



FCC/IC Partial Scope Test Report

FOR

Manufacturer: Securitron Magnalock Corp.

Model Number: R100-1-SE

Product Description: Aperio Wall Mounted Reader

FCC ID: KSF-R1001SE

IC Certification Number: 11564A-R1001SE

FCC CFR 47 Part 15.225

IC RSS-210 Issue 8, Annex 2.6

TEST REPORT #: EMC_HANC1_002_13502_R100_RFID-C

DATE: March 11, 2014



**FCC:
Accredited**

**IC recognized #
3462B-1**

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1 Assessment

The following device, as detailed in section 3 of this test report, was evaluated against the applicable criteria specified in FCC CFR 47 Parts 15.207, 15.209, 15.215, 15.225, and Industry Canada Radio Standard Specification RSS 210 Issue 8, Annex 2.6.

No deviations were ascertained during the course of the tests performed.

This partial scope test report only contains the details of the conducted RF antenna port measurements of the above listed rules. Radiated measurements are documented in a separate test report as identified in section 4.

Manufacturer	Description	Model #
Securitron Magnalock Corp.	Aperio Wall Mounted Reader	R100-1-SE

Responsible for Testing Laboratory:

Franz Engert

March 11, 2014 Compliance (Manager of Compliance)

Date	Section	Name	Signature
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Responsible for the Report:

Josie Sabado

March 11, 2014 Compliance (Test Lab Manager)

Date	Section	Name	Signature
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The test results of this test report relate exclusively to the test item specified in Section 3.

CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Acting Test Lab Manager:	Franz Engert
Test Engineer:	Josie Sabado

2.2 Identification of the Client

Applicant's Name:	Assa Abloy
Street Address:	10027 S. 51st St. Ste. 102
City/Zip Code	Phoenix, AZ 85044
Country	USA
Contact Person:	Josh Peabody
Phone No.	623-582-4626
e-mail:	josh.peabody@assaabloy.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Securitron Magnalock Corp.
Manufacturers Address:	10027 S. 51st St. Ste. 102
City/Zip Code	Phoenix, AZ 85044
Country	USA

3 Equipment under Test (EUT)

3.1 Details of the Equipment under Test

Marketing Name:	R100-1-SE Aperio Reader
Model Number:	R100-1-SE
FCC ID :	KSF-R1001SE
IC Certification Number:	11564A-R1001SE
Product Description:	Aperio Wall Mounted Reader
Technology / Type(s) of Modulation:	RFID, ASK Modulation
Nominal Channel Bandwidth:	500 kHz
Operating Frequency Range (MHz) / Channels:	13.56, 1 Channel
Antenna Information:	Temporary antenna cable soldered to PCB at antenna input, replacing antenna. 1.2 dB cable loss.
Rated Operating Voltage Range:	Battery, type CR2, 3.0V Li-ion
Rated Operating Temperature Range:	-40 °C to +50 °C
Test Sample Status:	Prototype with temporary antenna connector
Other Radios included:	2.4 GHz Zigbee

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version	Note
1	10046	7080058.014	r100_main2_aperio_lowFreq- 0.0.24450_bl-0.0.24450	

3.3 Identification of Accessory equipment

No accessory equipment

3.4 Other EUT Notes

The device was configured with manufacturer provided software, which allowed the EUT to be operated with 100% duty cycle during testing.

4 Summary of Measurement Results

Test Specification	Test Case	Temperature and Voltage Conditions	Pass	Fail	NA	NP	Result
§15.215(c)	20 dB Emission Bandwidth	Nominal	■	□	□	□	Complies
RSS Gen 4.6.1	Occupied Bandwidth	Nominal	■	□	□	□	Complies
§15.225(e) RSS 210 A2.6	Frequency Stability	Extreme	■	□	□	□	Complies
§15.225 (a)(b)(c) RSS 210 A2.6	In Band TX Spurious Emissions Radiated	Nominal	□	□	□	■	Note 1
§15.225(d) §15.209 RSS 210 A2.6	Out of Band TX Spurious Emissions Radiated	Nominal	□	□	□	■	Note 1
§15.207(a)	AC Power Line Conducted Emissions	Nominal	□	□	□	■	Note 1

Note: NA= Not Applicable; NP= Not Performed.

1. Radiated measurements are documented in a separate test report described in section 5.6

5 Measurement Information

5.1 Dates of Testing

November 21, 2013, March 2, 2014

5.2 Measurement Uncertainty

The following measurement uncertainties are applicable to the measurements described in this test report:

Conducted power and emission measurements: +/- 0.5dB

Radiated power and emission measurements: +/- 3.0 dB

5.3 Nominal EUT Conditions During Test

The following nominal EUT conditions were used during the course of testing, unless otherwise stated:

EUT Voltage: External power supply, 3.0 VDC nominal

5.4 Nominal Environmental Conditions During Test

The following nominal environmental conditions were maintained during the course of testing, unless otherwise stated:

Ambient Temperature: 20-25°C

Relative humidity: 40-60%

5.5 RF Antenna Port Conducted Measurement Procedure

1. Connect the EUT to the measurement equipment using the appropriate attenuation and power splitter.
2. Set the EUT to operate in the required mode of operation.
3. Measurements are to be performed with the EUT in all modes of operation.
 - a. All measurements should be performed with the EUT transmitting at full power
 - b. All measurements should be performed with all modulations supported by the EUT

5.6 Associated Test Reports

Radiated measurements are documented in test report number

EMC_HANC1_002_13502_R100_RFID-R issued by CETECOM Inc.

5.7 Other Testing Notes

RF antenna port measurements were performed with a temporary antenna connector/cable with 0 dB loss.

6 Measurement Results

6.1 20 dB Emission Bandwidth

6.1.1 References

§15.215(c)

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band 13.110 – 14.010 MHz.

6.1.2 Spectrum Analyzer Settings

Center Frequency	13.56 MHz
Span	1 MHz
Resolution Bandwidth	30 kHz
Video Bandwidth	100 kHz
Detector	Peak
Trace Mode	Max Hold
Sweep Time	Auto

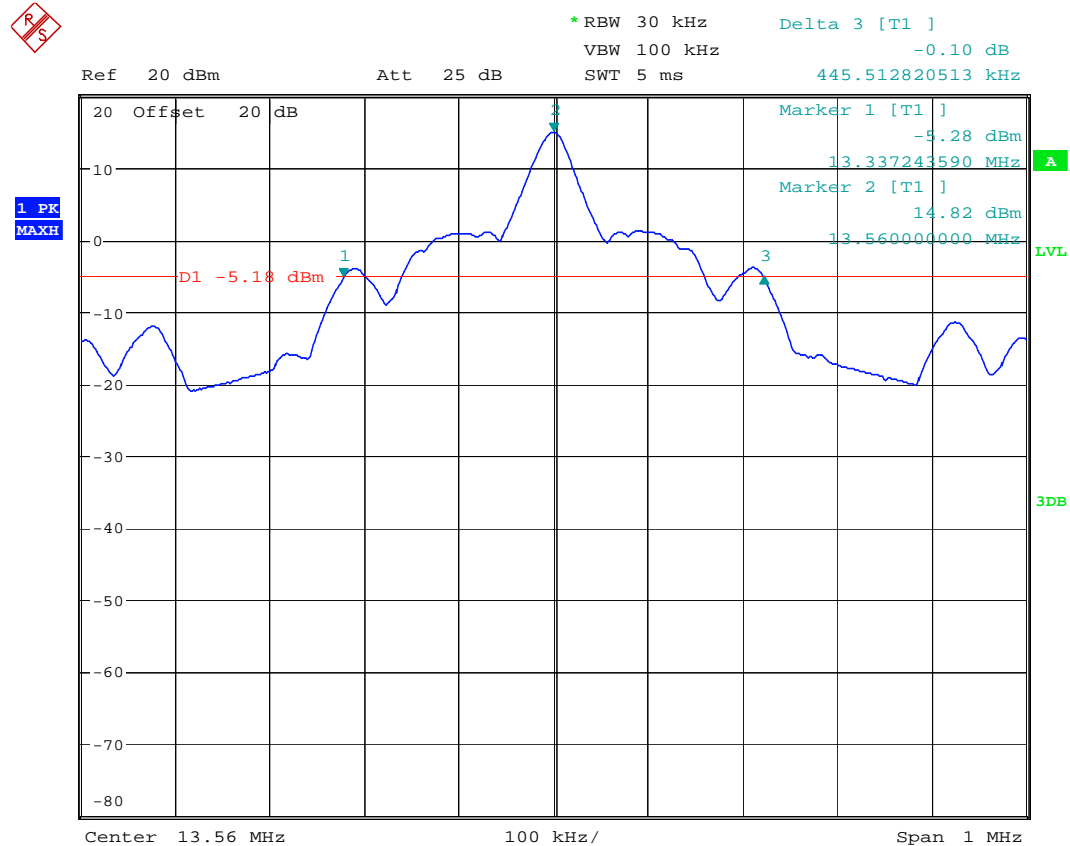
6.1.3 Test Results

20 dB Emission Bandwidth			
Mode	Measured Bandwidth (kHz)	Lower Edge of 20 dB Bandwidth (MHz)	Upper Edge of 20 dB Bandwidth (MHz)
RFID	445.5	13.33	13.78

6.1.4 Measurement Verdict

Pass

6.1.5 Test Plots



low

Date: 2.MAR.2014 14:17:47

6.2 99% Occupied Bandwidth

6.2.1 References

RSS Gen – 4.6.1

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth. No limits are specified.

6.2.2 Spectrum Analyzer Settings

Center Frequency	13.56 MHz
Span	1 MHz
Resolution Bandwidth	30 kHz
Video Bandwidth	100 kHz
Detector	Peak
Trace Mode	Max Hold
Sweep Time	Auto

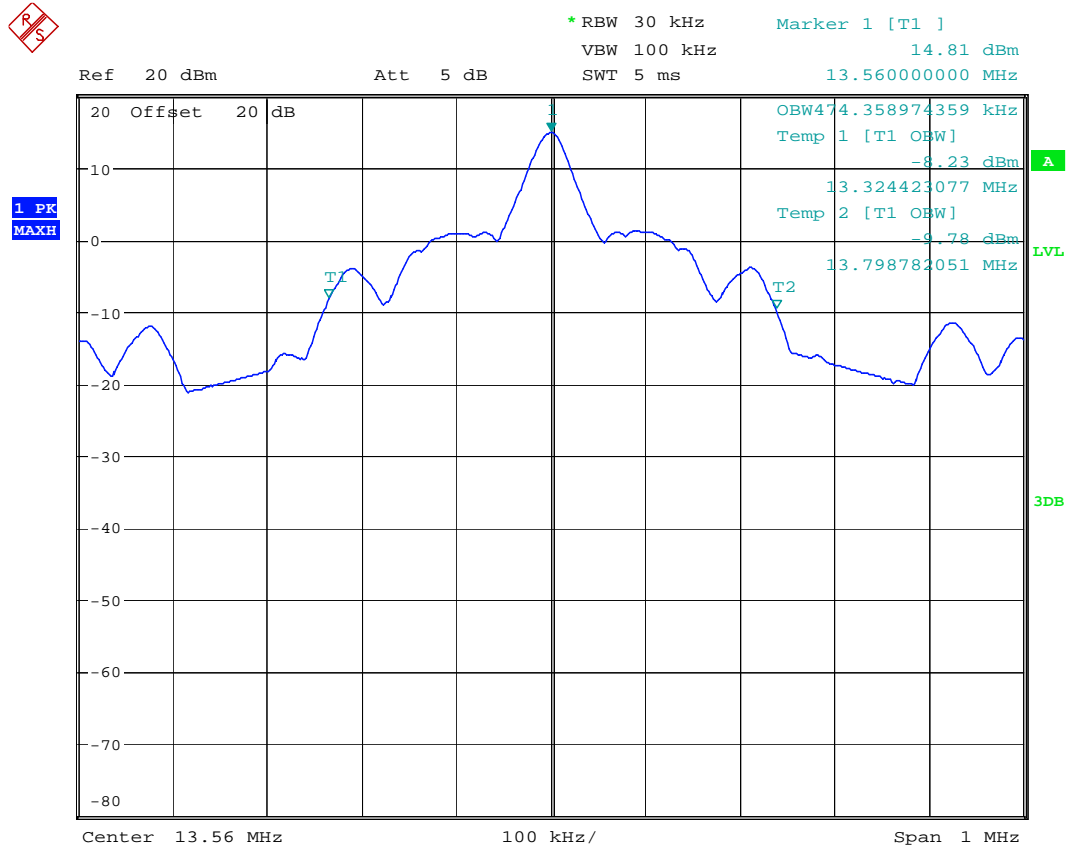
6.2.3 Test Results

Measured Conducted 99% Occupied Bandwidth (kHz)	
Mode	Frequency (MHz)
	13.56
RFID	474.36

6.2.4 Measurement Verdict

Pass

6.2.5 Test Plots



low

Date: 2.MAR.2014 14:08:02

6.3 Frequency Stability

6.3.1 References

§15.225(e)

RSS 210 Section A2.6

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ (± 100 ppm) of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

6.3.2 Testing Notes

Extreme conditions procedure:

1. EUT powered by external power supply at 3.1 VDC to simplify test setup.
2. Subject the EUT to long soak at -20 °C.
3. With the EUT powered via nominal voltage, measure the carrier frequency. These Measurements should be made within 2 minutes of powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10 °C increments from -20 °C to $+50$ °C. Allow at least 1 ½ hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Re-measure carrier frequency at low and high voltage.
6. If equipment is battery powered determine the battery end-point by reducing the voltage until the EUT powers off. Measure the frequency stability at the voltage before the EUT powers off.
7. At all temperature levels hold the temperature to ± 0.5 °C during the measurement procedure.

6.3.3 Test Results

Frequency Error vs. Voltage Temperature: 20 °C		
Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
Nominal V: 3.1	-160.2	-11.81
Battery End-point V: 1.65	-160.2	-11.81

FREQ ERROR vs. TEMPERATURE

Frequency Error vs. Temperature Voltage: 3.1 VDC		
Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)
-20	-160.2	-11.81
-10	-160.2	-11.81
0	-160.2	-11.81
+10	-160.2	-11.81
+20	-160.2	-11.81
+30	-160.2	-11.81
+40	-160.2	-11.81
+50	-160.2	-11.81

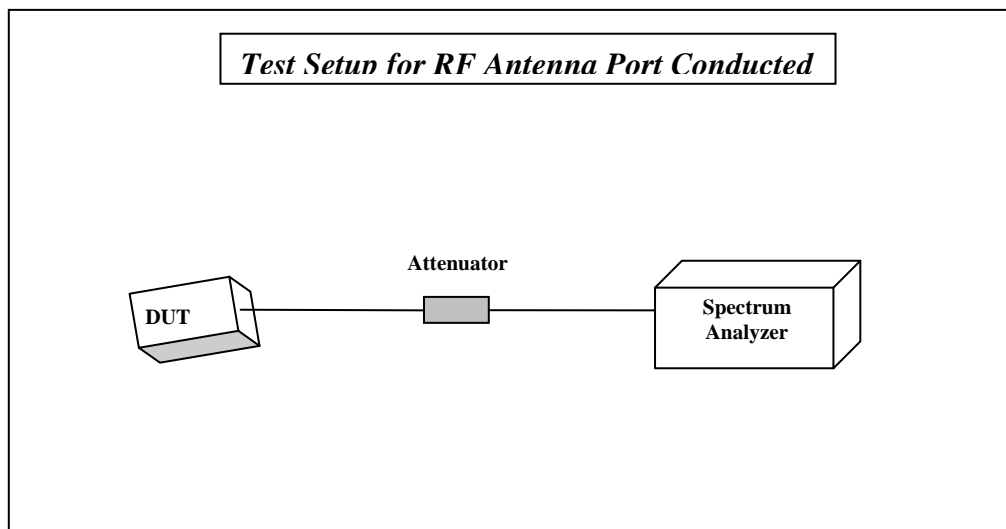
6.3.4 Measurement Verdict

Pass.

7 Test Equipment and ancillaries used for tests

No.	Equipment Name	Manufacturer	Type/model	Serial No.	Cal Date	Cal Interval
3m Semi- Anechoic Chamber:						
	EMC32 Measurement Software	Rohde&Schwarz	8.52.0	N/A	N/A	N/A
	Turn table	EMCO	2075	N/A	N/A	N/A
	MAPS Position Controller	ETS Lindgren	2092	0004-1510	N/A	N/A
	Antenna Mast	EMCO	2075	N/A	N/A	N/A
	Relay Switch Unit	Rohde&Schwarz	RSU	338964/001	N/A	N/A
	EMI Receiver/Analyzer(*)	Rohde&Schwarz	ESU 40	100365	Feb 2013	1 Year
	1500MHz HP Filter	Filtek	HP12/1700	14c48	N/A	N/A
	2800 MHz HP Filter	Filtek	HP12/2800	14C47	N/A	N/A
	Pre-Amplifier	Miteq	JS40010260	340125	N/A	N/A
	Binconilog Antenna	EMCO	3141	0005-1186	Apr 2012	3 Years
	Binconilog Antenna	ETS	3149	J000123908	Feb 2012	3 years
	Horn Antenna	EMCO	3115	35114	Mar 2012	3 Years
	LISN	FCC	50-25-2-08	08014	Jul 2012	2 Year
Ancillary equipment						
	Multimeter	Klein Tools	MM200	001	Apr 2011	3 Years
	Humidity Temperature Logger	Dickson	TM320	03280063	Apr 2013	1 Year
	Digital Barometer	VWR	35519-055	91119547	Nov 2011	3 Years
	DC Power Supply	HP	E3610A	KR83023316	N/A	N/A
	DC Power Supply	Protek	3003B	H012771	N/A	N/A
	Communication Antenna	IBP5-900/1940	Kathrein	N/A	N/A	N/A

8 Test Setup Diagrams



Test Report #: EMC_HANC1_002_13502_R100_RFID-C

FCC ID: KSF-R1001SE

Date of Report: March 11, 2014

IC Cert. No.: 11564A-R1001SE

9 Revision History

Date	Report Name – Changes to Report	Report prepared by
March 11, 2014	EMC_HANC1_002_13502_R100_RFID-C 1. Original Report	J. Sabado