EMC TEST REPORT

Report No.: 15020079-FCC-E
Supersede Report No.: N/A

Applicant	Shanghai Smarfid Security Equipment Co.,Ltd
Product Name	Slender Series 125 kHz Reader
Main Model No.	HR352-8K
Test Standard	FCC Part 15 Subpart C:2014, ANSI C63.4:2009
Test Date	February 06 to February 09, 2015
Issue Date	February 10, 2015
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Kahn Yang	Alex Liu	
Kahn Yang Test Engineer	Alex Liu Checked By	

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Test result presented in this test report is applicable to the tested sample only

Issued by:
SIEMIC (SHENZHEN-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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CONTENTS

1. Report Revision History

Report No.	Report Version	Description	Issue Date
15020079-FCC-E	NONE	Original	February 10, 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 (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	718246
IC Test Site No.	4842E-1
Test Software	Labview of SIEMIC version 1.0

4. Equipment under Test (EUT) Information

Description of EUT:	Slender Series 125 kHz Reader
Main Model:	HR352-8K
Serial Model:	HR352-8N, HR353-8K, HR353-8N, EM352-8K, EM352-8N
Date EUT received:	January 26, 2015
Test Date(s):	February 06 to February 09, 2015
Operating Frequency :	125kHz
Antenna Gain	6 dBi
Type of Modulation:	ASK
Number of Channels:	1 CH
Trade Name :	N/A
FCC ID:	X3A-SSHR35

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

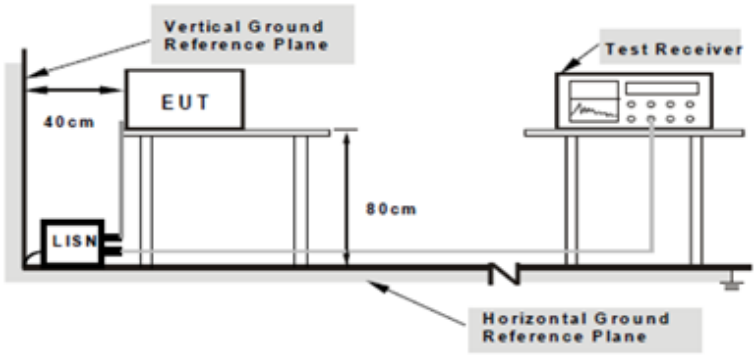
Temperature	24°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	February 09, 2015
Tested By :	Kahn Yang

Requirement(s):

Spec	Requirement	Applicable
§15.207	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.	☑

Frequency ranges (MHz)	Limit (dBµV)	
	QP	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

Procedure

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.
2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another main supply.
5. The EUT was switched on and allowed to warm up to its normal operating condition.
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.
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.
8. Steps 6-7 were repeated for the LIVE line (for AC mains) or DC line (for DC power).

Remark

Result ☑ Pass ☐ Fail

Test Data	☑ Yes ☐ N/A
Test Plot	☑ Yes ☐ N/A

Data sample

Frequency (MHz)	Quasi-Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Factors (dB)
xxx	56.21	66.00	-9.79	39.20	56.00	-16.80	12.22

Frequency (MHz) = Emission frequency in MHz

Quais-Peak/Average (dBμV/m)=Receiver Reading(dBμV/m)+ Factor(dB)

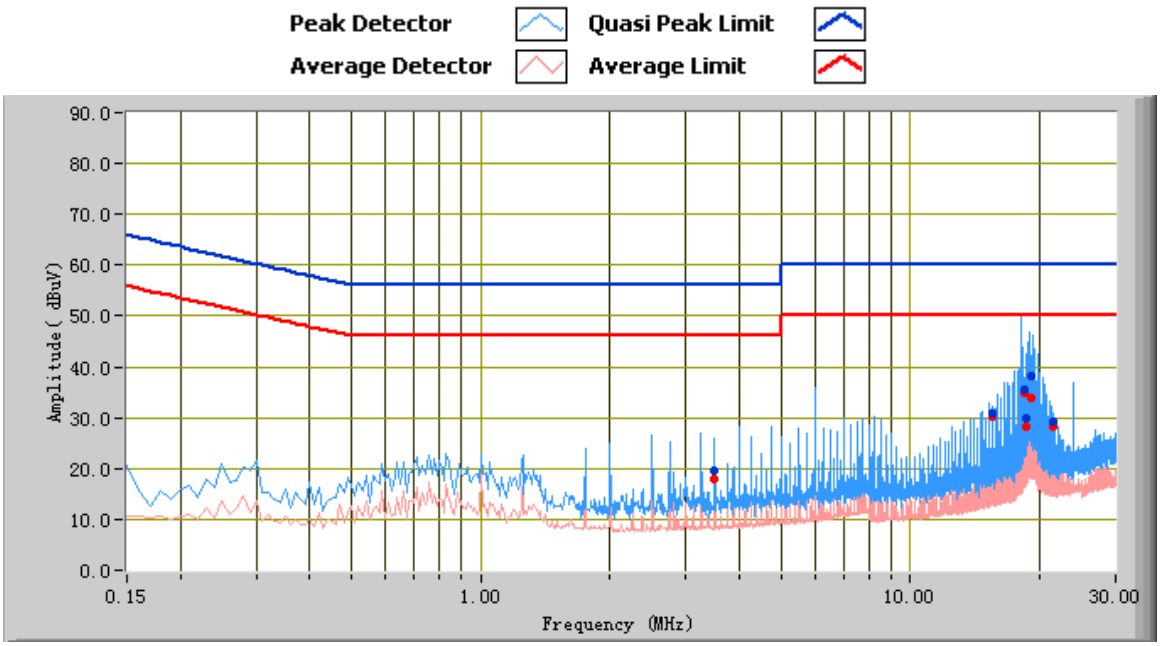
Limit(dBμV/m)=Limit stated in standard

Factor (dB)= cable loss+ Insertion loss of LISN+ Insertion loss of transient limiter (The transient limiter included 10dB attenuation)

Calculation Formula:

Margin (dB)=Quasi Peak / Average (dBμV/m) – limit (dBμV/m)

Test Mode:	Transmitting Mode

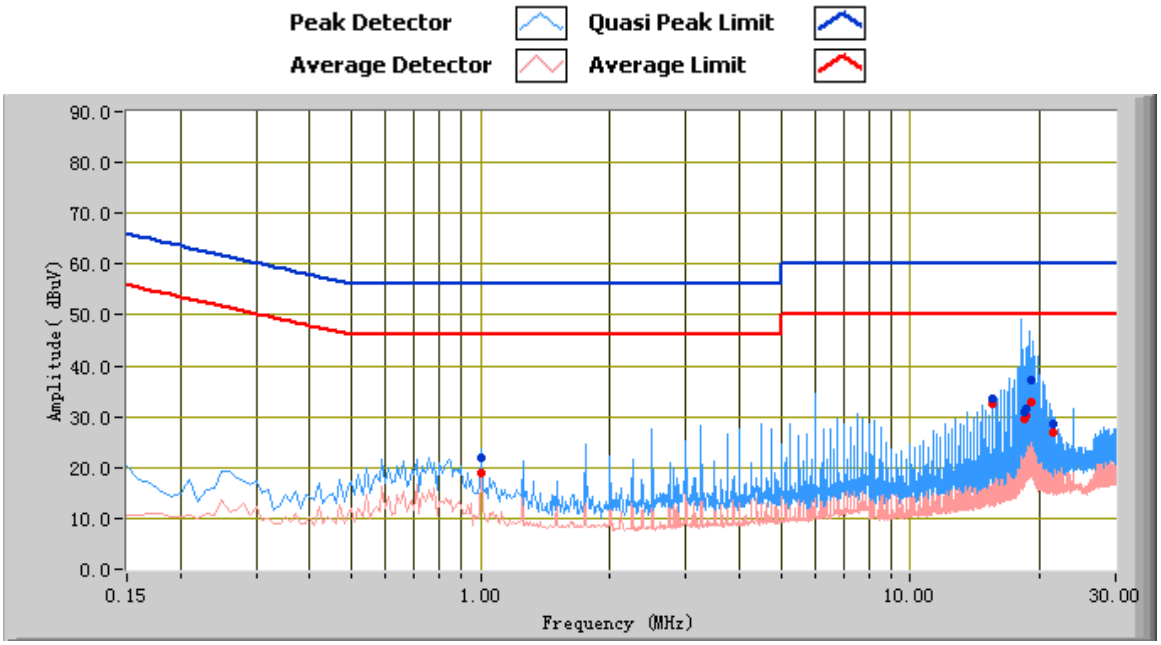


Test Data

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Factors (dB)
19.10	38.19	60.00	-21.81	34.04	50.00	-15.96	14.56
15.50	31.01	60.00	-28.99	30.16	50.00	-19.84	13.57
18.62	29.80	60.00	-30.20	28.09	50.00	-21.91	14.43
18.38	35.56	60.00	-24.44	34.80	50.00	-15.20	14.43
21.50	29.38	60.00	-30.62	28.07	50.00	-21.93	15.07
3.50	19.67	56.00	-36.33	18.02	46.00	-27.98	10.71

Test Mode:	Transmitting Mode



Test Data

Phase Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Factors (dB)
19.10	37.15	60.00	-22.85	33.04	50.00	-16.96	14.56
18.38	30.94	60.00	-29.06	29.52	50.00	-20.48	14.43
15.50	33.44	60.00	-26.56	32.68	50.00	-17.32	13.57
18.62	31.62	60.00	-28.38	30.22	50.00	-19.78	14.43
21.50	28.41	60.00	-31.59	26.96	50.00	-23.04	15.07
1.00	22.00	56.00	-34.00	19.04	46.00	-26.96	10.29

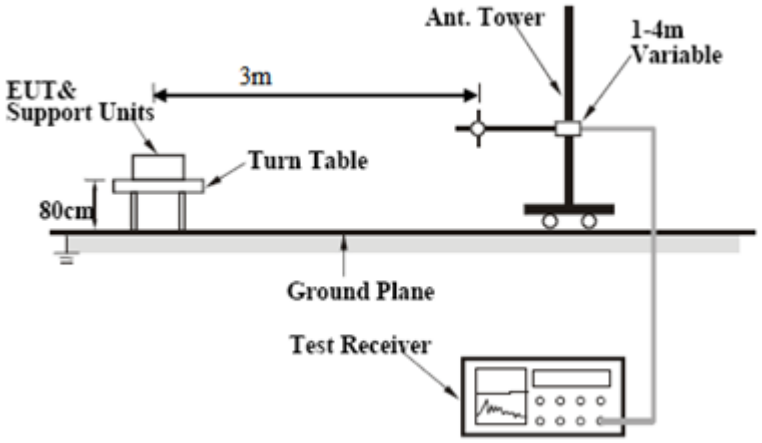
6.2 Radiated Emissions

Temperature	22°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	February 06, 2015
Tested By :	Kahn Yang

Requirement(s):

Spec	Requirement	Applicable
§15.209	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	☑

Frequency range (MHz)	Field Strength (μV/m)
30 – 88	100
88 – 216	150
216 960	200
Above 960	500

Test Setup	
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 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: a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. For emission frequencies measured below and above 1GHz, set the spectrum analyzer on a 100kHz and 1MHz resolution bandwidth respectively for each frequency measured. 4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	
Result	☑ Pass ☐ Fail
Test Data	☑ Yes ☐ N/A
Test Plot	☑ Yes ☐ N/A

Data sample

Frequency (MHz)	Quasi Peak (dBμV/m)	Azimuth	Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dBμV/m)	Margin (dB)
xxx	32.23	181.00	H	350.00	-38.23	40.00	-7.77

Frequency (MHz) = Emission frequency in MHz

Quais-Peak (dBμV/m)= Receiver Reading(dBμV/m)+ Factor(dB)

Azimuth=Position of turn table

Polarity=Polarity of Receiver antenna

Height(cm)= Height of Receiver antenna

Factor (dB)=Antenna factor + cable loss- antenna gain

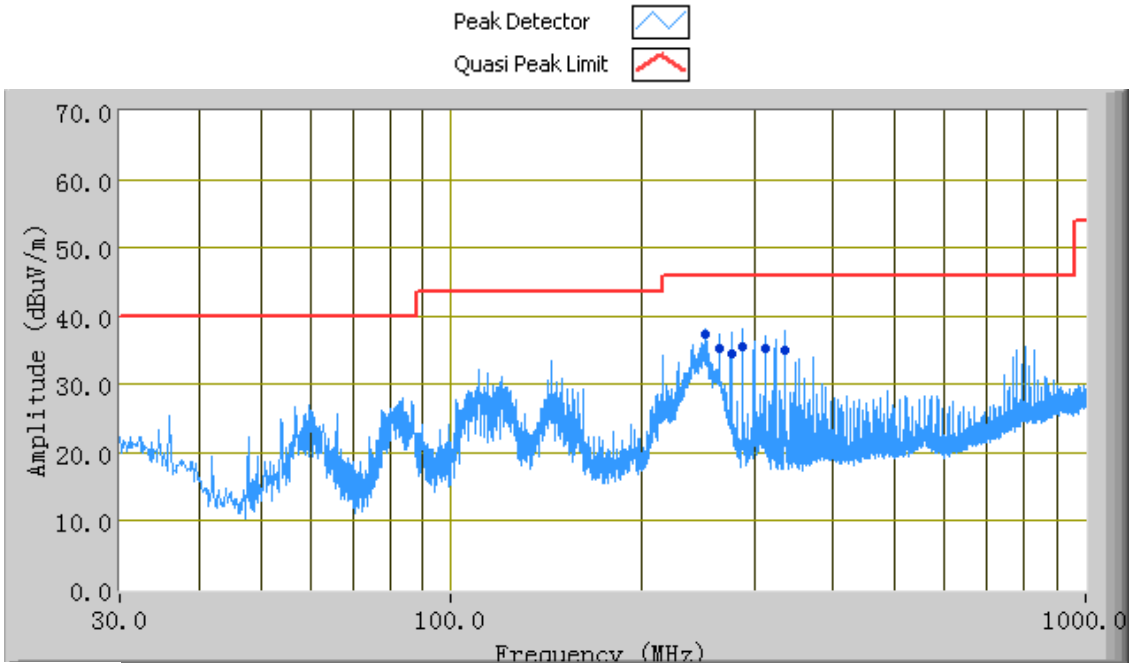
Limit (dBμV/m)=Limit stated in standard

Calculation Formula:

Margin (dB)=Quasi Peak (dBμV/m) – limit (dBμV/m)

Test Mode:	Transmitting Mode

(30MHz - 1GHz)



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)
252.08	37.43	185.00	V	110.00	-7.37	46.00	-8.57
288.09	35.48	198.00	V	101.00	-6.85	46.00	-10.52
336.11	34.95	74.00	H	100.00	-5.35	46.00	-11.05
276.15	34.61	173.00	H	100.00	-7.02	46.00	-11.39
264.06	35.28	223.00	H	121.00	-7.19	46.00	-10.72
312.10	35.14	275.00	H	102.00	-6.23	46.00	-10.86

0° 9 kHz -150kHz

Frequency (kHz)	S.A. Reading (dBµV)	Detector (PK/AV)	Ant. Factor (dB/m)	Cable Loss (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
16.2	48.22	QP	14.55	0.01	62.78	123.41	-60.63
30.8	44.05	QP	14.34	0.02	58.41	117.83	-59.42
110.6	37.15	QP	13.91	0.05	51.11	106.73	-55.62

90° 9 kHz -150kHz

Frequency (kHz)	S.A. Reading (dBµV)	Detector (PK/AV)	Ant. Factor (dB/m)	Cable Loss (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
16.2	47.56	QP	14.55	0.01	62.12	123.41	-61.29
30.8	43.27	QP	14.34	0.02	57.63	117.83	-60.20
110.6	36.56	QP	13.91	0.05	50.52	106.73	-56.21

0° 150 kHz -30MHz

Frequency (MHz)	S.A. Reading (dBµV)	Detector (PK/AV)	Ant. Factor (dB/m)	Cable Loss (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1.2	29.55	QP	13.76	0.1	43.41	66.00	-22.59
15.2	12.22	QP	16.13	0.2	28.55	69.54	-40.99
22.6	11.68	QP	13.15	0.3	25.13	69.54	-44.41

90° 150 kHz -30MHz

Frequency (MHz)	S.A. Reading (dBµV)	Detector (PK/AV)	Ant. Factor (dB/m)	Cable Loss (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1.2	28.42	QP	13.76	0.1	42.28	66.00	-23.72
15.2	11.54	QP	16.13	0.2	27.87	69.54	-41.67
22.6	10.96	QP	13.15	0.3	24.41	69.54	-45.13

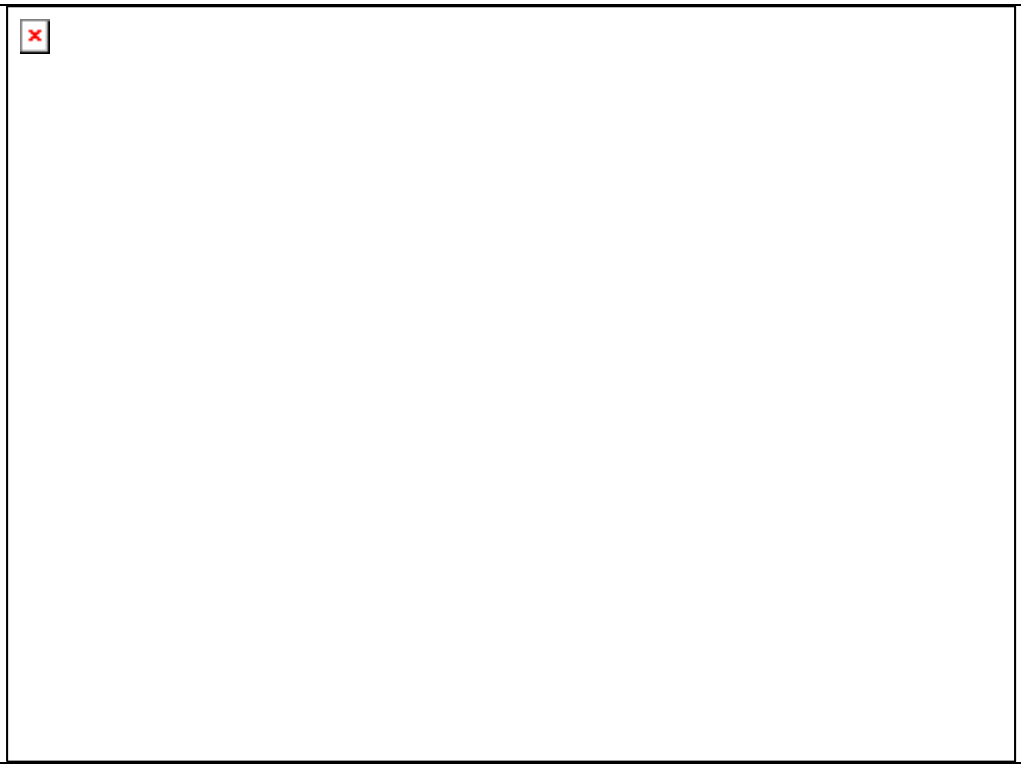
Note: The highest frequency of the internal sources of the EUT is less than 108MHz, so the measurement shall only be made up to 1GHz.

Annex A. TEST INSTRUMENT

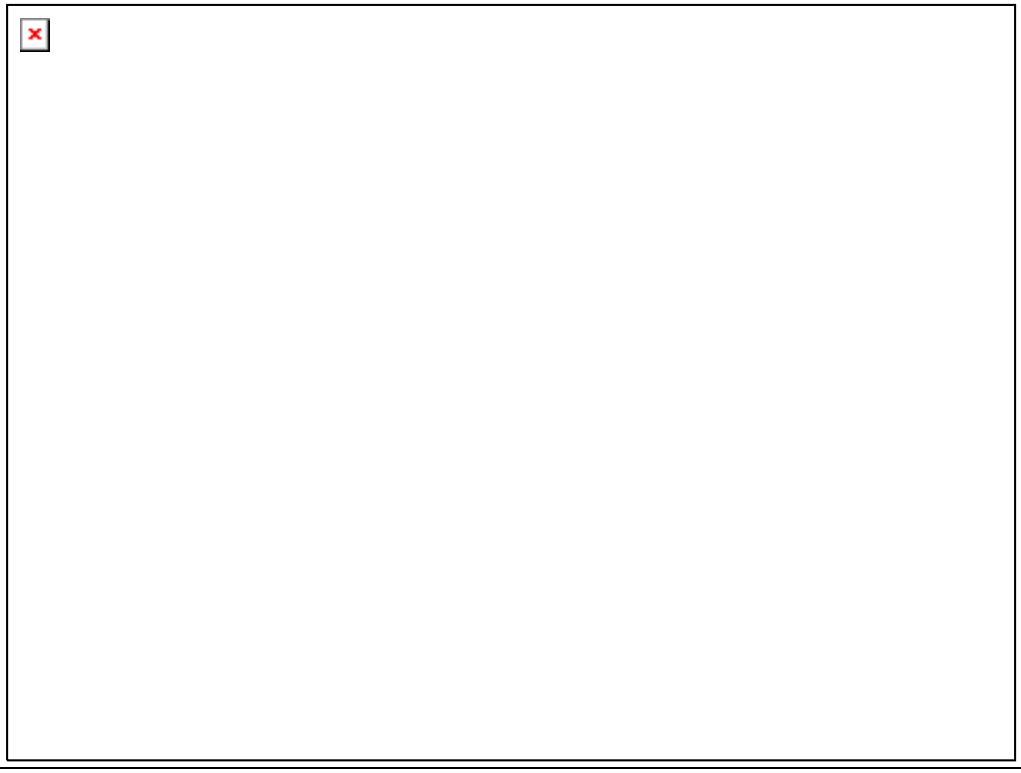
Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/18/2014	09/17/2015	☑
Line Impedance Stabilization Network	LI-125A	191106	09/26/2014	09/25/2015	☑
Line Impedance Stabilization Network	LI-125A	191107	09/26/2014	09/25/2015	☑
LISN	ISN T800	34373	09/26/2014	09/25/2015	☑
Transient Limiter	LIT-153	531118	09/02/2014	09/01/2015	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/18/2014	09/17/2015	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/02/2014	09/01/2015	☑
Microwave Preamplifier (0.5 ~ 18GHz)	PAM-118	443008	09/02/2014	09/01/2015	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/22/2014	09/21/2015	☑
Active Antenna(9kHz-30MHz)	AL-130	121031	09/22/2014	09/21/2015	☑

Annex B. EUT And Test Setup Photographs

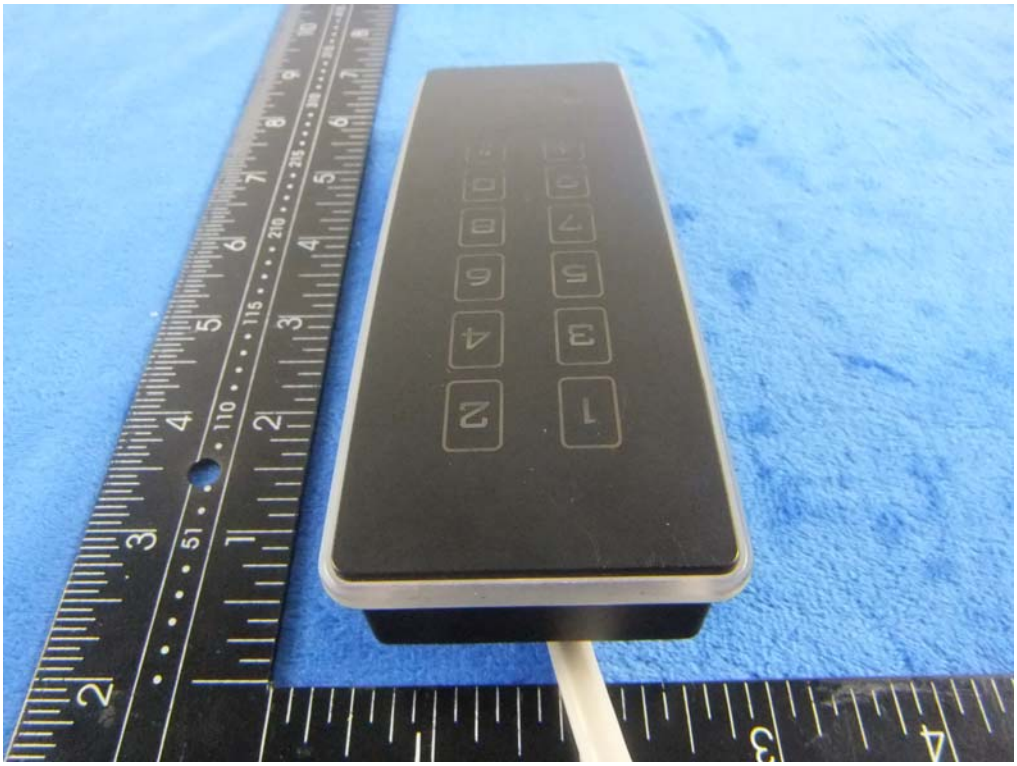
Annex B.i. Photograph: EUT External Photo



EUT – Front View



EUT – Rear View



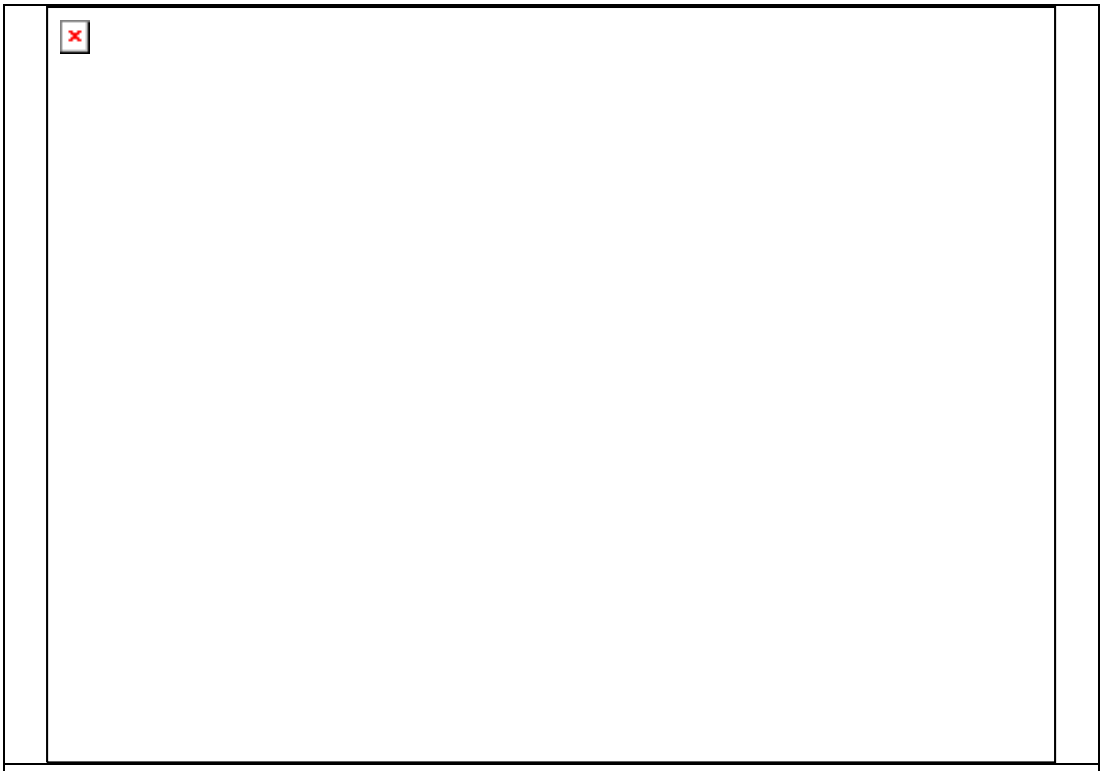
EUT – Top View

EUT – Bottom View

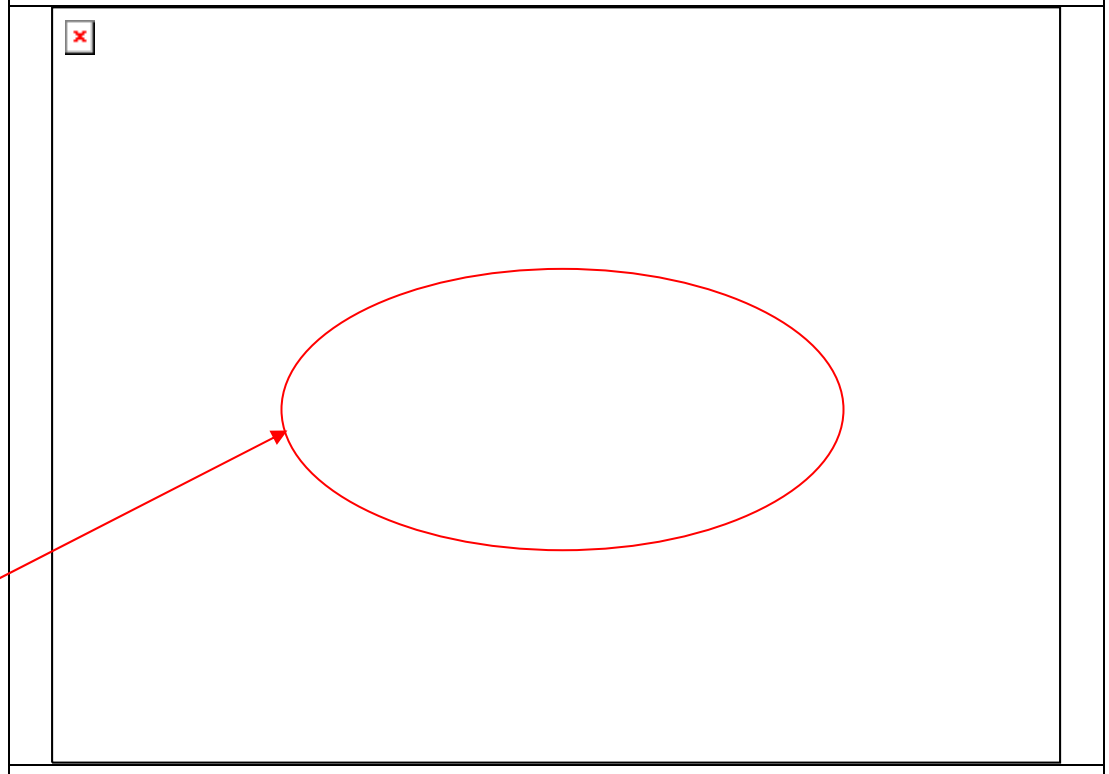
EUT – Left View

EUT – Right View

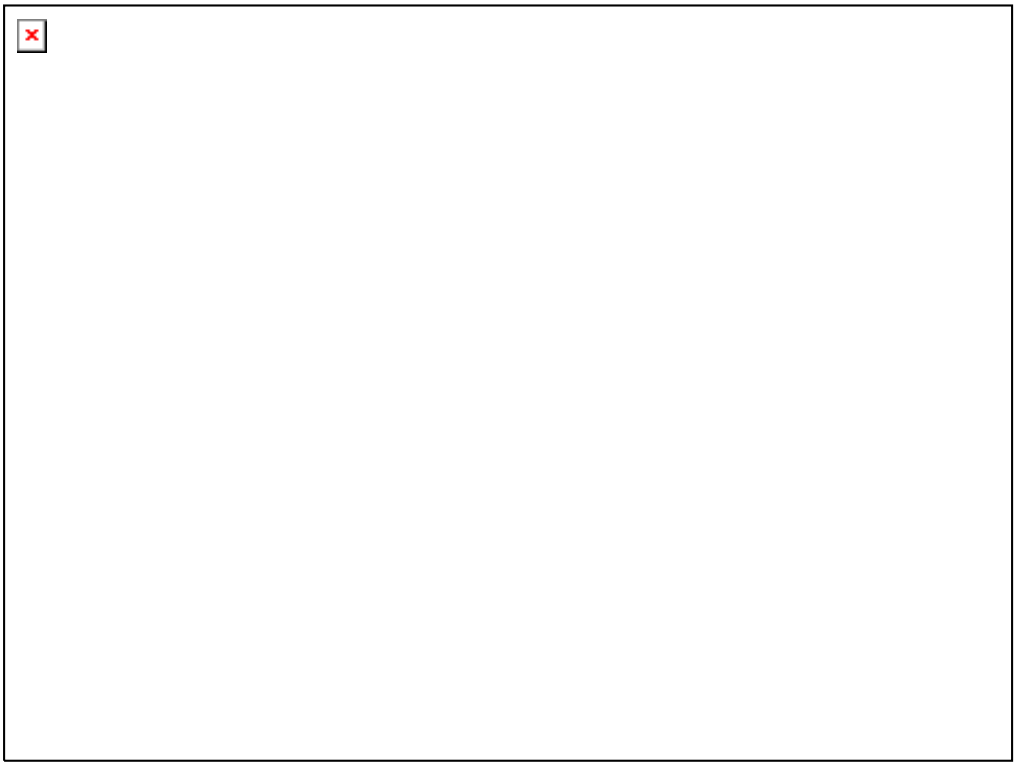
Annex B.ii. Photograph: EUT Internal Photo



EUT – Uncover Front View 1



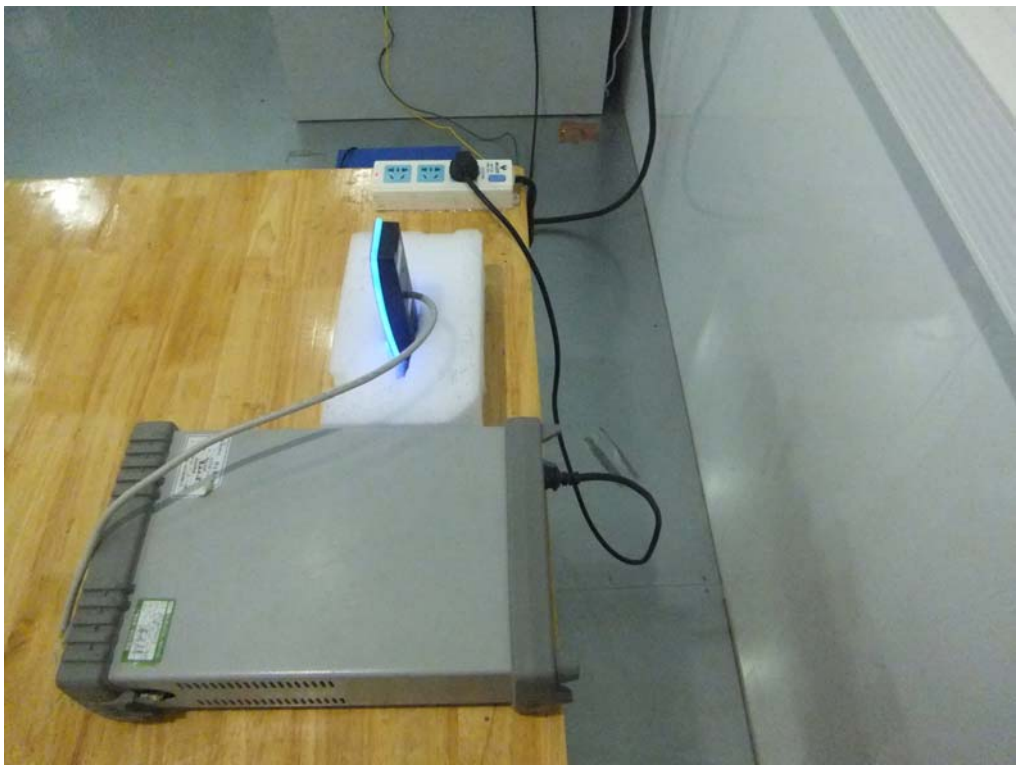
EUT – PCBA Front View



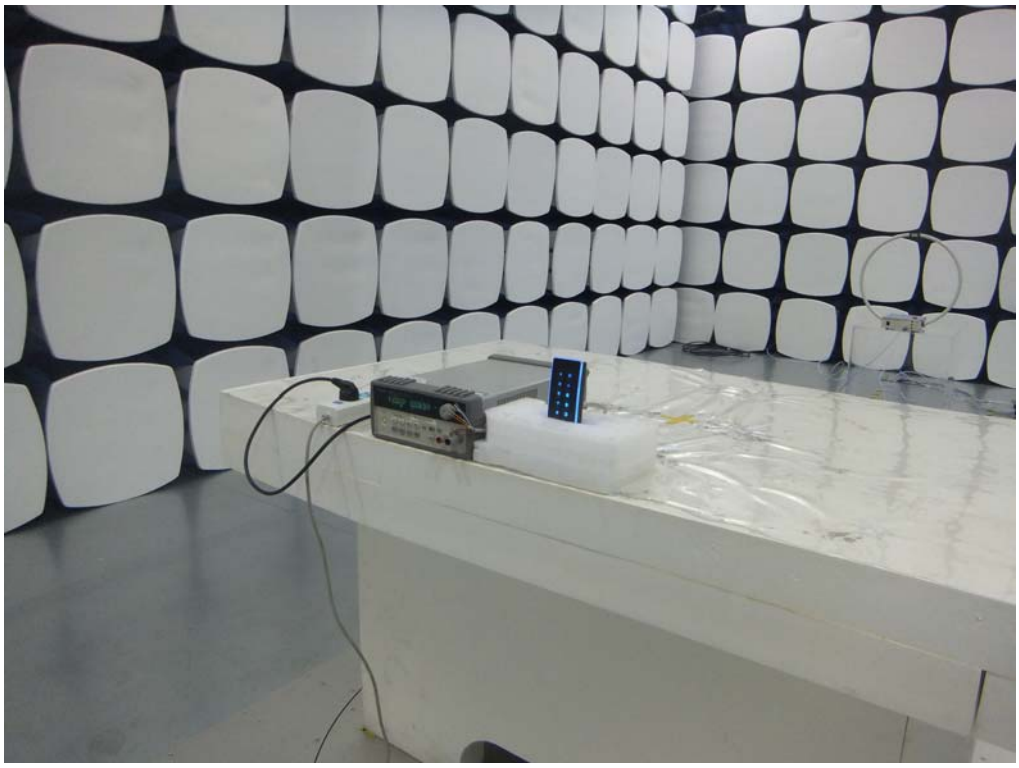
EUT – PCBA Rear View

Annex B.iii. Photograph Test Setup Photo

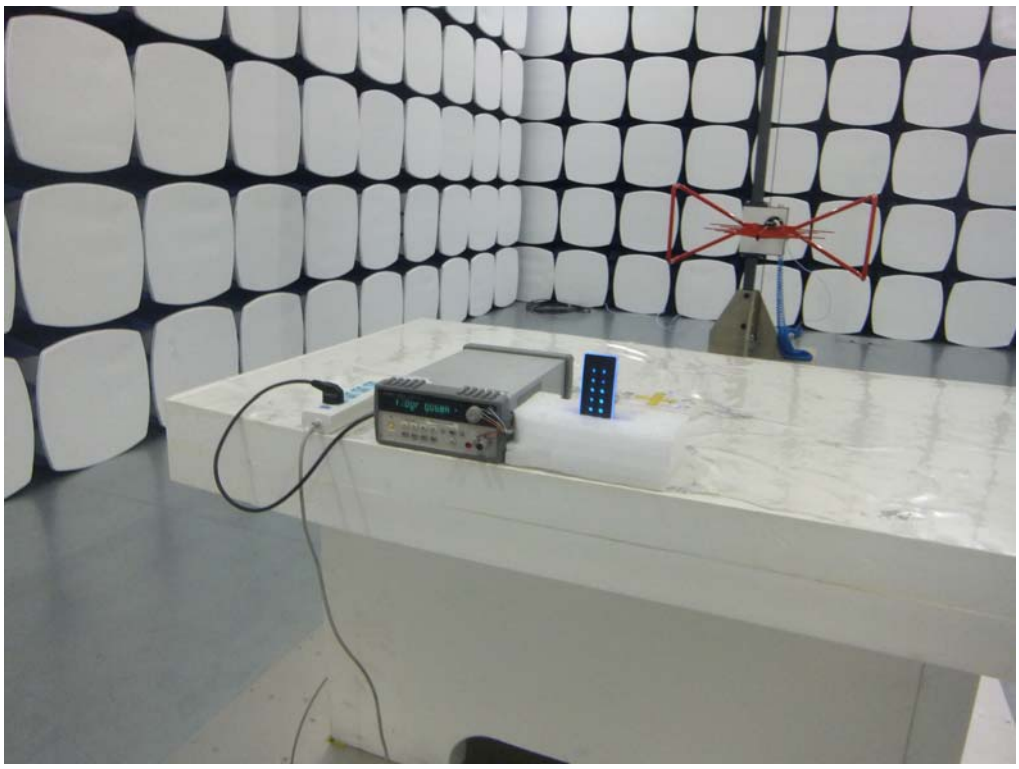
Conducted Emissions Setup Front View



Conducted Emissions Setup Side View



Front View of Radiated Emissions Test Setup below 30MHz

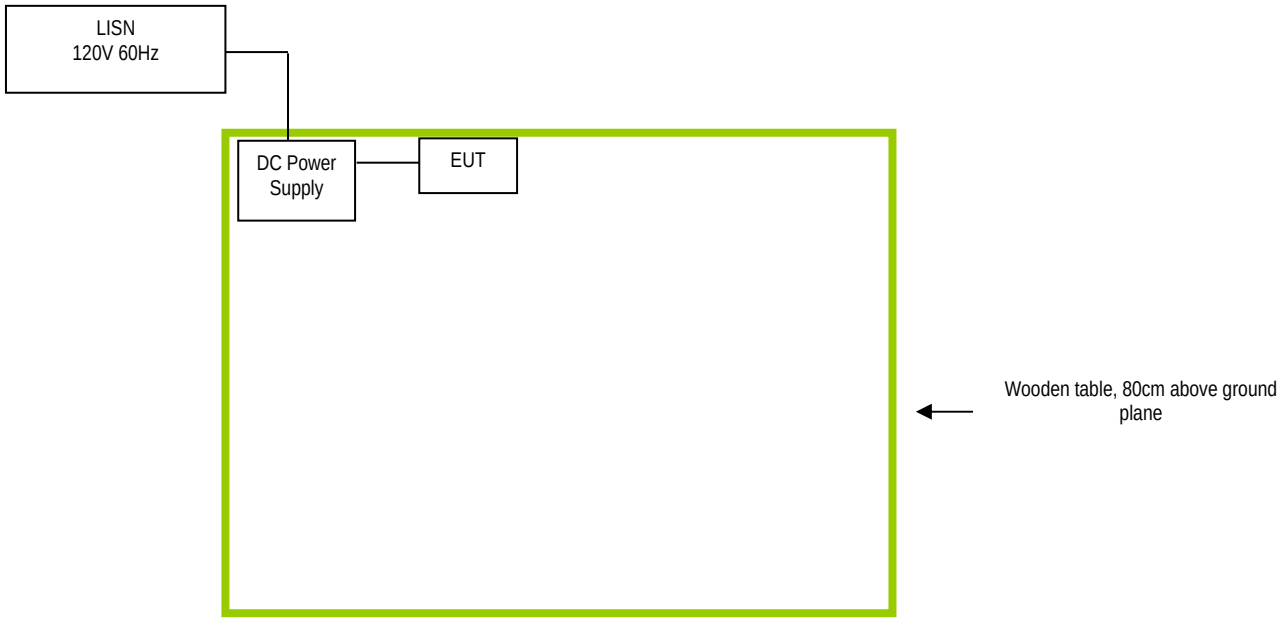


Radiated Emissions Setup Below 1GHz Front View

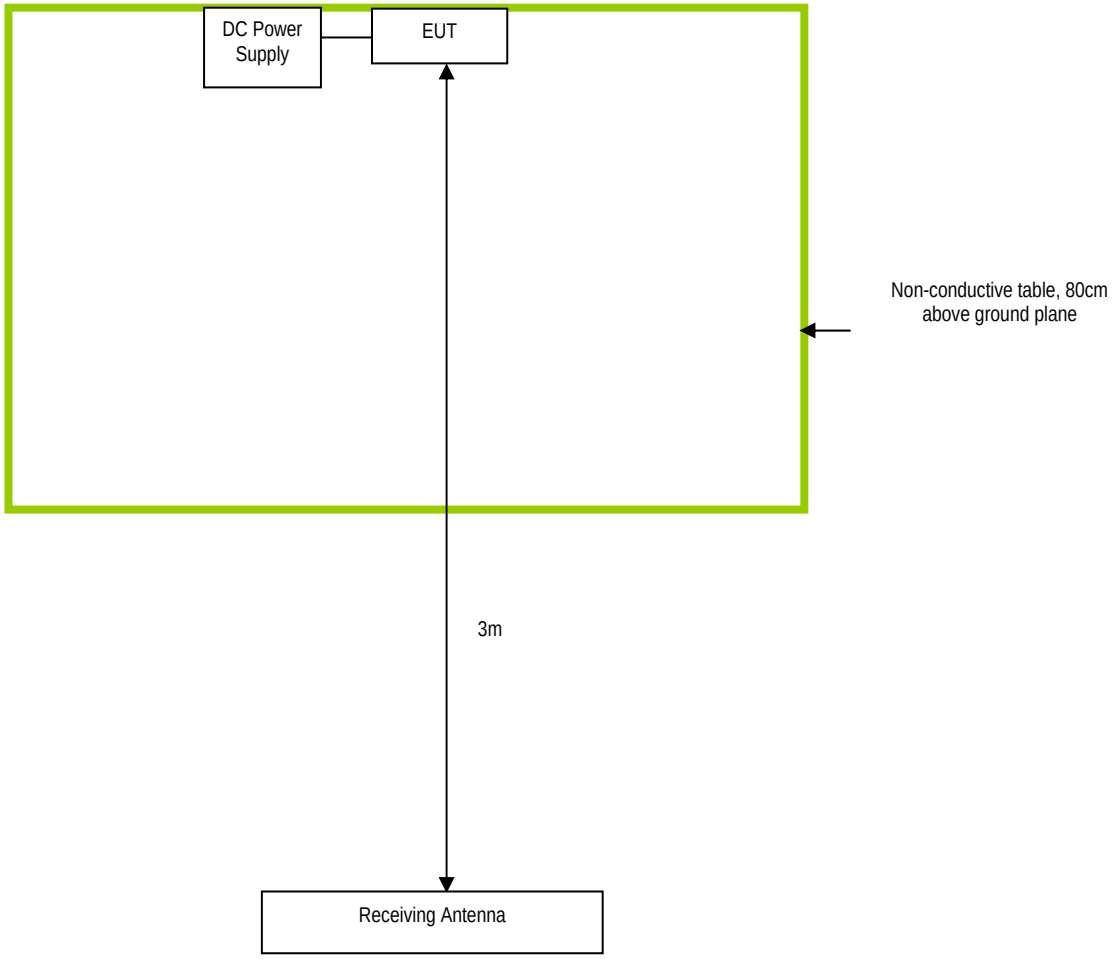
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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	Cal Date	Cal Due Date
Agilent	DC Power Supply	E3640A	09/18/2014	09/17/2014

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

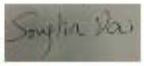
Dear :

For our business issue and marketing requirement, we would like to list different models numbers on the FCC certificates and reports, as following:
Model No: HR352-8K
HR352-8N,HR353-8K,HR353-8N,EM352-8K,EM3528N
FCC ID : X3A-SSHR35
The six models have the same Circuits, components and color.

The difference of these models are have different model name, but others differences as follows:
HR352-8K、HR353-8K、EM352-8K has buttons but HR352-8N、HR353-8N、EM352-8N has no buttons.
The card they can read is different, which "HR" means 125 kHz and "EM" means EM Technology.
(HR use 125KHz frequency and FSK(frequency shift keying) modulation technology, EM use 125KHz frequency and ASK(amplitude shift keying) modulation technology. HR and EM use the same hardware and 125kHZ RF transmission circuit, Due to the different modulation technology, HR and EM use the different receiving circuit, HR use the FSK decode, EM use the ASK decode)

The firmware is different of HR352 and HR353.
HR352 and HR353 use the same hardware and 125kHZ RF transmission circuit, Only is send the different card data. HR353 is send the 26 bits data, HR352 is send the all card data.HR352 and HR353 use the same hardware and 125kHZ RF transmission circuit, so the RF power is the same.

Thank you!

Signature: 
Printed name/title: Songlin Dai