



EMC TEST REPORT

Report Number: 100360832ATL-001e

Project Number: G100360832

Report Issue Date: May 8, 2014

Product Designation: L90

Standards: CFR47 FCC Part 15 Subpart C:2014 Section 15.225, CFR47 FCC Part 15 Subpart B:2014 Section 15.109
Industry Canada RSS-210 Issue 8 December 2010, Annex 2 Section A2.6
Industry Canada RSS-GEN Issue 3 December 2010

Tested by:
Intertek Testing Services NA, Inc.
1950 Evergreen Blvd, Suite 100
Duluth, GA 30096 USA

Client:
Salto Systems S.L.
Pol. Lanbarren, C/ Arkotz 9
20180-OIARTZUN Gipuzkoa
Spain

Report prepared by Mary Sampson

Mary Sampson/Senior Project Engineer

Report reviewed by

Vathana Van/Senior Project Engineer

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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. 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	Result
3	Client Information	
4	Description of Equipment Under Test	
5	System Setup and Method	
6	Fundamental Frequency Radiated Emissions FCC Part 15 Subpart C: 2014 15.225(a), (b), (c), (d) IC RSS-210 Issue 8 December 2010 Annex A2.6 (a), (b), (c), (d)	Pass
7	Transmitter Spurious Emissions Below 30 MHz FCC Part 15 Subpart C: 2014 15.209, 15.225(d) IC RSS-210 Issue 8 December 2010 A2.6(d)	Pass
8	Transmitter Spurious Emission Above 30MHz FCC Part 15 Subpart C: 2014 15.209, 15.225(d) IC RSS-210 Issue 8 December 2010 A2.6(d)	Pass
9	Receiver Spurious Emissions Above 30MHz FCC Part 15 Subpart B: 2014 15.109 IC RSS-Gen Issue 3 December 2010: Section 6.0	Pass
10	20dB and Occupied Bandwidth FCC Part 15 Subpart C:2014 15.225 IC RSS-Gen Issue 3 December 2010 Section 4.6	Pass
11	Frequency Stability FCC Part 15 Subpart C:2014 15.225(e) IC RSS-Gen Issue 3 December 2010 Section 4.7 IC RSS-210 December 2010 Annex A2.6	Pass
12	Revision History	

Section Test full name**Result****3 Client Information**

This EUT was tested at the request of:

Client: Salto Systems S.L.
Pol. Lanbarren, C/ Arkotz 9
20180-OIARTZUN Gipuzkoa
Spain

Contact: Julen Gutierrez
Telephone: +34 943 344 550
Fax: +34 943 341 621
Email: j.gutierrez@saltosystems.com

4 Description of Equipment Under Test

Manufacturer: Salto Systems S.L.
Pol. Lanbarren, C/ Arkotz 9
20180-OIARTZUN Gipuzkoa
Spain

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
SALTO Locker	Salto systems S.L.	L90	908083

Receive Date:	11/25/2013
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The SALTO L90 is a locker lock designed to bring all the advantages of an electronic access control for locker, and cabinets. Its ergonomic frontal knob has been design to make easier the use of the locker. The electronical and the mechanical components are located on the inside to enhance the security against vandalism or manipulation.

The L90 uses DESfi re Mifare RFID communication and offers no end of interesting possibilities as multi-application with others systems using the same card. Simple and intuitive use and the possibilities that the key can any shape make this system a good option for your special needs.

The L90 is perfect for controlling access to lockers, cupboards, cabinets, cabins, boxes, show cases, where access control and full audit trailing are required, eg where valuables such as medical drugs, electronic equipment, museum pieces, confidential documentation, are stored.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
4.5 Vdc	Standby 28uA Opening 180mA	DC	DC

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	The EUT was powered with 3.825 to 5.175 Vdc by power supply during frequency stability testing and 3 ‘AAA’ batteries for remaining test cases and placed in a continuous transmit state with normal modulation and standby mode for testing.

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	None

5 System Setup and Method

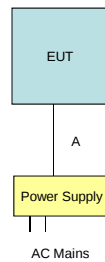
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
A	DC Input	2.0	None	None	Power Supply

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Power Supply	Tektronix	PS2510G	TW50295

5.1 Method:

Configuration as required by ANSI C63.4-2003.

5.2 EUT Block Diagram:



General notes: For Frequency Stability, a power supply was used to power device. All other test cases, battery powered.

6 Fundamental Frequency Radiated Emissions

6.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C: 2014 15.225(a)(b)(c)(d), IC RSS-210 Issue 8 December 2010 A2.6(a)(b)(c)(d), ANSI C63.4-2003.

TEST SITE: 10m Semi-Anechoic Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

Measurement Uncertainty

For radiated emissions, U_{lab} (3.9 dB at 3m and 3.6 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz) $< U_{CISPR}$ (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB/m}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = 32 \text{ dB}\mu\text{V/m}$$

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$
$$NF = \text{Net Reading in dB}\mu\text{V}$$

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
213108;	EMI Receiver, Preselector section	Hewlett Packard	85460A	3348A00203	01/03/2013	01/03/2014
213109;	EMI Receiver	Hewlett Packard	8546A	3410A00173	01/03/2013	01/03/2014
213071;	Antenna, Active Loop (1kHz to 30 MHz)	EMCO	6507	9204-1283	04/04/2013	04/04/2014
211897;	Digital Pocket Thermometer and Hydrometer	Mannix	SAM700BAR	none	12/18/2012	12/18/2013
ST-4;	7m Cable, 0.01-18GHz	Storm Products Co.	A81-0303-275.6	12-07-001	08/21/2013	08/21/2014
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/13/2013	05/13/2014
E205;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	9053201 003	05/08/2013	05/08/2014

Software Utilized:

Name	Manufacturer	Version
Tile	Quantum Change	3.4.K.22

6.3 Results:

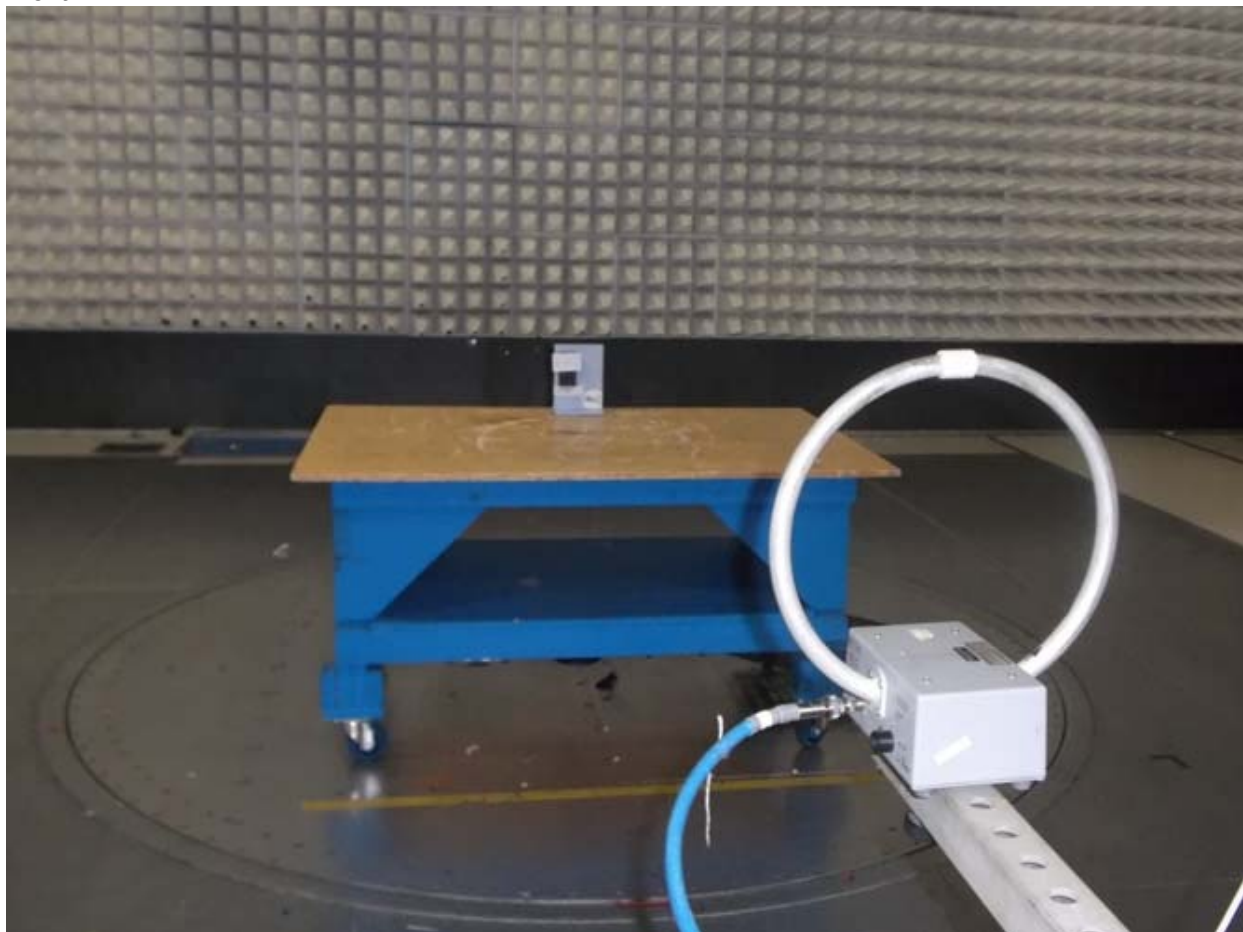
The sample tested was found to Comply.

The Field Strength of any emissions shall not exceed the limits as follows:

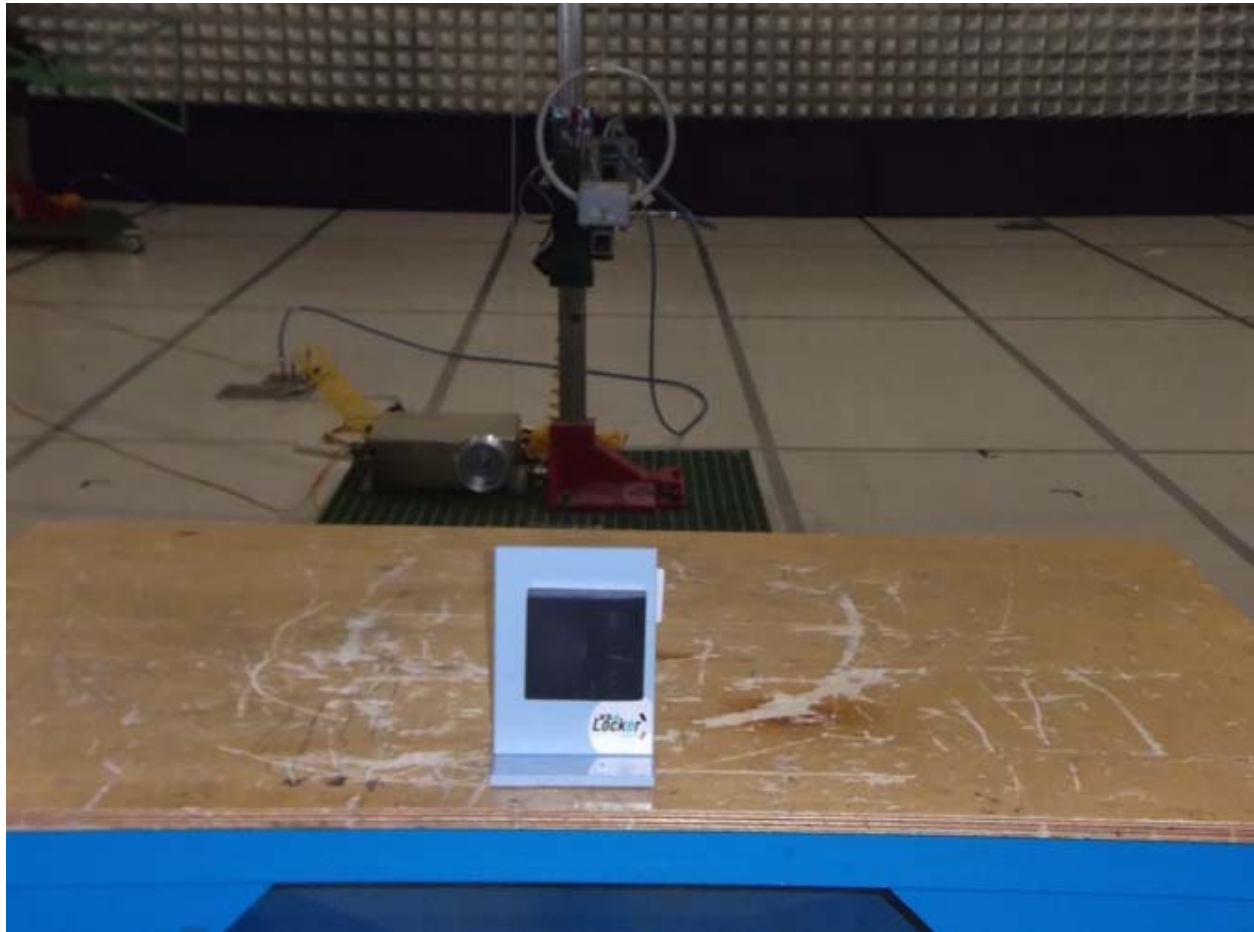
Frequency Bands	Field Strength Limits		Test Distance
(MHz)	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	(meters)
13.553-13.567	15,848	84.0	30
13.410-13.553	334	50.5	30
13.567-13.710	334	50.5	30
13.110-13.410	106	40.51	30
13.710-14.010	106	40.51	30
Outside of 13.110-14.010	§15.209		

6.4 Setup Photographs:

Front



Rear



6.5 Plots/Data:

Client: Salto Systems
Model Number: L90
Project Number: G100360832
Tested By: MS
Date: 12/9/13
Frequency Range (MHz): Fundamental
Input power: Battery, 3x1.5 V =4.5V
Receiver: HP 8546A
Antenna: EMCO 6507 h
Cables: ST-4+MP3+E-205
Preamplifier:
Test Distance (m): 3
Limit: FCC 15
Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
Co-Axial									
V	13.560	32.9	34.4	0.6	0.0	67.8	124.0	-56.2	QP/9k/30k
V	13.553	20.5	34.4	0.5	0.0	55.4	90.5	-35.1	QP/9k/30k
V	13.567	21.3	34.4	0.6	0.0	56.2	90.5	-34.3	QP/9k/30k
V	13.410	9.4	34.4	0.5	0.0	44.3	80.5	-36.2	QP/9k/30k
V	13.710	9.1	34.4	0.6	0.0	44.0	80.5	-36.5	QP/9k/30k
V	13.110	8.0	34.4	0.5	0.0	42.8	69.5	-26.7	QP/9k/30k
V	14.010	7.7	34.4	0.6	0.0	42.7	69.5	-26.8	QP/9k/30k
Co-Planar									
V	13.560	39.2	34.4	0.6	0.0	74.2	124.0	-49.8	QP/9k/30k
V	13.553	26.2	34.4	0.5	0.0	61.1	90.5	-29.4	QP/9k/30k
V	13.567	27.0	34.4	0.6	0.0	61.9	90.5	-28.5	QP/9k/30k
V	13.410	13.6	34.4	0.5	0.0	48.5	80.5	-32.0	QP/9k/30k
V	13.710	12.8	34.4	0.6	0.0	47.7	80.5	-32.8	QP/9k/30k
V	13.110	7.5	34.4	0.5	0.0	42.4	69.5	-27.1	QP/9k/30k
V	14.010	7.3	34.4	0.6	0.0	42.2	69.5	-27.3	QP/9k/30k
Calculations		G=C+D+E-F		I=G-H					

Test Personnel: Mary Sampson
Supervising/Reviewing Engineer:
 (Where Applicable)
Product Standard: FCC 15.225, IC RSS-210
Input Voltage: Battery, 3 AAA
Pretest Verification w/ Ambient Signals or BB Source: BB Source

Test Date: 12/9/13
Limit Applied: Per Section 6.3
Ambient Temperature: 21.7 °C
Relative Humidity: 44.4 %
Atmospheric Pressure: 986.9 mbars

Deviations, Additions, or Exclusions: None

7 Transmitter Spurious Emissions Below 30MHz

7.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C:2014 15.209, 15.225(d), IC RSS-210 Issue 8 December 2010 A2.6(d), ANSI C63.4-2003.

TEST SITE: 10m Semi-Anechoic Chamber

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

Measurement Uncertainty

For conducted emissions, U_{lab} (2.8 dB in worst case) $< U_{CISPR}$ (3.6 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculations

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in dB μ V

RF = Reading from receiver in dB μ V

LF = LISN or ISN Correction Factor in dB

CF = Cable Correction Factor in dB

AF = Attenuator Loss Factor in dB

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

$$NF = \text{Net Reading in dB}\mu\text{V}$$

Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 285.1 \mu\text{V/m}$$

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200162; NYM	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	02/15/2013	02/15/2014
EMC36; 211566;	Antenna, Active Loop (10kHz to 30 MHz)	EMCO	6512	9810-1228	12/02/2013	12/02/2014
	Preamplifier, 100 Hz to 30 MHz	Com-Power	PA-010	171001	11/08/2013	11/08/2014
ST-4;	7m Cable, 0.01-18GHz	Storm Products Co.	A81-0303- 275.6	12-07-001	08/21/2013	08/21/2014
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK- 394	MP3	05/13/2013	05/13/2014
E206;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK- 118	9053201 004	05/13/2013	05/13/2014
211897;	Digital Pocket Thermometer and Hydrometer	Mannix	SAM700BAR	none	12/27/2013	12/27/2014

Software Utilized:

Name	Manufacturer	Version
Tile	Quantum Change	3.4.K.22

7.3 Results:

The sample tested was found to Comply.

The Field Strength of any emissions shall not exceed the limits as follows:

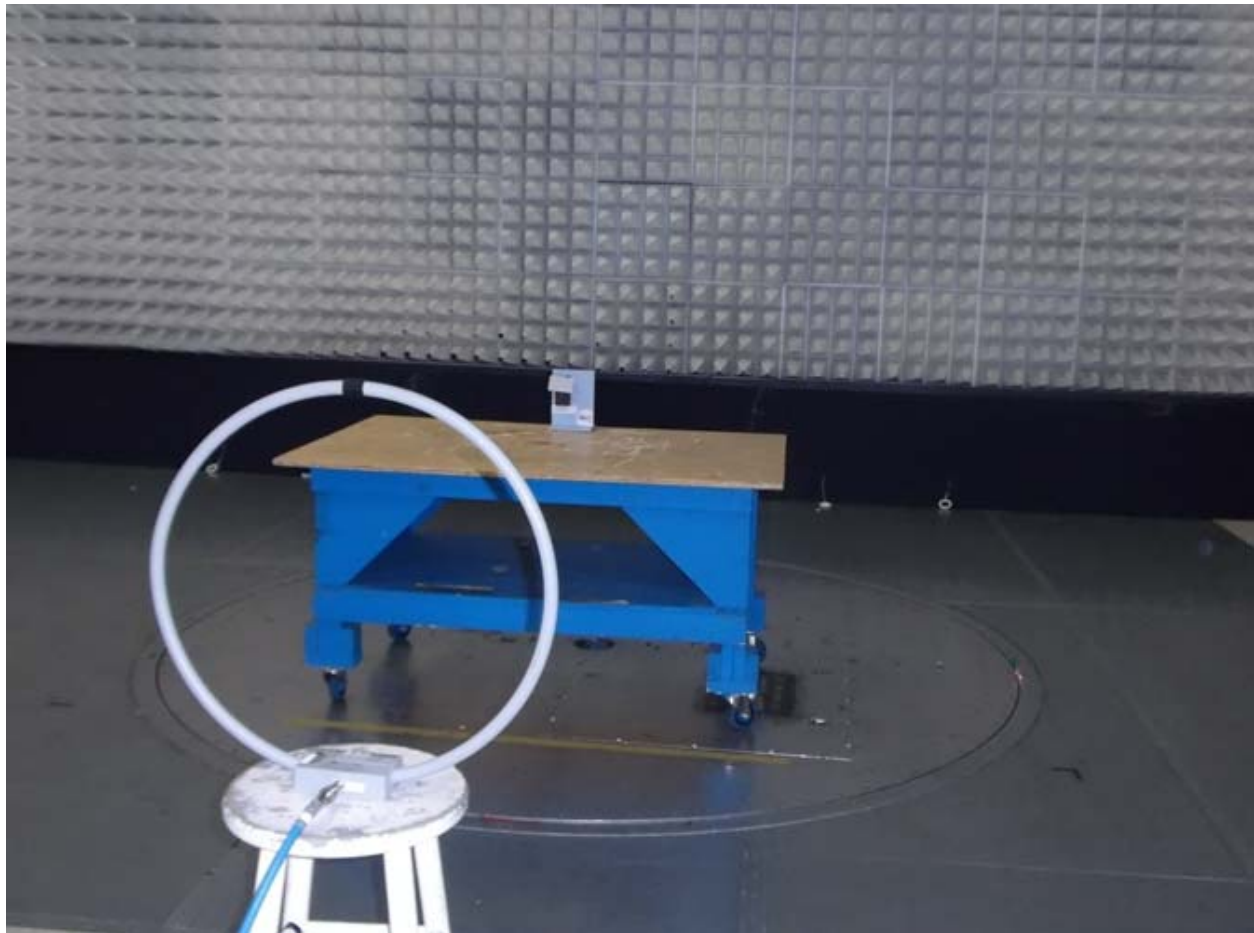
FCC Part 15.209

Frequency	Field Strength		Test Distance
(MHz)	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	(meters)
0.009-0.490	2400/F(kHz)	$20*\text{Log}(2400/\text{F(kHz)})$	300
0.490-1.705	24000/F(kHz)	$20*\text{Log}(24000/\text{F(kHz)})$	30
1.705-30.0	30.00	29.54	30

IC RSS-210 Annex A2.6(d): Emissions outside the band 13.110-14.010 must not exceed 30 microvolts/m (29.5 $\text{dB}\mu\text{V/m}$) at 30 m (69.5 $\text{dB}\mu\text{V/m}$) at 3 m.

7.4 Setup Photographs:

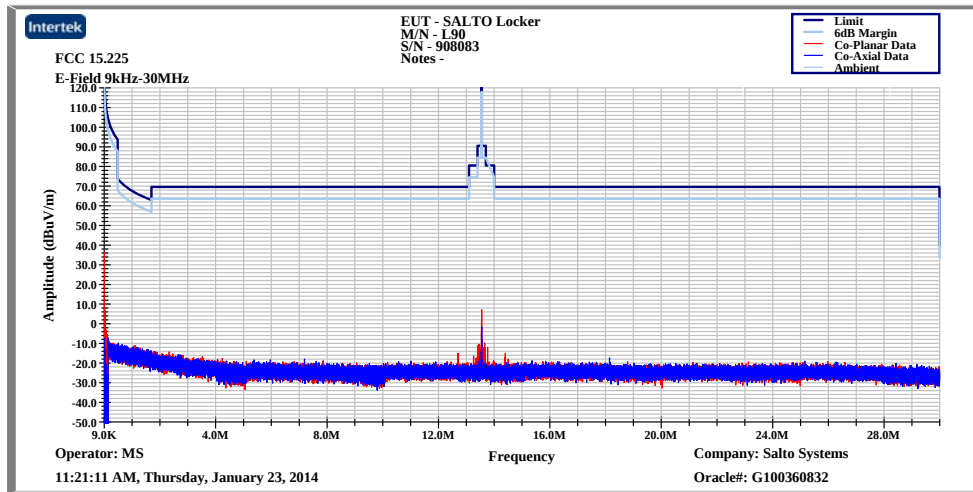
Front



Rear



7.5 Plots/Data:



Test Personnel: Mary Sampson
Supervising/Reviewing
Engineer:
(Where Applicable)
Product Standard: FCC 15.225, IC RSS-210
Input Voltage: Battery, 3 AAA
Pretest Verification w/
Ambient Signals or
BB Source: BB Source

Test Date: 01/23/14

Limit Applied: Per Section 7.3
Ambient Temperature: 22.7 °C
Relative Humidity: 24.2 %
Atmospheric Pressure: 992.4 mbars

Deviations, Additions, or Exclusions: None

8 Transmitter Spurious Above 30MHz

8.1 Method

Tests are performed in accordance with FCC Part Subpart C:2014 15.209, 15.225(d), IC RSS-210 Issue 8 December 2010 A2.6(d), ANSI C63.4-2003.

TEST SITE: 10m Semi-Anechoic Chamber

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
T006217;	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014
213108;	EMI Receiver, Preselector section	Hewlett Packard	85460A	3348A00203	01/03/2013	01/03/2014
213109;	EMI Receiver	Hewlett Packard	8546A	3410A00173	01/03/2013	01/03/2014
211518;	Antenna, BILog, 20-2000MHz	Chase	CBL6112A	2228	03/04/2013	03/04/2014
TW2 211411;	Cable TW2	Andrews	Cable TW2	TW2	05/08/2013	05/08/2014
ST-5;	7m Cable, 0.01-18GHz	Storm Products Co.	A81-0303-275.6	121-07-002	08/05/2013	08/05/2014
E205;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	9053201 003	05/08/2013	05/08/2014
E206;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	9053201 004	05/13/2013	05/13/2014
200074;	Preamplifier, 10 MHz to 2000 MHz, 27 dB gain	Mini-Circuits	ZKL-2	D052005	10/22/2013	10/22/2014

Software Utilized:

Name	Manufacturer	Version
Tile	Quantum Change	3.4.K.22

8.3 Results:

The sample tested was found to Comply.

FCC Part 15.209

Frequency (MHz)	Field Strength		Test Distance (meters)
	$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$	
30-88	100	40.0	3
88-216	150	43.52	3
216-960	200	46.02	3
Above 960	500	53.98	3

IC RSS-210 A2.6(d): emissions outside the band 13.110-14.010 MHz must not exceed 30 microvolts/m (29.5 $\text{dB}\mu\text{V}/\text{m}$) at 30 m (49.5 $\text{dB}\mu\text{V}/\text{m}$) at 3 m.

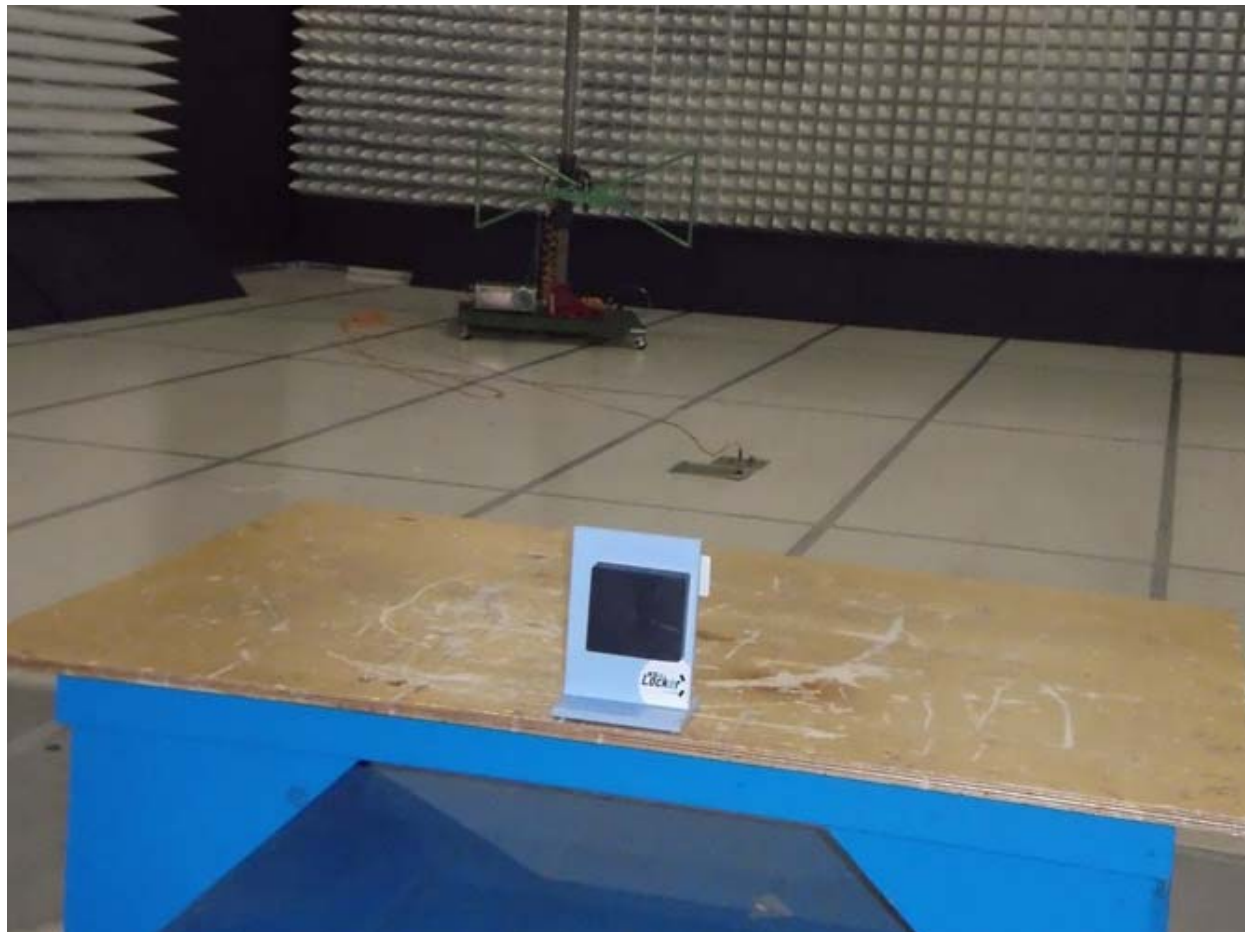
Since the IC RSS-210 limits are less stringent than the FCC 15.209 limits under 960 MHz, the FCC limits were used.

8.4 Setup Photographs:

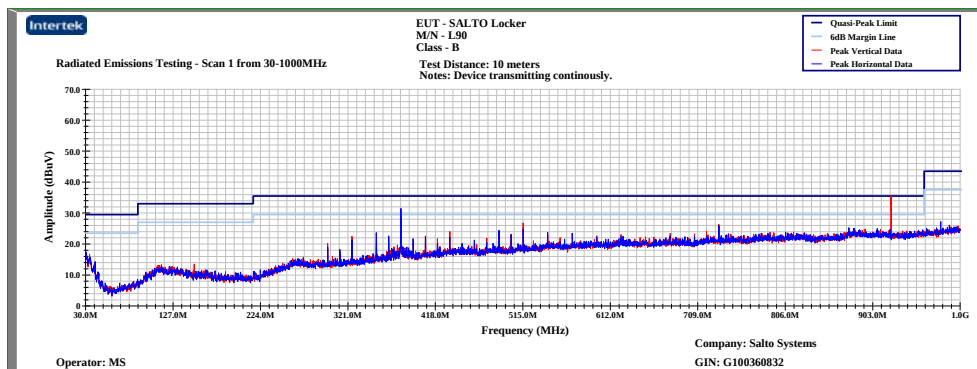
Front



Rear



8.5 Plots/Data:



Client: Salto Systems
Model Number: L90
Project Number: G1001360832
Tested By: MS
Date: 12/17/13
Frequency Range (MHz): 30-1000
Input power: Battery, 3x1.5V=4.5V

Receiver: HP 8546A
Antenna: Chase 2228
Cables: ST-5+TW2+E-205+E-206
Preamp: ZKL-2 200074

Test Distance (m): 10
Limit: FCC15 Class B-10m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	10m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
H	379.685	42.5	15.7	3.2	31.2	30.2	35.5	-5.3	QP/120k/300k
V	433.953	27.9	16.6	3.5	31.2	16.7	35.5	-18.8	QP/120k/300k
V	515.255	29.6	17.6	3.8	31.1	19.9	35.5	-15.6	QP/120k/300k
V	732.260	30.7	19.3	4.7	30.9	23.7	35.5	-11.8	QP/120k/300k
V	924.858	22.3	20.3	5.4	30.7	17.3	35.5	-18.2	QP/120k/300k
H	978.418	22.0	21.5	5.8	30.6	18.6	43.5	-24.9	QP/120k/300k
Calculations		G=C+D+E-F		I=G-H					

Test Personnel: Mary Sampson
Supervising/Reviewing Engineer:
(Where Applicable)
Product Standard: FCC 15.225
Input Voltage: Battery, 3 AAA
Pretest Verification w/ BB Source: Yes

Test Date: 12/17/13
Limit Applied: Per Section 8.3
Ambient Temperature: 21.5 °C
Relative Humidity: 27 %
Atmospheric Pressure: 988 mbars

Deviations, Additions, or Exclusions: None

9 Receiver Spurious Emissions Above 30 MHz

9.1 Method

Tests are performed in accordance with FCC Subpart B:2014 15.109, IC RSS-Gen Issue 3 December 2010, Section 6.0, ANSI C63.4-2003.

TEST SITE: 10m Semi-Anechoic Chamber

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
211897;	Digital Pocket Thermometer and Hydrometer	Mannix	SAM700BAR	none	12/18/2012	12/18/2013
211518;	Antenna, BiLog, 20-2000MHz	Chase	CBL6112A	2228	03/04/2013	03/04/2014
213108;	EMI Receiver, Preselector section	Hewlett Packard	85460A	3348A00203	01/03/2013	01/03/2014
213109;	EMI Receiver	Hewlett Packard	8546A	3410A00173	01/03/2013	01/03/2014
200074;	Preamplifier, 10 MHz to 2000 MHz, 27 dB gain	Mini-Circuits	ZKL-2	D052005	10/22/2013	10/22/2014
ST-5;	7m Cable, 0.01-18GHz	Storm Products Co.	A81-0303-275.6	121-07-002	08/05/2013	08/05/2014
E205;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	9053201 003	05/08/2013	05/08/2014
E206;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	9053201 004	05/13/2013	05/13/2014
TW2 211411;	Cable TW2	Andrews	Cable TW2	TW2	05/08/2013	05/08/2014

Software Utilized:

Name	Manufacturer	Version
Tile	Quantum Change	3.4.K.22

9.3 Results:

The sample tested was found to Comply.

FCC Part 15.109

Frequency	Field Strength		Test Distance
(MHz)	$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$	(meters)
30-88	100	40.0	3
88-216	150	43.52	3
216-960	200	46.02	3
Above 960	500	53.98	3

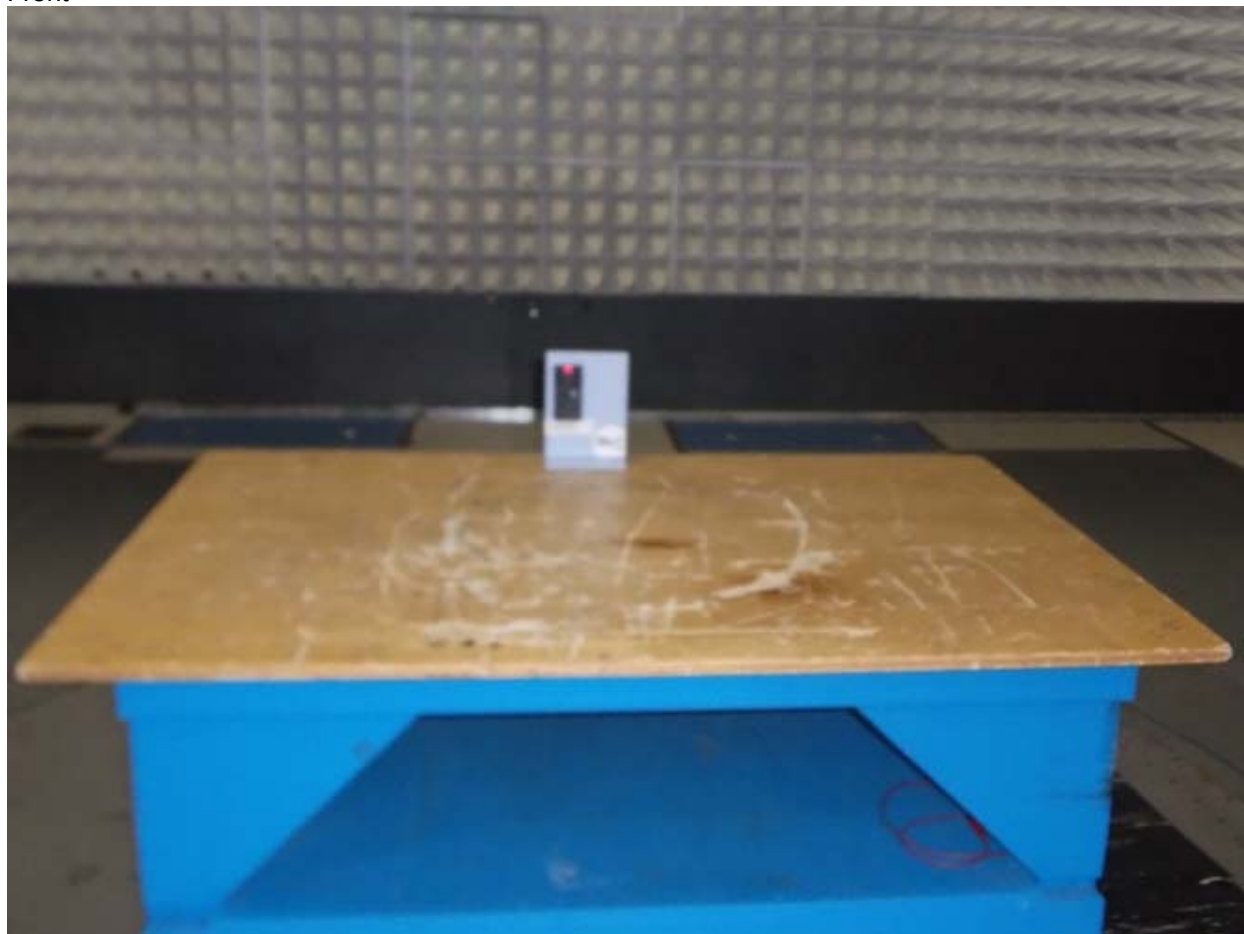
IC RSS-Gen Table 2:

Frequency (MHz)	Field Strength (microvolts/m at 3 metres)*
30-88	100
88-216	150
216-960	200
Above 960	500

*Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 7.2.7.

9.4 Setup Photographs:

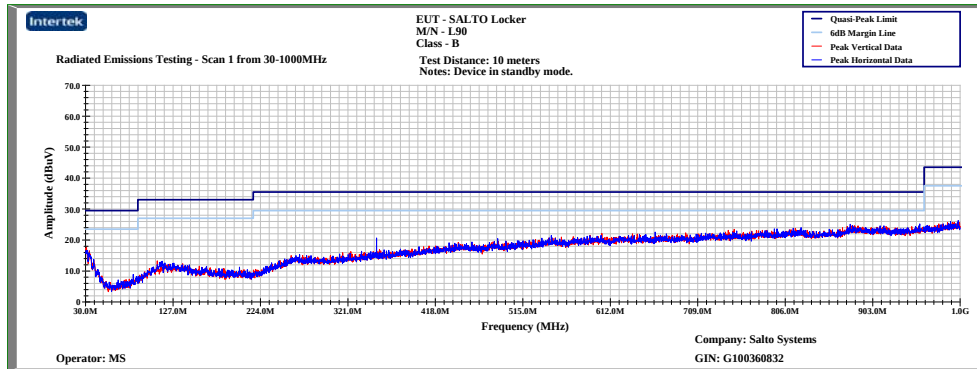
Front



Rear



9.5 Plots/Data:



Client: Salto Systems
Model Number: L90
Project Number: G100360832
Tested By: MS
Date: 12/13/13
Frequency Range (MHz): 30-1000
Input power: Battery, 3xAAA
Receiver: HP 8546A
Antenna: Chase 2228
Cables: ST-5+TW2+E-205+E-206
Preamp: ZKL-2 200074
Test Distance (m): 10
Limit: FCC15 Class B-10m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	10m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
H	352.768	23.2	14.4	3.1	31.3	9.5	35.5	-26.0	QP/120k/300k
H	823.460	22.3	20.5	4.9	30.8	16.8	35.5	-18.7	QP/120k/300k
H	878.023	22.2	20.9	5.1	30.8	17.5	35.5	-18.0	QP/120k/300k
H	955.138	22.0	21.5	5.6	30.7	18.5	35.5	-17.0	QP/120k/300k
H	989.330	22.0	21.6	5.9	30.6	18.9	43.5	-24.6	QP/120k/300k
H	997.817	21.9	21.6	6.0	30.6	18.9	43.5	-24.6	QP/120k/300k
Calculations		G=C+D+E-F		I=G-H					

Test Personnel: Mary Sampson
Supervising/Reviewing Engineer:
 (Where Applicable)
Product Standard: FCC 15.109
Input Voltage: IC RSS-Gen
 Battery, 3 AAA
Pretest Verification w/ BB Source: Yes

Test Date: 12/13/13
Limit Applied: Per section 9.3
Ambient Temperature: 21.6 °C
Relative Humidity: 29.3 %
Atmospheric Pressure: 993.4 mbars

Deviations, Additions, or Exclusions: None

10 20dB and Occupied Bandwidth

10.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C:2014, IC RSS-Gen Issue 3 December 2010 Section 4.6, ANSI C63.4-2003.

TEST SITE: 10m Semi-Anechoic Chamber

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200162;	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	11/21/2013	11/21/2014
NYM						
EMC36;	Antenna, Active Loop (10kHz to 30 MHz)	EMCO	6512	9810-1228	12/02/2013	12/02/2014
T006217;	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014

Software Utilized:

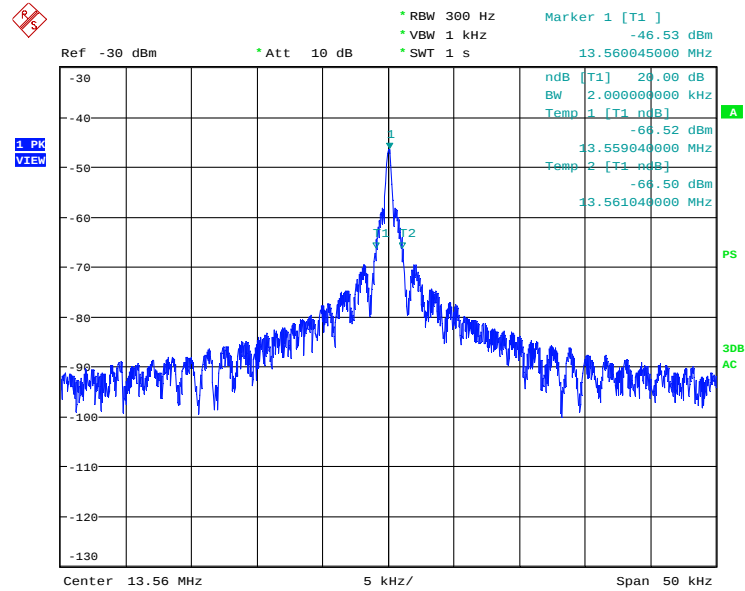
Name	Manufacturer	Version
None (Spectrum Analyzer Firmware)		

10.3 Results:

The sample tested was found to Comply.

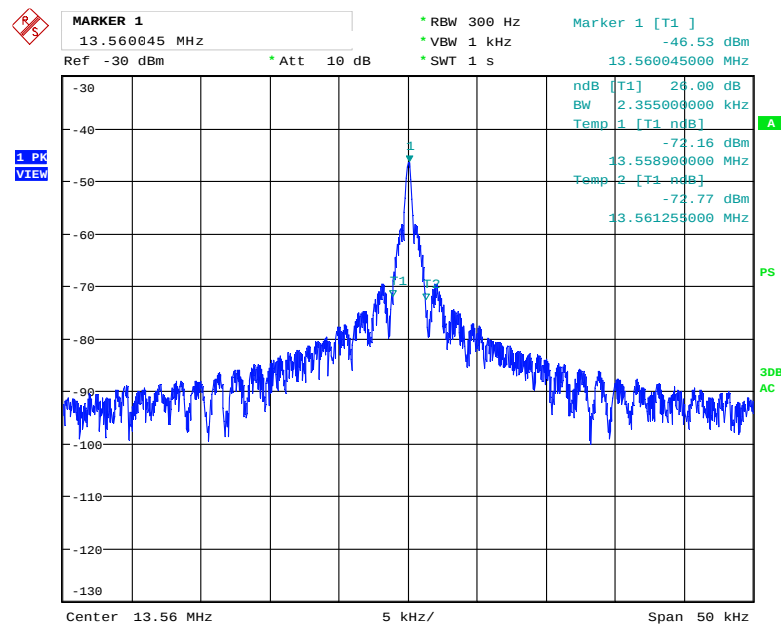
10.4 Data:

20 dB Bandwidth



Date: 8.MAY.2014 11:48:09

Occupied Bandwidth



Date: 8.MAY.2014 11:47:42

Test Personnel: Mary Sampson
 Supervising/Reviewing
 Engineer: _____
 (Where Applicable)
 Product Standard: FCC 15.225, IC RSS-210
 Input Voltage: Battery, 3 AAA
 Pretest Verification w/
 BB Source BB Source

Test Date: 05/08/14

 Ambient Temperature: 23 °C
 Relative Humidity: 39 %
 Atmospheric Pressure: 988 mbars

Notes:

(1) The EUT met the requirements without any degradation of performance.

Deviations, Additions, or Exclusions: None

11 Frequency Stability

11.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C:2012 15.225, IC RSS-GEN Issue 3 December 2010 Section 4.7, IC RSS-210 December 2010 A2.6, ANSI C63.4-2003.

TEST SITE: Temperature/humidity chamber in the Safety Lab

11.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
211678;	Power Supply	Tektronix	PS2510G	TW50295	VBU	Verified
Rental;	EMC Analyzer	Agilent	7405A	MY42000128	8/23/13	8/23/14
211540;	Walk-In Enviromental Chamber	Thermotron	WP-867-THCM1-5-5AC	32891	04/10/2013	04/10/2014
213047;	Multimeter	Fluke	87	65290209	01/09/2013	01/09/2014

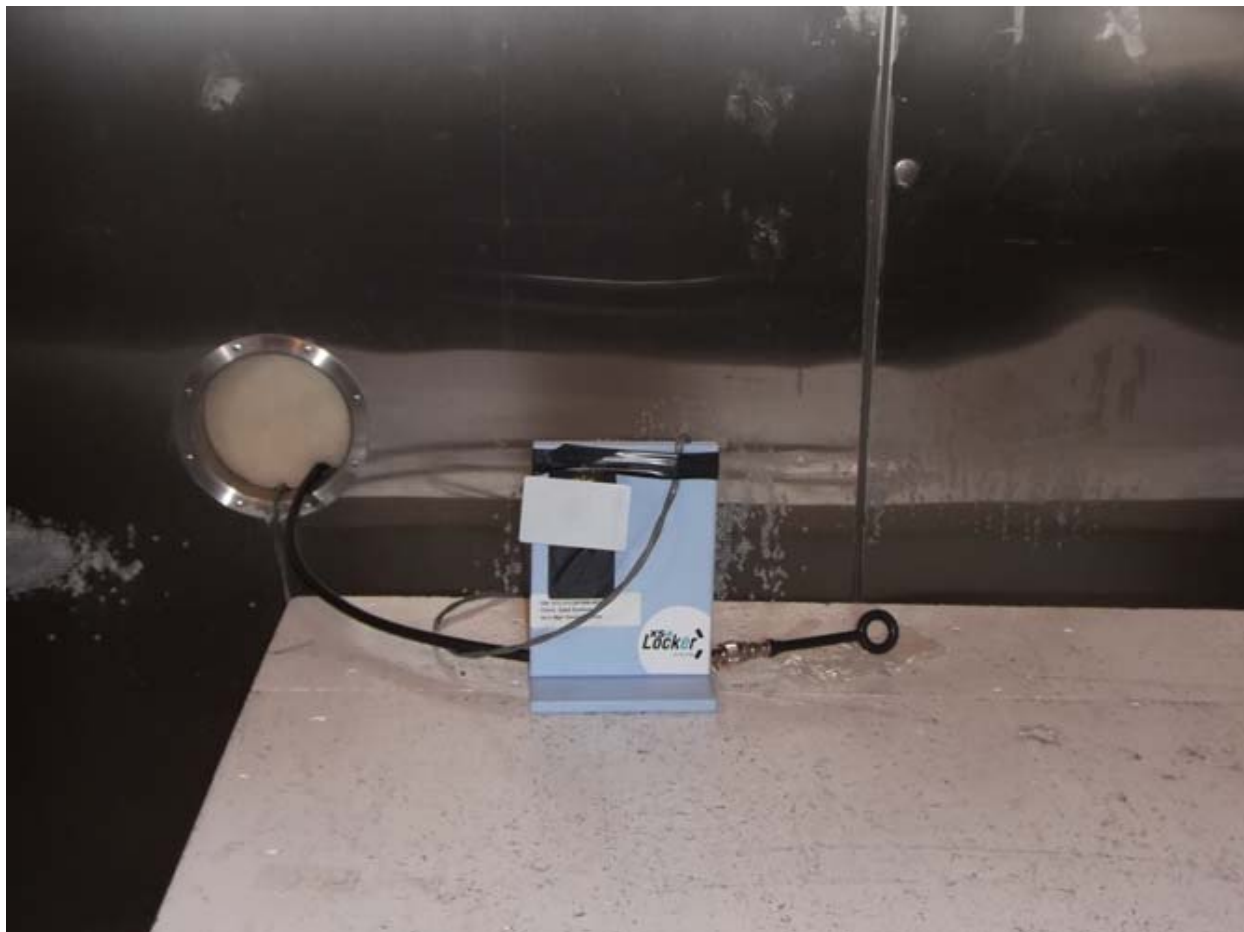
Software Utilized:

Name	Manufacturer	Version
None (Spectrum Analyzer Firmware)		

11.3 Results:

The sample tested was found to Comply.

11.4 Setup Photographs:



11.5 Data:

Intertek									
Frequency Stability									
Company: Salto Systems S.L.					Test Equipment Used:				
Model #: L90									
Serial #: 908083									
Engineer(s): Mary Sampson					Location: Safety				
Project #: G101360832					Date(s): 12/12/13				
Standard: FCC Part 15.225, IC RSS-Gen, IC RSS-210									
Limit: 100 PPM									
Nominal f: 13.56 MHz					Voltage: 4.5 VDC				
	%	Voltage Volts	Frequency MHz	Deviation kHz	Limit kHz	Temp Celsius	Frequency MHz	Deviation kHz	Limit kHz
	-15%	3.825	13.560500	-0.5	1.36	-30	13.561000	0	1.36
	-10%	4.05	13.561000	0	1.36	-20	13.560500	-0.5	1.36
	-5%	4.275	13.560500	-0.5	1.36	-10	13.561500	0.5	1.36
	+0%	4.5	13.561000	0	1.36	0	13.560500	-0.5	1.36
	+5%	4.725	13.560500	-0.5	1.36	10	13.561000	0	1.36
	+10%	4.95	13.561000	0	1.36	20	13.561000	0	1.36
	+15%	5.175	13.560500	-0.5	1.36	30	13.560500	-0.5	1.36
						40	13.560500	-0.5	1.36
						50	13.561000	0	1.36

Test Personnel: Mary Sampson

Supervising/Reviewing Engineer:
(Where Applicable) FCC 15.225, IC RSS-Gen, IC RSS-210

Product Standard: 3.825 Vdc to 5.175 Vdc

Input Voltage: 3.825 Vdc to 5.175 Vdc

Pretest Verification w/Ambient Signals or BB Source: Ambient Signals

Test Date: 12/12/13

Test Levels: Per Section 11.3

Ambient Temperature: 23.2 °C

Relative Humidity: 36.4 %

Atmospheric Pressure: 995.0 mbars

Notes:

(1) The EUT met the requirements without any degradation of performance.

Deviations, Additions, or Exclusions: None

12 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	01/24/2014	101360832ATL-001e	MS <i>MTS</i>	VV <i>VV</i>	Original Issue
1	05/08/2014	101360832ATL-001e	MS <i>MTS</i>	VV <i>VV</i>	Updated with comments from TCB Reviewer.