

# EMC TEST REPORT



Report No.: 15050047-FCC-E

Supersede Report No.:N/A

Applicant	Collage Investments LLC.	
Product Name	Mobile Phone	
Model No.	LK500	
Serial No.	N/A	
Test Standard	FCC Part 15 Subpart B Class B:2014, ANSI C63.4: 2014	
Test Date	October 13 to November 02, 2015	
Issue Date	November 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"/>	
<i>Winnie Zhang</i>	<i>David Huang</i>	
Winnie Zhang Test Engineer	David Huang 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**

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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.



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### 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
15050047-FCC-E	NONE	Original	November 03, 2015

## 2. Customer information

Applicant Name	Collage Investments LLC.
Applicant Add	11437 NW 34 STREET Doral Florida United States 33178
Manufacturer	Collage Investments LLC.
Manufacturer Add	11437 NW 34 STREET Doral Florida United States 33178

## 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:	LK500
Serial Model:	N/A
Antenna Gain:	GSM850:0.8dBi PCS1900:1.5dBi UMTS-FDD Band II : 1.5dBi Bluetooth:1.5dBi
Input Power:	Adapter: Model:LK500 Input: AC 100-240V; 50/60Hz;0.15A Output: DC5.0V;500mA Battery: Model:LK500 Spec:DC3.7V,800mAh,2.96Wh Limited charger voltage:4.2V
Equipment Category :	JBP
Type of Modulation:	GSM / GPRS: GMSK Bluetooth: GFSK, $\pi$ /4DQPSK, 8DPSK UMTS-FDD: QPSK, 16QAM
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 Bluetooth: 2402-2480 MHz UMTS-FDD Band II TX:1852.4 ~ 1907.6 MHz; RX: 1932.4 ~ 1987.6 MHz
Number of Channels:	GSM 850: 124CH PCS1900: 299CH UMTS-FDD Band II : 277CH Bluetooth: 79CH

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Port: Earphone Port, USB Port

GPRS Multi-slot class 8/10/12

Trade Name : LIKUID

FCC ID: GAO-LK500

Date EUT received: October 12, 2015

## 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
-	-	-



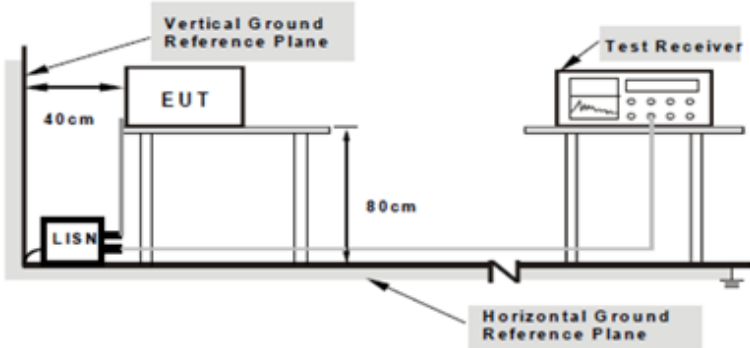
## 6. Measurements, Examination And Derived Results

### 6.1 AC Power Line Conducted Emissions

Temperature	24°C
Relative Humidity	56%
Atmospheric Pressure	1023mbar
Test date :	October 23, 2015
Tested By :	Winnie Zhang

#### 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 [μ] 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 (dBμV)		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 (dBμV)																
	QP	Average															
0.15 ~ 0.5	66 – 56	56 – 46															
0.5 ~ 5	56	46															
5 ~ 30	60	50															

Test Setup	 <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>
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Procedure	<ol style="list-style-type: none"> <li>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>The power supply for the EUT was fed through a 50Ω /50mH EUT LISN, connected to filtered mains.</li> </ol>
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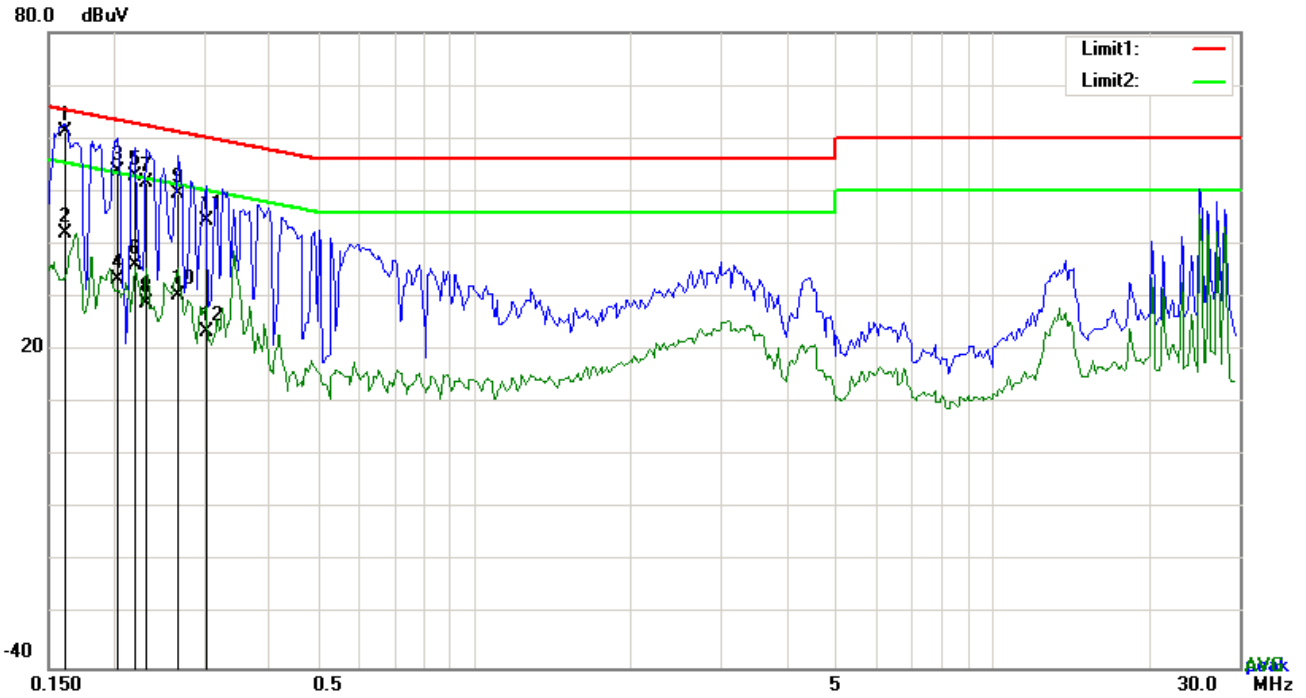
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	<ol style="list-style-type: none"> <li>3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>4. All other supporting equipment were powered separately from another main supply.</li> <li>5. The 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**

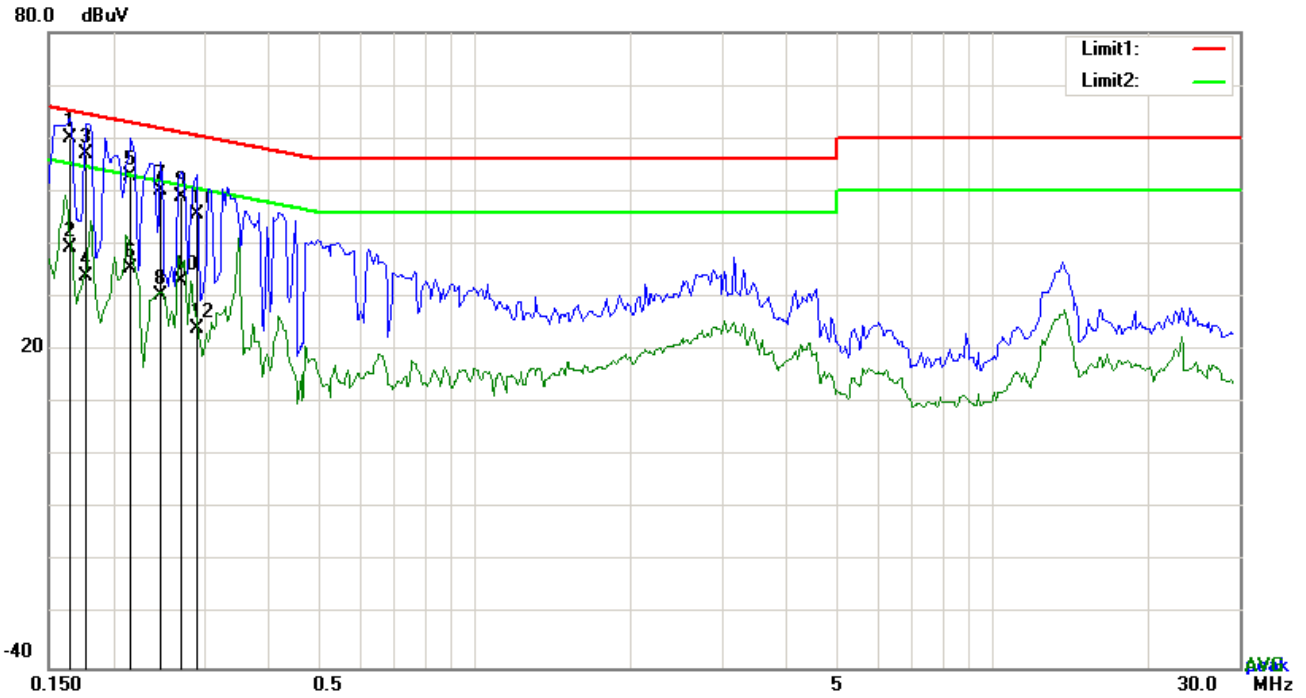


**Test Data**

**Phase Line Plot at 120Vac, 60Hz**

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.1617	51.16	QP	10.03	61.19	65.38	-4.19
2	L1	0.1617	31.91	AVG	10.03	41.94	55.38	-13.44
3	L1	0.2046	43.77	QP	10.03	53.80	63.42	-9.62
4	L1	0.2046	23.24	AVG	10.03	33.27	53.42	-20.15
5	L1	0.2202	42.92	QP	10.03	52.95	62.81	-9.86
6	L1	0.2202	25.90	AVG	10.03	35.93	52.81	-16.88
7	L1	0.2319	41.60	QP	10.03	51.63	62.38	-10.75
8	L1	0.2319	18.90	AVG	10.03	28.93	52.38	-23.45
9	L1	0.2670	39.38	QP	10.03	49.41	61.21	-11.80
10	L1	0.2670	20.20	AVG	10.03	30.23	51.21	-20.98
11	L1	0.3021	34.40	QP	10.03	44.43	60.18	-15.75
12	L1	0.3021	13.43	AVG	10.03	23.46	50.18	-26.72

**Test Mode : USB Mode**

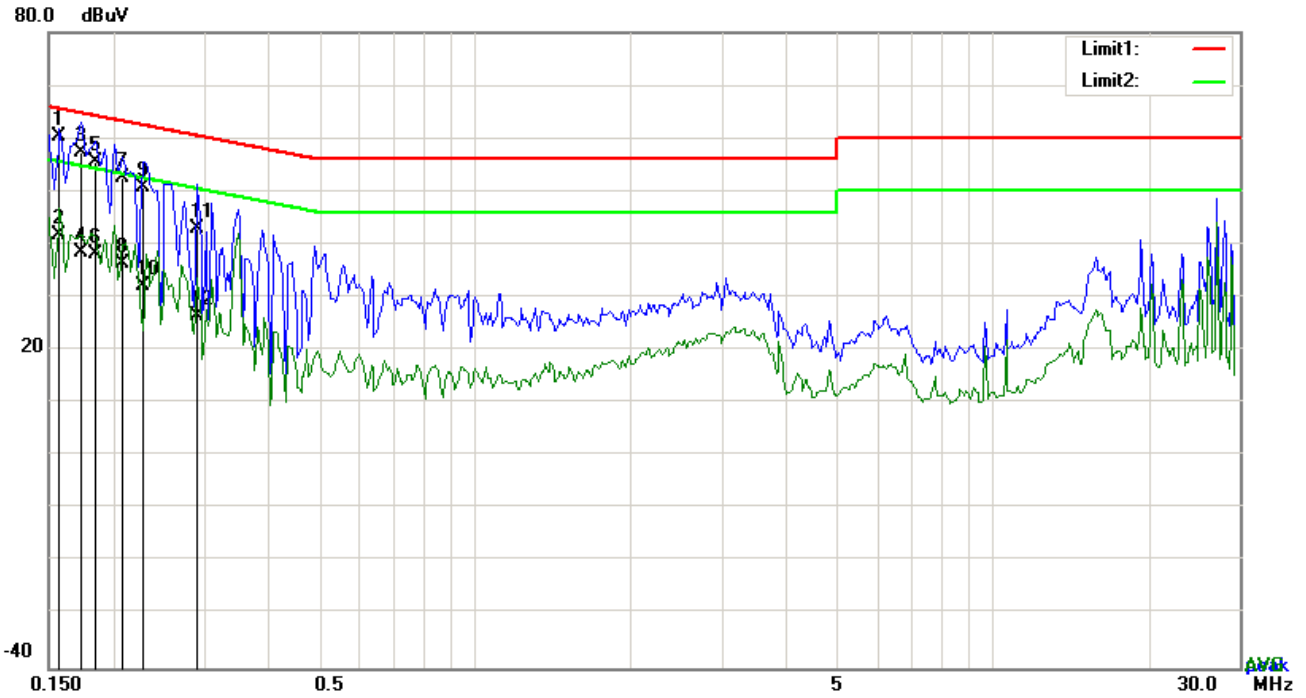


**Test Data**

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

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.1656	50.12	QP	10.02	60.14	65.18	-5.04
2	N	0.1656	29.23	AVG	10.02	39.25	55.18	-15.93
3	N	0.1773	47.05	QP	10.02	57.07	64.61	-7.54
4	N	0.1773	24.01	AVG	10.02	34.03	54.61	-20.58
5	N	0.2163	42.87	QP	10.02	52.89	62.96	-10.07
6	N	0.2163	25.29	AVG	10.02	35.31	52.96	-17.65
7	N	0.2475	40.06	QP	10.02	50.08	61.84	-11.76
8	N	0.2475	20.34	AVG	10.02	30.36	51.84	-21.48
9	N	0.2709	39.03	QP	10.02	49.05	61.09	-12.04
10	N	0.2709	23.04	AVG	10.02	33.06	51.09	-18.03
11	N	0.2904	35.54	QP	10.02	45.56	60.51	-14.95
12	N	0.2904	14.08	AVG	10.02	24.10	50.51	-26.41

**Test Mode : USB Mode**

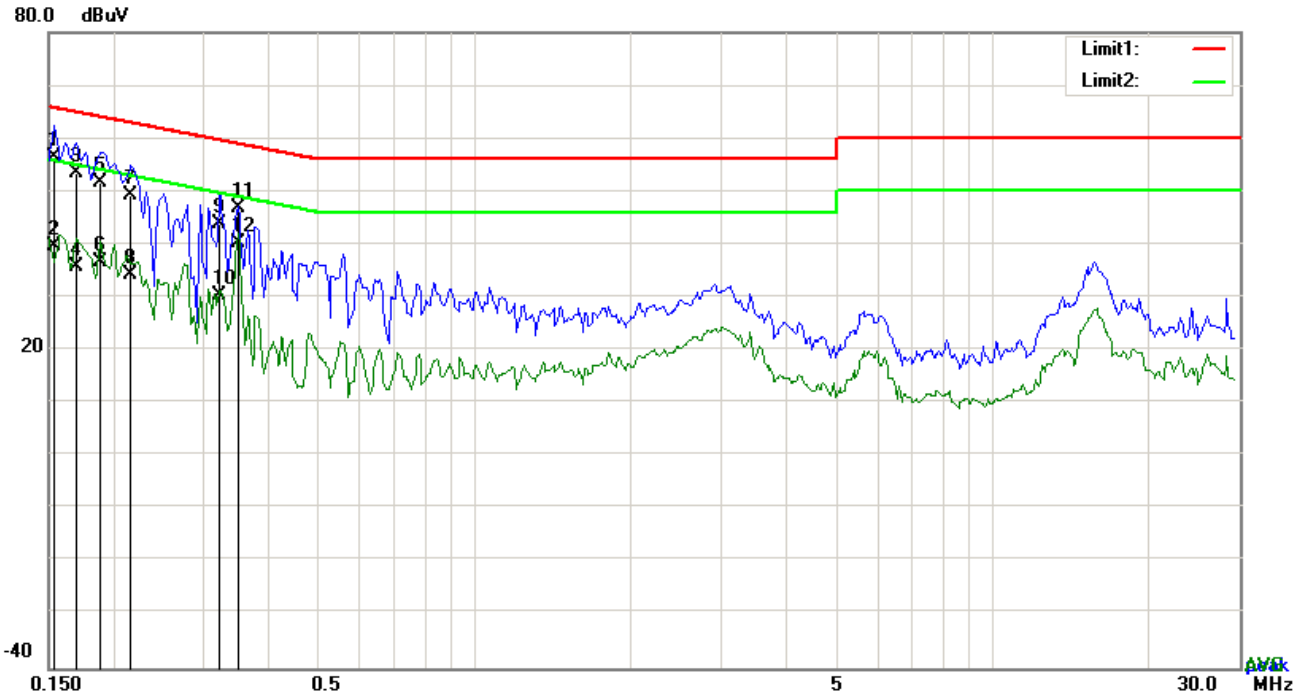


**Test Data**

**Phase Line Plot at 240Vac, 60Hz**

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.1578	50.29	QP	10.03	60.32	65.58	-5.26
2	L1	0.1578	31.61	AVG	10.03	41.64	55.58	-13.94
3	L1	0.1734	47.38	QP	10.03	57.41	64.80	-7.39
4	L1	0.1734	28.37	AVG	10.03	38.40	54.80	-16.40
5	L1	0.1851	45.55	QP	10.03	55.58	64.25	-8.67
6	L1	0.1851	28.14	AVG	10.03	38.17	54.25	-16.08
7	L1	0.2085	42.40	QP	10.03	52.43	63.26	-10.83
8	L1	0.2085	26.20	AVG	10.03	36.23	53.26	-17.03
9	L1	0.2280	40.61	QP	10.03	50.64	62.52	-11.88
10	L1	0.2280	22.25	AVG	10.03	32.28	52.52	-20.24
11	L1	0.2904	32.97	QP	10.03	43.00	60.51	-17.51
12	L1	0.2904	16.36	AVG	10.03	26.39	50.51	-24.12

**Test Mode : USB Mode**



**Test Data**

**Phase Neutral Plot at 240Vac, 60Hz**

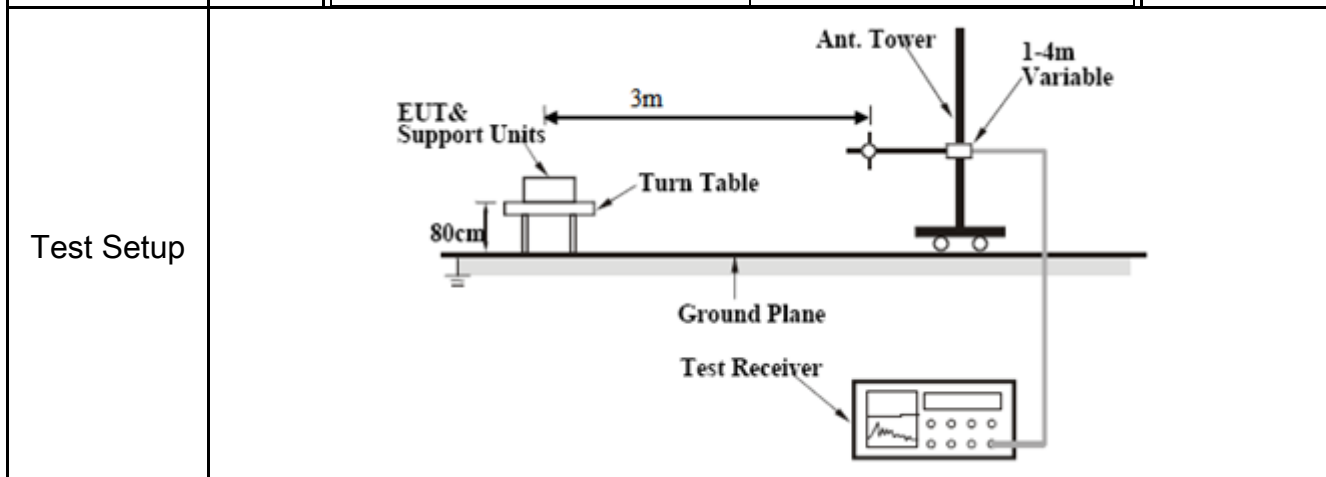
No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.1539	46.40	QP	10.02	56.42	65.79	-9.37
2	N	0.1539	29.78	AVG	10.02	39.80	55.79	-15.99
3	N	0.1695	43.55	QP	10.02	53.57	64.98	-11.41
4	N	0.1695	25.81	AVG	10.02	35.83	54.98	-19.15
5	N	0.1890	41.51	QP	10.02	51.53	64.08	-12.55
6	N	0.1890	26.64	AVG	10.02	36.66	54.08	-17.42
7	N	0.2163	39.12	QP	10.02	49.14	62.96	-13.82
8	N	0.2163	24.23	AVG	10.02	34.25	52.96	-18.71
9	N	0.3216	33.73	QP	10.02	43.75	59.67	-15.92
10	N	0.3216	20.19	AVG	10.02	30.21	49.67	-19.46
11	N	0.3489	36.70	QP	10.02	46.72	58.99	-12.27
12	N	0.3489	30.15	AVG	10.02	40.17	48.99	-8.82

## 6.2 Radiated Emissions

Temperature	23°C
Relative Humidity	59%
Atmospheric Pressure	1026mbar
Test date :	October 26, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable										
47CFR§15.109(d)	a)	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	<input checked="" type="checkbox"/>										
		<table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (<math>\mu\text{V}/\text{m}</math>)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">30 – 88</td> <td style="text-align: center;">100</td> </tr> <tr> <td style="text-align: center;">88 – 216</td> <td style="text-align: center;">150</td> </tr> <tr> <td style="text-align: center;">216 960</td> <td style="text-align: center;">200</td> </tr> <tr> <td style="text-align: center;">Above 960</td> <td style="text-align: center;">500</td> </tr> </tbody> </table>		Frequency range (MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	30 – 88	100	88 – 216	150	216 960	200	Above 960	500
		Frequency range (MHz)		Field Strength ( $\mu\text{V}/\text{m}$ )									
		30 – 88		100									
		88 – 216		150									
216 960	200												
Above 960	500												



Procedure	<ol style="list-style-type: none"> <li>1. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>2. 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>a. Vertical or horizontal polarization (whichever gave the higher emission level</li> </ol> </li> </ol>
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	<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.      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.      ■ 1 kHz (Duty cycle &lt; 98%) □ 10 Hz (Duty cycle &gt; 98%)</p> <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

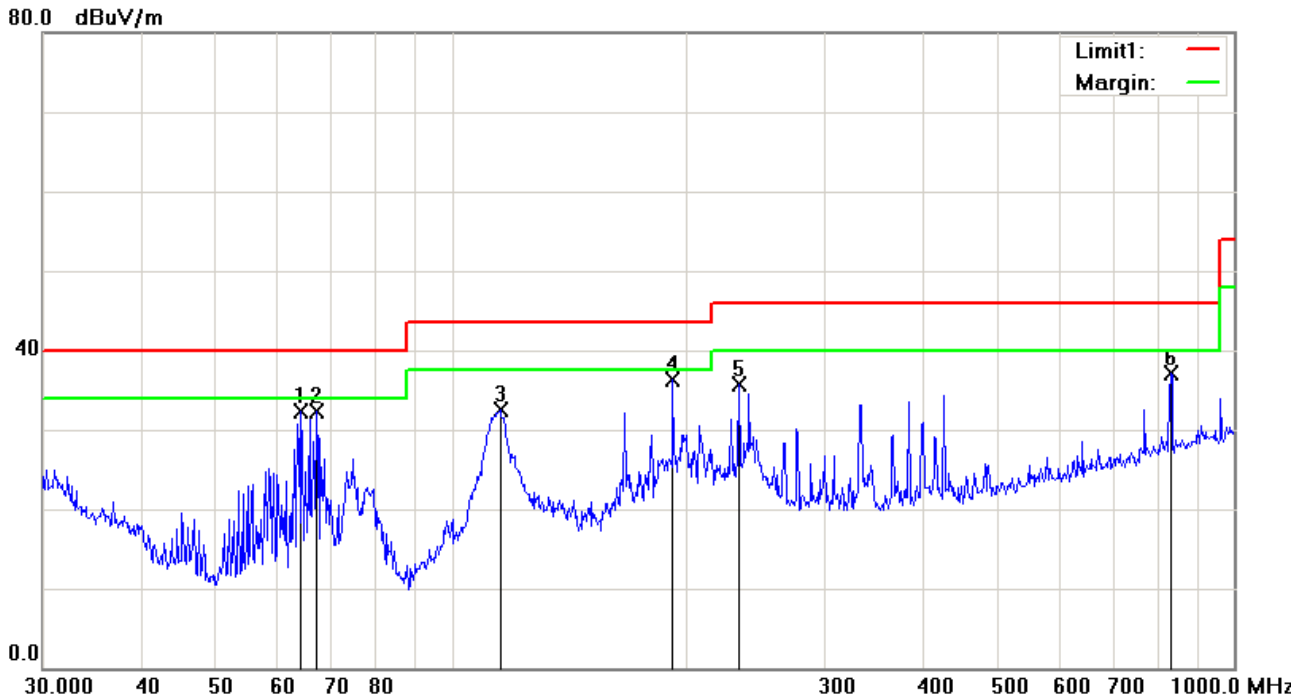
Test Data     Yes                       N/A

Test Plot     Yes (See below)             N/A



<b>Test Mode 1:</b>	<b>USB Mode</b>
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**Below 1GHz**



**Test Data**

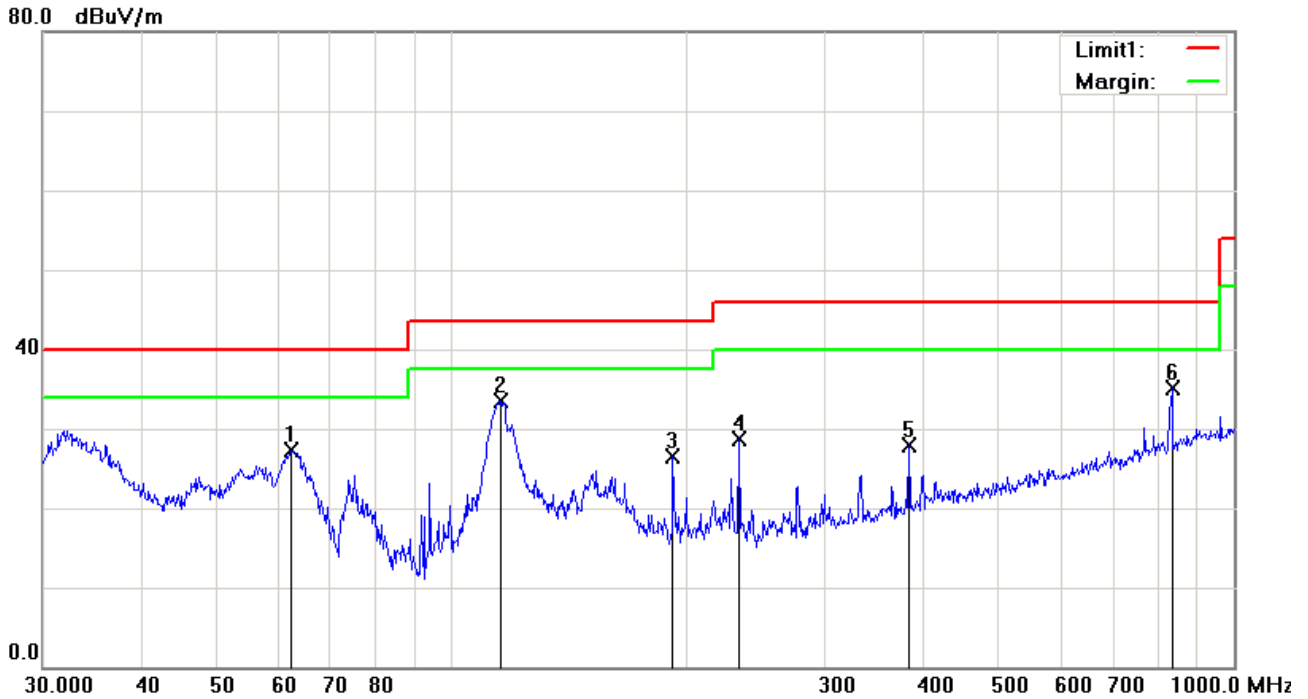
**Horizontal Polarity Plot @3m**

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	( )
1	H	64.2075	46.34	peak	-14.03	32.31	40.00	-7.69	100	194
2	H	67.2022	46.20	peak	-13.81	32.39	40.00	-7.61	100	239
3	H	115.3205	40.67	peak	-8.11	32.56	43.50	-10.94	100	318
4	H	191.7450	45.46	peak	-9.14	36.32	43.50	-7.18	100	66
5	H	233.3487	44.83	peak	-9.04	35.79	46.00	-10.21	100	265
6	H	830.4002	33.51	peak	3.57	37.08	46.00	-8.92	100	235

**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 ( )
1	V	62.2128	41.55	peak	-14.18	27.37	40.00	-12.63	100	154
2	V	115.7256	41.58	peak	-8.04	33.54	43.50	-9.96	100	237
3	V	191.7450	35.57	peak	-9.14	26.43	43.50	-17.07	100	338
4	V	232.5318	37.80	peak	-9.04	28.76	46.00	-17.24	100	203
5	V	383.9318	32.57	peak	-4.67	27.90	46.00	-18.10	100	222
6	V	833.3171	31.40	peak	3.61	35.01	46.00	-10.99	100	207

**Above 1GHz**

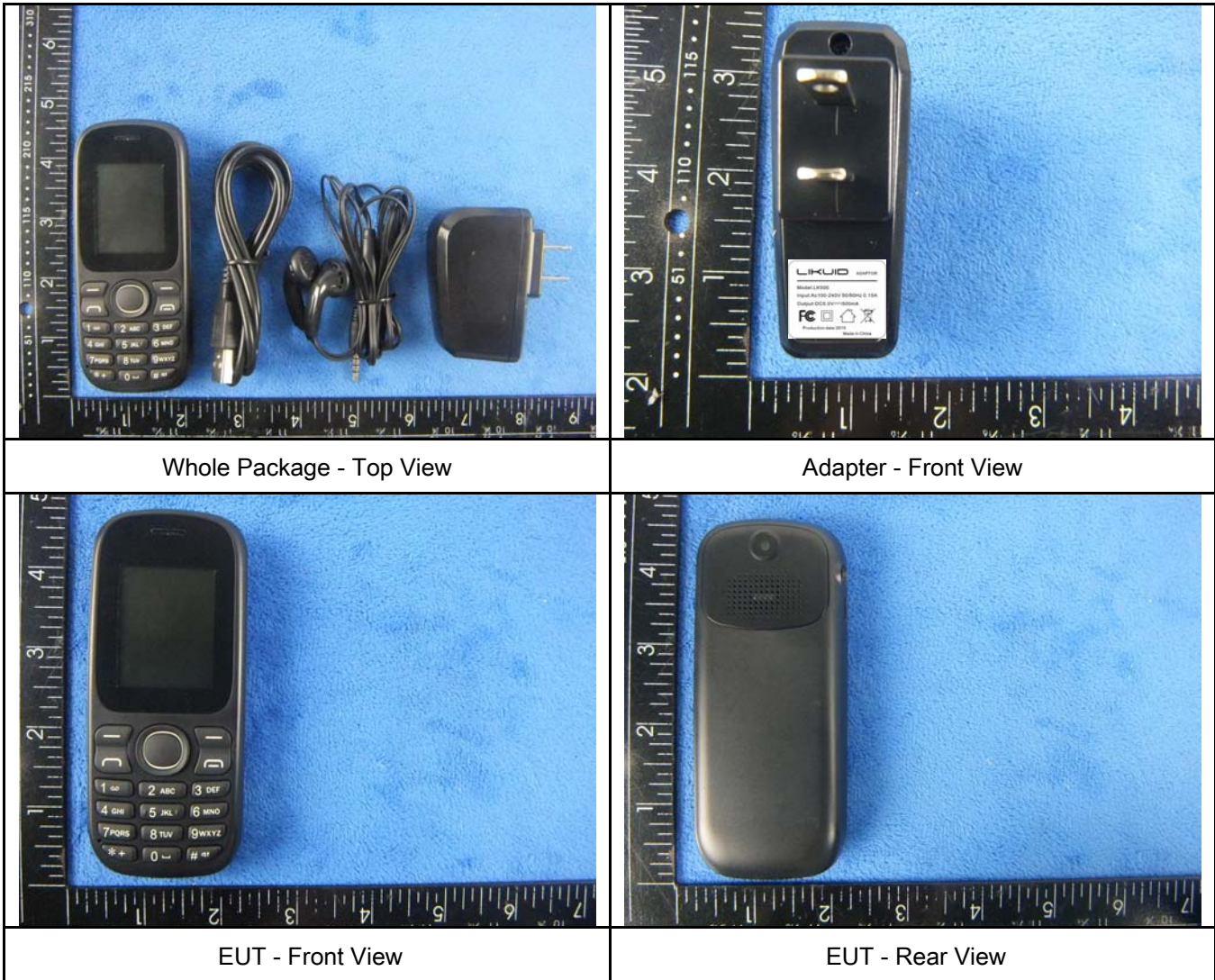
Note: The frequency that above 1GHz is mainly from the environment noise.

## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>AC Line Conducted Emissions</b>					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Line Impedance Stabilization Network	LI-125A	191106	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
Line Impedance Stabilization Network	LI-125A	191107	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
LISN	ISN T800	34373	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	<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	09/21/2015	09/20/2016	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna	AH-118	71259	09/24/2015	09/23/2016	<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**



Cover Off - Top View 1



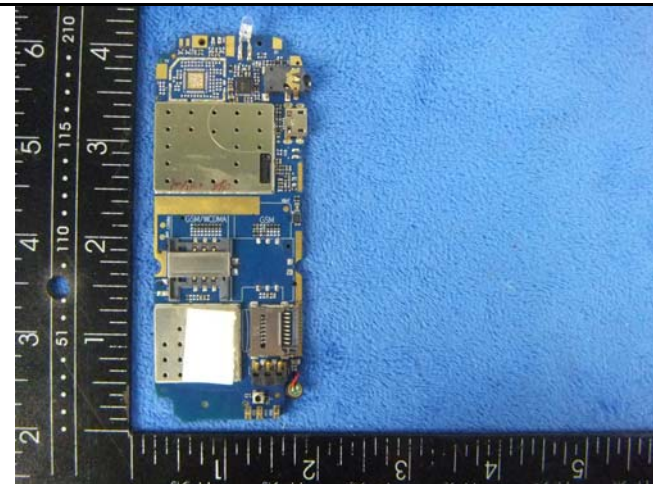
Cover Off - Top View 2



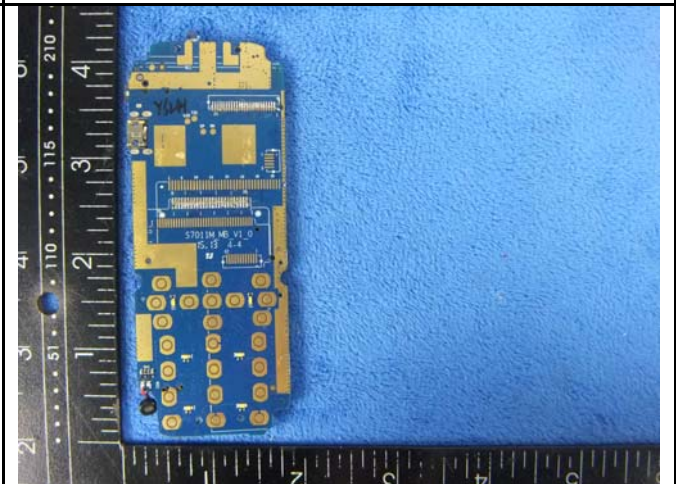
Battery - Top View



Battery - Bottom View

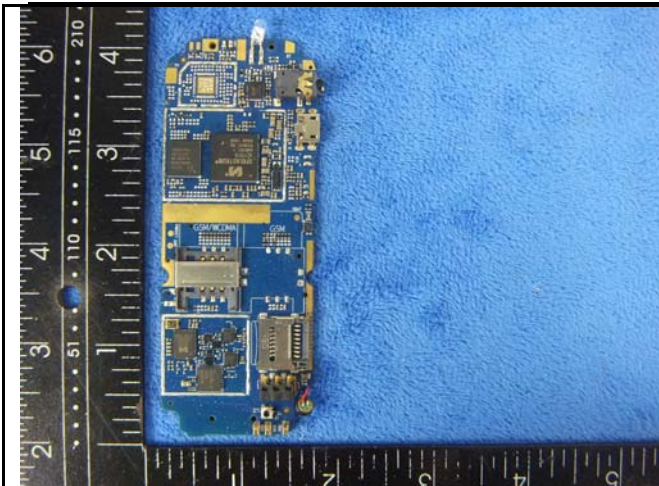


Mainboard With Shielding - Front View

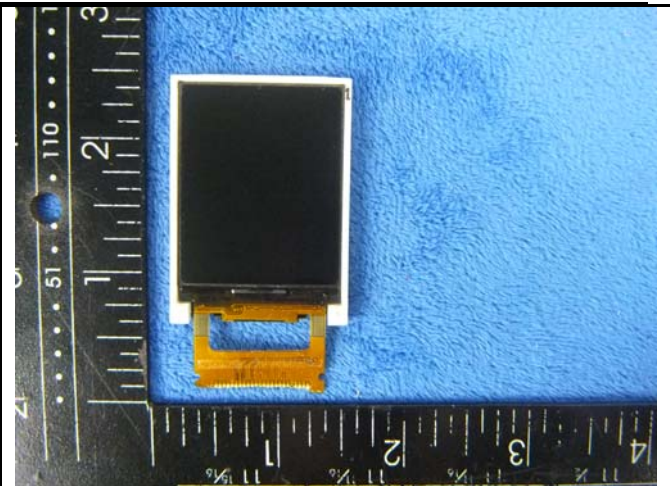


Mainboard With Shielding - Rear View

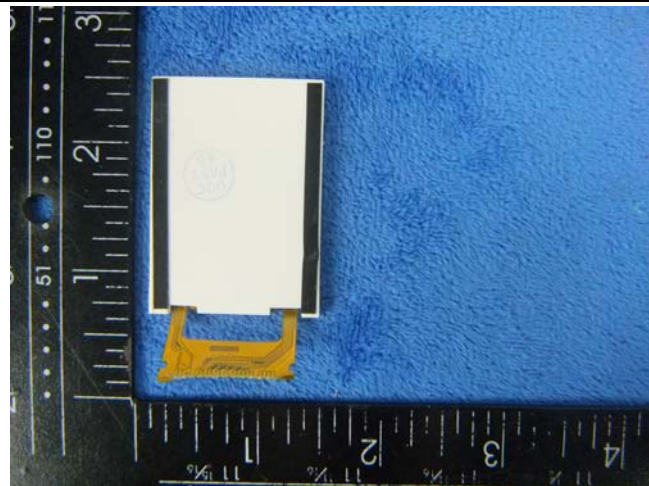




Mainboard Without Shielding - Front View



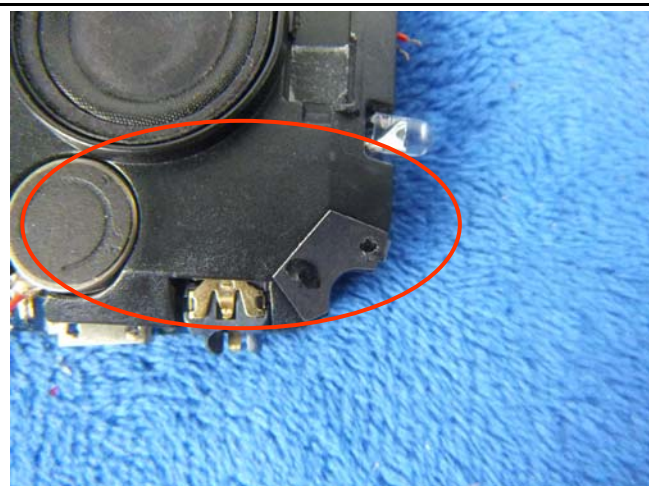
LCD - Front View



LCD - Rear View



GSM/PCS/UMTS-FDD Antenna View



BT Antenna View

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



Conducted Emissions Test Setup – Front View



Conducted Emissions Test Setup – Side View



Radiated Spurious Emissions Test Setup Below 1GHz



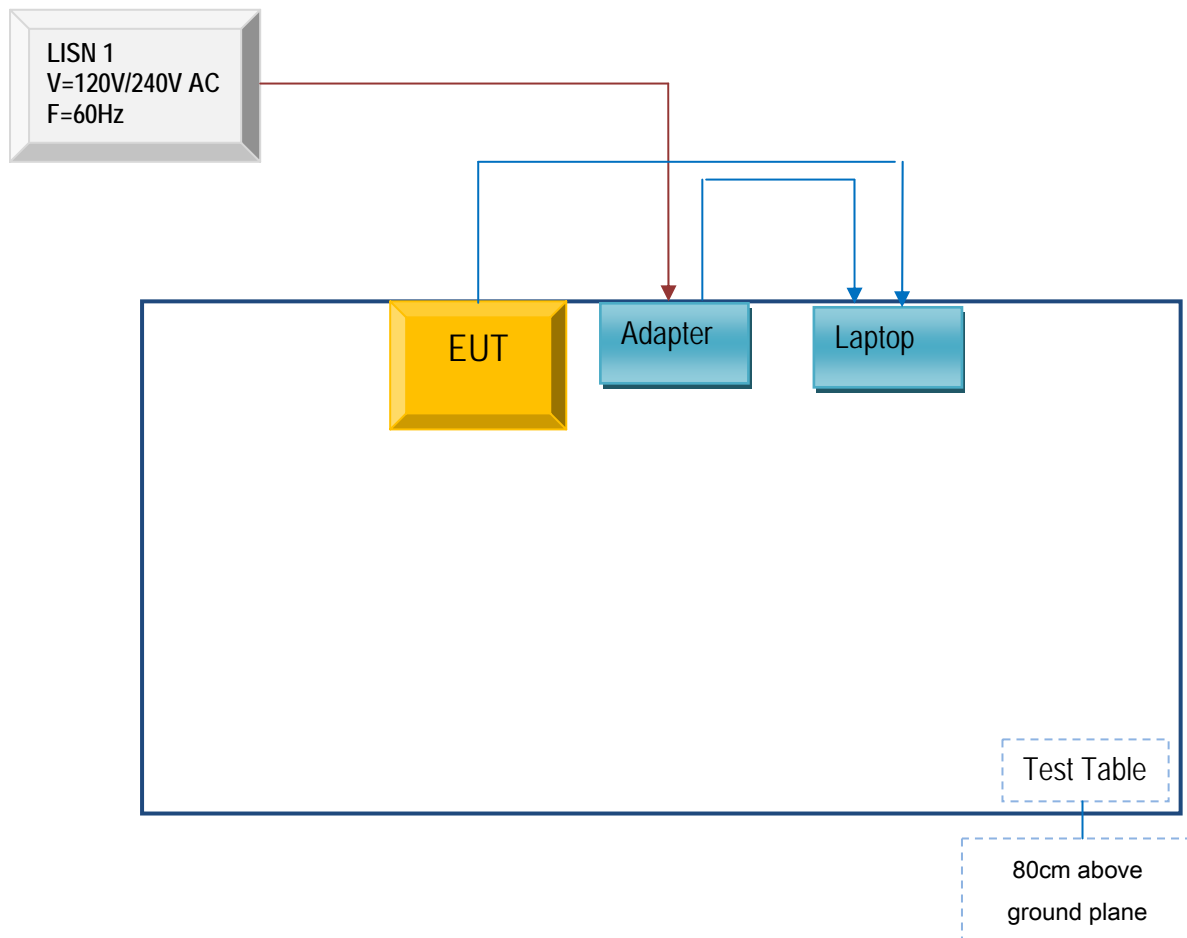
Radiated Spurious Emissions Test Setup Above 1GHz



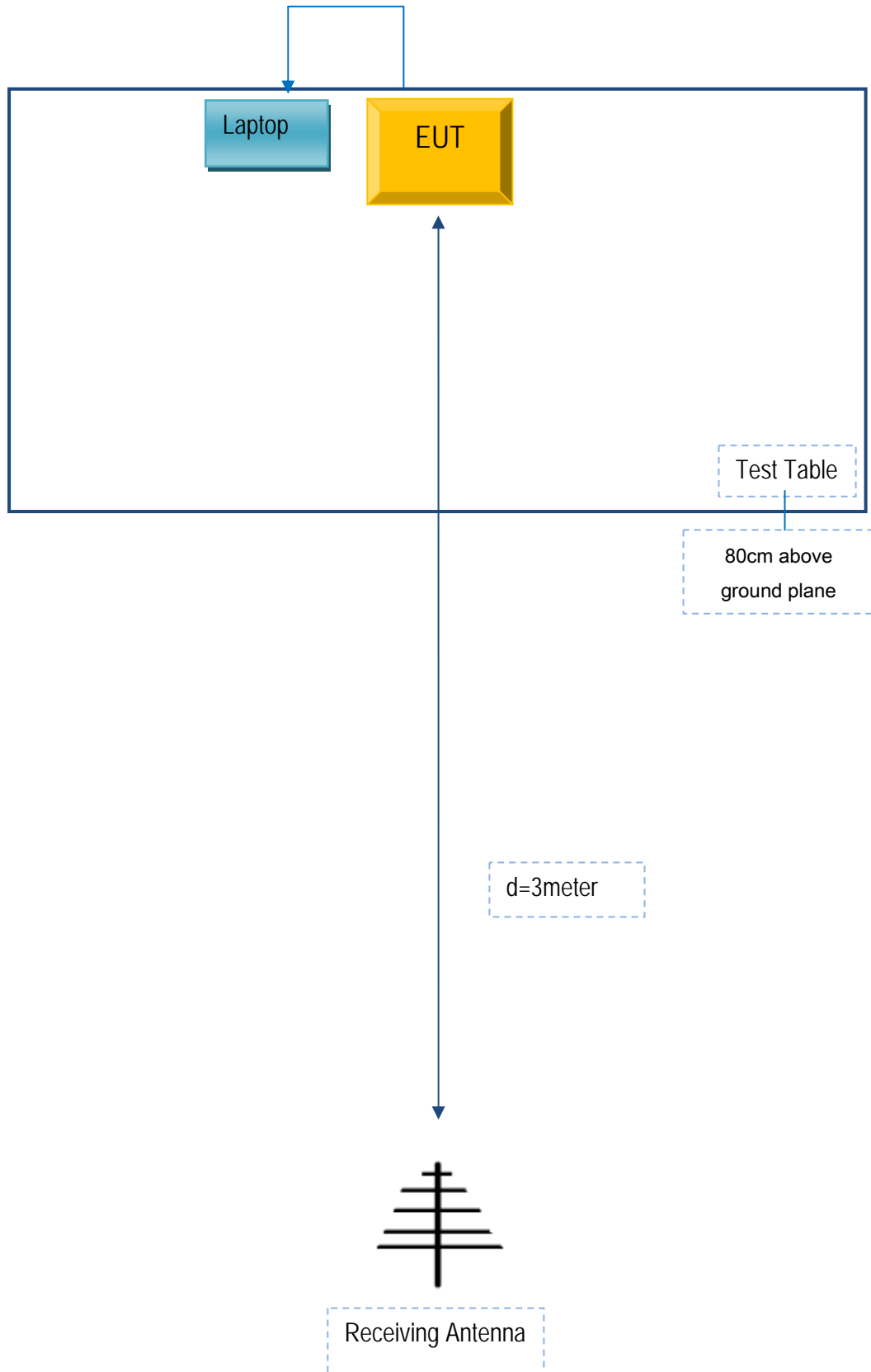
## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

### Annex C.ii. TEST SET UP BLOCK

#### Block Configuration Diagram for Conducted Emissions



### Block Configuration Diagram for Radiated Emissions



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**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

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

Please see Attachment

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## Annex E. DECLARATION OF SIMILARITY

N/A