14	0.00	10.01	35.53	Line 2	NA	- 24.47	0.009
16.345	26.73	Av	1.10	0.16	0.00	10.01	38.00	Line 2	- 22.00	NA	0.009
16.345	29.33	Qp	1.10	0.16	0.00	10.01	40.60	Line 2	NA	- 19.40	0.009
20.385	30.43	Av	1.10	0.22	0.00	10.02	41.77	Line 2	- 18.23	NA	0.009
20.385	33.70	Qp	1.10	0.22	0.00	10.02	45.04	Line 2	NA	- 14.96	0.009
25.005	24.66	Av	1.20	0.32	0.00	10.04	36.22	Line 2	- 23.78	NA	0.009
25.005	27.44	Qp	1.20	0.32	0.00	10.04	39.00	Line 2	NA	- 21.00	0.009
26.065	20.89	Av	1.20	0.28	0.00	10.04	32.41	Line 2	- 27.59	NA	0.009
26.065	24.60	Qp	1.20	0.28	0.00	10.04	36.12	Line 2	NA	- 23.88	0.009
27.995	20.05	Av	1.30	0.21	0.00	10.04	31.60	Line 2	- 28.40	NA	0.009
27.995	22.21	Qp	1.30	0.21	0.00	10.04	33.76	Line 2	NA	- 26.24	0.009

9.13 Test Data: 12VDC

AC Conducted Electromagnetic Emissions

Test Report #:	G100781715	Test Area:	CC1 Radiated	Temperature:	23.2	C
Test Method:	FCC 15.207/RSS-Gen, Section 7.2.4	Test Date:	06-July 2012	Relative Humidity:	39.1	%
EUT Model #:	RC-03-MCT-K	EUT Power:	12VDC	Air Pressure:	83.1	kPa
EUT Serial #:	FCC2					
Manufacturer:	ISONAS Security Systems			Level Key		
EUT Description:	Network-Enabled RFID Reader/Controller – Multi Frequency 122.8kHz & 13.56MHz			Pk - Peak		
Notes:	Product continuously active during testing – normal operation			Qp - QuasiPeak		
	Product Configuration: 12VDC			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 Line 2 (Neutral)	FCC15.207 RSS-Gen Average	FCC15.207 RSS-Gen QP	(MHz)
Multitech 12VDC Unit @ 115VAC/60Hz											
Line 1 Data											
0.151	8.82	Av	0.10	0.04	0.00	9.95	18.91	Line 1	- 47.02	NA	0.009
0.151	34.79	Qp	0.10	0.04	0.00	9.95	44.88	Line 1	NA	- 21.05	0.009
0.160	8.36	Av	0.10	0.04	0.00	9.95	18.45	Line 1	- 47.02	NA	0.009
0.160	34.08	Qp	0.10	0.04	0.00	9.95	44.17	Line 1	NA	- 21.30	0.009
0.170	7.91	Av	0.10	0.04	0.00	9.95	18.00	Line 1	- 46.96	NA	0.009
0.170	33.48	Qp	0.10	0.04	0.00	9.95	43.57	Line 1	NA	- 21.39	0.009
0.200	6.66	Av	0.10	0.03	0.00	9.95	16.74	Line 1	- 46.87	NA	0.009
0.200	31.42	Qp	0.10	0.03	0.00	9.95	41.50	Line 1	NA	- 22.11	0.009
0.240	3.93	Av	0.10	0.03	0.00	9.95	14.01	Line 1	- 48.07	NA	0.009
0.240	24.00	Qp	0.10	0.03	0.00	9.95	34.08	Line 1	NA	- 28.00	0.009
0.270	2.50	Av	0.10	0.03	0.00	9.96	12.58	Line 1	- 48.53	NA	0.009
0.270	17.87	Qp	0.10	0.03	0.00	9.96	27.95	Line 1	NA	- 33.16	0.009
0.480	0.70	Av	0.10	0.03	0.00	9.96	10.79	Line 1	- 45.55	NA	0.009
0.480	6.28	Qp	0.10	0.03	0.00	9.96	16.37	Line 1	NA	- 39.97	0.009
1.378	- 1.45	Av	0.20	0.03	0.00	9.97	8.75	Line 1	- 47.25	NA	0.009
1.378	3.87	Qp	0.20	0.03	0.00	9.97	14.07	Line 1	NA	- 41.93	0.009
4.805	- 3.75	Av	0.30	0.04	0.00	9.98	6.57	Line 1	- 49.43	NA	0.009
4.805	1.86	Qp	0.30	0.04	0.00	9.98	12.18	Line 1	NA	- 43.82	0.009
7.405	- 3.27	Av	0.43	0.07	0.00	9.98	7.21	Line 1	- 52.79	NA	0.009
7.405	2.32	Qp	0.43	0.07	0.00	9.98	12.80	Line 1	NA	- 47.20	0.009
12.905	7.23	Av	0.85	0.12	0.00	10.00	18.20	Line 1	- 41.80	NA	0.009
12.905	9.87	Qp	0.85	0.12	0.00	10.00	20.84	Line 1	NA	- 39.16	0.009
13.490	11.28	Av	0.90	0.12	0.00	10.00	22.30	Line 1	- 37.70	NA	0.009
13.490	32.48	Qp	0.90	0.12	0.00	10.00	43.50	Line 1	NA	- 16.50	0.009
13.615	12.95	Av	0.90	0.12	0.00	10.00	23.98	Line 1	- 36.02	NA	0.009
13.615	35.10	Qp	0.90	0.12	0.00	10.00	46.13	Line 1	NA	- 13.87	0.009
13.885	12.84	Av	0.90	0.13	0.00	10.00	23.87	Line 1	- 36.13	NA	0.009

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

13.885	17.61	Qp	0.90	0.13	0.00	10.00	28.64	Line 1	NA	- 31.36	0.009
14.745	22.16	Av	1.00	0.14	0.00	10.01	33.30	Line 1	- 26.70	NA	0.009
14.745	22.61	Qp	1.00	0.14	0.00	10.01	33.75	Line 1	NA	- 26.25	0.009
17.470	15.00	Av	1.10	0.17	0.00	10.01	26.29	Line 1	- 33.71	NA	0.009
17.470	16.23	Qp	1.10	0.17	0.00	10.01	27.52	Line 1	NA	- 32.48	0.009
25.000	27.82	Av	1.20	0.20	0.00	10.04	39.26	Line 1	- 20.74	NA	0.009
25.000	27.90	Qp	1.20	0.20	0.00	10.04	39.34	Line 1	NA	- 20.66	0.009
25.810	7.95	Av	1.20	0.19	0.00	10.04	19.37	Line 1	- 40.63	NA	0.009
25.810	9.73	Qp	1.20	0.19	0.00	10.04	21.15	Line 1	NA	- 38.85	0.009
Multitech 12VDC Unit @ 115VAC/60Hz											
Line 2 (Neutral) Data											
0.151	8.80	Av	0.10	0.04	0.00	9.95	18.89	Line 2	- 47.08	NA	0.009
0.151	34.94	Qp	0.10	0.04	0.00	9.95	45.03	Line 2	NA	- 20.94	0.009
0.160	8.37	Av	0.10	0.04	0.00	9.95	18.46	Line 2	- 47.01	NA	0.009
0.160	34.22	Qp	0.10	0.04	0.00	9.95	44.31	Line 2	NA	- 21.16	0.009
0.200	6.65	Av	0.10	0.03	0.00	9.95	16.73	Line 2	- 46.87	NA	0.009
0.200	31.48	Qp	0.10	0.03	0.00	9.95	41.56	Line 2	NA	- 22.04	0.009
0.241	3.74	Av	0.10	0.03	0.00	9.95	13.82	Line 2	- 48.26	NA	0.009
0.241	23.97	Qp	0.10	0.03	0.00	9.95	34.05	Line 2	NA	- 28.03	0.009
0.280	2.32	Av	0.10	0.03	0.00	9.96	12.40	Line 2	- 48.41	NA	0.009
0.280	16.11	Qp	0.10	0.03	0.00	9.96	26.19	Line 2	NA	- 34.62	0.009
0.480	0.71	Av	0.10	0.02	0.00	9.96	10.80	Line 2	- 45.54	NA	0.009
0.480	6.33	Qp	0.10	0.02	0.00	9.96	16.42	Line 2	NA	- 39.92	0.009
1.375	- 1.54	Av	0.20	0.03	0.00	9.97	8.66	Line 2	- 47.34	NA	0.009
1.375	3.91	Qp	0.20	0.03	0.00	9.97	14.11	Line 2	NA	- 41.89	0.009
4.805	- 3.68	Av	0.30	0.04	0.00	9.98	6.64	Line 2	- 49.36	NA	0.009
4.805	1.92	Qp	0.30	0.04	0.00	9.98	12.24	Line 2	NA	- 43.76	0.009
12.410	5.02	Av	0.80	0.13	0.00	10.00	15.95	Line 2	- 44.05	NA	0.009
12.410	7.81	Qp	0.80	0.13	0.00	10.00	18.74	Line 2	NA	- 41.26	0.009
13.395	10.66	Av	0.90	0.13	0.00	10.00	21.69	Line 2	- 38.31	NA	0.009
13.395	22.72	Qp	0.90	0.13	0.00	10.00	33.75	Line 2	NA	- 26.25	0.009
13.615	12.79	Av	0.90	0.13	0.00	10.00	23.82	Line 2	- 36.18	NA	0.009
13.615	34.98	Qp	0.90	0.13	0.00	10.00	46.01	Line 2	NA	- 13.99	0.009
13.885	12.67	Av	0.90	0.14	0.00	10.00	23.71	Line 2	- 36.29	NA	0.009
13.885	17.56	Qp	0.90	0.14	0.00	10.00	28.60	Line 2	NA	- 31.40	0.009
14.745	22.06	Av	1.00	0.15	0.00	10.01	33.21	Line 2	- 26.79	NA	0.009
14.745	22.51	Qp	1.00	0.15	0.00	10.01	33.66	Line 2	NA	- 26.34	0.009
14.870	16.60	Av	1.00	0.15	0.00	10.01	27.75	Line 2	- 32.25	NA	0.009
14.870	18.02	Qp	1.00	0.15	0.00	10.01	29.17	Line 2	NA	- 30.83	0.009
17.080	13.44	Av	1.10	0.17	0.00	10.01	24.73	Line 2	- 35.27	NA	0.009
17.080	15.05	Qp	1.10	0.17	0.00	10.01	26.34	Line 2	NA	- 33.66	0.009
17.350	17.23	Av	1.10	0.18	0.00	10.01	28.52	Line 2	- 31.48	NA	0.009
17.350	21.70	Qp	1.10	0.18	0.00	10.01	32.99	Line 2	NA	- 27.01	0.009
25.000	27.74	Av	1.20	0.32	0.00	10.04	39.30	Line 2	- 20.70	NA	0.009
25.000	27.83	Qp	1.20	0.32	0.00	10.04	39.39	Line 2	NA	- 20.61	0.009
26.985	9.64	Av	1.28	0.24	0.00	10.04	21.21	Line 2	- 38.79	NA	0.009
26.985	11.36	Qp	1.28	0.24	0.00	10.04	22.93	Line 2	NA	- 37.07	0.009

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

28.915	4.60	Av	1.40	0.18	0.00	10.04	16.22	Line 2	- 43.78	NA	0.009
28.915	7.87	Qp	1.40	0.18	0.00	10.04	19.49	Line 2	NA	- 40.51	0.009

9.14 Test Data: 24VDC

AC Conducted Electromagnetic Emissions

Test Report #:	G100781715	Test Area:	CC1 Radiated	Temperature:	23.2	C
Test Method:	FCC 15.207/RSS-Gen, Section 7.2.4	Test Date:	06-July 2012	Relative Humidity:	39.1	%
EUT Model #:	RC-03-MCT-K	EUT Power:	24VDC	Air Pressure:	83.1	kPa
EUT Serial #:	FCC2					
Manufacturer:	ISONAS Security Systems			Level Key		
EUT Description:	Network-Enabled RFID Reader/Controller – Multi Frequency 122.8kHz & 13.56MHz			Pk - Peak		
Notes:	Product continuously active during testing – normal operation			Qp - QuasiPeak		
	Product Configuration: 24VDC			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 Line 2 (Neutral)	FCC15.207 RSS-Gen Average	FCC15.207 RSS-Gen QP	(MHz)
Multitech 24VDC Unit @ 115VAC/60Hz											
Line 1 Data											
0.160	7.23	Av	0.10	0.04	0.00	9.95	17.32	Line 1	- 48.15	NA	0.009
0.160	32.20	Qp	0.10	0.04	0.00	9.95	42.29	Line 1	NA	- 23.18	0.009
0.180	6.57	Av	0.10	0.03	0.00	9.95	16.65	Line 1	- 47.83	NA	0.009
0.180	31.10	Qp	0.10	0.03	0.00	9.95	41.18	Line 1	NA	- 23.30	0.009
0.200	5.58	Av	0.10	0.03	0.00	9.95	15.66	Line 1	- 47.95	NA	0.009
0.200	29.33	Qp	0.10	0.03	0.00	9.95	39.41	Line 1	NA	- 24.20	0.009
0.242	3.18	Av	0.10	0.03	0.00	9.95	13.26	Line 1	- 48.76	NA	0.009
0.242	21.58	Qp	0.10	0.03	0.00	9.95	31.66	Line 1	NA	- 30.36	0.009
0.280	1.83	Av	0.10	0.03	0.00	9.96	11.91	Line 1	- 48.90	NA	0.009
0.280	14.22	Qp	0.10	0.03	0.00	9.96	24.30	Line 1	NA	- 36.51	0.009
0.480	0.64	Av	0.10	0.03	0.00	9.96	10.73	Line 1	- 45.61	NA	0.009
0.480	6.10	Qp	0.10	0.03	0.00	9.96	16.19	Line 1	NA	- 40.15	0.009
1.375	- 1.49	Av	0.20	0.03	0.00	9.97	8.71	Line 1	- 47.29	NA	0.009
1.375	4.05	Qp	0.20	0.03	0.00	9.97	14.25	Line 1	NA	- 41.75	0.009
4.814	3.39	Av	0.30	0.04	0.00	9.98	13.71	Line 1	- 42.29	NA	0.009
4.814	7.10	Qp	0.30	0.04	0.00	9.98	17.42	Line 1	NA	- 38.58	0.009
12.536	2.09	Av	0.80	0.12	0.00	10.00	13.01	Line 1	- 46.99	NA	0.009
12.536	6.15	Qp	0.80	0.12	0.00	10.00	17.07	Line 1	NA	- 42.93	0.009
13.322	- 4.05	Av	0.90	0.12	0.00	10.00	6.97	Line 1	- 53.03	NA	0.009
13.322	8.94	Qp	0.90	0.12	0.00	10.00	19.96	Line 1	NA	- 40.04	0.009
13.550	13.92	Av	0.90	0.12	0.00	10.00	24.94	Line 1	- 35.06	NA	0.009
13.550	30.19	Qp	0.90	0.12	0.00	10.00	41.21	Line 1	NA	- 18.79	0.009
13.580	- 1.26	Av	0.90	0.12	0.00	10.00	9.76	Line 1	- 50.24	NA	0.009
13.580	25.54	Qp	0.90	0.12	0.00	10.00	36.56	Line 1	NA	- 23.44	0.009
13.920	- 3.99	Av	0.90	0.13	0.00	10.00	7.04	Line 1	- 52.96	NA	0.009
13.920	8.67	Qp	0.90	0.13	0.00	10.00	19.70	Line 1	NA	- 40.30	0.009
14.750	5.37	Av	1.00	0.14	0.00	10.01	16.51	Line 1	- 43.49	NA	0.009

Intertek

Report Number: 100781715DEN-001

Issued: 11/7/2013

14.750	8.12	Qp	1.00	0.14	0.00	10.01	19.26	Line 1	NA	- 40.74	0.009
17.090	10.14	Av	1.10	0.16	0.00	10.01	21.42	Line 1	- 38.58	NA	0.009
17.090	13.39	Qp	1.10	0.16	0.00	10.01	24.67	Line 1	NA	- 35.33	0.009
19.290	15.02	Av	1.10	0.21	0.00	10.02	26.35	Line 1	- 33.65	NA	0.009
19.290	20.52	Qp	1.10	0.21	0.00	10.02	31.85	Line 1	NA	- 28.15	0.009
25.000	23.52	Av	1.20	0.20	0.00	10.04	34.96	Line 1	- 25.04	NA	0.009
25.000	23.72	Qp	1.20	0.20	0.00	10.04	35.16	Line 1	NA	- 24.84	0.009
25.070	10.68	Av	1.20	0.20	0.00	10.04	22.12	Line 1	- 37.88	NA	0.009
25.070	15.46	Qp	1.20	0.20	0.00	10.04	26.90	Line 1	NA	- 33.10	0.009
27.120	3.62	Av	1.30	0.16	0.00	10.04	15.11	Line 1	- 44.89	NA	0.009
Multitech 24VDC Unit @ 115VAC/60Hz											
Line 2 (Neutral) Data											
0.160	7.24	Av	0.10	0.04	0.00	9.95	17.33	Line 2	- 48.14	NA	0.009
0.160	32.13	Qp	0.10	0.04	0.00	9.95	42.22	Line 2	NA	- 23.25	0.009
0.180	6.41	Av	0.10	0.03	0.00	9.95	16.49	Line 2	- 47.99	NA	0.009
0.180	30.89	Qp	0.10	0.03	0.00	9.95	40.97	Line 2	NA	- 23.51	0.009
0.200	5.85	Av	0.10	0.03	0.00	9.95	15.93	Line 2	- 47.68	NA	0.009
0.200	29.27	Qp	0.10	0.03	0.00	9.95	39.35	Line 2	NA	- 24.26	0.009
0.240	3.03	Av	0.10	0.03	0.00	9.95	13.11	Line 2	- 48.98	NA	0.009
0.240	21.66	Qp	0.10	0.03	0.00	9.95	31.74	Line 2	NA	- 30.35	0.009
0.280	2.09	Av	0.10	0.03	0.00	9.96	12.17	Line 2	- 48.64	NA	0.009
0.280	14.00	Qp	0.10	0.03	0.00	9.96	24.08	Line 2	NA	- 36.73	0.009
0.480	0.48	Av	0.10	0.02	0.00	9.96	10.57	Line 2	- 45.77	NA	0.009
0.480	6.19	Qp	0.10	0.02	0.00	9.96	16.28	Line 2	NA	- 40.06	0.009
1.375	- 1.55	Av	0.20	0.03	0.00	9.97	8.65	Line 2	- 47.35	NA	0.009
1.375	4.07	Qp	0.20	0.03	0.00	9.97	14.27	Line 2	NA	- 41.73	0.009
4.800	- 3.66	Av	0.30	0.04	0.00	9.98	6.66	Line 2	- 49.34	NA	0.009
4.800	1.82	Qp	0.30	0.04	0.00	9.98	12.14	Line 2	NA	- 43.86	0.009
13.402	- 3.48	Av	0.90	0.13	0.00	10.00	7.55	Line 2	- 52.45	NA	0.009
13.402	13.68	Qp	0.90	0.13	0.00	10.00	24.71	Line 2	NA	- 35.29	0.009
13.550	14.22	Av	0.90	0.13	0.00	10.00	25.25	Line 2	- 34.75	NA	0.009
13.550	30.49	Qp	0.90	0.13	0.00	10.00	41.52	Line 2	NA	- 18.48	0.009
13.570	11.51	Av	0.90	0.13	0.00	10.00	22.54	Line 2	- 37.46	NA	0.009
13.570	29.91	Qp	0.90	0.13	0.00	10.00	40.94	Line 2	NA	- 19.06	0.009
13.882	- 1.13	Av	0.90	0.14	0.00	10.00	9.91	Line 2	- 50.09	NA	0.009
13.882	4.43	Qp	0.90	0.14	0.00	10.00	15.47	Line 2	NA	- 44.53	0.009
14.460	4.65	Av	0.97	0.14	0.00	10.00	15.77	Line 2	- 44.23	NA	0.009
14.460	8.43	Qp	0.97	0.14	0.00	10.00	19.55	Line 2	NA	- 40.45	0.009
17.330	12.63	Av	1.10	0.18	0.00	10.01	23.92	Line 2	- 36.08	NA	0.009
17.330	17.08	Qp	1.10	0.18	0.00	10.01	28.37	Line 2	NA	- 31.63	0.009
25.000	22.62	Av	1.20	0.32	0.00	10.04	34.18	Line 2	- 25.82	NA	0.009
25.000	22.85	Qp	1.20	0.32	0.00	10.04	34.41	Line 2	NA	- 25.59	0.009
25.070	12.65	Av	1.20	0.32	0.00	10.04	24.21	Line 2	- 35.79	NA	0.009
25.070	16.02	Qp	1.20	0.32	0.00	10.04	27.58	Line 2	NA	- 32.42	0.009
27.000	8.65	Av	1.29	0.24	0.00	10.04	20.22	Line 2	- 39.78	NA	0.009
27.000	11.04	Qp	1.29	0.24	0.00	10.04	22.61	Line 2	NA	- 37.39	0.009

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

Notes:

- 1) The product was tested in the following product options: Power-Over-Ethernet (POE) and 12/24VDC. Tx active during testing – normal operation.
- 2) Covers RSS-Gen, Section 7.2.4 – Table 2.

Deviations, Additions, or Exclusions: None

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

10 Telecom Port Conducted Emissions (CISPR 22) – Test not Applicable

10.1 Method

Unless otherwise stated no deviations were made from CISPR 22: 2008.

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

10.2 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>

10.3 Results:

Not Applicable

10.4 Setup Photographs:

10.5 Pre-scan Plots: Reference Only - Not Final Data

10.6 Final Plots:

10.7 Test Data:

Notes: Test not required.

Deviations, Additions, or Exclusions:

Intertek	
Report Number: 100781715DEN-001	Issued: 11/7/2013

11 Occupied Bandwidth (OBW) – RSS-GEN, Section 4.6.1

11.1 Method

Unless otherwise stated no deviations were made from RSS-GEN:2010, Section 4.6.1.

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

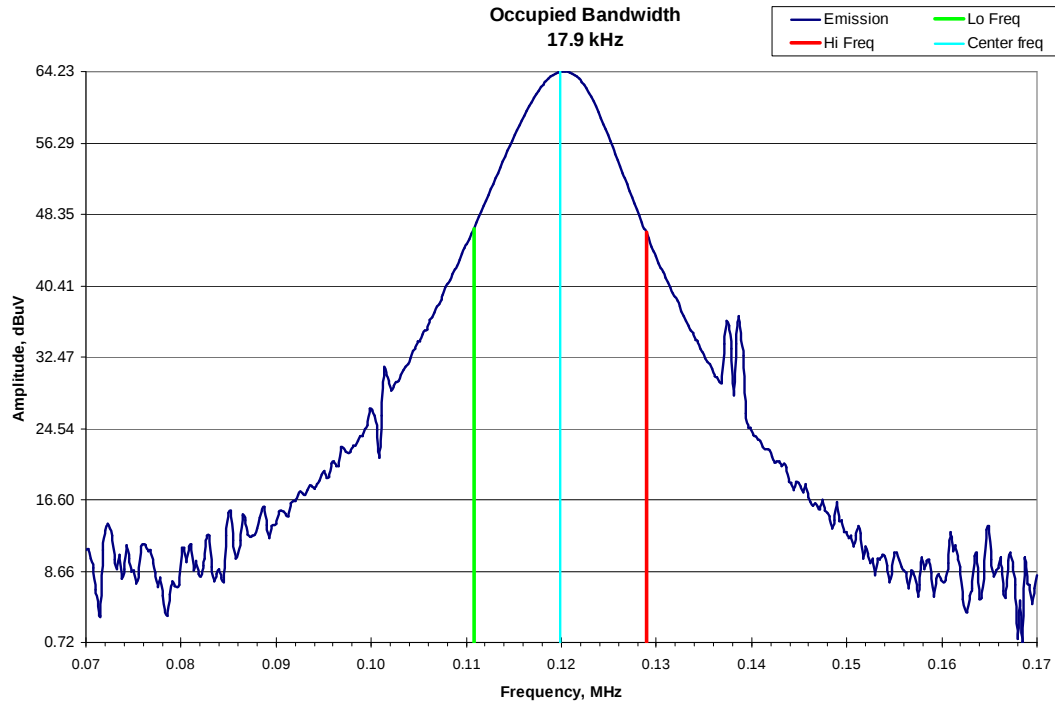
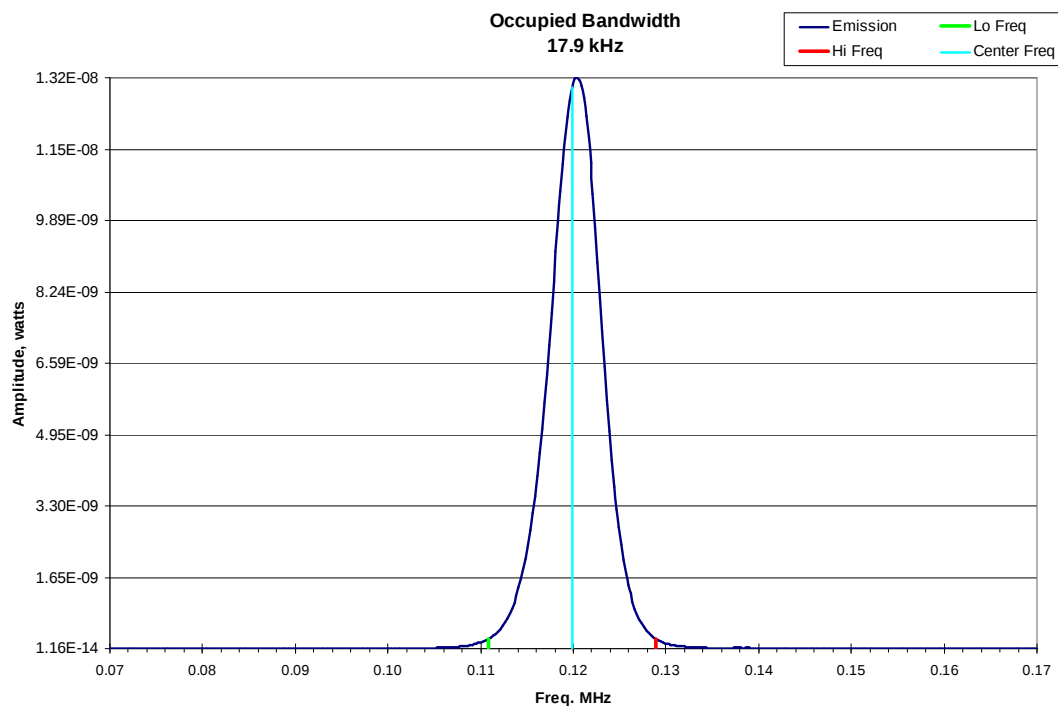
11.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	07/16/2012	07/16/2013
18897	Active Loop Antenna	EMCO	6502	9205-2738	11/22/2011	11/22/2012
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_Vba	V003	VBU	VBU

11.3 Results:

The product tested was found to comply.

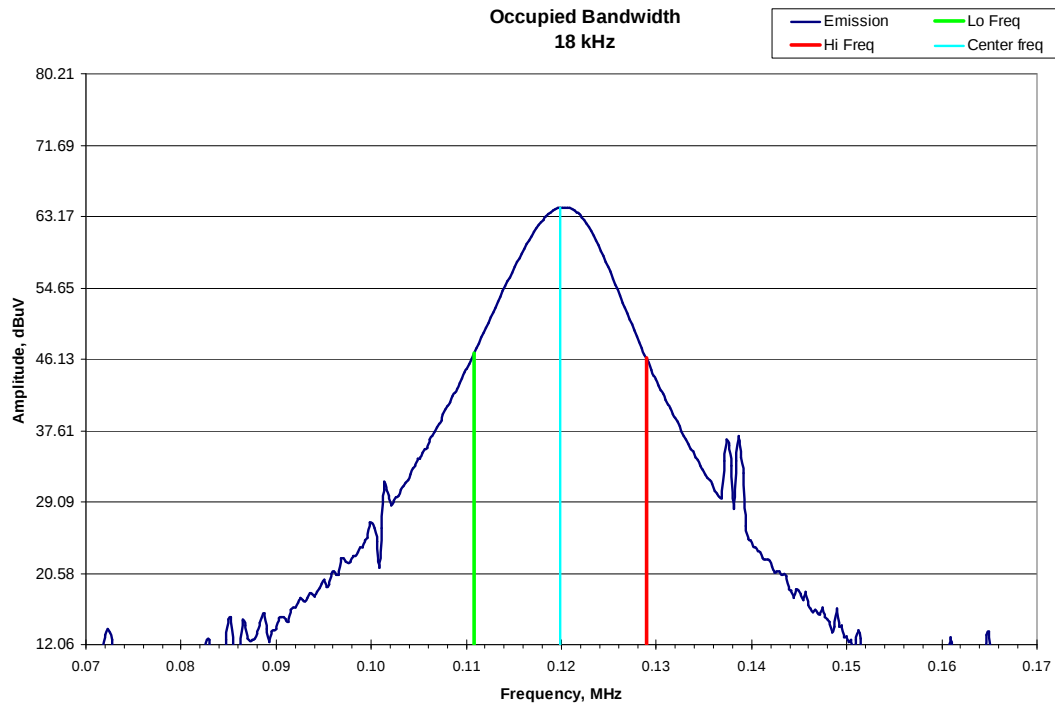
11.4 Setup Photographs:

11.5 Final Plots: 122.8kHz Tx**Occupied Bandwidth - (RSS-GEN, Section 4.6.1) – 122.8kHz Tx****Loop Parallel (122.8kHz)****Field Strength Graph****Power Graph**

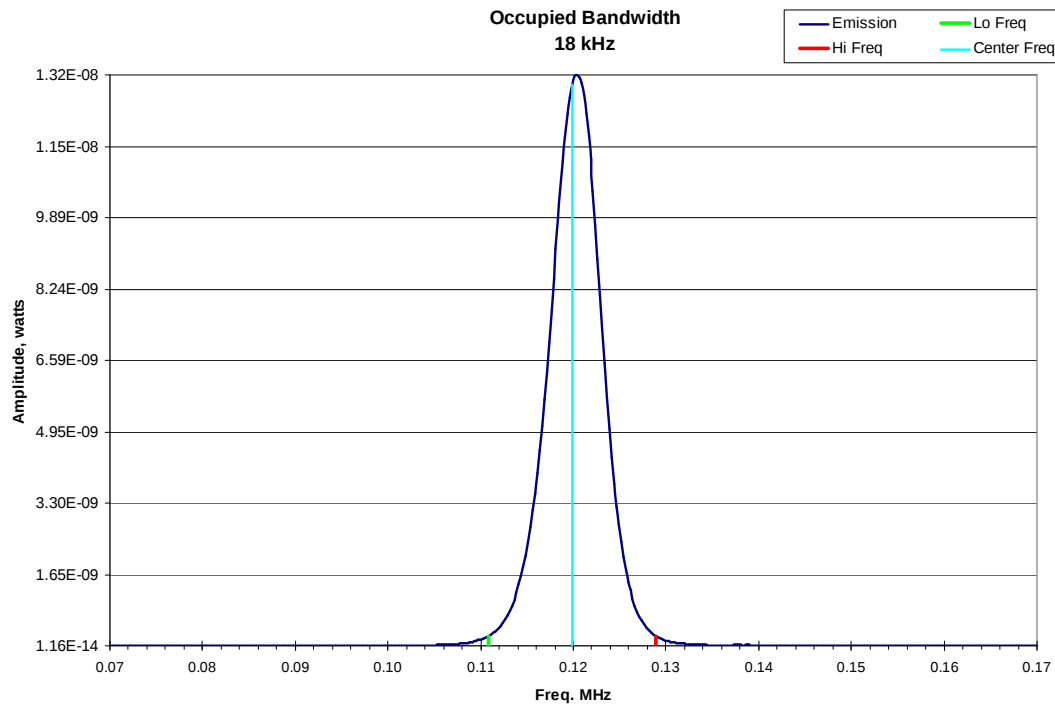
Occupied Bandwidth - (RSS-GEN, Section 4.6.1)

Loop Perpendicular (122.8kHz)

Field Strength Graph



Power Graph

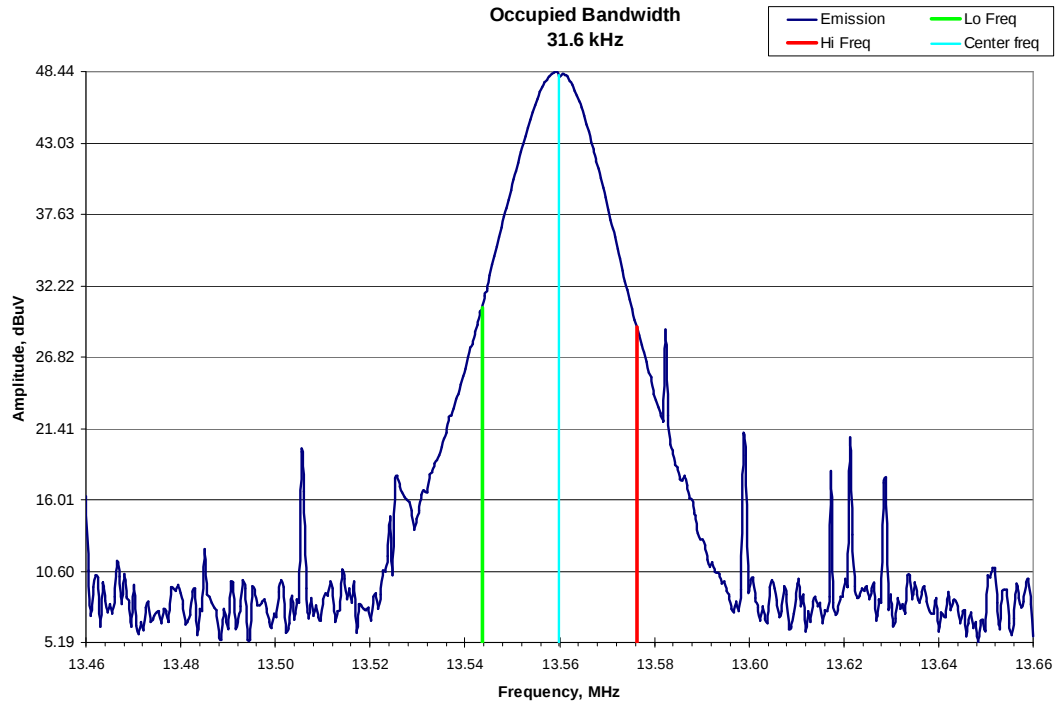


11.6 Final Plots: 13.56MHz Tx

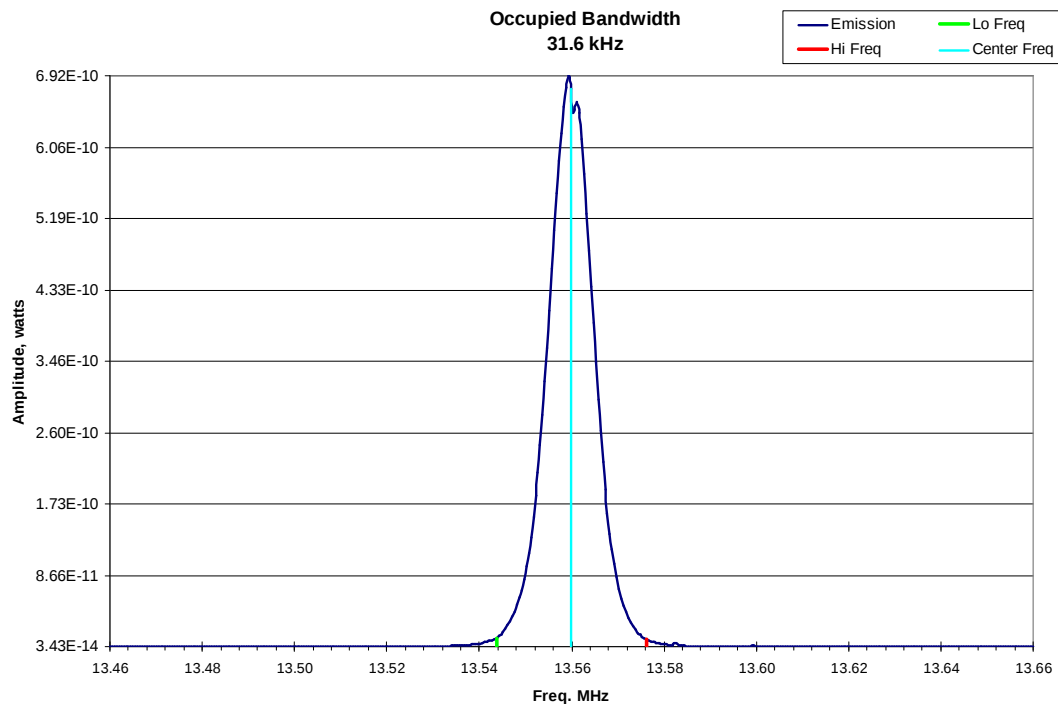
Occupied Bandwidth - (RSS-GEN, Section 4.6.1) – 13.56MHz Tx

Loop Parallel (13.56MHz)

Field Strength Graph



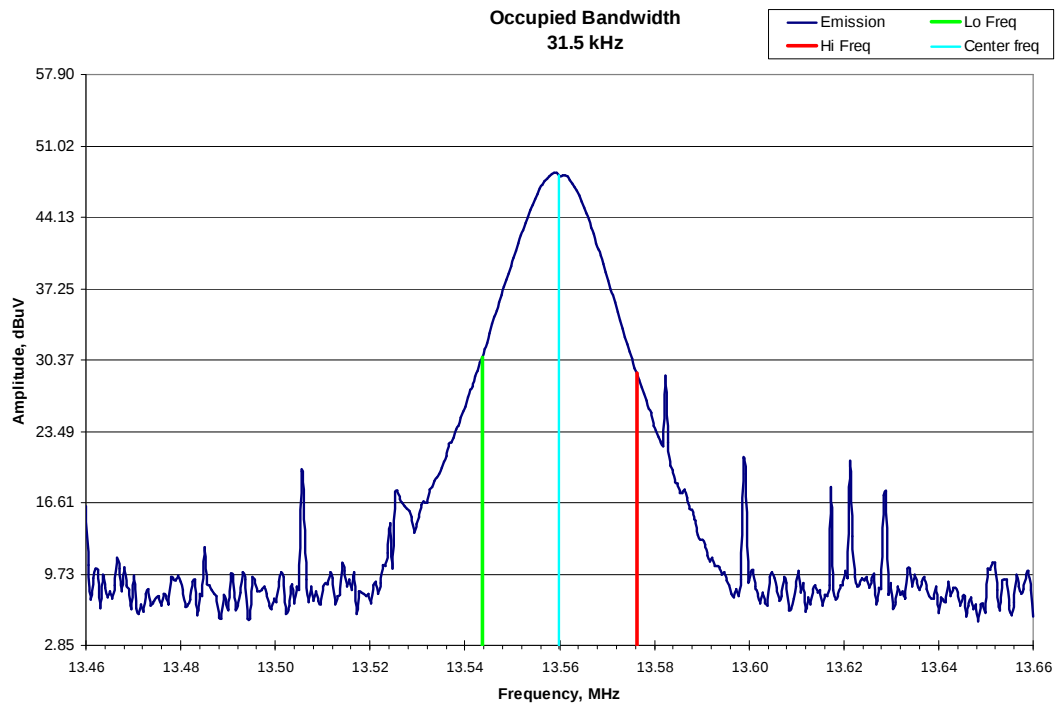
Power Graph



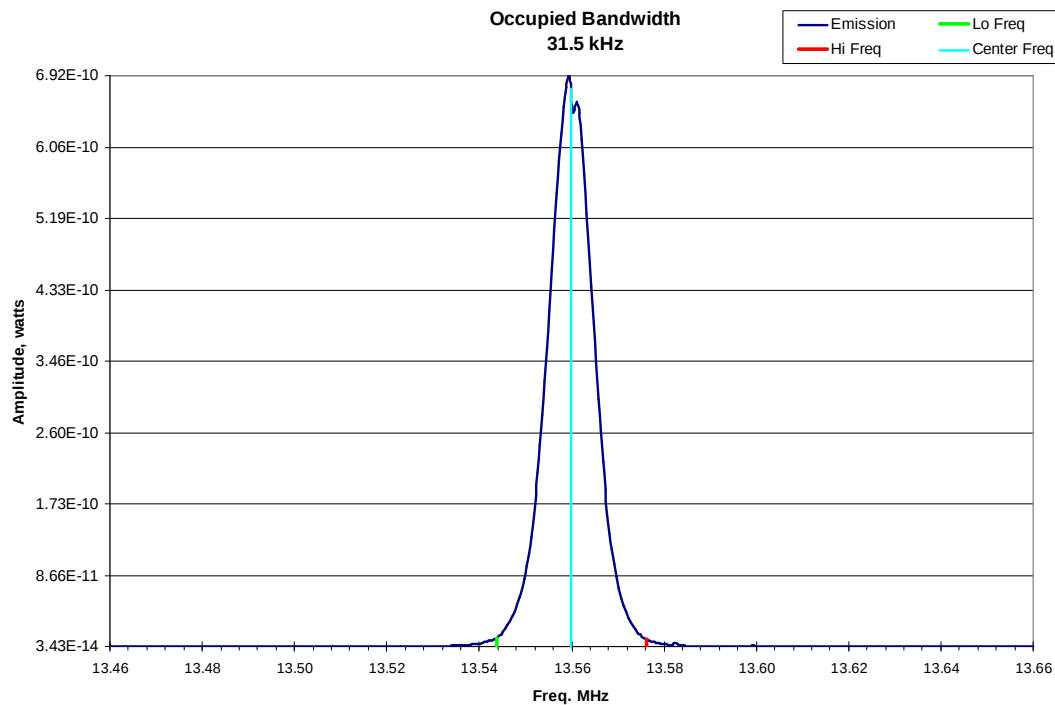
Occupied Bandwidth - (RSS-GEN, Section 4.6.1)

Loop Perpendicular (13.56MHz)

Field Strength Graph



Power Graph



Notes: Measured OBW for the Tx 122.8kHz: 8kHz
Measured OBW for the Tx 13.56MHz: 31.6kHz

12 Product Modifications Required to Pass

12.1 Radiated Emissions

The following product modification was required to pass the Tx Spurious and Unintentional Radiated Emissions testing. Specifically, the POE product configuration exhibited high emissions around 64MHz. Therefore, a ferrite was installed on the Ethernet cable near the product-side.

Refer to photo for details.

12.2 Photo:



Ferrite: Steward Part Number: 28A2026-0A0 (28-Material)

13 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 1000 MHz	4.4 dB	
Radiated emissions, 1 to 18 GHz	4.7 dB	
AC mains Conducted emissions, 9kHz to 30 MHz	3.14 dB	
Disturbance Power 30 to 1000 MHz	3.3 dB	
Telecom Port Conducted emissions, Voltage 150 kHz to 30 MHz	3.11 dB	
Harmonics	-	Meets the requirements specified by the standard.
Flicker	-	Meets the requirements specified by the standard.
ESD	4.4 %	
Radiated RF field immunity 80MHz to 2.7GHz	2.2 dB	
EFT	4.3 %	
Surge	4.3 %	
Conducted RF immunity	2.1 dB	
Power frequency magnetic field immunity	2.3 dB	
Voltage dips / interruptions immunity	0.3 mV	

14 Revision History

Revision Level	Date	Report Number	Notes
0	9/7/2012	100781715DEN-001	Original Issue
1	11/07/2013	100781715DEN-001	Revised Report 1. added notes in section 5 with respect to 10kHz-150kHz RBW deviation 2. added note 4, page 52 with respect to 32kHz oscillator signal <i>R.T.</i>