

# RF TEST REPORT



Report No.: 15020001-FCC-R1

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 15.225: 2014, ANSI C63.10: 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:

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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-R1 | NONE           | Original    | February 03, 2015 |
|                 |                |             |                   |
|                 |                |             |                   |
|                 |                |             |                   |
|                 |                |             |                   |
|                 |                |             |                   |

## 2. Customer information

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

Antenna Gain: 13.56MHz: 4.5 dBi

Type of Modulation: ASK

RF Operating Frequency (ies): 13.56MHz

Number of Channels: 1 CH

Input Power: DC 12V

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     |
|-------------------|-----------------------------|------------|
| §15.203           | Antenna Requirement         | Compliance |
| §15.207(a)        | Conducted Emissions Voltage | Compliance |
| §15.225(a)        | Fundamental Field Strength  | Compliance |
| §15.225(b)        | Fundamental Field Strength  | Compliance |
| §15.225(c)        | Fundamental Field Strength  | Compliance |
| §15.225(d),15.209 | Radiated Emissions          | Compliance |
| §15.225(e)        | Frequency Stability         | Compliance |
| §15.215(c)        | Occupied Bandwidth          | Compliance |

### Measurement Uncertainty

| Emissions                   |   |             |
|-----------------------------|---|-------------|
| Test Item                   | Description   | Uncertainty |
| Radiated Spurious 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 Antenna Requirement**

#### **Applicable Standard**

Requirement(s): 47 CFR §15.203

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.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

The antenna is permanently attached to the device which meets the requirement.

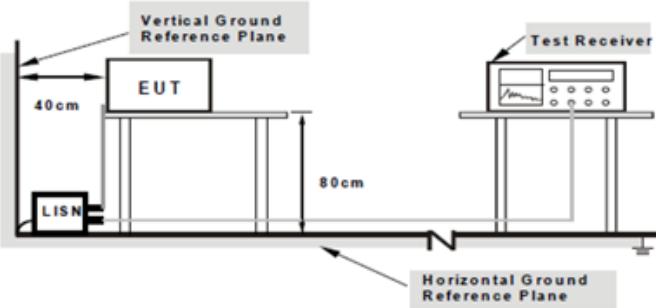
Result: Compliance.

## 6.2 Conducted Emissions Voltage

|                      |                  |
|----------------------|------------------|
| Temperature          | 20°C             |
| Relative Humidity    | 50%              |
| Atmospheric Pressure | 1019mbar         |
| Test date :          | January 31, 2015 |
| Tested By :          | Deon Dai         |

### Conducted Emission Limit

| Frequency ranges<br>(MHz) | Limit (dB $\mu$ V) |         |
|---------------------------|--------------------|---------|
|                           | QP                 | Average |
| 0.15 ~ 0.5                | 66 – 56            | 56 – 46 |
| 0.5 ~ 5                   | 56                 | 46      |
| 5 ~ 30                    | 60                 | 50      |

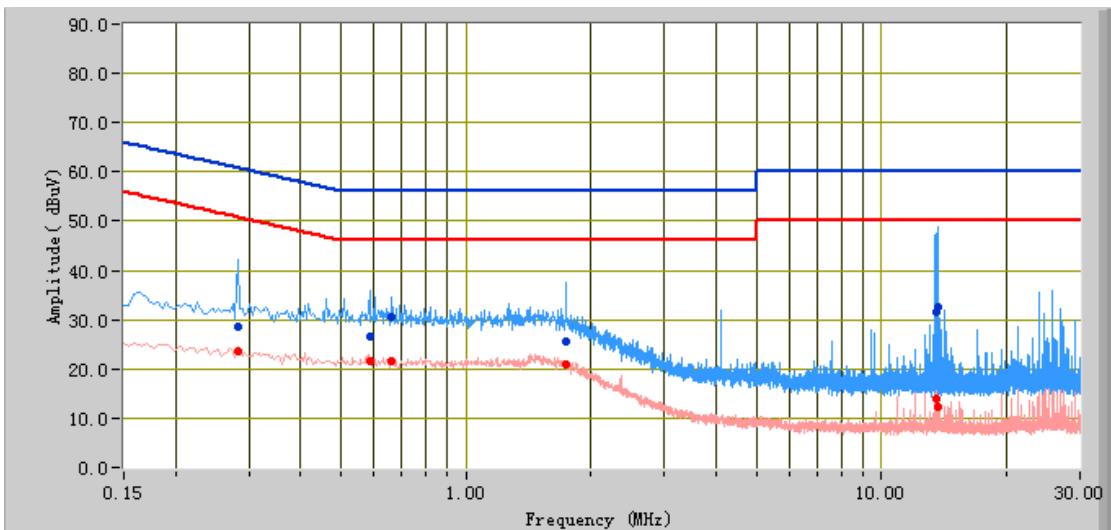
| Spec                               | Item  | Requirement   | Applicable                          |
|------------------------------------|---|---|-------------------------------------|
| 47CFR§15.20<br>7, RSS210<br>(A8.1) | a)  | For Low-power radio-frequency devices that is designed to be connected 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 frequency ranges. | <input checked="" type="checkbox"/> |
| 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                          | <ul style="list-style-type: none"> <li>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, as shown in Annex B.</li> <li>The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</li> <li>The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>All other supporting equipment were powered separately from another main supply.</li> </ul> |   |                                     |
| Remark                             |   |   |                                     |
| Result                             | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail  |   |                                     |

Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

**Test Mode:** Transmitting Mode

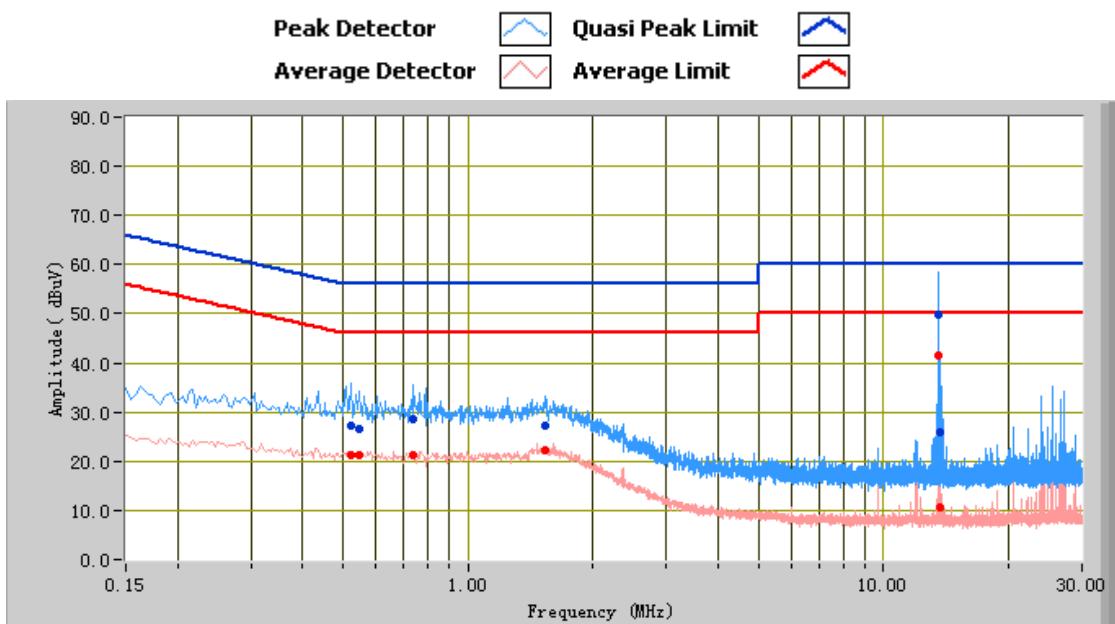
Peak Detector  Quasi Peak Limit   
 Average Detector  Average Limit 



### 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) |
|-----------------|-------------------------|--------------------|-------------|----------------------|--------------------|-------------|--------------|
| 13.64           | 32.51                   | 60.00              | -27.49      | 12.37                | 50.00              | -37.63      | 11.33        |
| 13.48           | 31.47                   | 60.00              | -28.53      | 14.01                | 50.00              | -35.99      | 11.32        |
| 1.74            | 25.67                   | 56.00              | -30.33      | 20.88                | 46.00              | -25.12      | 10.83        |
| 0.28            | 28.42                   | 60.76              | -32.33      | 23.47                | 50.76              | -27.29      | 11.41        |
| 0.59            | 26.68                   | 56.00              | -29.32      | 21.47                | 46.00              | -24.53      | 11.02        |
| 0.66            | 30.69                   | 56.00              | -25.31      | 21.42                | 46.00              | -24.58      | 10.96        |

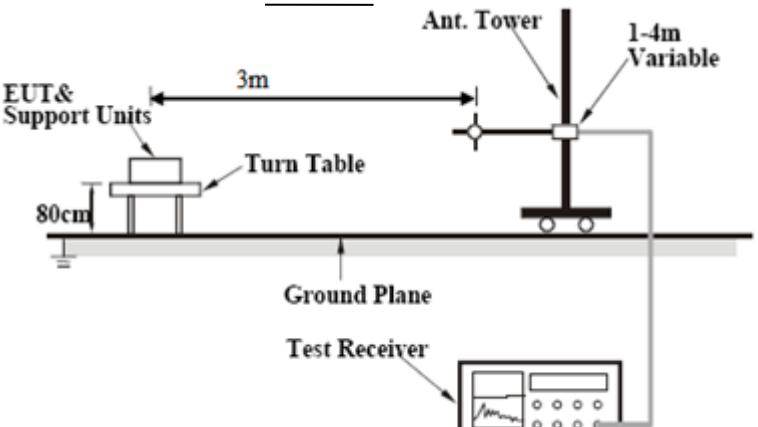
**Test Mode:**
**Transmitting Mode**

**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) |
|-----------------|-------------------------|--------------------|-------------|----------------------|--------------------|-------------|--------------|
| 13.55           | 49.70                   | 60.00              | -10.30      | 41.39                | 50.00              | -8.61       | 11.33        |
| 13.68           | 26.06                   | 60.00              | -33.94      | 10.78                | 50.00              | -39.22      | 11.33        |
| 0.52            | 27.08                   | 56.00              | -28.92      | 21.36                | 46.00              | -24.64      | 11.04        |
| 0.74            | 28.68                   | 56.00              | -27.32      | 21.21                | 46.00              | -24.79      | 10.89        |
| 0.55            | 26.61                   | 56.00              | -29.39      | 21.24                | 46.00              | -24.76      | 11.03        |
| 1.53            | 27.35                   | 56.00              | -28.65      | 22.34                | 46.00              | -23.66      | 10.82        |

### 6.3 Fundamental Field Strength Test Result

|                      |                  |
|----------------------|------------------|
| Temperature          | 20°C             |
| Relative Humidity    | 50%              |
| Atmospheric Pressure | 1019mbar         |
| Test date :          | January 31, 2015 |
| Tested By :          | Deon Dai         |

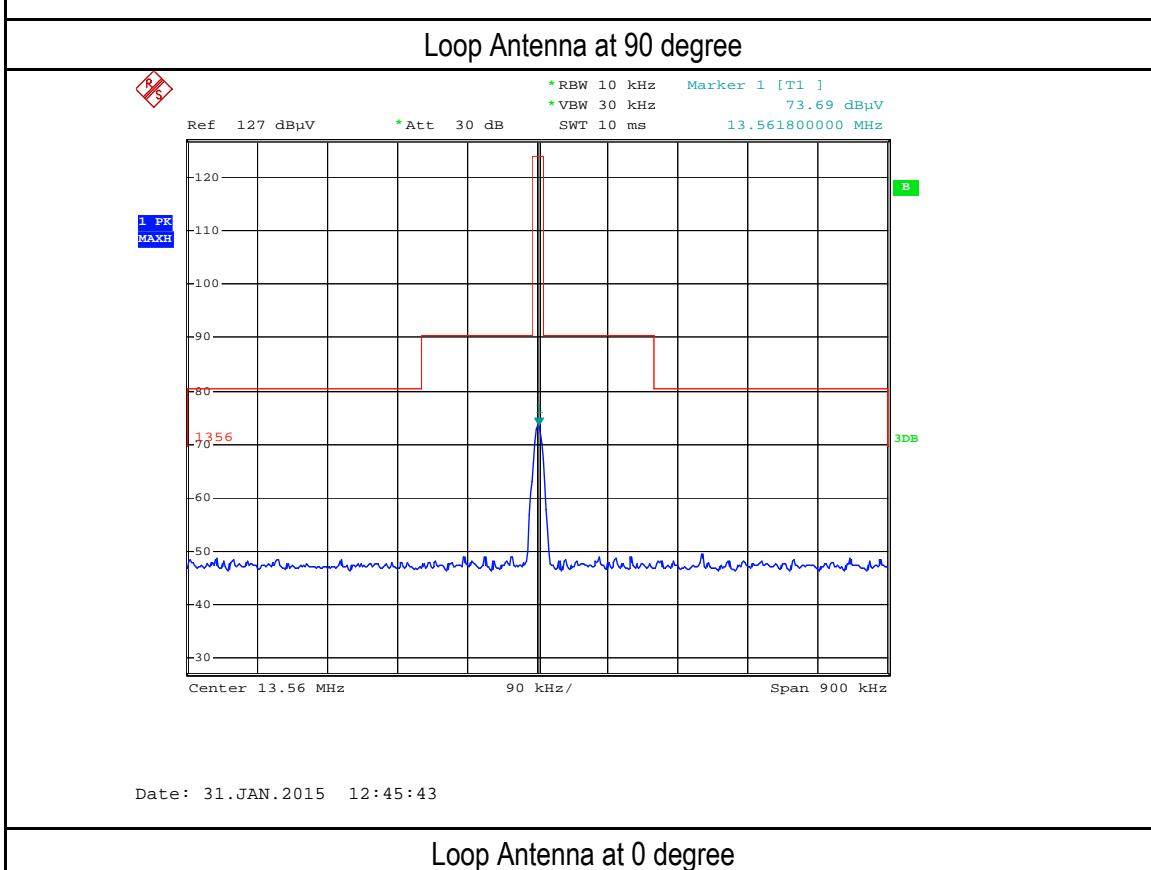
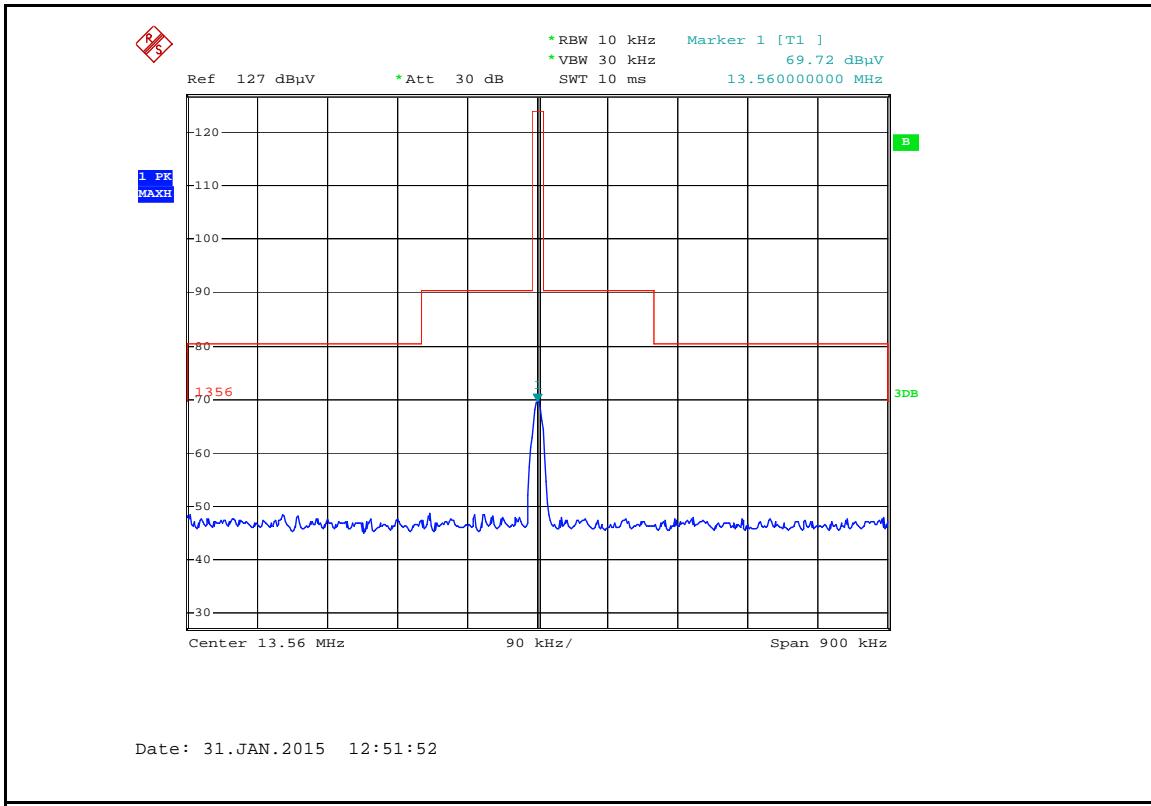
Requirement(s):

| Spec                                   | Item   | Requirement   | Applicable                          |
|--|--|---|-------------------------------------|
| §15.225(a)<br>§15.225(b)<br>§15.225(c) | a)   | The field strength of any emissions within the band 13.553 –13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.               | <input checked="" type="checkbox"/> |
|  | b)   | The bands 13.410 –13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. | <input type="checkbox"/>            |
|  | c)   | The bands 13.110 –13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.  | <input type="checkbox"/>            |
| Test Setup                             |   |   |                                     |
| Test Procedure                         | <ol style="list-style-type: none"> <li>1. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>2. 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>a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>b. The EUT was then rotated to the direction that gave the maximum emission.</li> <li>c. Finally, the antenna height was adjusted to the height that gave the maximum emission. A peak measurement was then made for that frequency point.</li> </ol> </li> <li>3. 4. 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 type="checkbox"/> Yes            | <input checked="" type="checkbox"/> N/A |
| Test Plot | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> N/A            |

## Test Plots

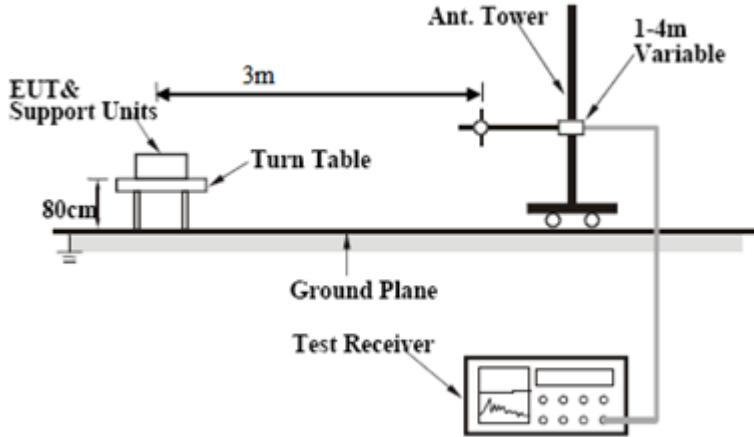
### Fundamental Field Strength Measurement Result:



## 6.4 Radiated Spurious Emissions

|                      |                  |
|----------------------|------------------|
| Temperature          | 20°C             |
| Relative Humidity    | 50%              |
| Atmospheric Pressure | 1019mbar         |
| Test date :          | January 31, 2015 |
| Tested By :          | Deon Dai         |

Requirement(s):

| Spec                        | Item   | Requirement  | Applicable                  |                                   |                               |             |             |     |             |              |    |            |    |    |       |       |   |        |       |   |         |       |   |           |     |   |                                     |
|-----------------------------|--|--|-----------------------------|-----------------------------------|-------------------------------|-------------|-------------|-----|-------------|--------------|----|------------|----|----|-------|-------|---|--------|-------|---|---------|-------|---|-----------|-----|---|-------------------------------------|
| §15.225(d)                  | a)   | <p>The field strength of any emissions appearing outside of the 3.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.</p> <table border="1"> <thead> <tr> <th>Fundamental frequency (MHz)</th> <th>Field strength (microvolts/meter)</th> <th>Measurement distance (meters)</th> </tr> </thead> <tbody> <tr> <td>0.009-0.490</td> <td>2400/F(kHz)</td> <td>300</td> </tr> <tr> <td>0.490-1.705</td> <td>24000/F(kHz)</td> <td>30</td> </tr> <tr> <td>1.705-30.0</td> <td>30</td> <td>30</td> </tr> <tr> <td>30-88</td> <td>100**</td> <td>3</td> </tr> <tr> <td>88-246</td> <td>150**</td> <td>3</td> </tr> <tr> <td>216-960</td> <td>200**</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>3</td> </tr> </tbody> </table> | Fundamental 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 | 88-246 | 150** | 3 | 216-960 | 200** | 3 | Above 960 | 500 | 3 | <input checked="" type="checkbox"/> |
| Fundamental 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  |                             |                                   |                               |             |             |     |             |              |    |            |    |    |       |       |   |        |       |   |         |       |   |           |     |   |                                     |
| 88-246                      | 150**  | 3  |                             |                                   |                               |             |             |     |             |              |    |            |    |    |       |       |   |        |       |   |         |       |   |           |     |   |                                     |
| 216-960                     | 200**  | 3  |                             |                                   |                               |             |             |     |             |              |    |            |    |    |       |       |   |        |       |   |         |       |   |           |     |   |                                     |
| Above 960                   | 500  | 3  |                             |                                   |                               |             |             |     |             |              |    |            |    |    |       |       |   |        |       |   |         |       |   |           |     |   |                                     |
| Test Setup                  |  <p>The diagram illustrates the test setup for radiated spurious emissions. It shows a 'Turn Table' with an 'EUT &amp; Support Units' mounted on it, positioned 80cm from the 'Ground Plane'. The turn table is connected to a 'Test Receiver' which displays a waveform. A vertical 'Ant. Tower' is mounted on the turn table, with its height adjustable between 1-4m. 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>A Quasi-peak measurement was then made for that frequency point.</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  Yes  N/A

Test Plot  Yes (See below)  N/A

**Test Mode:** Transmitting

Loop Antenna at 0 degree:

@ 3M

| Frequency<br>(MHz) | Peak<br>( Corrected )<br>(dB $\mu$ V/m) | Factor<br>(dB) | Height<br>(cm) | Azimuth<br>(deg) | Limits<br>@ 3m<br>(dB $\mu$ V/m) | Margin<br>(dB) |
|--------------------|---|----------------|----------------|------------------|----------------------------------|----------------|
| 19.76              | 56.78                                   | 20.1           | 110            | 180              | 69.54                            | -12.76         |
| 16.89              | 57.29                                   | 18.3           | 109            | 177              | 69.54                            | -12.25         |
| 4.33               | 56.01                                   | 34.2           | 100            | 0                | 69.54                            | -13.53         |

Loop Antenna at 90 degree:

@ 3M

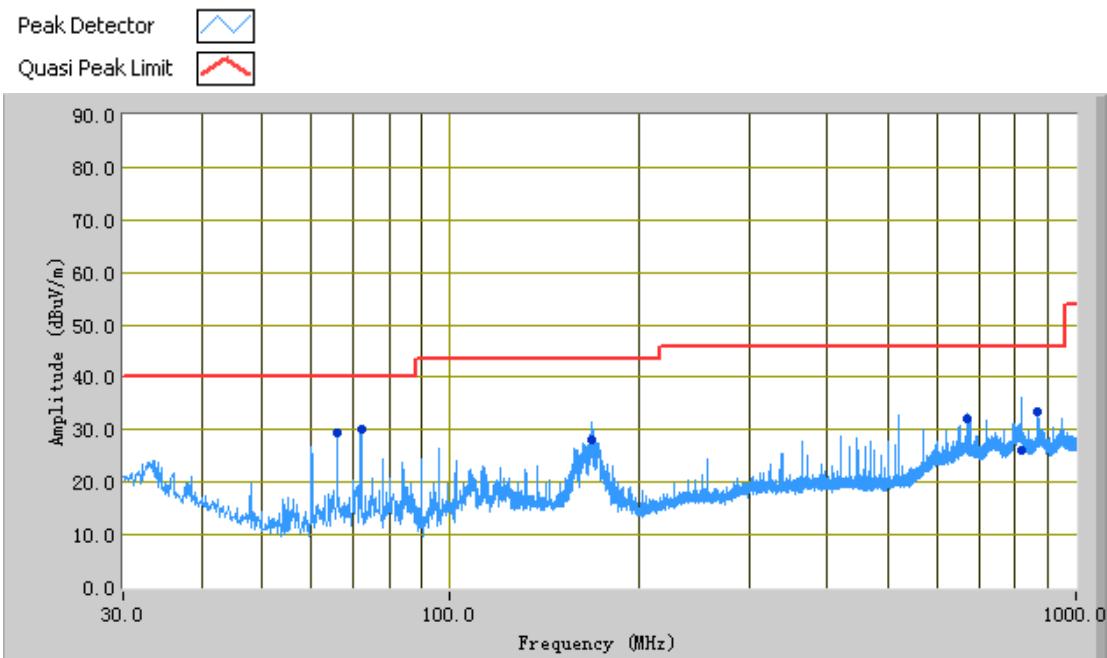
| Frequency<br>(MHz) | Peak<br>( Corrected )<br>(dB $\mu$ V/m) | Factor<br>(dB) | Height<br>(cm) | Azimuth<br>(deg) | Limits<br>@ 3m<br>(dB $\mu$ V/m) | Margin<br>(dB) |
|--------------------|---|----------------|----------------|------------------|----------------------------------|----------------|
| 5.22               | 53.45                                   | 32.9           | 122            | 189              | 69.54                            | -16.09         |
| 19.77              | 55.38                                   | 20.1           | 100            | 179              | 69.54                            | -14.16         |
| 17.76              | 56.01                                   | 18.5           | 133            | 177              | 69.54                            | -13.53         |

Note :

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

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

*Below 1GHz*



### Test Data

Vertical & Horizontal Polarity Plot at 3m

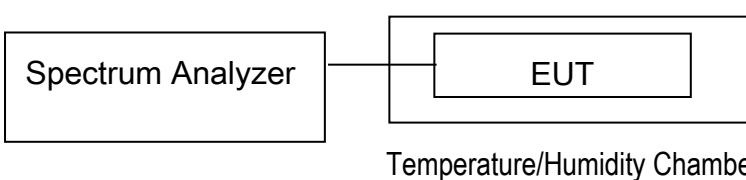
| Frequency (MHz) | Quasi Peak (dB $\mu$ V/m) | Azimuth | Polarity (H/V) | Height (cm) | Factors (dB) | Limit (dB $\mu$ V/m) | Margin (dB) |
|-----------------|---------------------------|---------|----------------|-------------|--------------|----------------------|-------------|
| 817.60          | 26.16                     | 7.00    | H              | 99.00       | -17.54       | 46.00                | -19.84      |
| 72.02           | 30.02                     | 96.00   | V              | 230.00      | -37.36       | 40.00                | -9.98       |
| 66.02           | 29.32                     | 247.00  | V              | 102.00      | -37.44       | 40.00                | -10.68      |
| 168.06          | 28.17                     | 131.00  | H              | 106.00      | -31.51       | 43.50                | -15.33      |
| 867.16          | 33.50                     | 135.00  | V              | 137.00      | -18.15       | 46.00                | -12.50      |
| 668.95          | 32.06                     | 342.00  | V              | 101.00      | -20.59       | 46.00                | -13.94      |

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.

## 6.5 Frequency Stability

|                      |                  |
|----------------------|------------------|
| Temperature          | 20°C             |
| Relative Humidity    | 50%              |
| Atmospheric Pressure | 1019mbar         |
| Test date :          | January 31, 2015 |
| Tested By :          | Deon Dai         |

Requirement(s):

| Spec           | Item  | Requirement   | Applicable                          |
|----------------|---|---|-------------------------------------|
| §15.225(e)     | a)  | The Frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20°C to +50°C at normal supply voltage. | <input checked="" type="checkbox"/> |
|                | b )   | The frequency of the transmitter was measured at 85% and at 115% of the rated power supply voltage at 20°C environmental temperature.   | <input checked="" type="checkbox"/> |
| Test Setup     | <br>Spectrum Analyzer — EUT — Temperature/Humidity Chamber   |   |                                     |
| Test Procedure | 1> Place the de-energized EUT in an environmental temperature test chamber. Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. An antenna should be connected to the antenna output connector of the EUT if possible. Use of a dummy load could affect the output frequency of the EUT. If the EUT is equipped with or uses an adjustable-length antenna, it should be fully extended.<br>2> Turn the EUT on, and couple its output to a frequency counter or other frequency-measuring device of sufficient accuracy, considering the frequency tolerance with which the EUT shall comply.<br>3> Turn the EUT off, and place it inside an environmental chamber set to the highest temperature specified by the procuring or regulatory agency. For devices that are normally operated continuously, the EUT may be energized while inside the test chamber. For devices that have oscillator heaters, energize only the heater circuit while the EUT is inside the chamber.<br>4> Allow sufficient time (approximately 30 minutes) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and measure the EUT operating frequency at startup, and two, five, and ten minutes after startup. Four measurements in total are made.<br>5> If 13.1.1 requires measurements on only one operating frequency, proceed to step f); otherwise, successively tune the EUT to each of the additional operating frequencies specified in 13.1.1 and repeat step d).<br>6> Repeat step d) and step e) with the temperature chamber set to the lowest temperature specified by the procuring or regulatory agency. Be sure to allow the environmental chamber temperature to stabilize before performing these measurements. |   |                                     |

|        |  |                               |
|--------|--|-------------------------------|
| Remark |  |                               |
| Result | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |

Test Data  Yes  N/A

Test Plot  Yes  N/A

Carrier Frequency: 13.56MHz at -20°C to +50°C, DC12V

| Temperature (°C) | Measured Freq. (MHz) | Freq. Drift (Hz) | Freq. Deviation (Limit: 0.01%) | Pass/Fail |
|------------------|----------------------|------------------|--------------------------------|-----------|
| 50               | 13.5597              | 300              | < 0.01                         | Pass      |
| 40               | 13.5597              | 300              | < 0.01                         | Pass      |
| 30               | 13.5596              | 400              | < 0.01                         | Pass      |
| 20               |                      |                  | Reference                      |           |
| 10               | 13.5597              | 300              | < 0.01                         | Pass      |
| 0                | 13.5597              | 300              | < 0.01                         | Pass      |
| -10              | 13.5596              | 400              | < 0.01                         | Pass      |
| -20              | 13.5597              | 300              | < 0.01                         | Pass      |

Carrier Frequency: 13.56MHz at 20°C at DC12V

| Measured Voltage ±15% of nominal | Measured Freq. (MHz) | Freq. Drift (Hz) | Freq. Deviation (Limit: 0.01%) | Pass/Fail |
|----------------------------------|----------------------|------------------|--------------------------------|-----------|
| 10.2                             | 13.5597              | 300              | <0.01                          | Pass      |
| 13.8                             | 13.5596              | 400              | <0.01                          | Pass      |

## 6.6 20dB Occupied Bandwidth

|                      |                  |
|----------------------|------------------|
| Temperature          | 20°C             |
| Relative Humidity    | 50%              |
| Atmospheric Pressure | 1019mbar         |
| Test date :          | January 31, 2015 |
| Tested By :          | Deon Dai         |

Requirement(s):

| Spec           | Item   | Requirement  | Applicable                          |
|----------------|--|--|-------------------------------------|
| §15.215(c)     | a)   | Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation. | <input checked="" type="checkbox"/> |
| Test Setup     |  | <div style="display: flex; justify-content: space-around; border: 1px solid black; padding: 2px;"> <span>Spectrum Analyzer</span> <span>EUT</span> </div>  |                                     |
| Test Procedure |  | <p><u>20dB Emission bandwidth measurement procedure</u></p> <ul style="list-style-type: none"> <li>- Set RBW = 300 Hz.</li> <li>- Set the video bandwidth (VBW) <math>\geq 3' RBW</math>.</li> <li>- Detector = Peak.</li> <li>- Trace mode = max hold.</li> <li>- Sweep = auto couple.</li> <li>- Allow the trace to stabilize.</li> </ul> <p>Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.</p>  |                                     |
| Remark         |  |  |                                     |
| Result         | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |  |                                     |

Test Data  Yes  N/A

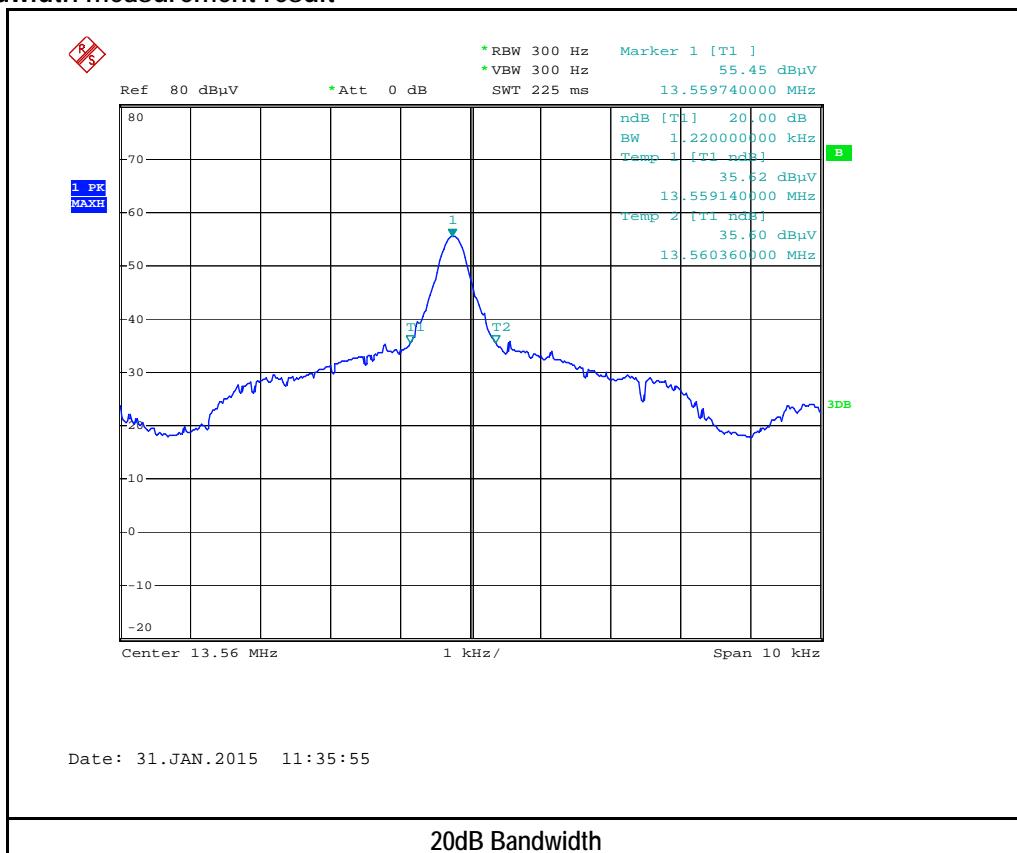
Test Plot  Yes  N/A

### 20dB Bandwidth measurement result

| Frequency<br>(MHz) | 20dB BW<br>(kHz) | Frequency range<br>( MHz ) F Low | Frequency range<br>( MHz ) F High | Test Result |
|--------------------|------------------|----------------------------------|-----------------------------------|-------------|
| 13.55974           | 1.22             | 13.55914                         | 13.56036                          | PASS        |

### Test Plots

#### 20dB Bandwidth measurement result



## Annex A. TEST INSTRUMENT

| Instrument                        | Model                  | Serial #       | Cal Date   | Cal Due    | In use                              |
|-----------------------------------|------------------------|----------------|------------|------------|-------------------------------------|
| <b>RF Conducted Test</b>          |                        |                |            |            |                                     |
| R&S EMI Receiver                  | ESPI3                  | 101216         | 11/04/2014 | 11/03/2015 | <input checked="" type="checkbox"/> |
| Power Splitter                    | 1#                     | 1#             | 02/02/2014 | 02/01/2015 | <input checked="" type="checkbox"/> |
| Hp Spectrum Analyzer              | 8563E                  | 3821A09023     | 10/09/2014 | 10/08/2015 | <input checked="" type="checkbox"/> |
| Temperature/Humidity Chamber      | 1007H                  | N/A            | 01/07/2016 | 01/06/2017 | <input checked="" type="checkbox"/> |
| <b>Radiated Emissions</b>         |                        |                |            |            |                                     |
| Hp Spectrum Analyzer              | 8563E                  | 3821A09023     | 10/09/2014 | 10/08/2015 | <input checked="" type="checkbox"/> |
| 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"/> |
| EMCO Horn Antenna (1 ~18GHz)      | 3115                   | N/A            | 11/15/2014 | 11/14/2015 | <input checked="" type="checkbox"/> |
| INFOMW Antenna (1 ~18GHz)         | JXTXLB-10180           | J2031081120092 | 10/09/2013 | 10/08/2014 | <input checked="" type="checkbox"/> |
| Horn Antenna (18~40GHz)           | AH-840                 | 101013         | 04/22/2014 | 04/22/2015 | <input checked="" type="checkbox"/> |
| Microwave Pre-Amp (18~40GHz)      | PA-840                 | 181250         | 05/29/2014 | 05/28/2015 | <input checked="" type="checkbox"/> |
| Hp Agilent Pre-Amplifier          | 8447F                  | 1937A01160     | 10/27/2014 | 10/26/2015 | <input checked="" type="checkbox"/> |
| MITEQ Pre-Amplifier (0.1 ~ 18GHz) | AMF-7D-00101800-30-10P | 1451709        | 10/27/2014 | 10/26/2015 | <input checked="" type="checkbox"/> |

## Annex B. EUT And Test Setup Photographs

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



Front View of EUT

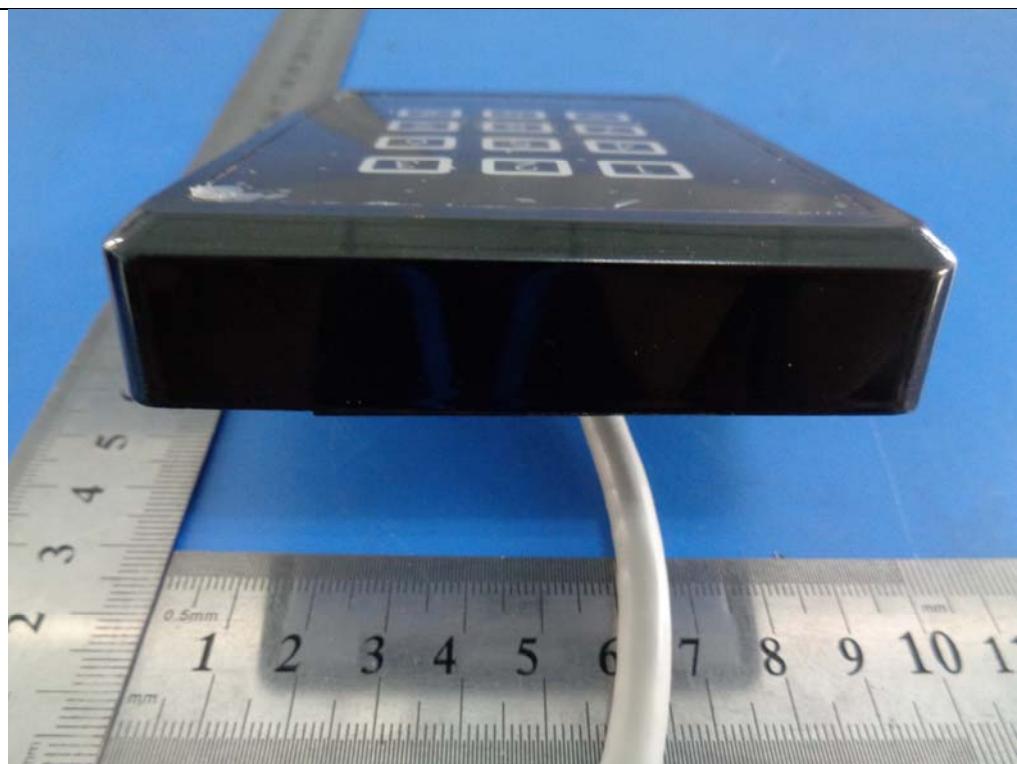
|                 |                 |
|-----------------|-----------------|
| Test Report No. | 15020001-FCC-R1 |
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Rear View of EUT



Top View of EUT



Bottom View of EUT



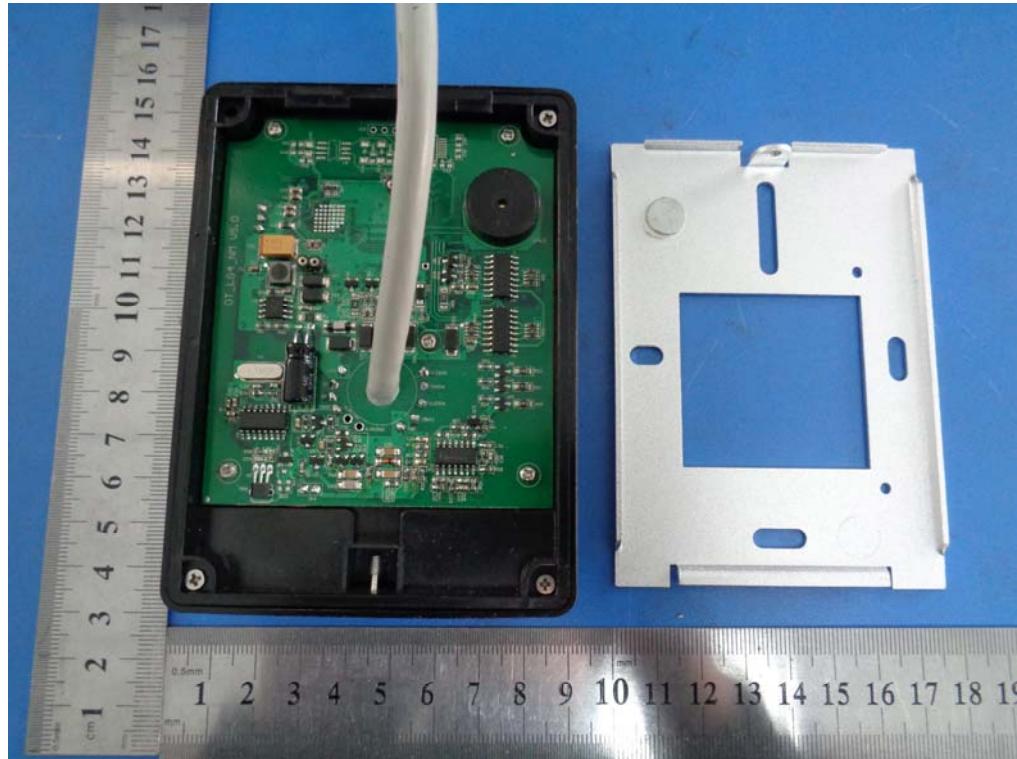
Left View of EUT

|                 |                 |
|-----------------|-----------------|
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Right View of EUT

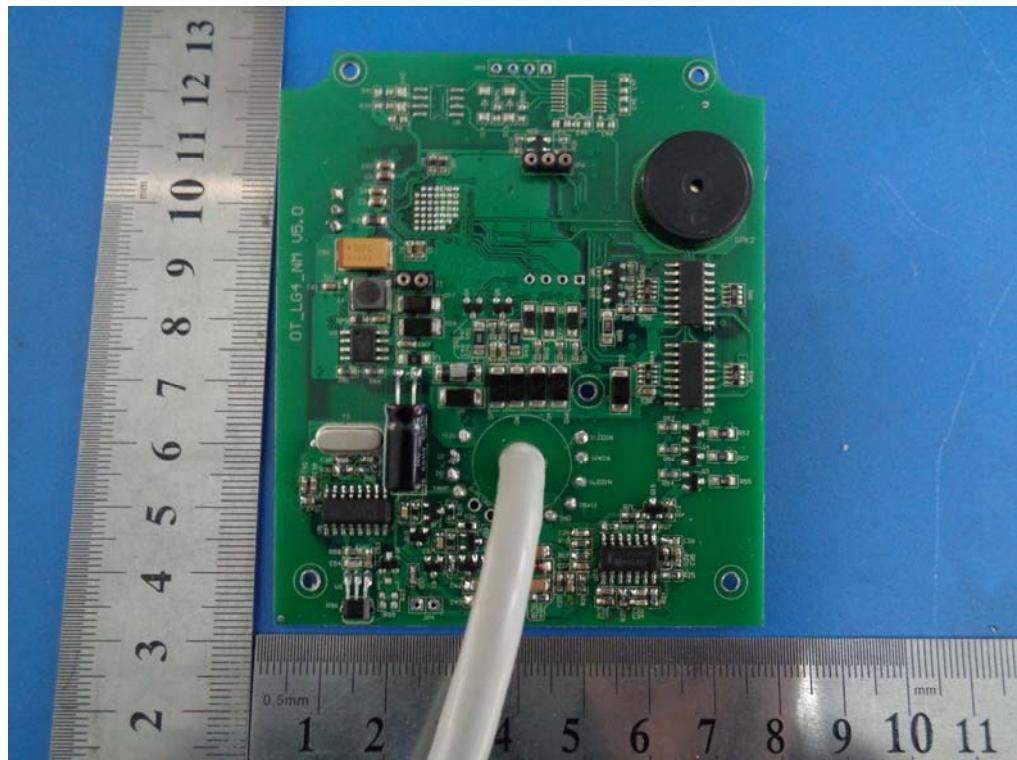
Annex B.ii. Photograph EUT Internal Photo



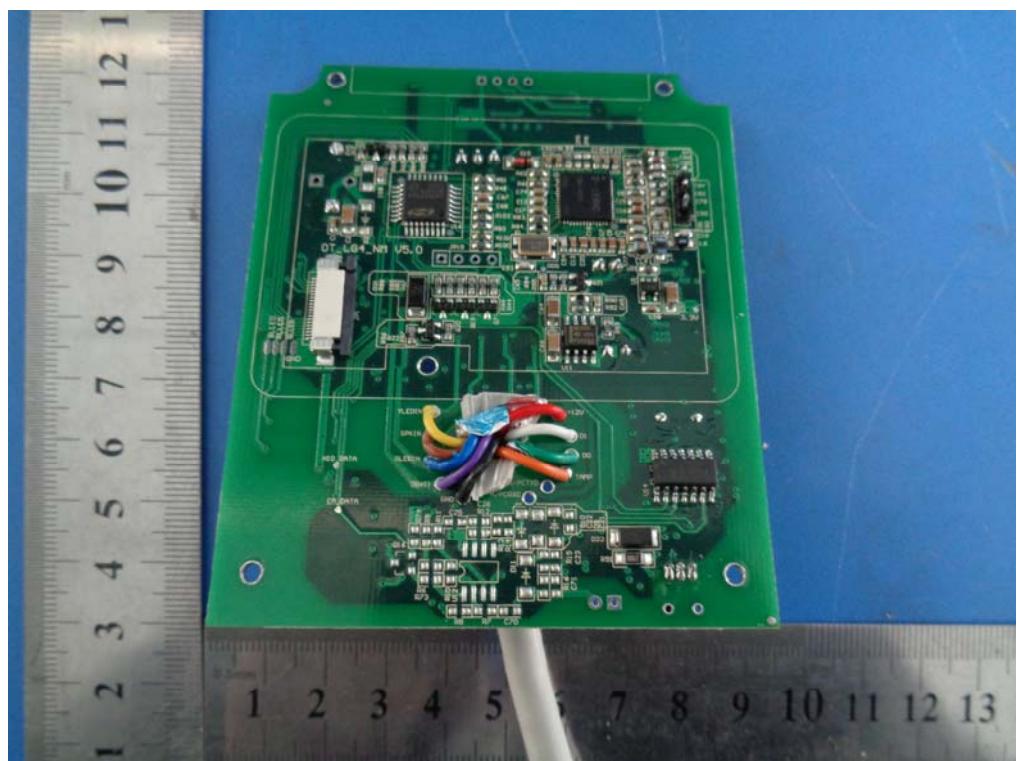
Uncover- Front View 1



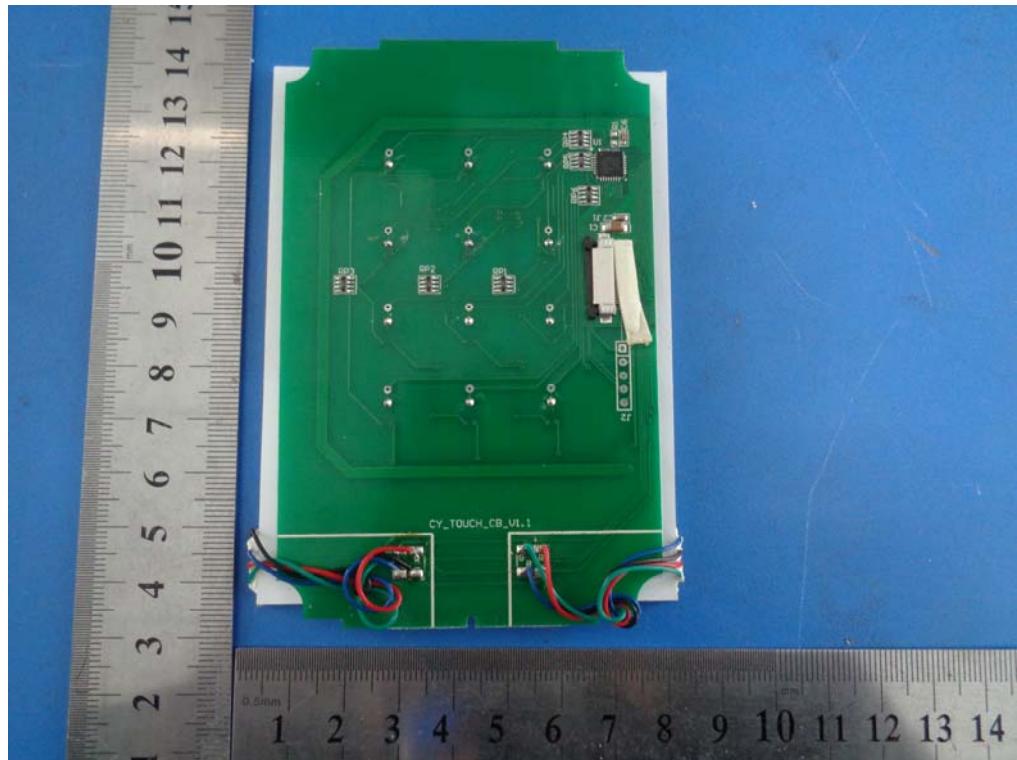
Uncover- Front View 2



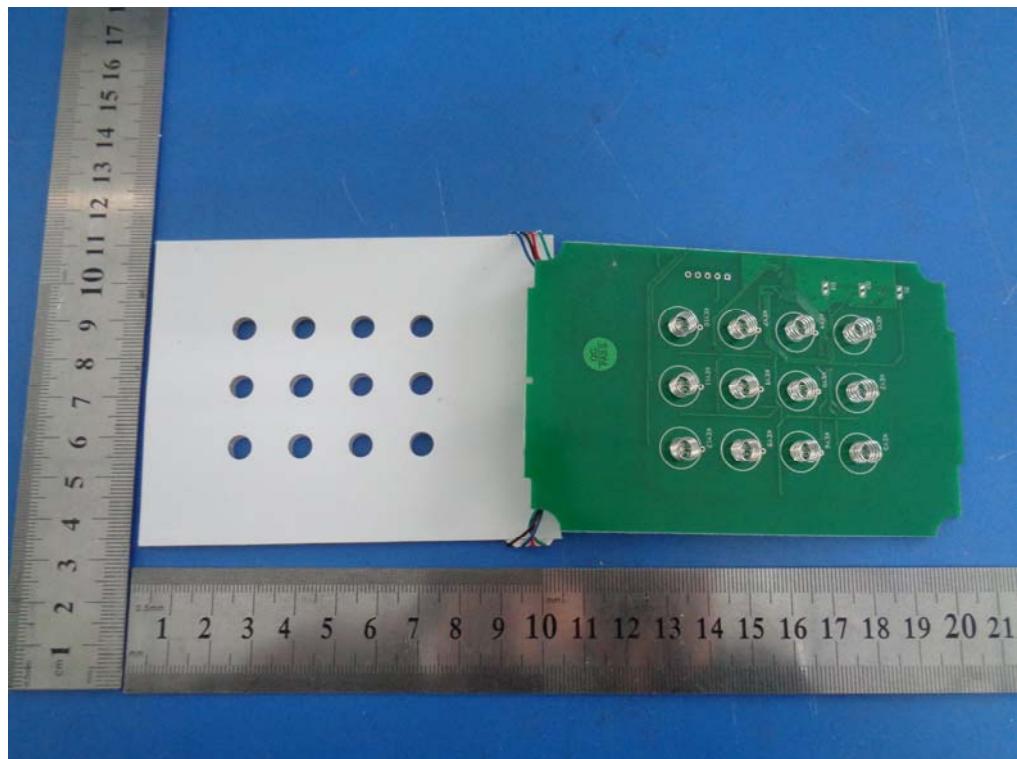
EUT PCBA 1– Front View



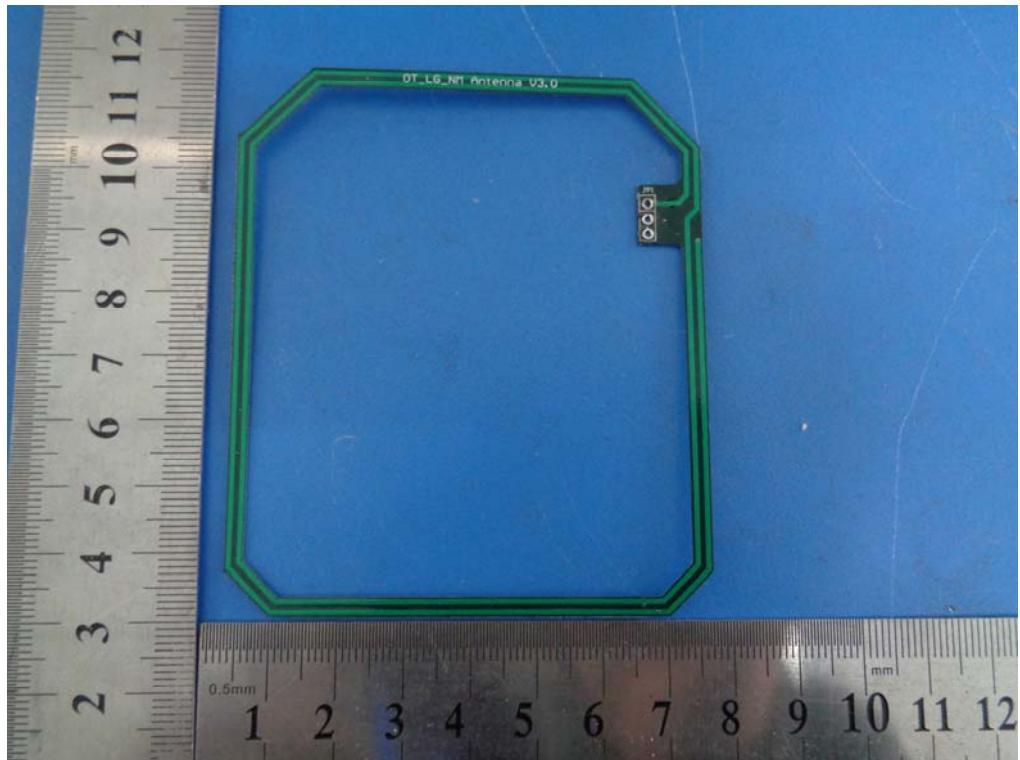
EUT PCB 1– Rear View



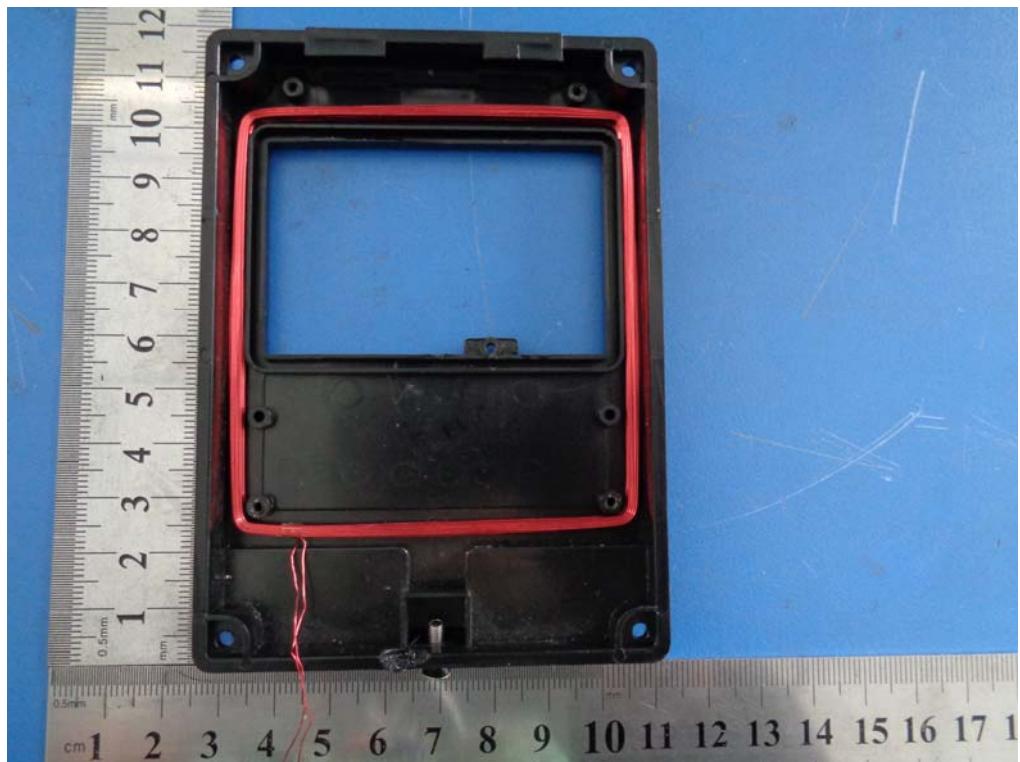
EUT PCBA 2– Front View



EUT PCBA 2– Rear View



Antenna – Front View(13.56MHz)



Antenna – Front View(125kHz)

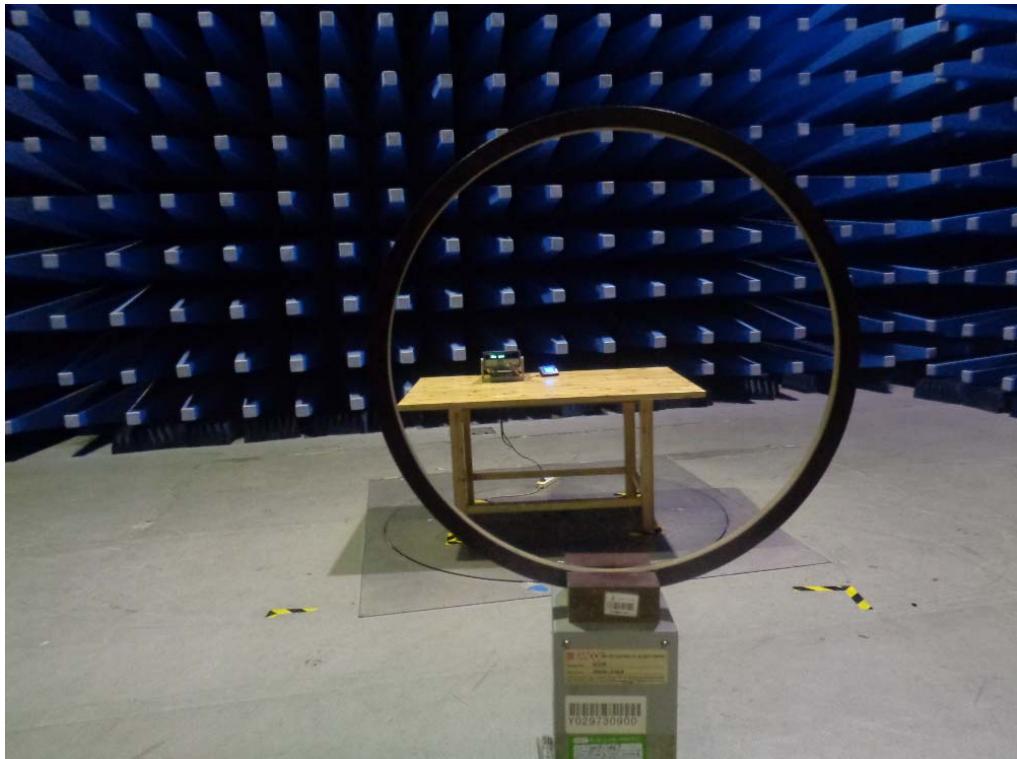
**Annex B.iii. Photograph Test Setup Photo**



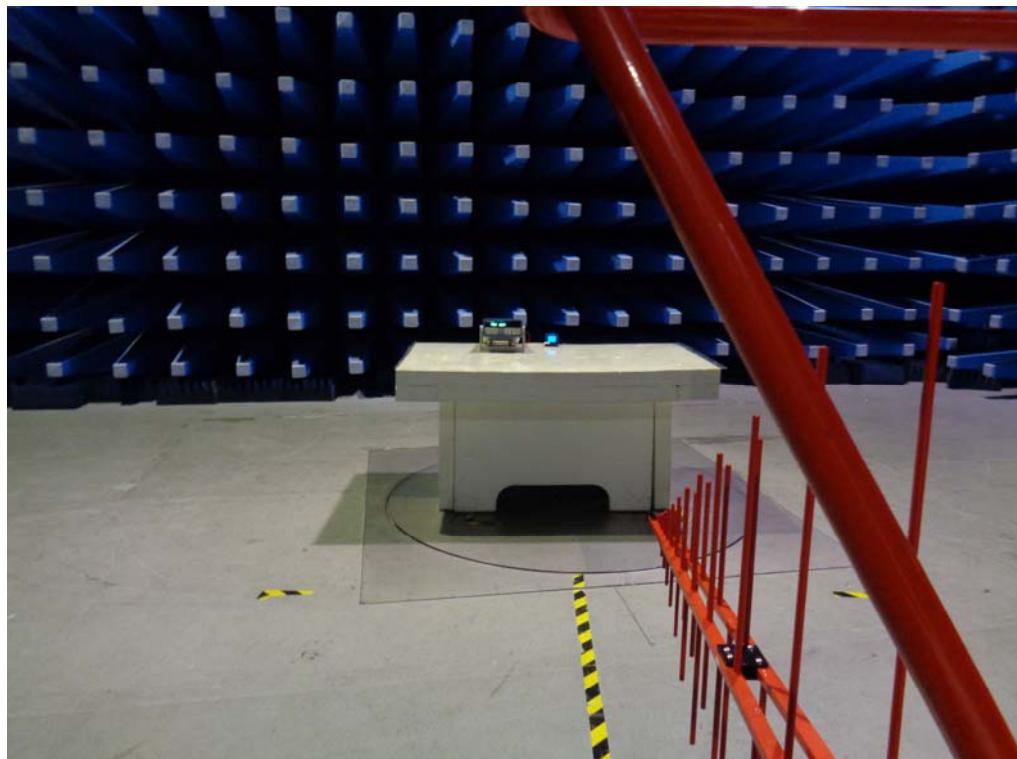
Conducted Emissions Setup Front View



Conducted Emissions Setup Side View



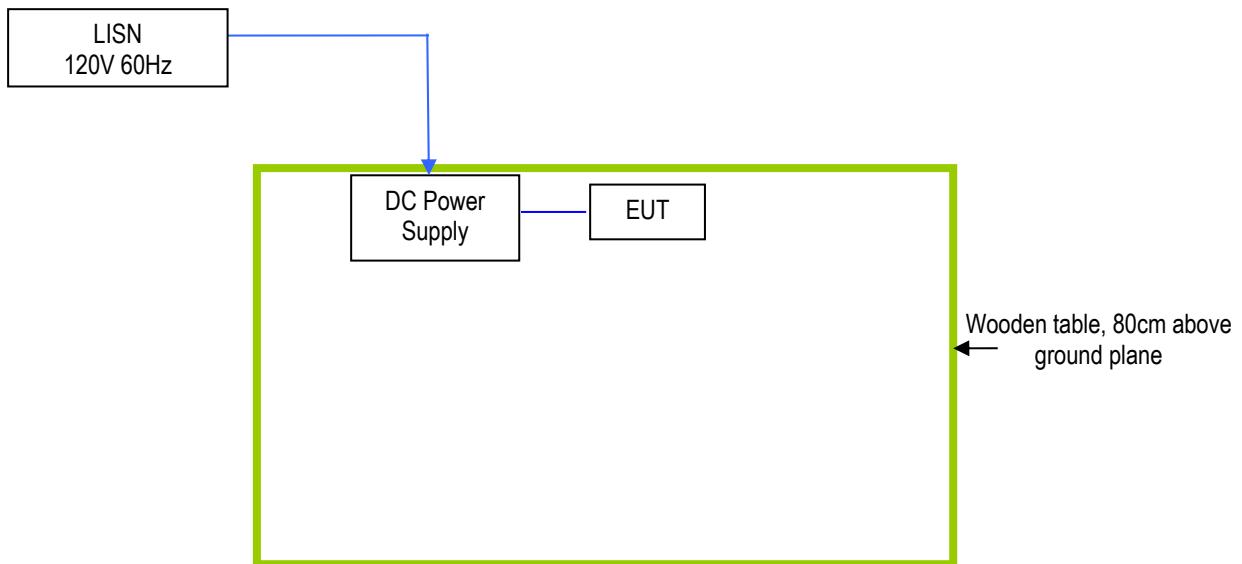
Front View of Radiated Emissions Test Setup below 30MHz



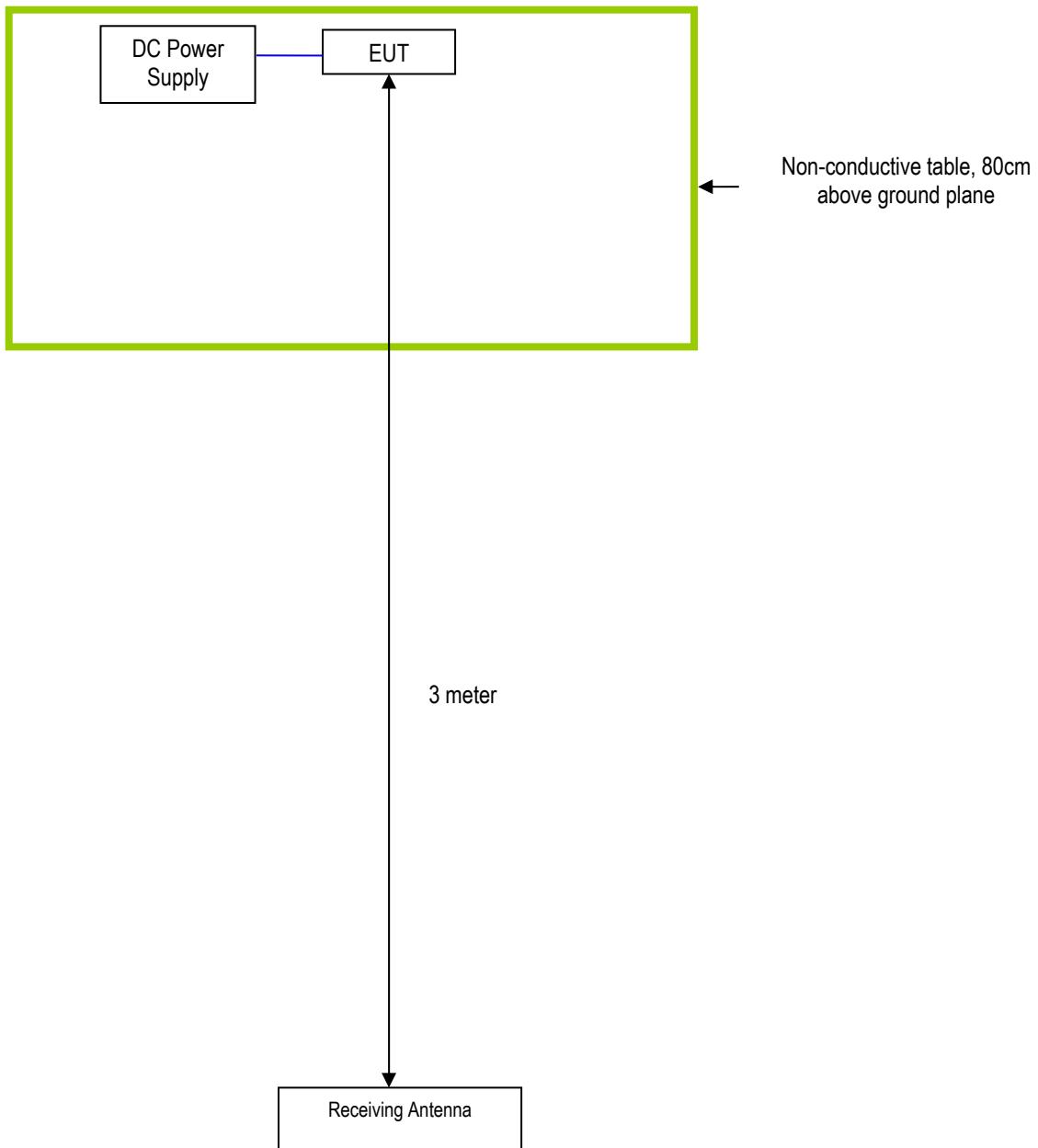
Front View of Radiated Emissions Test Setup (30MHz-1GHz)

## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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



### Block Configuration Diagram for Radiated Emissions



|                 |                 |
|-----------------|-----------------|
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#### 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 | Calibration Due Date |
|--------------|-----------------------|-------|------------------|----------------------|
| BK PRECISION | DC Power Supply       | 1786B | 10/27/2014       | 10/26/2015           |

|                 |                 |
|-----------------|-----------------|
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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.  
Add: Room 301, 4th Bldg., No.4 TongLi Road, SongJiang District, Shanghai 201615,  
China  
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:

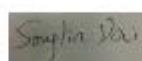
LH322-8K、LE322-8K has buttons but LH322-8N、LE322-8N、LH122-8N has no buttons.

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