Zhuhai Unitech Power Technology Co., Ltd.

Key Management Cabinet

Main Model: UT-059B_UL
Serial Model: N/A

July 22, 2014

Report No.: 14020514-FCC-R1
(This report supersedes NONE)

Modifications made to the product : None

This Test Report is Issued Under the Authority of:		
Kahn Yang	Alex Liu	
Kahn Yang **Compliance Engineer**	**Alex Liu** **Technical Manager**	

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

RF Test Report

To: FCC Part 15.207; 15.209, ANSI C63.4: 2009

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Laboratory Introduction

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

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CONTENTS

1 EXECUTIVE SUMMARY & EUT INFORMATION

The purpose of this test programme was to demonstrate compliance of the Zhuhai Unitech Power Technology Co., Ltd., Key Management Cabinet and model: UT-059B_UL against the current Stipulated Standards. The Key Management Cabinet has demonstrated compliance with the FCC 15.207; FCC 15.209; ANSI C63.4: 2009.

EUT Information

EUT Description	:	**Key Management Cabinet**
Main Model	:	**UT-059B_UL (S/N: 214051071)**
Serial Model	:	**N/A**
Input Power	:	**Battery:** **Model: UTBY-1** **Spec: 7.4V 4000mAh** **Limited charger voltage: 8.4V** **Input: AC 85~265V, DC 110~330V**
Classification Per Stipulated Test Standard	:	**FCC 15.207; FCC 15.209; ANSI C63.4: 2009**

2 TECHNICAL DETAILS

Purpose	**Compliance testing of Key Management Cabinet with stipulated standards**
Applicant / Client	**Zhuhai Unitech Power Technology Co., Ltd. No. 102, Yinhua Road, Xiangzhou, Guangdong**
Manufacturer	**Zhuhai Unitech Power Technology Co., Ltd. No. 102, Yinhua Road, Xiangzhou, Guangdong**
Laboratory performing the tests	**SIEMIC (Shenzhen - China) Laboratories Zone A, Floor 1, Building 2, Wan Ye Long Technology Park, South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong, China Tel: +86-0755-2601 4629 / 2601 4953 Fax: +86-0755-2601 4953-810 Email: China@siemic.com.cn**
Test report reference number	**14020514-FCC-R1**
Date EUT received	**June 05, 2014**
Standard applied	**FCC 15.207; FCC 15.209; ANSI C63.4: 2009**
Dates of test (from – to)	**June 12 to July 22, 2014**
No of Units	**#1**
Equipment Category	**DCD**
Trade Name	**N/A**
RF Operating Frequency (ies)	**125kHz**
Number of Channels	**1**
Modulation	**AM**
GPRS Multi-slot class	**N/A**
FCC ID	**Z5FUT-059B-UL**

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:

Spread Spectrum System/Device

Test Results Summary

Test Standard	Description	Product Class	Pass / Fail
§15.207(a)	AC Line Conducted Emissions	See Above	Pass
§15.205, §15.209	Radiated Emissions	See Above	Pass

5 MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

5.1 §15.207 (a) – AC Line Conducted Emissions

Standard Requirement:

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

Procedures:

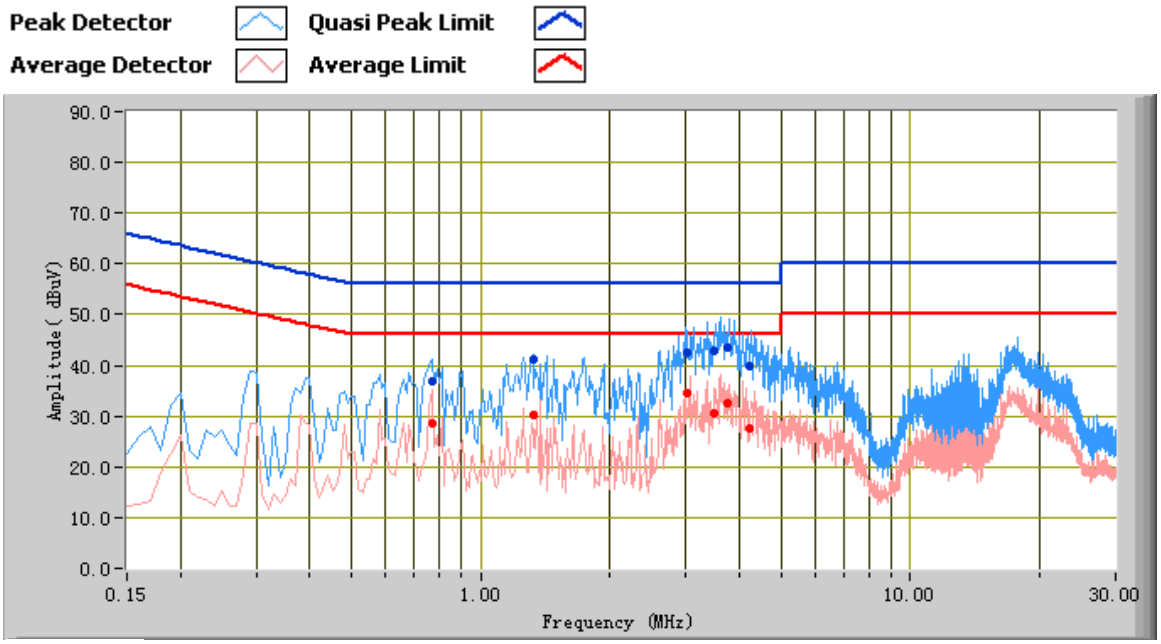
1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at 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 9kHz – 30MHz (Average & Quasi-peak) is ±3.5dB.
4. Environmental Conditions

Temperature	24°C
Relative Humidity	53%
Atmospheric Pressure	1012mbar

5. Test date : July 22, 2014
   Tested By : Kahn Yang

Test Result: Pass

Test Mode:	Charging & Transmitting

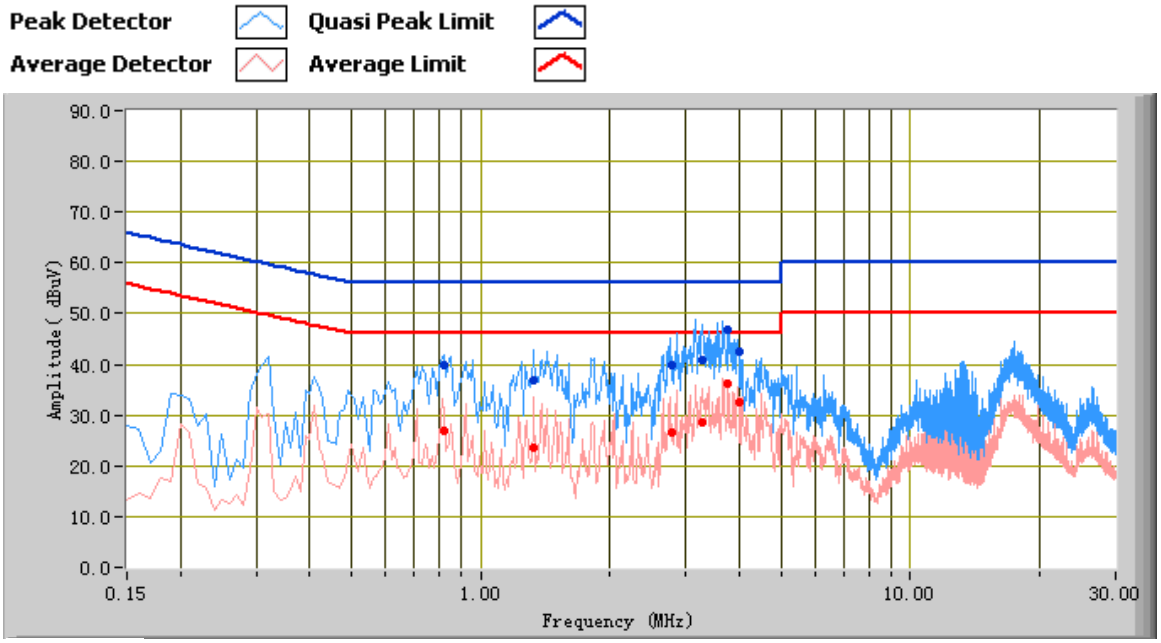


Test Data

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dBuV)	Limit (dBuV)	Margin (dB)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Factors (dB)
3.02	42.67	56.00	-13.33	34.50	46.00	-11.50	10.63
3.74	43.64	56.00	-12.36	32.50	46.00	-13.50	10.76
3.50	42.79	56.00	-13.21	30.44	46.00	-15.56	10.71
4.22	39.76	56.00	-16.24	27.53	46.00	-18.47	10.85
1.32	41.09	56.00	-14.91	30.11	46.00	-15.89	10.32
0.77	36.93	56.00	-19.07	28.70	46.00	-17.30	10.41

Test Mode:	Charging & Transmitting



Test Data

Phase Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dBuV)	Limit (dBuV)	Margin (dB)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Factors (dB)
3.26	40.69	56.00	-15.31	28.72	46.00	-17.28	10.67
3.74	46.76	56.00	-9.24	36.06	46.00	-9.94	10.76
3.98	42.44	56.00	-13.56	32.62	46.00	-13.38	10.81
1.33	37.00	56.00	-19.00	23.68	46.00	-22.32	10.32
0.82	39.80	56.00	-16.20	26.82	46.00	-19.18	10.39
2.78	39.94	56.00	-16.06	26.65	46.00	-19.35	10.58

5.2 §15.209, §15.205 & §15.247(d) - Spurious Emissions

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 (3m & 10m) & 1GHz above (3m) is +5.6/-4.5dB.
4. Environmental Conditions

Temperature	24°C
Relative Humidity	59%
Atmospheric Pressure	1014mbar

5. Test date : June 27, 2014
   Tested By : Kahn Yang

Standard Requirement:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Procedures:

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. A Quasi-peak measurement was then made for that frequency point for below 1GHz test, PK and AV for above 1GHz emission test.

a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 kHz for Quasiy Peak detection at frequency from 9 kHz to 150 kHz, and 9 kHz from 150 kHz to 30 MHz.

b. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.

c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.

d. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth for Average detection (AV) as below at frequency above 1GHz.

■ 1 kHz (Duty cycle < 98%) ☐ 10 Hz (Duty cycle > 98%)

4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.

Test Result: Pass

Emission Below 30 MHz

Test Mode:	**Charging & Transmitting**

9 - 150 kHz (0 degree)

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)	Note
15.6	47.56	QP	14.55	0.01	62.12	123.74	-61.62	spurious
31.4	43.28	QP	14.34	0.05	57.67	117.67	-60.00	spurious
113.6	36.59	QP	13.91	0.02	50.52	106.50	-55.98	spurious
125	45.22	QP	13.92	0.02	59.16	105.67	-46.51	fundamental

9 - 150 kHz (90 degree)

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)	Note
15.6	49.42	QP	14.55	0.01	63.98	123.74	-59.76	spurious
31.4	45.35	QP	14.34	0.05	59.74	117.67	-57.93	spurious
113.6	42.15	QP	13.91	0.02	56.08	106.50	-50.42	spurious
125	46.67	QP	13.92	0.02	60.61	105.67	-45.06	fundamental

150 kHz - 30 MHz (0 degree)

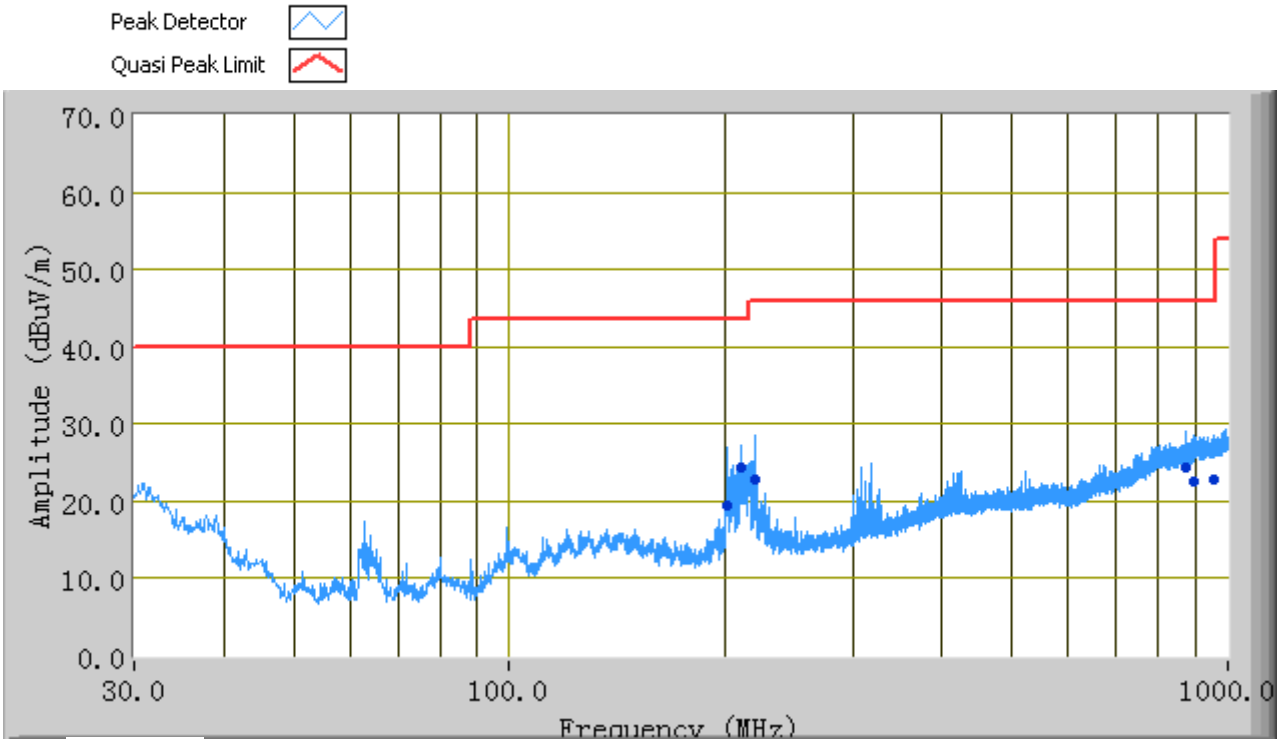
Frequency (MHz)	S.A. Reading (dBµV)	Detector (PK/AV)	Ant. Factor (dB/m)	Cable Loss (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Note
0.2	43.25	QP	13.65	0.03	56.93	123.74	-66.81	spurious
3.2	26.88	QP	13.85	0.1	40.83	69.54	-28.71	spurious
10	23.48	QP	13.36	0.2	37.04	69.54	-32.50	spurious
18	33.54	QP	15.15	0.3	48.99	69.54	-20.55	spurious

150 kHz - 30 MHz (90 degree)

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)	Note
0.2	44.11	QP	13.65	0.03	57.79	123.74	-65.95	spurious
3.2	26.42	QP	13.85	0.1	40.37	69.54	-29.17	spurious
10	24.03	QP	13.36	0.2	37.59	69.54	-31.95	spurious
18	33.19	QP	15.15	0.3	48.64	69.54	-20.90	spurious

Emission from 30 MHz to 1000 MHz

Test Mode:	Charging & Transmitting



Test Data

Horizontal & Vertical Polarity Plot @3m

Frequency (MHz)	Quasi Peak (dBuV/m)	Azimuth	Polarity(H/V)	Height (cm)	Factors (dB)	Limit (dBuV)	Margin (dB)
209.72	24.31	330.00	H	247.00	-7.97	43.52	-19.21
201.25	19.49	3.00	H	248.00	-8.09	43.52	-24.03
875.06	24.35	190.00	V	100.00	4.45	46.00	-21.65
894.95	22.53	92.00	H	240.00	4.70	46.00	-23.47
955.49	22.77	283.00	V	341.00	5.64	46.00	-23.23
219.42	22.94	171.00	V	172.00	-7.83	46.00	-23.06

Annex A. TEST INSTRUMENT & METHOD

Annex A.i. TEST INSTRUMENTATION & GENERAL PROCEDURES

Instrument	Model	Serial #	Calibration Date	Calibration Due Date
AC Line Conducted Emissions				
EMI test receiver	ESCS30	8471241027	05/27/2014	05/26/2015
Line Impedance Stabilization Network	LI-125A	191106	11/14/2013	11/13/2014
Line Impedance Stabilization Network	LI-125A	191107	11/14/2013	11/13/2014
LISN	ISN T800	34373	01/11/2014	01/10/2015
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	11/20/2013	11/19/2014
Transient Limiter	LIT-153	531118	09/02/2013	09/01/2014
Radiated Emissions				
EMI test receiver	ESL6	100262	11/23/2013	11/22/2014
Positioning Controller	UC3000	MF780208282	11/19/2013	11/19/2014
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/02/2013	09/01/2014
Microwave Preamplifier (0.5～18GHz)	PAM-118	443008	09/02/2013	09/01/2014
Active Antenna(9kHz-30MHz)	AL-130	121031	11/20/2013	11/19/2014
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/23/2013	09/22/2014
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	11/20/2013	11/19/2014
Universal Radio Communication Tester	CMU200	121393	09/17/2013	09/16/2014

Annex A.ii. CONDUCTED EMISSIONS TEST DESCRIPTION

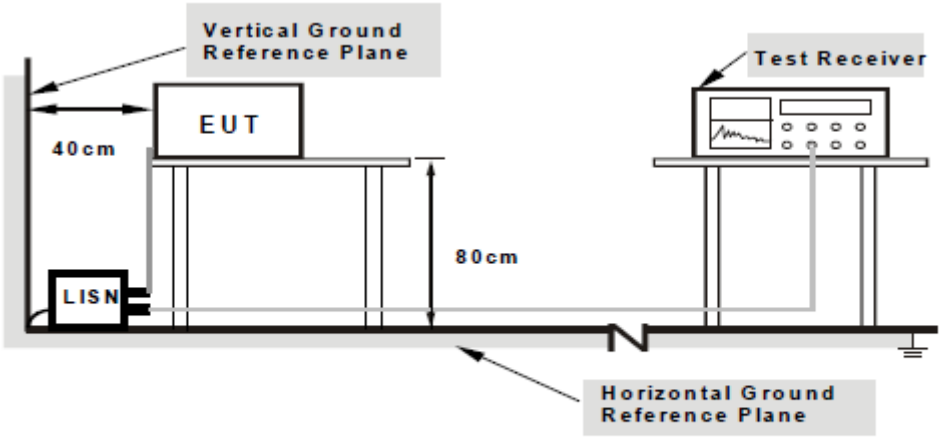
Test Set-up

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.



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.

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 B. EUT AND TEST SETUP PHOTOGRAPHS

Annex B.i. Photograph 1: EUT External Photo

Whole Package - Top View

EUT - Front View

EUT - Rear View

EUT - Top View

EUT - Bottom View

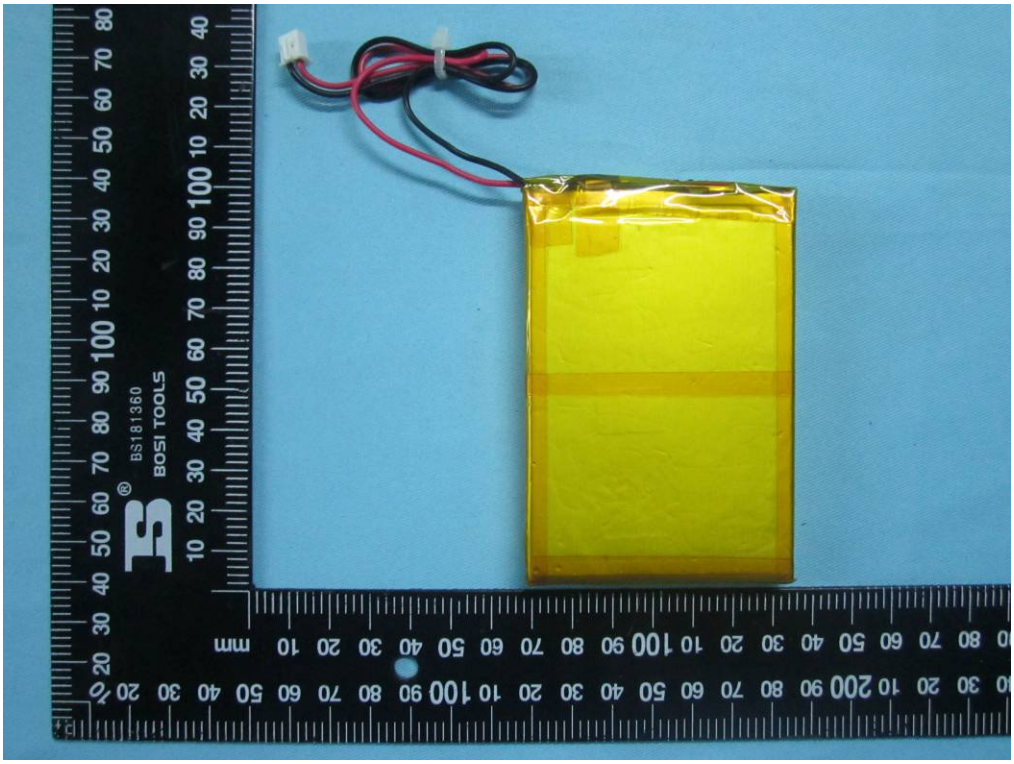
EUT - Left View

EUT - Right View

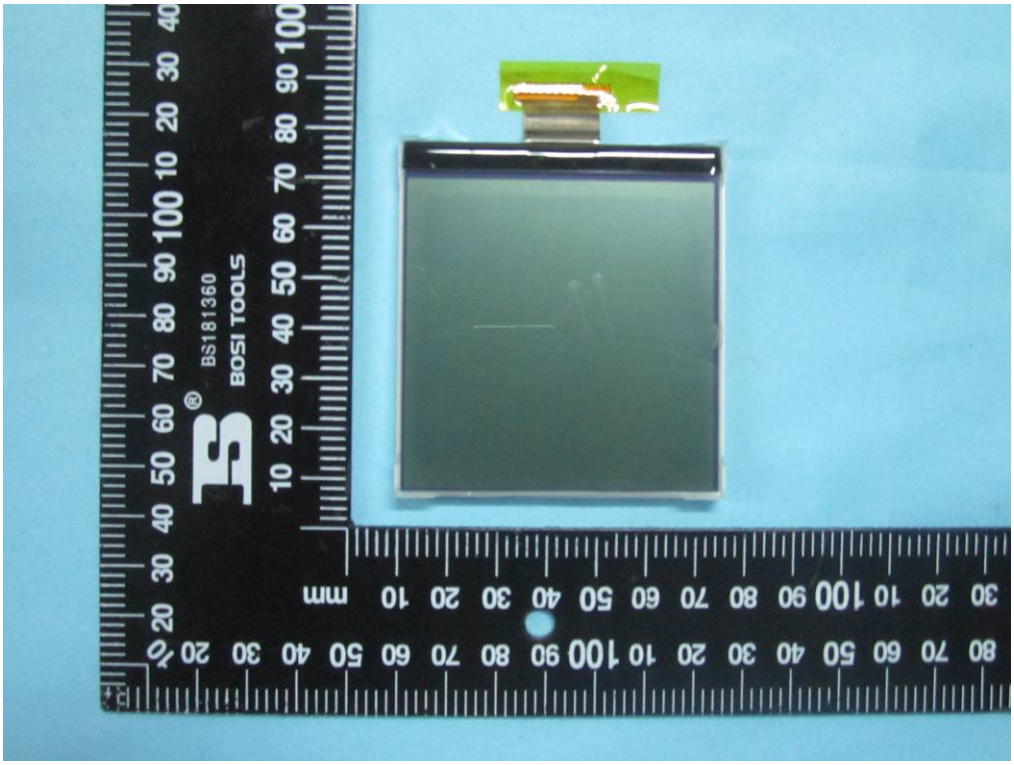
Annex B.ii. Photograph 2: EUT Internal Photo

Cover Off - Top View

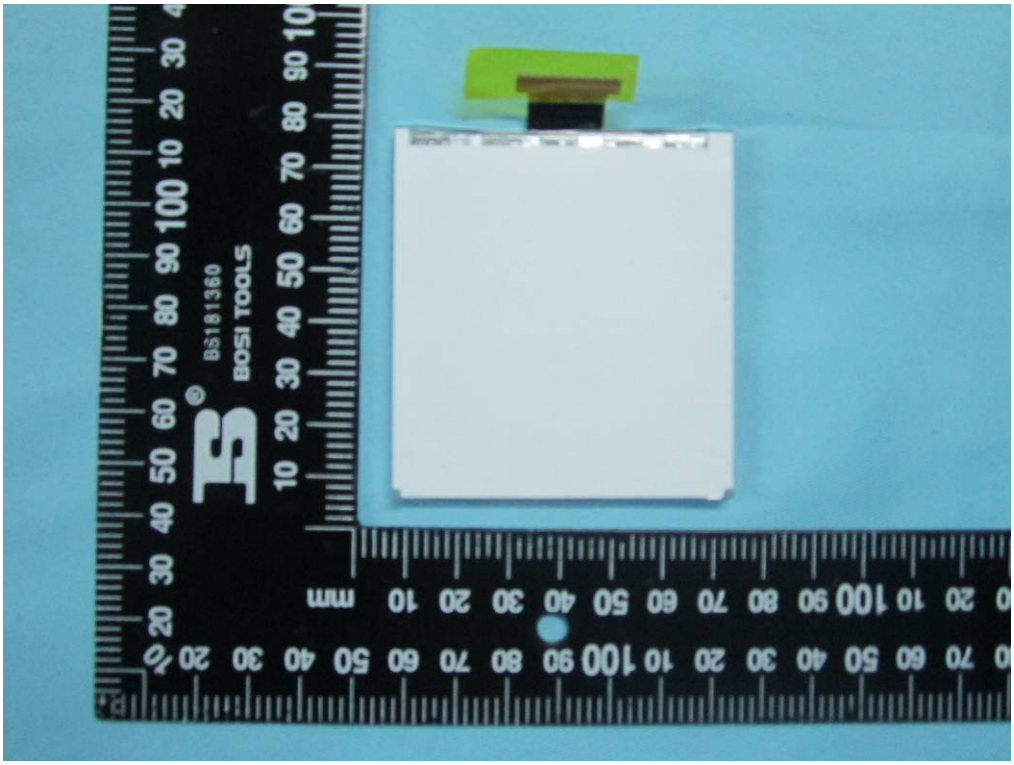
Battery - Top View



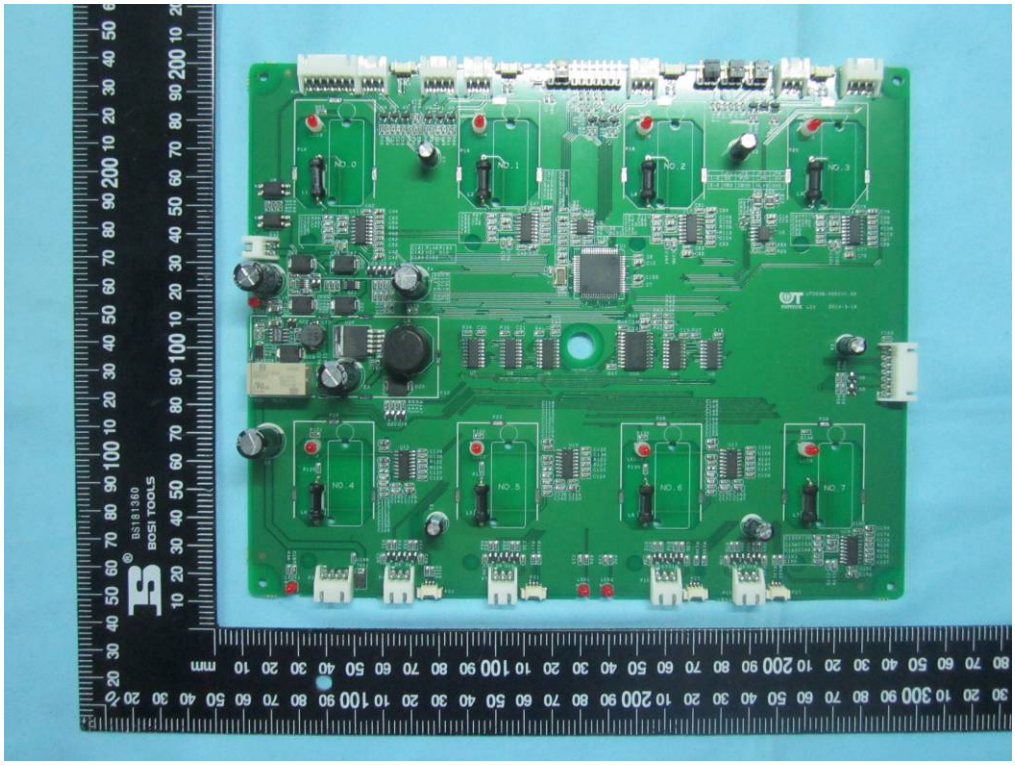
Battery - Bottom View



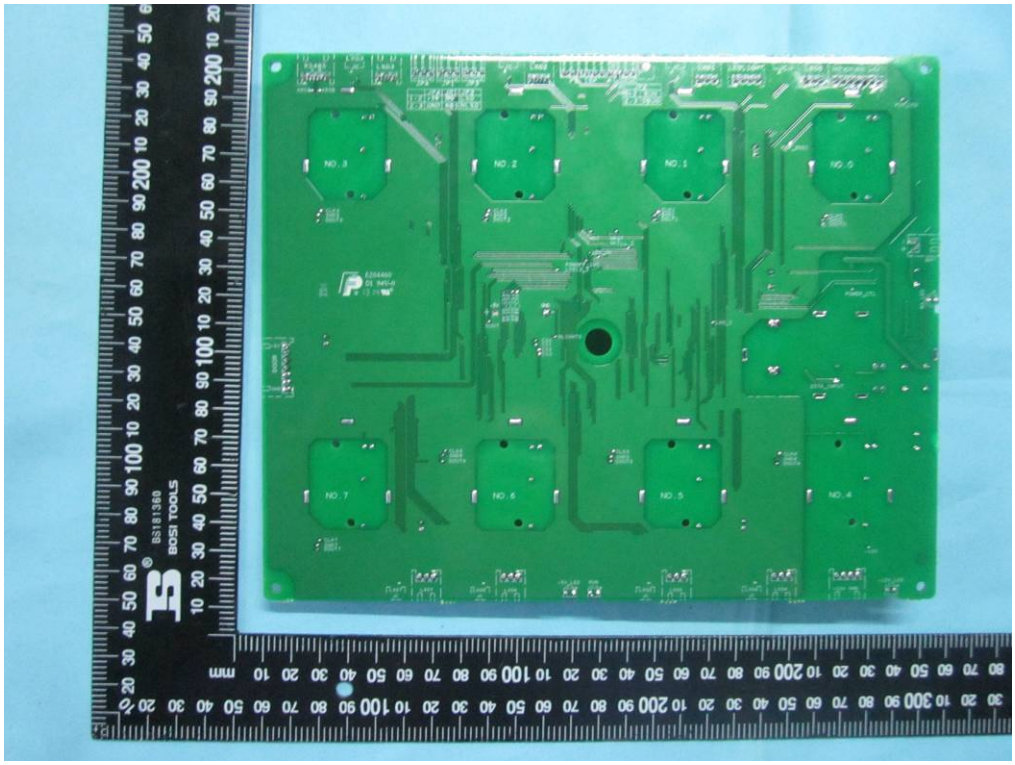
LCD – Front View



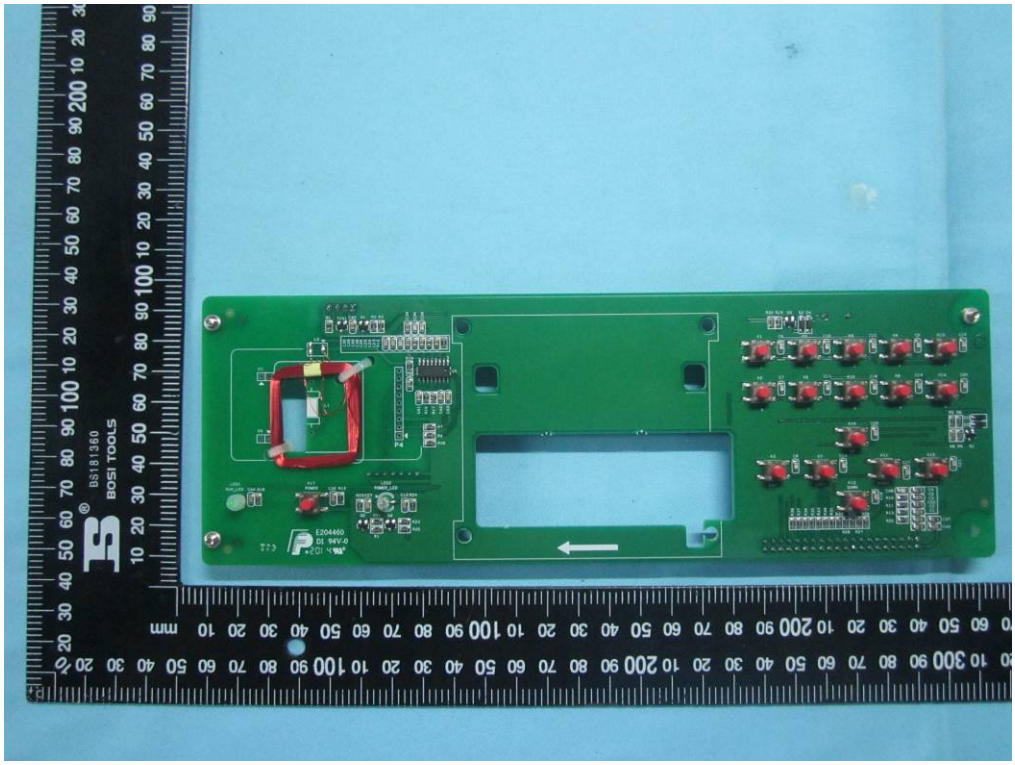
LCD – Rear View



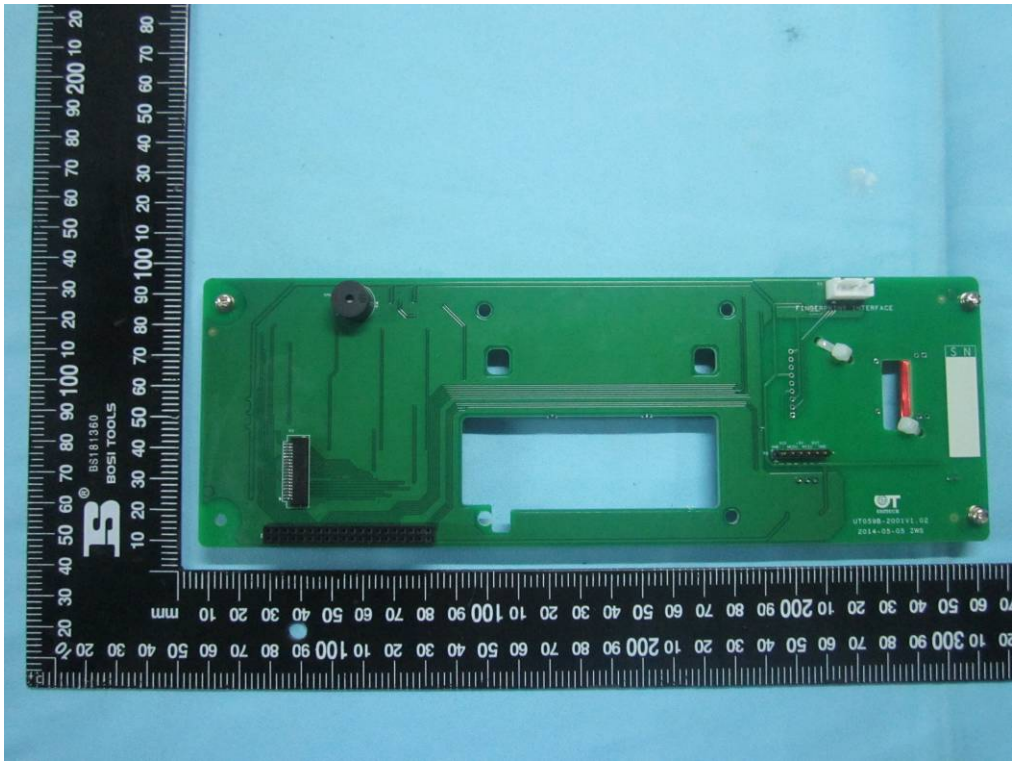
Mainborad - Front View



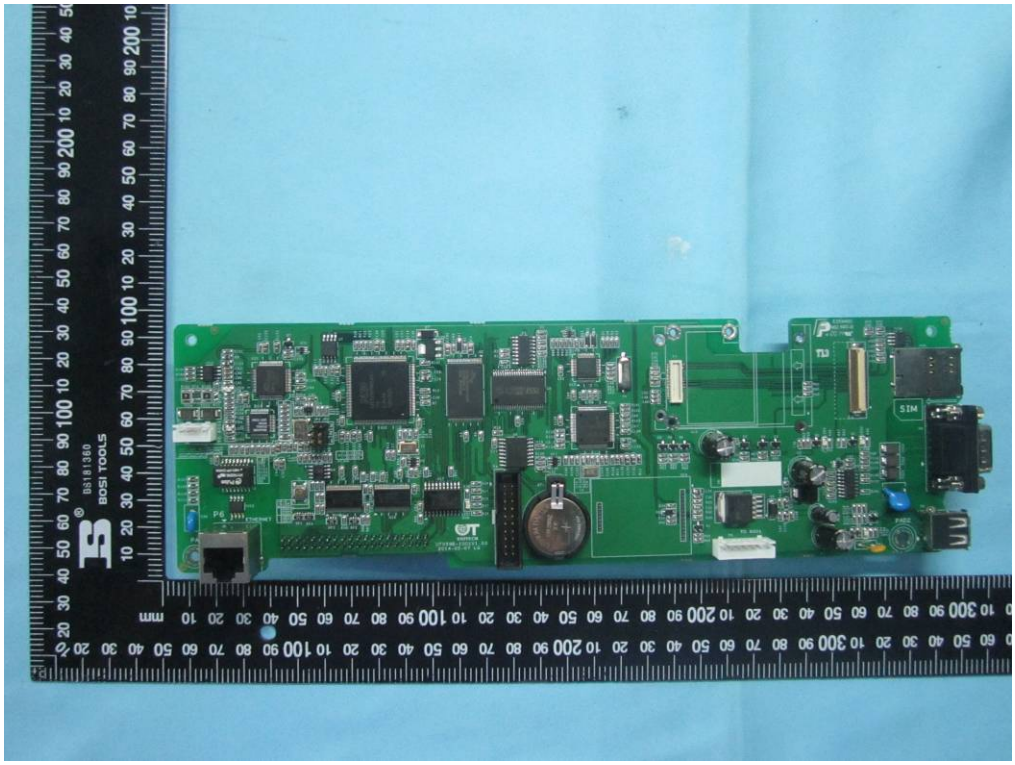
Mainborad - Rear View



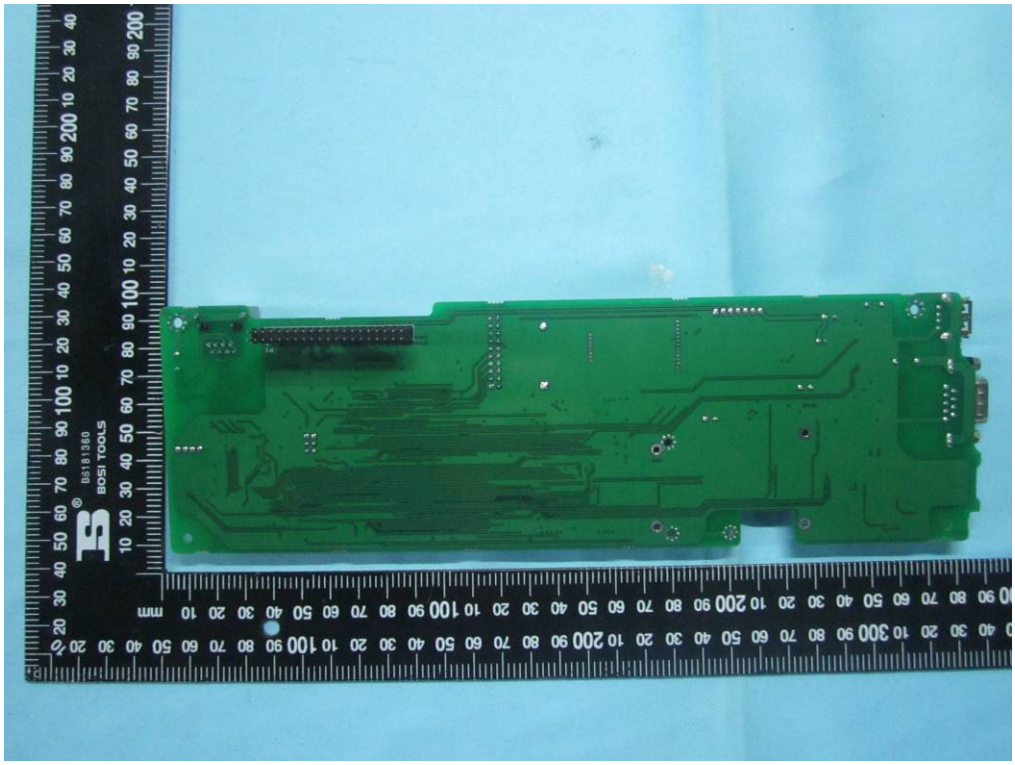
Keyboard - Front View



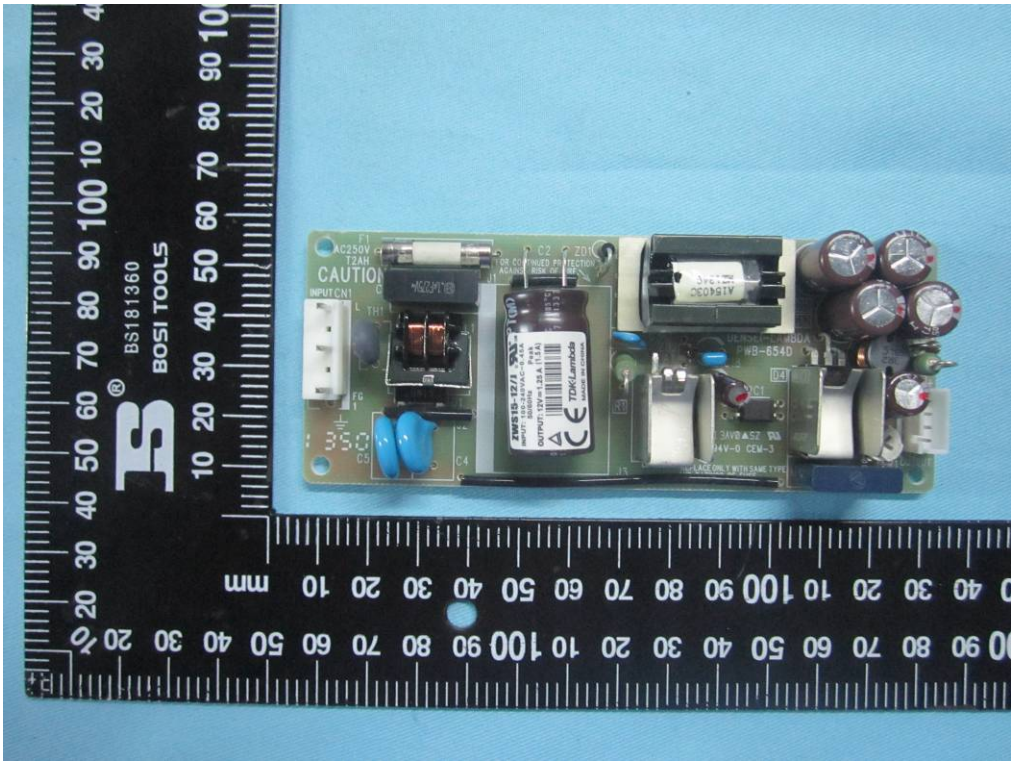
Keyboard - Rear View



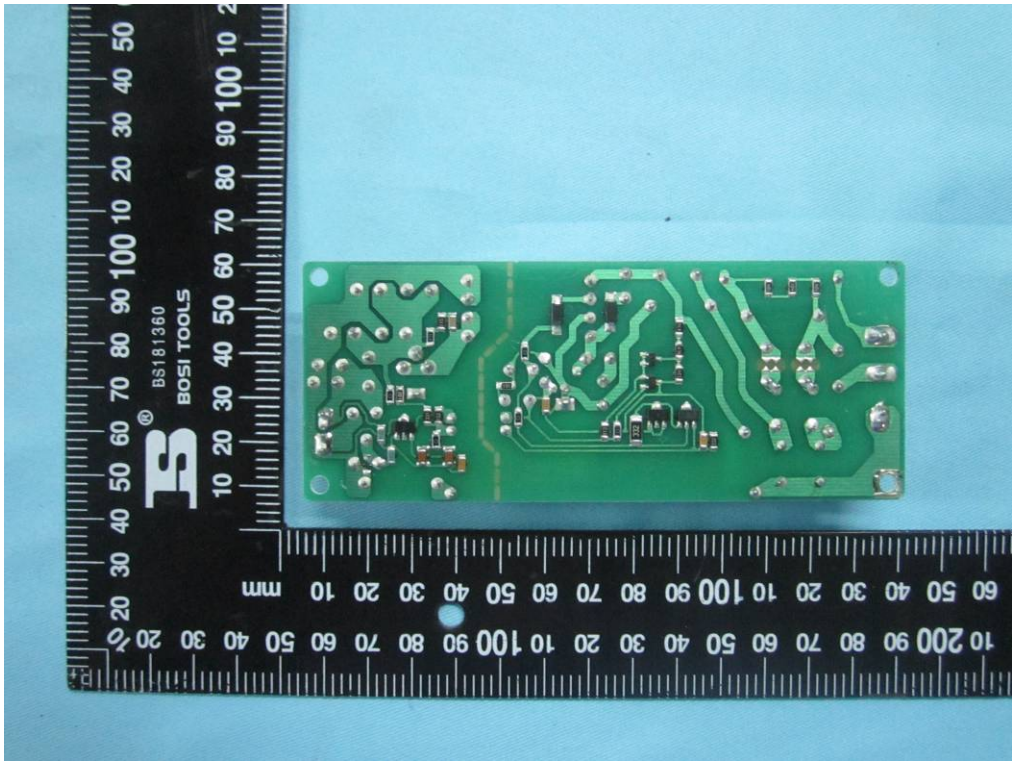
Connect board 1 - Front View



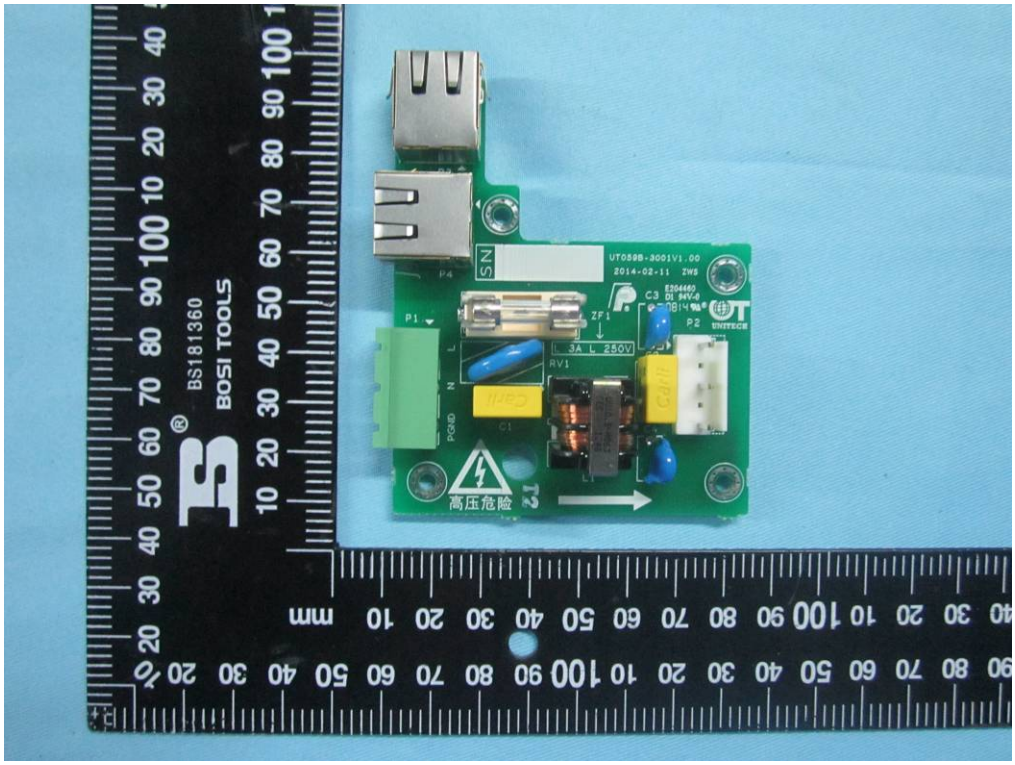
Connect board 1 - Rear View



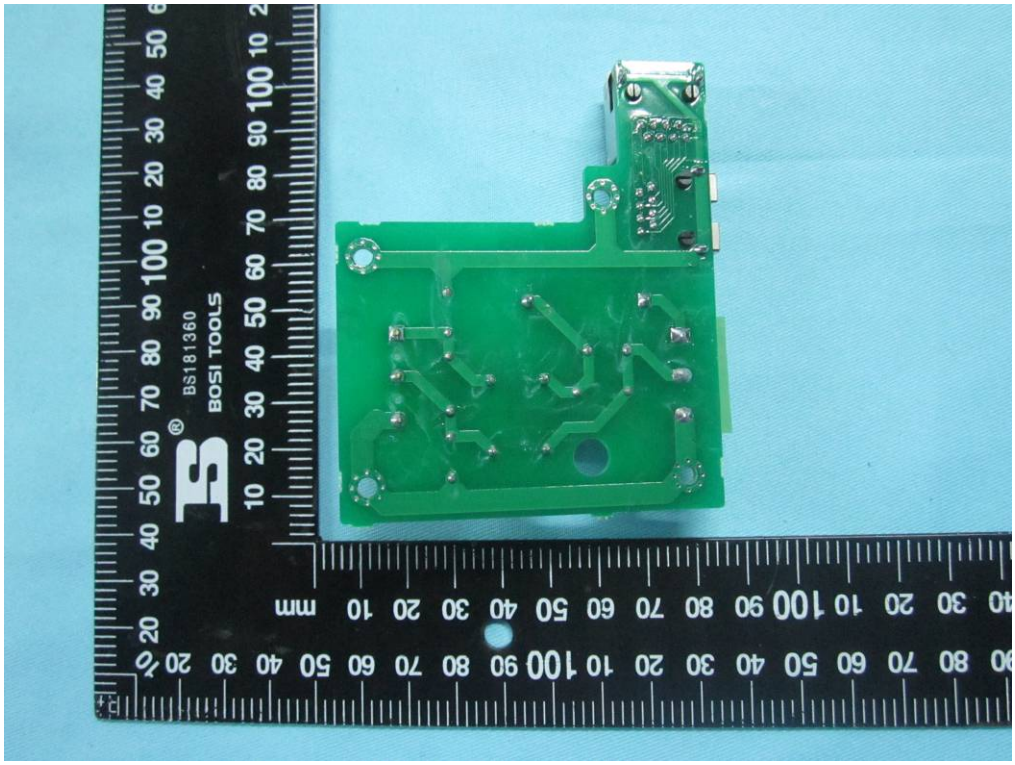
Connect board 2 - Front View



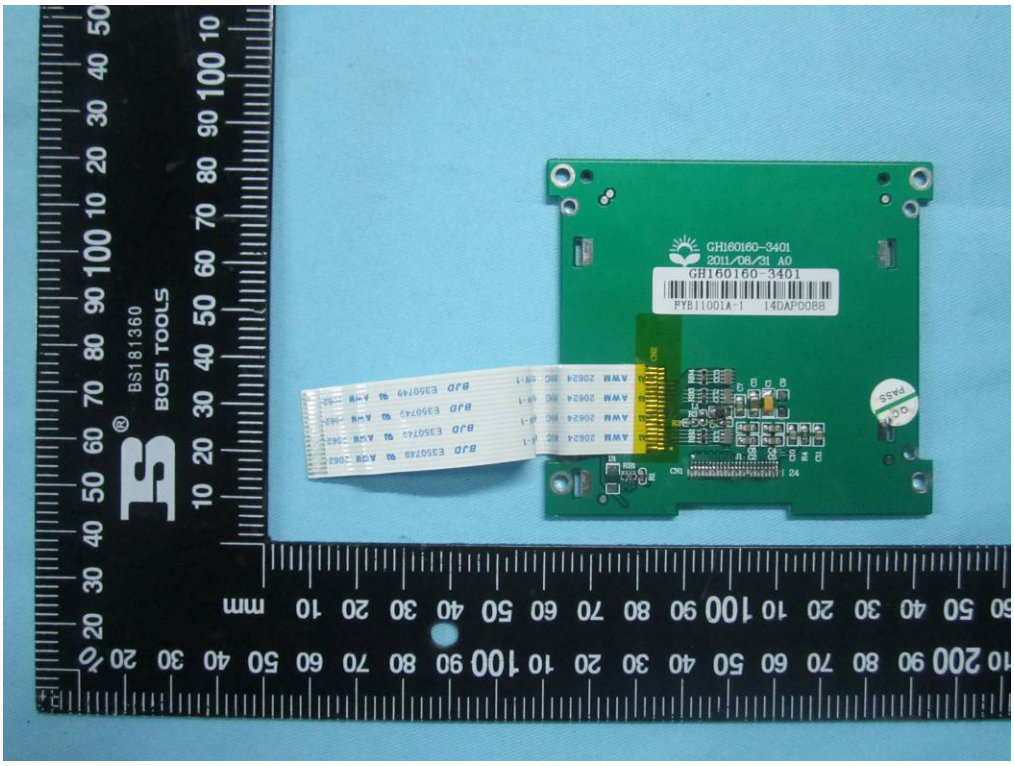
Connect board 2 - Rear View



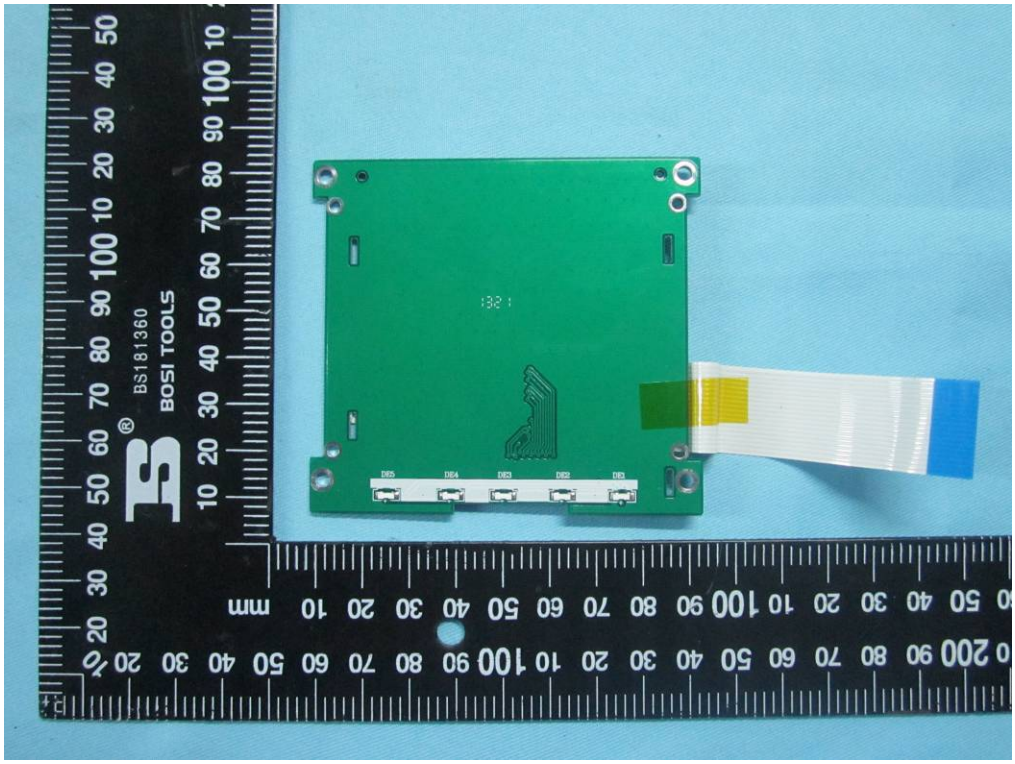
Connect board 3 - Front View



Connect board 3 - Rear View



Connect board 4 - Front View

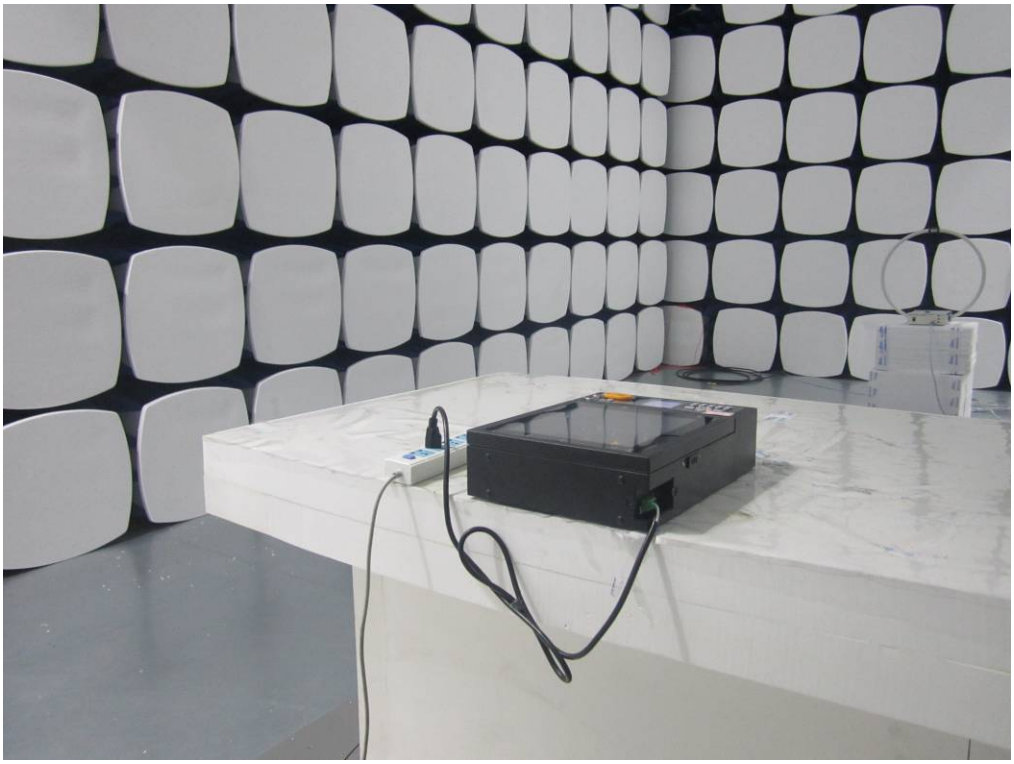


Connect board 4 - Rear View

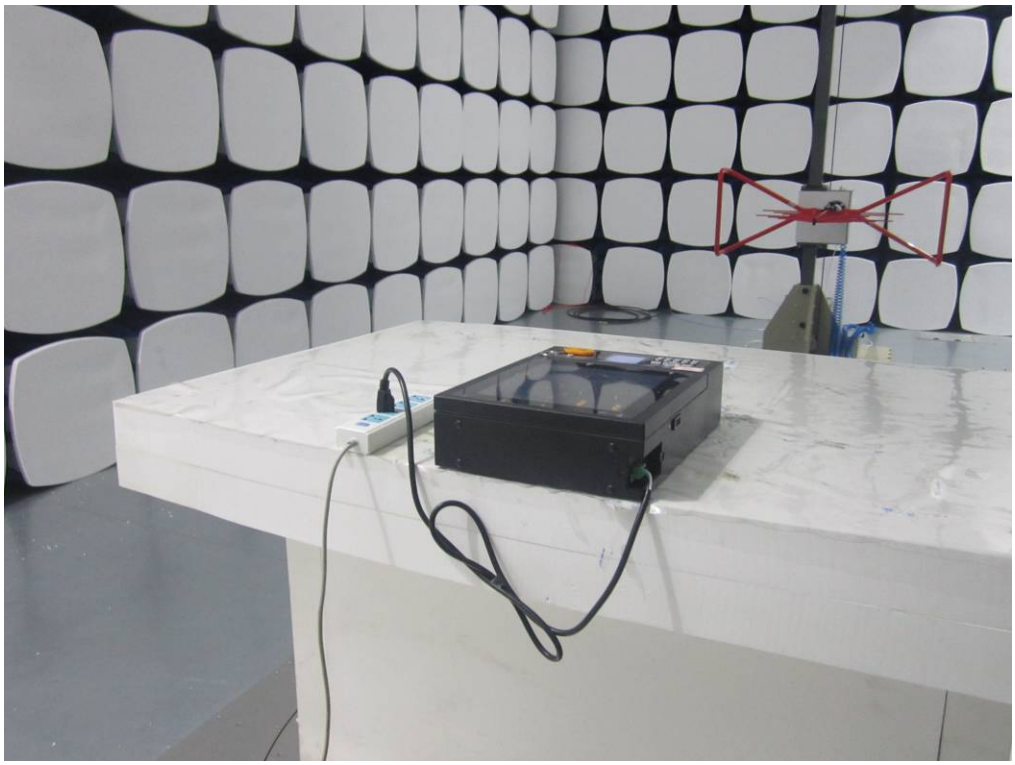
Annex B.iii. Photograph 3: Test Setup Photo

Conducted Emissions Test Setup Front View

Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Below 30 MHz - Front View



Radiated Spurious Emissions Test Setup Above 30MHz - Front View

Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

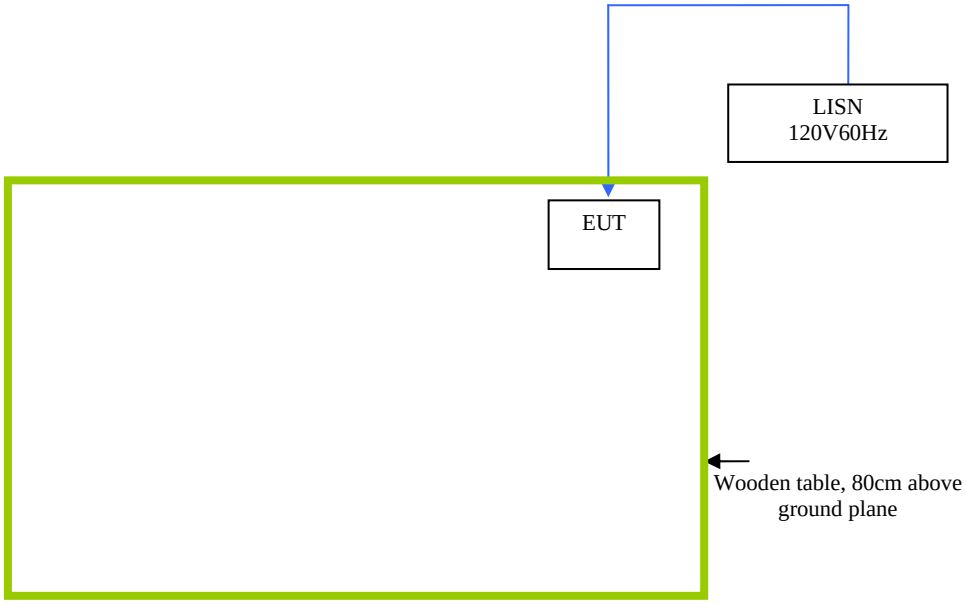
EUT TEST CONDITIONS

Annex C. i. SUPPORTING EQUIPMENT DESCRIPTION

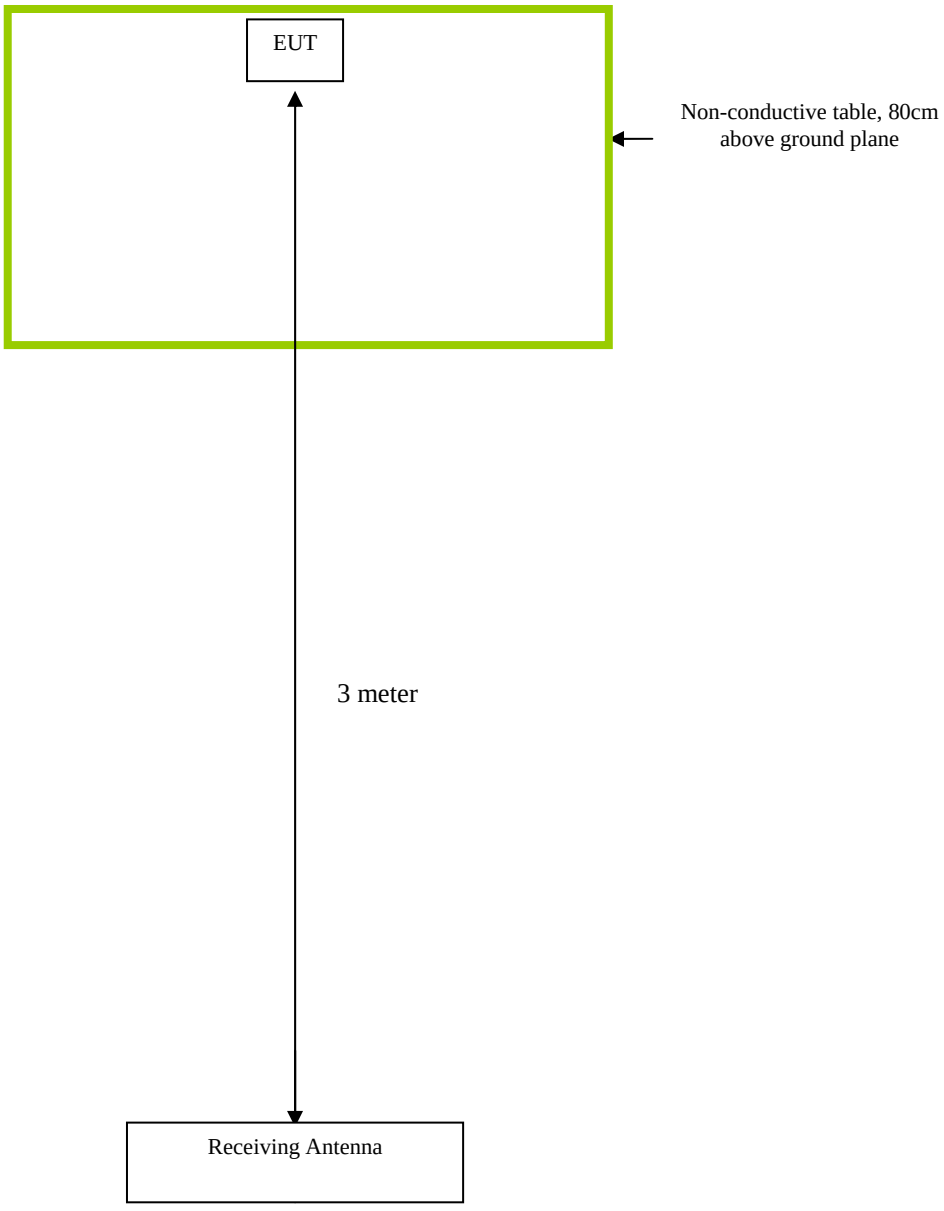
The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description (Including Brand Name)	Model	Calibration Date	Calibration Due Date
N/A	N/A	N/A	N/A	N/A

Block Configuration Diagram for AC Line 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	The EUT was continuously transmitting to stimulate the worst case.

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

Please see attachment

Annex E. DECLARATION OF SIMILARITY

N/A