

# EMC TEST REPORT



Report No.: 15020001-FCC-E

Supersede Report No.: N/A

|  |   |   |
|--|---|---|
| Applicant  | Shanghai Smarfid Security Equipment Co.,Ltd |   |
| Product Name   | Magic Series Legic & 125KHz Reader          |   |
| Main Model No.   | LH322-8K                                    |   |
| Test Standard  | FCC Part 15 Subpart C:2014, ANSI C63.4:2009 |   |
| Test Date  | January 31, 2015                            |   |
| Issue Date   | February 03, 2015                           |   |
| Test Result  | <input checked="" type="checkbox"/> Pass    | <input type="checkbox"/> Fail   |
| Equipment complied with the specification  |   | <input checked="" type="checkbox"/>   |
| Equipment did not comply with the specification  |   | <input type="checkbox"/>  |
| Deon Dai   | Alex Liu                                    |  |
| Deon Dai<br>Test Engineer  | Alex Liu<br>Checked By                      |   |
| <p>This test report may be reproduced in full only<br/>Test result presented in this test report is applicable to the tested sample only</p> |   |   |

Issued by:

SIEMIC (Nanjing-China) Laboratories

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## Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

### Accreditations for Conformity Assessment

| Country/Region | Scope                              |
|----------------|------------------------------------|
| USA            | EMC, RF/Wireless, SAR, Telecom     |
| Canada         | EMC, RF/Wireless, SAR, Telecom     |
| Taiwan         | EMC, RF, Telecom, SAR, Safety      |
| Hong Kong      | RF/Wireless, SAR, Telecom          |
| Australia      | EMC, RF, Telecom, SAR, Safety      |
| Korea          | EMI, EMS, RF, SAR, Telecom, Safety |
| Japan          | EMI, RF/Wireless, SAR, Telecom     |
| Singapore      | EMC, RF, SAR, Telecom              |
| Europe         | EMC, RF, SAR, Telecom, Safety      |

|                 |                |
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## 1. Report Revision History

| Report No.     | Report Version | Description | Issue Date        |
|----------------|----------------|-------------|-------------------|
| 15020001-FCC-E | NONE           | Original    | February 03, 2015 |
|                |                |             |                   |
|                |                |             |                   |
|                |                |             |                   |
|                |                |             |                   |
|                |                |             |                   |

## 2. Customer information

|                  |  |
|------------------|--|
| Applicant Name   | Shanghai Smarfid Security Equipment Co.,Ltd                                    |
| Applicant Add    | Room 301,4th Bldg., No.4 TongLi Road, SongJiang District,Shanghai 201615,China |
| Manufacturer     | Shanghai Smarfid Security Equipment Co.,Ltd                                    |
| Manufacturer Add | Room 301,4th Bldg., No.4 TongLi Road, SongJiang District,Shanghai 201615,China |

## 3. Test site information

|                      |  |
|----------------------|--|
| Lab performing tests | SIEMIC (Nanjing-China) Laboratories  |
| Lab Address          | 2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China |
| FCC Test Site No.    | 986914   |
| IC Test Site No.     | 4842B-1  |
| Test Software        | Labview of SIEMIC version 1.0  |

#### 4. Equipment under Test (EUT) Information

Description of EUT: Magic Series Logic & 125KHz Reader

Main Model: LH322-8K

Serial Model: LH322-8N, LE322-8K, LE322-8N, LH122-8N

Date EUT received: January 05, 2015

Test Date(s): January 31, 2015

Operating Frequency : 125kHz

Antenna Gain 125kHz: 6 dBi

Type of Modulation: ASK

Number of Channels: 1 CH

Trade Name : N/A

FCC ID: X3A-MGLH32

Note: the difference between these models please refer to **ANNEX E. DECLARATION OF SIMILARITY.**

## 5. Test Summary

The product was tested in accordance with the following specifications.  
 All testing has been performed according to below product classification:

| FCC Rules                 | Description of Test               | Result     |
|---------------------------|-----------------------------------|------------|
| §15.207; ANSI C63.4: 2009 | AC Power Line Conducted Emissions | Compliance |
| §15.209; ANSI C63.4: 2009 | Radiated Emissions                | Compliance |

### Measurement Uncertainty

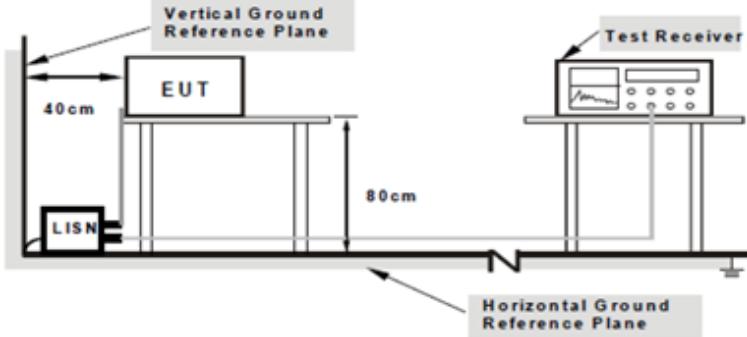
| Emissions          |   |             |
|--------------------|---|-------------|
| Test Item          | Description   | Uncertainty |
| Radiated Emissions | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | 3.952dB     |

## 6. Measurements, Examination And Derived Results

### 6.1 AC Power Line Conducted Emissions

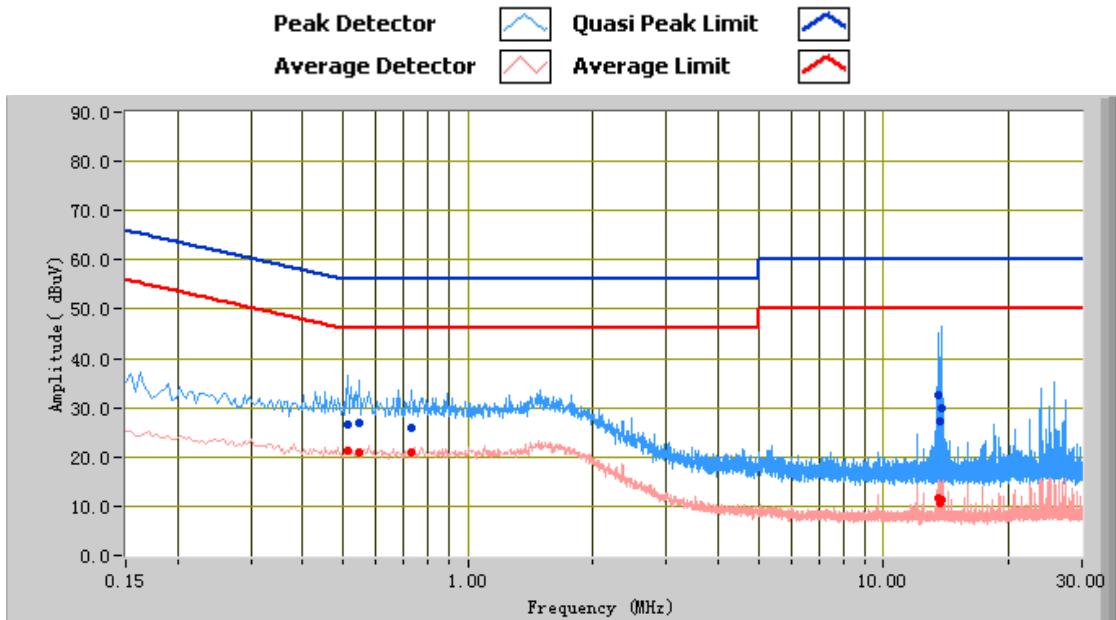
|                      |                  |
|----------------------|------------------|
| Temperature          | 24°C             |
| Relative Humidity    | 50%              |
| Atmospheric Pressure | 1019mbar         |
| Test date :          | January 31, 2015 |
| Tested By :          | Deon Dai         |

#### Requirement(s):

| Spec                   | Requirement   | Applicable             |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |
|------------------------|---|------------------------|--------------------|--|----|---------|------------|---------|---------|---------|----|----|--------|----|----|-------------------------------------|
| §15.207                | <p>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency ranges (MHz)</th> <th colspan="2">Limit (dB<math>\mu</math>V)</th> </tr> <tr> <th>QP</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15 ~ 0.5</td> <td>66 ~ 56</td> <td>56 ~ 46</td> </tr> <tr> <td>0.5 ~ 5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5 ~ 30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>  | Frequency ranges (MHz) | Limit (dB $\mu$ V) |  | QP | Average | 0.15 ~ 0.5 | 66 ~ 56 | 56 ~ 46 | 0.5 ~ 5 | 56 | 46 | 5 ~ 30 | 60 | 50 | <input checked="" type="checkbox"/> |
| Frequency ranges (MHz) | Limit (dB $\mu$ V)  |                        |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |
|                        | QP  | Average                |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |
| 0.15 ~ 0.5             | 66 ~ 56   | 56 ~ 46                |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |
| 0.5 ~ 5                | 56  | 46                     |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |
| 5 ~ 30                 | 60  | 50                     |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |
| Test Setup             |  <p><b>Note:</b><br/>     1. Support units were connected to second LISN.<br/>     2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</p>  |                        |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |
| Procedure              | <ol style="list-style-type: none"> <li>1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.</li> <li>2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</li> <li>3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>4. All other supporting equipment were powered separately from another main supply.</li> <li>5. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.</li> <li>7. High peaks, relative to the limit line, were then selected, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10kHz.</li> <li>8. Steps 6-7 were repeated for the LIVE line (for AC mains) or DC line (for DC power).</li> </ol> |                        |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |
| Remark                 |   |                        |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |
| Result                 | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail  |                        |                    |  |    |         |            |         |         |         |    |    |        |    |    |                                     |

|           |   |                              |
|-----------|---|------------------------------|
| Test Data | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> N/A |
| Test Plot | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> N/A |

Test Mode: Transmitting Mode



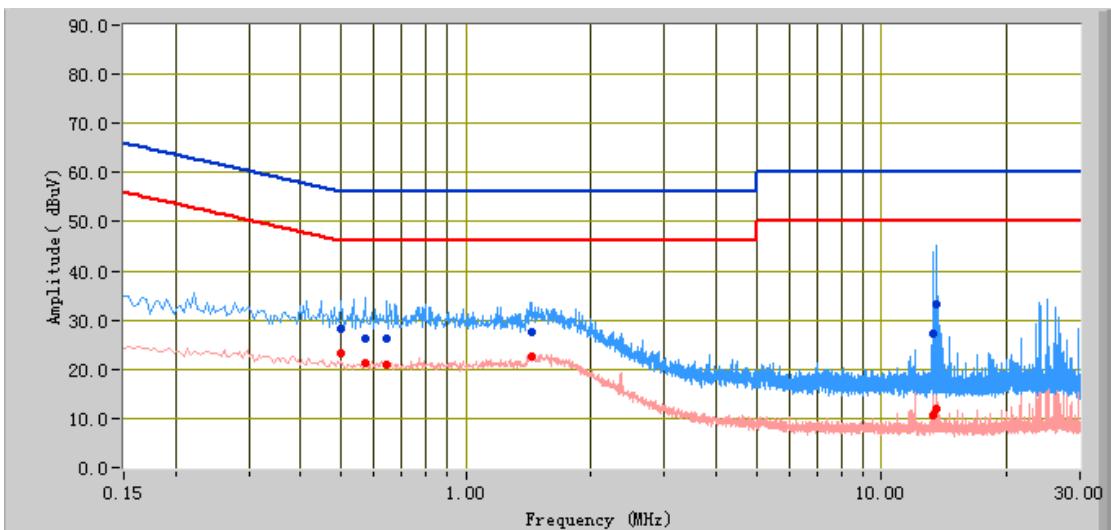
### Test Data

#### Phase Line Plot at 120Vac, 60Hz

| Frequency (MHz) | Quasi Peak (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Average (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Factors (dB) |
|-----------------|-------------------------|--------------------|-------------|----------------------|--------------------|-------------|--------------|
| 13.77           | 29.89                   | 60.00              | -30.11      | 11.34                | 50.00              | -38.66      | 11.34        |
| 13.58           | 32.50                   | 60.00              | -27.50      | 11.58                | 50.00              | -38.42      | 11.32        |
| 0.51            | 26.65                   | 56.00              | -29.35      | 21.32                | 46.00              | -24.68      | 11.08        |
| 13.62           | 27.36                   | 60.00              | -32.64      | 10.63                | 50.00              | -39.37      | 11.33        |
| 0.55            | 27.07                   | 56.00              | -28.93      | 21.04                | 46.00              | -24.96      | 11.05        |
| 0.73            | 25.86                   | 56.00              | -30.14      | 20.82                | 46.00              | -25.18      | 10.90        |

**Test Mode:**
**Transmitting Mode**

Peak Detector  Quasi Peak Limit  
 Average Detector  Average Limit


**Test Data**

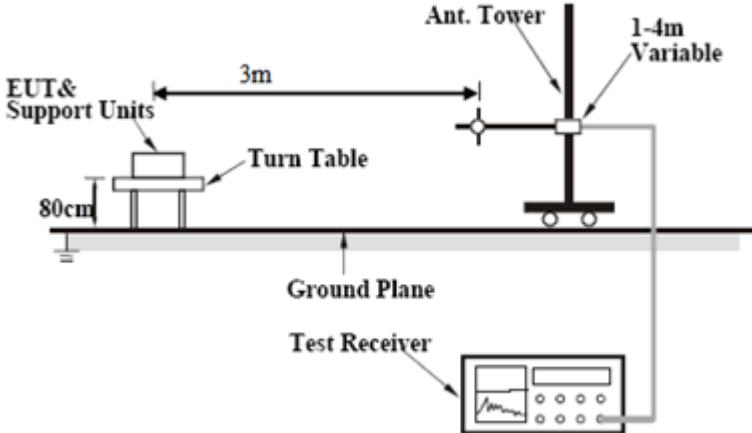
Phase Neutral Plot at 120Vac, 60Hz

| Frequency (MHz) | Quasi Peak (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Average (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Factors (dB) |
|-----------------|-------------------------|--------------------|-------------|----------------------|--------------------|-------------|--------------|
| 13.54           | 33.20                   | 60.00              | -26.80      | 12.09                | 50.00              | -37.91      | 11.33        |
| 13.35           | 27.25                   | 60.00              | -32.75      | 10.62                | 50.00              | -39.38      | 11.32        |
| 0.57            | 26.32                   | 56.00              | -29.68      | 21.20                | 46.00              | -24.80      | 11.01        |
| 0.65            | 26.19                   | 56.00              | -29.81      | 20.91                | 46.00              | -25.09      | 10.95        |
| 0.50            | 28.11                   | 56.03              | -27.92      | 23.19                | 46.03              | -22.85      | 11.06        |
| 1.44            | 27.55                   | 56.00              | -28.45      | 22.51                | 46.00              | -23.49      | 10.80        |

## 6.2 Radiated Emissions

|                      |                  |
|----------------------|------------------|
| Temperature          | 22°C             |
| Relative Humidity    | 50%              |
| Atmospheric Pressure | 1019mbar         |
| Test date :          | January 31, 2015 |
| Tested By :          | Deon Dai         |

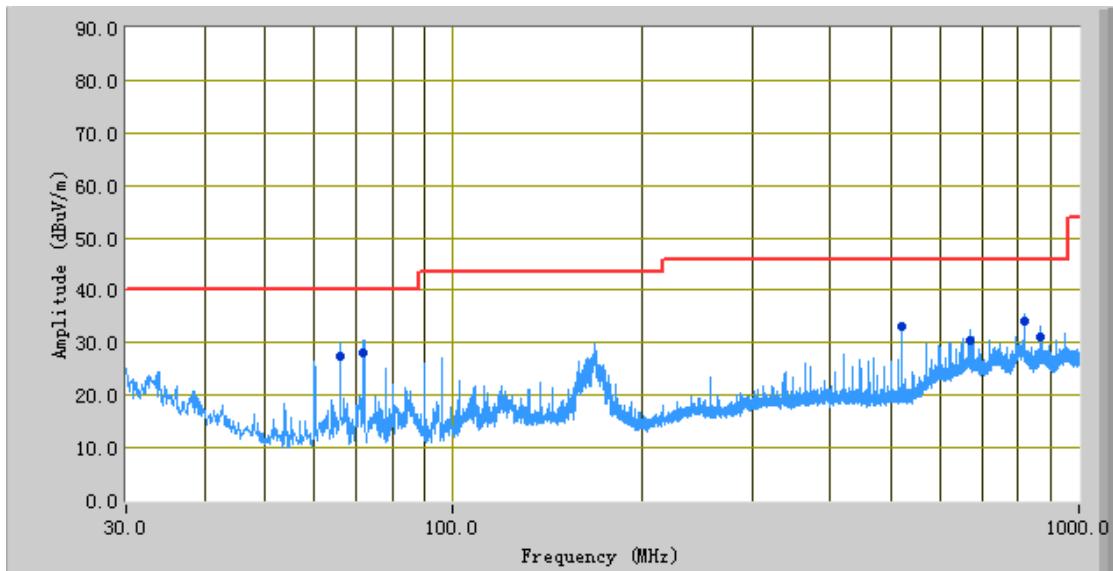
### Requirement(s):

| Spec                  | Requirement   | Applicable                    |                       |         |     |          |     |           |     |           |     |                                     |
|-----------------------|---|-------------------------------|-----------------------|---------|-----|----------|-----|-----------|-----|-----------|-----|-------------------------------------|
| §15.209               | <p>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges</p> <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (µV/m)</th> </tr> </thead> <tbody> <tr> <td>30 – 88</td> <td>100</td> </tr> <tr> <td>88 – 216</td> <td>150</td> </tr> <tr> <td>216 – 960</td> <td>200</td> </tr> <tr> <td>Above 960</td> <td>500</td> </tr> </tbody> </table>  | Frequency range (MHz)         | Field Strength (µV/m) | 30 – 88 | 100 | 88 – 216 | 150 | 216 – 960 | 200 | Above 960 | 500 | <input checked="" type="checkbox"/> |
| Frequency range (MHz) | Field Strength (µV/m)   |                               |                       |         |     |          |     |           |     |           |     |                                     |
| 30 – 88               | 100   |                               |                       |         |     |          |     |           |     |           |     |                                     |
| 88 – 216              | 150   |                               |                       |         |     |          |     |           |     |           |     |                                     |
| 216 – 960             | 200   |                               |                       |         |     |          |     |           |     |           |     |                                     |
| Above 960             | 500   |                               |                       |         |     |          |     |           |     |           |     |                                     |
| Test Setup            |  <p>The diagram illustrates the test setup. An 'EUT &amp; Support Units' is mounted on a 'Turn Table' which is positioned 80cm above a 'Ground Plane'. A 'Test Receiver' is connected to the turn table. A vertical 'Ant. Tower' is mounted on the turn table, with a '1-4m Variable' antenna height adjustment mechanism. The distance between the EUT and the Ant. Tower is 3m.</p>  |                               |                       |         |     |          |     |           |     |           |     |                                     |
| Procedure             | <ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:           <ol style="list-style-type: none"> <li>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>The EUT was then rotated to the direction that gave the maximum emission.</li> <li>Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>For emission frequencies measured below and above 1GHz, set the spectrum analyzer on a 100kHz and 1MHz resolution bandwidth respectively for each frequency measured.</li> <li>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol> |                               |                       |         |     |          |     |           |     |           |     |                                     |
| Remark                |   |                               |                       |         |     |          |     |           |     |           |     |                                     |
| Result                | <input checked="" type="checkbox"/> Pass  | <input type="checkbox"/> Fail |                       |         |     |          |     |           |     |           |     |                                     |
| Test Data             | <input checked="" type="checkbox"/> Yes   | <input type="checkbox"/> N/A  |                       |         |     |          |     |           |     |           |     |                                     |
| Test Plot             | <input checked="" type="checkbox"/> Yes   | <input type="checkbox"/> N/A  |                       |         |     |          |     |           |     |           |     |                                     |

|            |                   |
|------------|-------------------|
| Test Mode: | Transmitting Mode |
|------------|-------------------|

(30MHz - 1GHz)

Peak Detector   
 Quasi Peak Limit 



### Test Data

#### Horizontal & Vertical Polarity Plot @3m

| Frequency (MHz) | Quasi Peak (dBµV/m) | Azimuth | Polarity (H/V) | Height (cm) | Factors (dB) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|---------|----------------|-------------|--------------|----------------|-------------|
| 72.02           | 28.03               | 122.00  | V              | 164.00      | -37.37       | 40.00          | -11.97      |
| 66.02           | 27.33               | 239.00  | V              | 102.00      | -37.44       | 40.00          | -12.67      |
| 817.62          | 34.26               | 357.00  | H              | 100.00      | -17.54       | 46.00          | -11.74      |
| 520.33          | 33.24               | 56.00   | H              | 118.00      | -28.18       | 46.00          | -12.76      |
| 867.12          | 31.07               | 320.00  | H              | 100.00      | -18.15       | 46.00          | -14.93      |
| 668.95          | 30.53               | 357.00  | V              | 110.00      | -20.59       | 46.00          | -15.47      |

Note: Emissions from 9kHz to 1MHz is very low under transmit mode so test data is not presented in this report.

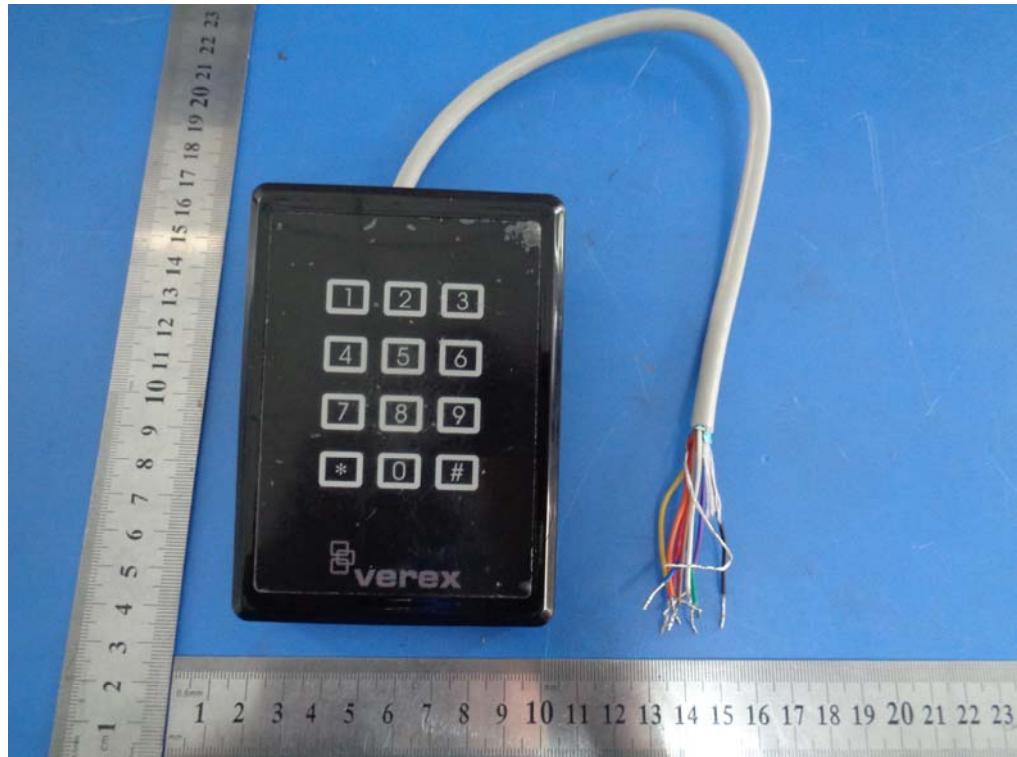
Note: The highest frequency of the internal sources of the EUT is less than 108MHz, so the measurement shall only be made up to 1GHz.

## Annex A. TEST INSTRUMENT

| Instrument                                  | Model   | Serial #   | Cal Date   | Cal Due    | In use                              |
|---|---------|------------|------------|------------|-------------------------------------|
| <b>AC Line Conducted Emissions</b>          |         |            |            |            |                                     |
| R&S EMI Test Receiver                       | ESPI3   | 101216     | 11/04/2014 | 11/03/2015 | <input checked="" type="checkbox"/> |
| V-LISN                                      | ESH3-Z5 | 838979/005 | 09/27/2014 | 09/26/2015 | <input checked="" type="checkbox"/> |
| SIEMIC Conducted Emissions Labview software | V1.0    | N/A        | N/A        | N/A        | <input checked="" type="checkbox"/> |
| <b>Radiated Emissions</b>                   |         |            |            |            |                                     |
| R&S EMI Receiver                            | ESPI3   | 101216     | 11/04/2014 | 11/03/2015 | <input checked="" type="checkbox"/> |
| Antenna (30MHz~6GHz)                        | JB6     | A121411    | 04/15/2014 | 04/14/2015 | <input checked="" type="checkbox"/> |
| EMCO Passive Loop Antenna                   | 6509    | 9909-1469  | 10/09/2014 | 10/08/2015 | <input checked="" type="checkbox"/> |
| Hp Agilent Pre-Amplifier                    | 8447F   | 1937A01160 | 10/27/2014 | 10/26/2015 | <input checked="" type="checkbox"/> |
| SIEMIC Radiated Emissions Labview software  | V1.0    | N/A        | N/A        | N/A        | <input checked="" type="checkbox"/> |

## Annex B. EUT And Test Setup Photographs

### Annex B.i. Photograph EUT External Photo



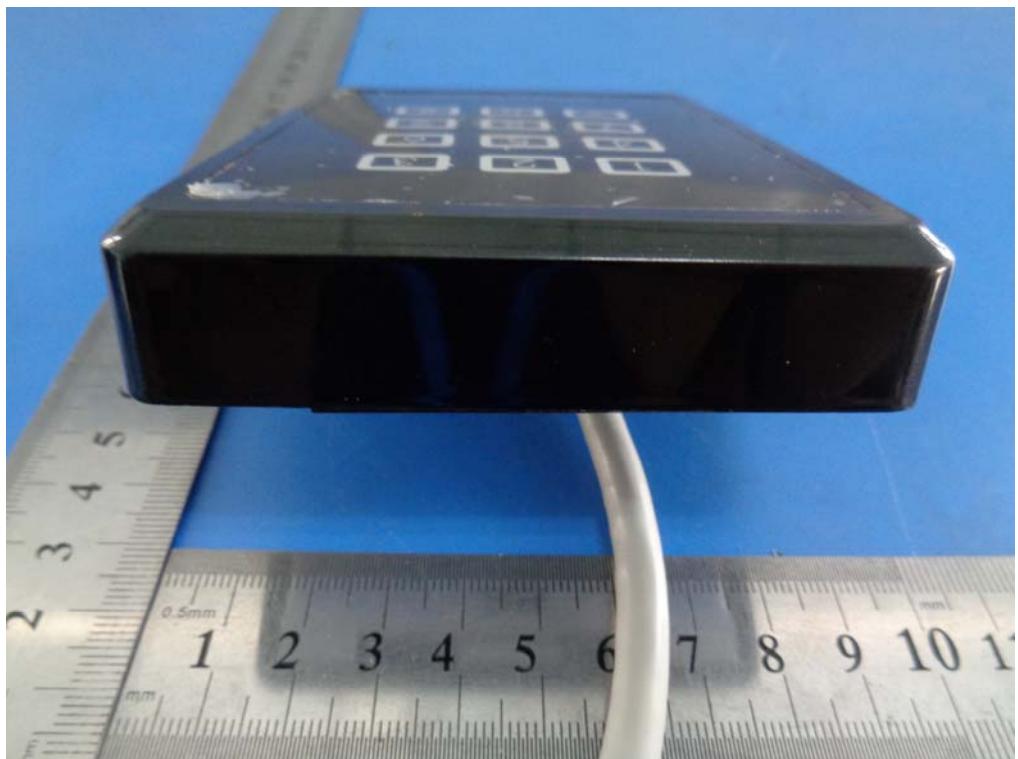
Front View of EUT



Rear View of EUT



Top View of EUT



Bottom View of EUT

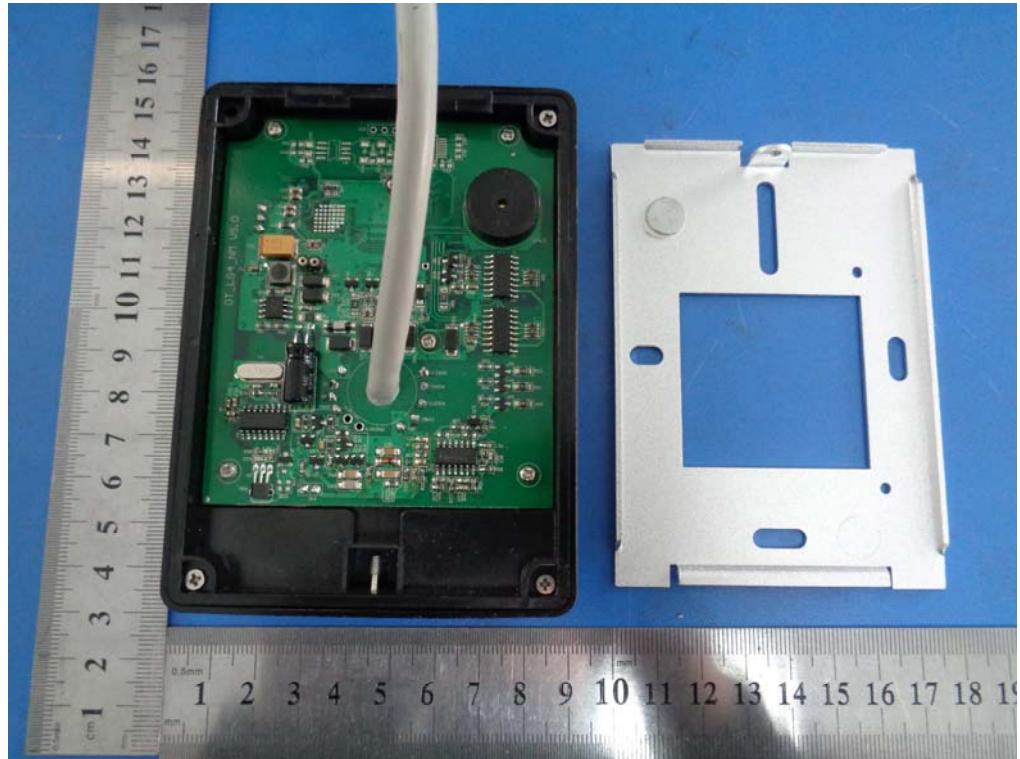


Left View of EUT



Right View of EUT

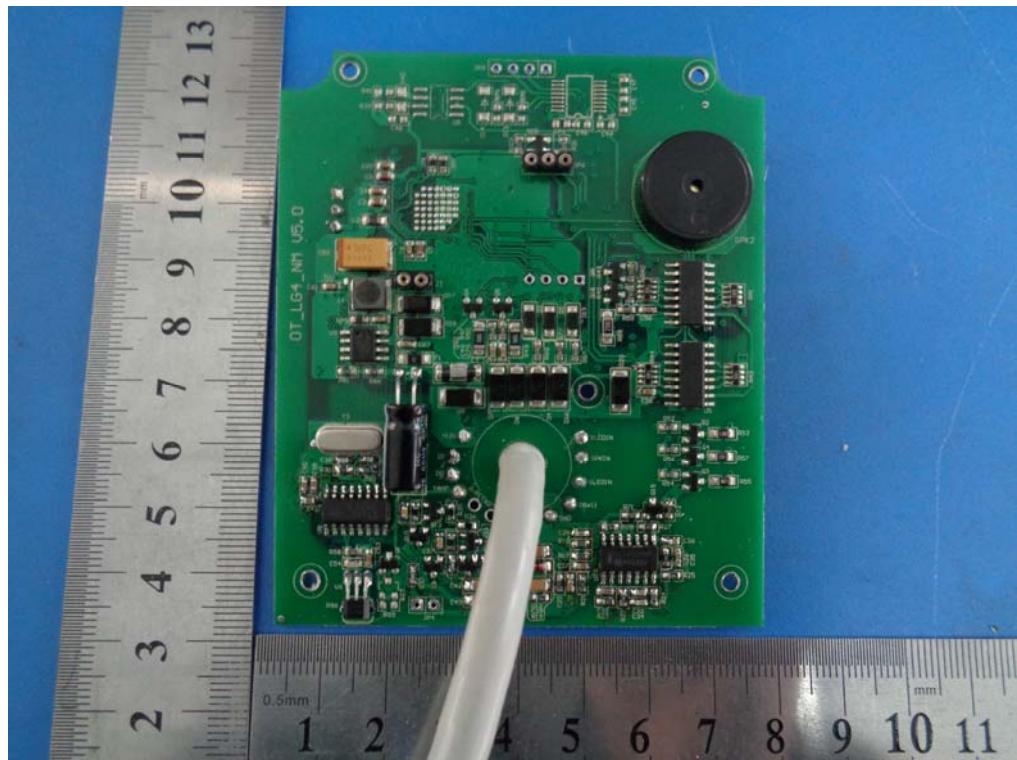
Annex B.ii. Photograph EUT Internal Photo



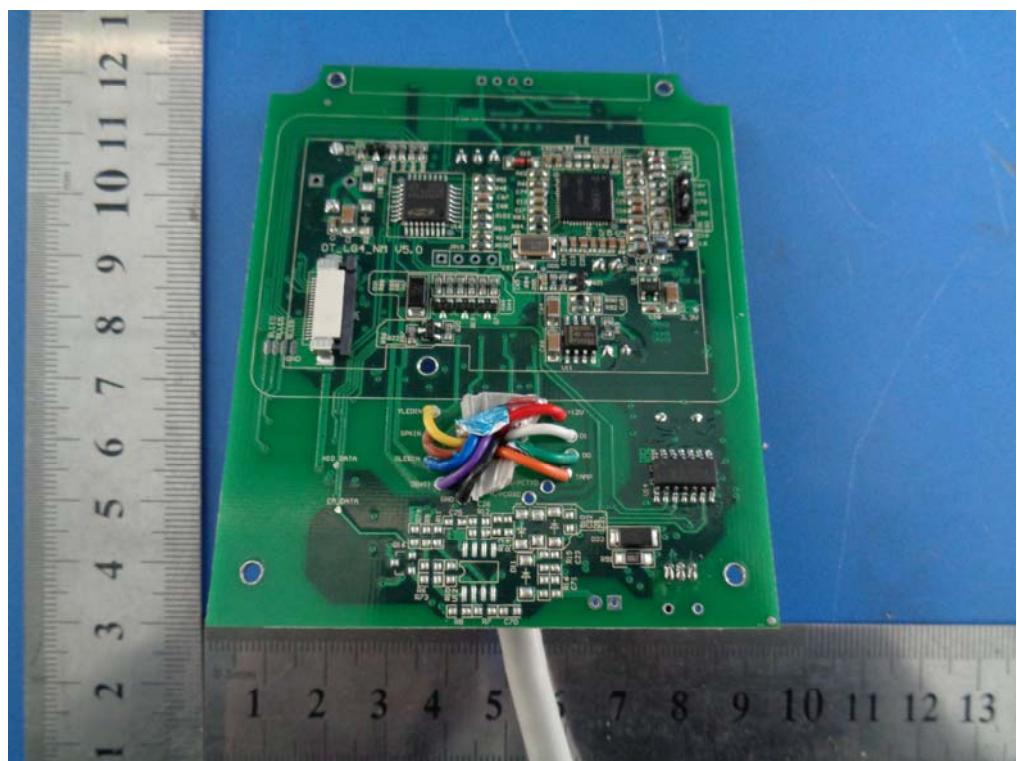
Uncover- Front View 1



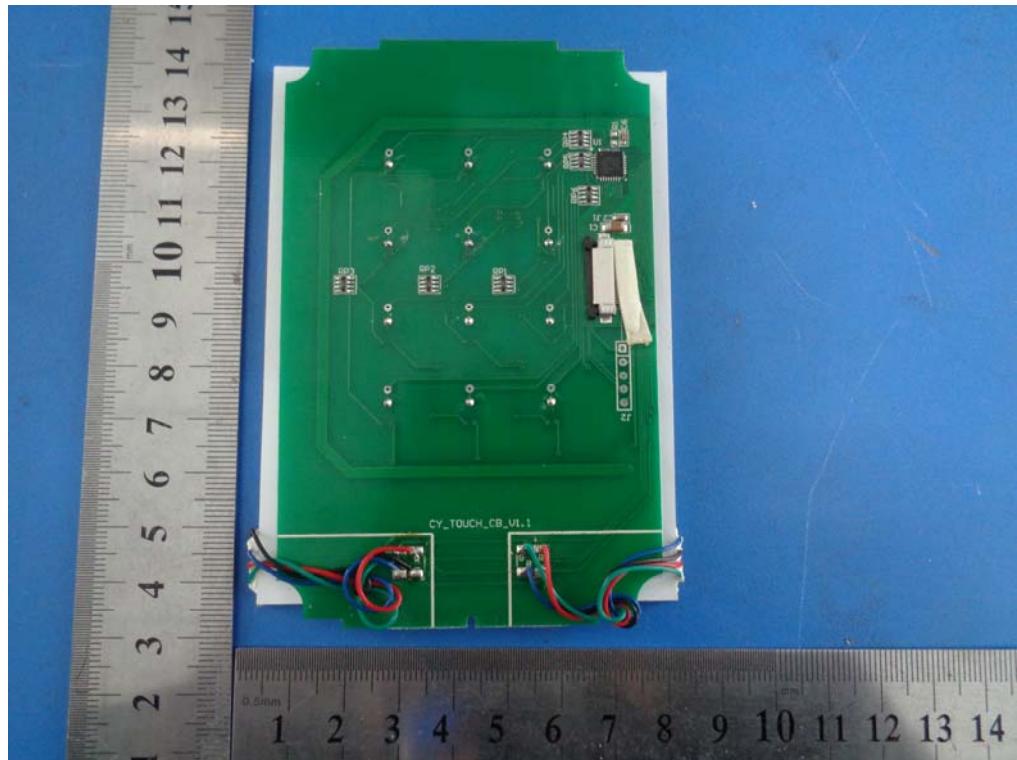
Uncover- Front View 2



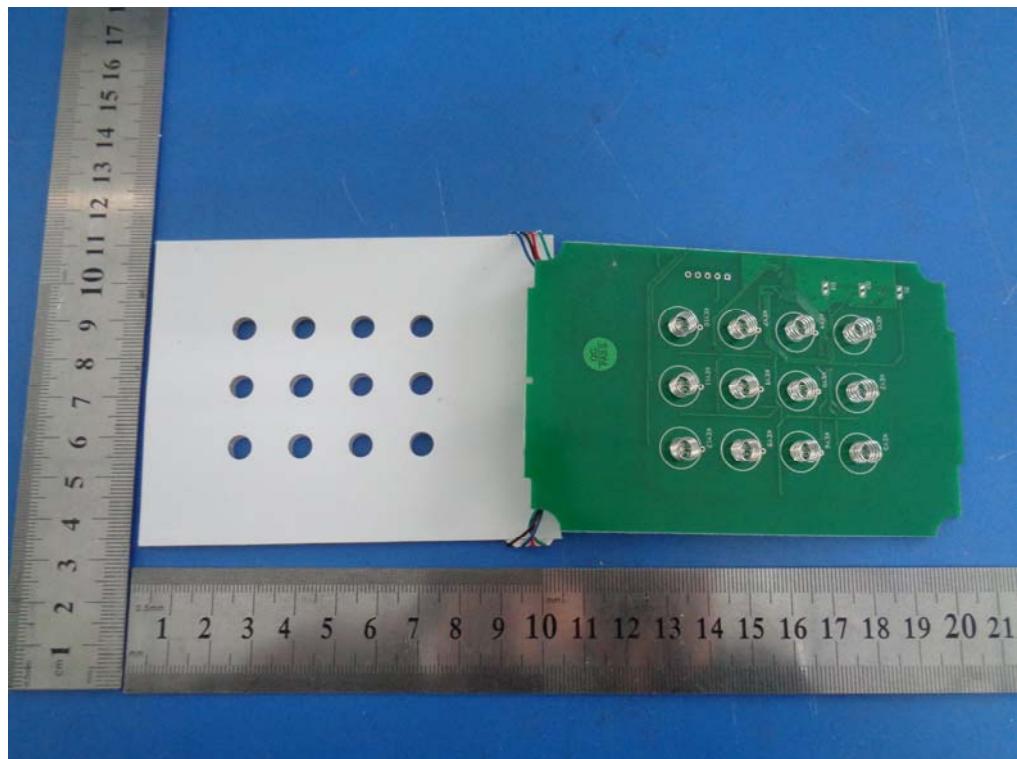
EUT PCBA 1- Front View



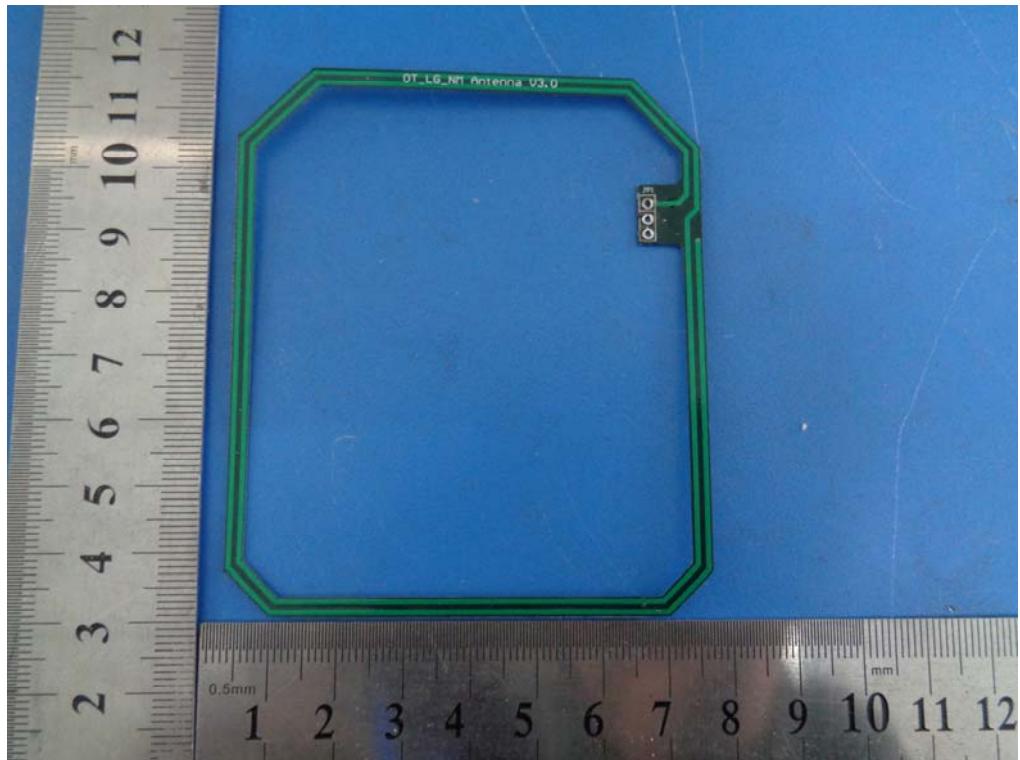
EUT PCB 1- Rear View



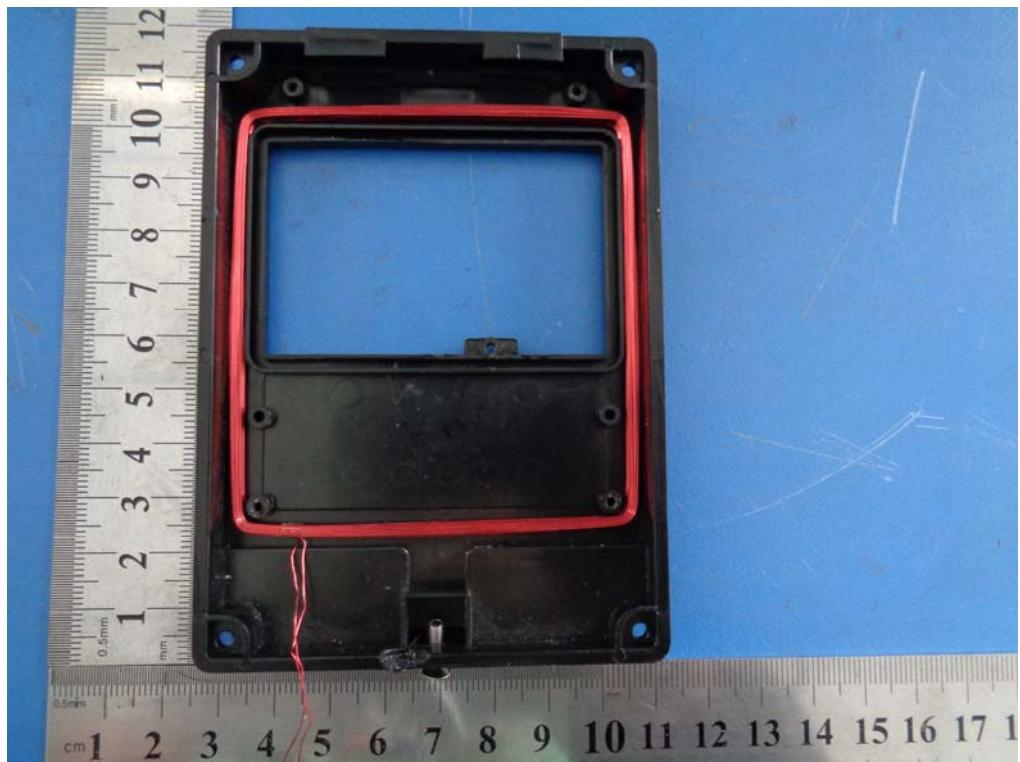
EUT PCBA 2- Front View



EUT PCBA 2- Rear View



Antenna – Front View(13.56MHz)



Antenna – Front View(125kHz)

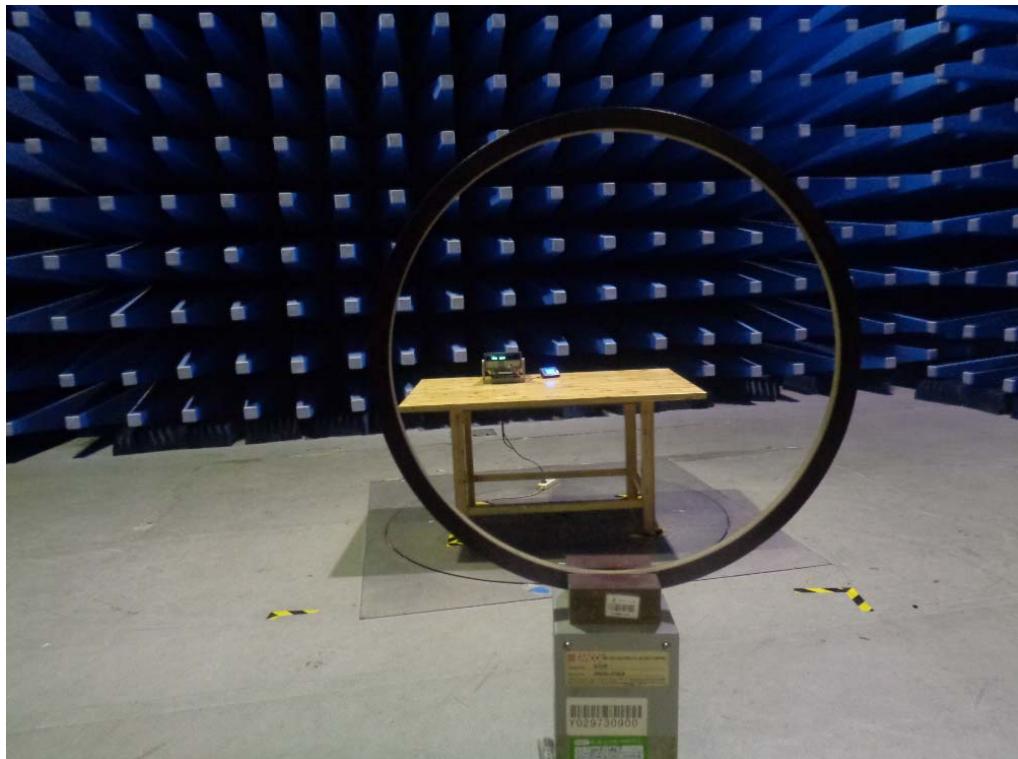
**Annex B.iii. Photograph Test Setup Photo**



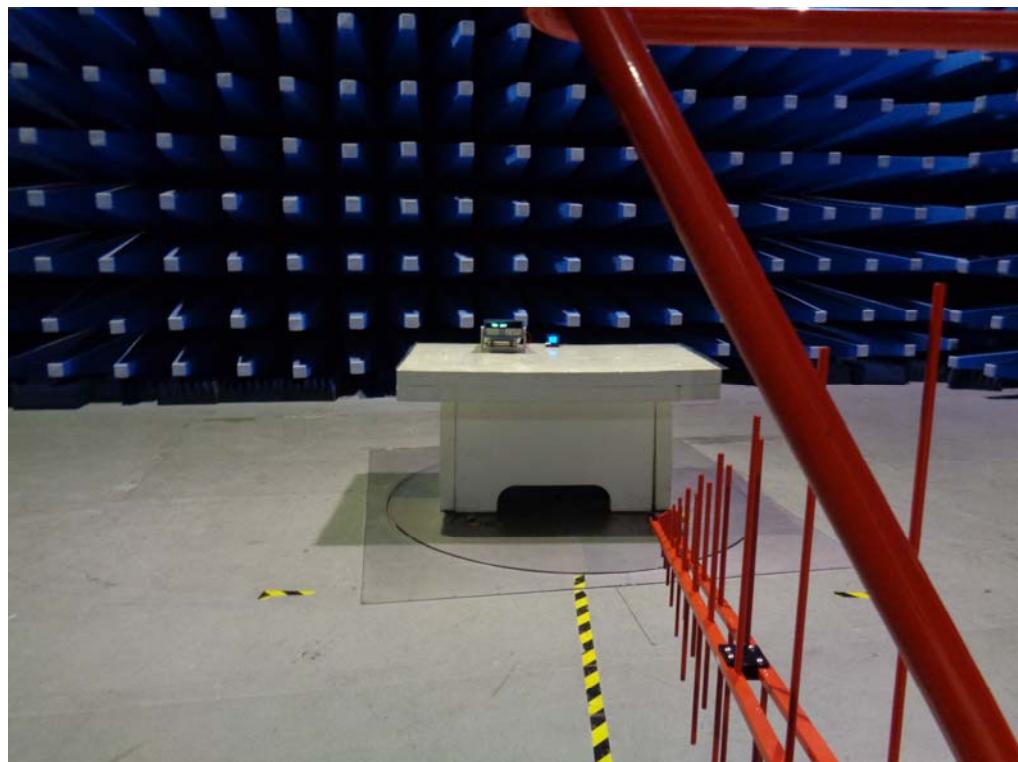
Conducted Emissions Setup Front View



Conducted Emissions Setup Side View



Front View of Radiated Emissions Test Setup below 30MHz

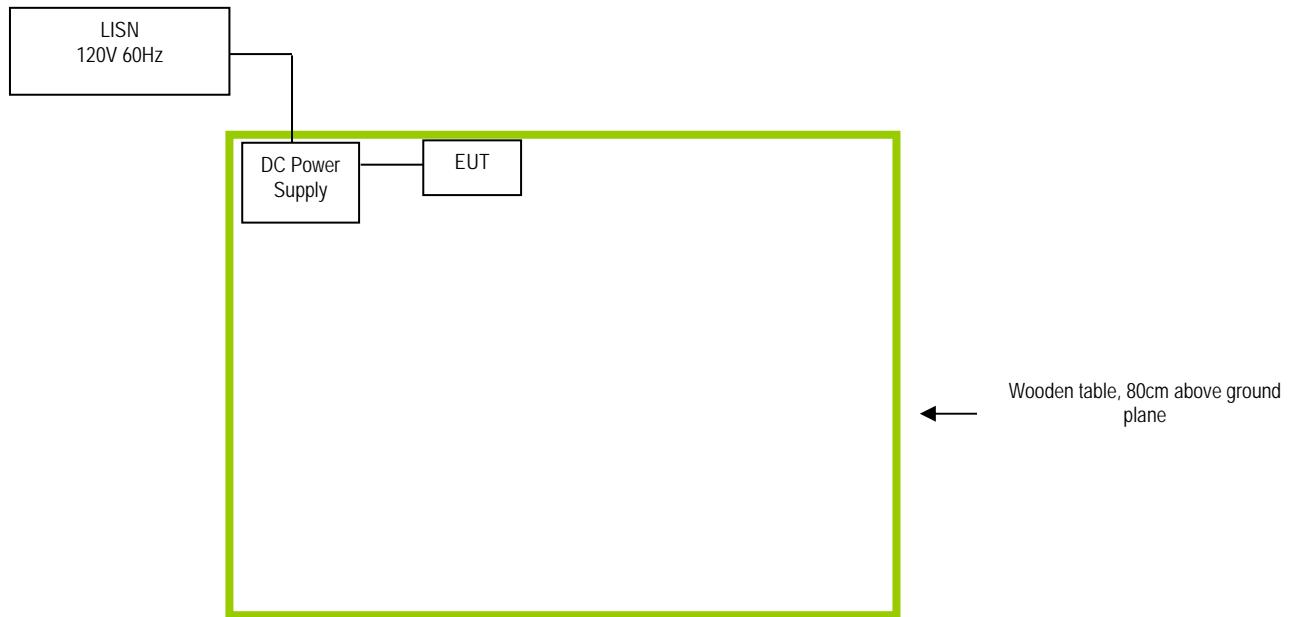


Radiated Emissions Setup Below 1GHz Front View

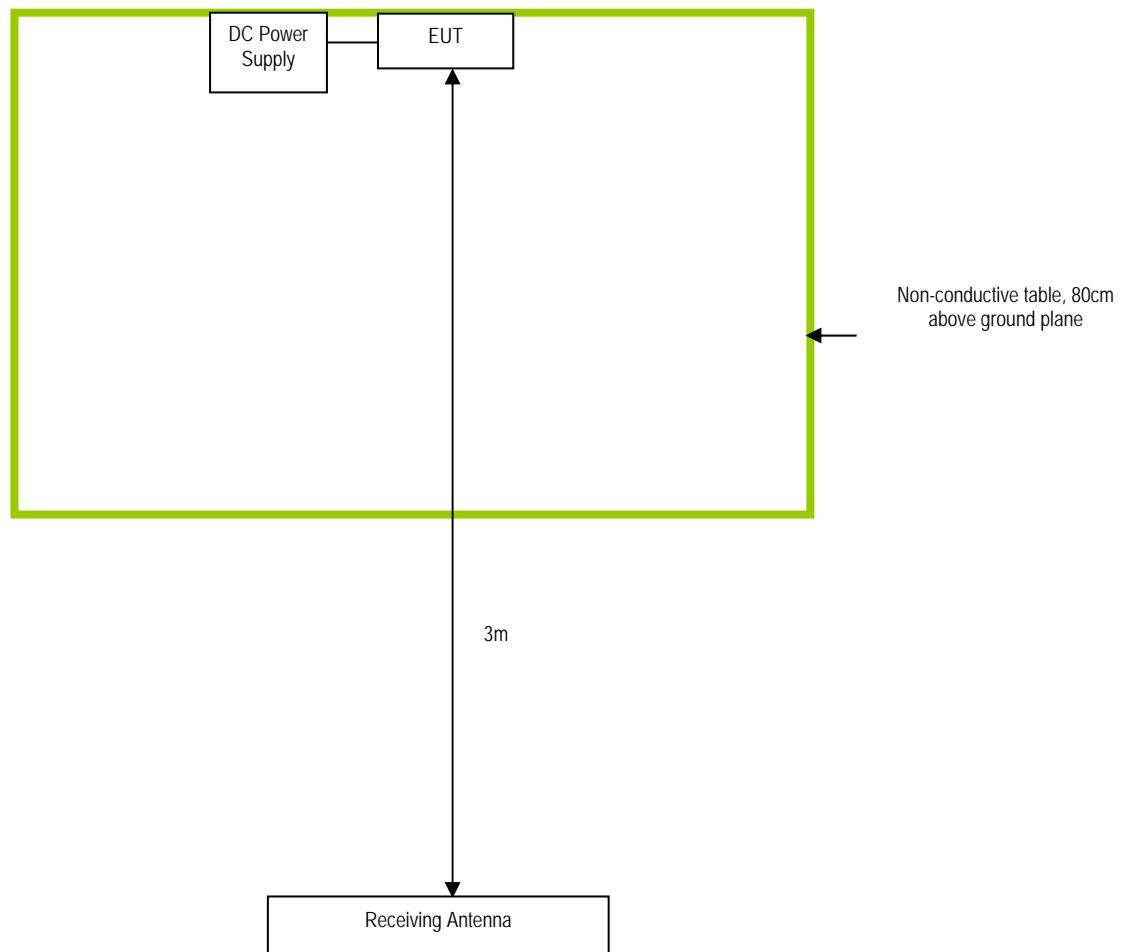
## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

### Annex C.i. TEST SET UP BLOCK

Block Configuration Diagram for Conducted Emissions



### Block Configuration Diagram for Radiated Emissions



### Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

| Manufacturer | Equipment Description | Model | Calibration Date |
|--------------|-----------------------|-------|------------------|
| BK PRECISION | DC Power Supply       | 1786B | N/A              |

|                 |                |
|-----------------|----------------|
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## Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see Attachment

## Annex E. DECLARATION OF SIMILARITY

# SMARFID

Shanghai Smarfid Security Equipment Co., Ltd.  
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Tel: (86-21) 54260103, 54260132 ext.215      Fax: (86-21) 54260132 ext.222

To: SIEMIC INC

## Declaration letter

Dear :

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

FCC ID:X3A-MGLH32

Model No.: LH322-8K

LH322-8N,LE322-8K,LE322-8N,LH122-8N

The five models have the same Circuits and color.

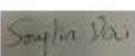
The difference of these models are have different model name but others differences as follows:

LH322-8K、LE322-8K has buttons but LH322-8N、LE322-8N、LH122-8N has no buttons.

LH322、LH122 read Legic and HID cards, LE322 read Legic cards.

LH122: the 125 KHz antenna is placed outside the card reader; LH322: the 125 KHz antenna is placed inside the card reader.

Thank you!

Signature:   
Printed name/title: Songlin Dai