



# Compliance Testing, LLC

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268

fax: (480) 926-3598

<http://www.ComplianceTesting.com>

[info@ComplianceTesting.com](mailto:info@ComplianceTesting.com)

## Test Report

Prepared for: Knox Company

Model: KSM200K2 & KLS400K2

Description: Key Retention Device

Serial Number: N/A

FCC ID: Z64-CC3100MODR1

IC: 451I-CC3100MODR1

To

FCC Part 15.247 DTS

Date of Issue: August 3, 2017

By the request of:

Knox Company  
1601 W Deer Valley Rd  
Phoenix, AZ 85027

Attention of:

Howard Needham, Sr. Engineer  
Ph: (623)687-2300  
E-Mail: [hneedman@knoxbox.com](mailto:hneedman@knoxbox.com)

Prepared By  
Compliance Testing, LLC  
1724 S. Nevada Way  
Mesa, AZ 85204  
(480) 926-3100 phone / (480) 926-3598 fax  
[www.compliancetesting.com](http://www.compliancetesting.com)  
Project No: p1690016

Poona Saber  
Project Test Engineer

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All results contained herein relate only to the sample tested.



## Test Report Revision History

| Revision | Date           | Revised By  | Reason for Revision |
|----------|----------------|-------------|---------------------|
| 1.0      | May 3, 2017    | Poona Saber | Original Document   |
| 2.0      | August 3, 2017 | Poona Saber | Updated Annex A     |
|          |                |             |                     |
|          |                |             |                     |



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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 to the 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**



**FCC Site Reg. #349717**

**IC Site Reg. #2044A-2**

**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 marked 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 party 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 C63.10-2013 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 specified 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 (°C)         | Humidity (%) | Pressure (mbar) |
| 24.4                     | 26.8         | 966.2           |

### EUT Description

**Model:** KSM200K2 & KLS-400K2

**Description:** Keysecure is a key retention device used for securing the Knox mechanical key in emergency vehicles

**Firmware:** NA

**Software:** NA

**Serial Number:** NA

### Additional Information

Device incorporates a 2.4 GHz module with following FCC ID: Z64-CC3100MODR1. Since the unit is incorporating a 5dBi Air802 antenna, Model: ANRD2405-RPSMA which has a higher gain than original wifi module antenna which was 1.9 dBi we tested radiated spurious emission to make sure the radiation is still within the limit.

Frequency range of the unit is 2400-2483.5 MHz and was tested with a 120V AC/DC adapter.

### EUT Operation during Tests

The EUT was placed in a test mode using manufacturer provided software. The test modes enabled the device to transmit continuously with CW or modulated signals.

**Accessories:** None

**Modifications:** None

#### Cables:

| Qty | Description | Length (M) | Shielding Y/N | Shielded Hood Y/N | Ferrite Y/N |
|-----|-------------|------------|---------------|-------------------|-------------|
| 1   | Power Cable | <3         | N             | N                 | N           |



**15.203: Antenna Requirement:**

- ☒ The antenna is permanently attached to the EUT
- ☐ The antenna uses a unique coupling
- ☐ The EUT must be professionally installed
- ☐ The antenna requirement does not apply



## Test Results Summary

| Specification                | Test Name                          | Pass, Fail, N/A | Comments                          |
|------------------------------|------------------------------------|-----------------|-----------------------------------|
| 15.247(b)                    | Peak Output Power                  | N/A             | Not required for C2PC application |
| 15.247(b)                    | Conducted Spurious Emissions       | N/A             | Not required for C2PC application |
| 15.247(d), 15.209(a), 15.205 | Radiated Spurious Emissions        | Pass            |                                   |
| 15.247(d), 15.209(a), 15.205 | Emissions At Band Edges            | Pass            |                                   |
| 15.247(a)(2)                 | Occupied Bandwidth                 | N/A             | Not required for C2PC application |
| 15.247(e)                    | Transmitter Power Spectral Density | N/A             | Not required for C2PC application |
| 15.207                       | A/C Powerline Conducted Emissions  | N/A             | Not required for C2PC application |
| RSS-Gen §7                   | Receiver Spurious Emission Limits  | N/A             | Not required for C2PC application |





## Radiated Spurious Emissions

**Engineer:** Poona Saber

**Test Date:** 4/28/17

### Test Procedure

#### Radiated Spurious Emissions: 30 – 1000 MHz

The EUT was tested in a semi-anechoic test chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and was raised from 1 to 4 meters to ensure the TX signal levels were maximized.

All emissions from 30 MHz to 1 GHz were examined.

Measured Level includes antenna and receiver cable correction factors.

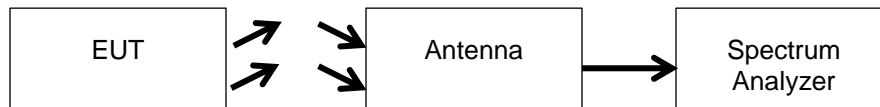
Correction factors were input into the spectrum analyzer before recording “Measured Level”.

RBW = 100 KHz

VBW = 300 KHz

Detector –Peak

### Test Setup



**See Annex A for test results**

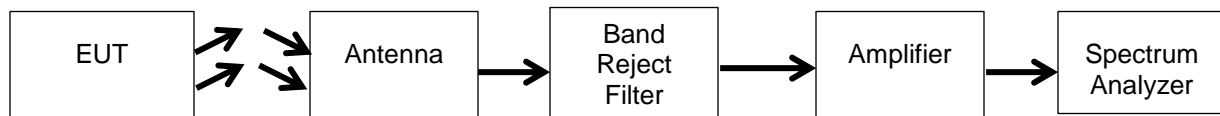


### **Test Procedure for Radiated Spurious Emissions above 1 GHz**

The EUT was tested in a semi anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions. The antenna, band reject filter, amplifier and cable correction factors were input into the spectrum analyzer before recording the Measured Level to ensure accurate readings. The spectrum for each tuned frequency was examined to the 10th harmonic.

RBW = 1 MHz  
VBW  $\geq$  3 MHz  
Detector – Peak

#### **Test Setup**



**See Annex A for test results**



### Test Equipment Utilized

| Description                   | Manufacturer | Model #                       | CT Asset # | Last Cal Date        | Cal Due Date |
|-------------------------------|--------------|-------------------------------|------------|----------------------|--------------|
| EMI Receiver                  | HP           | 8546A                         | i00033     | 3/28/17              | 3/28/18      |
| High Pass Filter              | Trilithic    | 4HX3400-3-XX                  | i00177     | Verified on: 4/28/17 |              |
| Horn Antenna                  | ARA          | DRG-118/A                     | i00271     | 6/16/16              | 6/16/18      |
| Horn Antenna, Amplified       | ARA          | MWH-1826/B                    | i00273     | 4/22/15              | 4/22/18      |
| Humidity / Temp Meter         | Newport      | IBTHX-W-5                     | i00282     | 5/26/16              | 5/26/17      |
| Voltmeter                     | Fluke        | 87III                         | i00319     | 4/11/16              | 4/11/19      |
| Bi-Log Antenna                | Schaffner    | CBL 6111D                     | i00349     | 8/3/16               | 8/3/18       |
| EMI Analyzer                  | Agilent      | E7405A                        | i00379     | 2/22/17              | 2/22/18      |
| 3 Meter Semi-Anechoic Chamber | Panashield   | 3 Meter Semi-Anechoic Chamber | i00428     | 8/15/16              | 8/15/19      |
| PSA Spectrum Analyzer         | Agilent      | E4445A                        | i00471     | 8/30/16              | 8/30/17      |
| Preamplifier                  | Miteq        | AFS44 00101 400 23-10P-44     | i00509     | N/A                  | N/A          |

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