

EMC TEST REPORT



Report No.: 15070303-FCC-E1

Supersede Report No.: N/A

Applicant	SynCrown Inc.	
Product Name	Mobile Thermal Printer	
Model No.	SMP-M240	
Serial No.	N/A	
Test Standard	FCC Part 15 Subpart B Class B:2014, ANSI C63.4: 2014	
Test Date	April 29 to May 06, 2015	
Issue Date	May 08, 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"/>		
Kahn Yang	Chris You	
Kahn Yang Test Engineer	Chris You 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 (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 518108

Phone: +86 0755 2601 4629801 Email: China@siemic.com.cn

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

Test Report	15070303-FCC-E1
Page	3 of 26

This page has been left blank intentionally.

CONTENTS

1. REPORT REVISION HISTORY	5
2. CUSTOMER INFORMATION	5
3. TEST SITE INFORMATION.....	5
4. EQUIPMENT UNDER TEST (EUT) INFORMATION	6
5. TEST SUMMARY	7
6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS	8
6.1 AC POWER LINE CONDUCTED EMISSIONS.....	8
6.2 RADIATED EMISSIONS	12
ANNEX A. TEST INSTRUMENT.....	16
ANNEX B. EUT AND TEST SETUP PHOTOGRAPHS.....	17
ANNEX C. TEST SETUP AND SUPPORTING EQUIPMENT.....	22
ANNEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PARTLIST	25
ANNEX E. DECLARATION OF SIMILARITY	26

1. Report Revision History

Report No.	Report Version	Description	Issue Date
15070303-FCC-E1	NONE	Original	May 08, 2015

2. Customer information

Applicant Name	SynCrown Inc.
Applicant Add	704, EnC dream-tower, 45 Gasan Digital 1st road, GeumCheon, Seoul, Korea
Manufacturer	Xiamen Hanin Electronic Technology Co., Ltd.
Manufacturer Add	Room 305A, Angye Building, Pioneering Park, Torch High-tech Zone, Xiamen 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	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT: Mobile Thermal Printer

 Main Model: SMP-M240

 Serial Model: N/A

 Date EUT received: April 28, 2015

 Test Date(s): April 29 to May 06, 2015

 Equipment Category : JBP

 Antenna Gain: Bluetooth/BLE: 2 dBi

 Type of Modulation: Bluetooth: GFSK, π /4DQPSK, 8DPSK
 BLE: GFSK

 RF Operating Frequency (ies): Bluetooth& BLE: 2402-2480 MHz

 Number of Channels: Bluetooth: 79CH
 BLE: 40CH

 Port: Power Port, USB Port

 Battery:
 Model: L002
 Spec: 7.4V 1500mAh

 Input Power: Adapter:
 Model: P6120050 US
 Input: AC 100-240V; 50/60Hz 0.2A
 Output: DC 12.0V; 0.5A

 Trade Name : SYNCROWN

 FCC ID: 2AEPCSMP-M240

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
§15.107; ANSI C63.4: 2014	AC Power Line Conducted Emissions	Compliance
§15.109; ANSI C63.4: 2014	Radiated Emissions	Compliance

Measurement Uncertainty

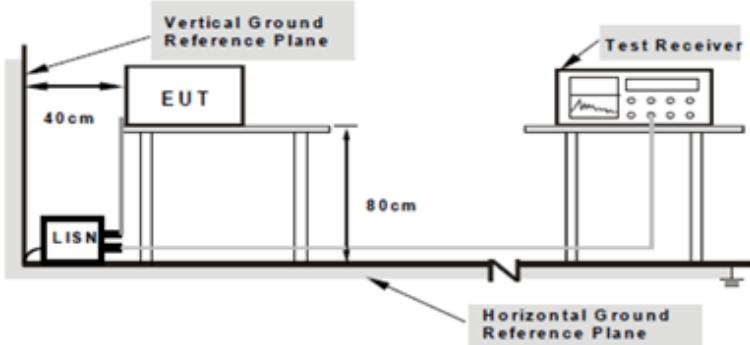
Emissions		
Test Item	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

6. Measurements, Examination And Derived Results

6.1 AC Power Line Conducted Emissions

Temperature	25°C
Relative Humidity	62%
Atmospheric Pressure	1015mbar
Test date :	April 29 to May 04, 2015
Tested By :	Kahn Yang

Requirement(s):

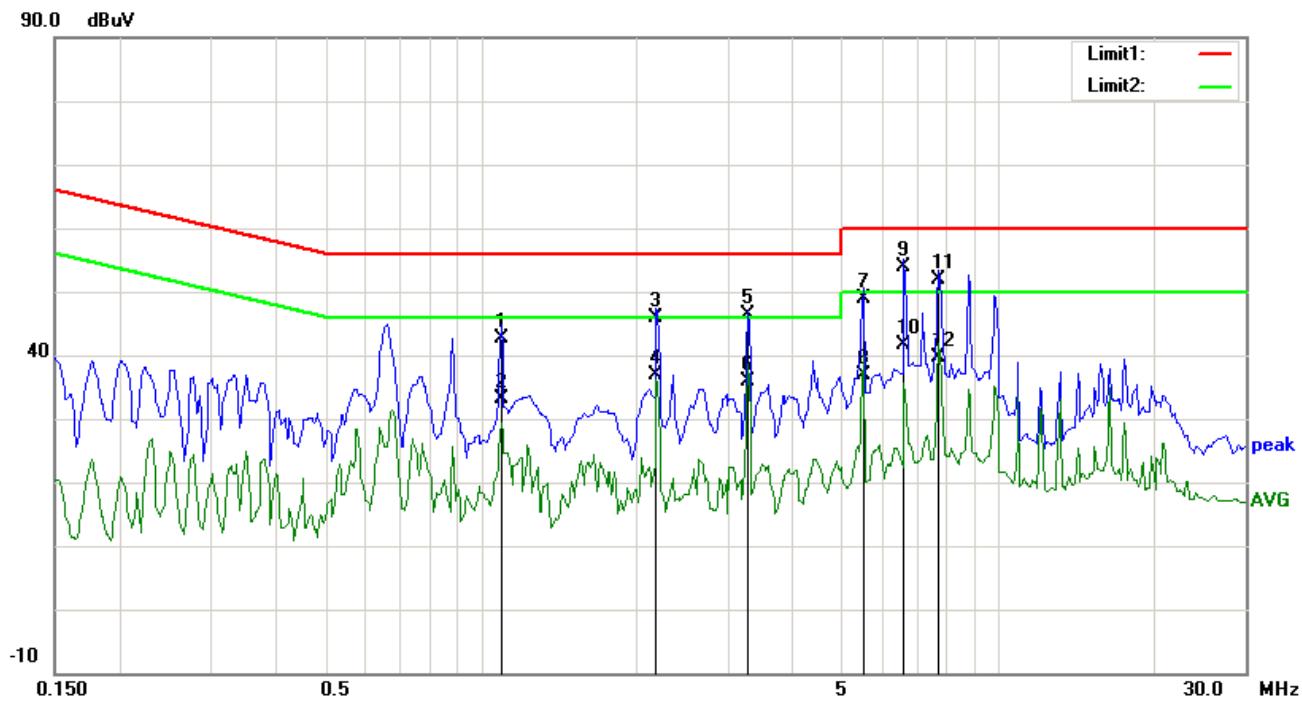
Spec	Item	Requirement	Applicable														
47CFR§15.107	a)	<p>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 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.</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency ranges (MHz)</th> <th colspan="2">Limit (dBμV)</th> </tr> <tr> <th>QP</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15 ~ 0.5</td> <td>66 – 56</td> <td>56 – 46</td> </tr> <tr> <td>0.5 ~ 5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5 ~ 30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>	Frequency ranges (MHz)	Limit (dB μ V)		QP	Average	0.15 ~ 0.5	66 – 56	56 – 46	0.5 ~ 5	56	46	5 ~ 30	60	50	<input checked="" type="checkbox"/>
Frequency ranges (MHz)	Limit (dB μ V)																
	QP	Average															
0.15 ~ 0.5	66 – 56	56 – 46															
0.5 ~ 5	56	46															
5 ~ 30	60	50															
Test Setup	 <p>The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a table. A LISN (Line Impedance Stabilization Network) is connected between the EUT and the power source. A Test Receiver is connected to the LISN. The setup is positioned on a horizontal ground reference plane. The distance between the LISN and the EUT is 40 cm, and the distance between the LISN and the Test Receiver is 80 cm. A vertical ground reference plane is also indicated.</p> <p>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.</p>																
Procedure	<ol style="list-style-type: none"> 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. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains. 																

	<ol style="list-style-type: none"> 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, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. 8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data Yes N/A

Test Plot Yes (See below) N/A

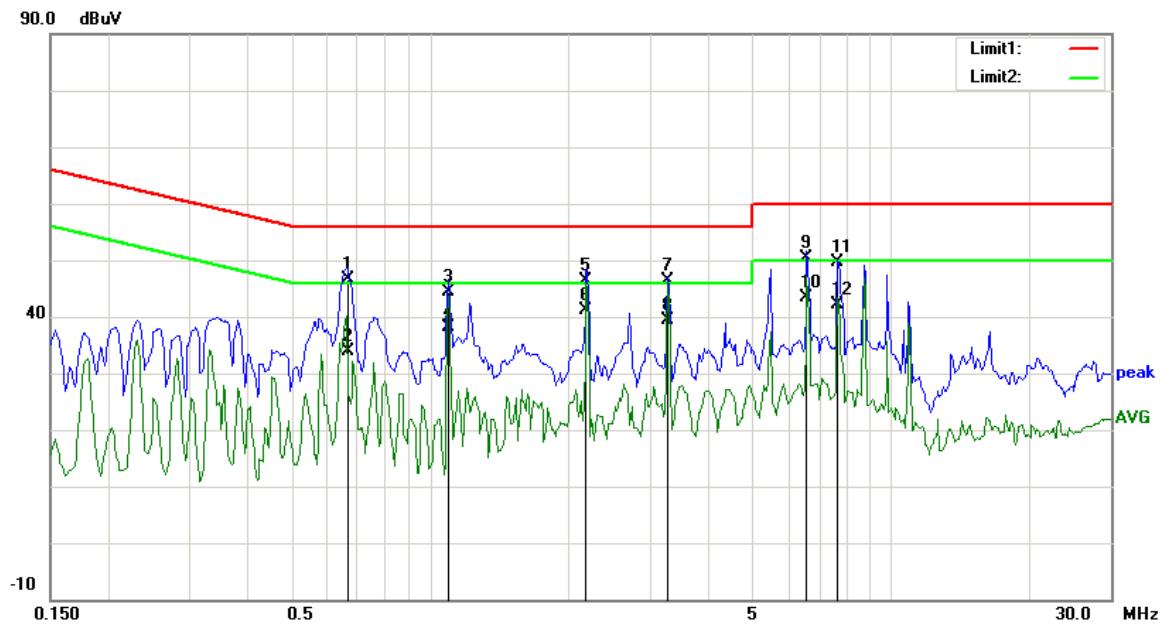
Test Mode 1: Print for USB Mode



Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dB μ V/m)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	L1	1.0953	31.35	QP	11.40	42.75	56.00	-13.25
2	L1	1.0953	21.73	AVG	11.40	33.13	46.00	-12.87
3	L1	2.1891	34.60	QP	11.40	46.00	56.00	-10.00
4	L1	2.1891	25.47	AVG	11.40	36.87	46.00	-9.13
5	L1	3.2852	34.86	QP	11.40	46.26	56.00	-9.74
6	L1	3.2852	24.43	AVG	11.40	35.83	46.00	-10.17
7	L1	5.4766	37.38	QP	11.57	48.95	60.00	-11.05
8	L1	5.4766	25.30	AVG	11.57	36.87	50.00	-13.13
9	L1	6.5703	41.88	QP	11.97	53.85	60.00	-6.15
10	L1	6.5703	29.61	AVG	11.97	41.58	50.00	-8.42
11	L1	7.6680	39.60	QP	12.36	51.96	60.00	-8.04
12	L1	7.6680	27.38	AVG	12.36	39.74	50.00	-10.26



Test Data

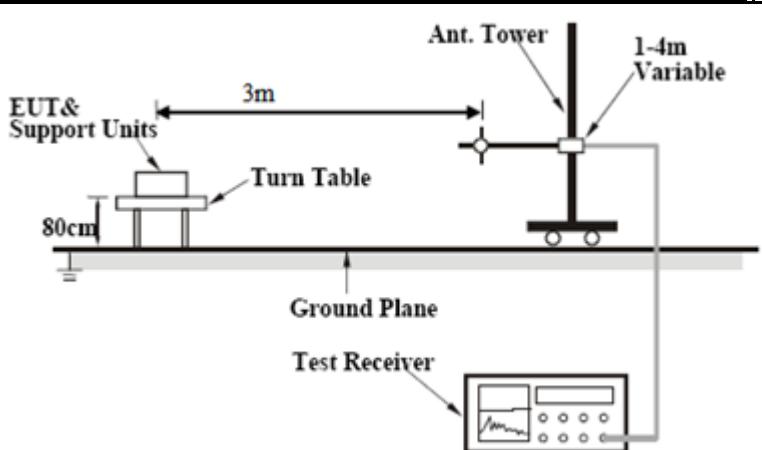
Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dB μ V/m)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	N	0.6617	34.93	QP	11.74	46.67	56.00	-9.33
2	N	0.6617	22.08	AVG	11.74	33.82	46.00	-12.18
3	N	1.0953	32.96	QP	11.41	44.37	56.00	-11.63
4	N	1.0953	26.81	AVG	11.41	38.22	46.00	-7.78
5	N	2.1891	34.87	QP	11.55	46.42	56.00	-9.58
6	N	2.1891	29.58	AVG	11.55	41.13	46.00	-4.87
7	N	3.2852	34.64	QP	11.69	46.33	56.00	-9.67
8	N	3.2852	27.62	AVG	11.69	39.31	46.00	-6.69
9	N	6.5703	38.00	QP	12.31	50.31	60.00	-9.69
10	N	6.5703	31.11	AVG	12.31	43.42	50.00	-6.58
11	N	7.6680	37.04	QP	12.59	49.63	60.00	-10.37
12	N	7.6680	29.47	AVG	12.59	42.06	50.00	-7.94

6.2 Radiated Emissions

Temperature	25°C
Relative Humidity	61%
Atmospheric Pressure	1013mbar
Test date :	May 06, 2015
Tested By :	Kahn Yang

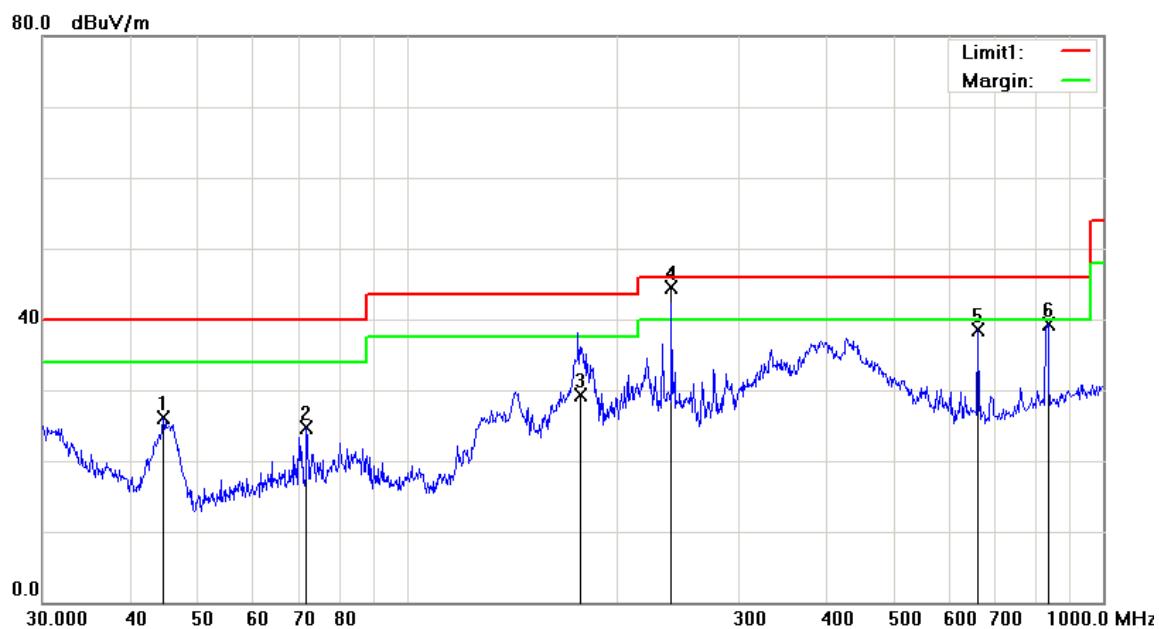
Requirement(s):

Spec	Item	Requirement	Applicable										
47CFR§15. 107(d)	a)	<p>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</p> <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (μV/m)</th> </tr> </thead> <tbody> <tr> <td>30 – 88</td> <td>100</td> </tr> <tr> <td>88 – 216</td> <td>150</td> </tr> <tr> <td>216 – 960</td> <td>200</td> </tr> <tr> <td>Above 960</td> <td>500</td> </tr> </tbody> </table>	Frequency range (MHz)	Field Strength (μ V/m)	30 – 88	100	88 – 216	150	216 – 960	200	Above 960	500	<input checked="" type="checkbox"/>
Frequency range (MHz)	Field Strength (μ V/m)												
30 – 88	100												
88 – 216	150												
216 – 960	200												
Above 960	500												
Test Setup		 <p>The diagram illustrates the test setup for radiated emissions. A 'Turn Table' is positioned on a 'Ground Plane'. An 'EUT & Support Units' is placed on the turn table, with a vertical distance of '80cm' indicated. A '3m' horizontal distance is marked between the EUT and a '1-4m Variable' height 'Ant. Tower'. The 'Ant. Tower' is connected to a 'Test Receiver'.</p>											
Procedure		<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterization. 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"> Vertical or horizontal polarization (whichever gave the higher emission level) 											

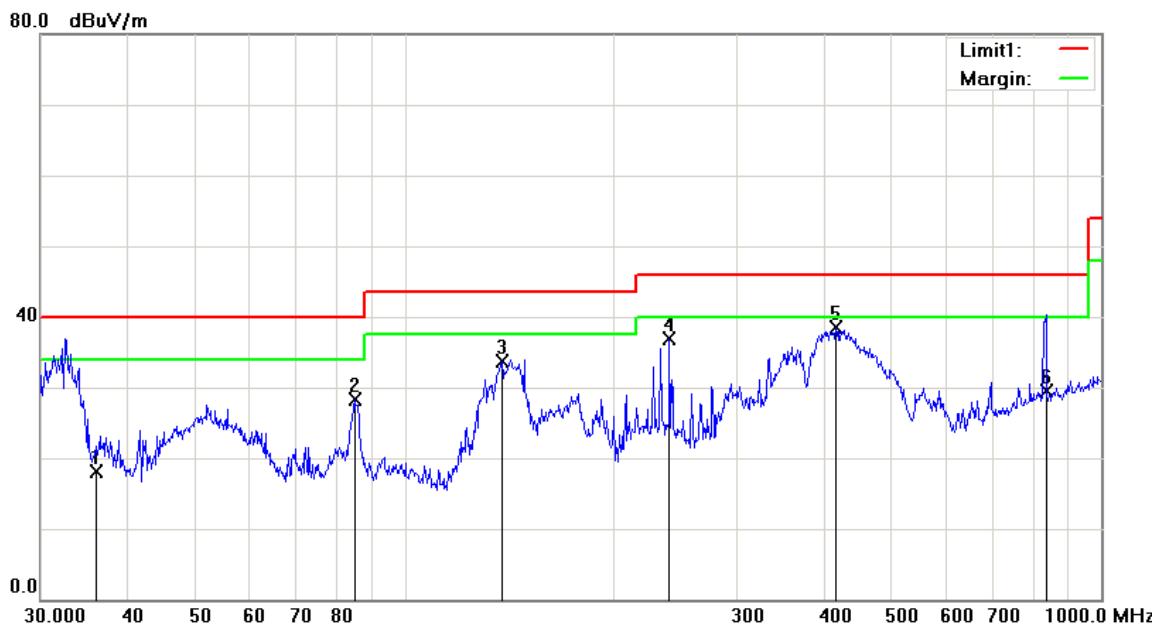
	<p>over a full rotation of the EUT) was chosen.</p> <p>b. The EUT was then rotated to the direction that gave the maximum emission.</p> <p>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</p> <p>3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.</p> <p>4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz.</p> <p>The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth with Peak detection for Average Measurement as below at frequency above 1GHz.</p> <ul style="list-style-type: none"> ■ 1 kHz (Duty cycle < 98%) <input type="checkbox"/> 10 Hz (Duty cycle > 98%) <p>5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</p>
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 1: Print for USB Mode
(Below 1GHz)

Test Data
Horizontal Polarity Plot @3m

No.	P/L	Frequency (MHz)	Reading (dB μ V/m)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Degree (°)
1	H	44.7434	26.78	peak	-0.71	26.07	40.00	-13.93	200	210
2	H	71.8320	38.27	peak	-13.66	24.61	40.00	-15.39	200	248
3	H	177.3052	39.04	QP	-9.67	29.37	43.50	-14.13	100	243
4	H	239.9933	53.58	QP	-9.10	44.48	46.00	-1.52	100	161
5	H	661.1505	37.60	peak	0.93	38.53	46.00	-7.47	200	252
6	H	833.3171	35.73	peak	3.61	39.34	46.00	-6.66	100	119



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency (MHz)	Reading (dB μ V/m)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Degree (°)
1	V	36.1500	22.96	QP	-4.79	18.17	40.00	-21.83	100	244
2	V	84.7019	42.01	peak	-13.75	28.26	40.00	-11.74	111	360
3	V	137.9029	40.87	peak	-7.13	33.74	43.50	-9.76	100	151
4	V	239.9873	44.27	peak	-7.30	36.97	46.00	-9.03	200	284
5	V	416.1791	42.11	peak	-3.60	38.51	46.00	-7.49	100	215
6	V	832.5099	25.66	QP	3.84	29.50	46.00	-16.50	100	211

Note: The above 1GHz frequency was pre-scanned and the result which was 20dB lower than the limit line per 15.109 was not recorded.

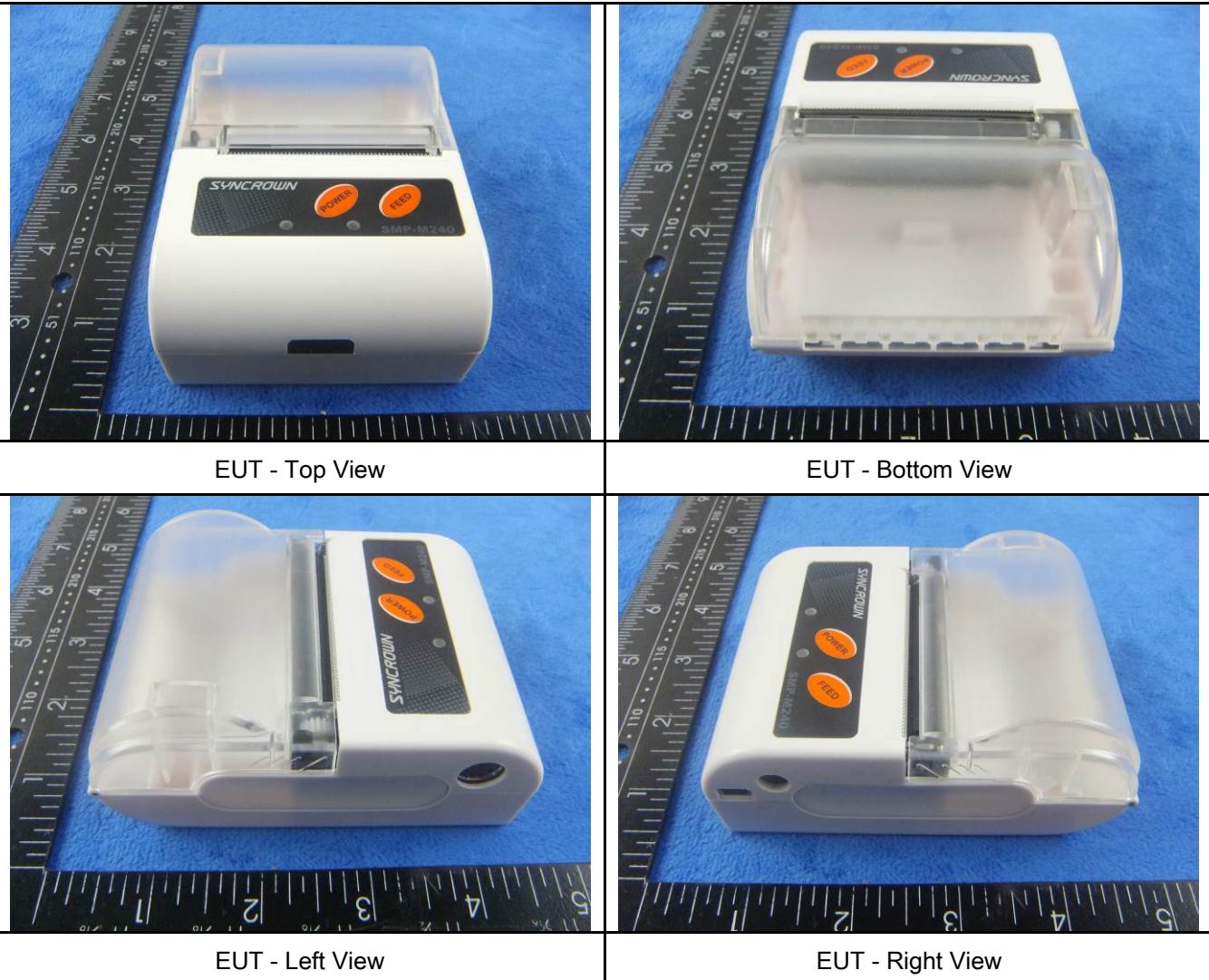
Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
Line Impedance Stabilization Network	LI-125A	191106	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>
Line Impedance Stabilization Network	LI-125A	191107	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>
LISN	ISN T800	34373	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>
Transient Limiter	LIT-153	531118	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
Radiated Emissions					
EMI test receiver	ESL6	100262	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
Microwave Preamplifier (1~26.5GHz)	8449B	3008A02402	03/25/2015	03/24/2016	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/22/2014	09/21/2015	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna	AH-118	71259	09/25/2014	09/24/2015	<input checked="" type="checkbox"/>

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo



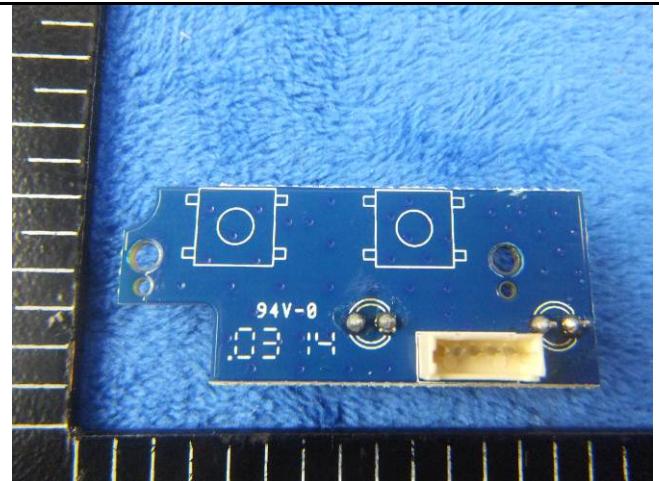


Annex B.ii. Photograph: EUT Internal Photo



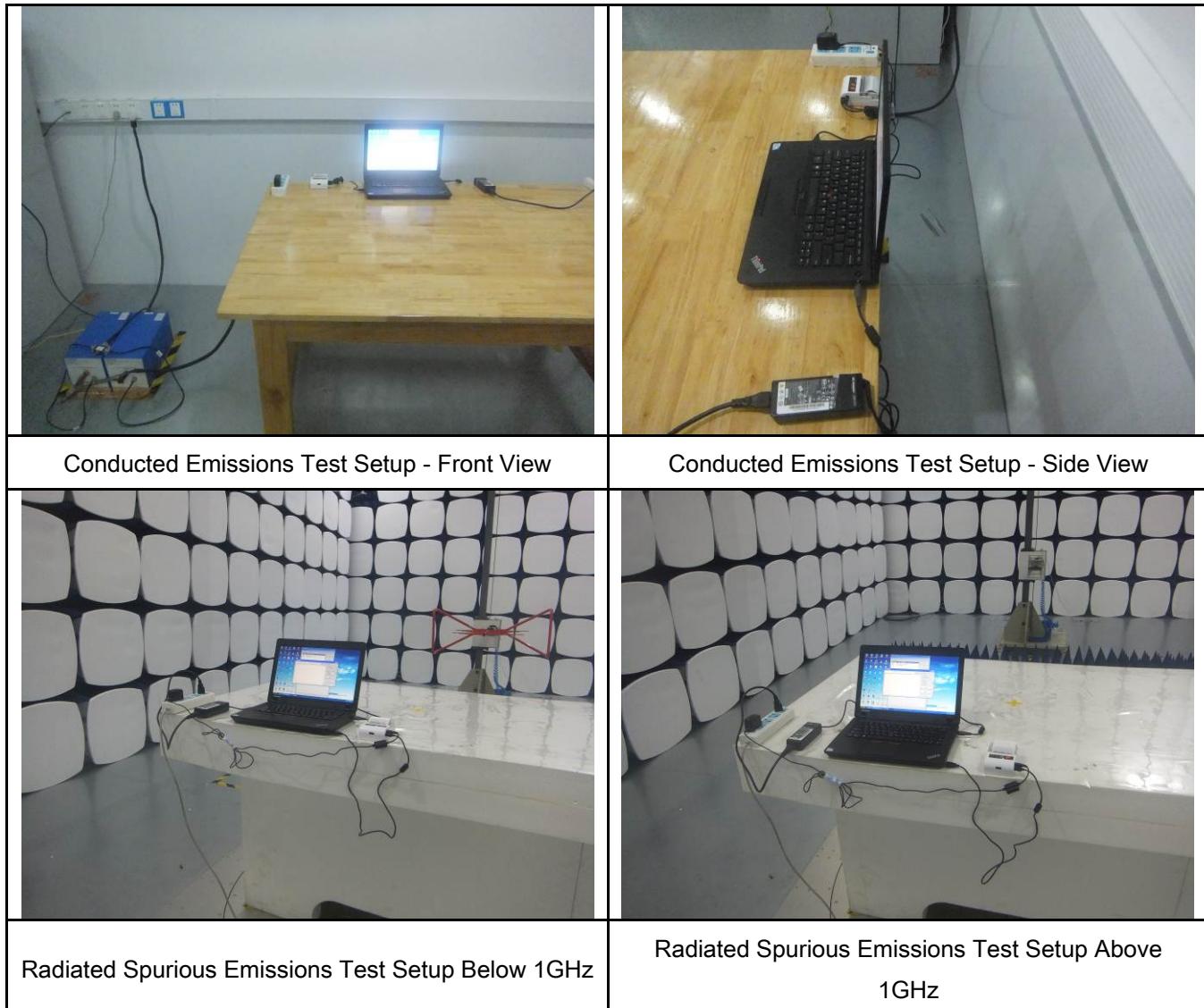


Mainborad 2 - Front View



Mainborad 2 - Rear View

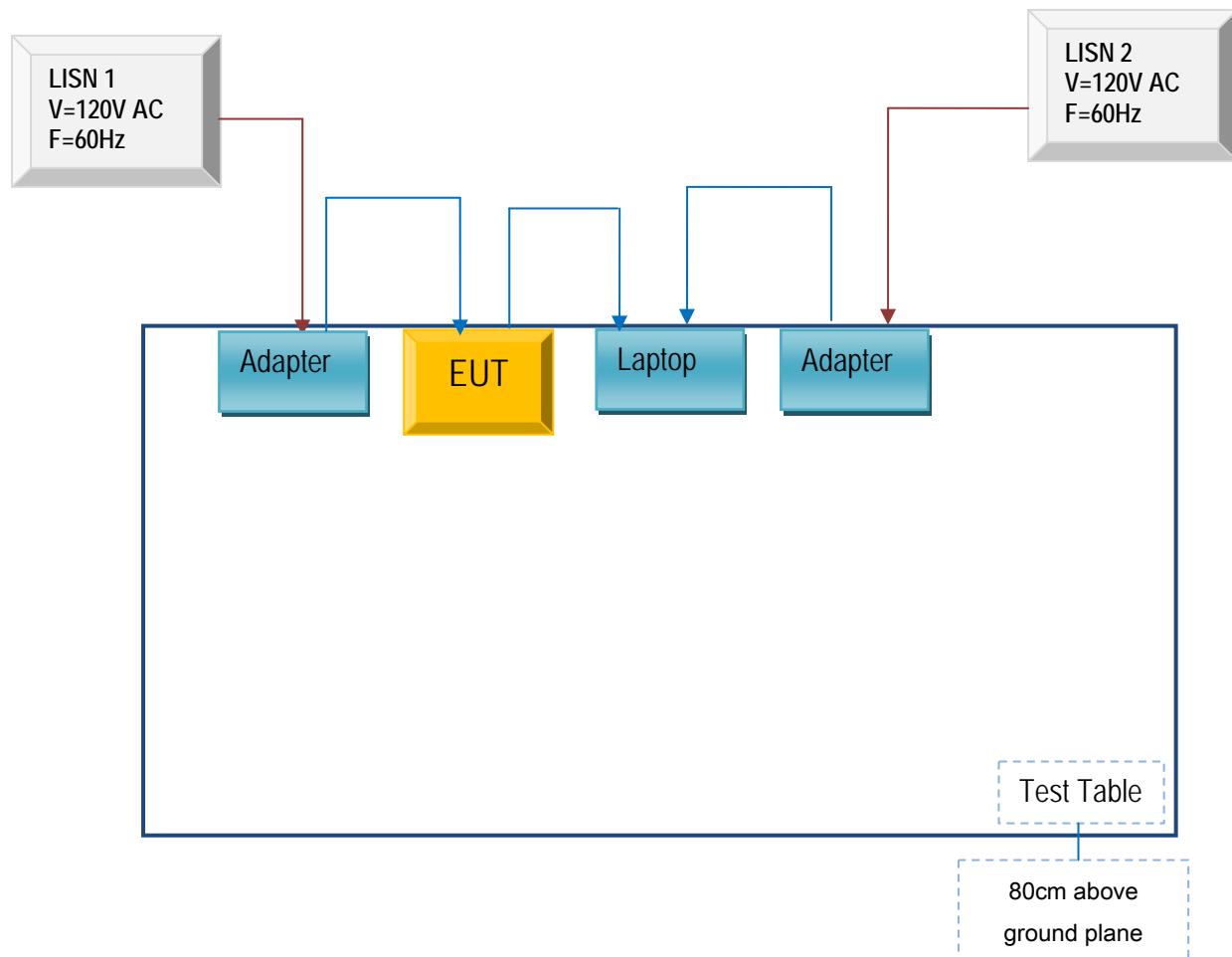
Annex B.iii. Photograph: Test Setup Photo



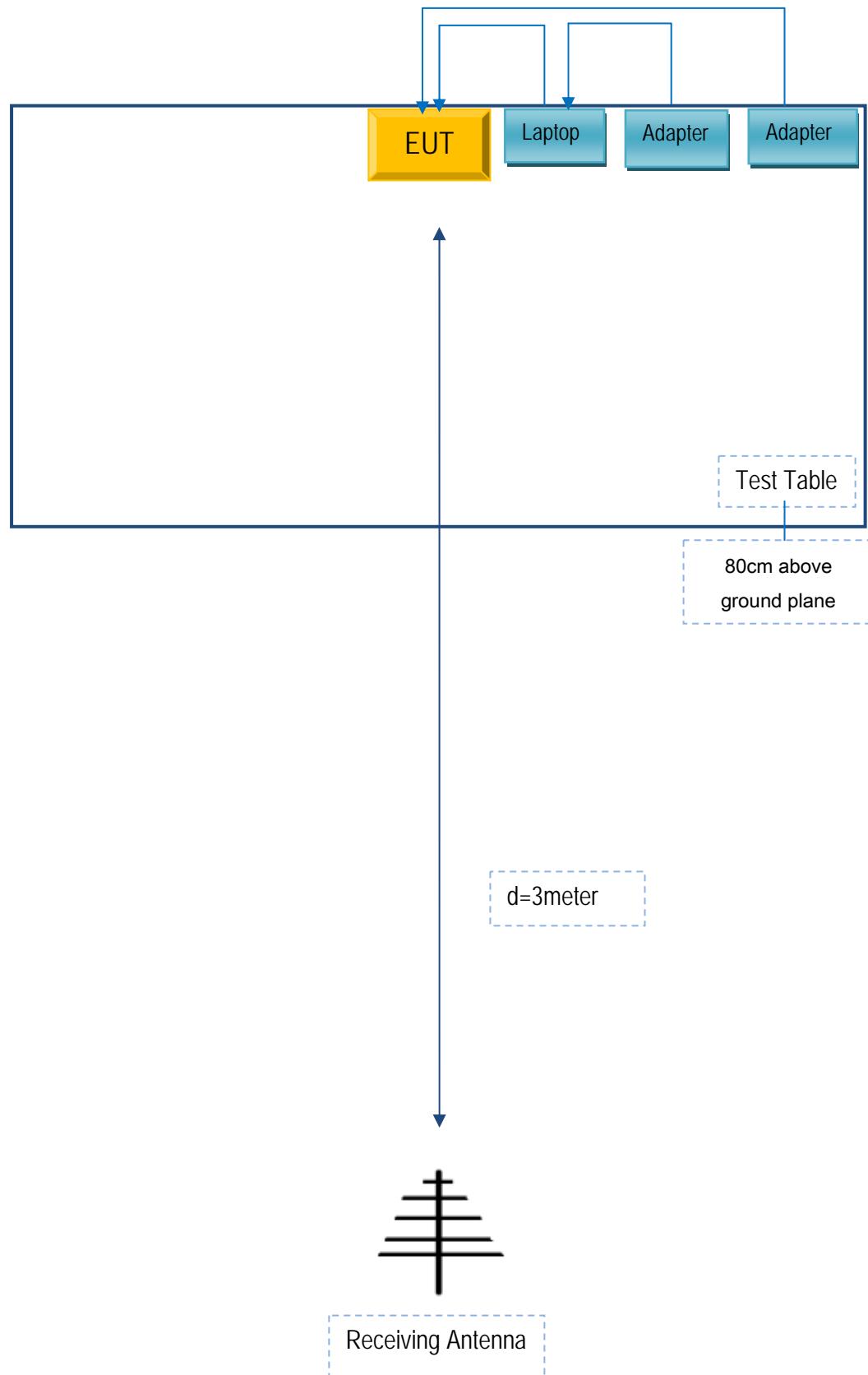
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. 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	Calibration Due Date
Lenovo	Lenovo Laptop	E40& 0579A52	N/A	N/A

Test Report	15070303-FCC-E1
Page	25 of 26

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

Please see Attachment

Test Report	15070303-FCC-E1
Page	26 of 26

Annex E. DECLARATION OF SIMILARITY

N/A