EMC TEST REPORT

GLOBAL TESTING & CERTIFICATIONS
YOUR CHOICE FOR- TCB FCB CB NB CAB RCB

Report No.: 15021064-FCC-E
Supersede Report No.: N/A

Applicant	HANGZHOU HILAND TECHNOLOGY CO.,LTD
Product Name	Receiver
Main Model	R5113
Serial Model	R51XX (XX=00-99)
Test Standard	FCC Part 15 Subpart B:2015, ANSI C63.4:2014
Test Date	November 03, 2015
Issue Date	November 05, 2015
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Deon Dai	Herve Idoko	
Deon Dai Test Engineer	Herve Idoko Checked By	

This test report may be reproduced in full only
Test result presented in this test report is applicable to the tested sample only

Issued by:
SIEMIC (Nanjing-China) Laboratories
2-1 Longcang Avenue Yuhua Economic and
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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
15021064-FCC-E	NONE	Original	November 05, 2015

2. Customer information

Applicant Name	HANGZHOU HILAND TECHNOLOGY CO.,LTD
Applicant Add	4TH BUILDING,2XIYUANWU ROAD,WESTLAKE TECHNOLOGY GARDEN,HANGZHOU,CHINA
Manufacturer	HANGZHOU HILAND TECHNOLOGY CO.,LTD
Manufacturer Add	4TH BUILDING,2XIYUANWU ROAD,WESTLAKE TECHNOLOGY GARDEN,HANGZHOU,CHINA

3. Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Add	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:	Receiver
Main Model:	R5113
Serial Model:	R51XX (XX=00-99)
Date EUT received:	October 28, 2015
Test Date(s):	November 03, 2015
Operating Frequency :	433.92MHz(Rx)
Antenna Gain	0 dBi
Type of Modulation:	ASK
Number of Channels:	1 CH
Input Power	12-24VAC/DC
Trade Name :	HILAND
FCC ID:	2AGCVR51XX2015

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: 2014	AC Power Line Conducted Emissions	Compliance
§15.209; ANSI C63.4: 2014	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

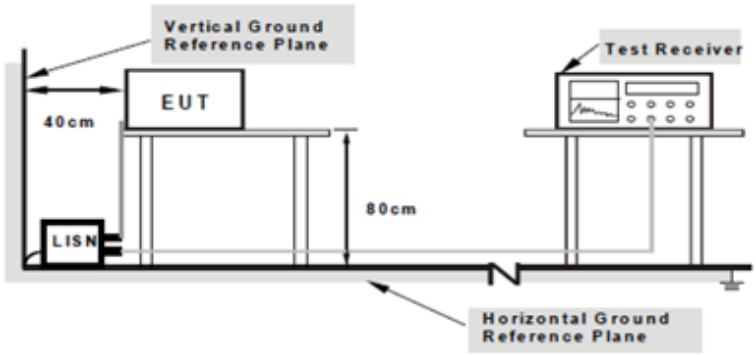
Temperature	24°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	November 03, 2015
Tested By :	Deon Dai

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)

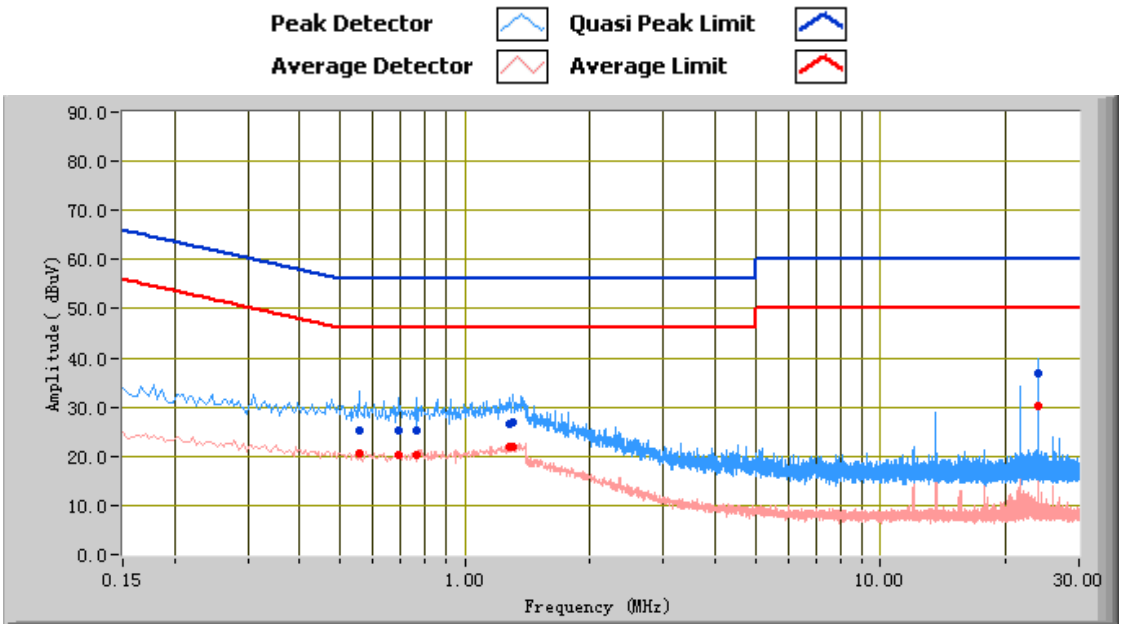
Limit(dBμV/m)=Limit stated in standard

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

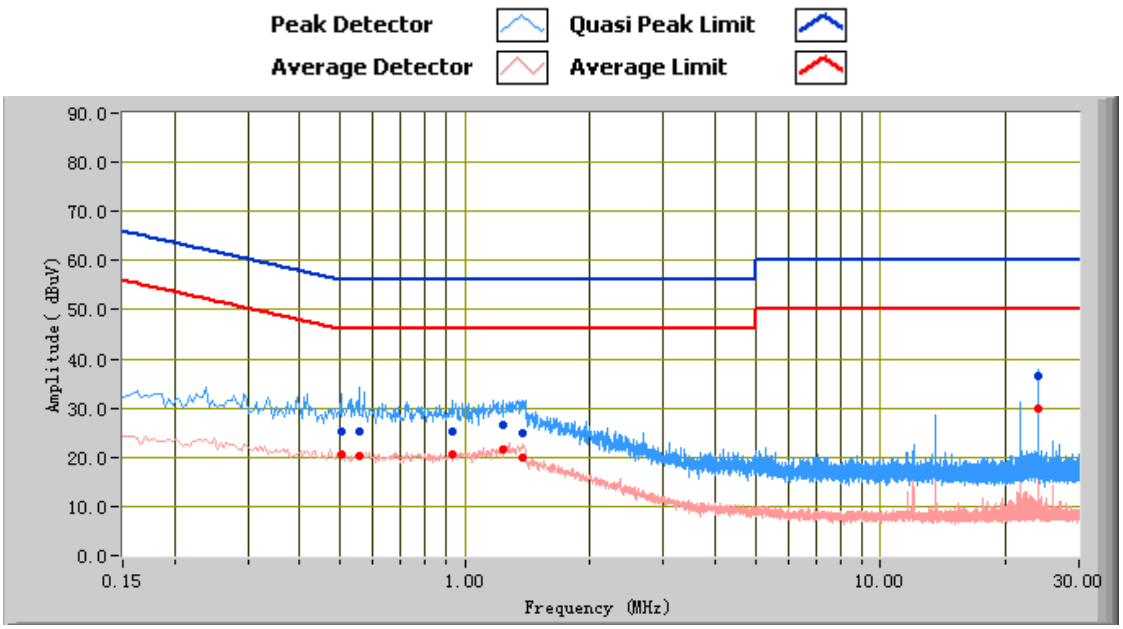


Test Data

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Factors (dB)
24.01	36.83	60.00	-23.17	30.36	50.00	-19.64	11.67
0.55	25.33	56.00	-30.67	20.49	46.00	-25.51	11.04
1.31	26.82	56.00	-29.18	21.89	46.00	-24.11	10.74
0.69	25.27	56.00	-30.73	20.30	46.00	-25.70	10.93
0.76	25.15	56.00	-30.85	20.31	46.00	-25.69	10.88
1.28	26.69	56.00	-29.31	21.80	46.00	-24.20	10.74

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)
0.55	25.09	56.00	-30.91	20.26	46.00	-25.74	11.02
24.01	36.45	60.00	-23.55	30.01	50.00	-19.99	11.70
0.50	25.40	56.00	-30.60	20.46	46.00	-25.54	11.06
1.37	25.01	56.00	-30.99	20.08	46.00	-25.92	10.78
0.93	25.37	56.00	-30.63	20.51	46.00	-25.49	10.75
1.23	26.61	56.00	-29.39	21.55	46.00	-24.45	10.75

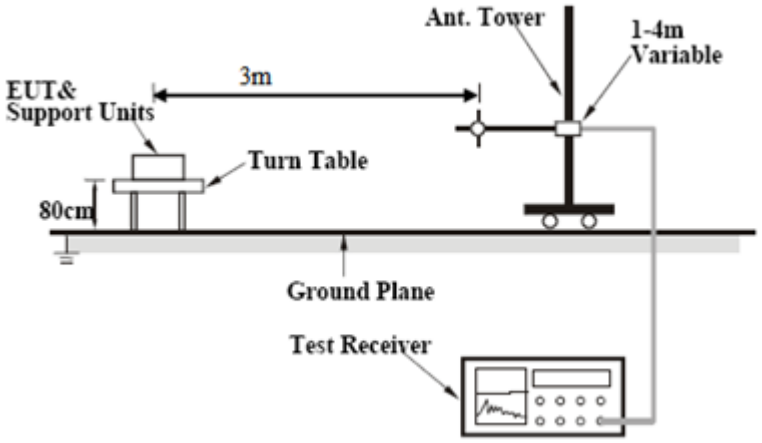
6.2 Radiated Emissions

Temperature	22°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	November 03, 2015
Tested By :	Deon Dai

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	The EUT antenna was pre-tested under the following modes: X-Y axis; Y-Z axis; X-Z axis. We only recorded the worst case X-Y axis in this report.
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

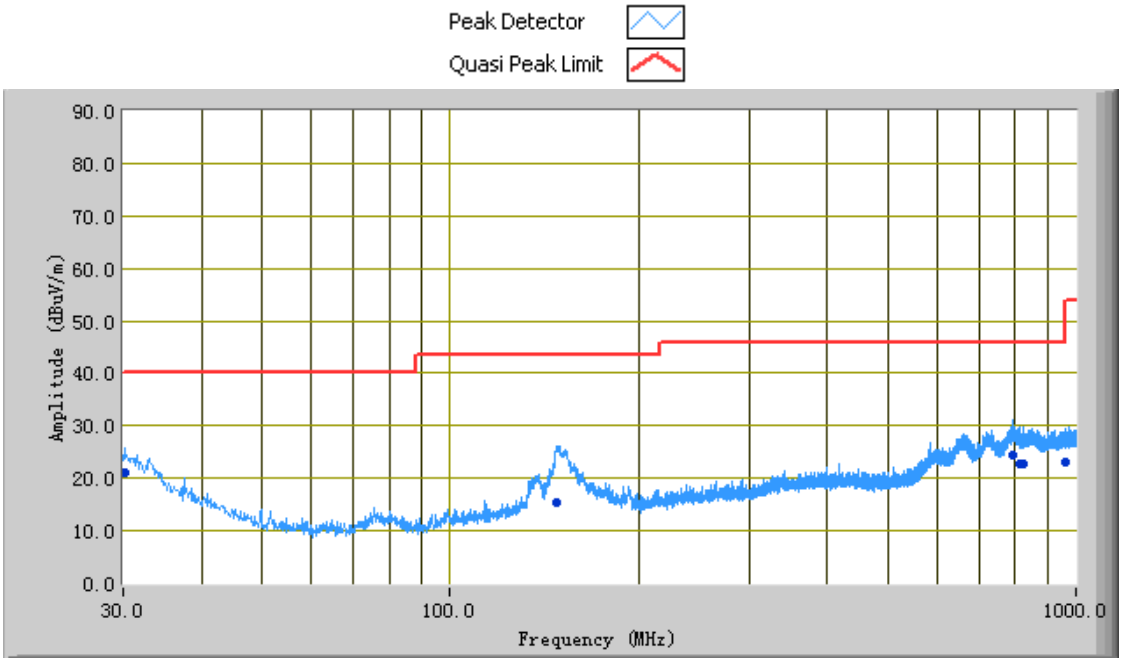
Limit (dBμV/m)=Limit stated in standard

Calculation Formula:

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

Test Mode:	Transmitting Mode

(Below 1GHz)



Test Data

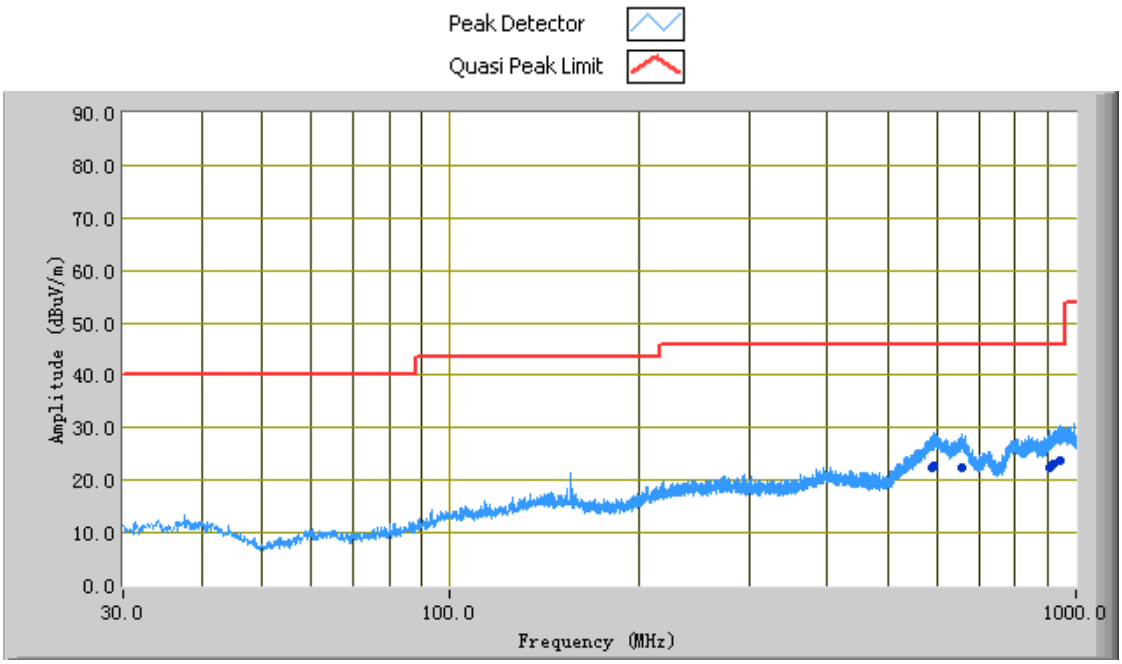
Vertical Polarity Plot @3m

Frequency (MHz)	Quasi Peak (dBµV/m)	Azimuth	Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dBµV/m)	Margin (dB)
29.98	20.94	242.00	V	122.00	-24.26	40.00	-19.06
793.00	24.32	36.00	V	176.00	-17.67	46.00	-21.68
824.30	22.64	0.00	V	221.00	-17.57	46.00	-23.36
814.36	22.82	12.00	V	175.00	-17.53	46.00	-23.18
959.12	23.16	15.00	V	139.00	-18.15	46.00	-22.84
147.90	15.46	109.00	V	108.00	-31.17	43.50	-28.04

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.

Test Mode:	Transmitting Mode

(30MHz - 1GHz)



Test Data

Horizontal Polarity Plot @3m

Frequency (MHz)	Quasi Peak (dBµV/m)	Azimuth	Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dBµV/m)	Margin (dB)
941.76	23.71	296.00	H	249.00	-16.84	46.00	-22.29
909.99	22.34	358.00	H	284.00	-18.73	46.00	-23.66
922.00	23.05	232.00	H	276.00	-17.95	46.00	-22.95
594.14	22.92	330.00	H	158.00	-21.15	46.00	-23.08
657.78	22.51	360.00	H	162.00	-21.25	46.00	-23.49
588.04	22.48	325.00	H	279.00	-21.58	46.00	-23.52

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

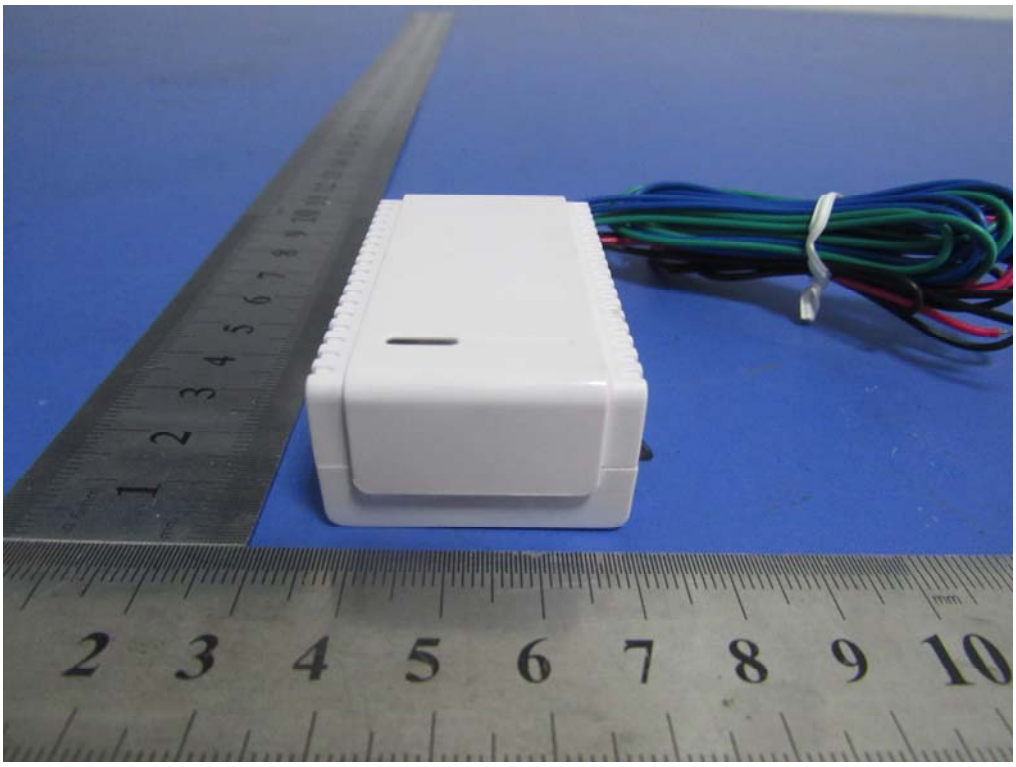
Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
R&S EMI Test Receiver	ESPI3	101216	11/03/2015	11/02/2016	☑
V-LISN	ESH3-Z5	838979/005	09/27/2015	09/26/2016	☑
SIEMIC Conducted Emissions Labview software	V1.0	N/A	N/A	N/A	☑
Radiated Emissions					
R&S EMI Receiver	ESPI3	101216	11/03/2015	11/02/2016	☑
Antenna (30MHz~6GHz)	JB6	A121411	06/04/2015	06/03/2016	☑
EMCO Passive Loop Antenna	6509	9909-1469	10/09/2015	10/08/2016	☐
Hp Agilent Pre-Amplifier	8447F	1937A01160	10/27/2015	10/26/2016	☐
SIEMIC Radiated Emissions Labview software	V1.0	N/A	N/A	N/A	☑

Annex B. EUT And Test Setup Photographs

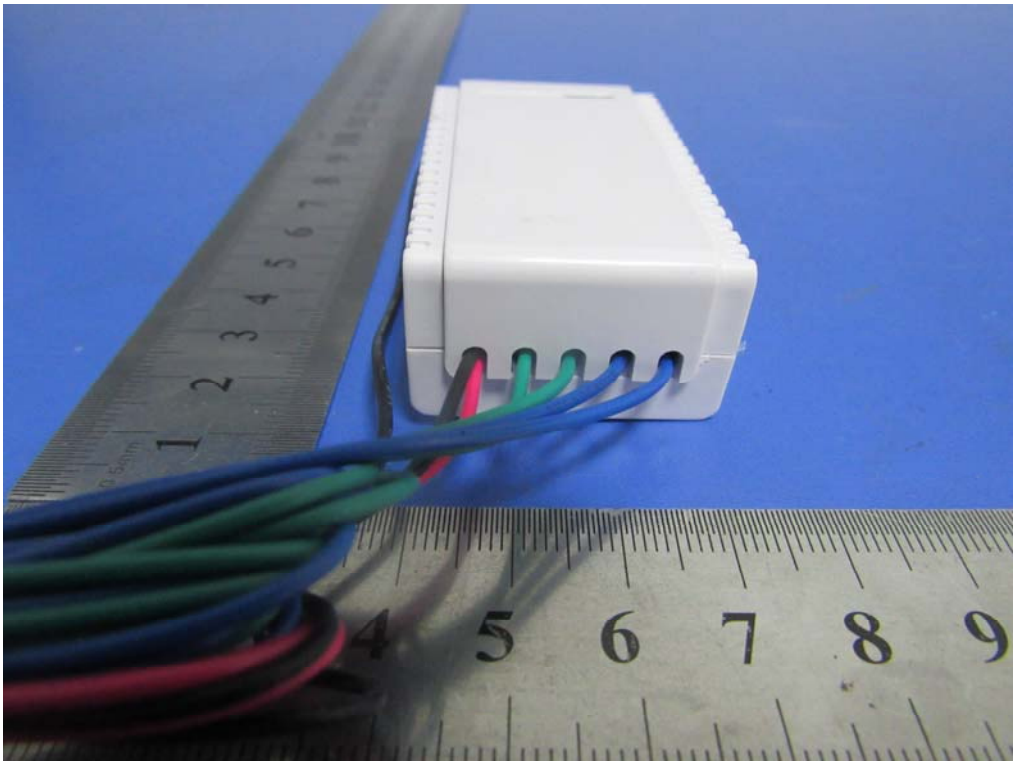
Annex B.i. Photograph EUT External Photo

Top View of EUT

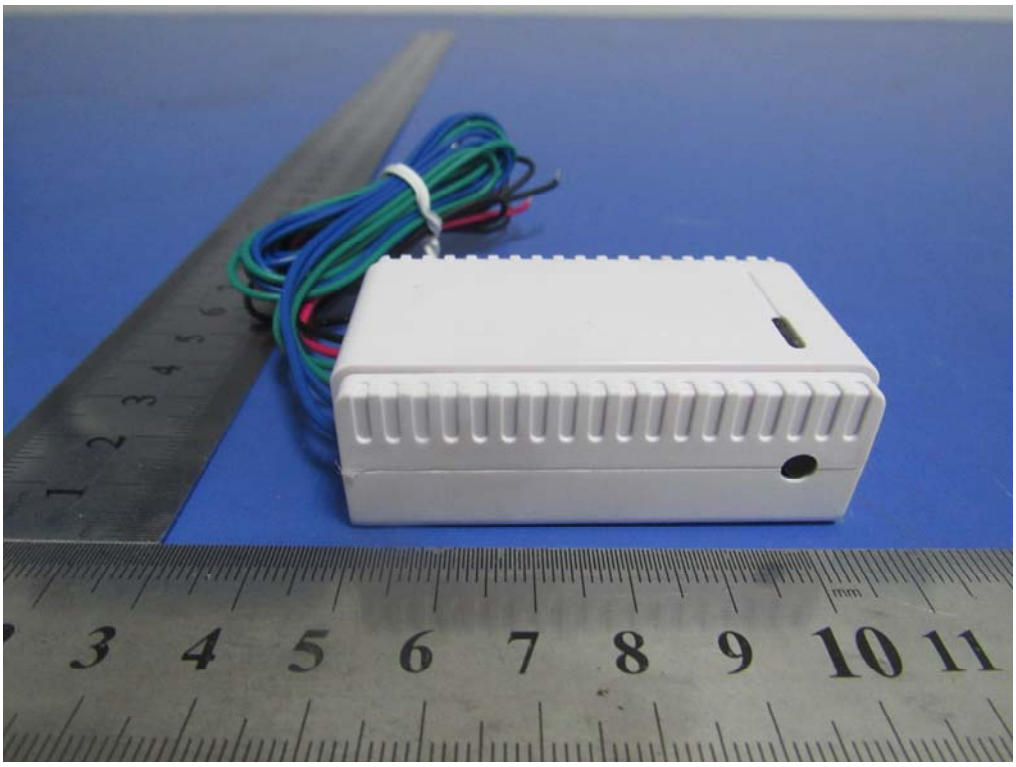
Bottom View of EUT



Top View of EUT



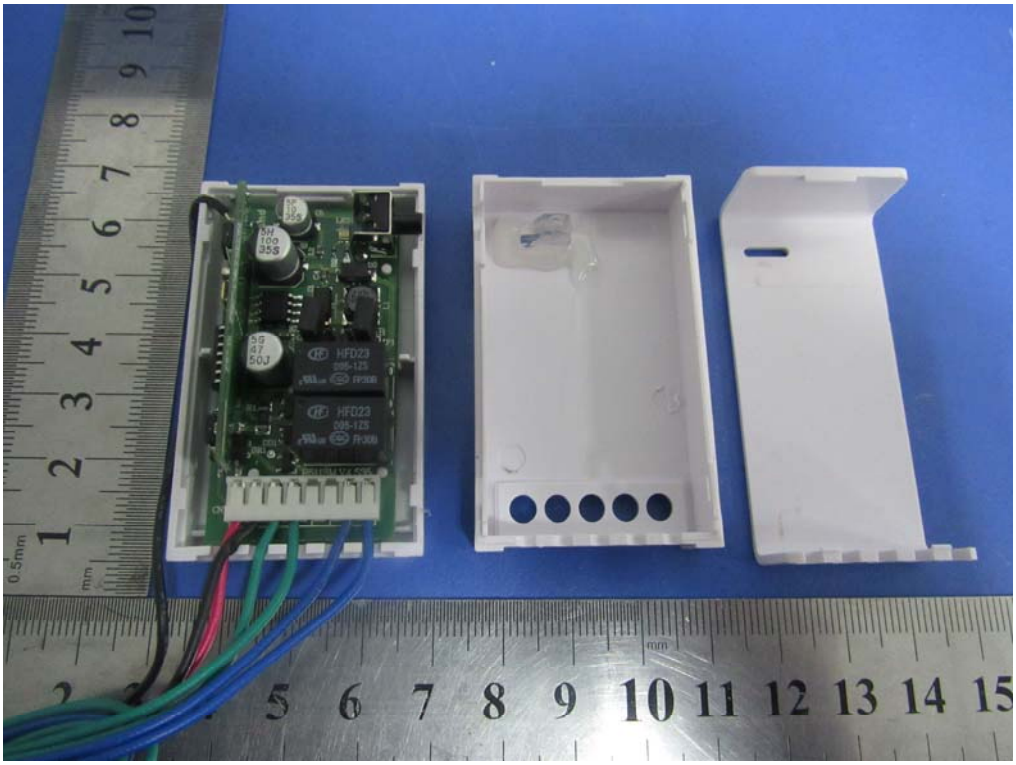
Bottom View of EUT



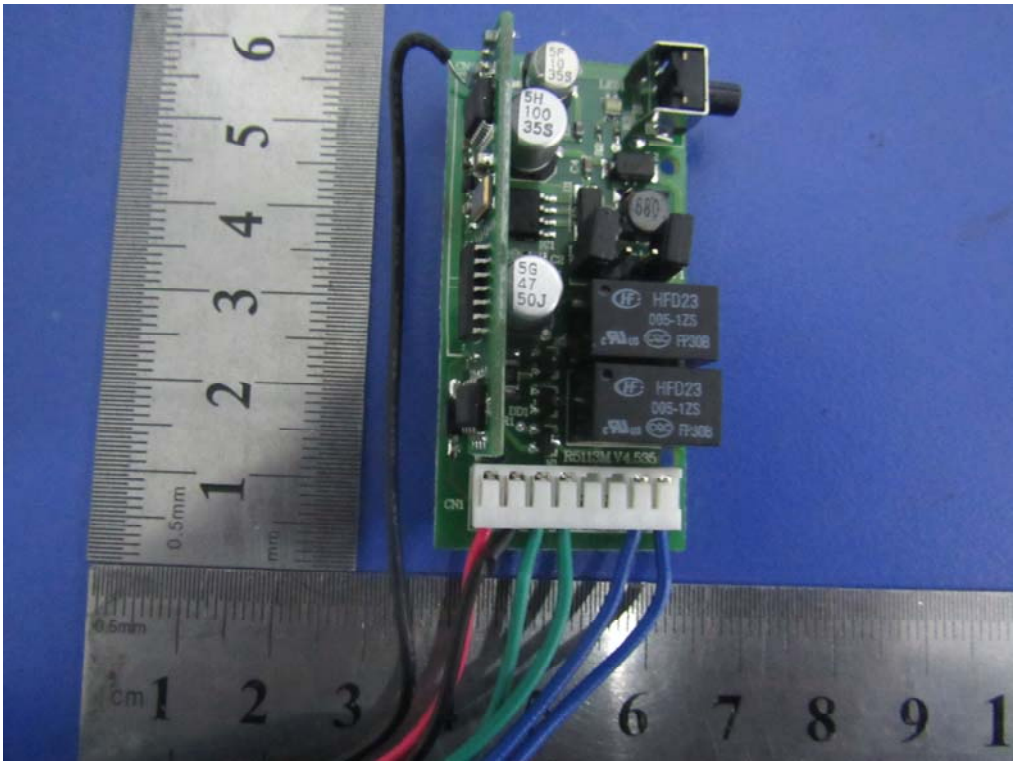
Left View of EUT

Right View of EUT

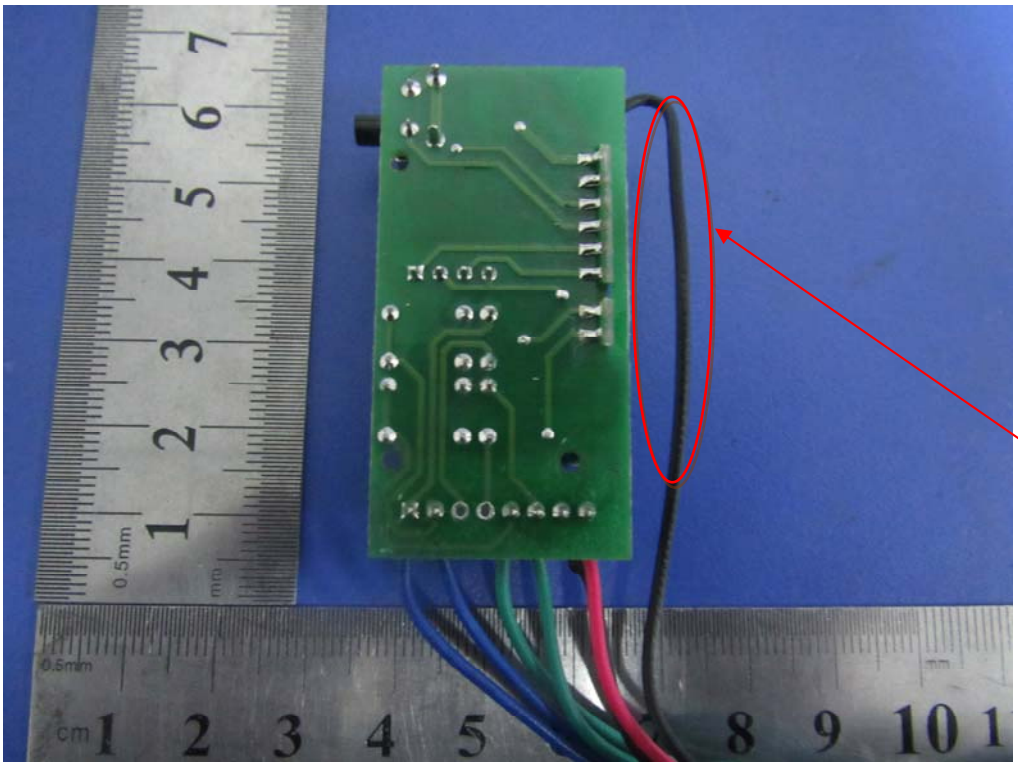
Annex B.ii. Photograph EUT Internal Photo



Uncover- Front View



EUT PCBA – Front View

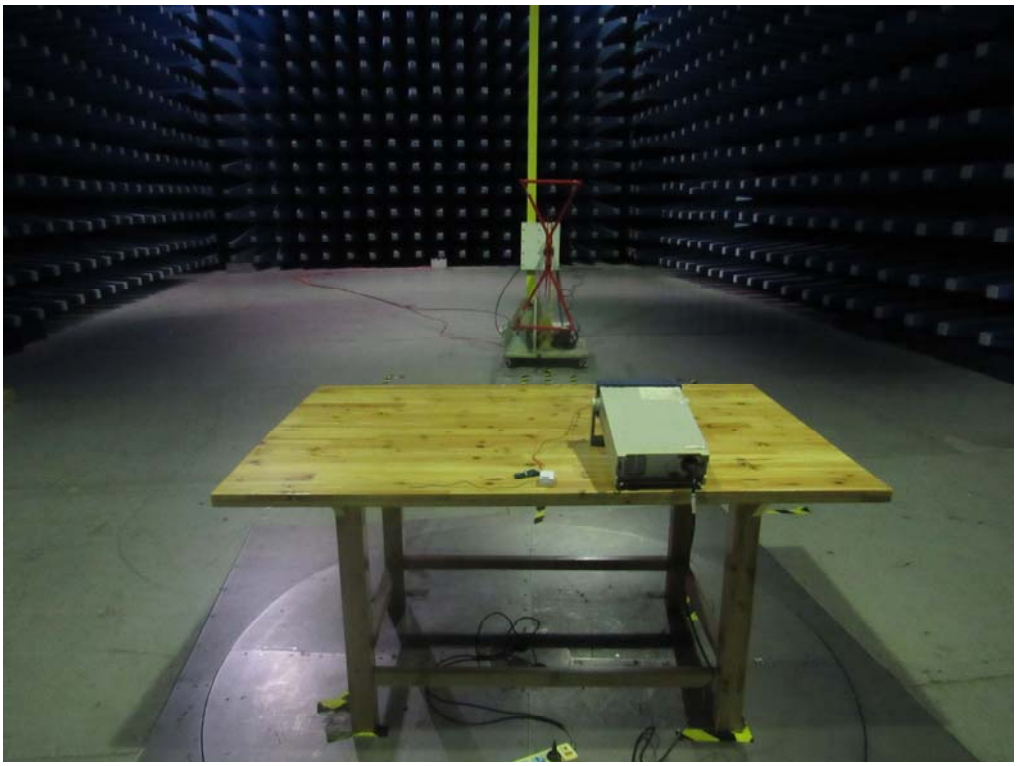


EUT PCBA – Rear View

Annex B.iii. Photograph Test Setup Photo

Conducted Emissions Setup Front View

Conducted Emissions Setup Side View

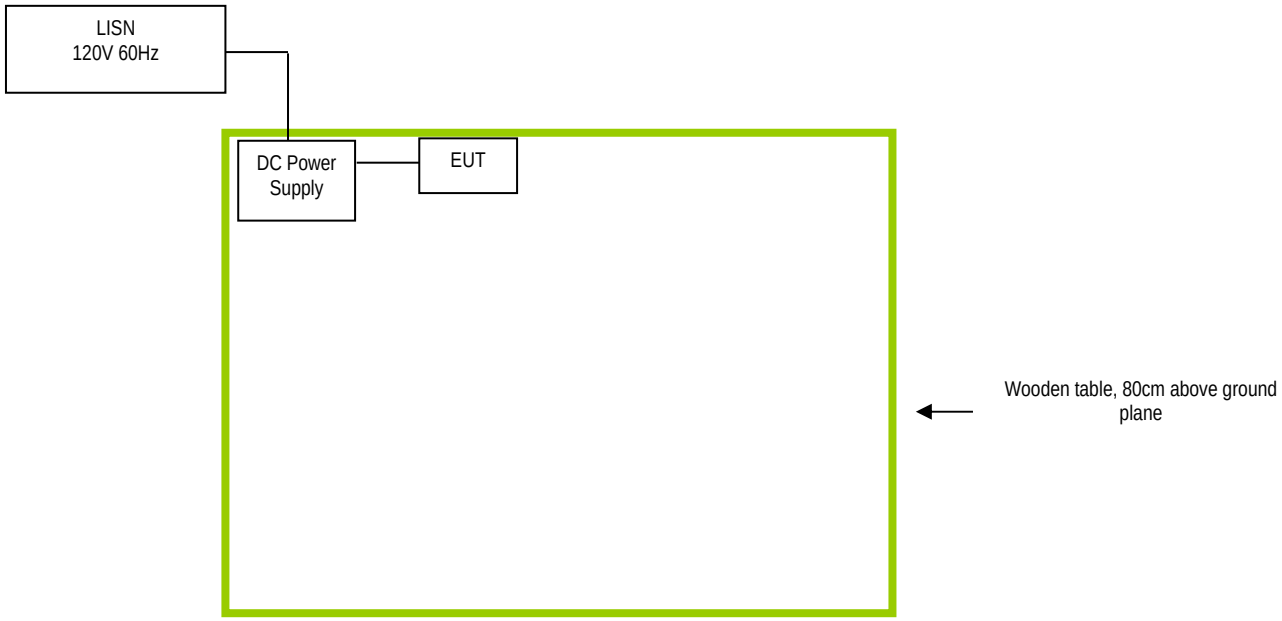


Radiated Emissions Setup Below 1GHz Front View

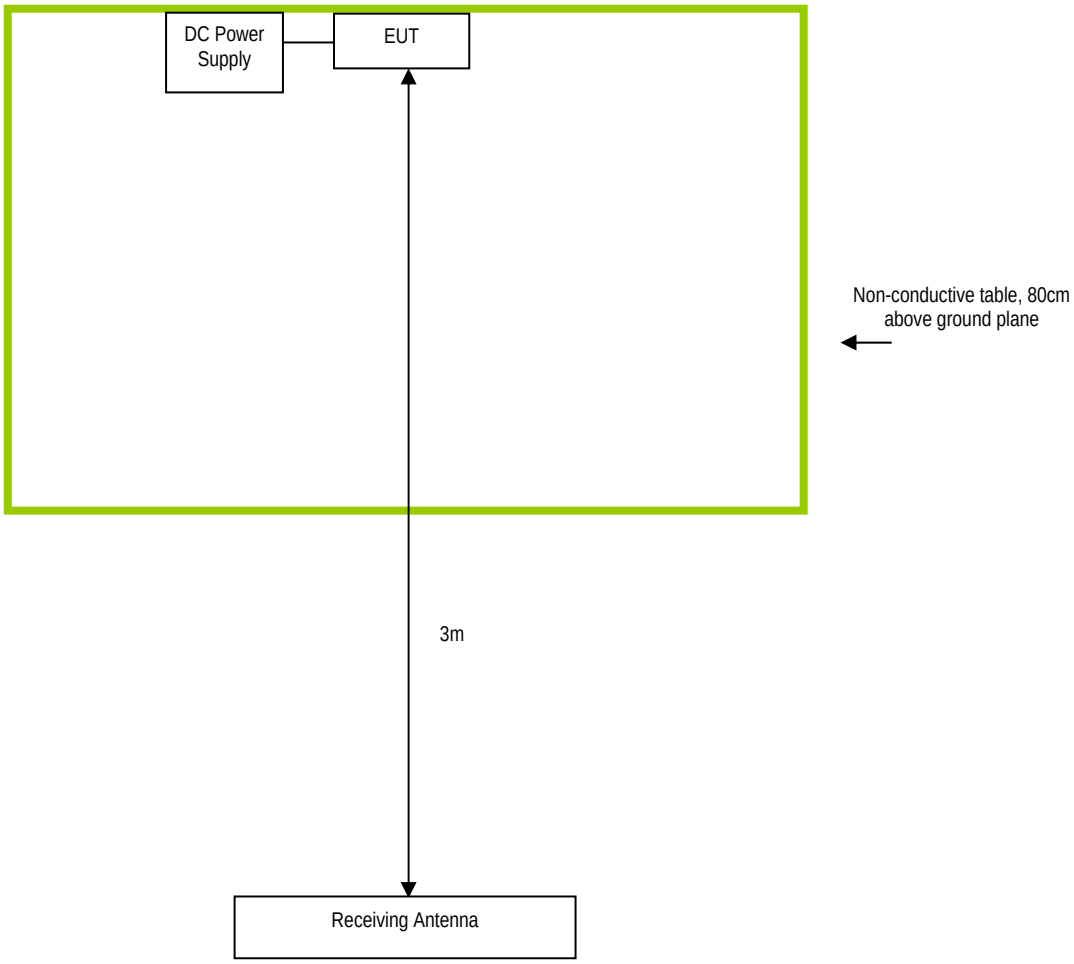
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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

Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see Attachment

Annex E. DECLARATION OF SIMILARITY

To: SIEMIC INC.

Declaration letter

Dear Sir,

For our business issue and marketing requirement, we would like to list different models numbers on the FCC certificates and reports, as following:
Mode No.: R51XX(XX=00-99)

The Main test model R5113and R51XX(XX=00-99) have the same circuit, same power, same structure and size. Only product type name, program, code is different.

Thank you!

Product name:Receiver
FCC ID: 2AGCVR51XX2015
Applicant: HANGZHOU HILAND TECHNOLOGY CO.,LTD
Address: 4TH BUILDING,2XIYUANWU ROAD,WESTLAKE TECHNOLOGY GARDEN, HANGZHOU,CHINA

Company representative: