

EMC TEST REPORT



Report No.: 15070727-FCC-E

Supersede Report No.:N/A

Applicant	Worldlinks Communications, L.L.C.	
Product Name	RedDot Phone	
Model No.	R50	
Serial No.	N/A	
Test Standard	FCC Part 15 Subpart B Class B:2014, ANSI C63.4: 2014	
Test Date	August 24 to September 24 , 2015	
Issue Date	September 28, 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
15070727-FCC-E	NONE	Original	September 28, 2015

2. Customer information

Applicant Name	Worldlinks Communications, L.L.C.
Applicant Add	270 Center Drive Suite 230, Vernon Hills, IL. 60061
Manufacturer	SHENZHEN NEWCHABRIDGE COMMUNICATION CO.,LTD
Manufacturer Add	New Bridge Industrial Park, Baolong Six Road, Baolong Industrial City, Longgang District, Shenzhen

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:	RedDot Phone
Main Model:	R50
Serial Model:	N/A
Antenna Gain:	GSM850: 0.37 dBi PCS1900: 1.01 dBi UMTS-FDD Band V: 0.37 dBi UMTS-FDD Band II: 1.01 dBi Bluetooth/BLE: 1.34 dBi WIFI: 1.34 dBi GPS: 0.46 dBi
Input Power:	Battery: Model:R50 Spec: 2200mAh(9.57Wh) Limited Charging Voltage: 4.35V Adapter: Model:HJ-0501000 Input: 100-240V; 50/60Hz; 0.15A Output: DC 5.0V,1000mA
Trade Name :	N/A
FCC ID:	2ADNIR50
Date EUT received:	August 24 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

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): 2412-2462 MHz

WIFI:802.11n(40M): 2422-2452 MHz

Bluetooth& BLE: 2402-2480 MHz

GPS RX:1575.42 MHz

GSM 850: 124CH

PCS1900: 299CH

UMTS-FDD Band V : 102CH

UMTS-FDD Band II : 277CH

Number of Channels:

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	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	September 18, 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 50Ω /50mH EUT LISN, connected to filtered mains.
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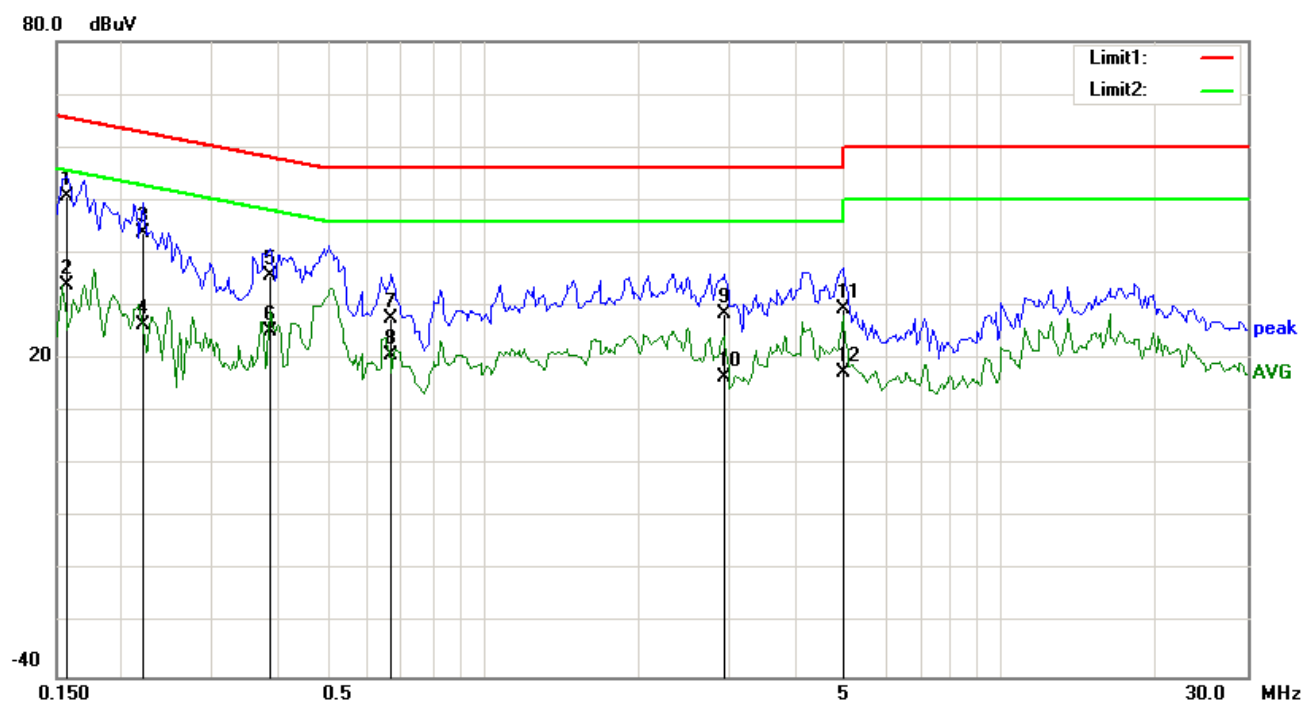
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	<p>3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</p> <p>4. All other supporting equipment were powered separately from another main supply.</p> <p>5. The EUT was switched on and allowed to warm 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 : USB Mode

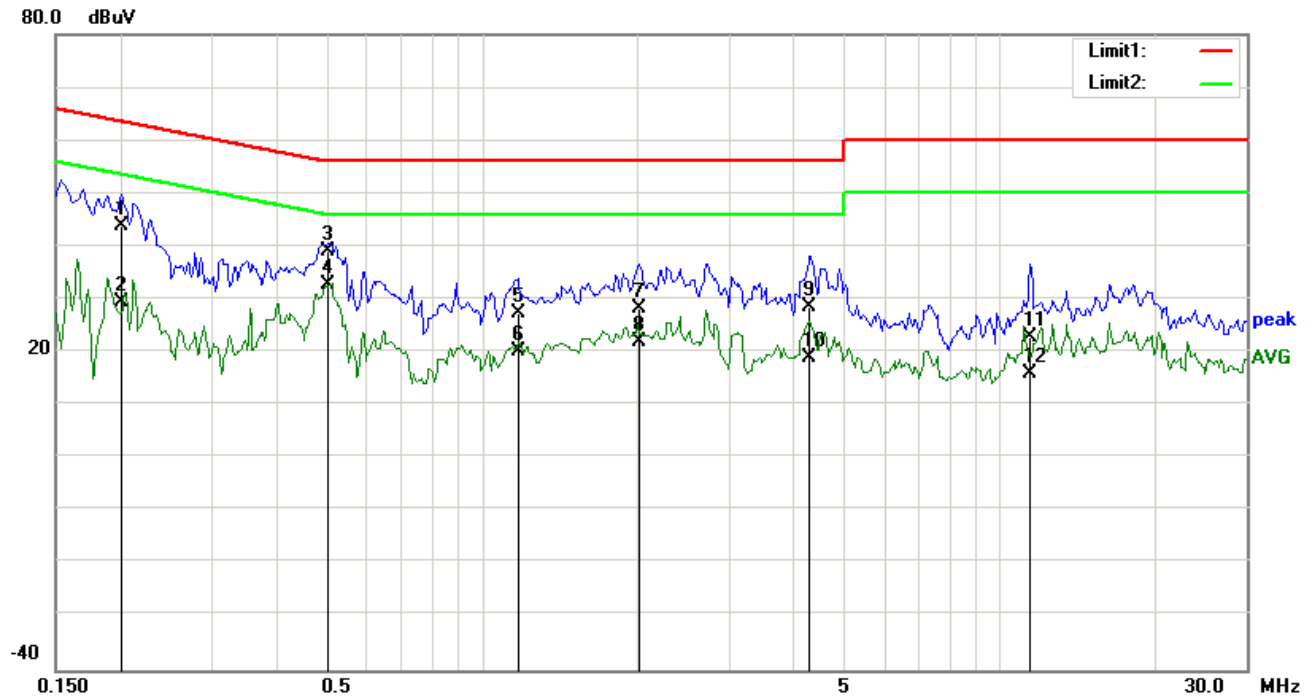


Test Data

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	0.1578	40.66	QP	10.03	50.69	65.58	-14.89	
2	L1	0.1578	23.80	AVG	10.03	33.83	55.58	-21.75	
3	L1	0.2203	33.81	QP	10.03	43.84	62.81	-18.97	
4	L1	0.2203	16.33	AVG	10.03	26.36	52.81	-26.45	
5	L1	0.3883	25.60	QP	10.03	35.63	58.10	-22.47	
6	L1	0.3883	15.07	AVG	10.03	25.10	48.10	-23.00	
7	L1	0.6656	17.70	QP	10.03	27.73	56.00	-28.27	
8	L1	0.6656	10.64	AVG	10.03	20.67	46.00	-25.33	
9	L1	2.9234	18.56	QP	10.05	28.61	56.00	-27.39	
10	L1	2.9234	6.49	AVG	10.05	16.54	46.00	-29.46	
11	L1	4.9727	19.50	QP	10.08	29.58	56.00	-26.42	
12	L1	4.9727	7.27	AVG	10.08	17.35	46.00	-28.65	

Test Mode : USB Mode

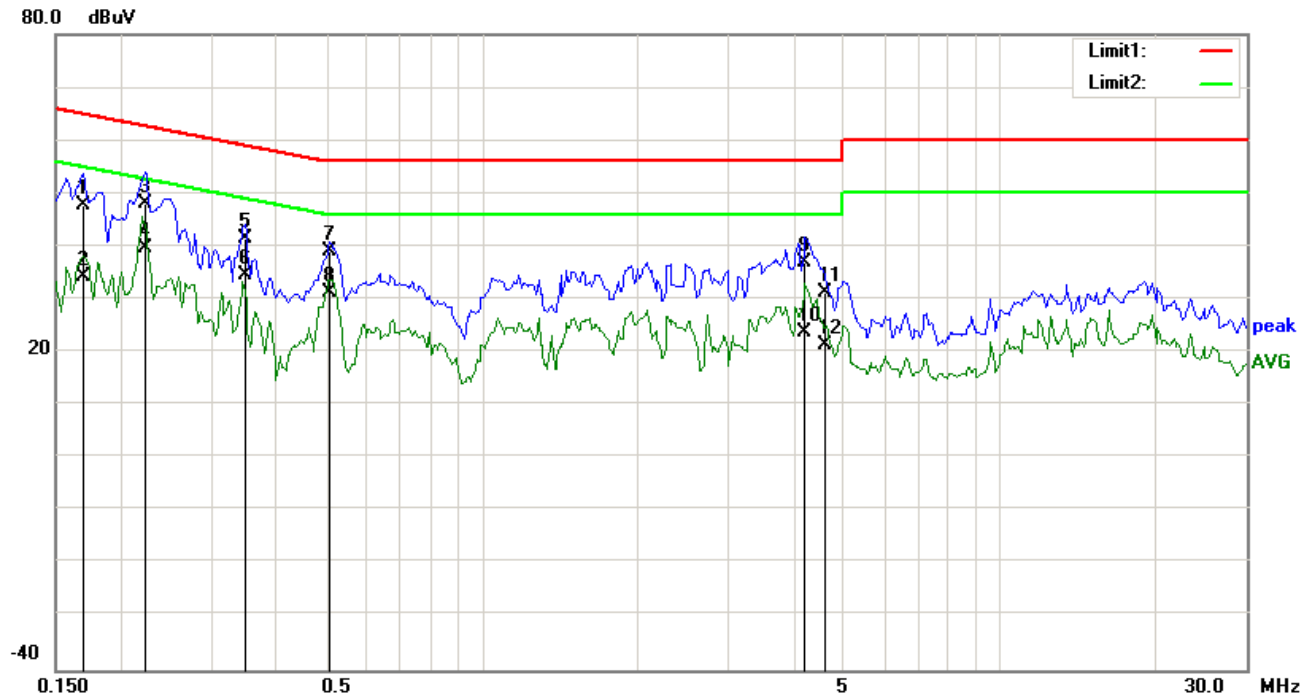


Test Data

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	0.2008	33.90	QP	10.02	43.92	63.58	-19.66	
2	N	0.2008	19.31	AVG	10.02	29.33	53.58	-24.25	
3	N	0.5055	28.94	QP	10.02	38.96	56.00	-17.04	
4	N	0.5055	22.60	AVG	10.02	32.62	46.00	-13.38	
5	N	1.1734	17.26	QP	10.03	27.29	56.00	-28.71	
6	N	1.1734	10.26	AVG	10.03	20.29	46.00	-25.71	
7	N	2.0133	18.27	QP	10.04	28.31	56.00	-27.69	
8	N	2.0133	11.88	AVG	10.04	21.92	46.00	-24.08	
9	N	4.3125	18.46	QP	10.06	28.52	56.00	-27.48	
10	N	4.3125	8.88	AVG	10.06	18.94	46.00	-27.06	
11	N	11.4844	12.65	QP	10.16	22.81	60.00	-37.19	
12	N	11.4844	5.87	AVG	10.16	16.03	50.00	-33.97	

Test Mode : USB Mode

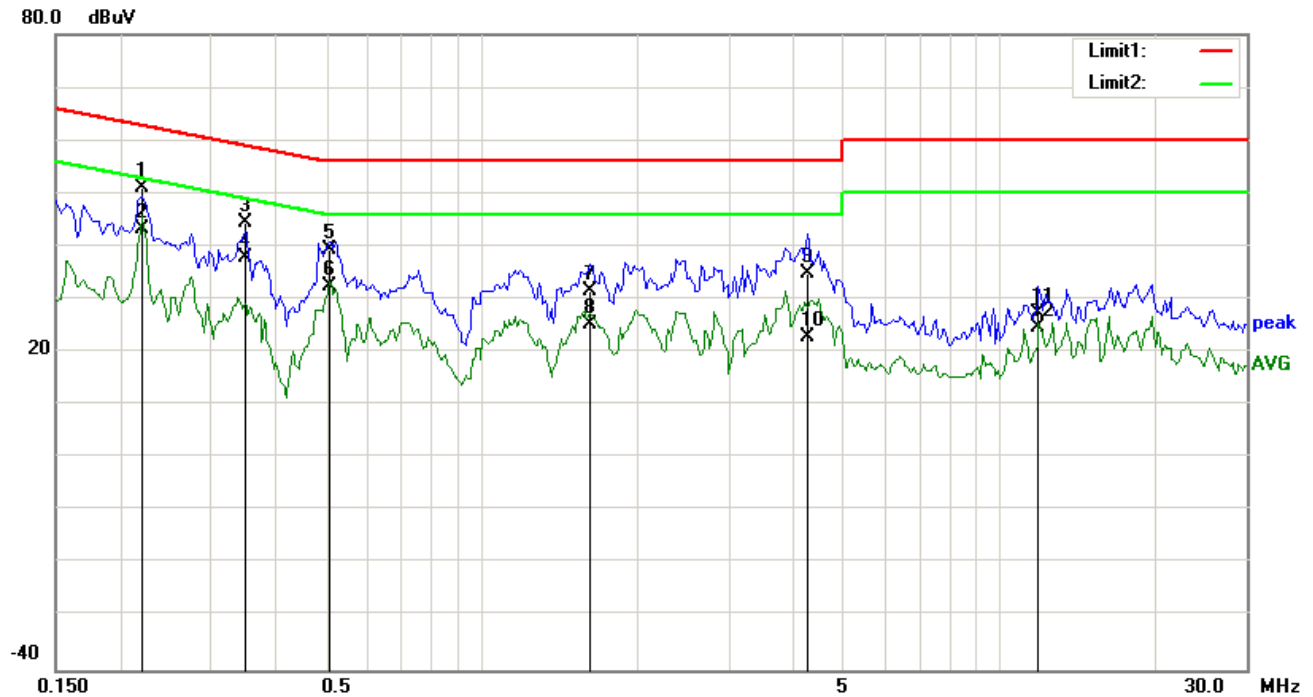


Test Data

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	0.1695	37.79	QP	10.03	47.82	64.98	-17.16	
2	L1	0.1695	24.08	AVG	10.03	34.11	54.98	-20.87	
3	L1	0.2242	38.09	QP	10.03	48.12	62.66	-14.54	
4	L1	0.2242	29.52	AVG	10.03	39.55	52.66	-13.11	
5	L1	0.3492	31.40	QP	10.03	41.43	58.98	-17.55	
6	L1	0.3492	24.40	AVG	10.03	34.43	48.98	-14.55	
7	L1	0.5094	29.17	QP	10.03	39.20	56.00	-16.80	
8	L1	0.5094	21.31	AVG	10.03	31.34	46.00	-14.66	
9	L1	4.2109	26.74	QP	10.07	36.81	56.00	-19.19	
10	L1	4.2109	13.77	AVG	10.07	23.84	46.00	-22.16	
11	L1	4.5979	21.18	QP	10.07	31.25	56.00	-24.75	
12	L1	4.5979	11.28	AVG	10.07	21.35	46.00	-24.65	

Test Mode : USB Mode



Test Data


Phase Neutral Plot at 240Vac, 60Hz

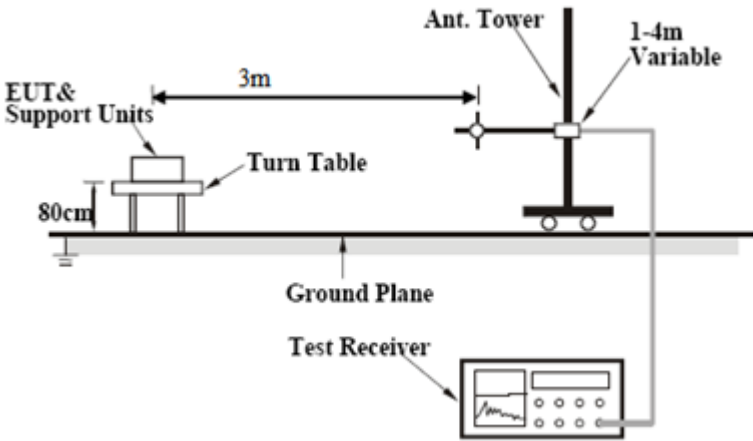
No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)	
1	N	0.2203	41.05	QP	10.02	51.07	62.81	-11.74	
2	N	0.2203	33.17	AVG	10.02	43.19	52.81	-9.62	
3	N	0.3492	34.34	QP	10.02	44.36	58.98	-14.62	
4	N	0.3492	27.75	AVG	10.02	37.77	48.98	-11.21	
5	N	0.5094	29.20	QP	10.02	39.22	56.00	-16.78	
6	N	0.5094	22.43	AVG	10.02	32.45	46.00	-13.55	
7	N	1.6148	21.60	QP	10.04	31.64	56.00	-24.36	
8	N	1.6148	15.15	AVG	10.04	25.19	46.00	-20.81	
9	N	4.2500	24.92	QP	10.06	34.98	56.00	-21.02	
10	N	4.2500	12.92	AVG	10.06	22.98	46.00	-23.02	
11	N	11.9023	17.25	QP	10.16	27.41	60.00	-32.59	
12	N	11.9023	14.60	AVG	10.16	24.76	50.00	-25.24	

6.2 Radiated Emissions

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	September 18, 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		
		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

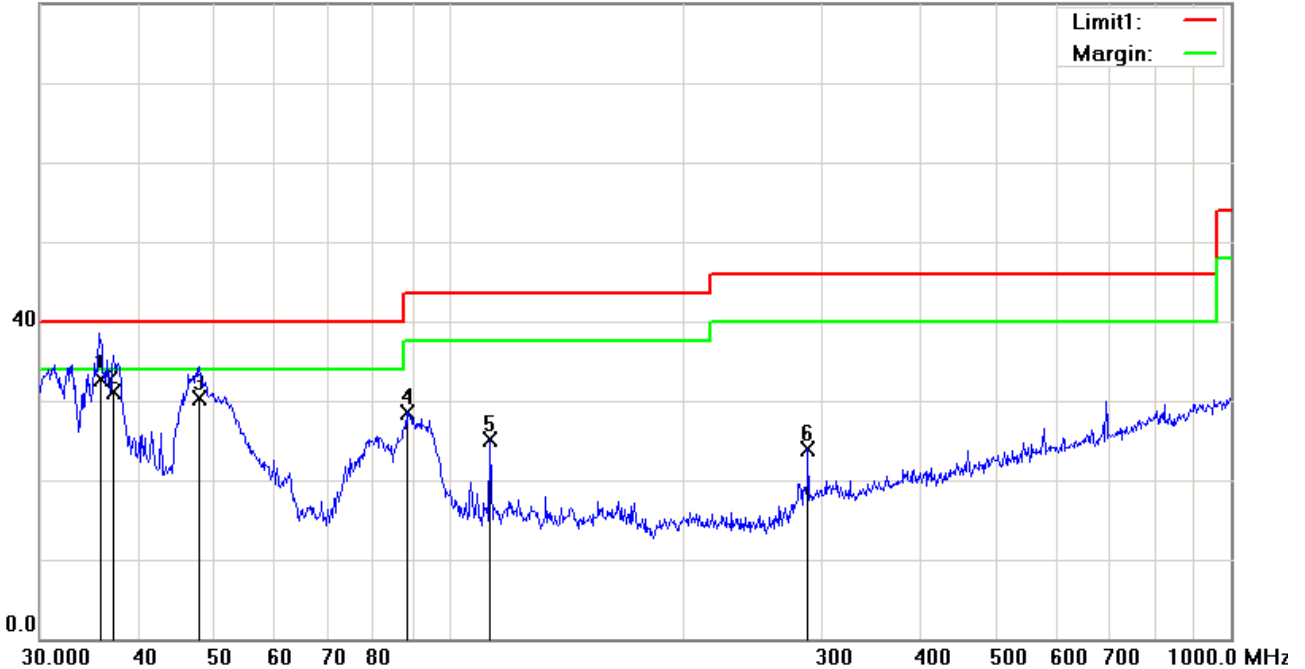
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Mode : USB Mode

Below 1GHz

80.0 dBuV/m



Test Data

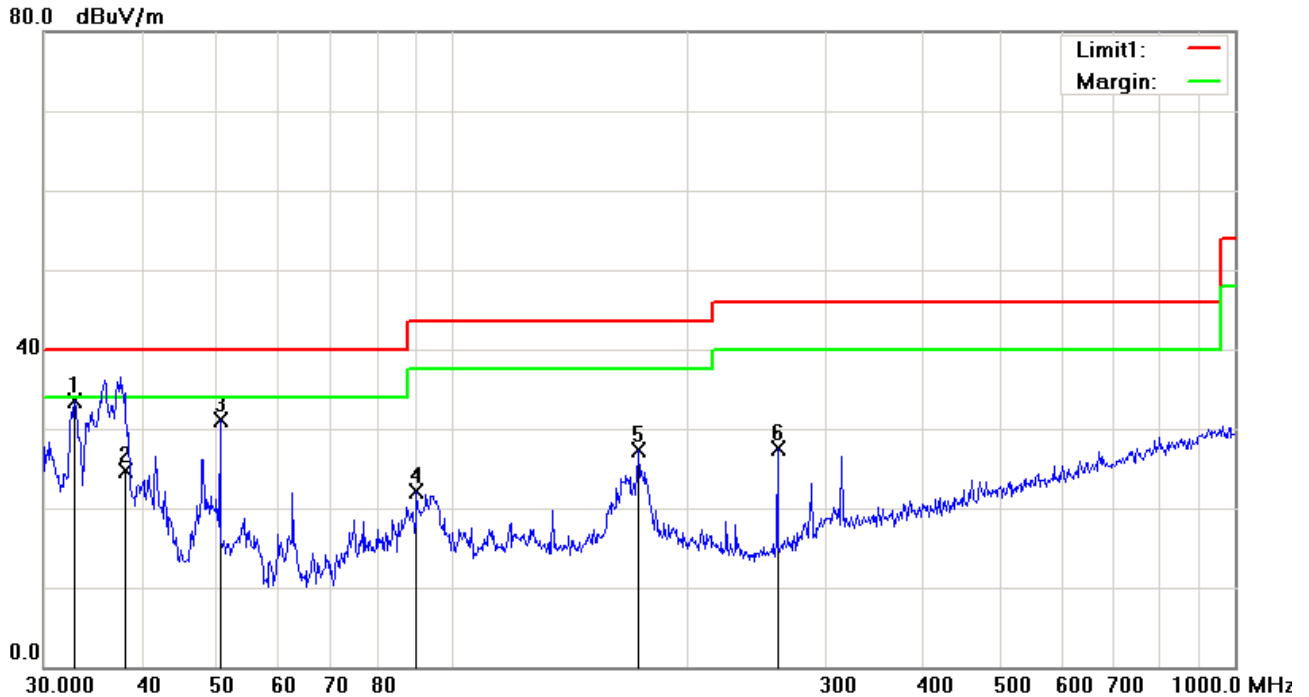
Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	()	
1	H	35.9688	37.36	QP	-4.65	32.71	40.00	-7.29	100	183	
2	H	37.3171	36.75	QP	-5.63	31.12	40.00	-8.88	100	33	
3	H	47.9600	42.47	QP	-12.26	30.21	40.00	-9.79	100	250	
4	H	88.3421	42.00	peak	-13.42	28.58	43.50	-14.92	100	93	
5	H	112.9196	33.70	peak	-8.52	25.18	43.50	-18.32	100	66	
6	H	287.9904	31.36	peak	-7.45	23.91	46.00	-22.09	100	104	

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	32.8637	35.95	peak	-2.37	33.58	40.00	-6.42	100	181	
2	V	37.9487	30.84	QP	-6.09	24.75	40.00	-15.25	100	278	
3	V	50.4089	44.33	peak	-13.22	31.11	40.00	-8.89	100	177	
4	V	89.9047	35.40	peak	-13.37	22.03	43.50	-21.47	100	177	
5	V	172.5988	36.65	peak	-9.31	27.34	43.50	-16.16	100	124	
6	V	260.1444	36.15	peak	-8.72	27.43	46.00	-18.57	100	113	

Above 1GHz

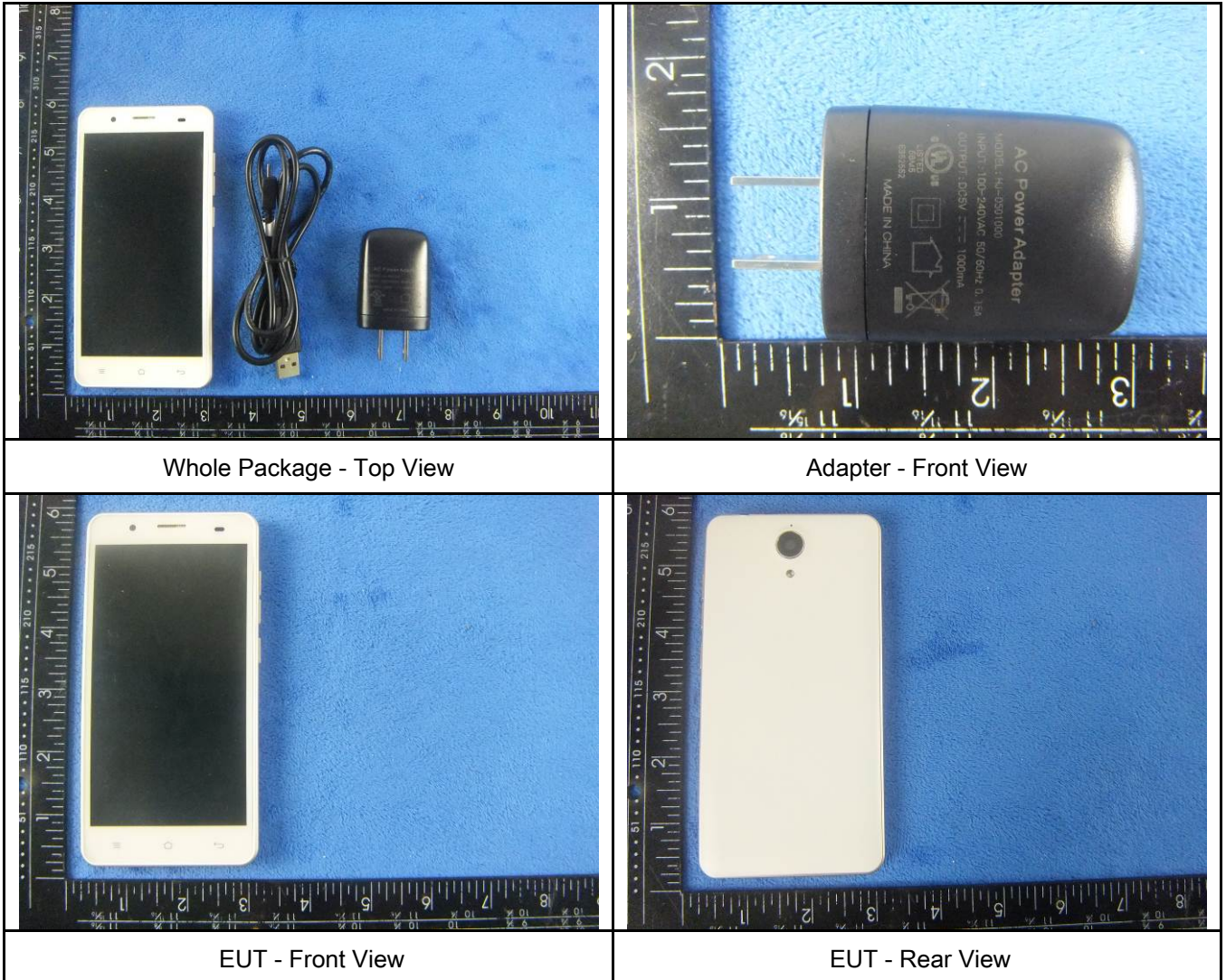
Note: The frequency that above 1GHz is mainly from the environment noise.

Annex A. TEST INSTRUMENT

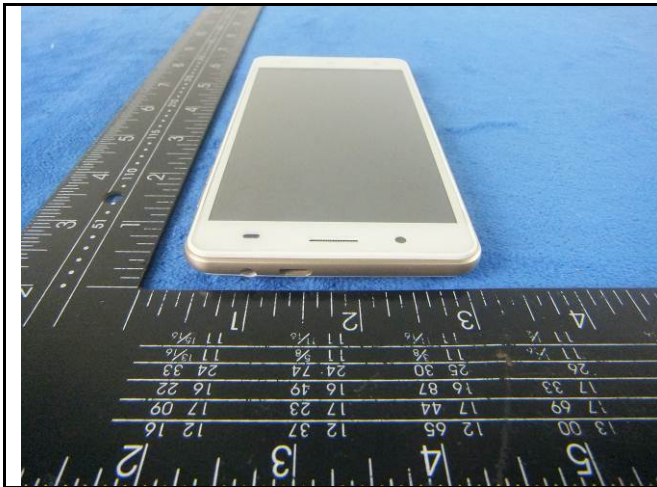
Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Line Impedance Stabilization Network	LI-125A	191106	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>
Line Impedance 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	09/17/2015	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	09/22/2014	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



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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



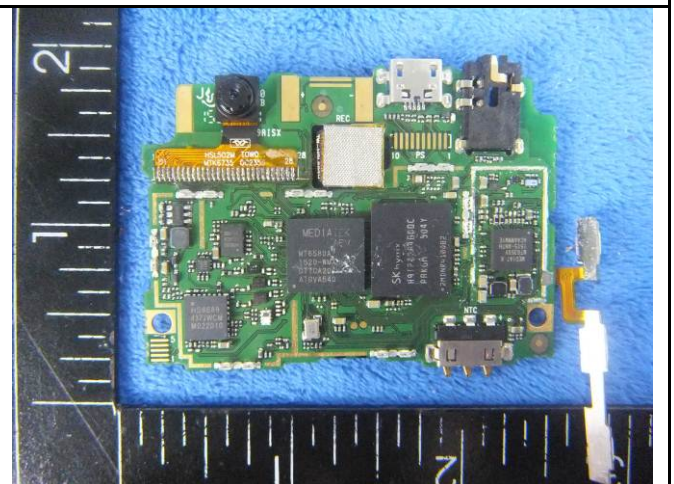
Battery - Front View



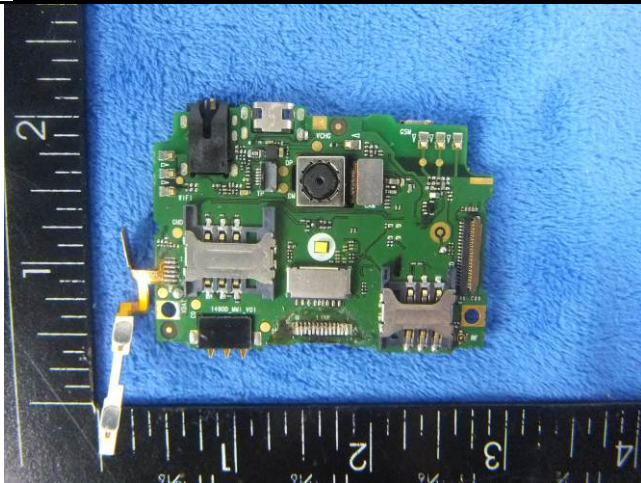
Battery Label - Rear View



Mainboard With Shielding - Front View



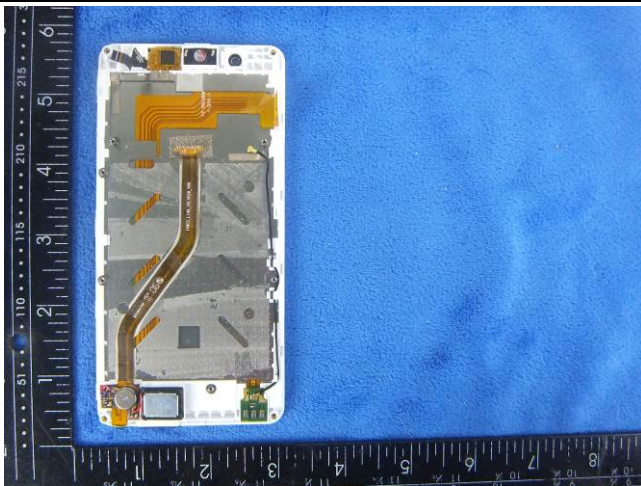
Mainboard Without Shielding - Front View



Mainboard - Rear View



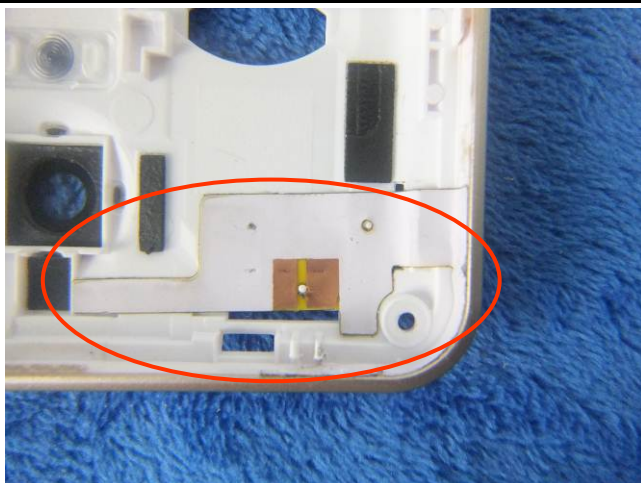
LCD - Front View



LCD - Rear View



GSM/PCS/UMTS-FDD Antenna View



WIFI/BT/BLE - Antenna View

Annex B.iii. Photograph: Test Setup Photo



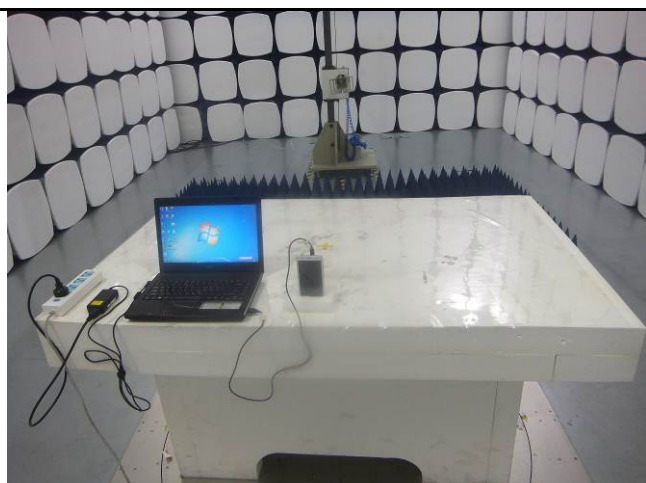
Conducted Emissions Test Setup – Front View



Conducted Emissions Test Setup – Side View



Radiated Spurious Emissions Test Setup Below 1GHz

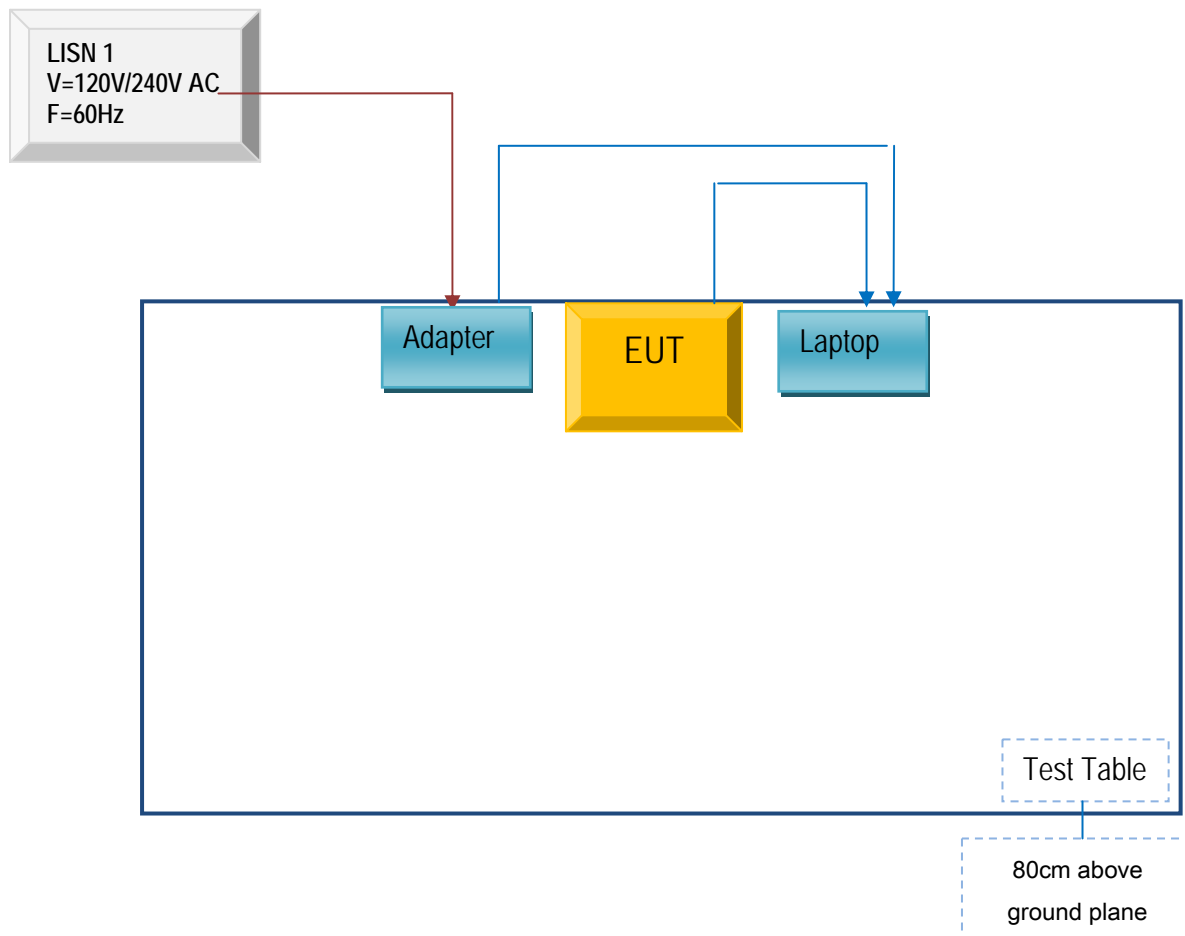


Radiated Spurious Emissions Test Setup Above
1GHz

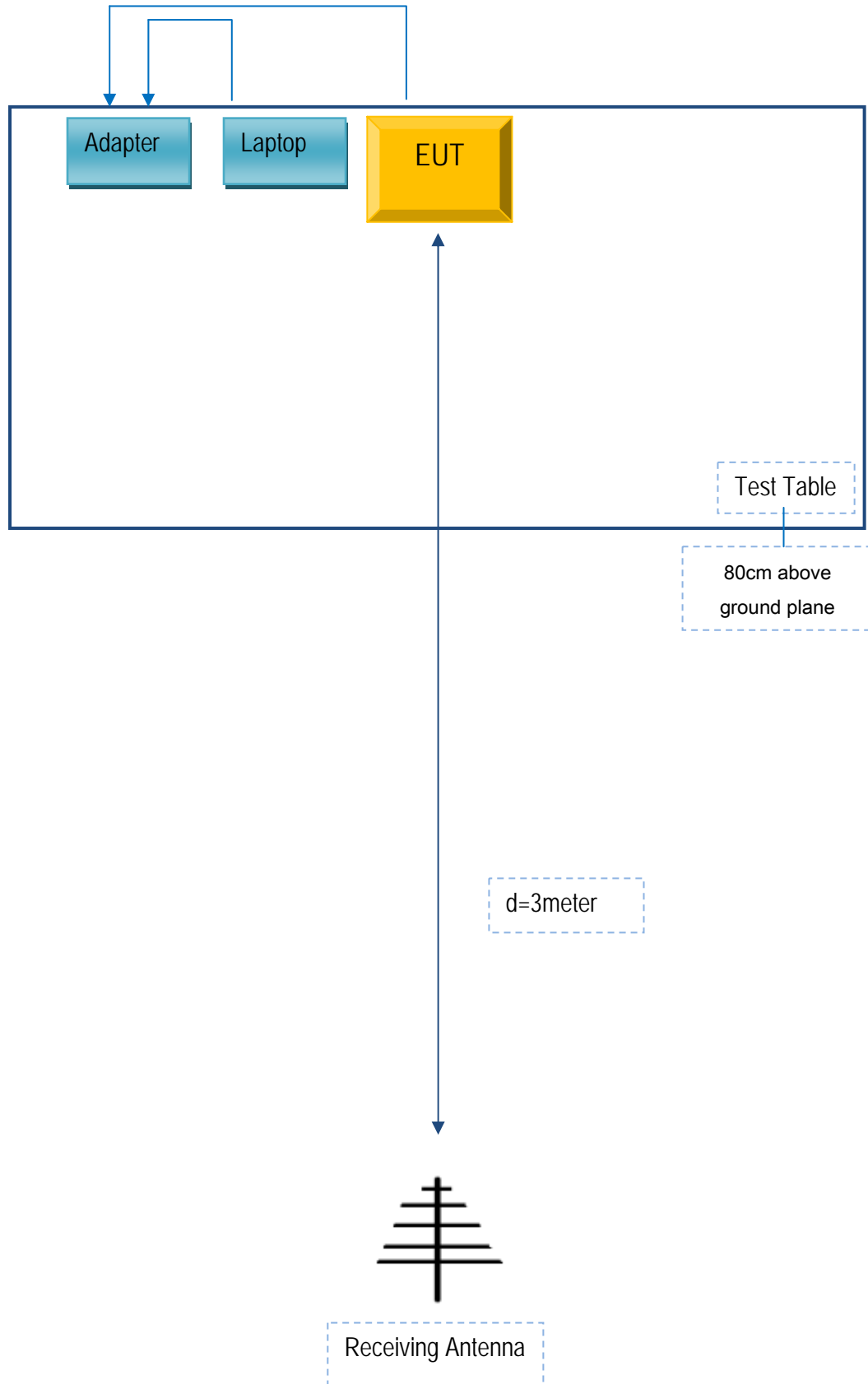
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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