Compliance Testing, LLC
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Test Report

Prepared for: HES, Inc.

Model: K100-620PA

Description: Electronic Cabinet Lock System

To

FCC Part 15.249

Date of Issue: November 7, 2012

On the behalf of the applicant:

HES, Inc.
10027 S. 51st Street
Suite 102
Phoenix, AZ 85044

Attention of:

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Prepared by
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Project No: p12a0007

Greg Corbin
Project Test Engineer

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	November 7, 2012	Greg Corbin	Original Document
2.0	November 13, 2012	Karen Springer	Corrected Operating Frequency on pg 6
3.0	December 12, 2012	Greg Corbin	Added comments for clarification on pg 6 (fresh battery and continuous operation)and pg 12 (20 dB BW statement)

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ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009)

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to http://www.compliancetesting.com/labscope.html for current scope of accreditation.

Testing Certificate Number: **2152.01**

ACCREDITED
TESTING CERT
#2152.01

FCC OATS Reg, #933597

IC Reg. #2044A-1

Non-accredited tests contained in this report:

N/A

The applicant has been cautioned as to the following

15.21: Information to User

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a): Special Accessories

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator the responsible part may employ other methods of ensuring that the special accessories are provided to the consumer, without an additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

Standard Test Conditions Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing.

In accordance with ANSI C63.10-2009 and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements.

Environmental Conditions		
Temperature (Deg C)	**Humidity (%)**	**Pressure (mbar)**
25.1 – 27.7	23.1 – 28.6	970.5 – 975.1

EUT Description

Model: K100-620PA
Description: Electronic Cabinet Lock System

Additional Information:

Door mounted keycard entry system with 2 wireless RF transmitters.
One transmitter is operating at 125 kHz using ASK modulation.
The 2nd transmitter is a DTS transmitter operating at 2.4 GHz with O-QPSK modulation.
The 125 kHz transmitter was not transmitting while testing the 2.4 GHz transmitter.
The EUT is powered by 3.0 v Lithium battery (battery type = CR123A) that is not rechargeable and the EUT never connects to the AC mains.

EUT Operation during Tests

A new battery was used to ensure that the EUT was at the proper operating voltage during the tests.
The transmitter was powered on continuously during the test.
The manufacturer put the EUT in a test mode that provided continuous transmitter operation during the RF tests.

Accessories: None

Cables: None

Modifications: None

15.203: Antenna Requirement:

X The antenna is permanently attached to the EUT

Test Results Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.249(a)	Fundamental Field Strength	Pass	
15.249(d)	Out of Band Spurious Emissions	Pass	
RSS-210	99% Occupied Bandwidth	Pass	

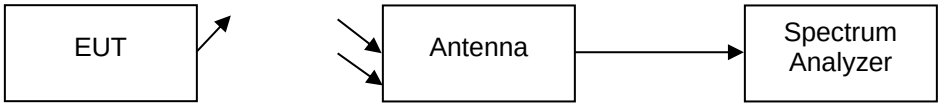
Fundamental Field Strength

Name of Test:	Fundamental Field Strength	**Engineer:** Greg Corbin
Test Equipment Utilized:	i00103, i00331	**Test Date:** 11/5/2012

Test Procedure

The EUT was tested on an Open Area Test Site (OATS) at a distance of 3 meters from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Fundamental Field Strength.

Test Setup



Spectrum Analyzer Settings

Detector Settings	RBW	VBW	Span
Peak	1 MHz	3 MHz	As Necessary
Average	1 MHz	3 MHz	As Necessary

Sample Calculations:

Correction Factors include Antenna and cable insertion loss correction factors.
Measured Level includes correction factors that were input to the spectrum analyzer before recording test data.

Fundamental Field Strength

Tuned Freq (MHz)	Peak Measured Level (dBuV/m)	Peak Limit (dBuV/m)	Result
2405	69.3	114.0	Pass
2440	65.4	114.0	Pass
2475	63.1	114.0	Pass

Tuned Freq (MHz)	Avg Measured Level (dBuV/m)	Avg Limit (dBuV/m)	Result
2405	67.8	94.0	Pass
2440	64.0	94.0	Pass
2475	64.5	94.0	Pass

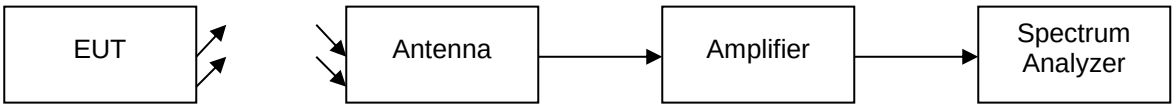
Radiated Spurious Emissions

Name of Test:	Radiated Spurious Emissions	**Engineer:** Greg Corbin
Test Equipment Utilized:	i00267, i00271, i00331	**Test Date:** 11/5/2012

Test Procedure

The EUT was tested on an Open Area Test Site (OATS) at a distance of 3 meters from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions. The spectrum for each tuned frequency was examined to the 10th harmonic. In addition, plots of the radiated spurious emissions at the operating band edges are provided to verify compliance.

Test Setup



Analyzer Settings

Detector Settings	RBW	VBW	Span
Peak	1 MHz	3 MHz	As Necessary
Average	1 MHz	3 MHz	As Necessary
QP	120 kHz	300 kHz	As Necessary

Sample Calculations:

Correction Factors include Antenna and cable insertion loss correction factors.
Measured Level includes correction factors that were input to the spectrum analyzer before recording test data

Radiated Spurious Emissions 30 – 1000 MHz

QP detector

Freq. (MHz)	Peak (dBuV)	C.F. (dBuV)	Calc. (dBuV)	Limit (dBuV)	Margin (dBuV)	Pol (V/H)	Height (cm)	Position (degrees)
40.145	12.970	14.683	27.653	40.000	-12.347	V	110	254
143.997	18.060	13.035	31.095	43.500	-12.405	V	110	254
329.030	6.140	16.095	22.235	46.000	-23.765	V	110	254
569.086	7.850	21.380	29.230	46.000	-16.770	V	110	254
761.973	6.210	24.379	30.589	46.000	-15.411	V	110	254
930.991	6.170	26.900	33.070	46.000	-12.930	V	110	254

Radiated Spurious Emissions above 1 GHz

Peak Detector

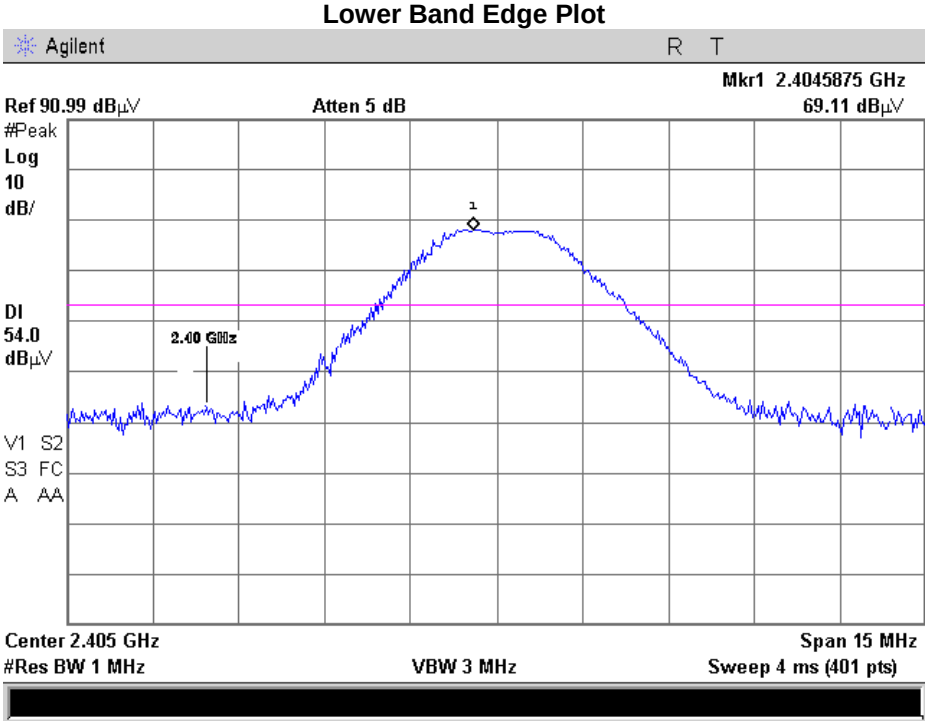
Tuned Freq. (MHz)	Emission Freq. (MHz)	Peak Measured Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2405	4810	31.6	74.0	-42.4
2405	7215	36.3	74.0	-37.7
2405	9620	41.3	74.0	-32.7
2440	4880	31.3	74.0	-42.7
2440	7320	35.9	74.0	-38.1
2440	9760	41.3	74.0	-32.7
2475	4950	33.7	74.0	-40.3
2475	7425	37.8	74.0	-36.2
2475	9900	42.0	74.0	-32

Average Detector

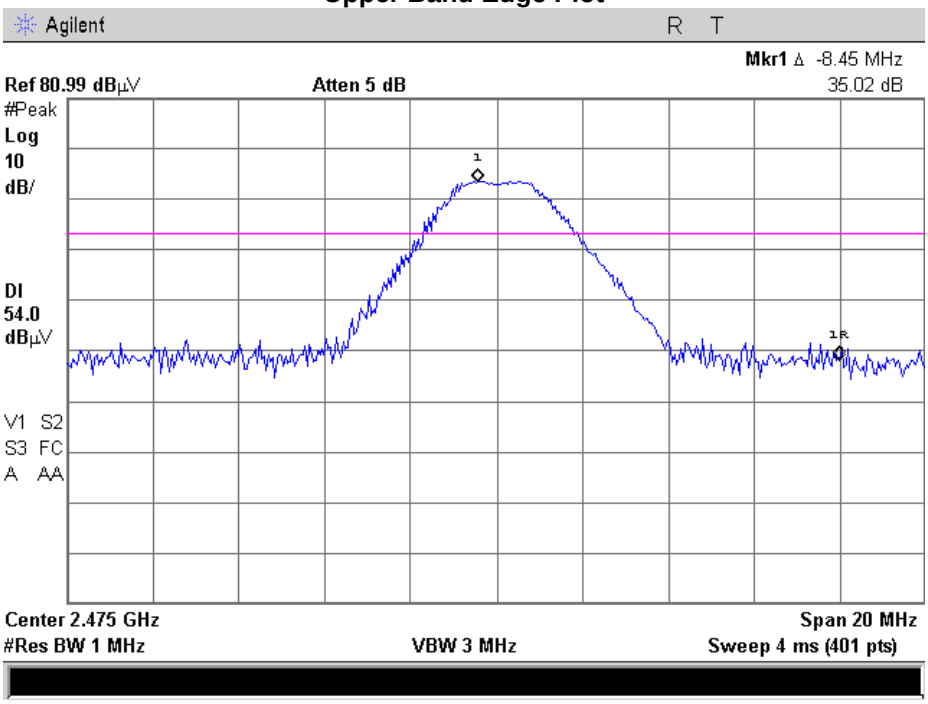
Tuned Freq. (MHz)	Emission Freq. (MHz)	Avg. Measured Level (dBuV/m)	Avg. Limit (dBuV/m)	Margin (dB)
2405	4810	25.1	54.0	-28.9
2405	7215	28.9	54.0	-25.1
2405	9260	32.9	54.0	-21.1
2440	4880	25.5	54.0	-28.5
2440	7320	29.1	54.0	-24.9
2440	9760	34.3	54.0	-19.7
2475	4950	24.8	54.0	-29.2
2475	7425	30.8	54.0	-23.2
2475	9900	34.1	54.0	-19.9

No other emissions were detectable.

Lower Band Edge Plot



Upper Band Edge Plot



The Lower and Upper band edge plots show that the EUT meets the 20 dB bandwidth requirements per FCC 15.215(c).

99% Occupied Bandwidth

Name of Test: 99% Occupied Bandwidth

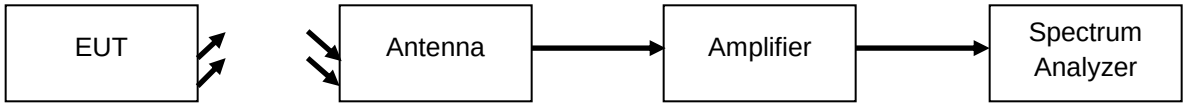
Specification: RSS 210 Industry Canada Only **Engineer:** Greg Corbin

Test Equipment Utilized: i00271, i00331 **Test Date:** 11/5/2012

Test Procedure

The EUT was tested on an Open Area Test Site (OATS) at a distance of 3 meter from the receiving antenna. The Span was set wide enough to capture the entire transmit spectrum and the resolution bandwidth was set to at least 1% of the span. The analyzer was set to max hold while the 99% bandwidth was measured.

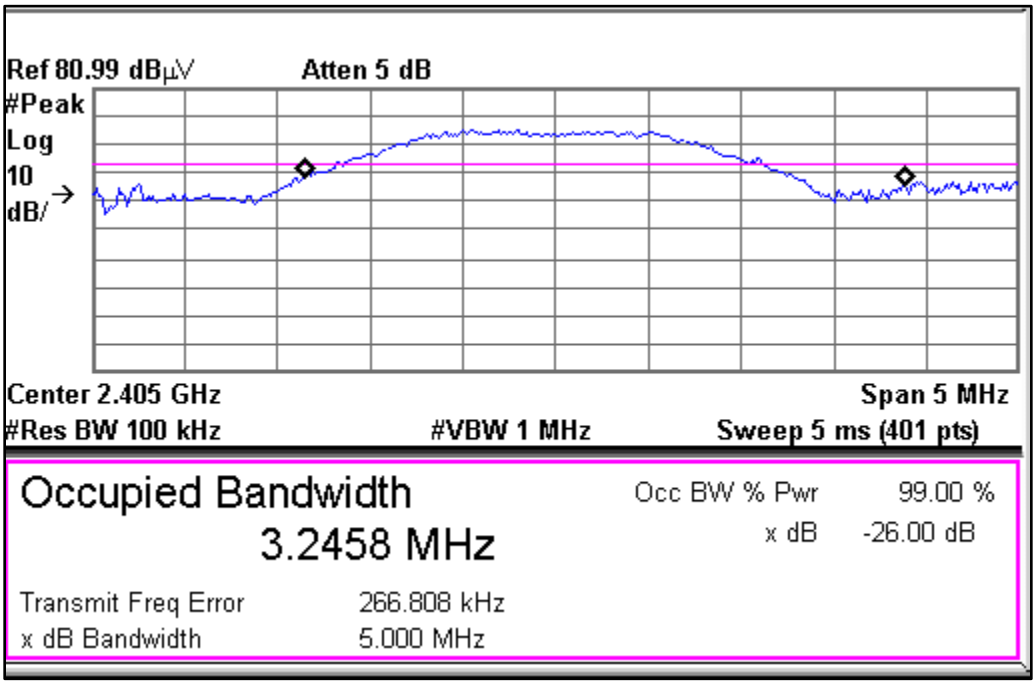
Test Setup



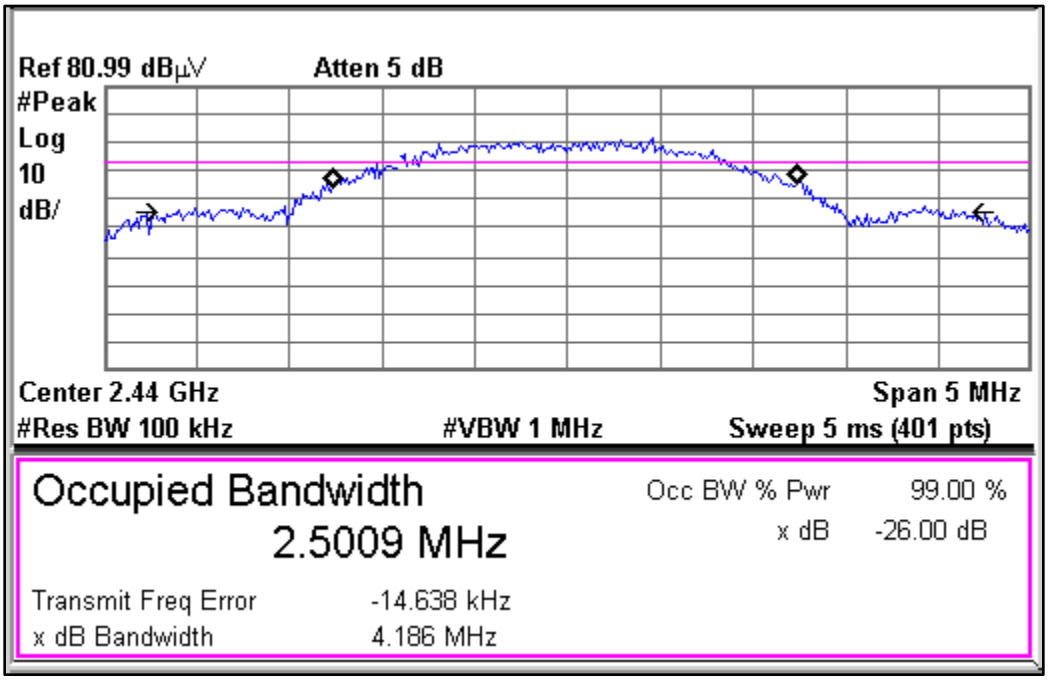
Occupied Bandwidth Summary

Frequency (MHz)	Recorded Measurement (MHz)	Result
2405	3.2458	Pass
2440	2.5009	Pass
2475	2.6135	Pass

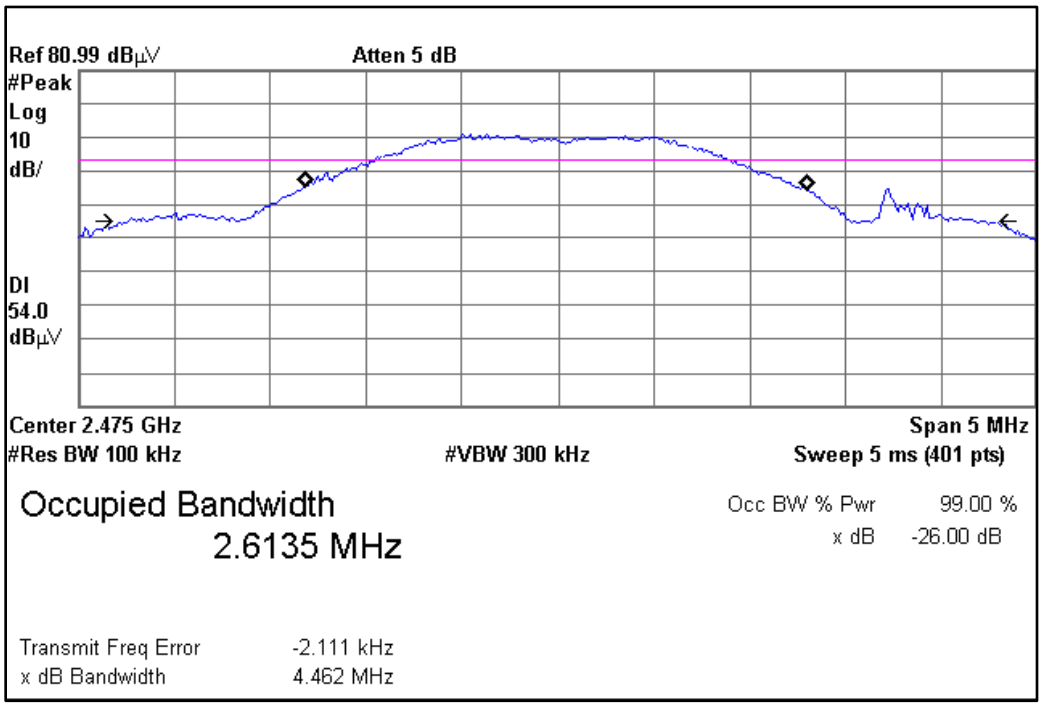
99% Bandwidth 2405 MHz



99% Bandwidth 2440 MHz



99% Bandwidth 2475 MHz



Test Equipment Utilized

Description	Manufacturer	Model Number	CT Asset #	Last Cal Date	Cal Due Date
Horn Antenna	EMCO	3115	i00103	11/5/10	11/5/12
Bi-Log Antenna	Schaffner	CBL611C	i00267	12/19/11	12/19/13
Horn Antenna, Amplified	ARA	DRG-118/A	i00271	4/19/12	4/19/14
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	11/5/11	11/5/12
Spectrum Analyzer	Agilent	E4407B	i00331	4/20/12	4/20/13
Humidity / Temp Meter	Control Company	4189CC	i00355	1/11/12	1/11/13

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT