

# EMC TEST REPORT



Report No.: 15050009-FCC-E

Applicant	Collage Investments LLC	
Product Name	Mobile Phone	
Model No.	LK700	
Serial No.	N/A	
Test Standard	FCC Part 15 Subpart B Class B:2014, ANSI C63.4: 2014	
Test Date	May 28 to June 02, 2015	
Issue Date	Juen 03, 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"/>
Lucifer He	Chris You	
Lucifer He Test Engineer	Chris You Checked By	
<p>This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only</p>		

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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## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
15050009-FCC-E	NONE	Original	Juen 03, 2015

## 2. Customer information

Applicant Name	Collage Investments LLC
Applicant Add	11437 NW 34 STREET Doral Florida United States 33178
Manufacturer	ZHENGZHOU SPEED COMMUNICATION EQUIPMEINT CO.,LTD
Manufacturer Add	6F, Tianzhan Building, Tairan 4th Rd, Chegongmiao, Futian District, Shenzhen, 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 Phone
Main Model:	LK700
Serial Model:	N/A
Date EUT received:	May 13, 2015
Test Date(s):	May 28 to June 02, 2015
Equipment Category :	JBP
Antenna Gain:	GSM850:1.24dBi PCS1900: -3.61dBi UMTS-FDD Band V: 0.65dBi Bluetooth: 0.5dBi
Type of Modulation:	GSM / GPRS: GMSK EGPRS: GMSK, 8PSK UMTS-FDD: QPSK, 16QAM Bluetooth: GFSK, π /4DQPSK, 8DPSK
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 UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz Bluetooth: 2402-2480 MHz
Number of Channels:	GSM 850: 124CH PCS1900: 299CH UMTS-FDD Band V : 102CH Bluetooth: 79CH
Port:	Earphone Port, USB Port
Input Power:	Battery:

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Model: F161

Spec: 3.7V 1000mAh

Charger Max Voltage:4.3V

Adapter:

Model: LK700

Input: AC 100-240V; 50/60Hz 0.15A Max

Output: DC5.0V; 500mA

Trade Name : LIKUID

GPRS/EGPRS Multi-slot class 8/10/12

FCC ID: GAO-LK700

## 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

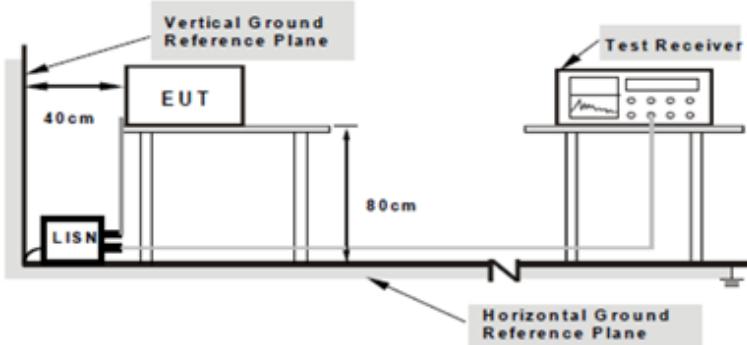
Emissions		
Test Item	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

## 6. Measurements, Examination And Derived Results

### 6.1 AC Power Line Conducted Emissions

Temperature	21°C
Relative Humidity	55%
Atmospheric Pressure	1028mbar
Test date :	May 28, 2015
Tested By :	Lucifer He

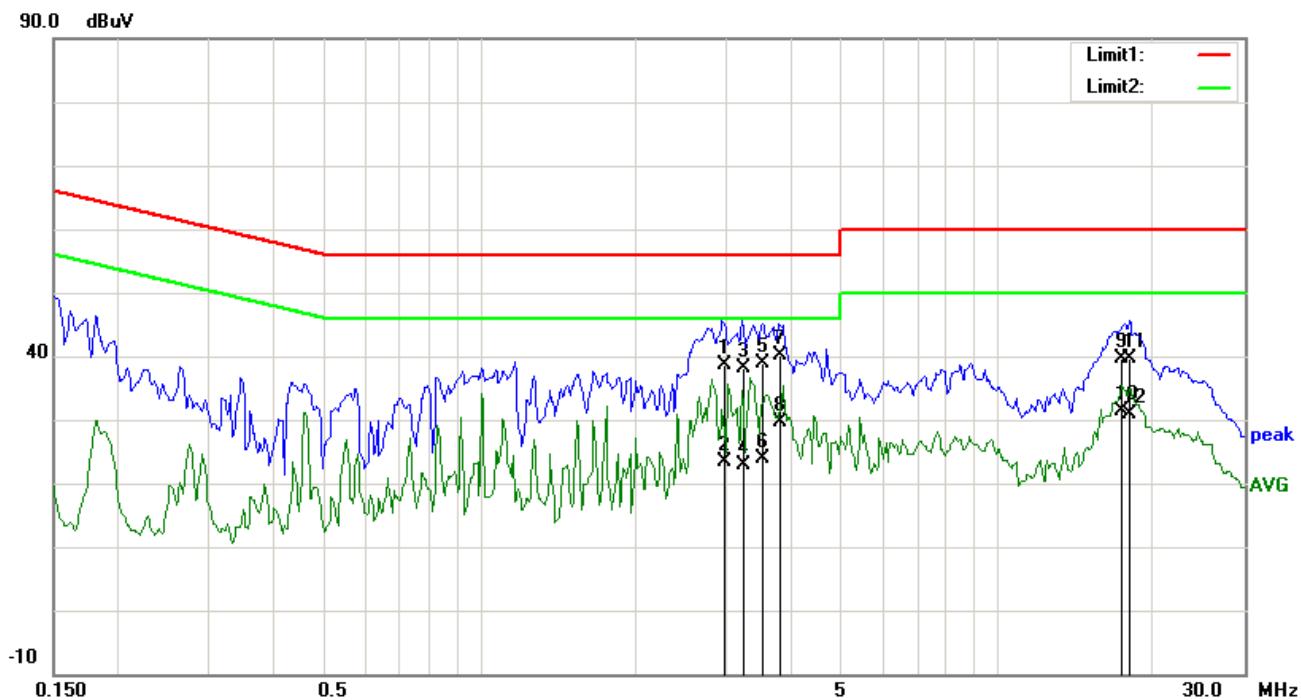
#### Requirement(s):

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 (dB<math>\mu</math>V)</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 $\mu$ 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 $\mu$ 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. A 'Vertical Ground Reference Plane' is shown as a horizontal line. A 'Horizontal Ground Reference Plane' is shown as a thick horizontal line at the bottom. An 'EUT' (Equipment Under Test) is a rectangular box connected to a 'LISN' (Line Impedance Stabilization Network) at the bottom. The LISN is connected to a 'Test Receiver' which is also connected to the ground reference plane. A '40 cm' dimension is shown between the LISN and the EUT. A '80 cm' dimension is shown between the LISN and the Test Receiver. Arrows point from the text labels to their respective components in the diagram.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Support units were connected to second LISN.</li> <li>2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</li> </ol>																
Procedure	<ol style="list-style-type: none"> <li>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.</li> <li>2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</li> </ol>																

	<ol style="list-style-type: none"> <li>3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>4. All other supporting equipment were powered separately from another main supply.</li> <li>5. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>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.</li> <li>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.</li> <li>8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).</li> </ol>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

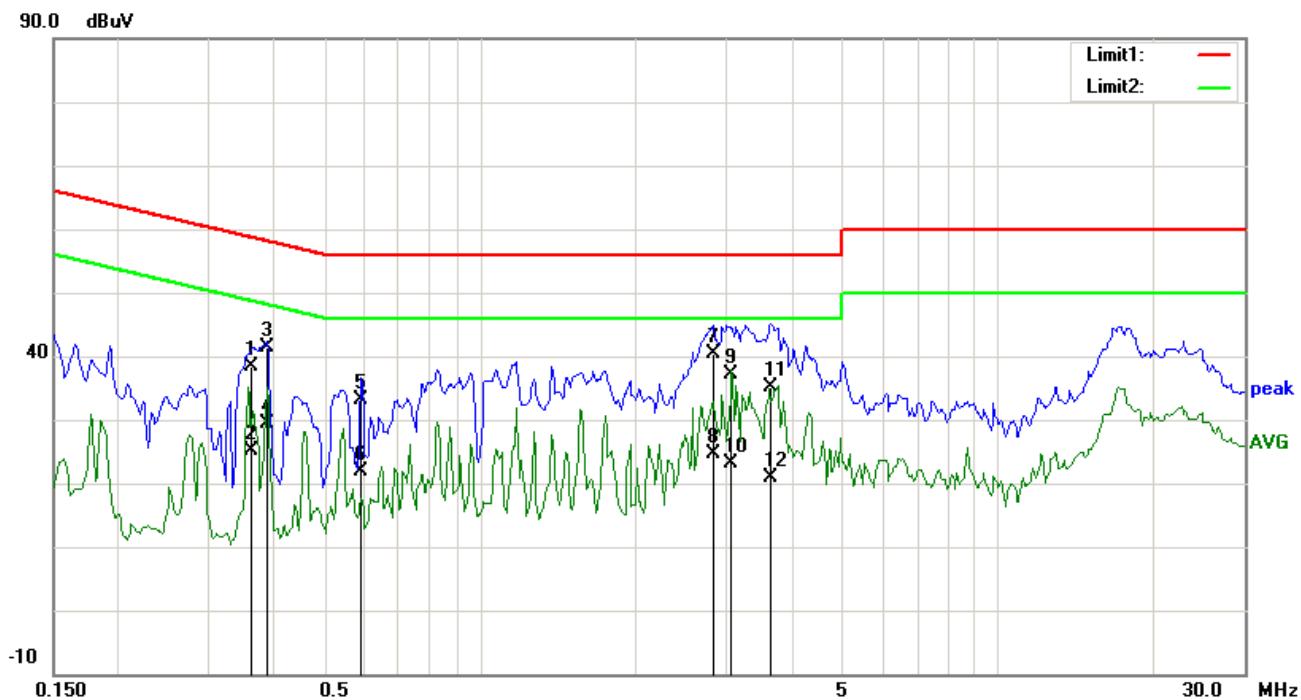
Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

**Test Mode 1: USB Mode**

**Test Data**

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
1	L1	2.9619	27.15	QP	11.40	38.55	56.00	-17.45	
2	L1	2.9619	12.10	AVG	11.40	23.50	46.00	-22.50	
3	L1	3.2239	26.78	QP	11.40	38.18	56.00	-17.82	
4	L1	3.2239	11.47	AVG	11.40	22.87	46.00	-23.13	
5	L1	3.5195	27.50	QP	11.40	38.90	56.00	-17.10	
6	L1	3.5195	12.42	AVG	11.40	23.82	46.00	-22.18	
7	L1	3.8398	28.72	QP	11.40	40.12	56.00	-15.88	
8	L1	3.8398	18.35	AVG	11.40	29.75	46.00	-16.25	
9	L1	17.3826	25.05	QP	14.60	39.65	60.00	-20.35	
10	L1	17.3826	16.89	AVG	14.60	31.49	50.00	-18.51	
11	L1	18.0234	24.92	QP	14.72	39.64	60.00	-20.36	
12	L1	18.0234	16.19	AVG	14.72	30.91	50.00	-19.09	

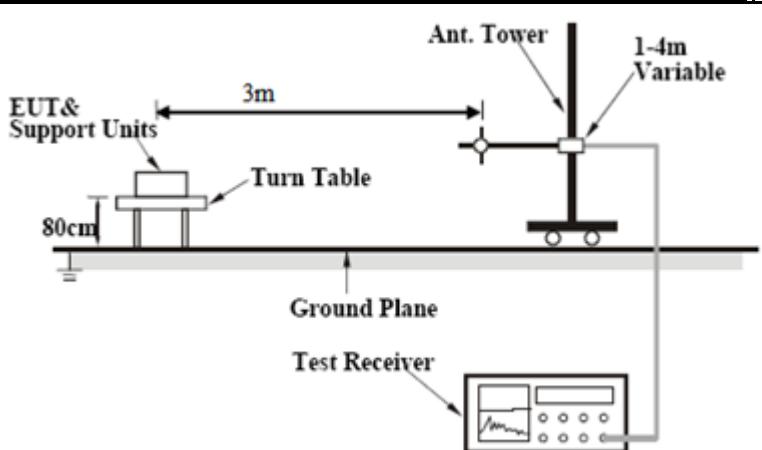
**Test Mode 1: USB Mode**

**Test Data**
**Phase Neutral Plot at 120Vac, 60Hz**

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
1	N	0.3615	25.89	QP	12.41	38.30	58.69	-20.39	
2	N	0.3615	12.80	AVG	12.41	25.21	48.69	-23.48	
3	N	0.3883	28.96	QP	12.31	41.27	58.10	-16.83	
4	N	0.3883	16.97	AVG	12.31	29.28	48.10	-18.82	
5	N	0.5914	21.26	QP	11.81	33.07	56.00	-22.93	
6	N	0.5914	10.10	AVG	11.81	21.91	46.00	-24.09	
7	N	2.8336	28.85	QP	11.63	40.48	56.00	-15.52	
8	N	2.8336	13.01	AVG	11.63	24.64	46.00	-21.36	
9	N	3.0703	25.59	QP	11.66	37.25	56.00	-18.75	
10	N	3.0703	11.40	AVG	11.66	23.06	46.00	-22.94	
11	N	3.6523	23.36	QP	11.73	35.09	56.00	-20.91	
12	N	3.6523	9.18	AVG	11.73	20.91	46.00	-25.09	

## 6.2 Radiated Emissions

Temperature	21°C
Relative Humidity	55%
Atmospheric Pressure	1028mbar
Test date :	May 28, 2015
Tested By :	Lucifer He

### 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 (<math>\mu</math>V/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 ( $\mu$ V/m)	30 – 88	100	88 – 216	150	216 – 960	200	Above 960	500	<input checked="" type="checkbox"/>
Frequency range (MHz)	Field Strength ( $\mu$ V/m)												
30 – 88	100												
88 – 216	150												
216 – 960	200												
Above 960	500												
Test Setup		 <p>The diagram illustrates the test setup. A 'Turn Table' is positioned on a 'Ground Plane'. An 'EUT &amp; Support Units' is mounted on the turn table at a height of 80cm. A '3m' horizontal distance separates the EUT from an 'Ant. Tower'. The 'Ant. Tower' is mounted on a vertical post and is connected to a 'Test Receiver' via a cable. The 'Ant. Tower' has a '1-4m Variable' height adjustment mechanism.</p>											
Procedure		<ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>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"> <li>Vertical or horizontal polarization (whichever gave the higher emission level)</li> </ol> </li> </ol>											

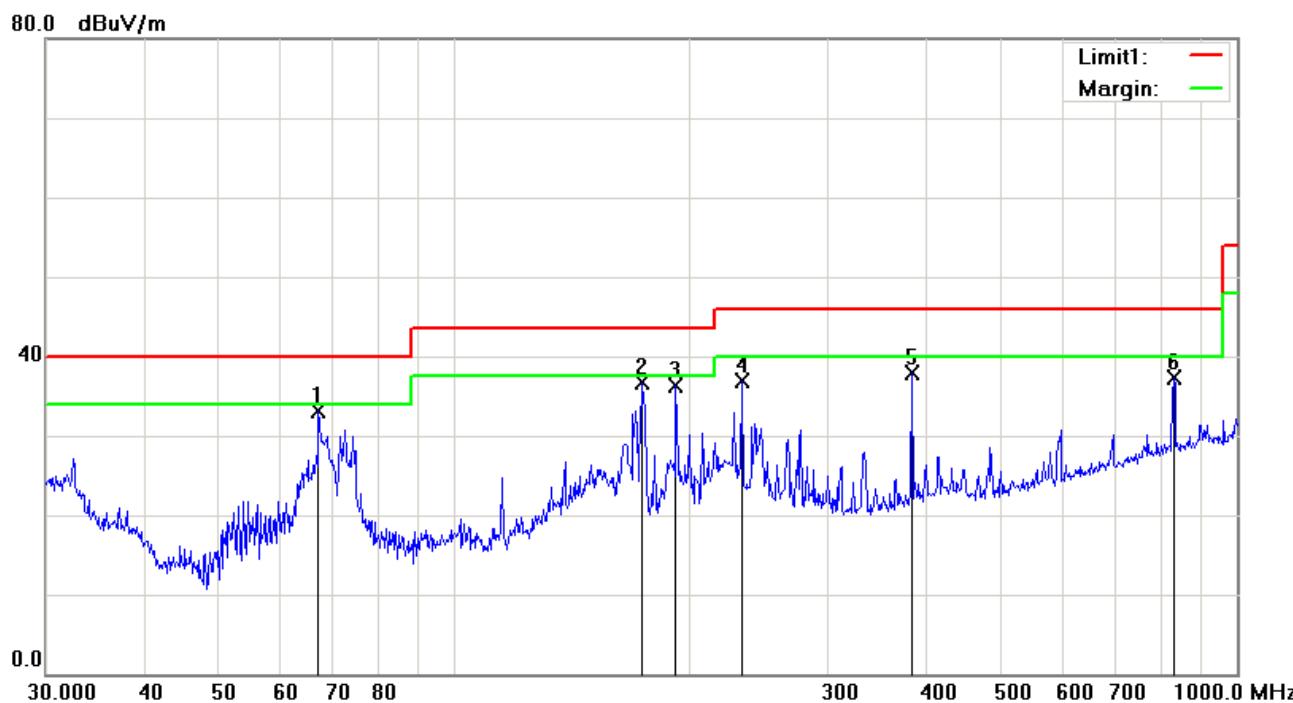
	<p>over a full rotation of the EUT) was chosen.</p> <p>b. The EUT was then rotated to the direction that gave the maximum emission.</p> <p>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</p> <p>3. The resolution bandwidth and video bandwidth of test receiver/spectrum 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"> <li>■ 1 kHz (Duty cycle &lt; 98%) <input type="checkbox"/> 10 Hz (Duty cycle &gt; 98%)</li> </ul> <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: **USB Mode**

**Below 1GHz**



**Test Data**

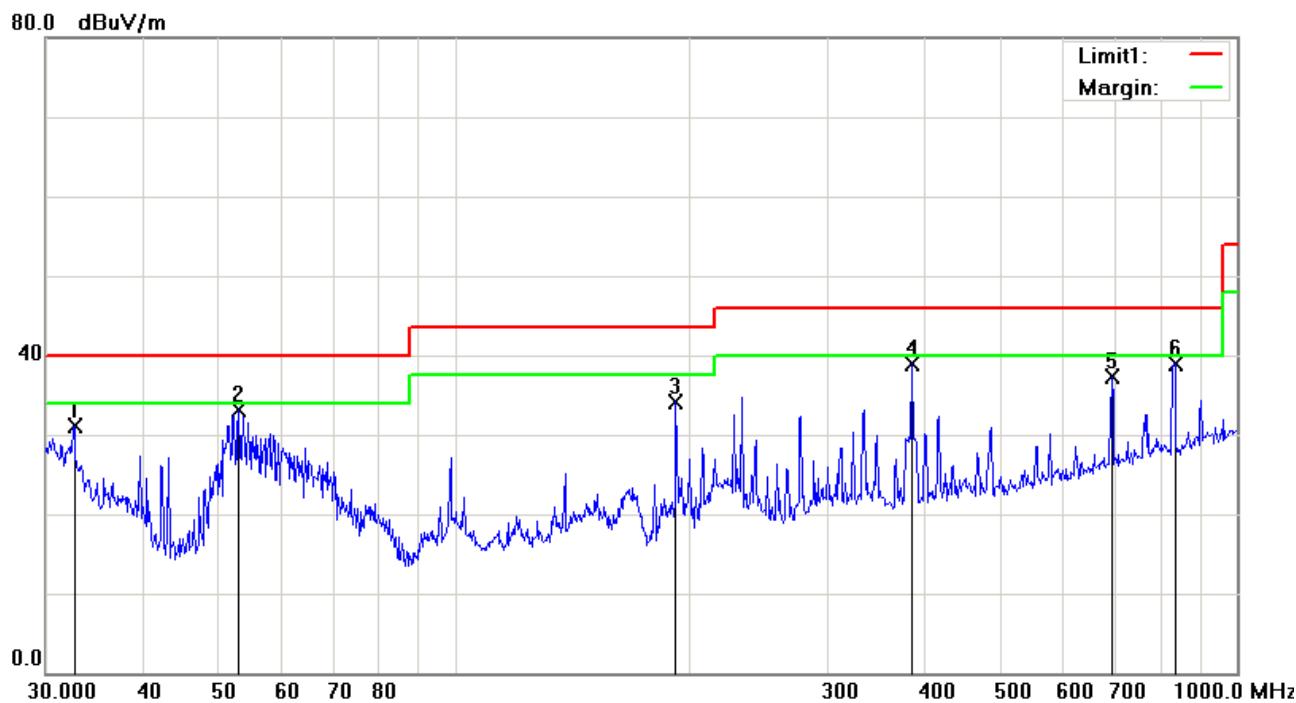
**Horizontal Polarity Plot @3m**

No.	P/L	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree ( )	Comment
1	H	66.9669	46.84	peak	-13.82	33.02	40.00	-6.98	100	177	
2	H	173.8135	46.04	peak	-9.41	36.63	43.50	-6.87	100	252	
3	H	191.7450	45.48	peak	-9.14	36.34	43.50	-7.16	100	121	
4	H	233.3487	45.95	peak	-9.04	36.91	46.00	-9.09	100	113	
5	H	383.9318	42.65	peak	-4.67	37.98	46.00	-8.02	100	53	
6	H	830.4002	33.81	peak	3.57	37.38	46.00	-8.62	200	201	

**Above 1GHz**

*Note: The frequency that above 1GHz is mainly from the environment noise.*

**Below 1GHz**



**Test Data**

**Vertical Polarity Plot @3m**

No.	P/L	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree ( )	Comment
1	V	32.6340	33.31	peak	-2.20	31.11	40.00	-8.89	200	42	
2	V	52.9453	46.60	peak	-13.52	33.08	40.00	-6.92	100	108	
3	V	191.7450	43.23	peak	-9.14	34.09	43.50	-9.41	200	177	
4	V	383.9318	43.49	peak	-4.67	38.82	46.00	-7.18	100	160	
5	V	691.9867	35.93	peak	1.28	37.21	46.00	-8.79	200	162	
6	V	833.3171	35.27	peak	3.61	38.88	46.00	-7.12	200	203	

**Above 1GHz**

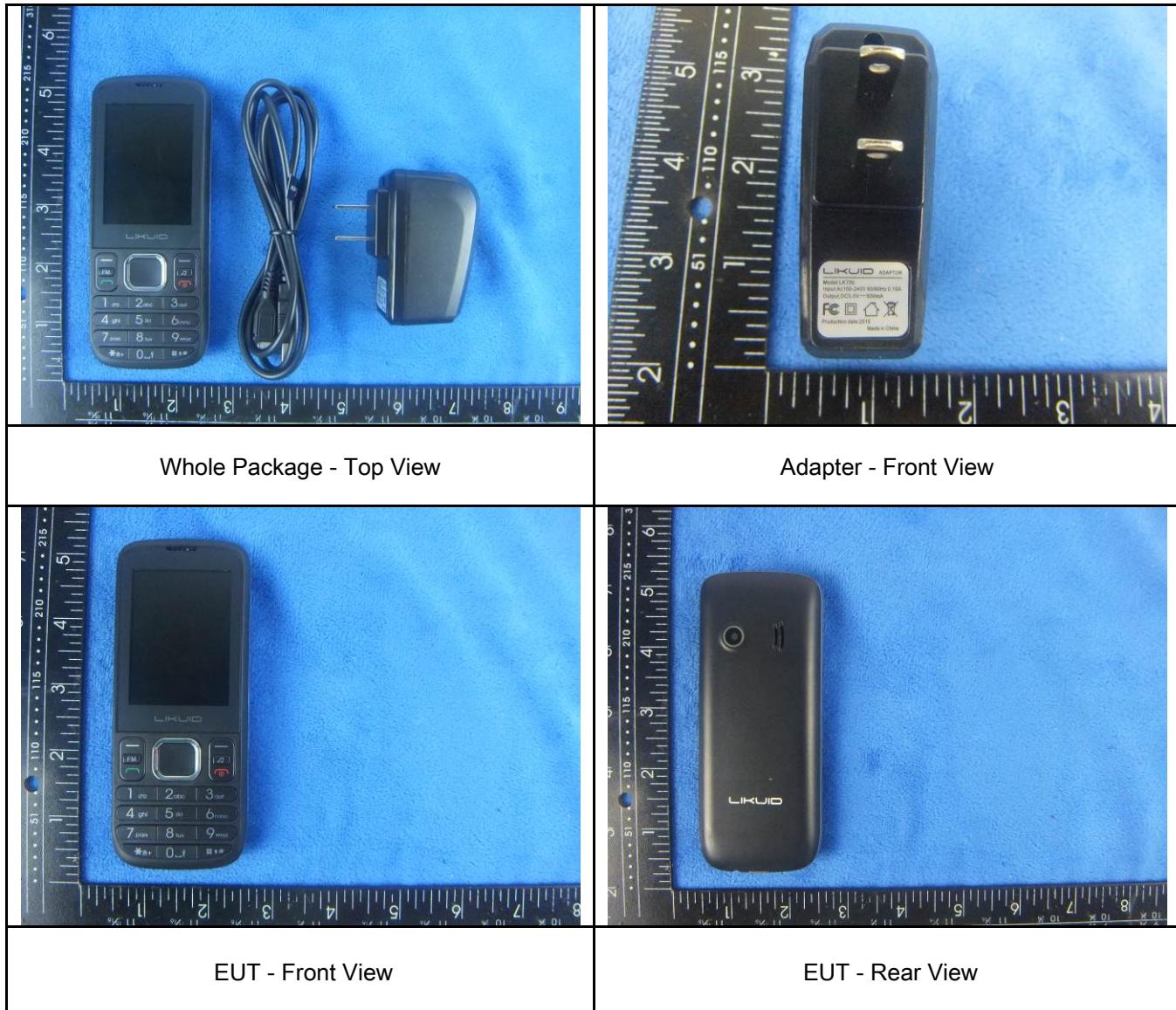
*Note: The frequency that above 1GHz is mainly from the environment noise.*

## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>AC Line Conducted Emissions</b>					
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"/>
<b>Radiated Emissions</b>					
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





EUT - Top View



EUT - Bottom View

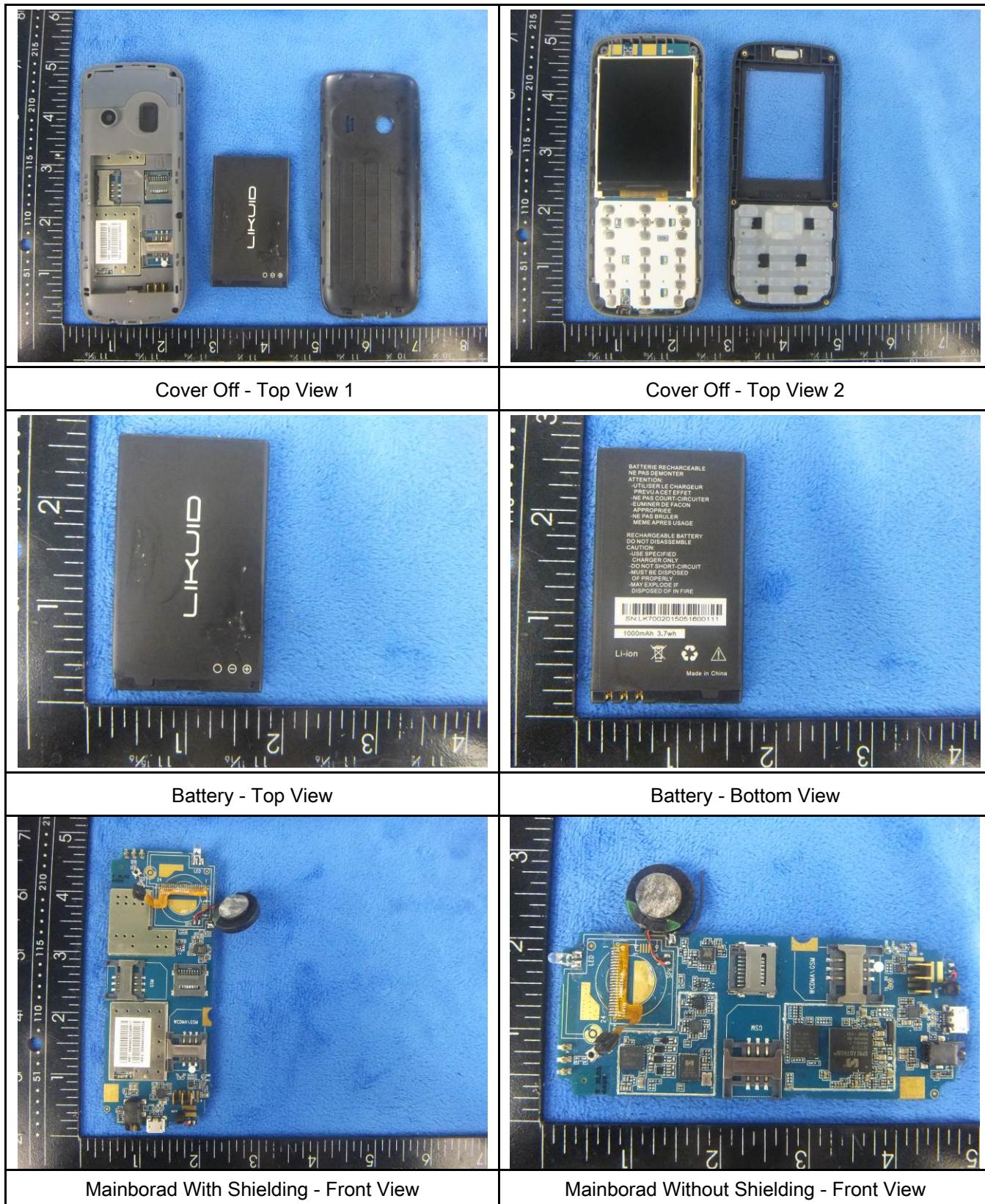


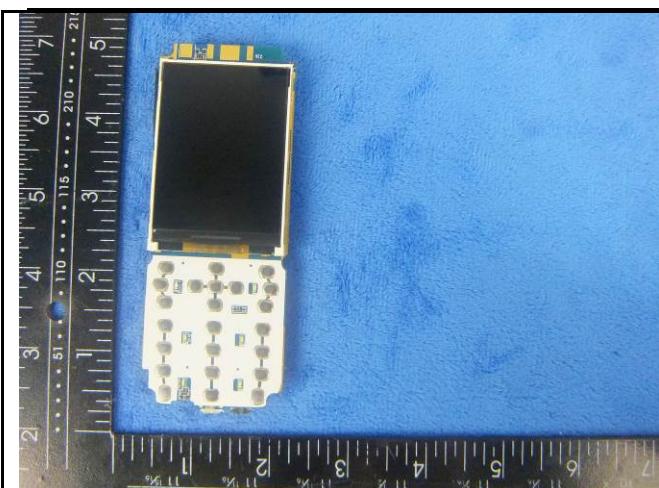
EUT - Left View



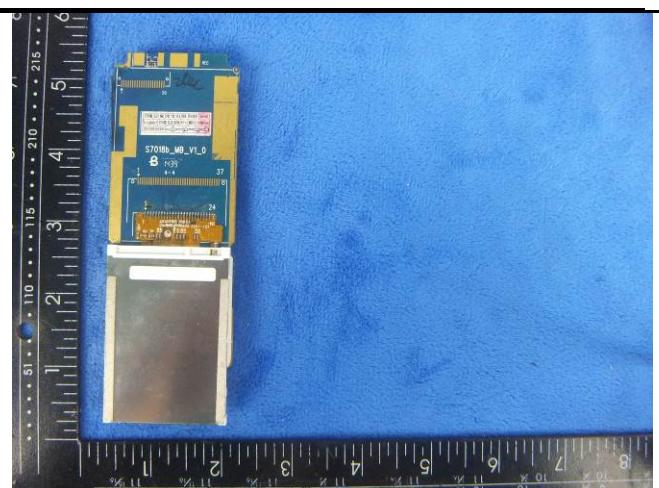
EUT - Right View

**Annex B.ii. Photograph: EUT Internal Photo**

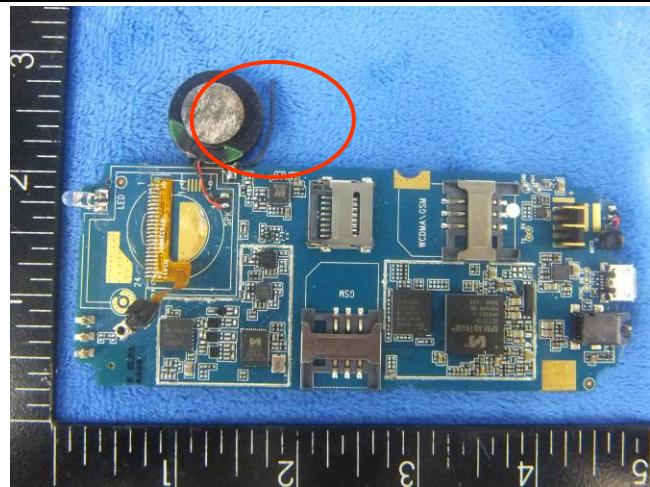




Mainborad With Shielding - rear View



Mainborad Without Shielding - rear View

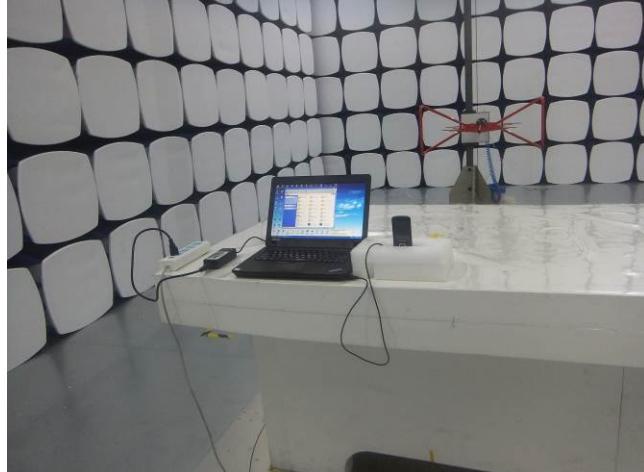


BT - Antenna View



GSM/PCS/UMTS-FDD Antenna View

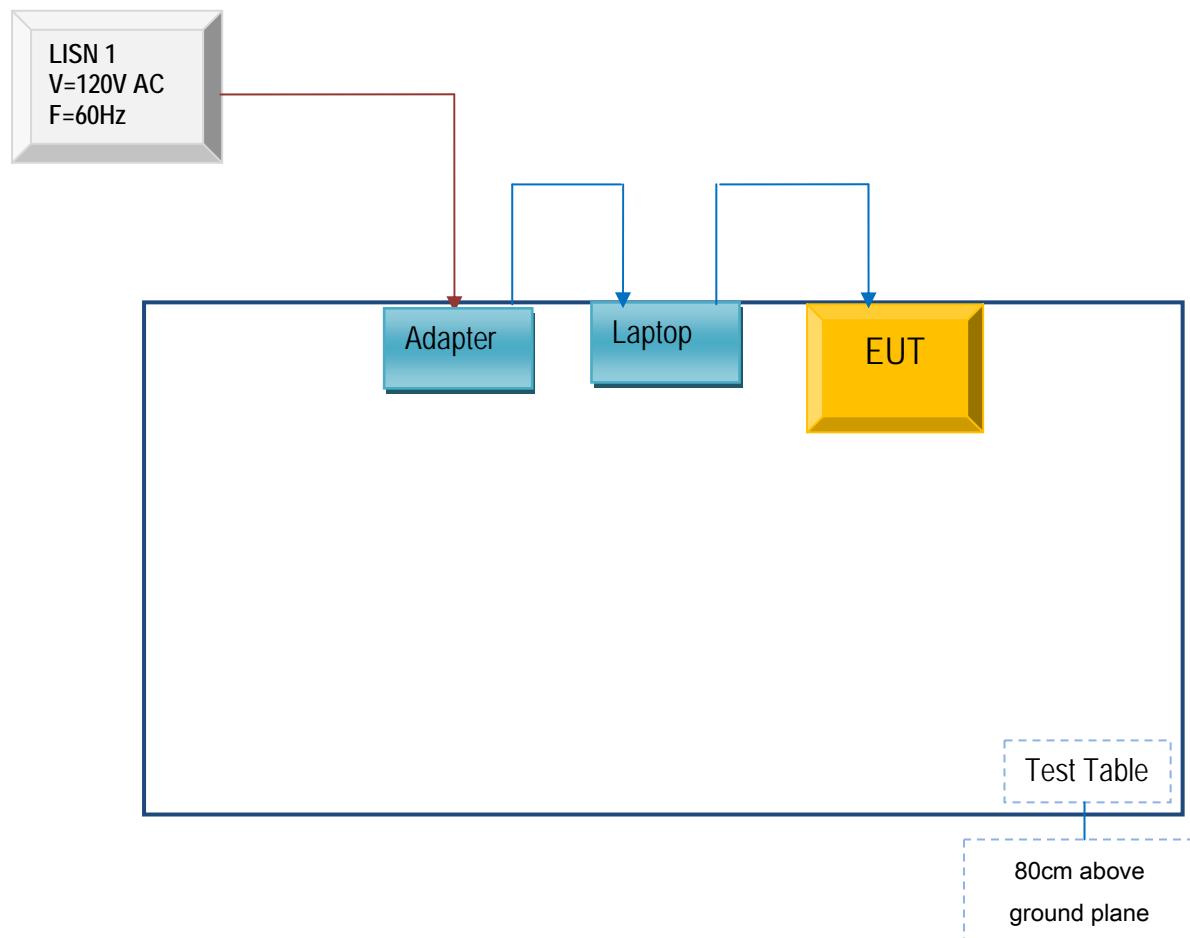
**Annex B.iii. Photograph: Test Setup Photo**

 A photograph showing a blue electronic test equipment unit on the floor to the left of a wooden table. A laptop is open on the table, and a small white device is connected to it. Power strips and cables are visible on the floor and wall.	 A photograph showing a black laptop on the wooden table, with a black keyboard and a small white device connected to it. The setup is positioned next to a white wall.
Conducted Emissions Test Setup – Front View	Conducted Emissions Test Setup – Side View
 A photograph of a test setup inside a large anechoic chamber. A laptop is on a white table, and a red and black test horn antenna is positioned above it. The chamber walls are covered in white absorptive panels.	 A photograph of a test setup inside a large anechoic chamber. A laptop is on a white table, and a blue and white test horn antenna is positioned above it. The chamber walls are covered in white absorptive panels.
Radiated Spurious Emissions Test Setup Below 1GHz	Radiated Spurious Emissions Test Setup Above 1GHz

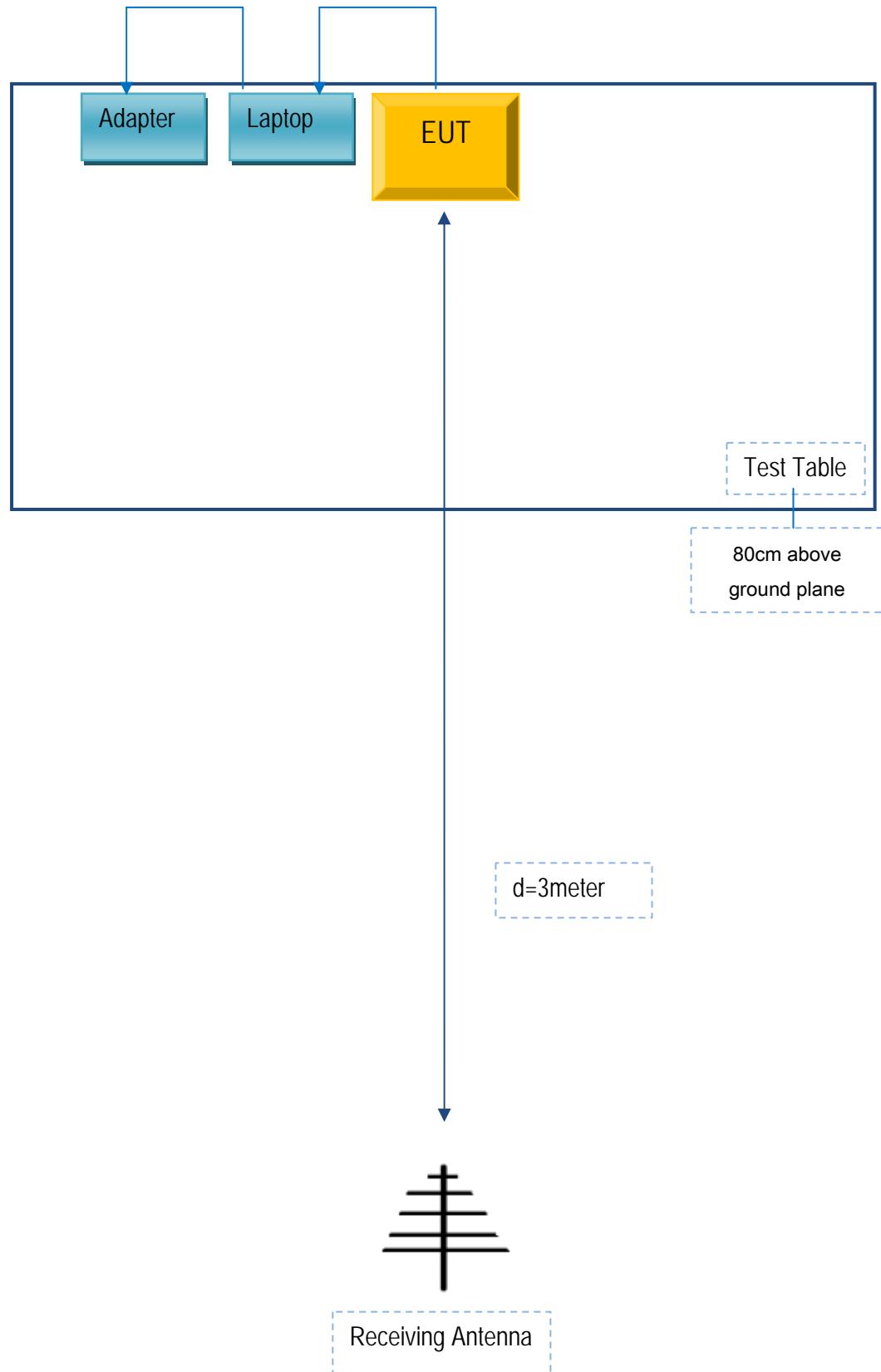
## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

### 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

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

Please see Attachment

## Annex E. DECLARATION OF SIMILARITY

N/A