EMC TEST REPORT

SIEMIC
GLOBAL TESTING & CERTIFICATIONS
YOUR CHOICE FOR- TCB FCB CB NB CAB RCB

Report No.: 16071033-FCC-E

Supersede Report No.: N/A

Applicant	ESG group SA
Product Name	Mobile Phone
Model No.	Mini
Serial No.	N/A
Test Standard	FCC Part 15 Subpart B Class B:2015, ANSI C63.4: 2014
Test Date	September 01 to September 06, 2016
Issue Date	September 07, 2016
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Loren Luo	David Huang	
Loren Luo Test Engineer	David Huang Checked By	

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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

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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
16071033-FCC-E	NONE	Original	September 07, 2016

2. Customer information

Applicant Name	ESG group SA
Applicant Add	14 Rue Capois, Port-au-Prince Haiti
Manufacturer	ESG group SA
Manufacturer Add	30 Rue des Nimes, route de l'aeoport Port-au-Prince, Haiti

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:	Mini
Serial Model:	N/A
Date EUT received:	August 30, 2016
Test Date(s):	September 01 to September 06, 2016
Equipment Category：	Class B
Antenna Gain:	GSM850: -0.13dBi PCS1900: -0.32dBi Bluetooth: -5.4dBi
Antenna Type:	GSM:PIFA antenna BT: Monopole antenna
Type of Modulation:	GSM / GPRS: GMSK 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 Bluetooth: 2402-2480 MHz
Number of Channels:	GSM 850: 124CH PCS1900: 299CHH Bluetooth: 79CH
Port:	Power Port, Earphone Port, USB Port

Input Power:	Adapter: Model:GCH-001 Input: AC 100-240V,50/60Hz;0.15A Output: DC 5.0V,500mA Battery: Model:BT012300 Spec: 3.7V,700mAh Charge limited voltage: 4.2V
Trade Name :	Gravity
GPRS Multi-slot class	8/10/12
FCC ID:	2AGOOMINIHT

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

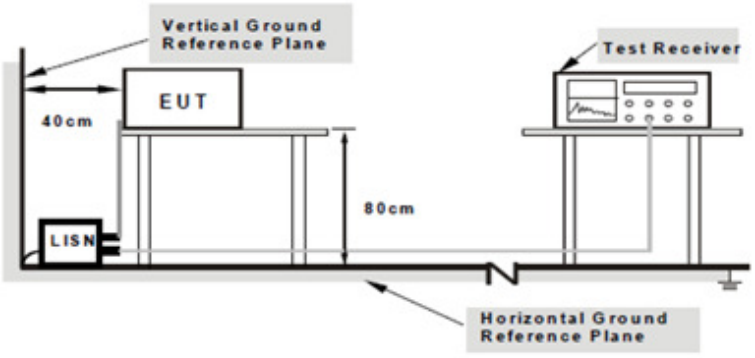
Emissions		
Test Item	**Description**	**Uncertainty**
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

6. Measurements, Examination And Derived Results

6.1 AC Power Line Conducted Emissions

Temperature	25℃
Relative Humidity	54%
Atmospheric Pressure	1002mbar
Test date :	September 02, 2016
Tested By :	Loren Luo

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.107</td><td>a)</td><td>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.
<table>
<tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBμV)</th></tr>
<tr><th>QP</th><th>Average</th></tr>
<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>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 

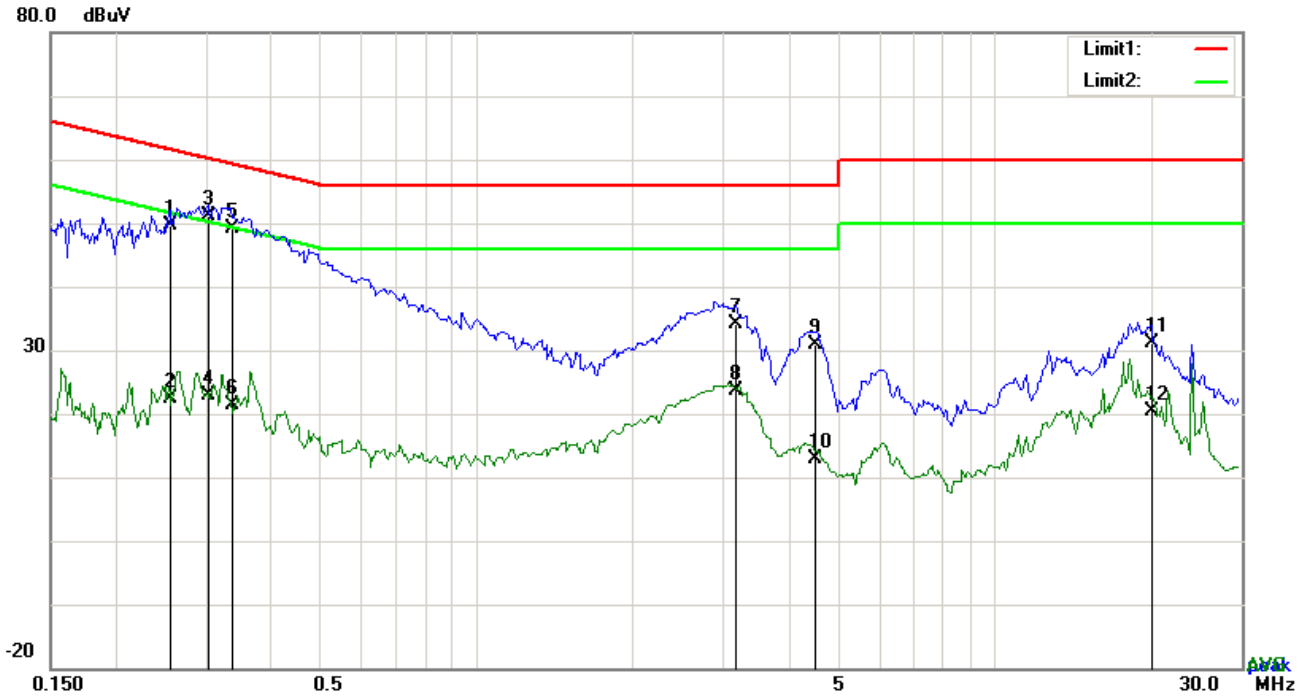
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</td></tr>
</table>

	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	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode:	USB Mode

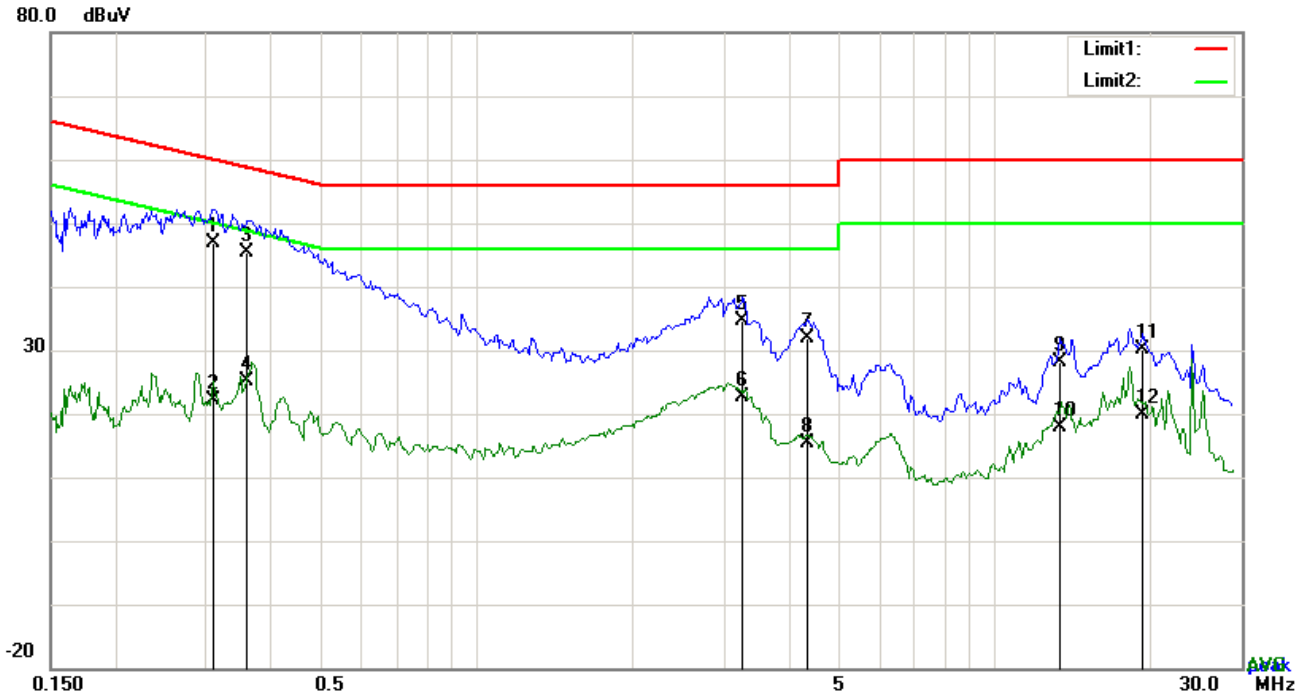


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.2553	39.60	QP	10.03	49.63	61.58	-11.95
2	L1	0.2553	12.30	AVG	10.03	22.33	51.58	-29.25
3	L1	0.3021	41.12	QP	10.03	51.15	60.18	-9.03
4	L1	0.3021	12.80	AVG	10.03	22.83	50.18	-27.35
5	L1	0.3374	39.19	QP	10.03	49.22	59.27	-10.05
6	L1	0.3374	11.36	AVG	10.03	21.39	49.27	-27.88
7	L1	3.1599	23.96	QP	10.06	34.02	56.00	-21.98
8	L1	3.1599	13.46	AVG	10.06	23.52	46.00	-22.48
9	L1	4.5249	20.79	QP	10.07	30.86	56.00	-25.14
10	L1	4.5249	2.92	AVG	10.07	12.99	46.00	-33.01
11	L1	20.0625	20.89	QP	10.30	31.19	60.00	-28.81
12	L1	20.0625	10.15	AVG	10.30	20.45	50.00	-29.55

Test Mode:	USB Mode

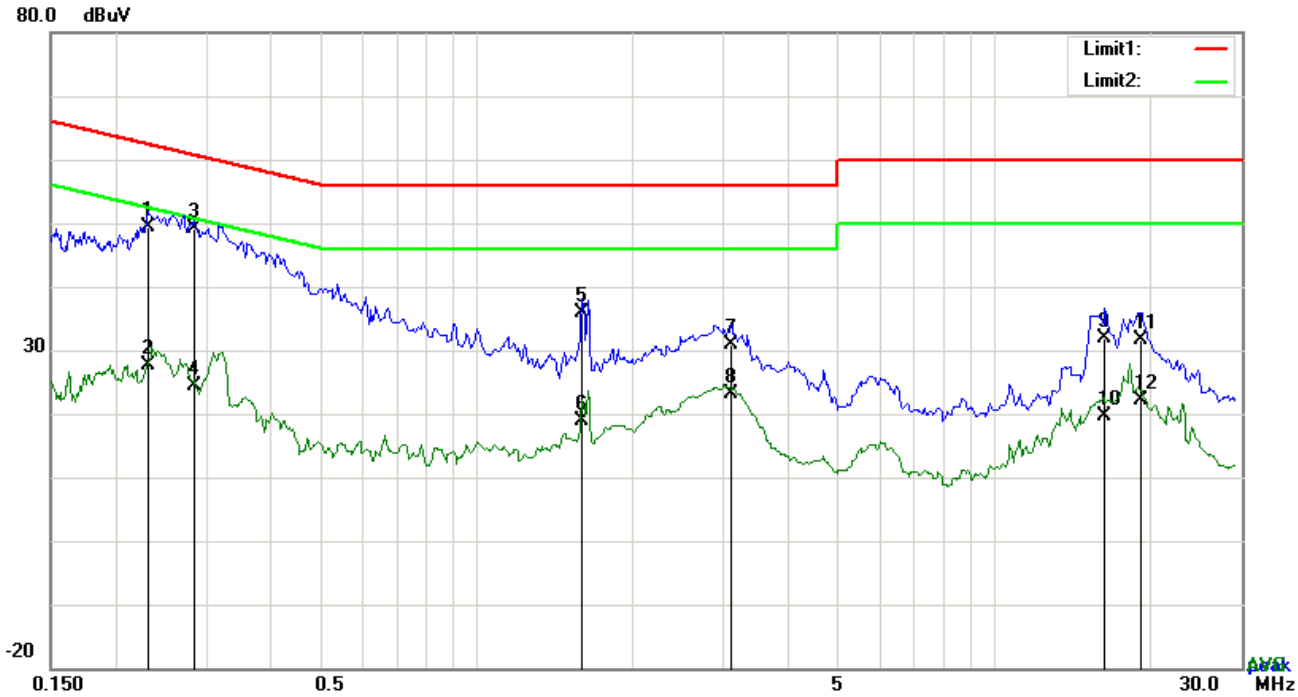


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.3099	36.79	QP	10.02	46.81	59.97	-13.16
2	N	0.3099	12.12	AVG	10.02	22.14	49.97	-27.83
3	N	0.3606	35.32	QP	10.02	45.34	58.71	-13.37
4	N	0.3606	15.06	AVG	10.02	25.08	48.71	-23.63
5	N	3.2730	24.51	QP	10.05	34.56	56.00	-21.44
6	N	3.2730	12.60	AVG	10.05	22.65	46.00	-23.35
7	N	4.3416	21.85	QP	10.06	31.91	56.00	-24.09
8	N	4.3416	5.32	AVG	10.06	15.38	46.00	-30.62
9	N	13.3584	17.86	QP	10.18	28.04	60.00	-31.96
10	N	13.3584	7.63	AVG	10.18	17.81	50.00	-32.19
11	N	19.3644	19.84	QP	10.25	30.09	60.00	-29.91
12	N	19.3644	9.52	AVG	10.25	19.77	50.00	-30.23

Test Mode:	USB Mode

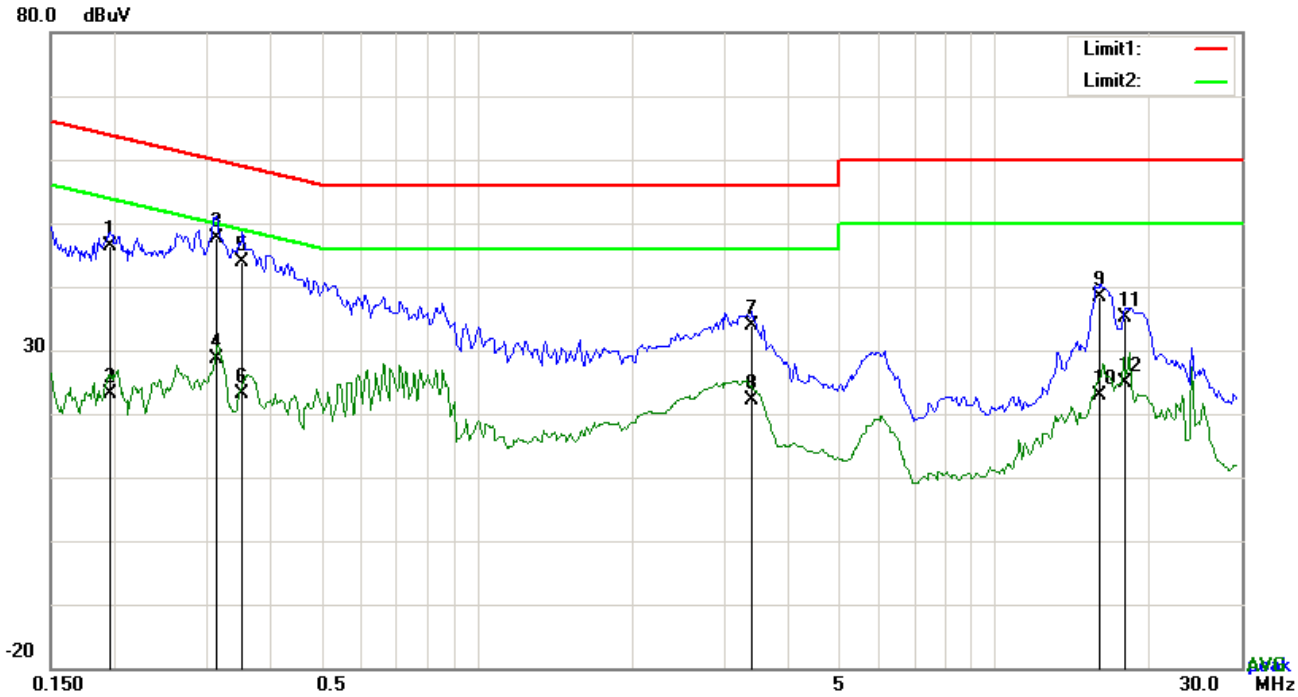


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.2319	39.33	QP	10.03	49.36	62.38	-13.02
2	L1	0.2319	17.61	AVG	10.03	27.64	52.38	-24.74
3	L1	0.2833	39.13	QP	10.03	49.16	60.72	-11.56
4	L1	0.2833	14.25	AVG	10.03	24.28	50.72	-26.44
5	L1	1.6008	25.76	QP	10.04	35.80	56.00	-20.20
6	L1	1.6008	8.81	AVG	10.04	18.85	46.00	-27.15
7	L1	3.1053	20.77	QP	10.06	30.83	56.00	-25.17
8	L1	3.1053	13.18	AVG	10.06	23.24	46.00	-22.76
9	L1	16.3614	21.60	QP	10.25	31.85	60.00	-28.15
10	L1	16.3614	9.46	AVG	10.25	19.71	50.00	-30.29
11	L1	19.2045	21.28	QP	10.29	31.57	60.00	-28.43
12	L1	19.2045	11.89	AVG	10.29	22.18	50.00	-27.82

Test Mode:	USB Mode



Test Data

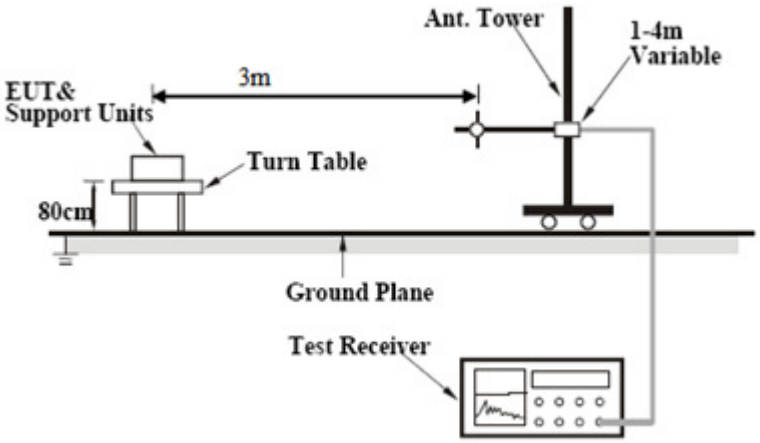
Phase Neutral Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.1955	36.37	QP	10.02	46.39	63.80	-17.41
2	N	0.1955	13.14	AVG	10.02	23.16	53.80	-30.64
3	N	0.3138	37.67	QP	10.02	47.69	59.87	-12.18
4	N	0.3138	18.54	AVG	10.02	28.56	49.87	-21.31
5	N	0.3528	33.92	QP	10.02	43.94	58.90	-14.96
6	N	0.3528	13.11	AVG	10.02	23.13	48.90	-25.77
7	N	3.4056	23.79	QP	10.05	33.84	56.00	-22.16
8	N	3.4056	12.14	AVG	10.05	22.19	46.00	-23.81
9	N	16.0182	28.24	QP	10.21	38.45	60.00	-21.55
10	N	16.0182	12.74	AVG	10.21	22.95	50.00	-27.05
11	N	17.9019	24.94	QP	10.23	35.17	60.00	-24.83
12	N	17.9019	14.59	AVG	10.23	24.82	50.00	-25.18

6.2 Radiated Emissions

Temperature	25℃
Relative Humidity	54%
Atmospheric Pressure	1002mbar
Test date :	September 02, 2016
Tested By :	Loren Luo

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.107(d)</td><td>a)</td><td>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
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (μV/m)</th></tr>
<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>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">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:
a. Vertical or horizontal polarization (whichever gave the higher emission level</td></tr>
</table>

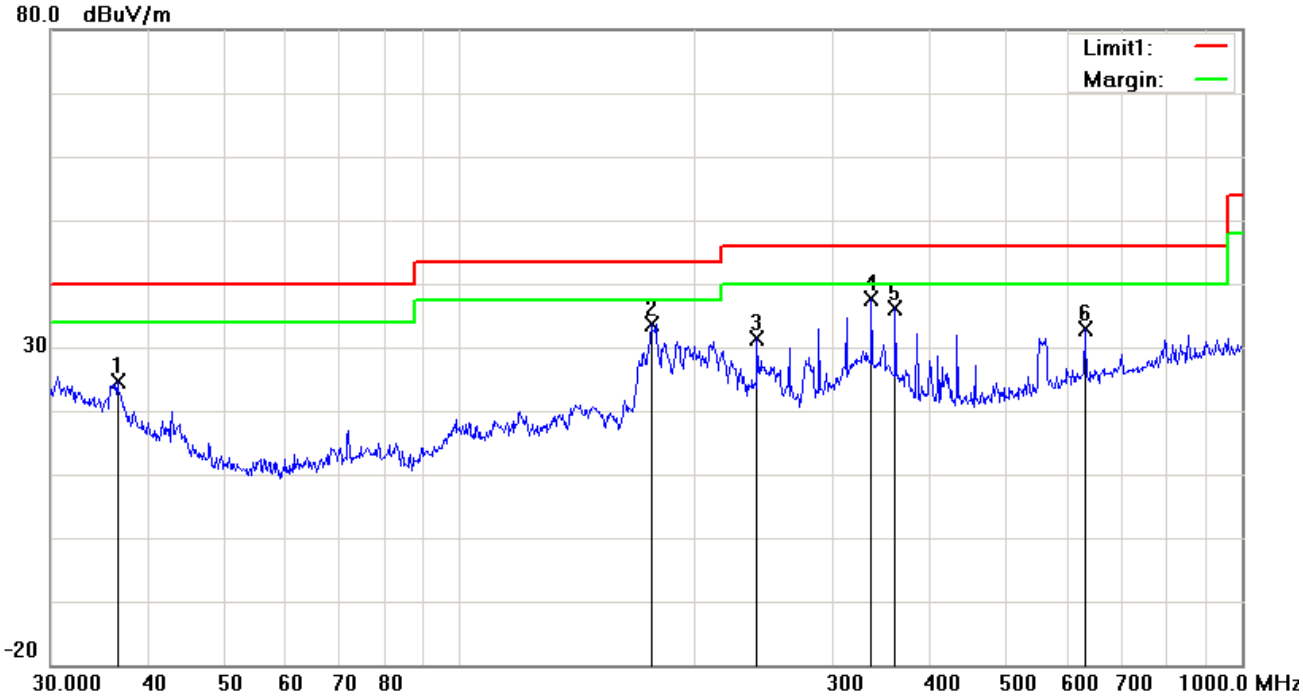
	over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. 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%) 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode :	USB Mode

Below 1GHz

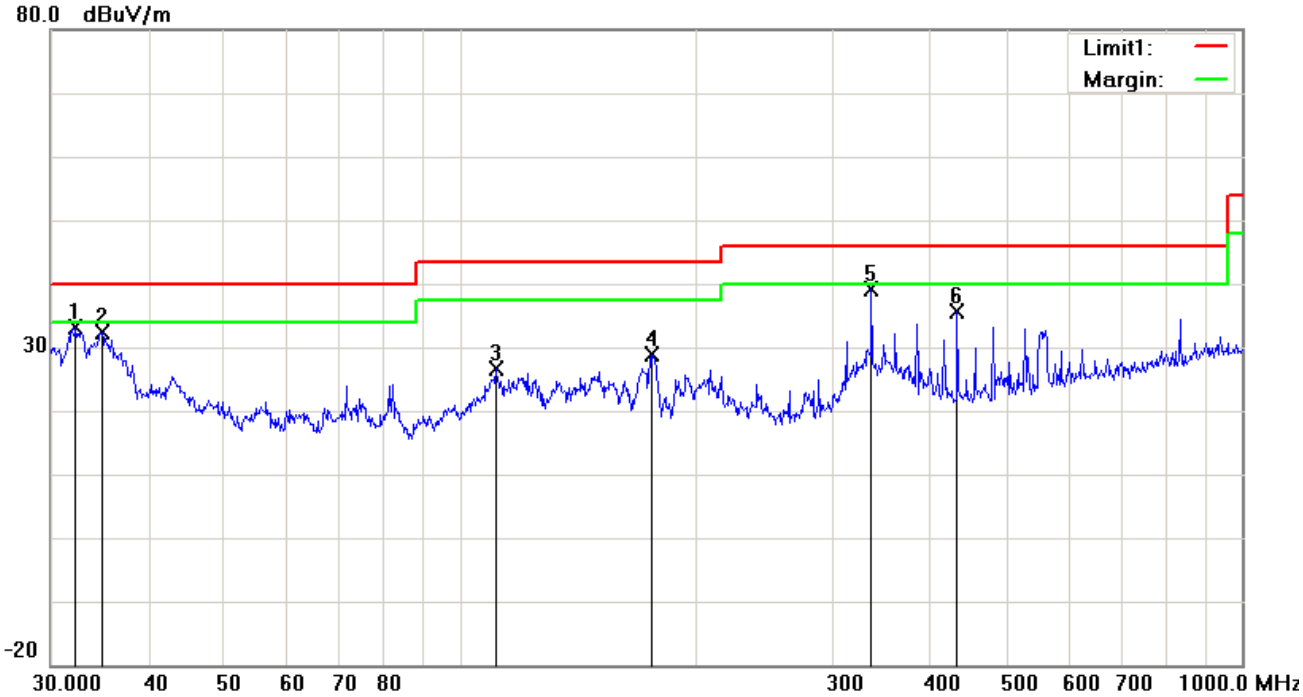


Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	H	36.5092	29.62	peak	-5.04	24.58	40.00	-15.42	100	123
2	H	175.6516	43.05	peak	-9.54	33.51	43.50	-9.99	100	158
3	H	239.9873	40.56	peak	-9.10	31.46	46.00	-14.54	100	167
4	H	336.0352	43.43	peak	-5.86	37.57	46.00	-8.43	100	95
5	H	360.4477	41.45	peak	-5.22	36.23	46.00	-9.77	100	317
6	H	629.4772	32.30	peak	0.47	32.77	46.00	-13.23	100	235

Below 1GHz



Test Data

Vertical 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	V	32.2925	35.10	peak	-1.96	33.14	40.00	-6.86	100	325
2	V	34.8823	36.26	peak	-3.85	32.41	40.00	-7.59	100	154
3	V	111.3468	35.29	peak	-8.78	26.51	43.50	-16.99	100	169
4	V	176.2686	38.35	peak	-9.59	28.76	43.50	-14.74	100	84
5	V	336.0352	44.99	peak	-5.86	39.13	46.00	-6.87	100	254
6	V	432.5457	39.11	peak	-3.50	35.61	46.00	-10.39	100	93

Above 1GHz

Frequency (MHz)	Amplitude (dBμV/m)	Azimuth	Height (cm)	Polarity (H/V)	Factors (dB)	Limit (dBμV/m)	Margin (dB)	Detector (PK/AV)
1561.25	52.3	49	128	V	-22.22	74	-21.7	PK
2075.4	49.21	121	138	V	-23.54	74	-24.79	PK
1772.43	49.55	73	184	V	-21.42	74	-24.45	PK
827.33	50.33	60	105	H	-22.36	74	-23.67	PK
1252.52	49.55	122	230	H	-21.58	74	-24.45	PK
1771.33	48.73	137	169	H	-22.5	74	-25.27	PK

*Note1: The highest frequency of the EUT is 2480 MHz, so the testing has been conformed to 5*2480MHz=12,400MHz.*

Note2: The frequency that above 3GHz is mainly from the environment noise.

Note3, X-Axis, Y-Axis and –Axis were investigated. The results above show only the worst case.

Note4: The AV measurement performed, more than 20dB below limit so AV test data was not presented.

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	☑
Line Impedance Stabilization Network	LI-125A	191106	09/25/2015	09/24/2016	☑
Line Impedance Stabilization Network	LI-125A	191107	09/25/2015	09/24/2016	☑
LISN	ISN T800	34373	09/25/2015	09/24/2016	☑
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	☑
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/24/2016	03/23/2017	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	☑
Double Ridge Horn Antenna	AH-118	71259	09/24/2015	09/23/2016	☑

Annex B. EUT And Test Setup Photographs

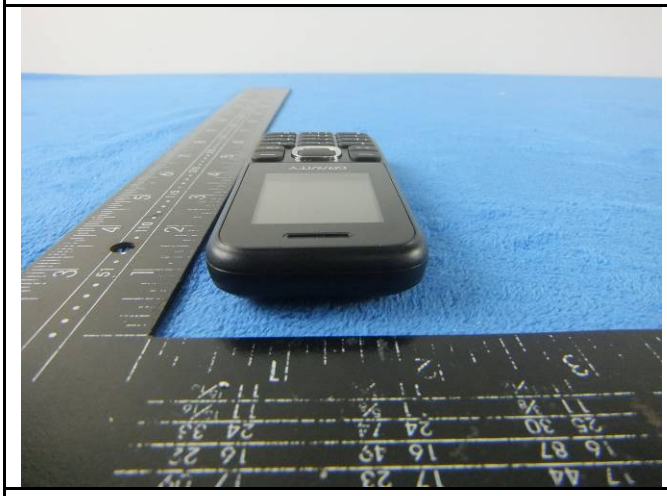
Annex B.i. Photograph: EUT External Photo

Whole Package View

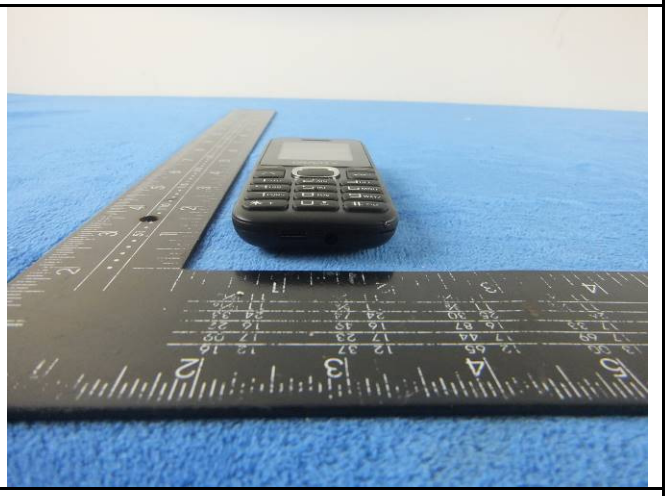
Adapter - Front View

EUT - Front View

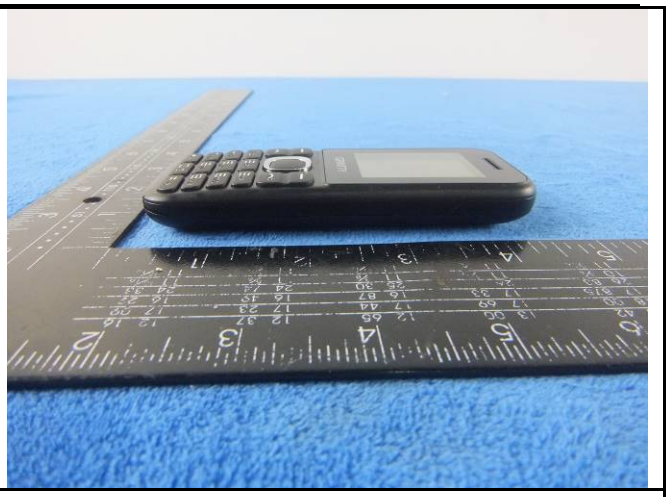
EUT - Rear View



EUT - Top View



EUT - Bottom View

	
EUT - Left View	EUT - Right View

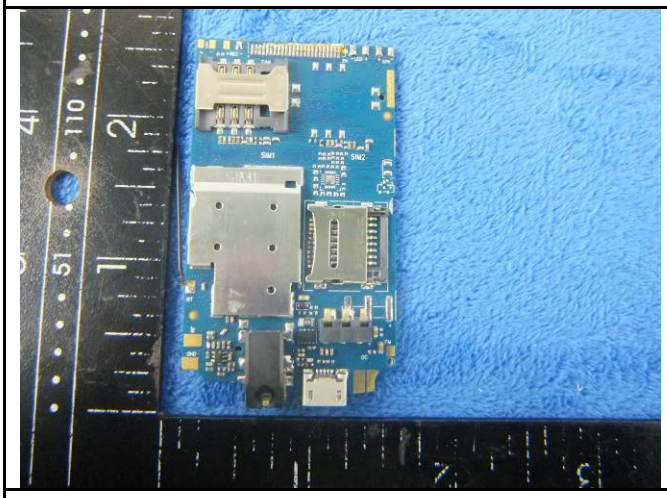
Annex B.ii. Photograph: EUT Internal Photo

Cover Off - Top View 1

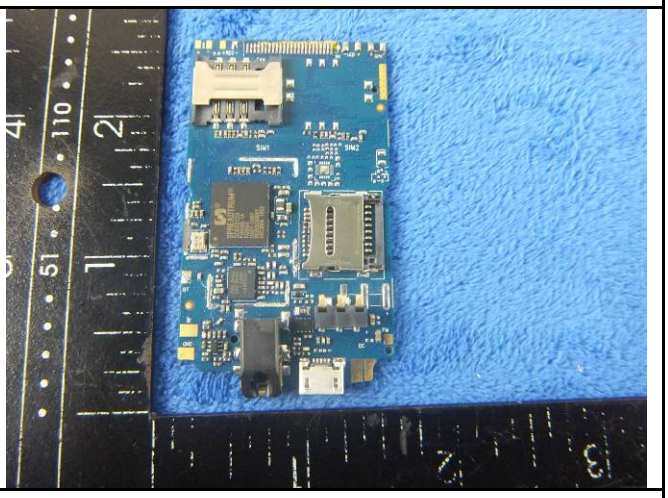
Cover Off - Top View 2

Battery - Front View

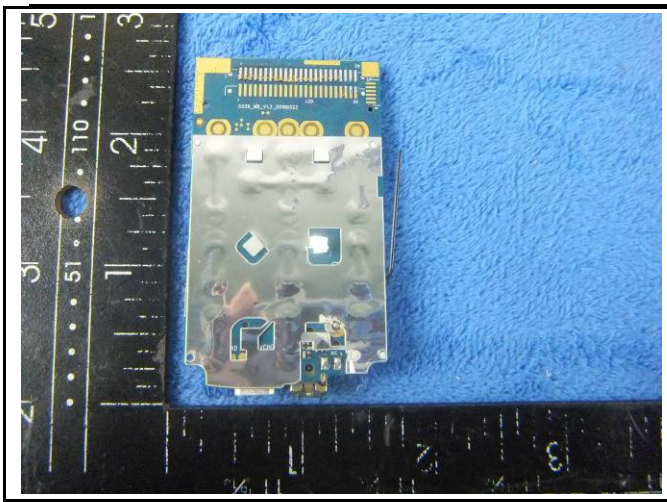
Battery - Rear View



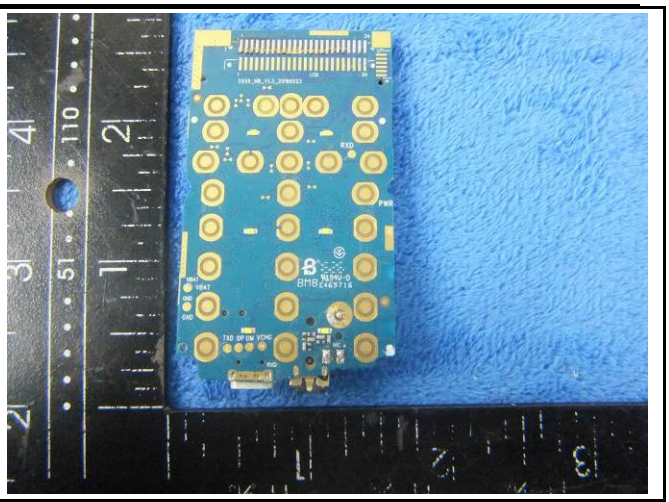
Mainboard with Shielding - Front View



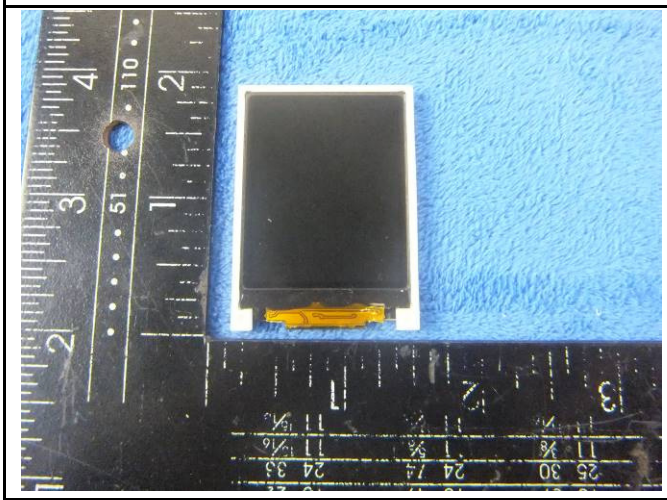
Mainboard without Shielding - Front View



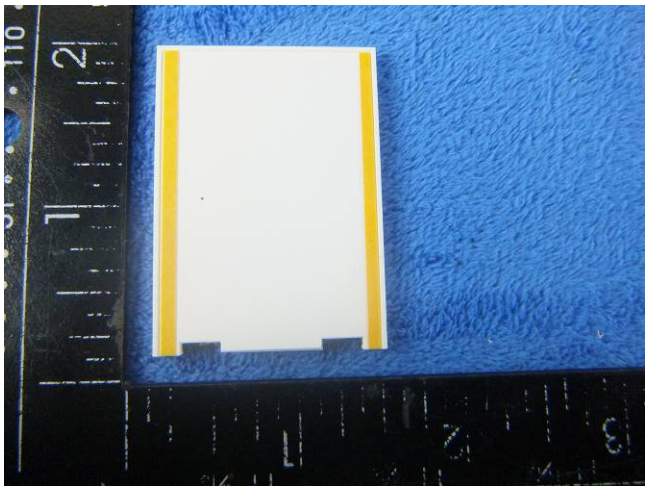
Mainboard with Shielding - Rear View



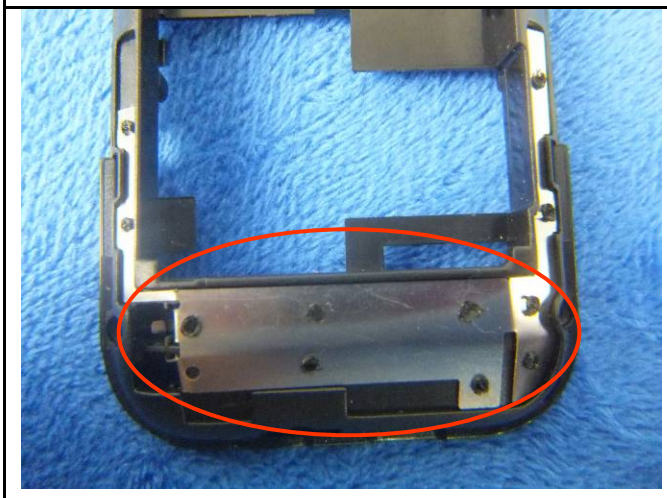
Mainboard without Shielding – Rear View



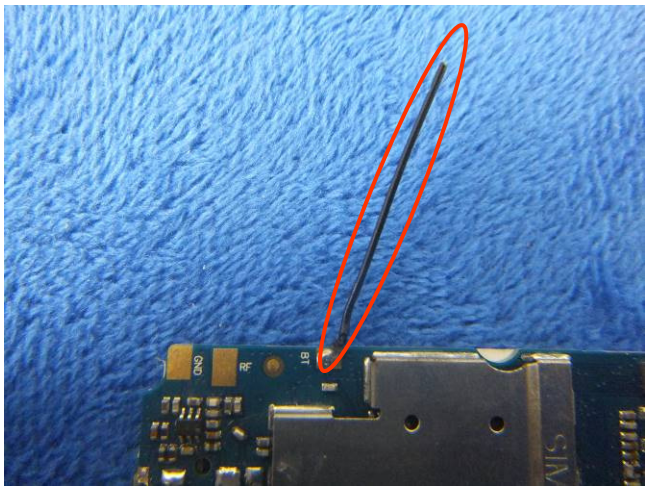
LCD – Front View



LCD – Rear View

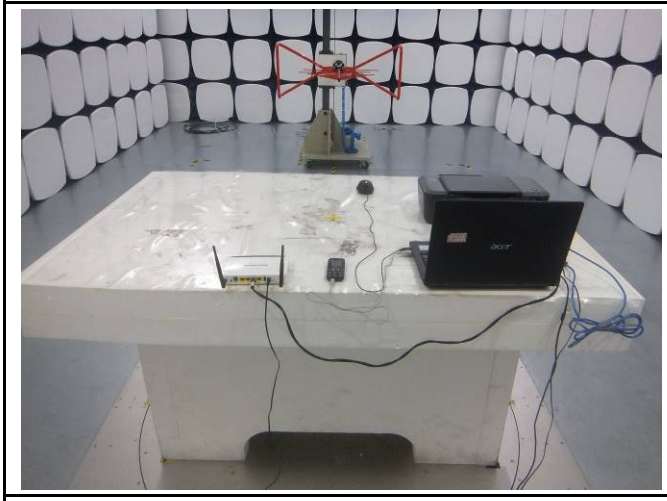
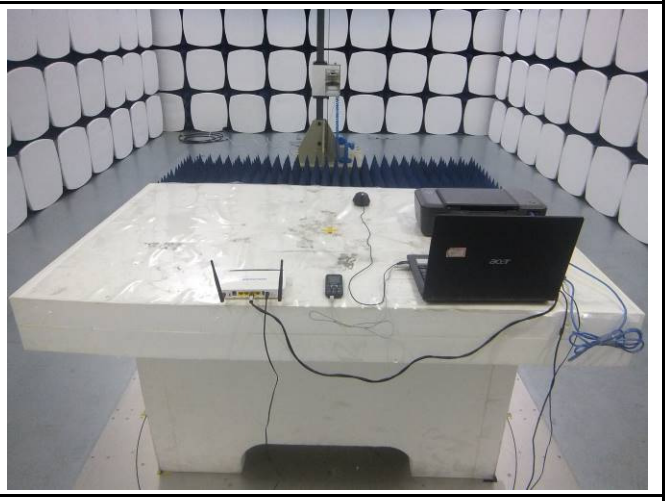


GSM/PCS Antenna View



BT- Antenna View

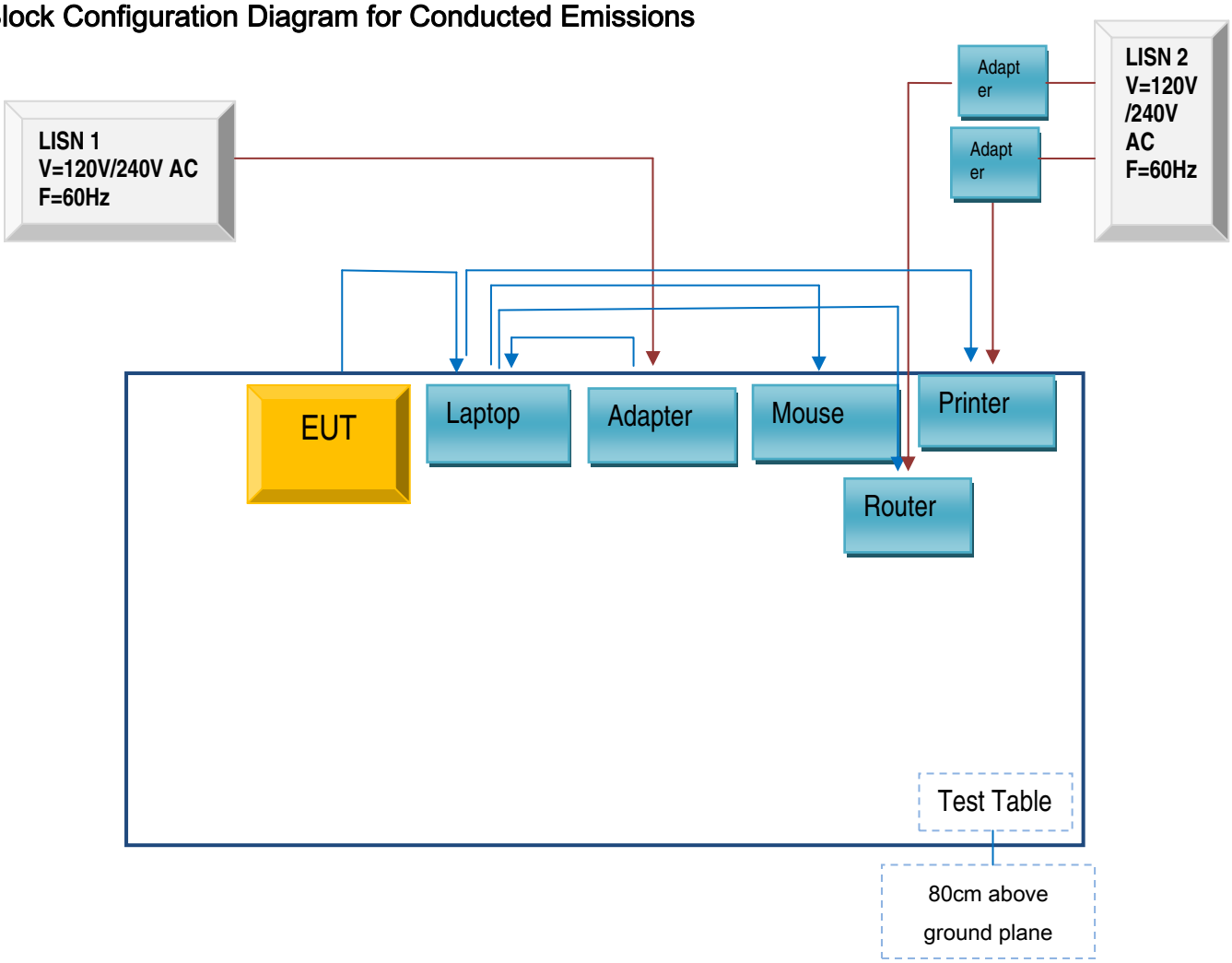
Annex B.iii. Photograph: Test Setup Photo

Conducted Emissions Test Setup – TF Card Front View	Conducted Emissions Test Setup – TF Card Side View
	
Radiated Emissions Test Setup Below 1GHz - TF Card Front View	Radiated Emissions Test Setup Above 1GHz - TF Card Side View

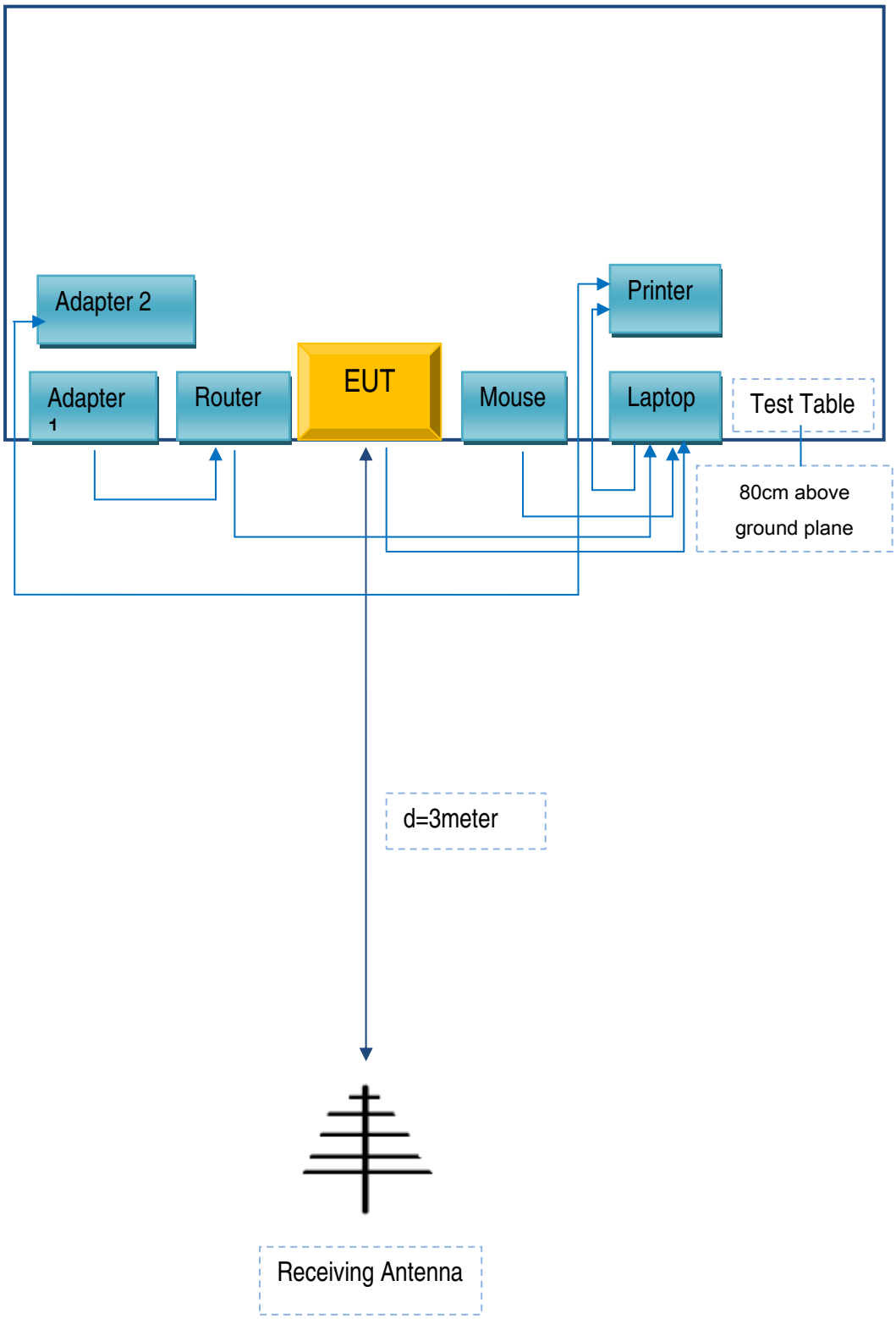
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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.

Supporting equipment:

Manufacturer	Equipment Description	Model	Serial No
Lenovo	Laptop	E40	LR-1EHRX
GOLDWEB	Router	R102	1202032094
ESG group SA	AC Adapter	GCH-001	001
HP	Printer	VCVRA-1003	CN36M19JWX
DELL	Mouse	E100	912NMTUT41481
BULL	Socket	GN-403	GN201203

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	2m	JX120051274
USB Cable	Un-shielding	No	2m	JX110725002
RJ45 Cable	Un-shielding	No	2m	KX156327541
Router Power cable	Un-shielding	No	2m	13274630Z
Printer Power cable	Un-shielding	No	2m	127581031
Power Cable	Un-shielding	No	0.8m	GT211032

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

Please see attachment

Annex E. DECLARATION OF SIMILARITY

N/A