Beijing InHand Networks Technology Co,. Ltd.

Industrial Cellular Router

Main Model: IR615WH01-AP
Serial Model: Please See Page 5

March 20, 2013
Report No.: 13020108-1-FCC-E1-V1

(This report supersedes NONE)

Modifications made to the product : None

This Test Report is Issued Under the Authority of:

Deon Dai	Alex Liu	
Deon Dai **Compliance Engineer**	**Alex Liu** **Technical Manager**	

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

EMC Test Report

To: FCC Part 15 Subpart B: 2012

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Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC , RF/Wireless , Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless , Telecom
Taiwan	BSMI , NCC , NIST	EMC, RF, Telecom , Safety
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Mexico	NOM, COFETEL, Caniety	Safety, EMC , RF/Wireless, Telecom
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Country/Region	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC , RF , Telecom
Canada	IC FCB , NIST	EMC , RF , Telecom
Singapore	iDA, NIST	EMC , RF , Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC, (RCB 208)	RF , Telecom
Hong Kong	OFTA (US002)	RF , Telecom

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CONTENTS

1 EXECUTIVE SUMMARY & EUT INFORMATION

The purpose of this test programme was to demonstrate compliance of the Beijing InHand Networks Technology Co,. Ltd. , Industrial Cellular Routerand model: IR615WH01-AP against the current Stipulated Standards. The Industrial Cellular Router has demonstrated compliance with the FCC Part 15 Subpart B: 2012, ANSI C63.4: 2009.

EUT Information

EUT Description	:	**Industrial Cellular Router**
Main Model	:	**IR615WH01-AP**
Serial Model	:	**IR605WH01-AP, IR605WH01-STA, IR615WH01-STA, IR695WH01-AP, IR695WH01-STA, IG605WH01-AP, IG605WH01-STA, IG615WH01-AP, IG615WH01-STA, IG695WH01-AP, IG695WH01-STA**
Input Power	:	**Adapter** **Model：AW018WR-1200 100CV** **Input：100-240V 50/60Hz 0.5A** **Output: 12V 1A** **EUT Power supply: 9-26V DC Power Terminal**
Classification Per Stipulated Test Standard	:	**FCC Part 15 Subpart B: 2012, ANSI C63.4: 2009**

2 TECHNICAL DETAILS

Purpose	**Compliance testing of Industrial Cellular Router with stipulated standard**
Applicant / Client	**Beijing InHand Networks Technology Co,. Ltd. West Wing, 11th Floor, Building G, Wang Jing Science Park, Chaoyang District, Beijing, 100102 China**
Manufacturer	**Beijing InHand Networks Technology Co,. Ltd. West Wing, 11th Floor, Building G, Wang Jing Science Park, Chaoyang District, Beijing, 100102 China**
Laboratory performing the tests	**SIEMIC Nanjing (China) Laboratories NO.2-1,Longcang Dadao, Yuhua Economic Development Zone, Nanjing, China Tel:+86(25)86730128/86730129 Fax:+86(25)86730127 Email:info@siemic.com**
Test report reference number	**13020108-1-FCC-E1-V1**
Date EUT received	**March 06, 2013**
Standard applied	**FCC Part 15 Subpart B: 2012, ANSI C63.4: 2009**
Dates of test	**March 15, 2013**
No of Units	**#1**
Equipment Category	**Class A Emission Product**
Trade Name	**N/A**
RF Operating Frequency (ies)	**GSM850 TX : 824.2 ~ 848.8 MHz; RX : 869.2 ~ 893.8 MHz PCS1900 TX : 1850.2 ~ 1909.8 MHz; RX : 1930.2 ~ 1989.8 MHz WLAN:2.4GHz band: 802.11b/g/n(HT 20) : 2412-2462 MHz 802.11n(HT 40): 2422~2452MHz**
Number of Channels	**299CH (PCS1900) and 124CH (GSM850) WiFi: 11CH**
Modulation	**GSM / GPRS: GMSK WLAN: DSSS**
FCC ID	**ZAZIR6X5WAP**

3 MODIFICATION

NONE

4 TEST SUMMARY

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

Class A Emission Product

Test Results Summary

Emissions			
Test Standard	**Description**	**Product Class**	**Pass / Fail**
FCC Part 15 Subpart B: 2012, ANSI C63.4: 2009	AC Line Conducted Emissions	See Above	Pass
FCC Part 15 Subpart B: 2012, ANSI C63.4: 2009	Radiated Emissions	See Above	Pass

All measurement uncertainty is not taken into consideration for all presented test result.

5 MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

5.1 AC Line Conducted Emissions Test Result

Note:

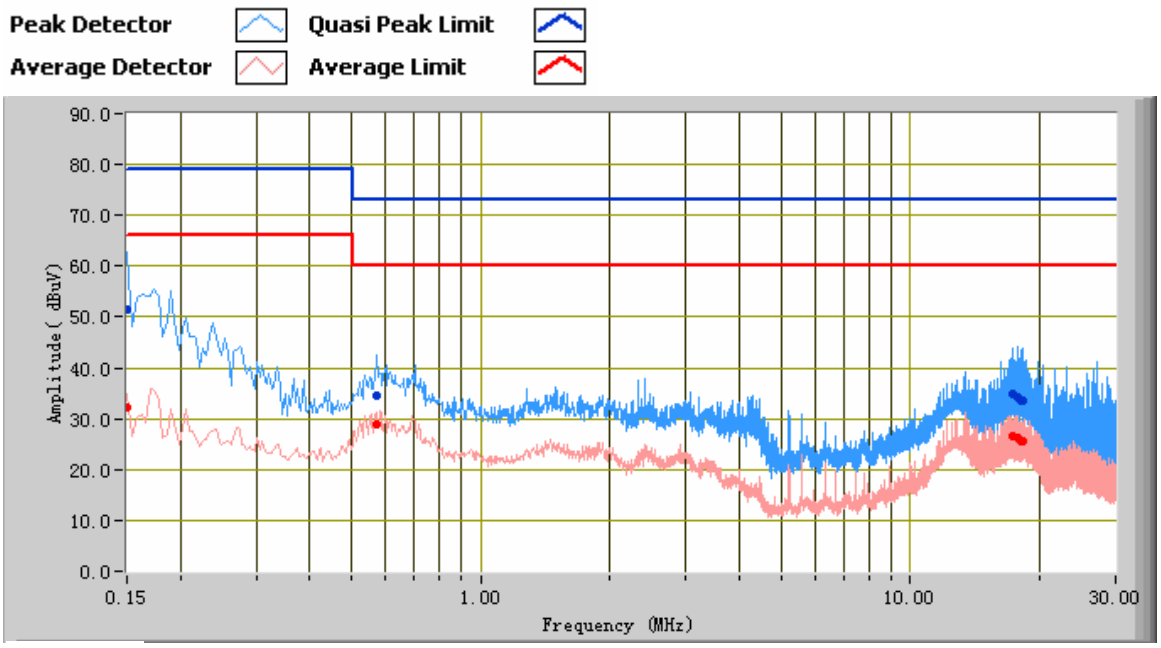
1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 9 kHz – 30 MHz (Average & Quasi-peak) is ±3.86dB.
4. Environmental Conditions

Temperature	16ºC
Relative Humidity	50%
Atmospheric Pressure	1009mbar

5. Test date : March 15, 2013
   Tested By : Deon Dai

Test Result: Pass

Test Mode:	Normal working with IR615WH01-AP Power-Line

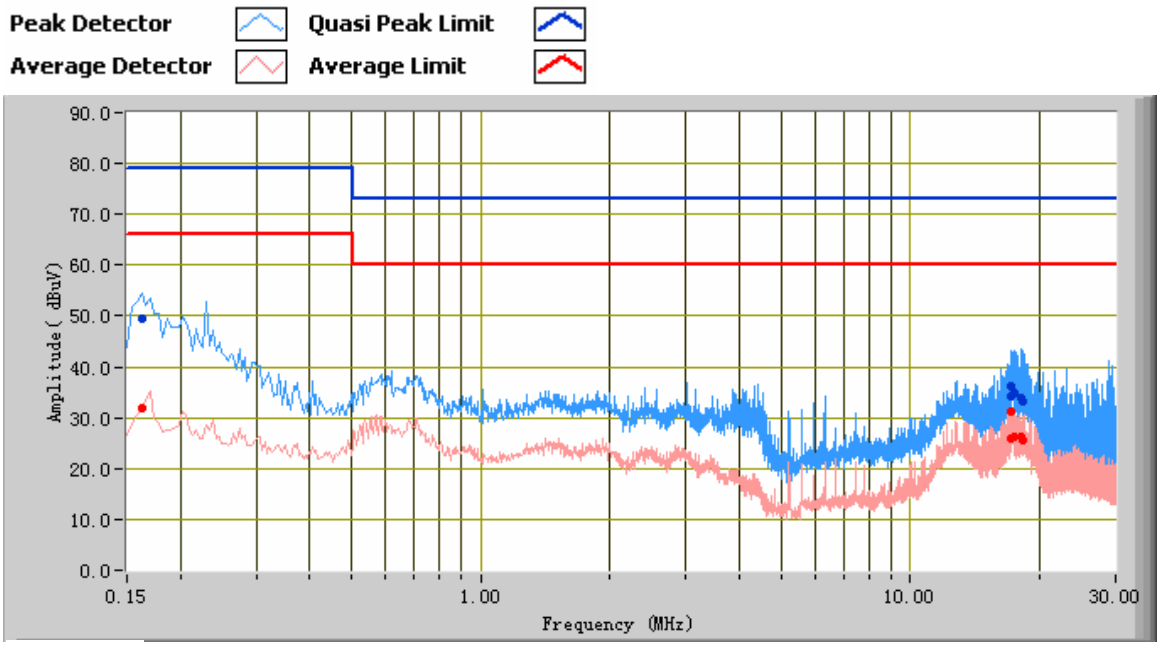


Test Data

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Factors (dB)
0.15	51.48	79.00	-27.52	32.09	66.00	-33.91	12.22
17.72	34.09	73.00	-38.91	26.35	60.00	-33.65	11.48
17.34	35.03	73.00	-37.97	26.46	60.00	-33.54	11.47
18.26	33.60	73.00	-39.40	25.49	60.00	-34.51	11.49
18.10	33.47	73.00	-39.53	25.48	60.00	-34.52	11.49
0.57	34.60	73.00	-38.40	28.83	60.00	-31.17	11.03

Test Mode:	Normal working with IR615WH01-AP Power-Neutral



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)
0.16	49.47	79.00	-29.53	32.00	66.00	-34.00	12.04
18.09	33.84	73.00	-39.16	26.22	60.00	-33.78	11.51
18.20	33.06	73.00	-39.94	25.42	60.00	-34.58	11.51
17.44	34.88	73.00	-38.12	26.32	60.00	-33.68	11.48
17.08	36.17	73.00	-36.83	31.18	60.00	-28.82	11.47
17.19	34.18	73.00	-38.82	25.95	60.00	-34.05	11.47

5.2 Radiated Emissions Test Result

Note:

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Radiated Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz & 1GHz above (3m & 10m) is +5.6/-4.5dB.
4. Environmental Conditions

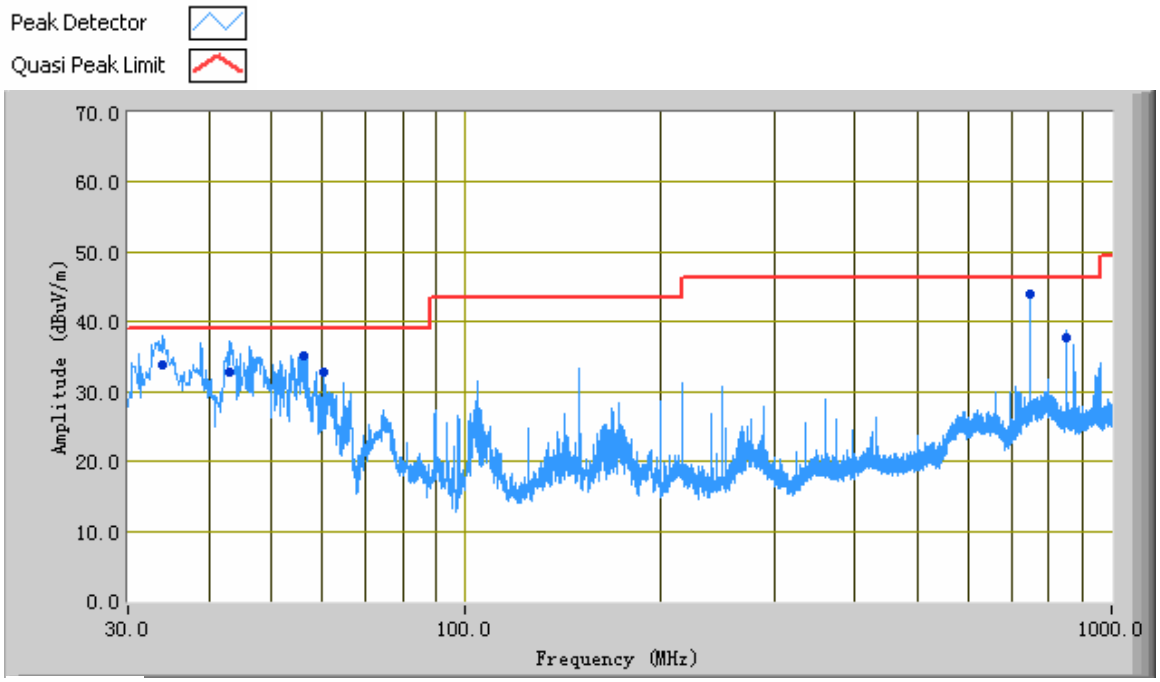
Temperature	16ºC
Relative Humidity	50%
Atmospheric Pressure	1009mbar

5. Test date : March 15, 2013
   Tested By : Deon Dai

Test Result: Pass

Test Mode:	Normal working with IR615WH01-AP

Below 1GHz



Test Data

Plot @10m

Frequency (MHz)	Quasi Peak (dBµV/m)	Azimuth	Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dBµV/m)	Margin (dB)
34.11	33.81	140.00	V	257.00	-22.75	39.00	-5.19
42.87	32.89	359.00	V	243.00	-29.30	39.00	-6.11
746.65	44.01	26.00	H	122.00	-19.22	46.44	-2.43
56.00	35.14	215.00	V	148.00	-36.43	39.00	-3.86
60.22	32.70	206.00	V	264.00	-38.82	39.00	-6.30
853.31	37.79	16.00	H	113.00	-19.55	46.44	-8.65

Note: The data above 1 GHz which below 20 dB to the limit was not recorded.

Annex A. TEST INSTRUMENT & METHOD

Annex A.i. TEST INSTRUMENTATION & GENERAL PROCEDURES

Instrument	Model	Serial #	Calibration Date	Calibration Due Date
AC Line Conducted Emissions				
R&S EMI Test Receiver	ESPI3	101216	10/27/2012	10/26/2013
V-LISN	ESH3-Z5	838979/005	10/27/2012	10/26/2013
Com-Power Transient Limiter	LIT-153	531021	11/03/2012	11/02/2013
SIEMIC Labview Conducted Emissions software V1.0	N/A	N/A	N/A	N/A
Radiated Emissions				
Hp Spectrum Analyzer	8563E	3821A09023	01/10/2013	01/09/2014
R&S EMI Receiver	ESPI3	101216	10/27/2012	10/26/2013
Antenna (30MHz~6GHz)	JB6	A121411	12/28/2012	12/27/2013
ETS-Lindgren Antenna (1 ~18GHz)	3115	N/A	10/29/2012	10/28/2013
A-INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	06/25/2012	06/24/2013
Horn Antenna (18~40GHz)	AH-840	101013	04/22/2012	04/22/2013
Microwave Pre-Amp (18~40GHz)	PA-840	181250	05/30/2012	05/29/2013
Hp Agilent Pre-Amplifier	8447F	1937A01160	11/03/2012	11/02/2013
MITEQ Pre-Amplifier (0.1 ~ 18GHz)	AMF-7D-00101800-30-10P	1451709	11/03/2012	11/02/2013
Chamber	3m	N/A	04/13/2012	04/12/2013
SIEMIC Labview Radiated Emissions software V1.0	N/A	N/A	N/A	N/A

Annex A.ii. AC LINE CONDUCTED EMISSIONS TEST DESCRIPTION

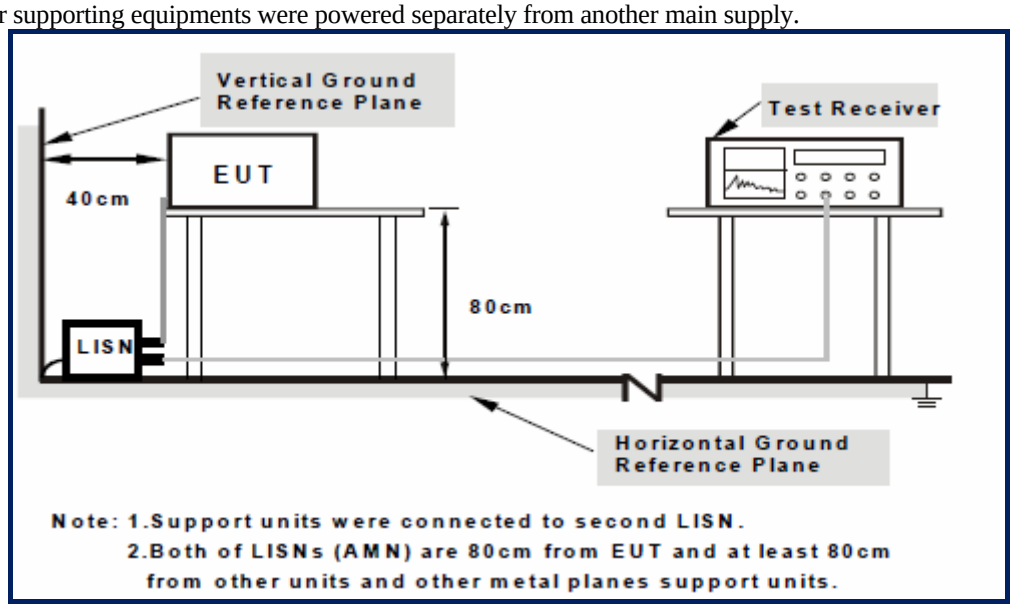
Test Set-up

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, as shown in Annex B.

2. The power supply for the EUT was fed through a 50Ω/50μH 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 equipments were powered separately from another main supply.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration1

Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.

2. 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.

3. High peaks, relative to the limit line, were then selected.

4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made.

5. Steps 2 to 4 were then repeated for the LIVE line (for AC mains) or DC line (for DC power).

Description of Conducted Emission Program

This EMC Measurement software run LabView automation software and offers a common user interface for electromagnetic interference (EMI) measurements. This software is a modern and powerful tool for controlling and monitoring EMI test receivers and EMC test systems. It guarantees reliable collection, evaluation, and documentation of measurement results. Basically, this program will run a pre-scan measurement before it proceeds with the final measurement. The pre-scan routine will run the common scan range from 150 kHz to 30 MHz; the program will first start a peak and average scan on selectable measurement time and step size. After the program complete the pre-scan, this program will perform the Quasi Peak and Average measurement, based on the pre-scan peak data reduction result.

Sample Calculation Example

At 20 MHz limit = 250 μV = 47.96 dBμV

Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.20 dB

Q-P reading obtained directly from EMI Receiver = 40.00 dBμV
(Calibrated for system losses)

Therefore, Q-P margin = 47.96 – 40.00 = 7.96 i.e. **7.96 dB below limit**

Annex A.iii. RADIATED EMISSIONS TEST DESCRIPTION

EUT Characterisation

EUT characterisation, over the frequency range from 30MHz to 10th Harmonic, was done in order to minimise radiated emissions testing time while still maintaining high confidence in the test results.

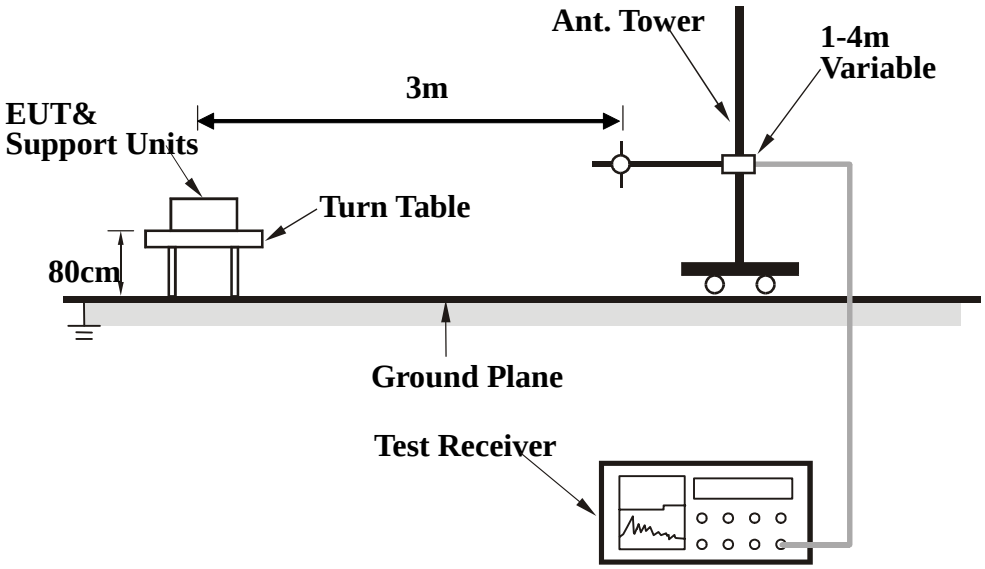
The EUT was placed in the chamber, at a height of about 0.8m on a turntable. Its radiated emissions frequency profile was observed, using a spectrum analyzer /receiver with the appropriate broadband antenna placed 3m away from the EUT. Radiated emissions from the EUT were maximised by rotating the turntable manually, changing the antenna polarisation and manipulating the EUT cables while observing the frequency profile on the spectrum analyzer / receiver. Frequency points at which maximum emissions occurred, clock frequencies and operating frequencies were then noted for the formal radiated emissions test at the Open Area Test Site (OATS) or EMC chamber.

Test Set-up

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.

2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.

3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration2

Test Method

The following procedure was performed to determine the maximum emission axis of EUT:
1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antenna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. So, the axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.

Final Radiated Emission Measurement
1. Setup the configuration according to figure 1. Turn on EUT and make sure that it is in normal function.

2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.

3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.

4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading.

5. Repeat step 4 until all frequencies need to be measured were complete.

6. Repeat step 5 with search antenna in vertical polarized orientations.

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Peak	100 kHz	100 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Sample Calculation Example

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

Peak = Reading + Corrected Factor

where
Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any)
And the average value is

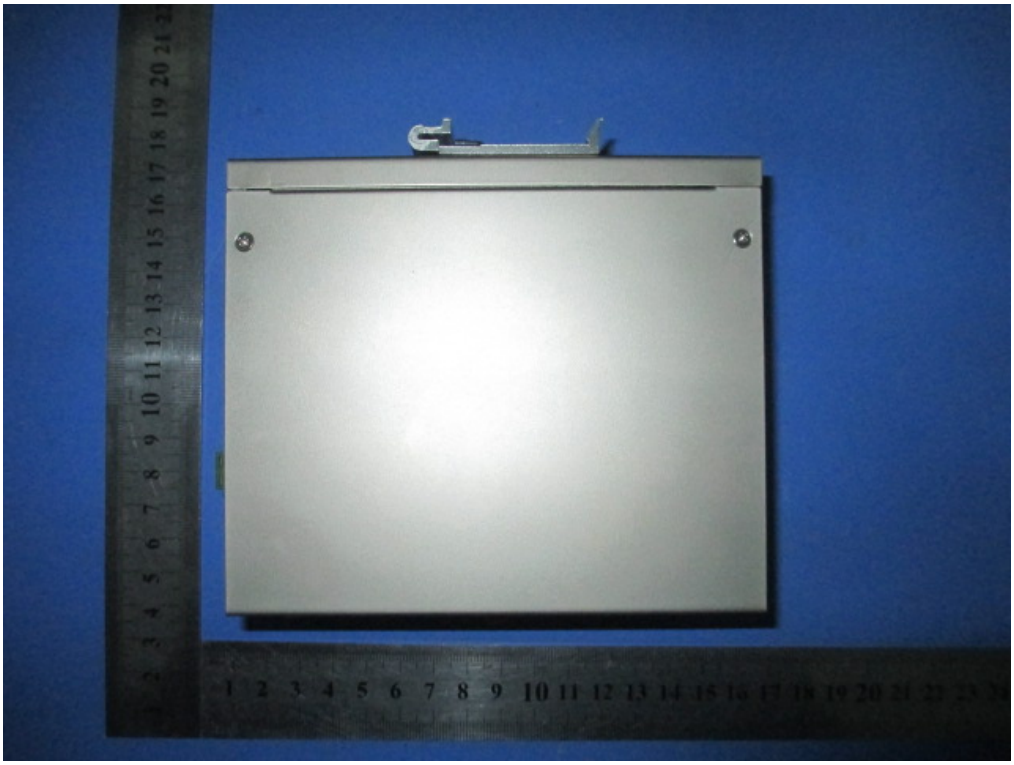
Average = Peak Value + Duty Factor or
Set RBW = 1MHz, VBW = 10Hz.

Note:
If the measured frequencies are fall in the restricted frequency band, the limit employed must be quasi peak value when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function.

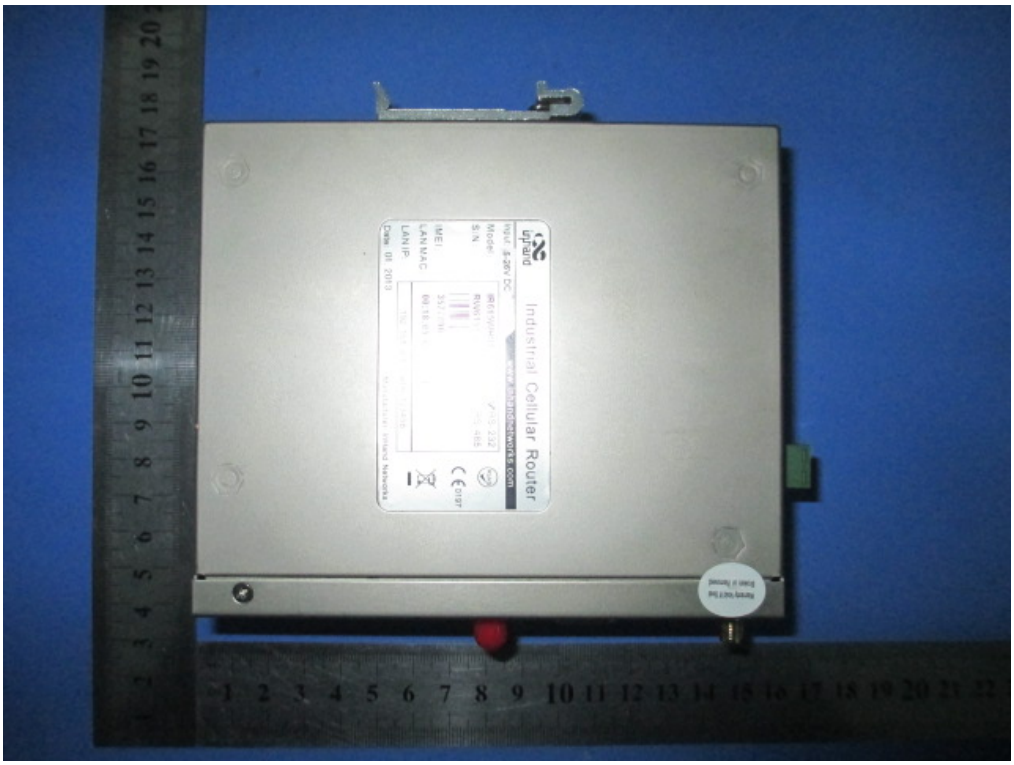
Annex B. EUT AND TEST SETUP PHOTOGRAPHS

Annex B.i. Photograph 1: EUT External Photo

Whole Package View



Top View of EUT



Bottom View of EUT

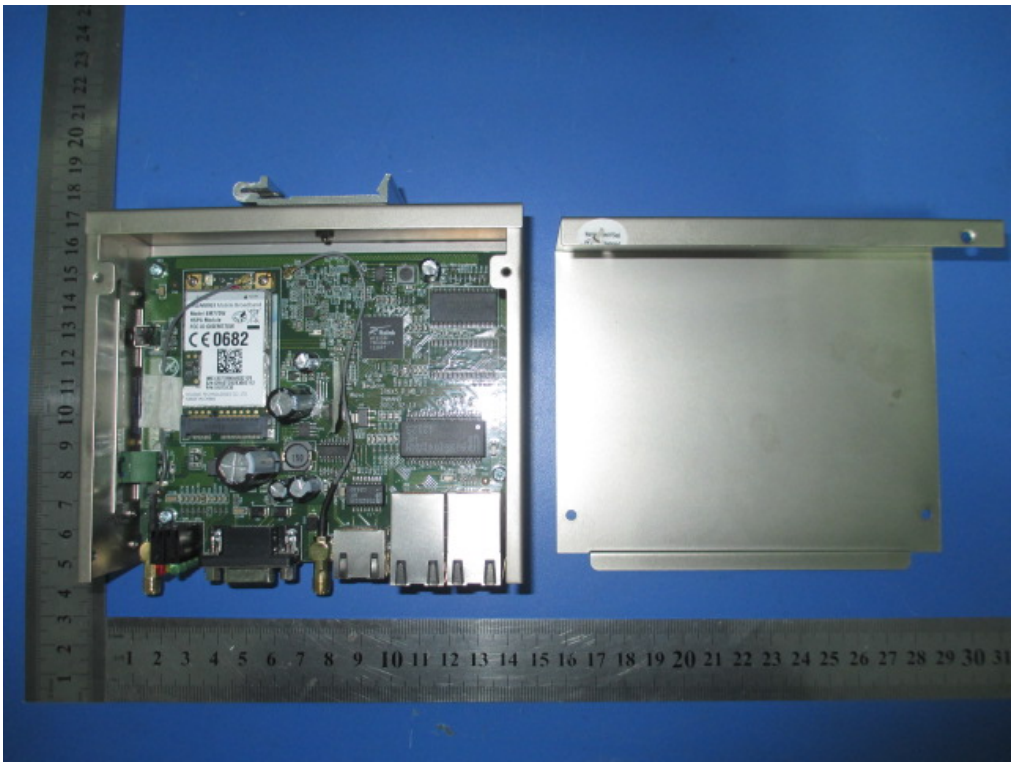
Front View of EUT

Rear View of EUT

Left View of EUT

Right View of EUT

Annex B.ii. Photograph 2: EUT Internal Photo

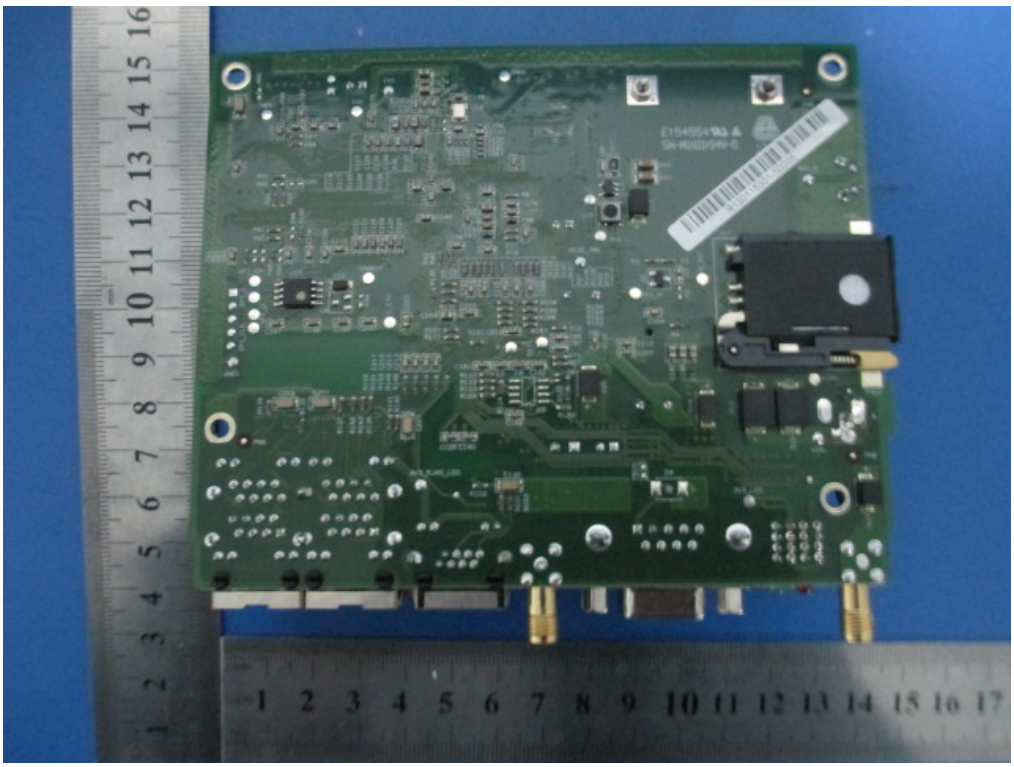


Cover Off - Front View

Antenna View

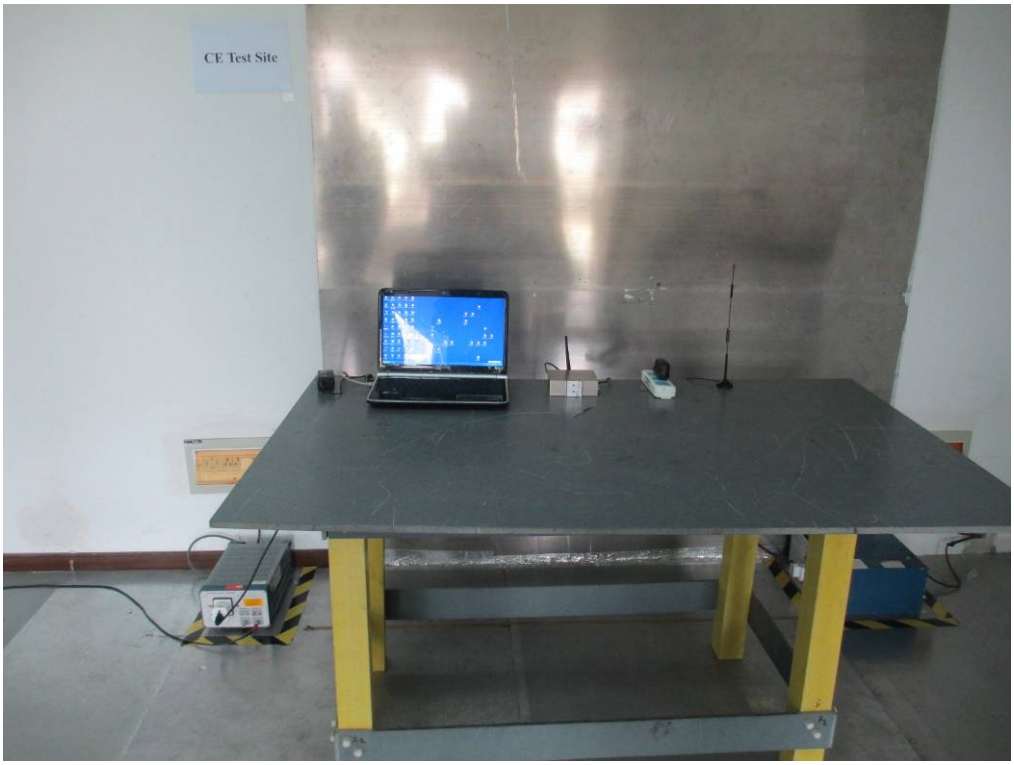
3GModule View for IR615WH01-AP

Main Board Front View



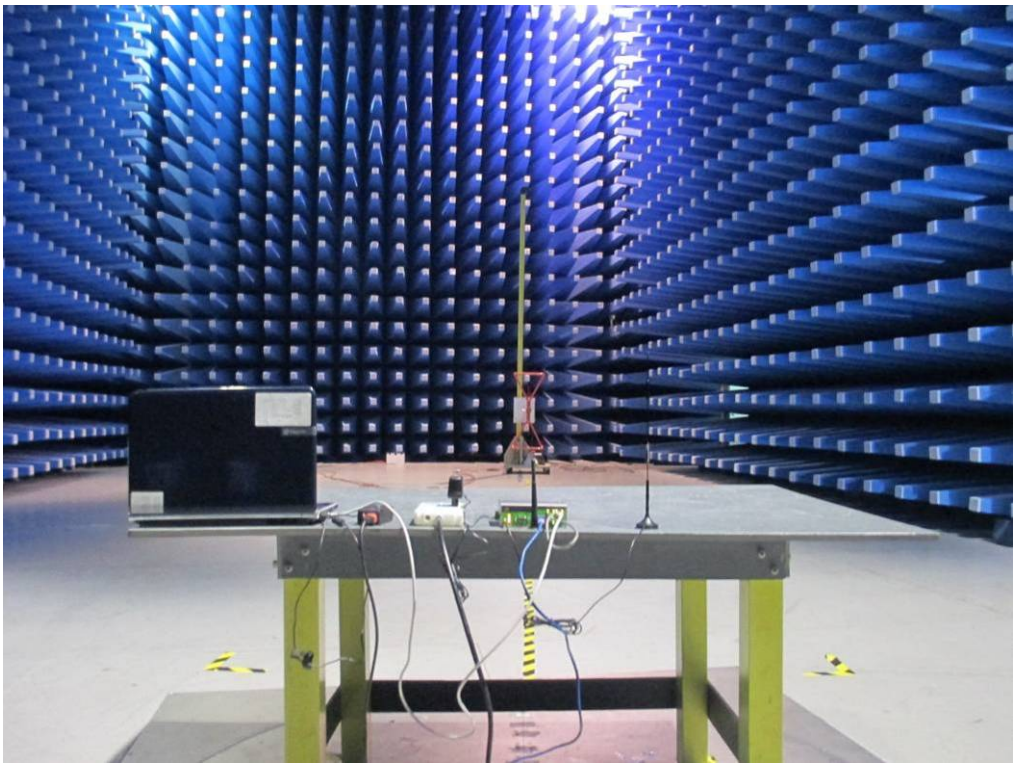
Main Board Rear View

Annex B.iii. Photograph 3: Test Setup Photo

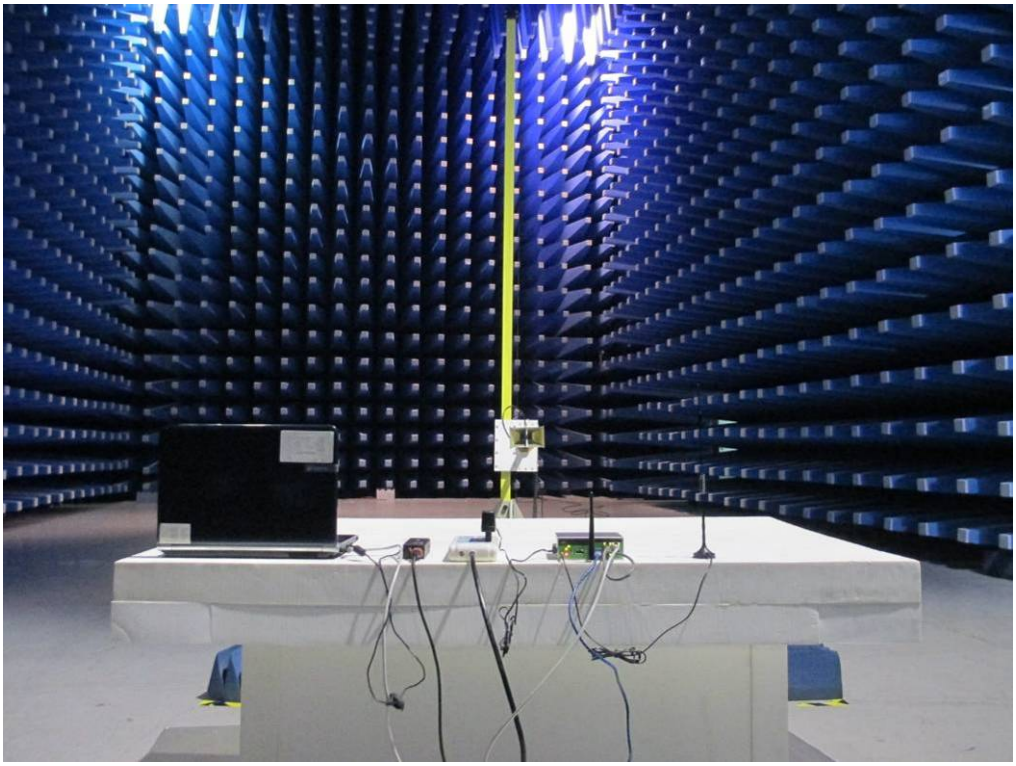


Conducted Emissions Test Setup - Front View

Conducted Emissions Test Setup - Side View



Radiated Emissions Test Setup Below 1GHz - Front View



Radiated Emissions Test Setup above 1GHz - Front View

Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

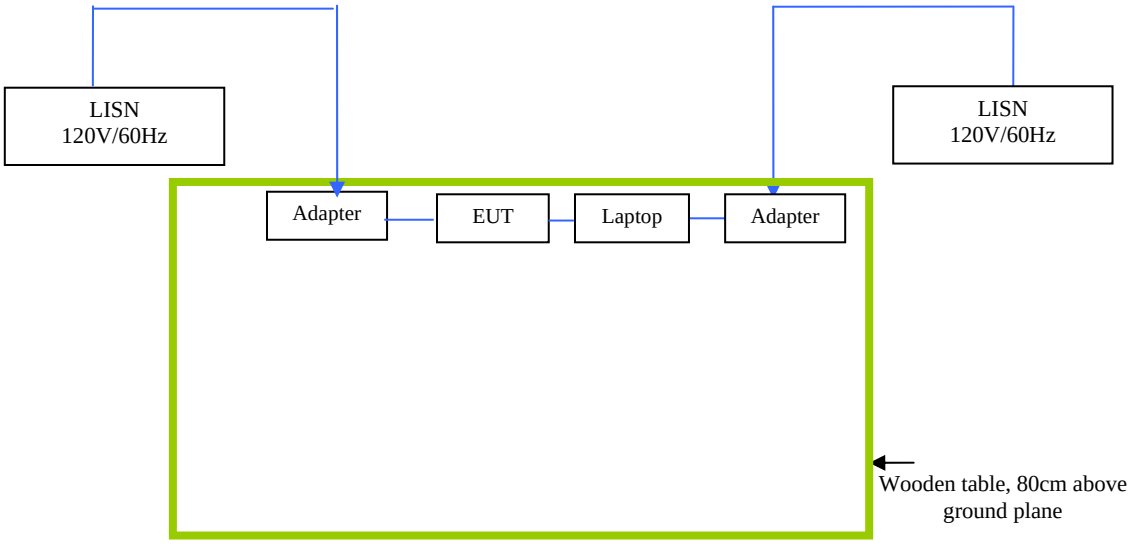
EUT TEST CONDITIONS

Annex C. i. SUPPORTING EQUIPMENT DESCRIPTION

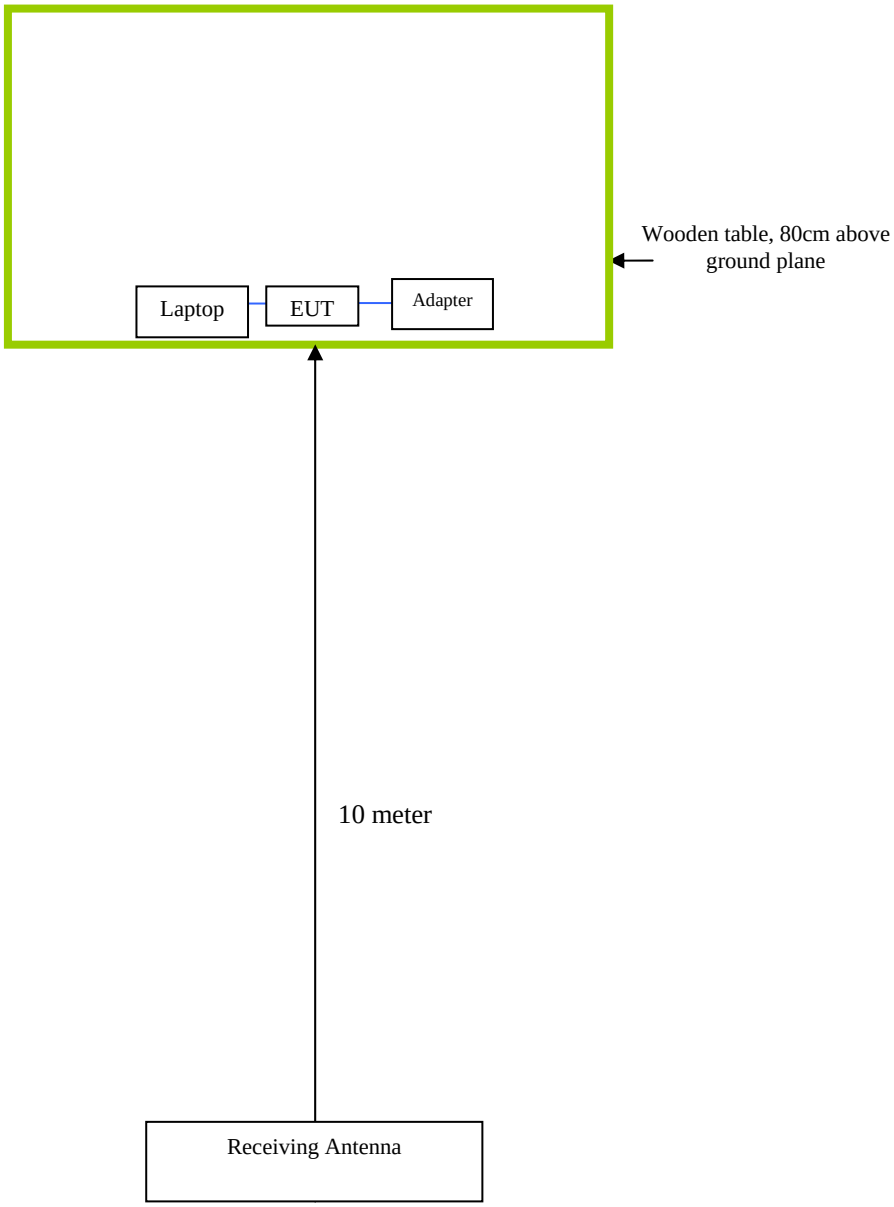
The following is a description of supporting equipment and details of cables used with the EUT.

Equipment Description (Including Brand Name)	Model & Serial Number	Cable Description (List Length, Type & Purpose)
Gateway Laptop	MS2288 & LXWHF02013951C3CA92200	N/A

Block Configuration Diagram for Conducted Emissions



Block Configuration Diagram for Radiated Emissions



Annex C.ii. EUT OPERATING CONDITIONS

The following is the description of how the EUT is exercised during testing.

Test	Description Of Operation
Emissions Testing	Normal Working

Annex D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PART LIST

Please see attachment

Annex E. DECLARATION OF SIMILARITY

Declaration letter

Beijing InHand Networks Technology Co., Ltd

To: SIEMIC Nanjing (China) Laboratories
No.2-1,Longcang Dadao
Yuhua Economic Development Zone
Nanjing,P.R.China

Dear Sir,

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

Model No.: IR615WH01-AP

IR605WH01-AP	IR605WH01-STA
IR695WH01-AP	IR615WH01-STA
IG605WH01-AP	IR695WH01-STA
IG615WH01-AP	IG605WH01-STA
IG695WH01-AP	IG615WH01-STA
	IG695WH01-STA

The twelve models are the same in these: appearance,PCB layout,and basic software function;The differences are as follows:

Ia6b5WH01-c		
【a】	【b】	【c】
R:router G:gateway	0: basic SW function 1: support VPN (IPsec/PPTP/L2TP) 9: support VPN\CA certificate\SSL	AP: Wi-Fi AP STA: Wi-Fi client

【a】, 【b】, 【c】 is software different only;

Thank you!

Signature: 王标

Printed name/title:Wangbiao/ EMC engineer

Address: WestWing 11th Floor, Buiding G, Wangjing Science Park, Chaoyang District, Beijing