

EMC TEST REPORT



Report No.: 15050020-FCC-E

Applicant	b mobile HK Limited	
Product Name	Mobile phone	
Model No.	AX680	
Serial No.	AX670	
Test Standard	FCC Part 15 Subpart B Class B:2014, ANSI C63.4: 2014	
Test Date	June 04 to June 16, 2015	
Issue Date	June 16, 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>Chris You</i>	
Winnie Zhang 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

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
15050020-FCC-E	NONE	Original	June 16, 2015

2. Customer information

Applicant Name	b mobile HK Limited
Applicant Add	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung;New Territories; Hong Kong
Manufacturer	b mobile HK limited
Manufacturer Add	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung;New Territories; Hong Kong

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: AX680

Serial Model: AX670

Date EUT received: June 04, 2015

Test Date(s): June 04 to June 16, 2015

Equipment Category : JBP

Antenna Gain:

GSM850: -1.87 dBi
PCS1900: -0.75dBi
UMTS-FDD Band V: -0.62dBi
UMTS-FDD Band II: -0.62dBi
Bluetooth/BLE: -0.7dBi
WIFI: -0.7dBi

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): 2412-2472 MHz
WIFI:802.11n(40M): 2422-2462 MHz
Bluetooth& BLE: 2402-2480 MHz
GPS RX:1575.42 MHz

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	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;
RF Operating Frequency (ies):	RX: 1932.4 ~ 1987.6 MHz
	WIFI:802.11b/g/n(20M): 2412-2472 MHz
	WIFI:802.11n(40M): 2422-2462 MHz
	Bluetooth& BLE: 2402-2480 MHz
	GPS RX:1575.42 MHz
	GSM 850: 124CH
	PCS1900: 299CH
	UMTS-FDD Band V : 102CH
Number of Channels:	UMTS-FDD Band II : 277CH
	WIFI :802.11b/g/n(20M): 13CH
	WIFI :802.11n(40M): 9CH
	Bluetooth: 79CH
	BLE: 40CH
Port:	Power Port, Earphone Port, USB Port
	Battery:
	Model: T-41
Input Power:	Spec: 3.7V 1500mAh 5.55Wh
	Adapter:
	Input: AC 100-240V; 150mA
	Output: DC 5.0V; 500mA
Trade Name :	Bmobile
GPRS/EGPRS Multi-slot class	8/10/12
FCC ID:	ZSW-30-006

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	22°C
Relative Humidity	52%
Atmospheric Pressure	1008mbar
Test date :	June 08, 2015
Tested By :	Winnie Zhang

Requirement(s):

Spec	Item	Requirement	Applicable														
47CFR§15.107	a)	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>	Frequency ranges (MHz)	Limit (dBµV)		QP	Average	0.15 ~ 0.5	66 – 56	56 – 46	0.5 ~ 5	56	46	5 ~ 30	60	50	
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"> 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.
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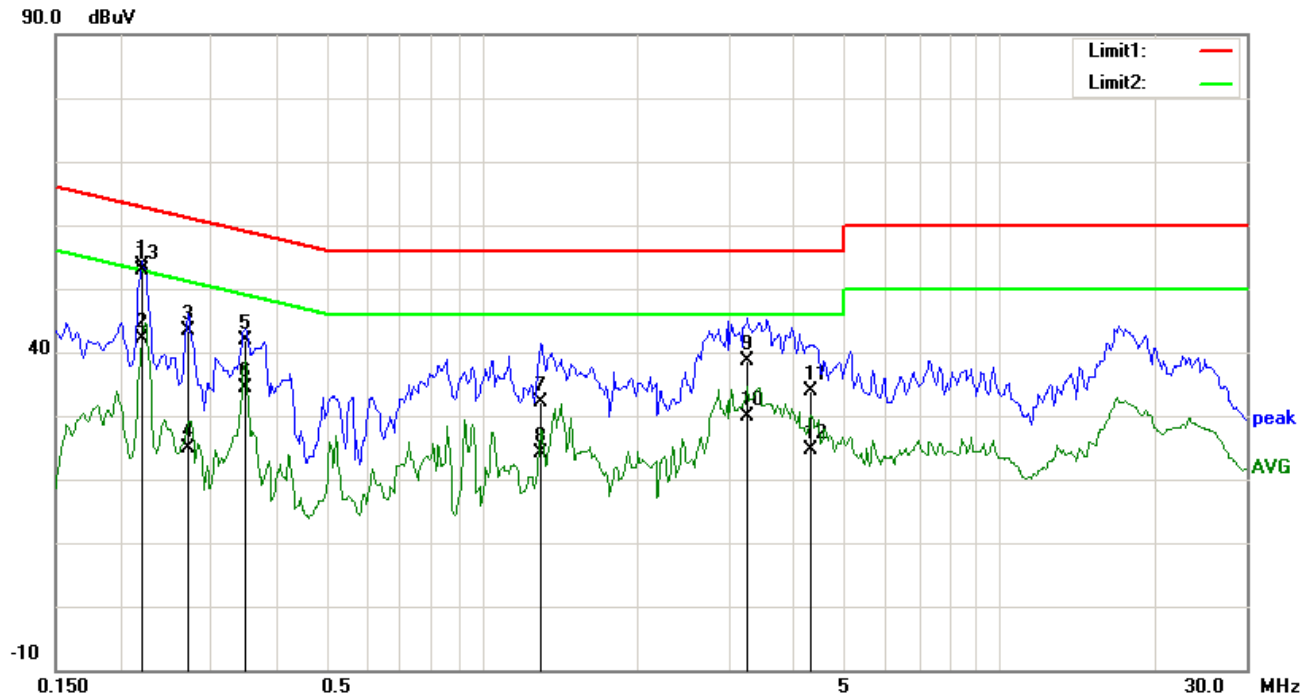
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	<p>3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</p> <p>4. All other supporting equipment were powered separately from another main supply.</p> <p>5. The EUT was switched on and allowed to warm up to its normal operating condition.</p> <p>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.</p> <p>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.</p> <p>8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).</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

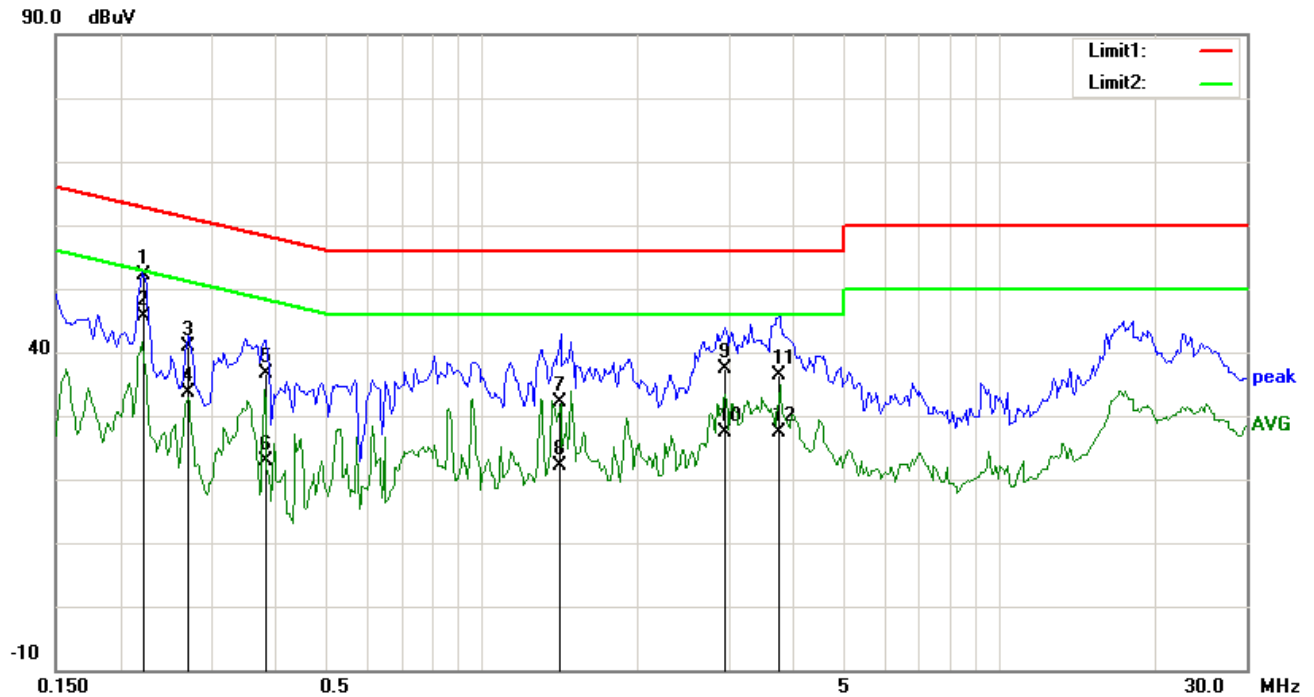


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)	
1	L1	0.2203	40.65	QP	12.94	53.59	62.81	-9.22	
2	L1	0.2203	40.00	QP	12.94	52.94	62.81	-9.87	
3	L1	0.2203	29.23	AVG	12.94	42.17	52.81	-10.64	
4	L1	0.2711	30.65	QP	12.75	43.40	61.08	-17.68	
5	L1	0.2711	12.25	AVG	12.75	25.00	51.08	-26.08	
6	L1	0.3492	29.32	QP	12.46	41.78	58.98	-17.20	
7	L1	0.3492	21.87	AVG	12.46	34.33	48.98	-14.65	
8	L1	1.3023	20.62	QP	11.40	32.02	56.00	-23.98	
9	L1	1.3023	12.77	AVG	11.40	24.17	46.00	-21.83	
10	L1	3.2695	27.21	QP	11.40	38.61	56.00	-17.39	
11	L1	3.2695	18.40	AVG	11.40	29.80	46.00	-16.20	
12	L1	4.3203	22.41	QP	11.40	33.81	56.00	-22.19	

Test Mode 1:	USB Mode
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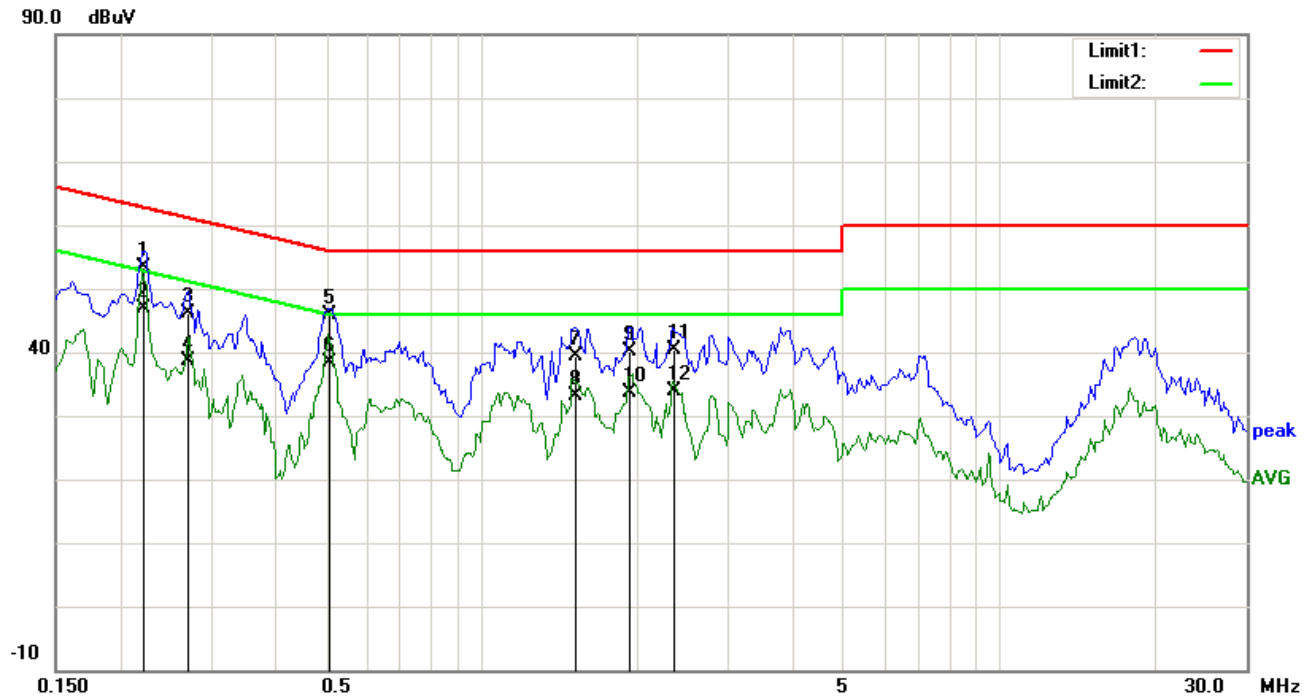


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	N	0.2220	39.17	QP	12.93	52.10	62.74	-10.64	
2	N	0.2220	32.75	AVG	12.93	45.68	52.74	-7.06	
3	N	0.2711	28.16	QP	12.75	40.91	61.08	-20.17	
4	N	0.2711	20.96	AVG	12.75	33.71	51.08	-17.37	
5	N	0.3844	24.27	QP	12.33	36.60	58.18	-21.58	
6	N	0.3844	10.46	AVG	12.33	22.79	48.18	-25.39	
7	N	1.4107	20.62	QP	11.45	32.07	56.00	-23.93	
8	N	1.4107	10.80	AVG	11.45	22.25	46.00	-23.75	
9	N	2.9547	25.67	QP	11.64	37.31	56.00	-18.69	
10	N	2.9547	15.83	AVG	11.64	27.47	46.00	-18.53	
11	N	3.7395	24.56	QP	11.74	36.30	56.00	-19.70	
12	N	3.7395	15.54	AVG	11.74	27.28	46.00	-18.72	

Test Mode 1: USB Mode

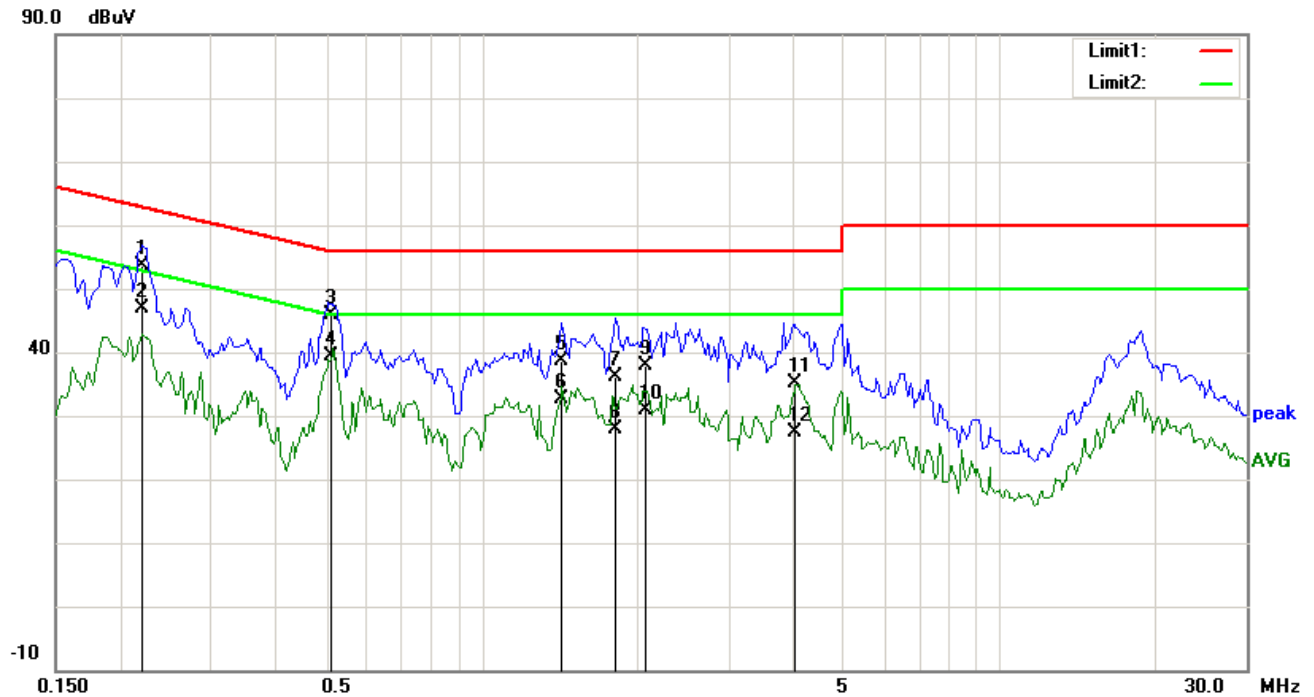


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)	
1	L1	0.2242	40.44	QP	12.92	53.36	62.66	-9.30	
2	L1	0.2242	33.98	AVG	12.92	46.90	52.66	-5.76	
3	L1	0.2711	33.31	QP	12.75	46.06	61.08	-15.02	
4	L1	0.2711	25.96	AVG	12.75	38.71	51.08	-12.37	
5	L1	0.5094	33.90	QP	11.89	45.79	56.00	-10.21	
6	L1	0.5094	26.49	AVG	11.89	38.38	46.00	-7.62	
7	L1	1.5250	27.98	QP	11.40	39.38	56.00	-16.62	
8	L1	1.5250	21.83	AVG	11.40	33.23	46.00	-12.77	
9	L1	1.9284	28.82	QP	11.40	40.22	56.00	-15.78	
10	L1	1.9284	22.33	AVG	11.40	33.73	46.00	-12.27	
11	L1	2.3460	28.95	QP	11.40	40.35	56.00	-15.65	
12	L1	2.3460	22.38	AVG	11.40	33.78	46.00	-12.22	

Test Mode 1: USB Mode



Test Data


Phase Neutral Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	N	0.2208	40.68	QP	12.94	53.62	62.79	-9.17	
2	N	0.2208	33.84	AVG	12.94	46.78	52.79	-6.01	
3	N	0.5101	33.92	QP	11.89	45.81	56.00	-10.19	
4	N	0.5101	27.48	AVG	11.89	39.37	46.00	-6.63	
5	N	1.4273	27.26	QP	11.45	38.71	56.00	-17.29	
6	N	1.4273	21.22	AVG	11.45	32.67	46.00	-13.33	
7	N	1.8141	24.65	QP	11.50	36.15	56.00	-19.85	
8	N	1.8141	16.35	AVG	11.50	27.85	46.00	-18.15	
9	N	2.0659	26.26	QP	11.53	37.79	56.00	-18.21	
10	N	2.0659	19.34	AVG	11.53	30.87	46.00	-15.13	
11	N	4.0469	23.30	QP	11.78	35.08	56.00	-20.92	
12	N	4.0469	15.52	AVG	11.78	27.30	46.00	-18.70	

6.2 Radiated Emissions

Temperature	22°C
Relative Humidity	52%
Atmospheric Pressure	1008mbar
Test date :	June 08, 2015
Tested By :	Winnie Zhang

Requirement(s):

Spec	Item	Requirement	Applicable	
47CFR§15.107(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		
		Frequency range (MHz)		Field Strength (µV/m)
		30 – 88		100
		88 – 216		150
		216 960		200
		Above 960		500

Test Setup	
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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
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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 Quasi 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> <p>■ 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

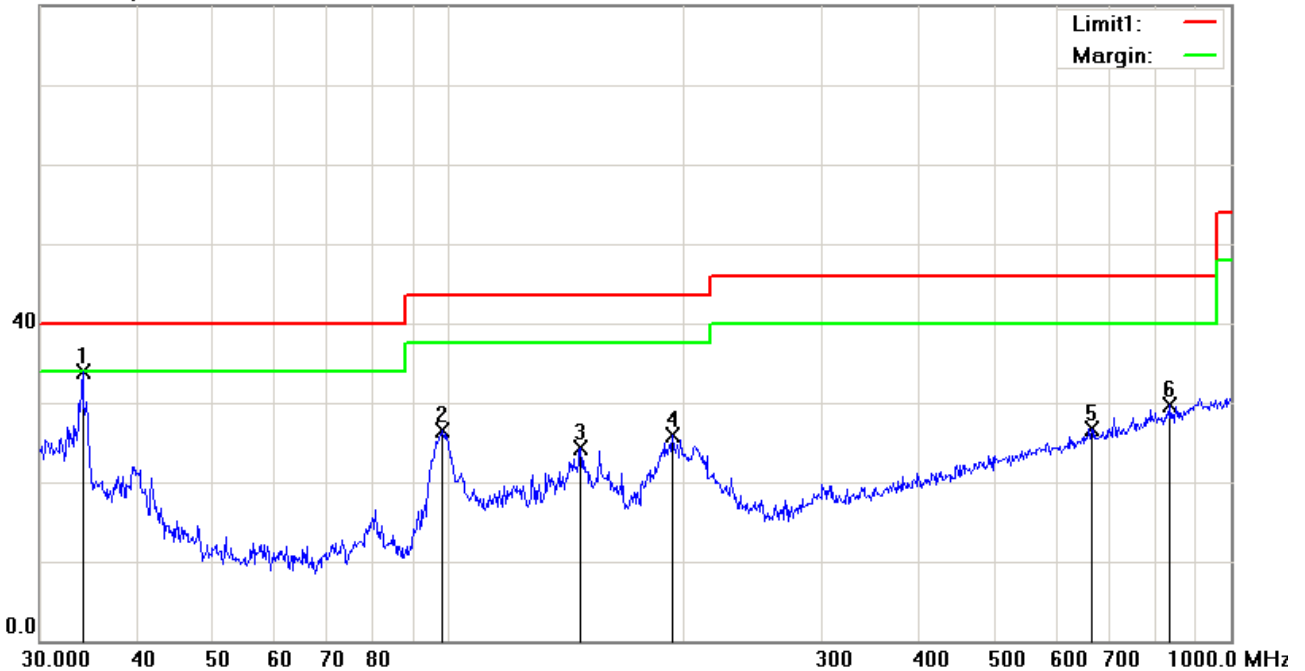
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Mode: USB Mode

Below 1GHz

80.0 dBuV/m



Test Data

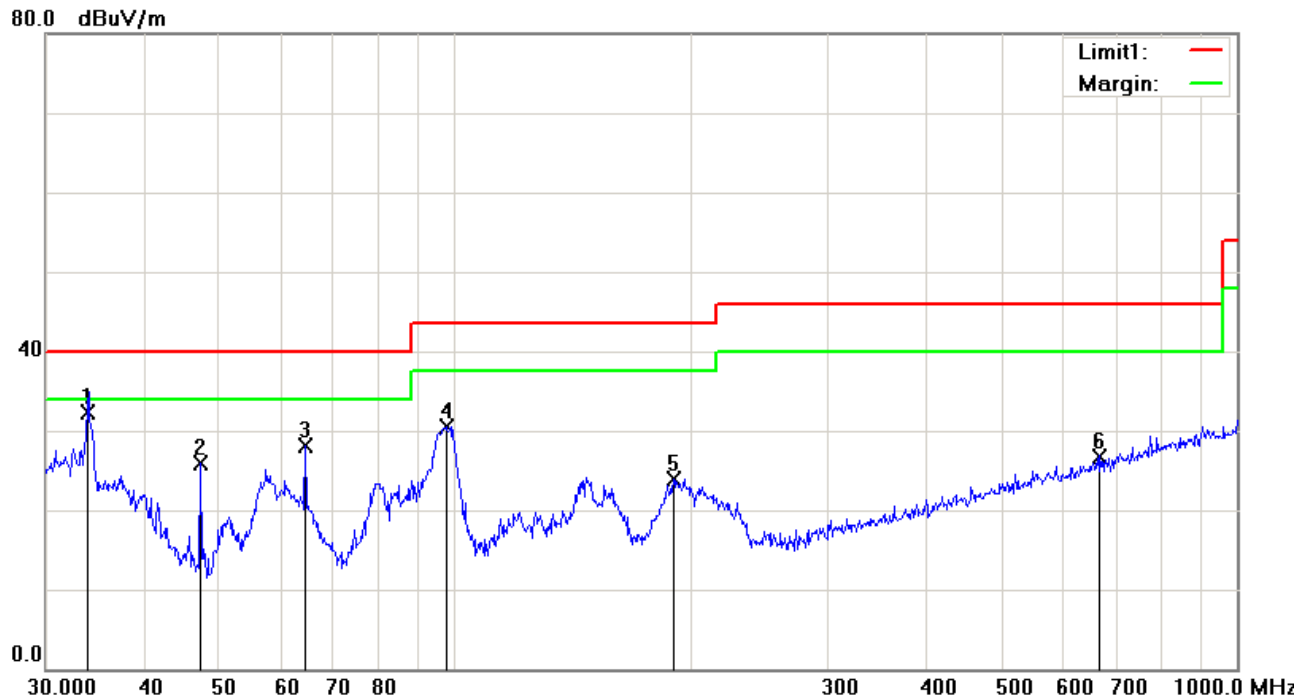
Horizontal Polarity Plot @3m

No.	P/L	Frequency	Readin g	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comme nt
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	()	
1	H	34.0365	37.07	peak	-3.24	33.83	40.00	-6.17	100	132	
2	H	98.1419	37.80	peak	-11.30	26.50	43.50	-17.00	200	190	
3	H	147.4036	32.65	peak	-8.44	24.21	43.50	-19.29	200	235	
4	H	193.0945	34.89	peak	-9.08	25.81	43.50	-17.69	100	113	
5	H	663.4729	25.78	peak	0.97	26.75	46.00	-19.25	100	42	
6	H	836.2443	26.09	peak	3.64	29.73	46.00	-16.27	161	0	

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	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	()	
1	V	33.9170	35.47	QP	-3.15	32.32	40.00	-7.68	100	149	
2	V	47.3255	37.83	peak	-11.98	25.85	40.00	-14.15	100	201	
3	V	64.4331	42.10	peak	-14.01	28.09	40.00	-11.91	100	231	
4	V	97.4560	42.06	peak	-11.48	30.58	43.50	-12.92	100	78	
5	V	190.4050	33.04	peak	-9.21	23.83	43.50	-19.67	200	207	
6	V	668.1423	25.78	peak	1.02	26.80	46.00	-19.20	100	261	

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	09/02/2014	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



Whole Package - Top 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



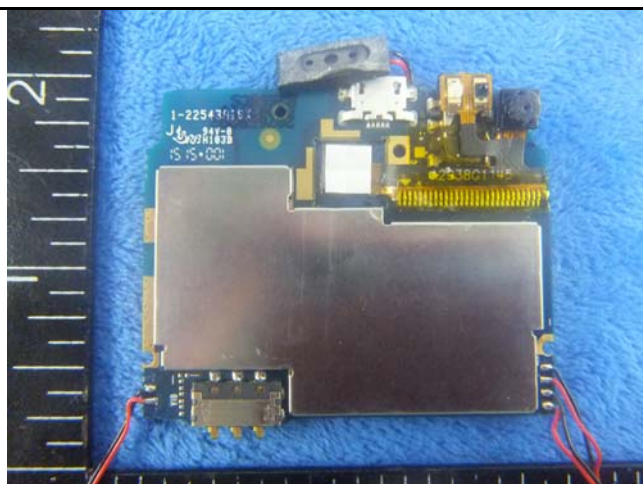
Cover Off - Top View 2



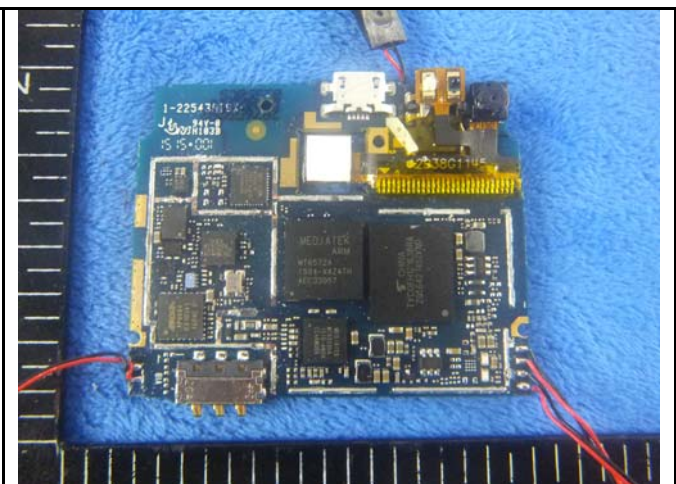
Battery - Top View



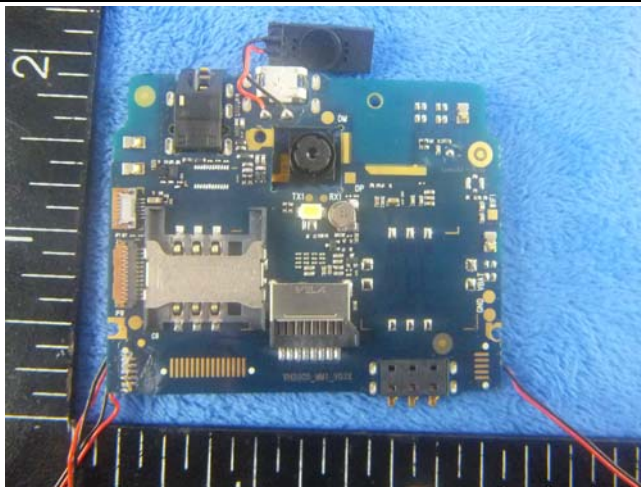
Battery - Bottom View



Mainboard With Shielding - Front View



Mainboard With out Shielding - Front View



Mainboard With Shielding - rear View



LCD front View



LCD Rear View



GPS- Antenna View



WIFI - Antenna View



GSM Antenna View

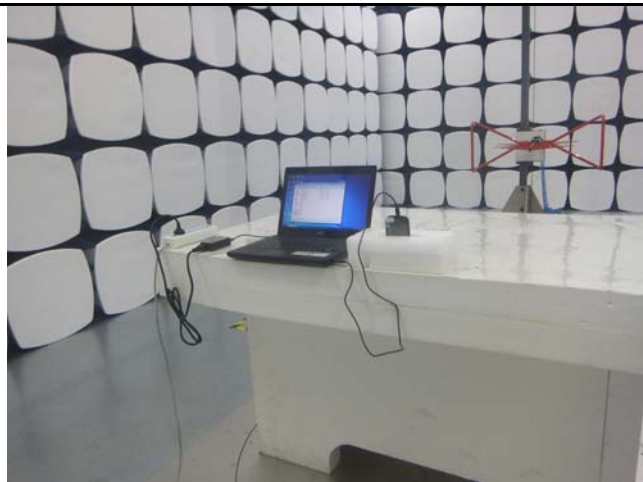
Annex B.iii. Photograph: Test Setup Photo



Conducted Emissions Test Setup – Front View



Conducted Emissions Test Setup – Side View



Radiated Spurious Emissions Test Setup Below 1GHz

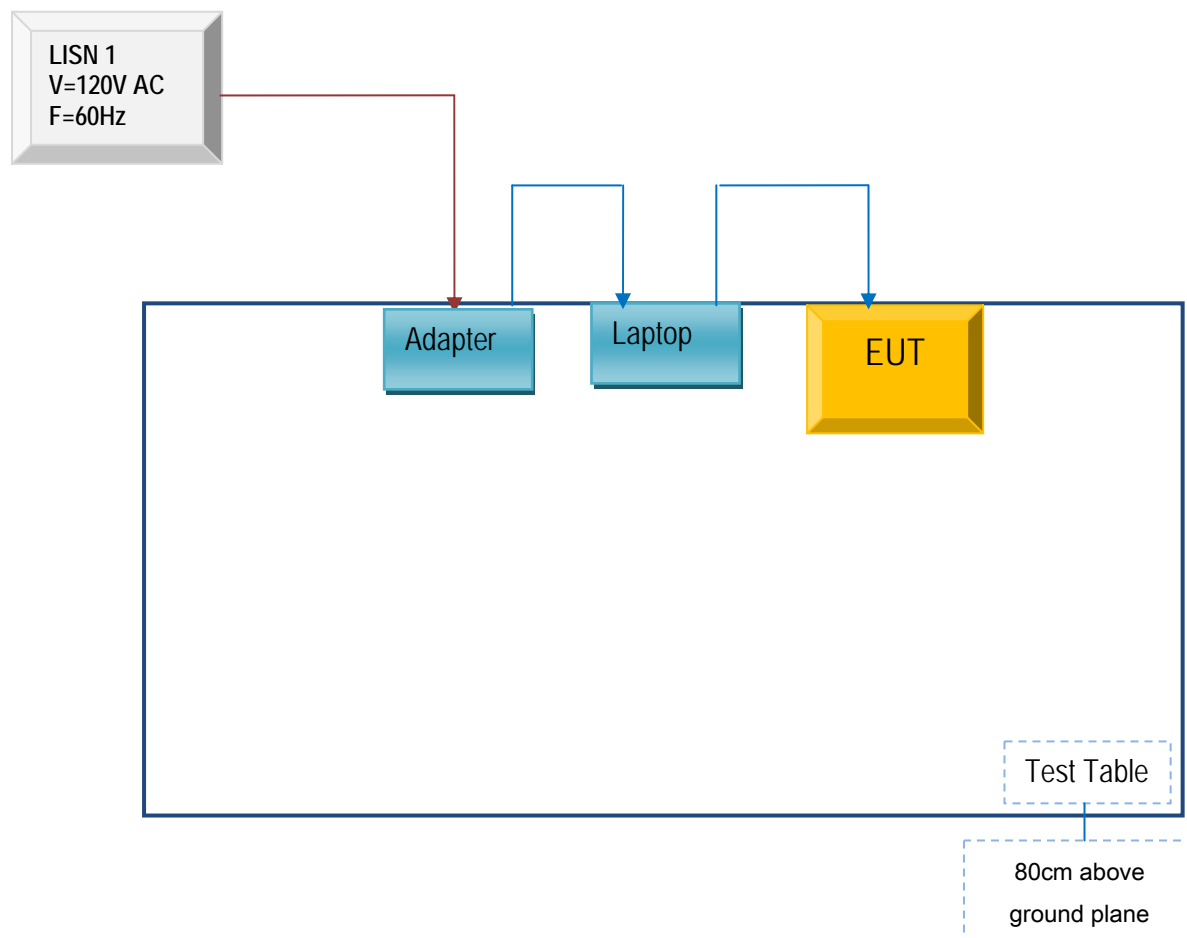


Radiated Spurious Emissions Test Setup Above
1GHz

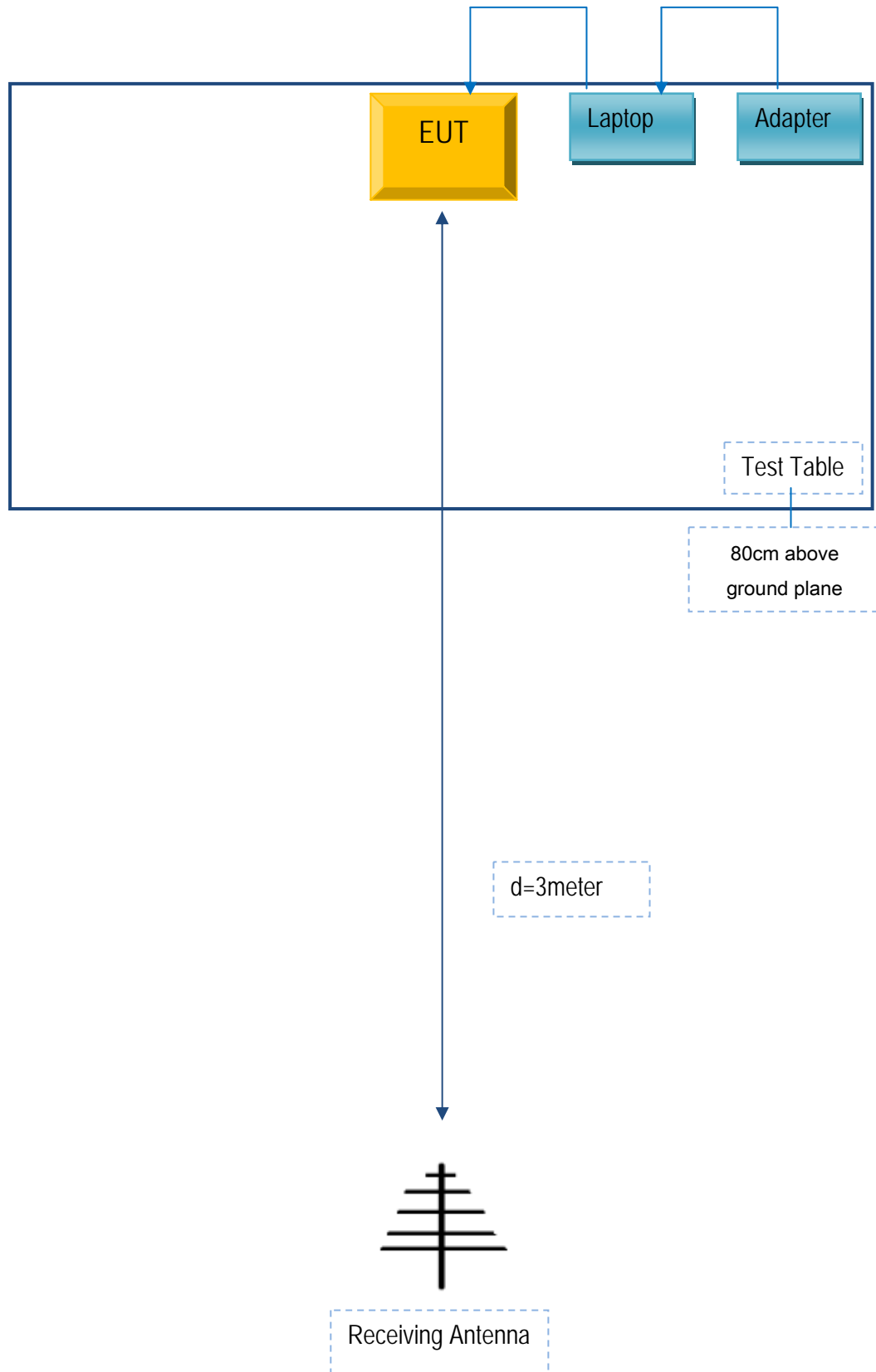
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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

Annex E. DECLARATION OF SIMILARITY

b Mobile HK Limited

To SIEMIC Inc
775 Montague Expressway
Milpitas, CA 95035.

Statement

We, b Mobile HK Limited apply a multiple-listing certification for the below models.

Product Name: Mobile phone

Model number: AX680/ AX670

FCC ID: ZSW-30-006

We hereby state that these models are identical in interior structure, electrical circuits and components, and just model name is different for the marketing requirement.

Your assistance on this matter is highly appreciated.

Sincerely,
Name: KA SHING LAM
Title: Director
Signature:

For and on behalf of
b mobile HK Limited

Authorized Signature(s)