



## FCC PART 15C

### TEST REPORT

For

### Shanghai Smarfid Security Equipment Co., Ltd.

Room 301, 4th Bldg., No.4 TongLi Road, SongJiang District, Shanghai 201615, China

**FCC ID: X3A-MG125KHZ**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Magic Series 125KHz reader
<b>Test Engineer:</b> <u>Allen Qiao</u> <i>Allen Qiao</i>	
<b>Report Number:</b> <u>R2SH130708051-00B</u>	
<b>Report Date:</b> <u>2013-12-24</u>	
<b>Reviewed By:</b> Ivan Cao RF Leader	<i>Ivan Cao</i>
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\* This report may contain data that are not covered by the NVLAP accreditation and shall be marked with an asterisk “★” (Rev.2)  
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## **GENERAL INFORMATION**

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### **Product Description for Equipment Under Test (EUT)**

The *Shanghai Smarfid Security Equipment Co., Ltd.*'s product, model number: *HR322-8K (FCC ID: X3A-MG125KHZ)* or ("EUT") in this report is a *Magic Series 125KHz reader*, which was measured approximately: 11.5 cm (L) x 8.5 cm (W) x 2.0cm (H), rated input voltage: DC 10-15 V from Access Controller.

*Note: The serial product model HR322-8K, HR322-8N, EM322-8K, EM322-8N, all the models are electrically identical, their difference please refer to declaration letter , we select model HR322-8K for the testing in this report, which was explained in the attached declaration letter.*

*\* All measurement and test data in this report was gathered from production sample serial number: 130708051-2 (Assigned by Dongguan BACL). The EUT was received on 2013-07-09.*

### **Objective**

This Type approval report is prepared on behalf of *Shanghai Smarfid Security Equipment Co., Ltd.* in accordance with Part 2, Subpart J, and Part 15, Subparts A, B and C of the Federal Communications Commission's rules.

The objective is to determine the compliance of the EUT with FCC rules, section 15.203, 15.205, 15.207, and 15.209.

### **Test Methodology**

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Dongguan) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 500069-0).



The current scope of accreditations can be found at <http://ts.nist.gov/standards/scopes/5000690.htm>

## SYSTEM TEST CONFIGURATION

### Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

### EUT Exercise Software

No software was performed under test.

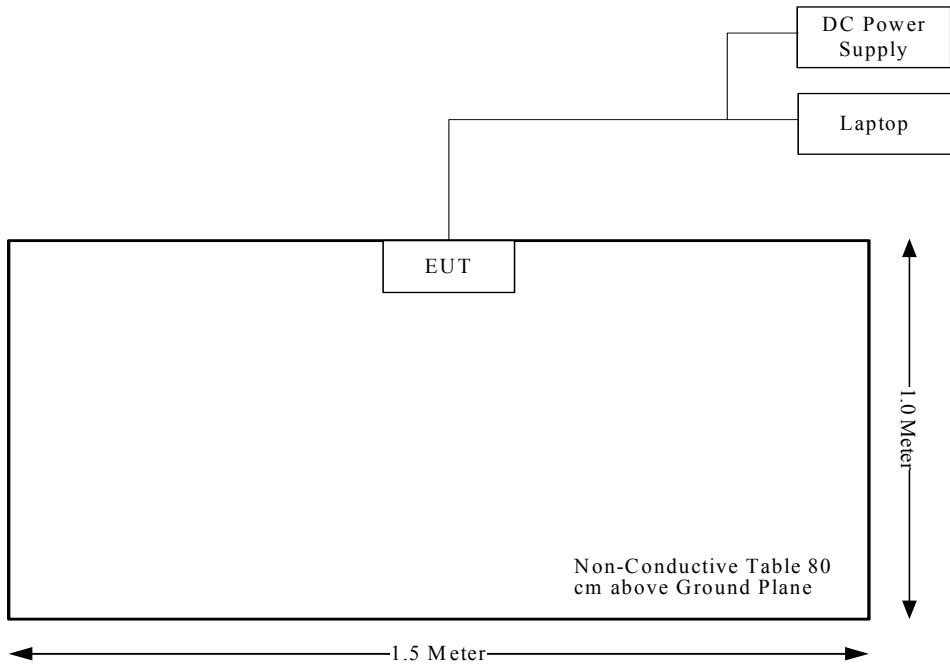
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
Pro instrument	DC Power Supply	pps3300	N/A

### External Cable

Cable Description	Length (m)	From	To
Shielded Un-detachable Control Cable	3.0	Serial port of Laptop and DC power Supply	EUT

### Block Diagram of Test Setup



## **SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207	AC Line Conducted Emission	Not Applicable
§15.209 §15.205	Radiated Emission Test	Compliance

Not Applicable\*: the EUT was powered by DC 10-15V from Access Controller.

## **FCC§15.203 - ANTENNA REQUIREMENT**

### **Applicable Standard**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

### **Antenna Connected Construction**

This EUT has one internal antennas arrangement which fulfills the requirement of this section, please refers to the internal photos.

**Result:** Compliance.

## §15.205 & §15.209 - RADIATED EMISSIONS TEST

### Applicable Standard

FCC §15.209, (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

### Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

30M~200MHz: 5.0 dB

200M~1GHz: 6.2 dB

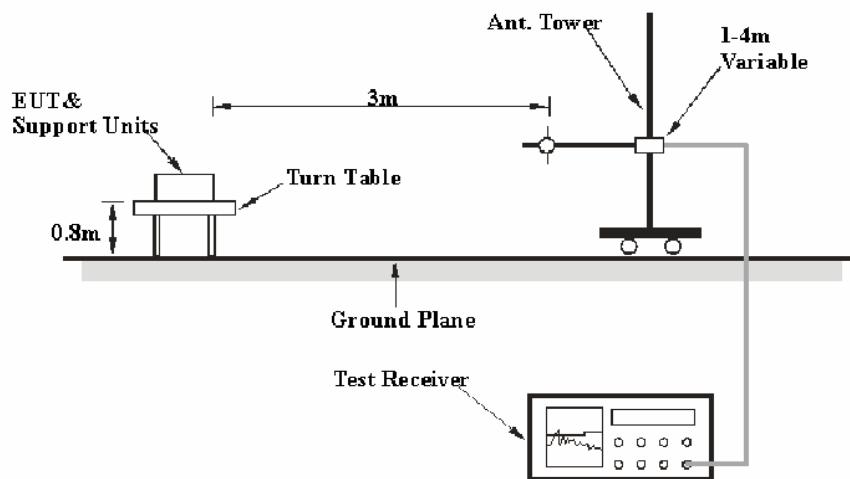
1G~6GHz: 4.45 dB

6G~18GHz: 5.23 dB

Table 1 – Values of  $U_{\text{cisp}}$ 

Measurement	$U_{\text{cisp}}$
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

## EUT Setup



The radiated emission tests were performed in the 3-meter chamber a test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part Subpart C limits.

The spacing between the peripherals was 10 cm.

The EUT was connected to 12V DC power source.

## EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated up to 1000 MHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
9kHz – 150 kHz	300 Hz	1 kHz	QP
150KHz – 30 MHz	10 kHz	30 kHz	QP
30MHz – 1000 MHz	100 kHz	300 kHz	QP

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corr. Amp.}$$

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCI	100224	2013-5-6	2014-5-5
Sunol Sciences	Antenna	JB3	A060611-1	2011-9-6	2014-9-5
HP	AMPLIFIER	8447E	2434A02181	N/A	N/A
The Electro-Mechanics Company	Passive Loop Antenna	6512	9706-1206	2011-11-30	2014-11-29

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 with the worst margin reading of:

**7.73 dB at 725.4 MHz in the Vertical polarization**

## Test Data

### Environmental Conditions

Temperature:	18.2 °C
Relative Humidity:	48 %
ATM Pressure:	101.9 kPa

\* The testing was performed by Allen Qiao on 2013-12-24.

Test mode: Transmitting

## 1) Spurious Emissions (9 kHz~30 MHz):

Frequency (MHz)	Receiver		Factor (dB(1/m))	Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude @ 3m (dB $\mu$ V/m)	Limit @ 3m (dB $\mu$ V/m)	Margin (dB)
	Reading (dB $\mu$ V)	Detector (PK/QP/AV)						
0.125	29.36	AV	48.10	0.20	20.00	57.66	105.67	48.01
0.326	21.34	QP	48.10	0.02	20.00	49.46	69.50	20.04
0.645	20.47	QP	48.10	0.76	21.50	47.83	71.76	23.93
5.530	18.69	QP	34.30	0.76	21.50	32.25	69.54	37.29
6.620	17.40	QP	34.30	0.11	20.00	31.81	69.54	37.73
16.340	17.33	QP	31.30	0.19	20.00	28.82	69.54	40.72

## 2) Spurious Emissions (30 MHz ~1 GHz):

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dB $\mu$ V	PK/QP/AV	H/V	dB(1/m)	dB	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
108.2	35.16	QP	V	12.56	1.26	21.40	27.58	43.50	15.92
450.5	36.47	QP	V	17.19	2.57	21.90	34.33	46.00	11.67
595.4	35.23	QP	V	19.32	2.97	22.26	35.26	46.00	10.74
625.1	36.11	QP	V	19.88	3.06	22.28	36.77	46.00	9.23
675.3	34.2	QP	V	20.21	3.16	22.30	35.27	46.00	10.73
725.4	36.3	QP	V	21.02	3.27	22.32	38.27	46.00	7.73

## **DECLARATION OF SIMILARITY**

# **SMARFID**

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China

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## **DECLARATION OF SIMILARITY**

December,24, 2013

To: Bay Area Compliance Laboratories Corp.(Dongguan)

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<http://www.baclcorp.com>

Dear Sir or Madam:

For our business issue and marketing requirement, we would like to list different models numbers on the FCC certificates and reports, as following:

The product name: Magic Series 125KHZ reader

Model No.: HR322-8K、EM322-8K、HR322-8N、EM322-8N

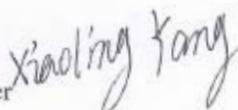
The four models have the same Circuits, components, and color.

Models: HR322-8K、EM322-8K、HR322-8N、EM322-8N just have different model name and HR322-8K、EM322-8K has buttons but HR322-8N、EM322-8N has no buttons.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Xiaoling Yang  
Hardware Engineer



**\*\*\*\*\*END OF REPORT\*\*\*\*\***