

EMC TEST REPORT



Report No.: 15050037-FCC-E

Supersede Report No.:N/A

Applicant	Collage Investments LLC.	
Product Name	Mobile Phone	
Model No.	MAX5.0	
Serial No.	N/A	
Test Standard	FCC Part 15 Subpart B Class B:2014, ANSI C63.4: 2014	
Test Date	September 02 to September 17, 2015	
Issue Date	September 18, 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.



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
15050037-FCC-E	NONE	Original	September 18, 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:	MAX5.0
Serial Model:	N/A
Antenna Gain:	GSM850: -2.8dBi PCS1900:-0.3dBi UMTS-FDD Band V:-0.6dBi UMTS-FDD Band II:-0.6dBi Bluetooth/BLE:-1.5dBi WIFI:-1.5dBi GPS:-0.5dBi
Input Power:	Battery: Model:MAX5.0 Spec:DC3.8V,2000mAh Adapter: Model:N/A Input: AC 100-240V; 50/60Hz;100mA Output: DC5.0V; 1A
Trade Name :	LIKUID
FCC ID:	GAO-MAX50
Date EUT received:	September 01, 2015

Equipment Category : JBP

Type of Modulation: GSM / GPRS: GMSK
EGPRS: GMSK, 8PSK
UMTS-FDD: QPSK, 16QAM
802.11b/g/n: DSSS, OFDM
Bluetooth: GFSK, π /4DQPSK, 8DPSK
BLE: GFSK
GPS:BPSK

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
UMTS-FDD Band II TX:1852.4 ~ 1907.6 MHz;
RX: 1932.4 ~ 1987.6 MHz
WIFI:802.11b/g/n(20M): 2412-2462 MHz
WIFI:802.11n(40M): 2422-2452 MHz
Bluetooth& BLE: 2402-2480 MHz
GPS RX:1575.42 MHz

Number of Channels: GSM 850: 124CH
PCS1900: 299CH
UMTS-FDD Band V : 102CH
UMTS-FDD Band II : 277CH
WIFI :802.11b/g/n(20M): 11CH
WIFI :802.11n(40M): 7CH
Bluetooth: 79CH
BLE: 40CH
GPS:1CH

Port: Power Port, Earphone Port, USB Port

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

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	54%
Atmospheric Pressure	1012mbar
Test date :	September 12, 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 style="text-align: center;"> 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"> 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 50Ω /50mH EUT LISN, connected to filtered mains.
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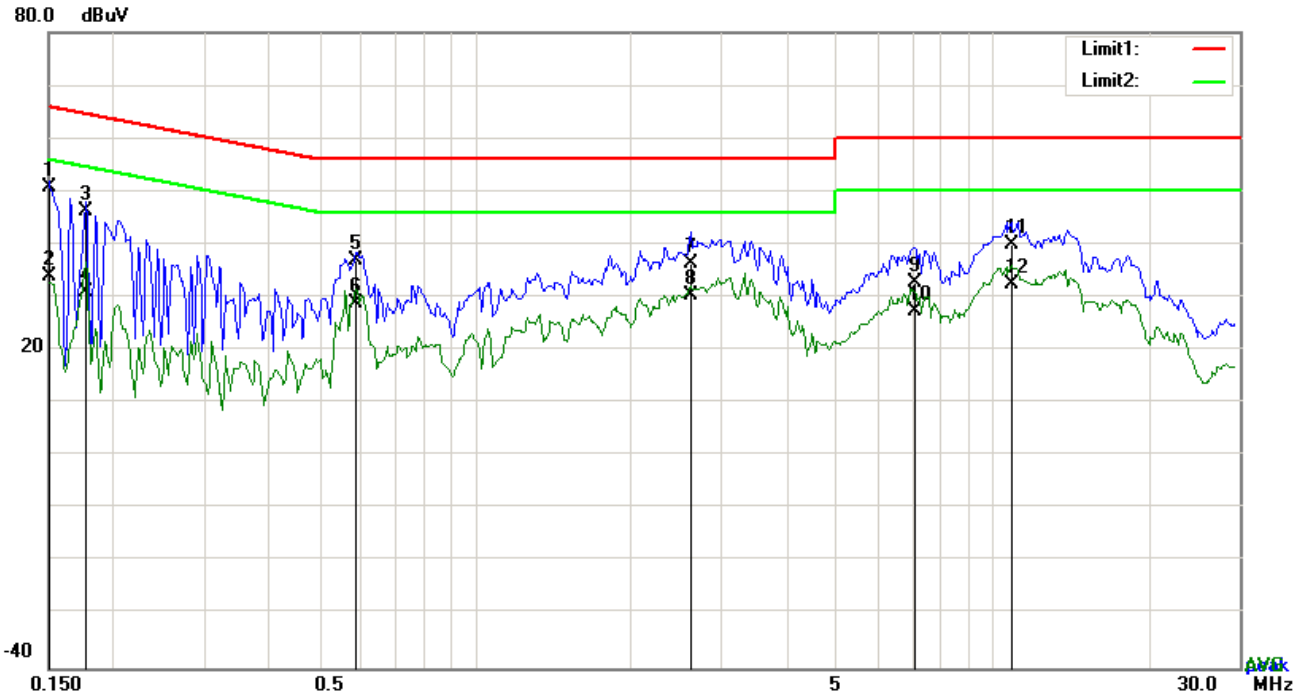
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	<ol style="list-style-type: none"> 3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and 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 : USB Mode

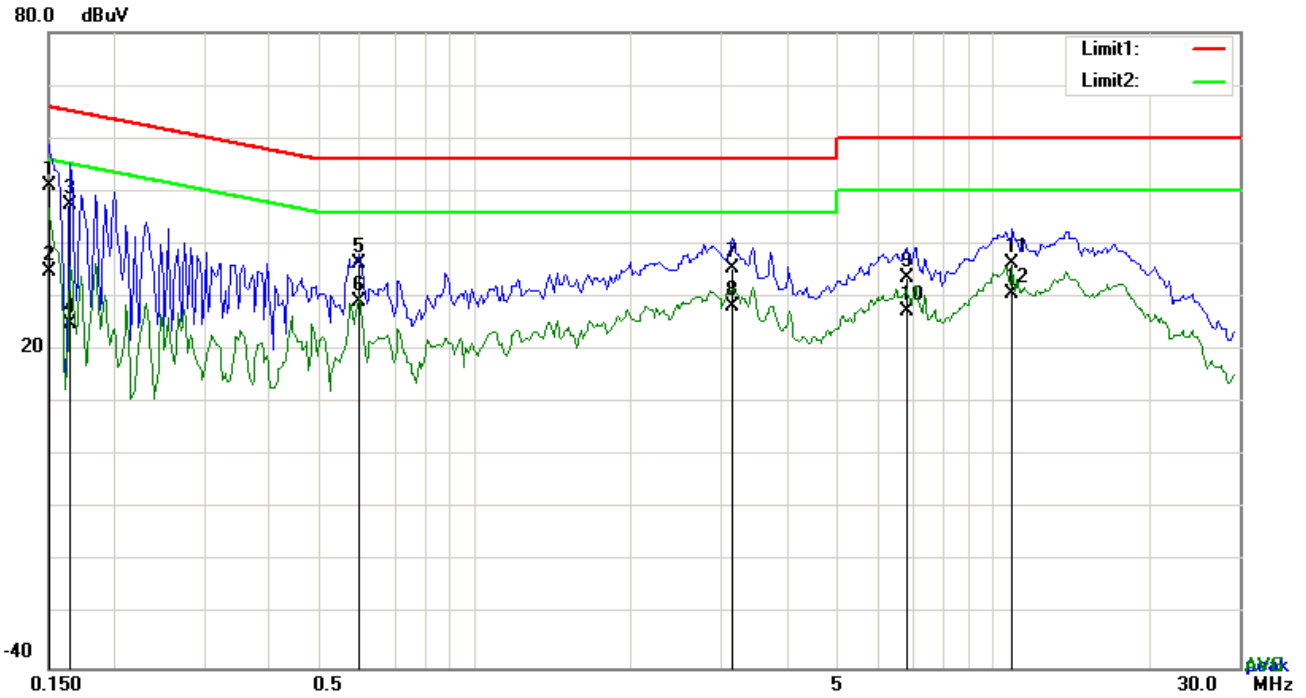


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.1500	40.78	QP	10.03	50.81	66.00	-15.19
2	L1	0.1500	23.87	AVG	10.03	33.90	56.00	-22.10
3	L1	0.1773	36.20	QP	10.03	46.23	64.61	-18.38
4	L1	0.1773	20.79	AVG	10.03	30.82	54.61	-23.79
5	L1	0.5907	26.88	QP	10.03	36.91	56.00	-19.09
6	L1	0.5907	18.77	AVG	10.03	28.80	46.00	-17.20
7	L1	2.6109	26.21	QP	10.05	36.26	56.00	-19.74
8	L1	2.6109	20.25	AVG	10.05	30.30	46.00	-15.70
9	L1	7.0794	22.78	QP	10.11	32.89	60.00	-27.11
10	L1	7.0794	17.23	AVG	10.11	27.34	50.00	-22.66
11	L1	10.8702	29.68	QP	10.16	39.84	60.00	-20.16
12	L1	10.8702	22.28	AVG	10.16	32.44	50.00	-17.56

Test Mode : USB Mode

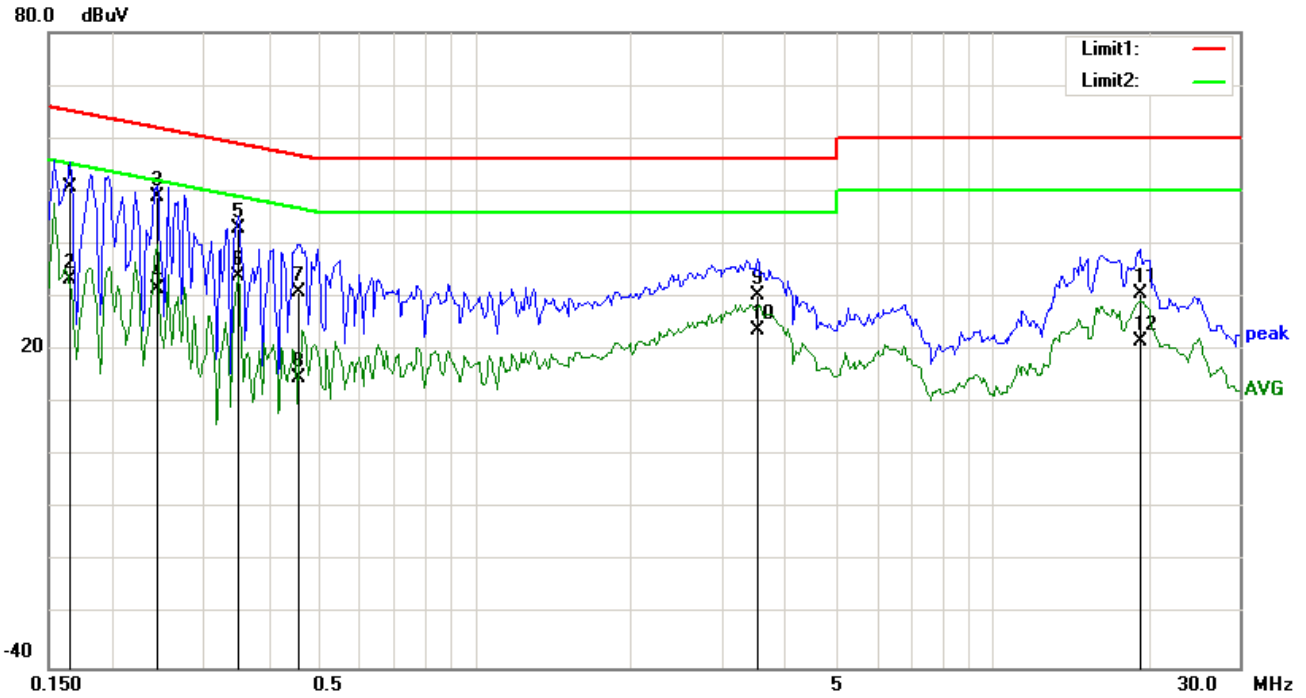


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.1500	41.12	QP	10.02	51.14	66.00	-14.86
2	N	0.1500	24.94	AVG	10.02	34.96	56.00	-21.04
3	N	0.1656	37.34	QP	10.02	47.36	65.18	-17.82
4	N	0.1656	14.92	AVG	10.02	24.94	55.18	-30.24
5	N	0.5985	26.23	QP	10.02	36.25	56.00	-19.75
6	N	0.5985	19.11	AVG	10.02	29.13	46.00	-16.87
7	N	3.1521	25.45	QP	10.05	35.50	56.00	-20.50
8	N	3.1521	18.26	AVG	10.05	28.31	46.00	-17.69
9	N	6.8181	23.43	QP	10.10	33.53	60.00	-26.47
10	N	6.8181	17.29	AVG	10.10	27.39	50.00	-22.61
11	N	10.9092	26.05	QP	10.15	36.20	60.00	-23.80
12	N	10.9092	20.62	AVG	10.15	30.77	50.00	-19.23

Test Mode :	USB Mode
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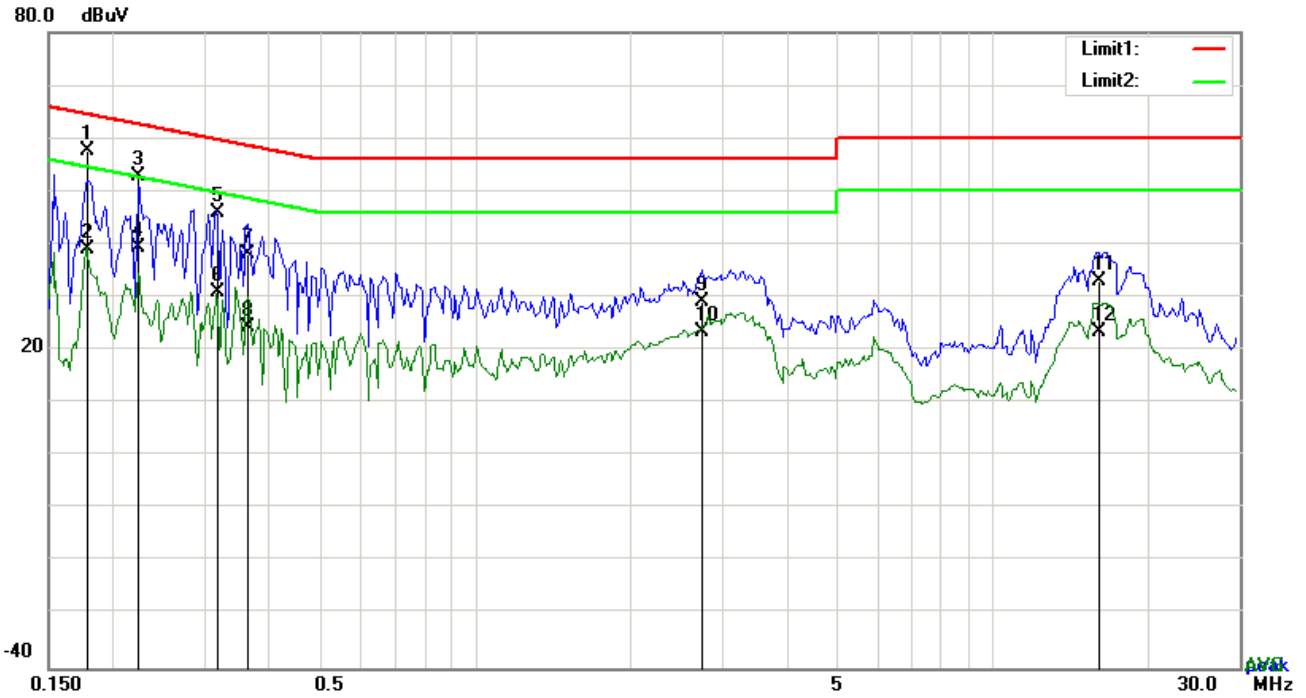


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.1656	40.85	QP	10.03	50.88	65.18	-14.30
2	L1	0.1656	23.25	AVG	10.03	33.28	55.18	-21.90
3	L1	0.2436	39.01	QP	10.03	49.04	61.97	-12.93
4	L1	0.2436	21.66	AVG	10.03	31.69	51.97	-20.28
5	L1	0.3489	33.01	QP	10.03	43.04	58.99	-15.95
6	L1	0.3489	23.81	AVG	10.03	33.84	48.99	-15.15
7	L1	0.4581	21.00	QP	10.03	31.03	56.73	-25.70
8	L1	0.4581	4.62	AVG	10.03	14.65	46.73	-32.08
9	L1	3.5187	20.19	QP	10.06	30.25	56.00	-25.75
10	L1	3.5187	13.69	AVG	10.06	23.75	46.00	-22.25
11	L1	19.2747	20.46	QP	10.29	30.75	60.00	-29.25
12	L1	19.2747	11.50	AVG	10.29	21.79	50.00	-28.21

Test Mode : USB Mode



Test Data

Phase Neutral Plot at 240Vac, 60Hz

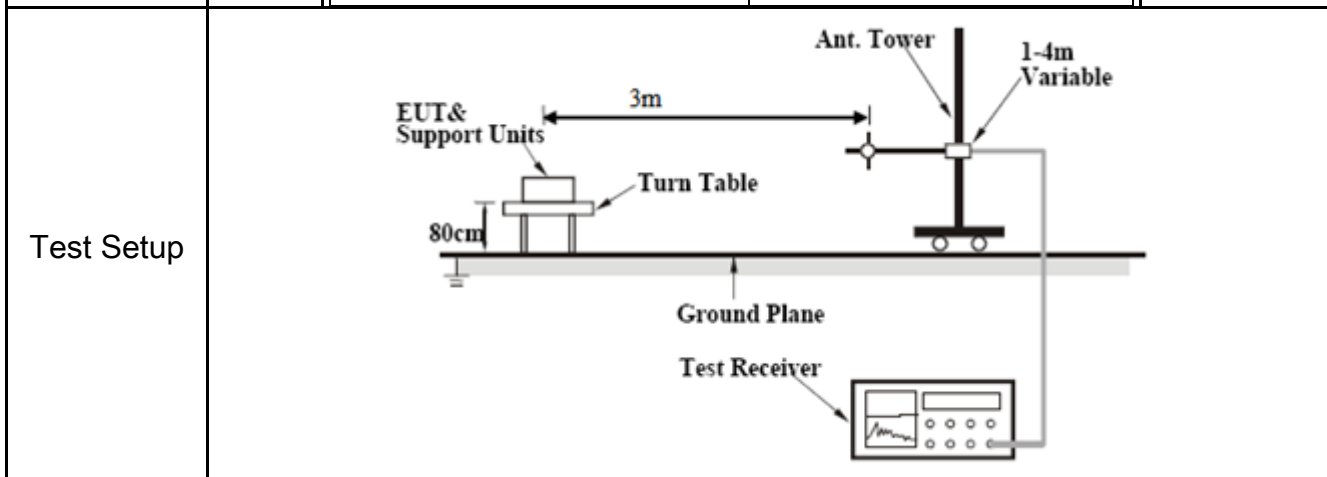
No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.1777	47.63	QP	10.02	57.65	64.59	-6.94
2	N	0.1777	28.94	AVG	10.02	38.96	54.59	-15.63
3	N	0.2241	42.79	QP	10.02	52.81	62.67	-9.86
4	N	0.2241	29.29	AVG	10.02	39.31	52.67	-13.36
5	N	0.3183	35.97	QP	10.02	45.99	59.75	-13.76
6	N	0.3183	20.86	AVG	10.02	30.88	49.75	-18.87
7	N	0.3645	28.26	QP	10.02	38.28	58.63	-20.35
8	N	0.3645	14.32	AVG	10.02	24.34	48.63	-24.29
9	N	2.7357	19.16	QP	10.05	29.21	56.00	-26.79
10	N	2.7357	13.34	AVG	10.05	23.39	46.00	-22.61
11	N	16.0806	22.74	QP	10.21	32.95	60.00	-27.05
12	N	16.0806	13.34	AVG	10.21	23.55	50.00	-26.45

6.2 Radiated Emissions

Temperature	25°C
Relative Humidity	54%
Atmospheric Pressure	1012mbar
Test date :	September 12, 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 ($\mu\text{V}/\text{m}$)</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 ($\mu\text{V}/\text{m}$)	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"> 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 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"> a. Vertical or horizontal polarization (whichever gave the higher emission level
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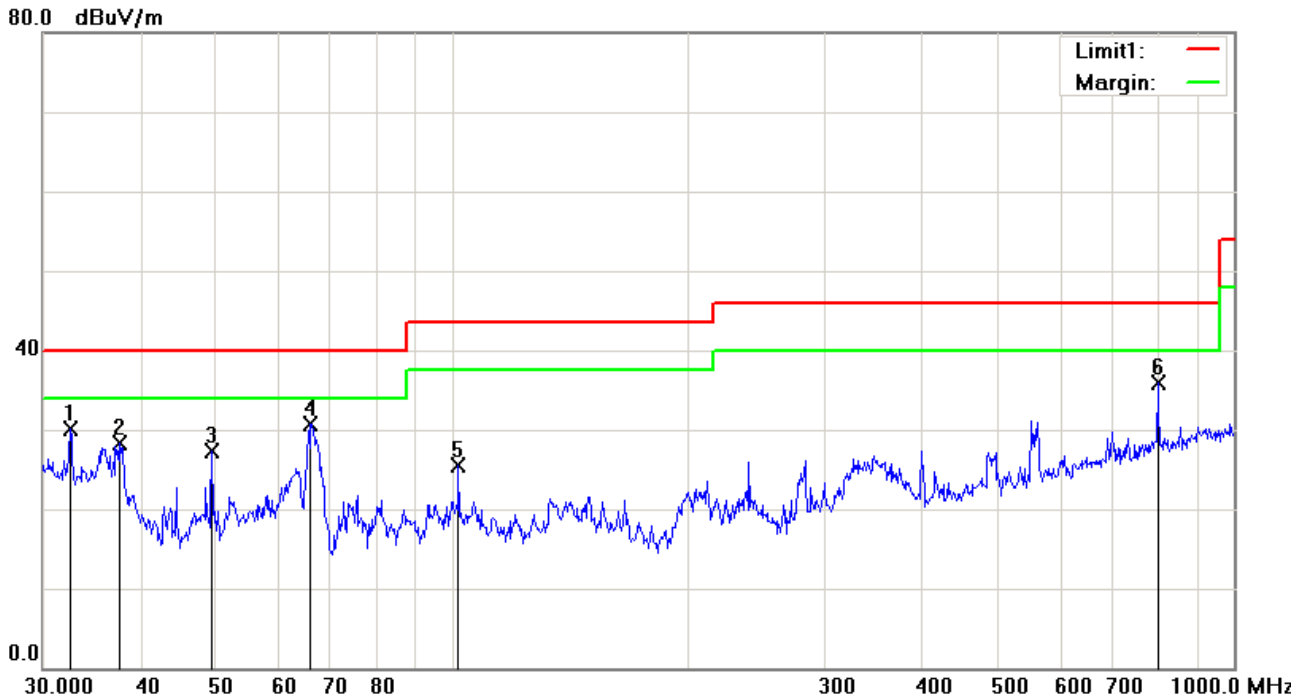
	<p>over a full rotation of the EUT) was chosen.</p> <p>b. The EUT was then rotated to the direction that gave the maximum emission.</p> <p>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</p> <p>3. The resolution bandwidth and video bandwidth of test receiver/spectrum 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 < 98%) □ 10 Hz (Duty cycle > 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

Test Mode 1: USB Mode

Below 1GHz



Test Data

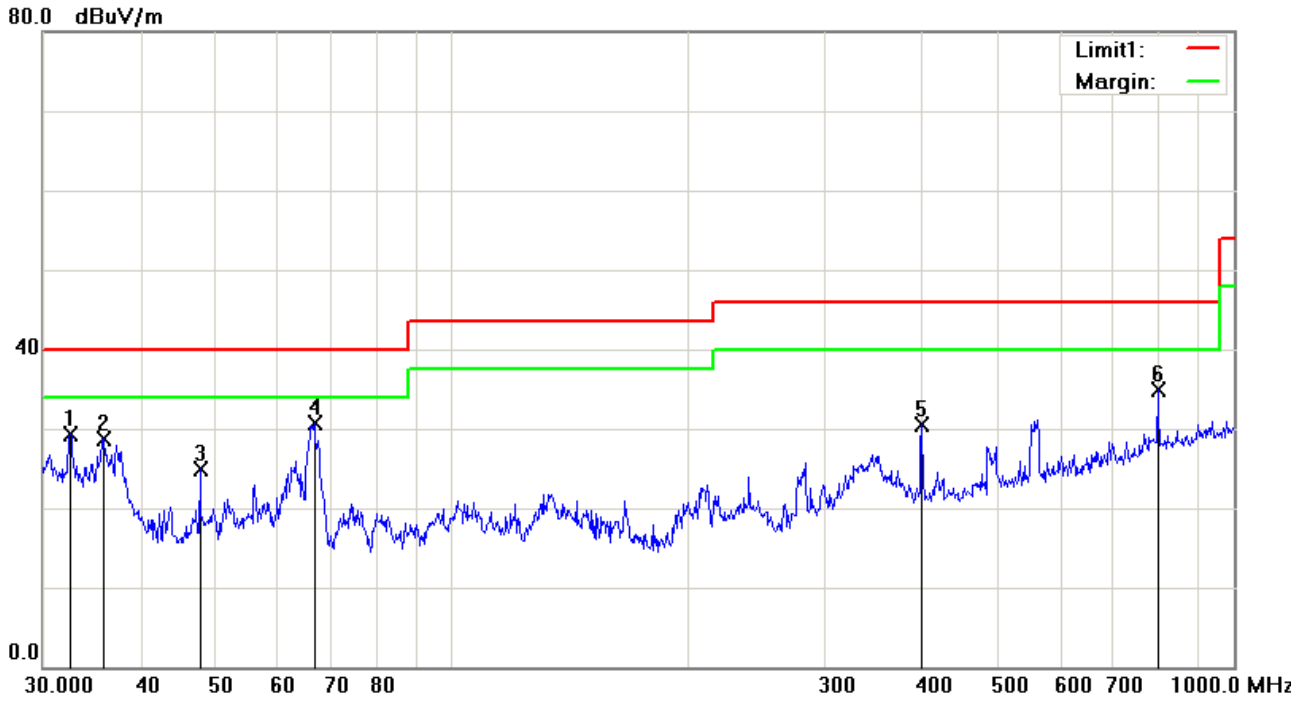
Horizontal Polarity Plot @3m

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	32.5198	32.12	peak	-2.11	30.01	40.00	-9.99	100	3
2	H	37.5479	34.07	peak	-5.80	28.27	40.00	-11.73	100	270
3	H	49.3594	40.22	peak	-12.90	27.32	40.00	-12.68	100	191
4	H	66.0342	44.68	peak	-13.89	30.79	40.00	-9.21	100	86
5	H	102.0014	35.87	peak	-10.44	25.43	43.50	-18.07	100	191
6	H	798.9797	32.76	peak	3.20	35.96	46.00	-10.04	100	359

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	32.5198	31.51	peak	-2.11	29.40	40.00	-10.60	100	246
2	V	35.8747	33.27	peak	-4.58	28.69	40.00	-11.31	100	25
3	V	47.6586	37.02	peak	-12.13	24.89	40.00	-15.11	100	153
4	V	66.7325	44.54	peak	-13.84	30.70	40.00	-9.30	100	89
5	V	399.0302	34.87	peak	-4.32	30.55	46.00	-15.45	100	0
6	V	798.9797	31.77	peak	3.20	34.97	46.00	-11.03	100	355

Above 1GHz

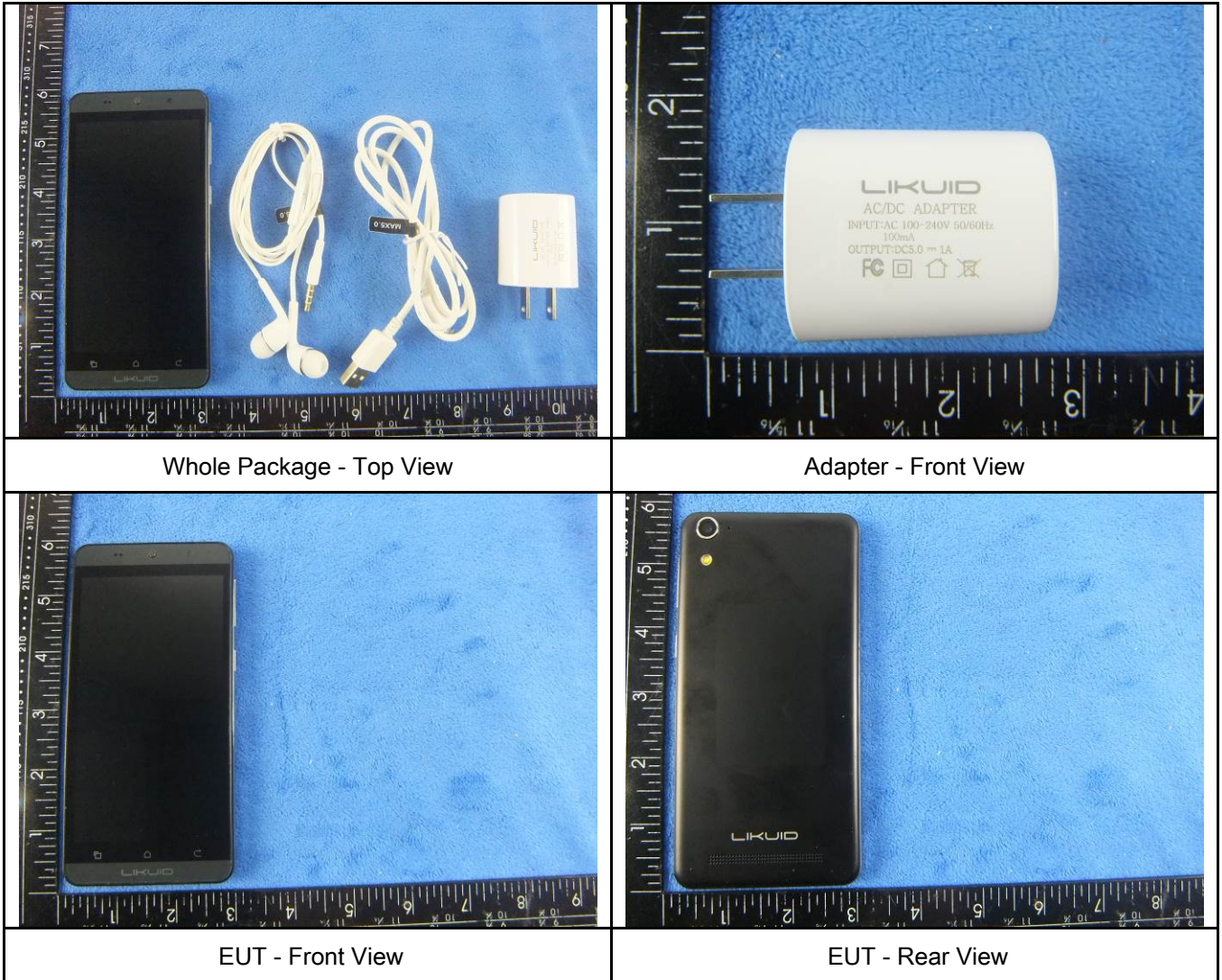
Note: The frequency that above 1GHz is mainly from the environment noise.

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
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	09/01/2015	08/31/2016	<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	09/01/2015	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	09/22/2014	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

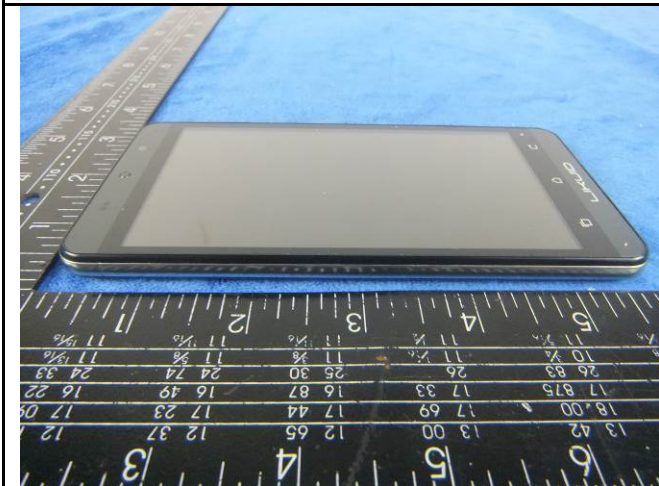




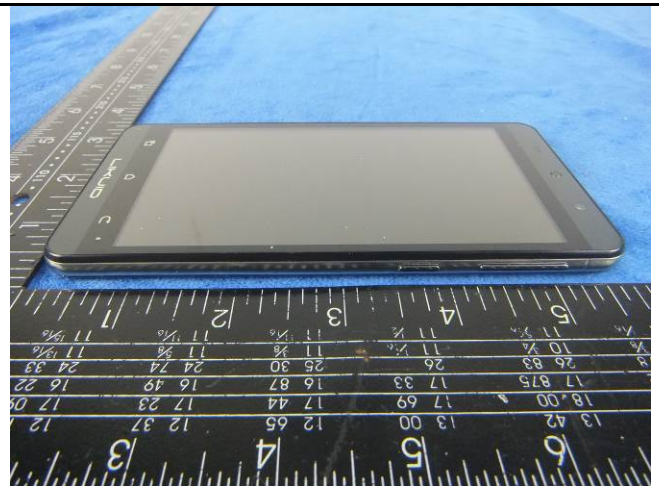
EUT - Top View



EUT - Bottom View



EUT - Left View



EUT - Right View

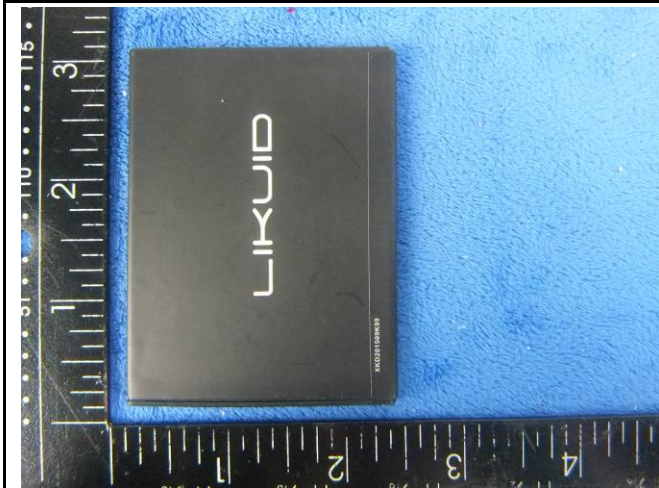
Annex B.ii. Photograph: EUT Internal Photo



Cover Off - Top View 1



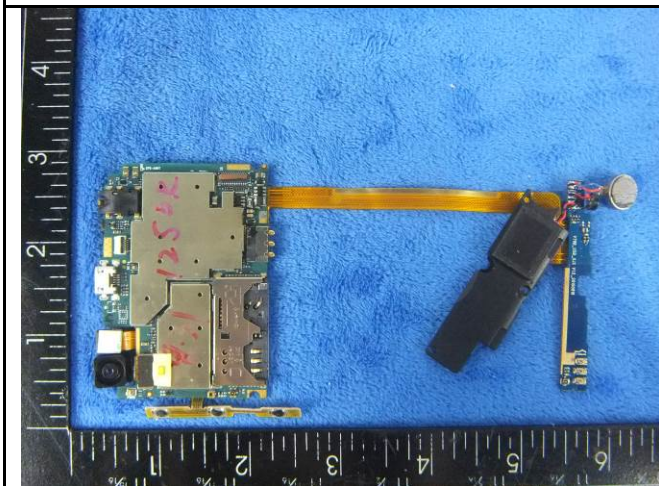
Cover Off - Top View 2



Battery - Top View



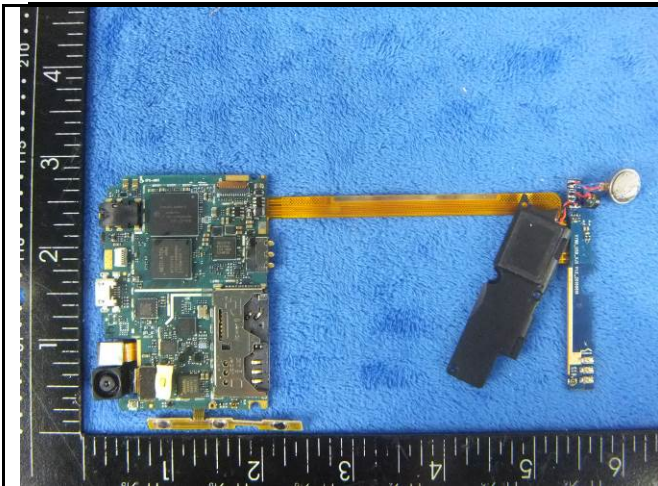
Battery - Bottom View



Mainboard With Shielding - Front View



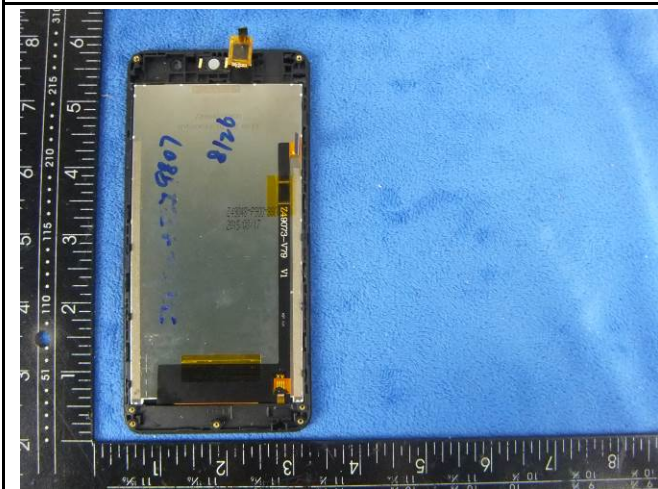
Mainboard With Shielding - Rear View



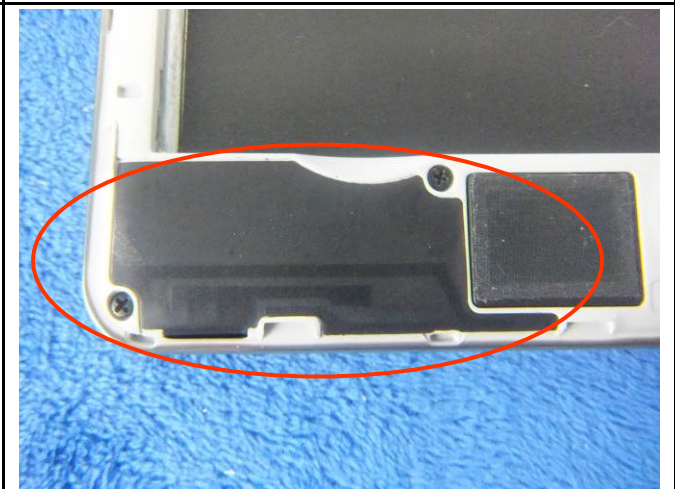
Mainboard Without Shielding - Front View



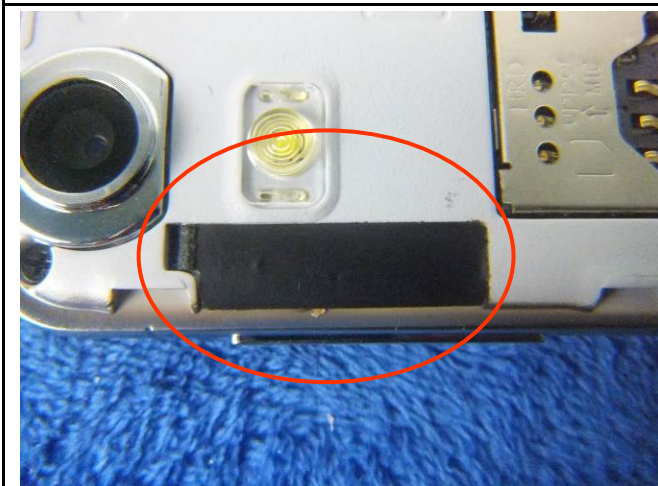
LCD - Front View



LCD - Rear View



GSM/PCS/UMTS-FDD Antenna View



WIFI/BT/BLE/GPS - Antenna View

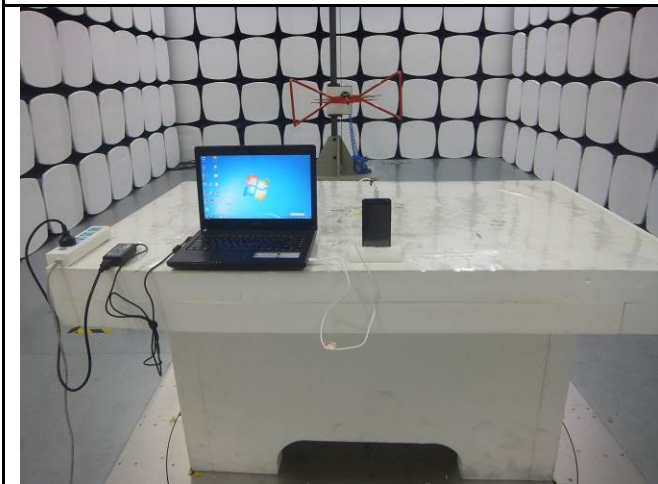
Annex B.iii. Photograph: Test Setup Photo



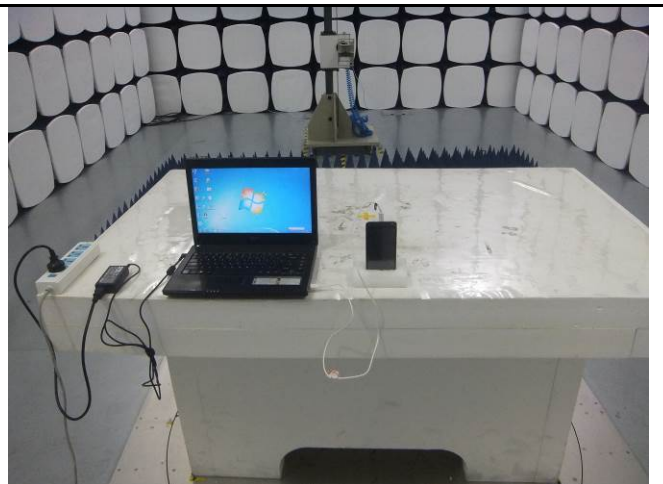
Conducted Emissions Test Setup – Front View



Conducted Emissions Test Setup – Side View



Radiated Spurious Emissions Test Setup Below 1GHz

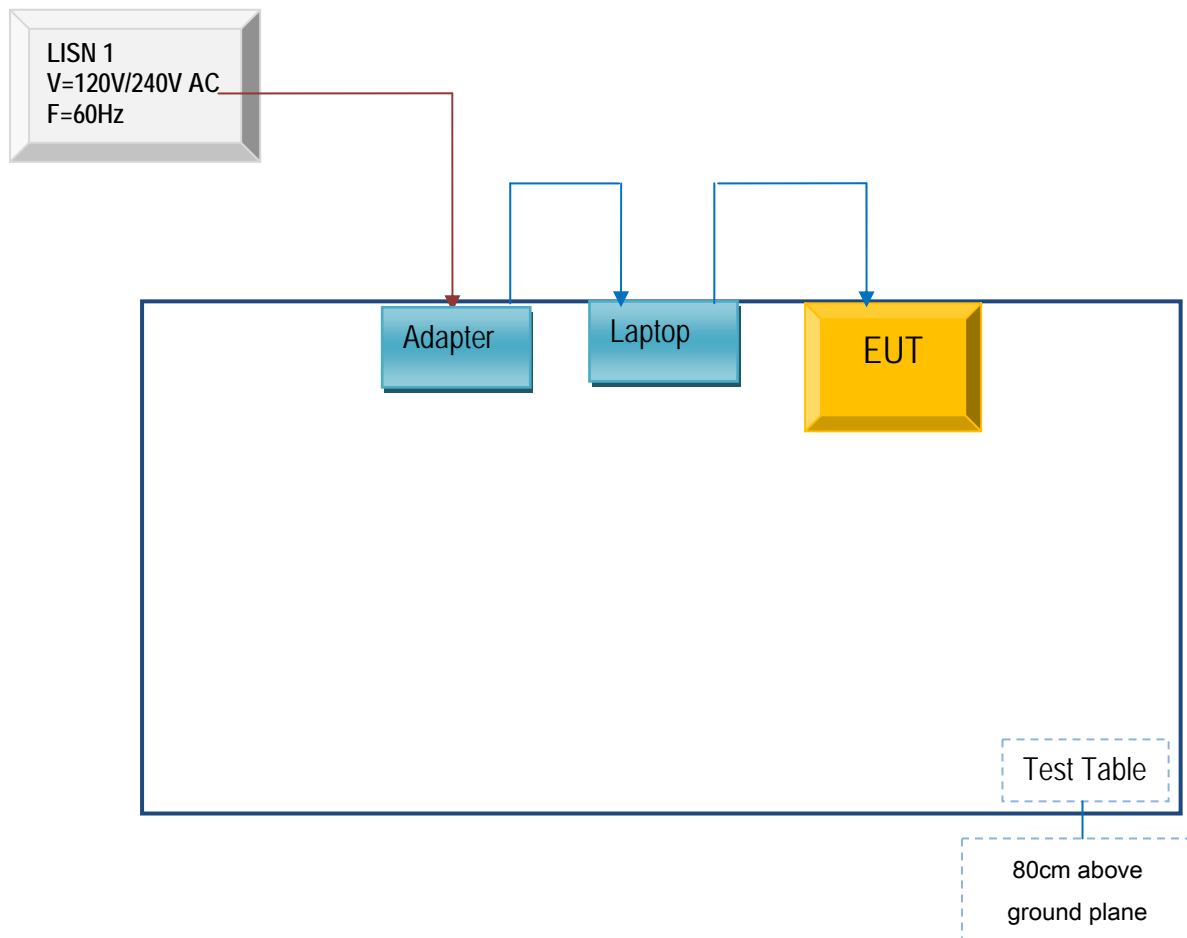


Radiated Spurious Emissions Test Setup Above 1GHz

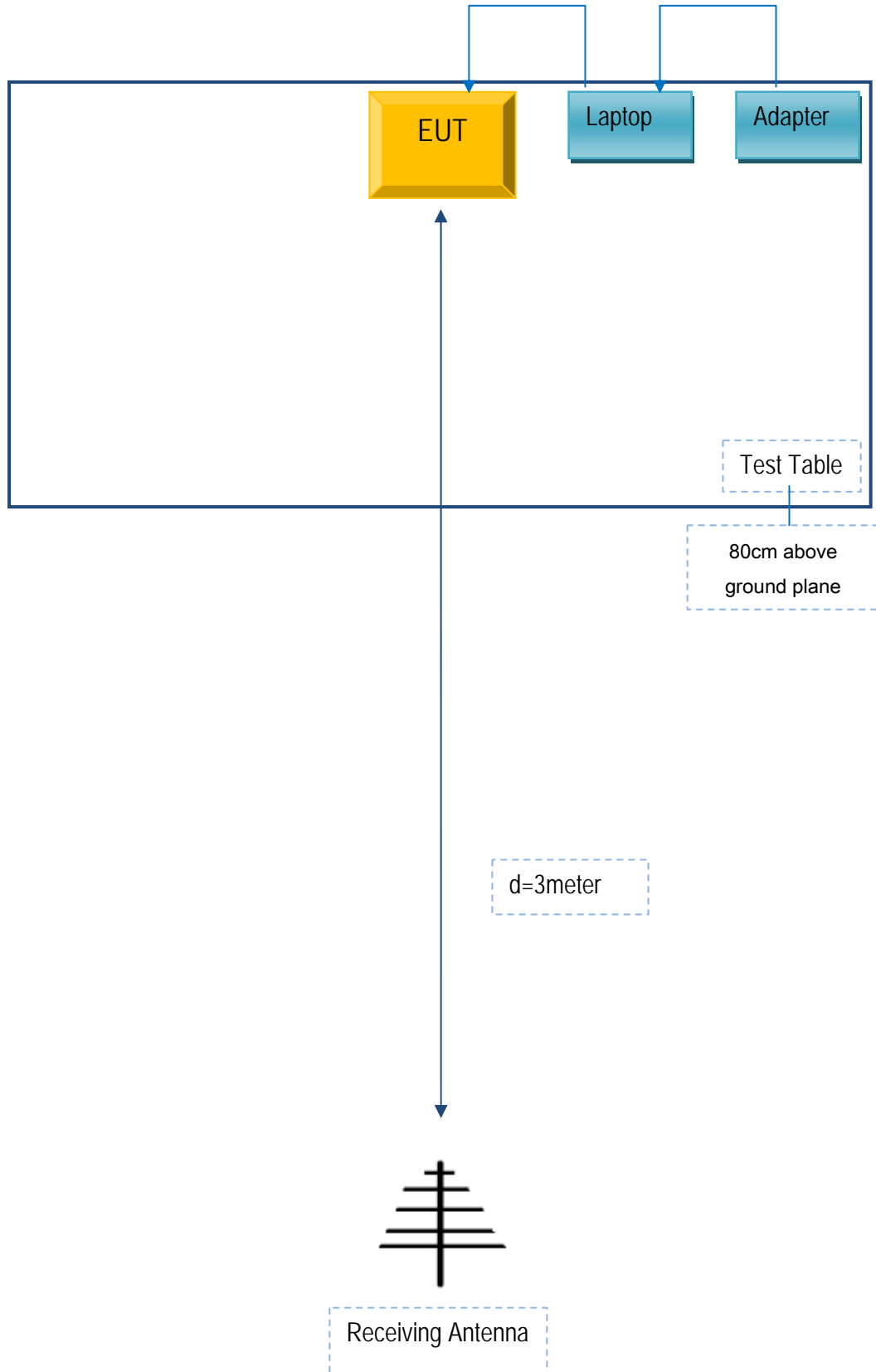
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Conducted Emissions



Block Configuration Diagram for Radiated Emissions



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