

EMC TEST REPORT

Report Number: 100360832ATL-001f

Project Number: G100360832

Report Issue Date: May 8, 2014

Product Designation: AE9

Standards: CFR47 FCC Part 15 Subpart C: 2014 Section 15.209, 15.225, CFR47
FCC 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 15.215 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
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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 AEElement Lock	Salto Systems S.L.	AE9	922068

Receive Date:	01/24/2014
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The Salto AEElement is a 13,56Mhz RFID Contactless Smart Card wall reader. The unit reads encrypted data from the carriers and then communicates it to the door controllers.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
4.5 Vdc	Standby 30mA Opening 100mA	DC	DC

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	The EUT was powered by 3 "AAA" batteries during emissions testing and by power supply with 4.5Vdc during frequency stability testing and placed in a continuous transmit state with normal modulation for testing.
2	

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	None

5 System Setup and Method

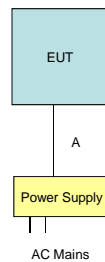
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
A	DC Input	1.6	None	None	Power Supply

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 dB μ V
 AF = 7.4 dB/m
 CF = 1.6 dB
 AG = 29.0 dB
 FS = 32 dB μ 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 = Net Reading in dB μ 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
211505;	EMI Receiver	Hewlett Packard	8546A	3650A00362	10/01/2013	10/01/2014
015762;	EMI Receiver, Preselector section	Hewlett Packard	85460A	3330A00158	04/05/2013	04/05/2014
NYM-EMC-36	Antenna, Loop, Passive (10 kHz - 30 MHz)	EMCO	6512	9810-1228	12/02/2013	12/02/2014
T006217;	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014
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
E204;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	9053201 001	05/13/2013	05/13/2014

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 (MHz)	Field Strength Limits		Test Distance (meters)
	$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$	
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:

<p>Client: Salto Systems Model Number: AE9 Project Number: G100360832 Tested By: MS Date: 2/25/14 Frequency Range (MHz): Fundamental Input power: Battery, 3xAAA</p>	<p>Receiver: HP 8546A Antenna: EMCO 6512 Cables: ST-4+MP3+E-204 Preamp: Test Distance (m): 3 Limit: FCC 15.225</p>
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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	20.2	33.4	0.7	0.0	54.3	124.0	-69.7	QP/9K/30K
V	13.553	8.1	33.4	0.7	0.0	42.2	90.5	-48.3	QP/9K/30K
V	13.567	8.6	33.4	0.7	0.0	42.7	90.5	-47.8	QP/9K/30K
V	13.410	-2.4	33.4	0.7	0.0	31.7	80.5	-48.8	QP/9K/30K
V	13.710	-2.4	33.3	0.7	0.0	31.6	80.5	-48.9	QP/9K/30K
V	13.110	-2.3	33.5	0.7	0.0	31.8	69.5	-37.7	QP/9K/30K
V	14.010	-2.4	33.3	0.7	0.0	31.6	69.5	-37.9	QP/9K/30K
Co-Planar									
V	13.560	21.3	33.4	0.7	0.0	55.4	124.0	-68.6	QP/9K/30K
V	13.553	8.3	33.4	0.7	0.0	42.3	90.5	-48.2	QP/9K/30K
V	13.567	8.8	33.4	0.7	0.0	42.9	90.5	-47.6	QP/9K/30K
V	13.410	-2.4	33.4	0.7	0.0	31.7	80.5	-48.8	QP/9K/30K
V	13.710	-2.4	33.3	0.7	0.0	31.6	80.5	-48.9	QP/9K/30K
V	13.110	-2.4	33.5	0.7	0.0	31.7	69.5	-37.8	QP/9K/30K
V	14.010	-2.4	33.3	0.7	0.0	31.6	69.5	-37.9	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: 02/25/14
 Limit Applied: Per Section 6.3
 Ambient Temperature: 22.5 °C
 Relative Humidity: 26 %
 Atmospheric Pressure: 983 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
NYM-EMC-36;	Antenna, Loop, Passive (10 kHz - 30 MHz)	EMCO	6512	9810-1228	12/02/2013	12/02/2014
T006217;	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014
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
E204;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	9053201 001	05/13/2013	05/13/2014
015762;	EMI Receiver, Preselector section	Hewlett Packard	85460A	3330A00158	04/05/2013	04/05/2014
211505;	EMI Receiver	Hewlett Packard	8546A	3650A00362	10/01/2013	10/01/2014

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

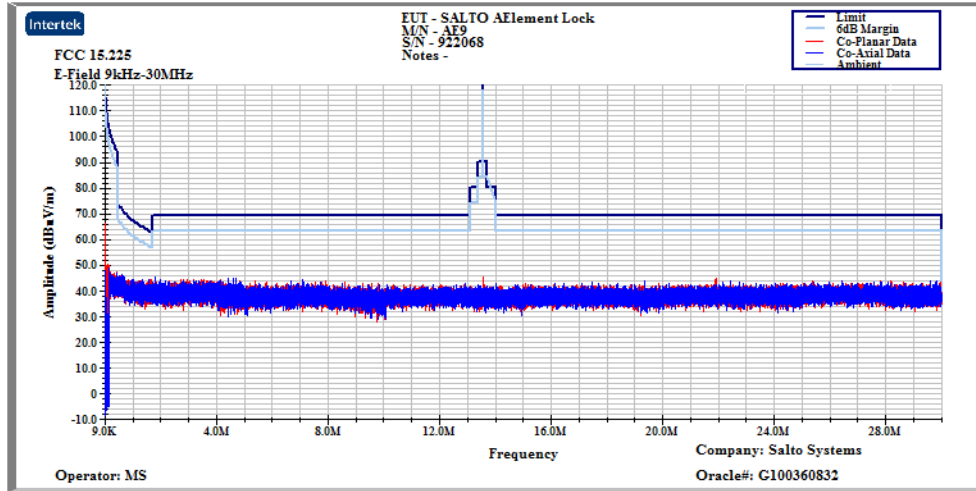
Front



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: 02/25/14
 Limit Applied: Per Section 7.3
 Ambient Temperature: 22.5 °C
 Relative Humidity: 26 %
 Atmospheric Pressure: 983 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
211386;	Antenna, BiLog, 20-2000MHz	Chase	CBL6112B	2622	12/12/2013	12/12/2014
211505;	EMI Receiver	Hewlett Packard	8546A	3650A00362	10/01/2013	10/01/2014
015762	EMI Receiver, Preselector section	Hewlett Packard	85460A	3330A00158	04/05/2013	04/05/2014
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
E204;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	9053201 001	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
200082;	Preamplifier, 20MHz to 2GHz, 30 dB	A.H. Systems	PAM-0202	203	10/22/2013	10/22/2014
T006217;	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014

Software Utilized:

Name	Manufacturer	Version
Tile	Quantum Change	3.4.K.22

8.3 Results:

The sample tested was found Non-compliant.

FCC Part 15.209

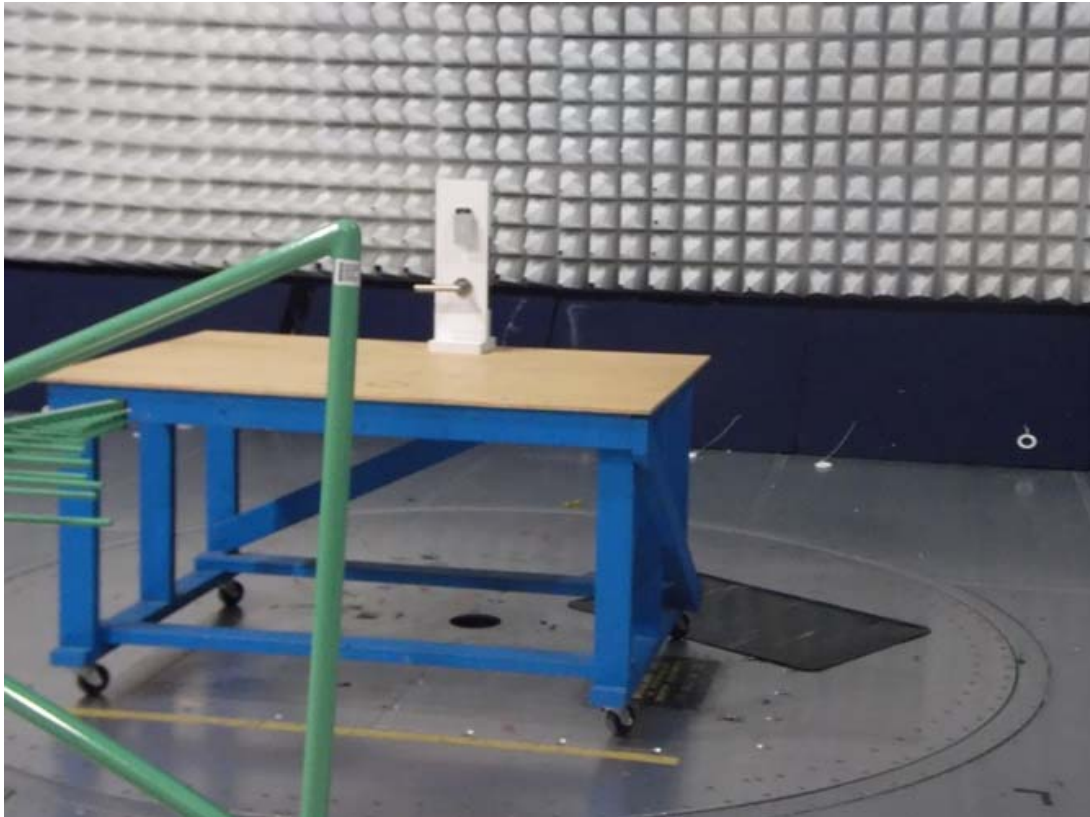
Frequency (MHz)	Field Strength		Test Distance (meters)
	$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$	
30-88	100	40.0	3
88-216	150	43.52	3
216-960	200	46.02	3
Above 960	500	53.98	3

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:

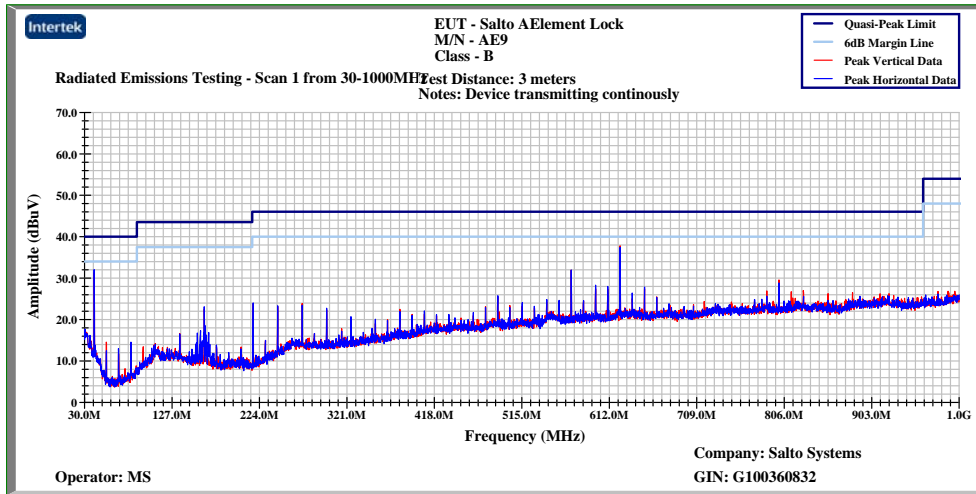
Front



Rear



8.5 Plots/Data:



Client: Salto Systems	Receiver: HP 8546A
Model Number: AE9	Antenna: Chase 2622
Project Number: G100360832	Cables: ST-4+MP3+E-204+E-206
Tested By: MS	Preamp: PAM-0202
Date: 2/25/14	
Frequency Range (MHz): 30-1000	Test Distance (m): 3
Input power: Battery, 3xAAA	Limit: FCC15 Class B-3m

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)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
H	40.670	42.5	11.7	1.5	31.6	24.1	40.0	-15.9	QP/120K/300K
H	162.748	42.0	11.2	2.8	31.4	24.6	43.5	-18.9	QP/120K/300K
H	216.968	42.7	10.7	3.3	31.3	25.4	46.0	-20.6	QP/120K/300K
H	569.550	36.0	19.2	5.2	31.0	29.4	46.0	-16.6	QP/120K/300K
V	623.783	44.1	19.7	5.5	31.0	38.3	46.0	-7.7	QP/120K/300K
V	800.080	34.5	21.0	6.2	30.7	31.0	46.0	-15.0	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: 02/25/14
 Limit Applied: Per Section 8.3
 Ambient Temperature: 22.5 °C
 Relative Humidity: 26 %
 Atmospheric Pressure: 983 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
211386;	Antenna, BiLog, 20-2000MHz	Chase	CBL6112B	2622	12/12/2013	12/12/2014
211505;	EMI Receiver	Hewlett Packard	8546A	3650A00362	10/01/2013	10/01/2014
015762;	EMI Receiver, Preselector section	Hewlett Packard	85460A	3330A00158	04/05/2013	04/05/2014
ST4;						
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/13/2013	05/13/2014
E204;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	9053201 001	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
200082;	Preamplifier, 20MHz to 2GHz, 30 dB	A.H. Systems	PAM-0202	203	10/22/2013	10/22/2014
T006217;	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014

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 (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-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:

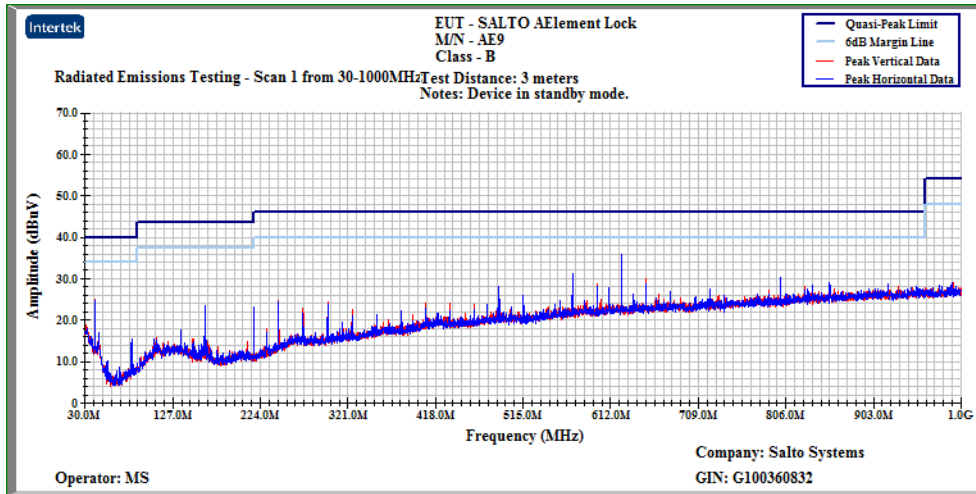
Front



Rear



9.5 Plots/Data:



Client: Salto Systems
 Model Number: AE9
 Project Number: G100360832
 Tested By: MS
 Date: 2/25/14
 Frequency Range (MHz): 30-1000
 Input power: Battery, 3xAAA

Receiver: HP 8546A
 Antenna: Chase 2622
 Cables: ST-4+MP3+E-204+E-206
 Preamp: PAM-0202

Test Distance (m): 3
 Limit: FCC15 Class B-3m

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)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
V	40.708	46.5	14.2	1.5	31.6	30.6	40.0	-9.4	QP/120K/300K
V	162.735	51.5	10.7	2.8	31.4	33.7	43.5	-9.8	QP/120K/300K
H	569.538	35.0	19.2	5.2	31.0	28.4	46.0	-17.6	QP/120K/300K
H	623.795	41.1	19.5	5.5	31.0	35.1	46.0	-10.9	QP/120K/300K
H	650.918	34.1	19.6	5.6	30.9	28.4	46.0	-17.6	QP/120K/300K
H	800.068	34.2	20.4	6.2	30.7	30.1	46.0	-15.9	QP/120K/300K
Calculations		G=C+D+E-F			I=G-H				

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

Test Date: 02/25/14
 Limit Applied: Per section 9.3
 Ambient Temperature: 22.5 °C
 Relative Humidity: 26 %
 Atmospheric Pressure: 983 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-EMC-36;	Antenna, Loop, Passive (10 kHz - 30 MHz)	EMCO	6512	9810-1228	12/02/2013	12/02/2014
E206;	Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKKN-118	9053201 004	05/13/2013	05/13/2014
ST-5;	7m Cable, 0.01-18GHz	Storm Products Co.	A81-0303-275.6	121-07-002	08/05/2013	08/05/2014
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKKN-394	MP3	05/13/2013	05/13/2014
T006217;	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014

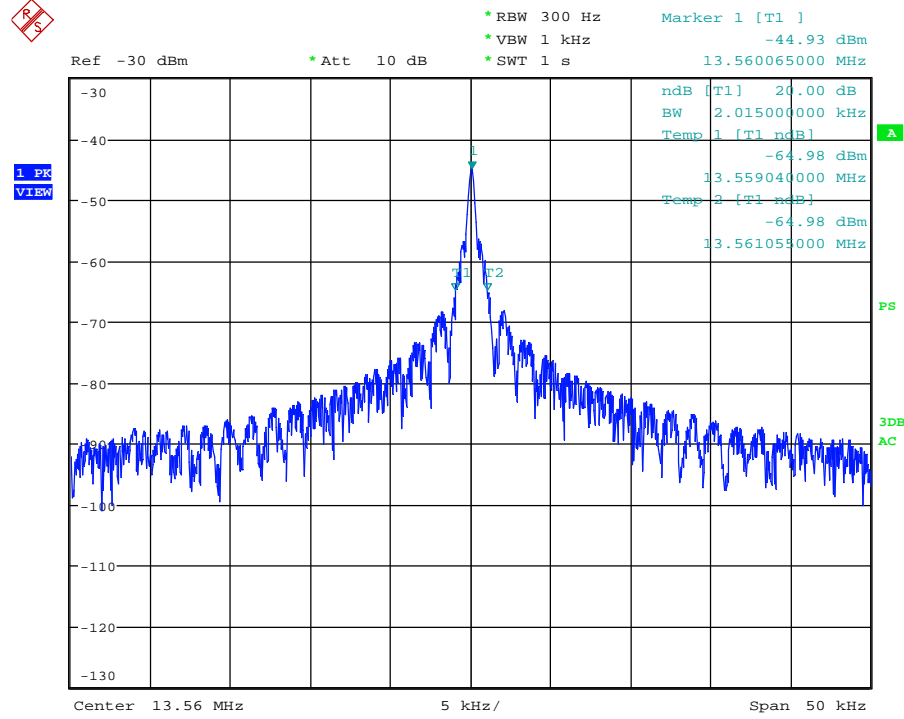
Software Utilized:

Name	Manufacturer	Version
Tile	Quantum Change	3.4.K.22

10.3 Results:

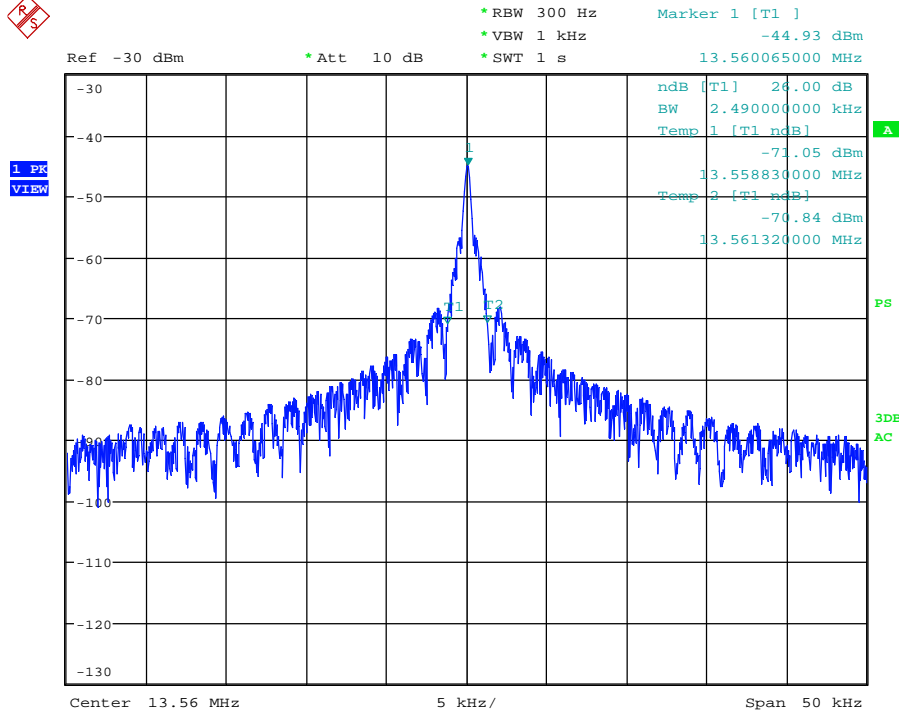
The sample tested was found to Comply.

10.4 Data: 20 dB Bandwidth



Date: 8.MAY.2014 12:45:17

Occupied Bandwidth



Date: 8.MAY.2014 12:46:18

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:2014 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
213109;	EMI Receiver	Hewlett Packard	8546A	3410A00173	01/17/2014	01/17/2015
211540;	Walk-In Enviromental Chamber	Thermotron	WP-867-THCM1-5-5AC	32891	04/10/2013	04/10/2014
212090;	Compact Digital Multimeter	Amprobe	15XP-B	100300808	VBU	Verified

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 #: AE9									
Serial #: 922068									
Engineer(s): Mary Sampson			Location: Safety						
Project #: G100360832			Date(s): 02/26/14						
Standard: FCC Part 15.225, IC RSS-Gen, IC RSS-210									
Limit: 100 PPM			Nominal f: 13.56 MHz		Voltage: 4.5 Vdc				
Done at 20 degree C									
	%	Voltage Volts	Frequency MHz	Deviation kHz	Limit kHz	Temp Celsius	Frequency MHz	Deviation kHz	Limit kHz
	-15%	3.825	13.560250	0	1.36	-30	13.560000	-0.25	1.36
	-10%	4.05	13.560250	0	1.36	-20	13.560000	-0.25	1.36
	-5%	4.275	13.560130	-0.12	1.36	-10	13.560000	-0.25	1.36
	+0%	4.5	13.560250	0	1.36	0	13.560000	-0.25	1.36
	+5%	4.725	13.560130	-0.12	1.36	10	13.560130	-0.12	1.36
	+10%	4.95	13.560130	-0.12	1.36	20	13.560250	0	1.36
	+15%	5.175	13.560250	0	1.36	30	13.560250	0	1.36
						40	13.560250	0	1.36
						50	13.560250	0	1.36

Test Personnel: Mary Sampson
 Supervising/Reviewing Engineer: _____
 (Where Applicable) _____
 Product Standard: FCC 15.225, IC RSS-Gen, IC RSS-210
 Input Voltage: 3.825 to 5.175 Vdc

Test Date: 2/26, 27/14

Test Levels: See table above

Ambient Temperature: 23.5, 21.5°C
 Relative Humidity: 26, 24%
 Atmospheric Pressure: 977 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	02/28/2014	100360832ATL-001f	MS ^{MTS}	VV ^{VSV}	Original Issue
1	05/08/2014	100360832ATL-001f	MS ^{MTS}	VV ^{VSV}	Updated with comments from TCB Reviewer.