

# RF TEST REPORT



Report No.: 15070121-FCC-R4 Rev2

Supersede Report No.: 15070121-FCC-R4 Rev1

Applicant	Worldlinks Communications, L.L.C.	
Product Name	PHONE	
Model No.	R50S	
Serial No.	N/A	
Test Standard	FCC Part 15.247: 2014, ANSI C63.10: 2009	
Test Date	March 02 to March 04, 2015	
Issue Date	March 21, 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"/>
Winnie.Zhang	Alex.Liu	
Winnie Zhang Test Engineer	Alex Liu 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](mailto: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

Test Report	15070121-FCC-R4 Rev2
Page	3 of 38

This page has been left blank intentionally.

## CONTENTS

1. REPORT REVISION HISTORY .....	5
2. CUSTOMER INFORMATION .....	5
3. TEST SITE INFORMATION.....	5
4. EQUIPMENT UNDER TEST (EUT) INFORMATION .....	6
5. TEST SUMMARY .....	8
6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS .....	9
6.1 ANTENNA REQUIREMENT.....	9
6.2 DTS (6 DB) CHANNEL BANDWIDTH .....	10
6.3 MAXIMUM OUTPUT POWER .....	12
6.4 POWER SPECTRAL DENSITY.....	14
6.5 BAND-EDGE & UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS.....	16
6.6 AC POWER LINE CONDUCTED EMISSIONS.....	19
6.7 RADIATED SPURIOUS EMISSIONS .....	23
ANNEX A. TEST INSTRUMENT.....	27
ANNEX B. EUT AND TEST SETUP PHOTOGRAPHS.....	28
ANNEX C. TEST SETUP AND SUPPORTING EQUIPMENT.....	34
ANNEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PARTLIST .....	37
ANNEX E. DECLARATION OF SIMILARITY .....	38

## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
15070121-FCC-R4	Original	NONE	March 12, 2015
15070121-FCC-R4 Ver1	Version 1	Update Battery Information	March 17, 2015
15070121-FCC-R4 Rev2	Version 2	Added LTE Band 7 Information	March 21, 2015

## 2. Customer information

Applicant Name	Worldlinks Communications, L.L.C.
Applicant Add	270 Center Drive Suite 230, Vernon Hills, IL. 60061
Manufacturer	Shenzhen VSDREAM Technology Co., Ltd
Manufacturer Add	4F, Headquarters Building, zhonghaixin Science&Technology Park, Bulan Road, Buji Ave, Longgang Dist., Shenzhen, Guangdong, China

## 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:	PHONE
Main Model:	R50S
Serial Model:	N/A
Date EUT received:	February 12, 2015
Test Date(s):	March 02 to March 04, 2015
Equipment Category :	DTS
	GSM850: 0.13 dBi
	PCS1900: 0.77 dBi
	UMTS-FDD Band 5: 0.11 dBi
	UMTS-FDD Band 2: 0.73 dBi
	UMTS-FDD Band 4: 0.52 dBi
Antenna Gain:	LTE Band 2: 0.81 dBi
	LTE Band 4: 0.55 dBi
	LTE Band 5: 0.27 dBi
	LTE Band 7: 1.01 dBi
	LTE Band 17: -1.23 dBi
	Bluetooth/BLE/WIFI: 1.15 dBi
	GSM / GPRS: GMSK
	EGPRS: GMSK
	UMTS-FDD: QPSK
Type of Modulation:	LTE Band: QPSK, 16QAM
	802.11b/g/n: DSSS, OFDM
	Bluetooth: GFSK, π /4DQPSK, 8DPSK
	BLE: GFSK
	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
RF Operating Frequency (ies):	UMTS-FDD Band 5 TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz
	UMTS-FDD Band 2 TX: 1852.4 ~ 1907.6 MHz;
	RX: 1932.4 ~ 1987.6 MHz

Test Report	15070121-FCC-R4 Rev2
Page	7 of 38

UMTS-FDD Band 4 TX :1712.4 ~ 1752.6 MHz;  
 RX : 2112.4 ~ 2152.6 MHz  
 LTE Band 2 TX: 1852.5 ~ 1907.5 MHz; RX : 1932.5 ~ 1987.5 MHz  
 LTE Band 4 TX: 1712.5 ~ 1752.5 MHz; RX : 2112.5 ~ 2152.5 MHz  
 LTE Band 5 TX: 826.5 ~ 846.5 MHz; RX : 871.5 ~ 891.5 MHz  
 LTE Band 7 TX: 2502.5 ~ 2567.5 MHz; RX : 2622.5 ~ 2687.5 MHz  
 LTE Band 17 TX: 706.5 ~ 713.5 MHz; RX : 736.5 ~ 743.5 MHz  
 WIFI: 802.11b/g/n(20M): 2412-2462 MHz  
 WIFI: 802.11n(40M): 2422-2452 MHz  
 Bluetooth& BLE: 2402-2480 MHz

Max. Output Power: -5.835 dBm

Port: Power Port, Earphone Port, USB Port

Battery:

Model: 5MQ2

Spec: 3.7V 2000mAh

Input Power: Limited charger voltage: 4.2V

Adapter:

Model: KA25-0501000US

Input: AC 100-240V; 50/60Hz 0.25A

Output: DC 5.0V; 1000mA

Trade Name : REDDOTMOBILE

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

FCC ID: 2ADNIR50S

## 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
§15.203	Antenna Requirement	Compliance
§15.247 (a)(2)	DTS (6 dB) CHANNEL BANDWIDTH	Compliance
§15.247(b)(3)	Conducted Maximum Output Power	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band-Edge & Unwanted Emissions into Non-Restricted Frequency Bands	Compliance
§15.207 (a),	AC Power Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Spurious Emissions & Unwanted Emissions into Restricted Frequency Bands	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 Antenna Requirement

#### Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### Antenna Connector Construction

The EUT has 2 antennas:

A permanently attached PIFA antenna for Bluetooth/BLE/WIFI, the gain is 1.15 dBi.

A permanently attached PIFA antenna for GSM/UMTS/LTE, the gain is 0.13 dBi for GSM850, 0.77 dBi for PCS1900;

0.11 dBi for UMTS-FDD Band 5, 0.73 dBi for UMTS-FDD Band 2, 0.52 dBi for UMTS-FDD Band 4;

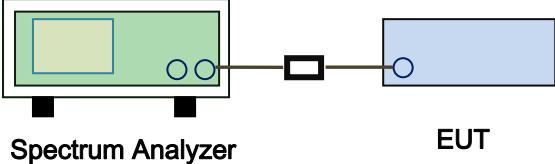
0.81 dBi for LTE Band 2, 0.55 dBi for LTE Band 4, 0.27 dBi for LTE Band 5, 1.01 dBi for LTE Band 7, -1.23 dBi for LTE Band 17.

**The antenna meets up with the ANTENNA REQUIREMENT.**

**Result:** Compliance.

## 6.2 DTS (6 dB) Channel Bandwidth

Temperature	23°C
Relative Humidity	60%
Atmospheric Pressure	1005mbar
Test date :	March 02, 2015
Tested By :	Winnie Zhang

Spec	Item	Requirement	Applicable
§ 15.247(a)(2)	a)	6dB BW $\geq$ 500kHz;	<input checked="" type="checkbox"/>
	b)	99% BW: For FCC reference only; required by IC.	<input checked="" type="checkbox"/>
Test Setup	 <b>Spectrum Analyzer</b> <b>EUT</b>		
Test Procedure	<p>558074 D01 DTS MEAS Guidance v03r02, 8.1 DTS bandwidth</p> <p><u>6dB Emission bandwidth measurement procedure</u></p> <ul style="list-style-type: none"> <li>- Set RBW = 100 kHz.</li> <li>- Set the video bandwidth (VBW) <math>\geq</math> 3 ' RBW.</li> <li>- Detector = Peak.</li> <li>- Trace mode = max hold.</li> <li>- Sweep = auto couple.</li> <li>- Allow the trace to stabilize.</li> </ul> <p>Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.</p>		
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

**Test Data**     Yes       N/A

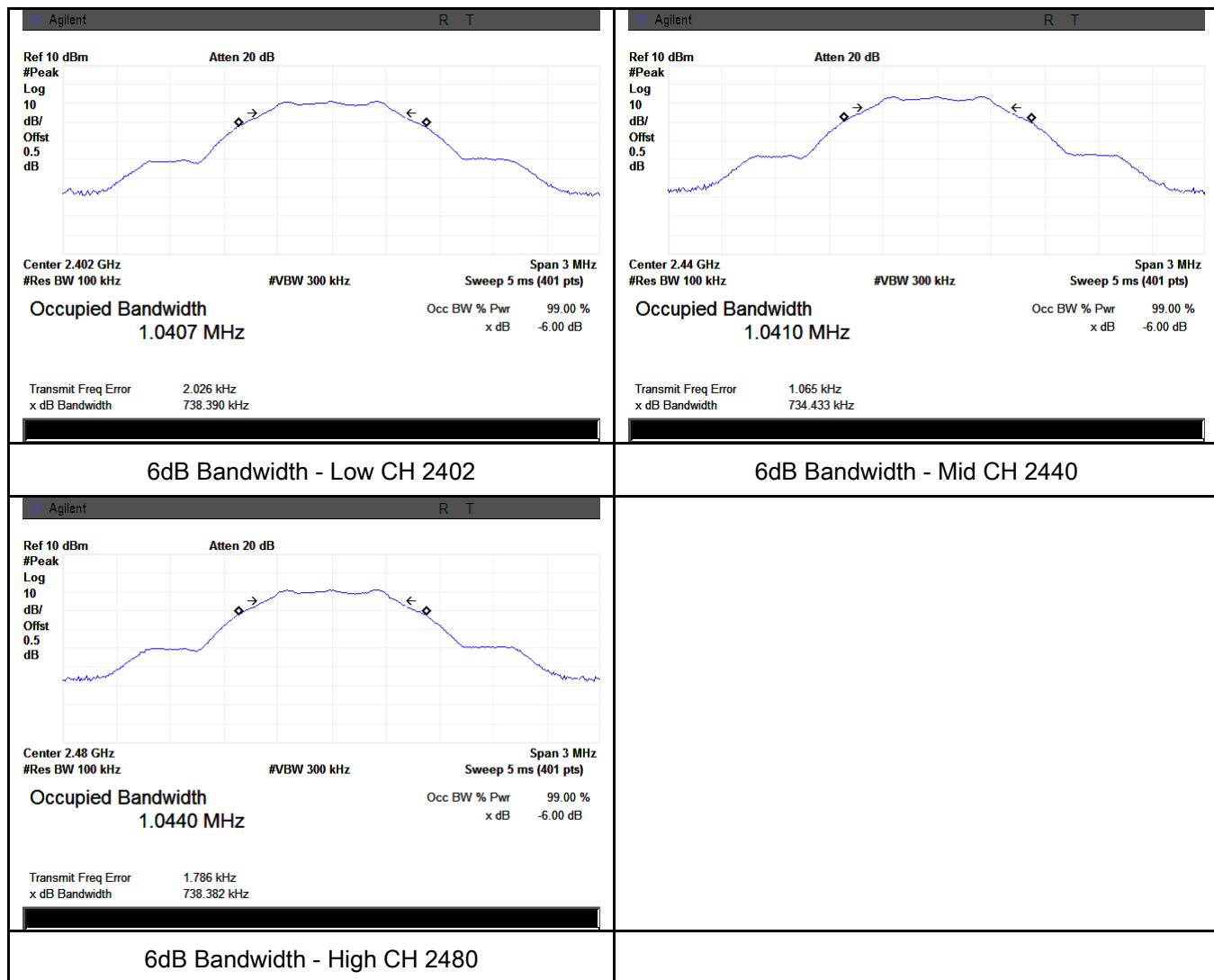
**Test Plot**     Yes (See below)       N/A

## 6dB Bandwidth measurement result

### Test Data

CH	Freq (MHz)	6dB Bandwidth (kHz)	99% Occupied Bandwidth (MHz)
Low	2402	738.390	1.0407
Mid	2440	734.433	1.0410
High	2480	738.382	1.0440

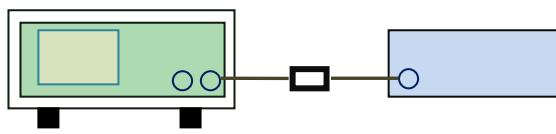
### Test Plots



## 6.3 Maximum Output Power

Temperature	23°C
Relative Humidity	60%
Atmospheric Pressure	1005mbar
Test date :	March 02, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b) (2), RSS210 (A8.4)	a)	FHSS in 2400-2483.5MHz with $\geq$ 75 channels: $\leq$ 1 Watt	<input type="checkbox"/>
	b)	FHSS in 5725-5850MHz: $\leq$ 1 Watt	<input type="checkbox"/>
	c)	For all other FHSS in the 2400-2483.5MHz band: $\leq$ 0.125 Watt.	<input type="checkbox"/>
	d)	FHSS in 902-928MHz with $\geq$ 50 channels: $\leq$ 1 Watt	<input type="checkbox"/>
	e)	FHSS in 902-928MHz with $\geq$ 25 & $<$ 50 channels: $\leq$ 0.25 Watt	<input type="checkbox"/>
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: $\leq$ 1 Watt	<input checked="" type="checkbox"/>
Test Setup		 <b>Spectrum Analyzer</b> <b>EUT</b>	
Test Procedure		<p>558074 D01 DTS MEAS Guidance v03r02, 9.1.2 Integrated band power method</p> <p>Maximum output power measurement procedure</p> <ol style="list-style-type: none"> <li>Set the RBW <math>\geq</math> DTS bandwidth.</li> <li>Set VBW <math>\geq</math> <math>3 \times</math> RBW.</li> <li>Set span <math>\geq</math> <math>3 \times</math> RBW</li> <li>Sweep time = auto couple.</li> <li>Detector = peak.</li> <li>Trace mode = max hold.</li> <li>Allow trace to fully stabilize.</li> <li>Use peak marker function to determine the peak amplitude level.</li> </ol>	
Remark			

Result	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
--------	--	-------------------------------

 Test Data  Yes  N/A

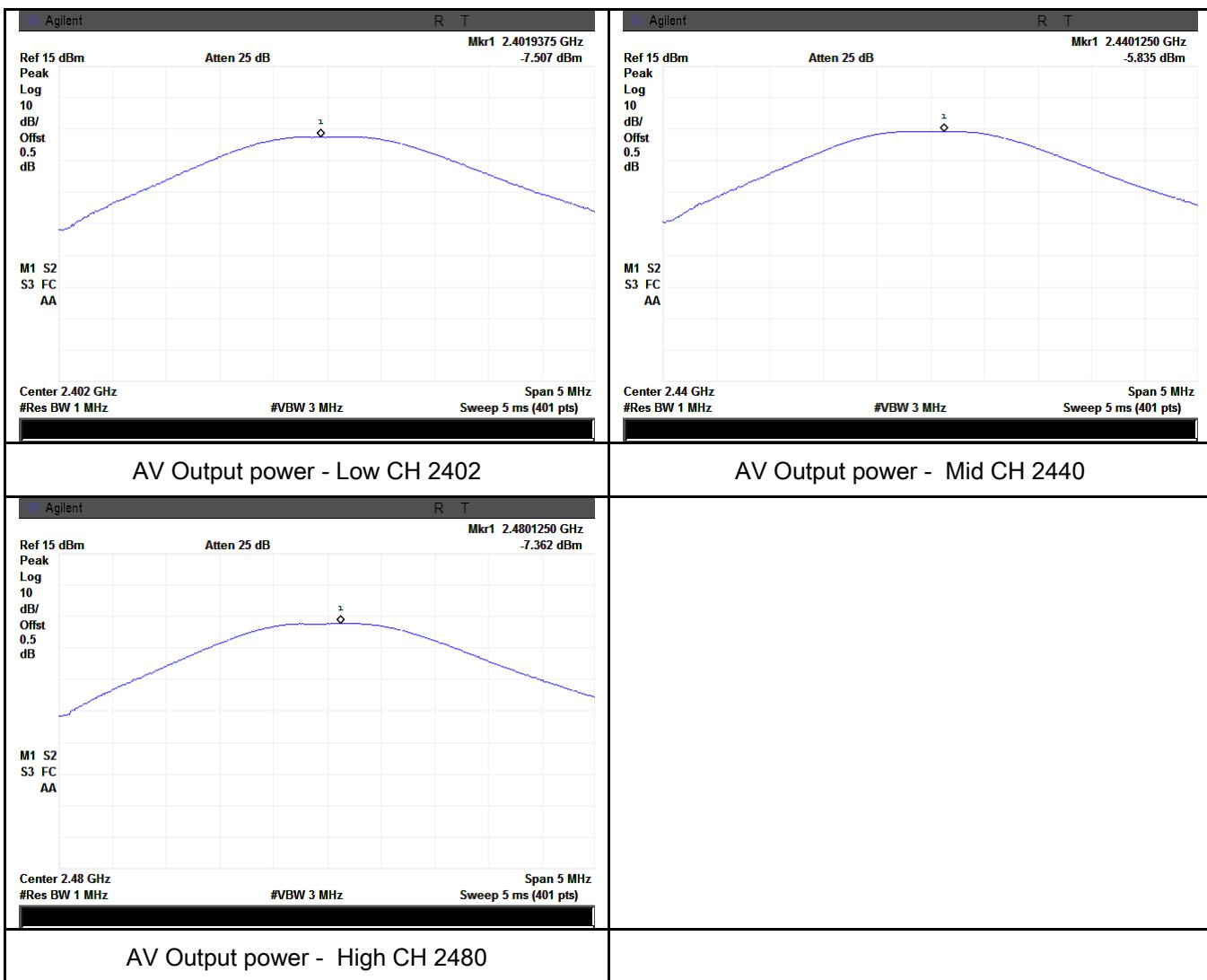
 Test Plot  Yes (See below)  N/A

### Output Power measurement result

#### Test Data

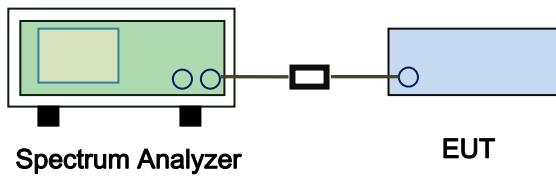
Type	CH	Freq (MHz)	Conducted Power (dBm)	Limit (dBm)	Result
Output power	Low	2402	-7.507	30	Pass
	Mid	2440	-5.835	30	Pass
	High	2480	-7.362	30	Pass

#### Test Plots



## 6.4 Power Spectral Density

Temperature	23°C
Relative Humidity	60%
Atmospheric Pressure	1005mbar
Test date :	March 02, 2015
Tested By :	Winnie Zhang

Spec	Item	Requirement	Applicable
§15.247(e)	a)	The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure	<p>558074 D01 DTS MEAS Guidance v03r02, 10.2 power spectral density method power spectral density measurement procedure</p> <ul style="list-style-type: none"> <li>- a) Set analyzer center frequency to DTS channel center frequency.</li> <li>- b) Set the span to 1.5 times the DTS bandwidth.</li> <li>- c) Set the RBW to: <math>3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}</math>.</li> <li>- d) Set the VBW <math>\geq 3 \times \text{RBW}</math>.</li> <li>- e) Detector = peak.</li> <li>- f) Sweep time = auto couple.</li> <li>- g) Trace mode = max hold.</li> <li>- h) Allow trace to fully stabilize.</li> <li>- i) Use the peak marker function to determine the maximum amplitude level within the RBW.</li> <li>- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.</li> </ul>		
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

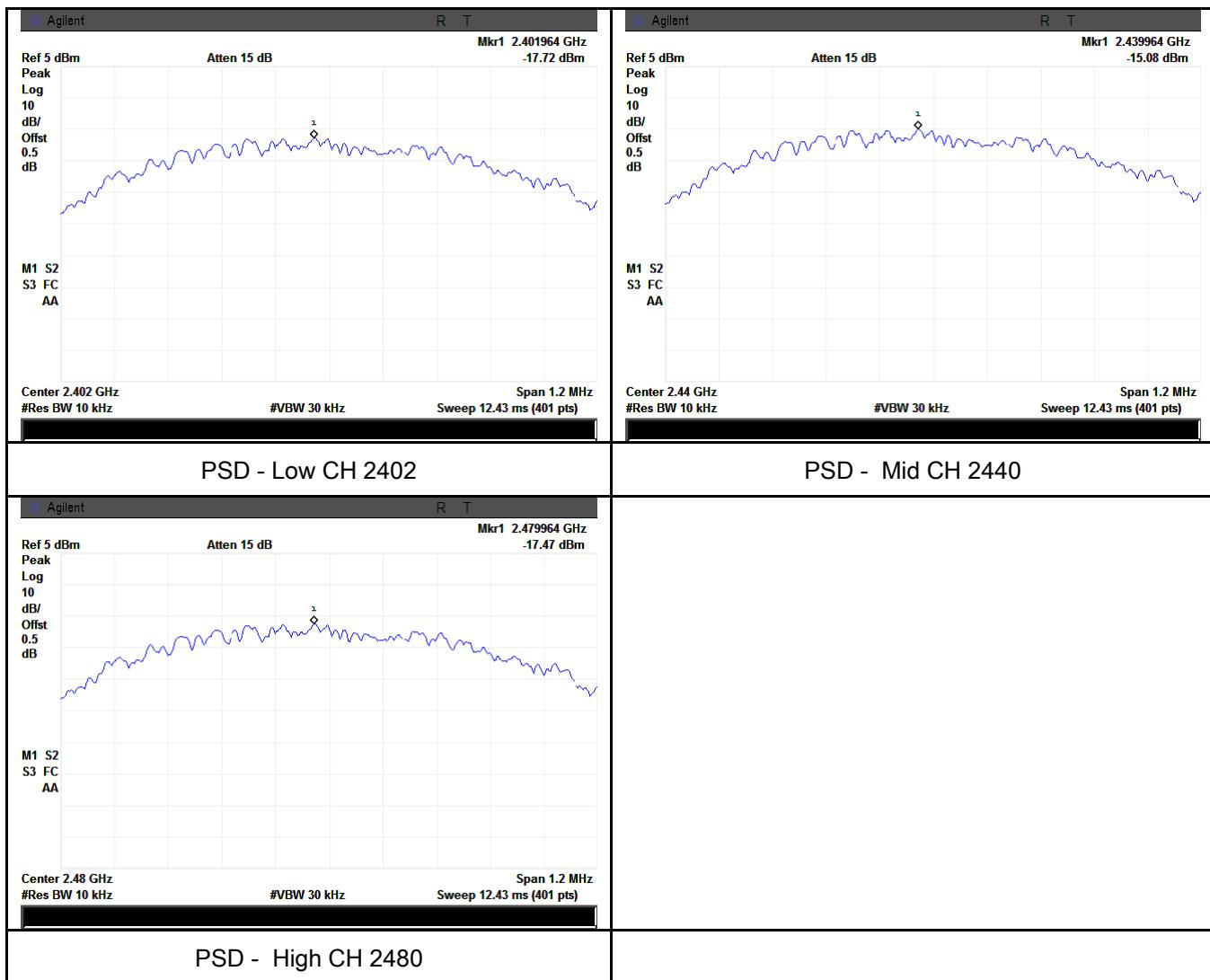
Test Data  Yes  N/A  
 Test Plot  Yes (See below)  N/A

## Power Spectral Density measurement result

### Test Data

Type	CH	Freq (MHz)	PSD (dBm)	Limit (dBm)	Result
PSD	Low	2402	-17.72	8	Pass
	Mid	2440	-15.08	8	Pass
	High	2480	-17.47	8	Pass

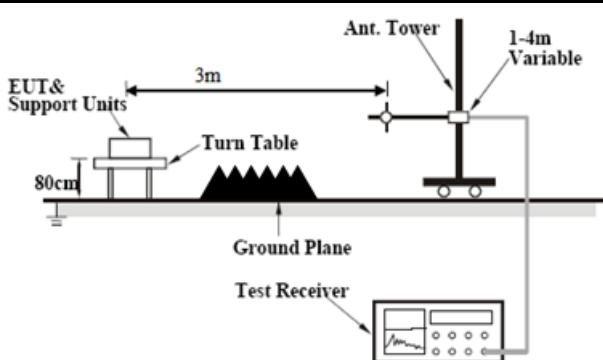
### Test Plots



## 6.5 Band-Edge & Unwanted Emissions into Non-Restricted Frequency Bands

Temperature	21°C
Relative Humidity	68%
Atmospheric Pressure	1009mbar
Test date :	March 04, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(d)	a)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure	<p>Radiated Method Only</p> <ul style="list-style-type: none"> <li>- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.</li> <li>- 2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.</li> <li>- 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check</li> </ul>		

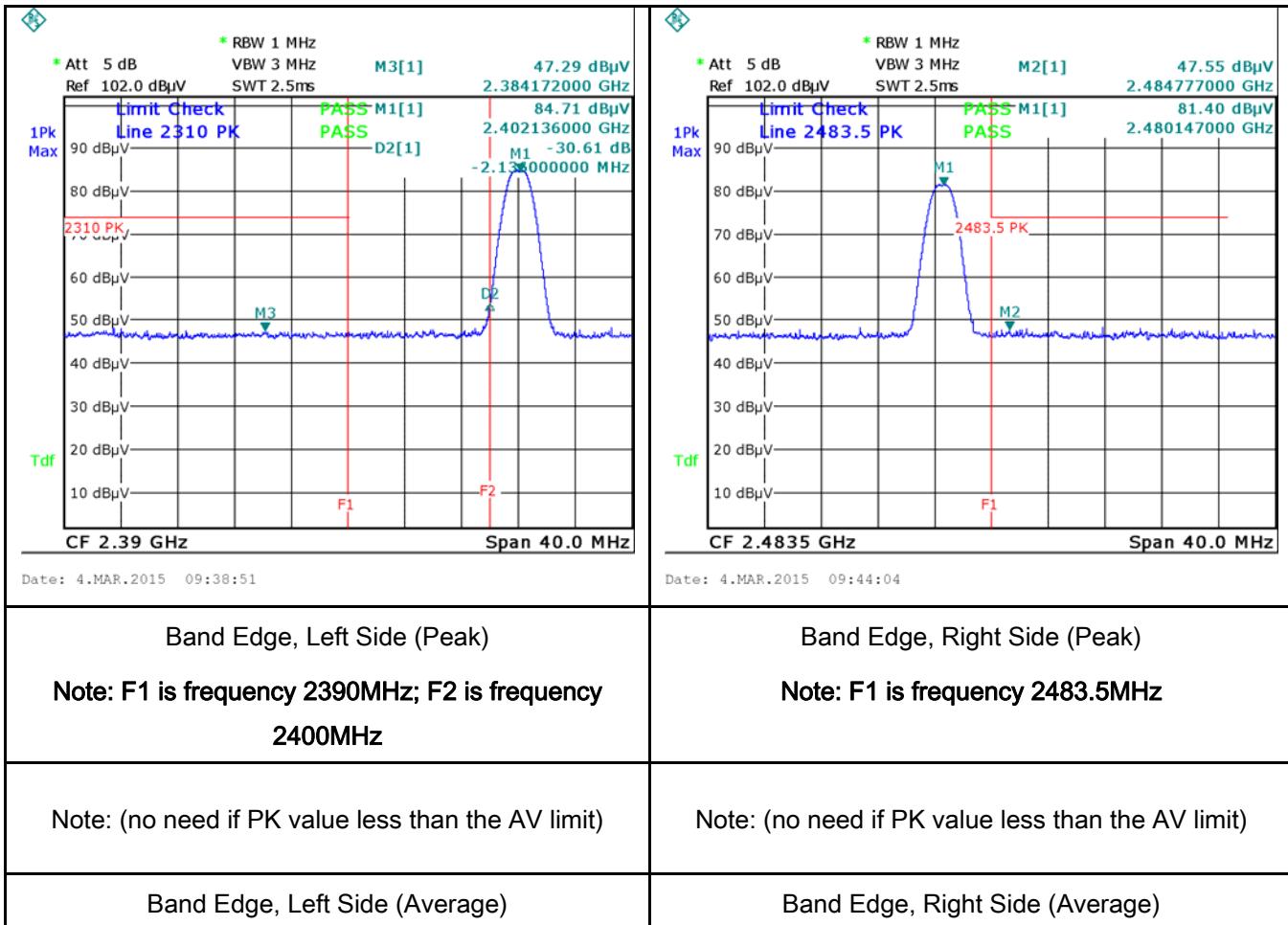
	<p>the emission of EUT, if pass then set Spectrum Analyzer as below:</p> <ul style="list-style-type: none"> <li>a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.</li> <li>b. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz.</li> <li>c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz.</li> <li>- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.</li> <li>- 5. Repeat above procedures until all measured frequencies were complete.</li> </ul>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

**Test Data**    Yes       N/A

**Test Plot**    Yes (See below)       N/A

## Test Plots

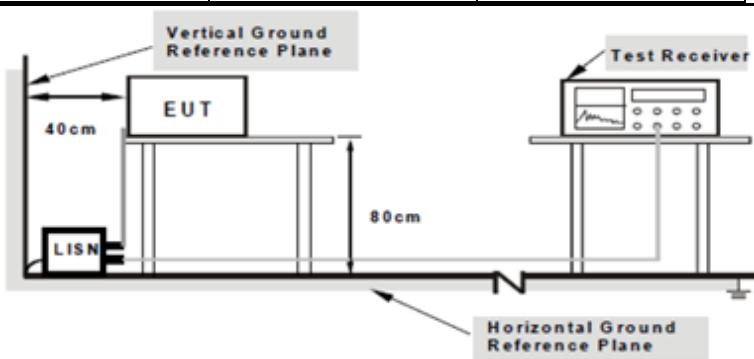
### Band Edge measurement result



## 6.6 AC Power Line Conducted Emissions

Temperature	24°C
Relative Humidity	66%
Atmospheric Pressure	1007mbar
Test date :	March 03, 2015
Tested By :	Winnie Zhang

### Requirement(s):

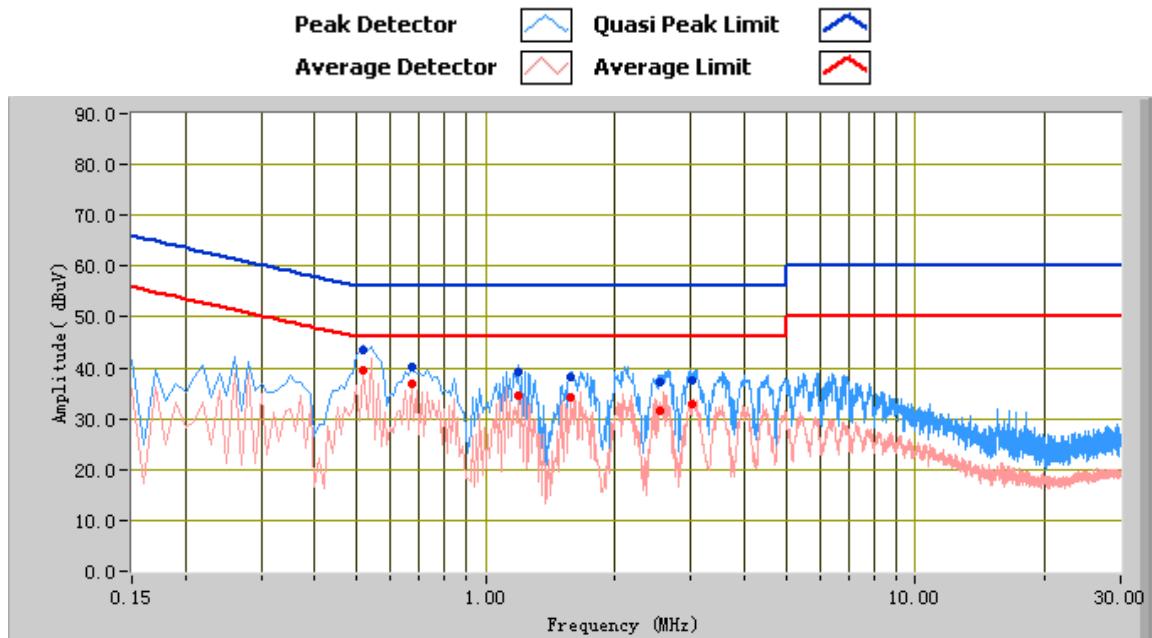
Spec	Item	Requirement	Applicable															
47CFR§15.207, RSS210 (A8.1)	a)	<p>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu] 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>Frequency ranges (MHz)</th> <th colspan="2">Limit (dB<math>\mu</math>V)</th> </tr> <tr> <th></th> <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 (dB $\mu$ V)			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 (dB $\mu$ V)																	
	QP	Average																
0.15 ~ 0.5	66 – 56	56 – 46																
0.5 ~ 5	56	46																
5 ~ 30	60	50																
Test Setup	 <p><b>Note:</b> 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>																	
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 50W/50mH EUT LISN, connected to filtered mains.</li> <li>The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss</li> </ol>																	

	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: Transmitting Mode

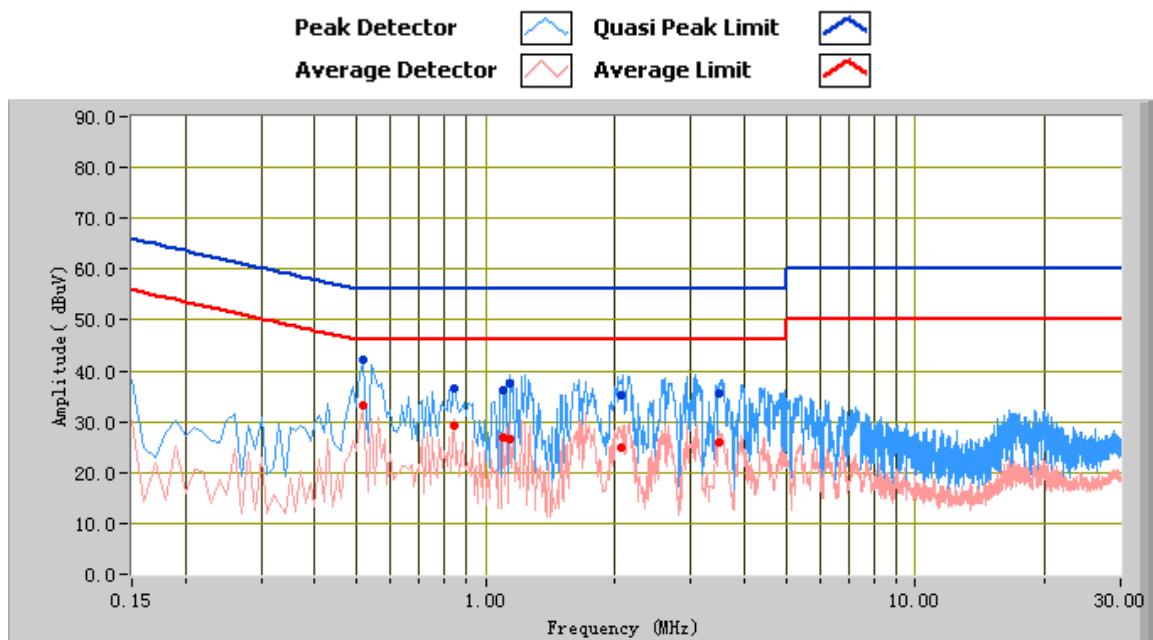


*Test Data*

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Average (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Factors (dB)
0.52	43.51	56.00	-12.49	39.41	46.00	-6.59	10.56
1.19	39.16	56.00	-16.84	34.45	46.00	-11.55	10.30
0.67	40.17	56.00	-15.83	37.02	46.00	-8.98	10.47
1.58	38.21	56.00	-17.79	34.07	46.00	-11.93	10.36
3.02	37.46	56.00	-18.54	32.74	46.00	-13.26	10.63
2.54	37.27	56.00	-18.73	31.68	46.00	-14.32	10.54

Test Mode: Transmitting Mode



### Test Data

Phase Neutral Plot at 120Vac, 60Hz

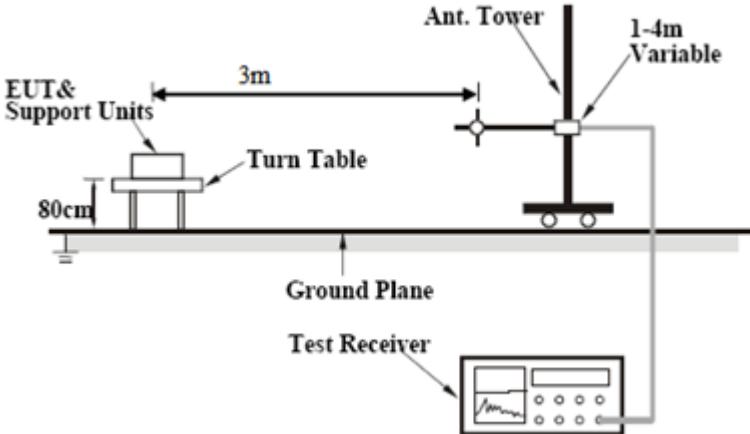
Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Average (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Factors (dB)
0.52	42.18	56.00	-13.82	33.08	46.00	-12.92	10.56
1.14	37.51	56.00	-18.49	26.54	46.00	-19.46	10.29
2.06	35.35	56.00	-20.65	25.04	46.00	-20.96	10.45
0.84	36.40	56.00	-19.60	29.36	46.00	-16.64	10.37
1.10	36.20	56.00	-19.80	27.04	46.00	-18.96	10.29
3.50	35.59	56.00	-20.41	25.77	46.00	-20.23	10.71

## 6.7 Radiated Spurious Emissions

Temperature	24°C
Relative Humidity	66%
Atmospheric Pressure	1007mbar
Test date :	March 03, 2015
Tested By :	Winnie Zhang

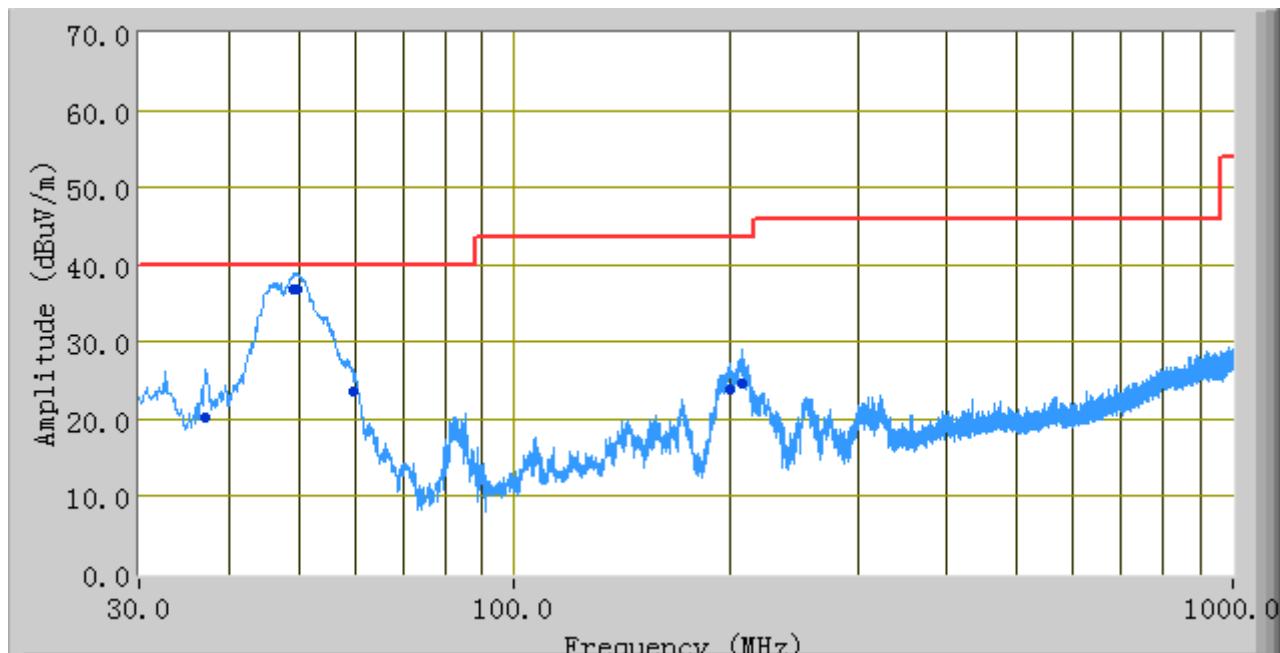
### Requirement(s):

Spec	Item	Requirement	Applicable							
47CFR§15. 247(d), RSS210 (A8.5)	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 (µV/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 (µV/m)	30 – 88	100	88 – 216	150	216 – 960
Frequency range (MHz)	Field Strength (µV/m)									
30 – 88	100									
88 – 216	150									
216 – 960	200									
Above 960	500									
b)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required <input checked="" type="checkbox"/> 20 dB down <input type="checkbox"/> 30 dB down	<input checked="" type="checkbox"/>								
	c)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	<input checked="" type="checkbox"/>							

Test Setup	 <p>The diagram illustrates the test setup. A turntable is positioned on a ground plane. An EUT (Equipment Under Test) and its support units are mounted on the turntable. A vertical Ant. Tower (Antenna Tower) is connected to the turntable. The distance between the EUT and the turntable is 3m. The height of the EUT is 80cm. The antenna height is adjustable, indicated as 1-4m Variable. A Test Receiver is connected to the turntable to receive signals from the EUT.</p>
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 over a full rotation of the EUT) was chosen.</li> <li>b. The EUT was then rotated to the direction that gave the maximum emission.</li> <li>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.</li> <li>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 is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz.</li> <li>5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol>
Remark	Different RF configuration has been evaluated but not much difference was found. The data presented here is the worst case data with EUT under 802.11n – HT20-2437MHz mode.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Test Data	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A
Test Plot	<input checked="" type="checkbox"/> Yes (See below) <input type="checkbox"/> N/A

Test Mode:	Transmitting Mode
------------	-------------------

**Below 1GHz**



***Test Data***

**Vertical & Horizontal Polarity Plot @3m**

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Azimuth	Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dB $\mu$ V/m)	Margin (dB)
50.00	36.90	0.00	V	100.00	-13.89	40.00	-3.10
49.33	36.77	148.00	V	100.00	-13.60	40.00	-3.23
37.08	20.29	313.00	V	100.00	-5.53	40.00	-19.71
59.41	23.48	57.00	V	108.00	-13.98	40.00	-16.52
207.43	24.53	224.00	H	148.00	-8.01	43.52	-18.99
198.92	23.74	145.00	V	112.00	-8.16	43.52	-19.78

Test Mode:	Transmitting Mode
------------	-------------------

(Above 1GHz)

Note: Other modes were verified, only the result of worst case basic rate mode was presented.

Low Channel (2402 MHz)

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
4804	35.42	AV	V	33.83	4.87	27.32	46.8	54	-7.2
4804	34.69	AV	H	33.83	4.87	27.32	46.07	54	-7.93
4804	43.91	PK	V	33.83	4.87	27.32	55.29	74	-18.71
4804	44.15	PK	H	33.83	4.87	27.32	55.53	74	-18.47

Middle Channel (2440 MHz)

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
4880	35.52	AV	V	33.86	4.87	26.32	47.93	54	-6.07
4880	35.89	AV	H	33.86	4.87	26.32	48.3	54	-5.7
4880	43.77	PK	V	33.86	4.87	26.32	56.18	74	-17.82
4880	43.39	PK	H	33.86	4.87	26.32	55.8	74	-18.2

High Channel (2480 MHz)

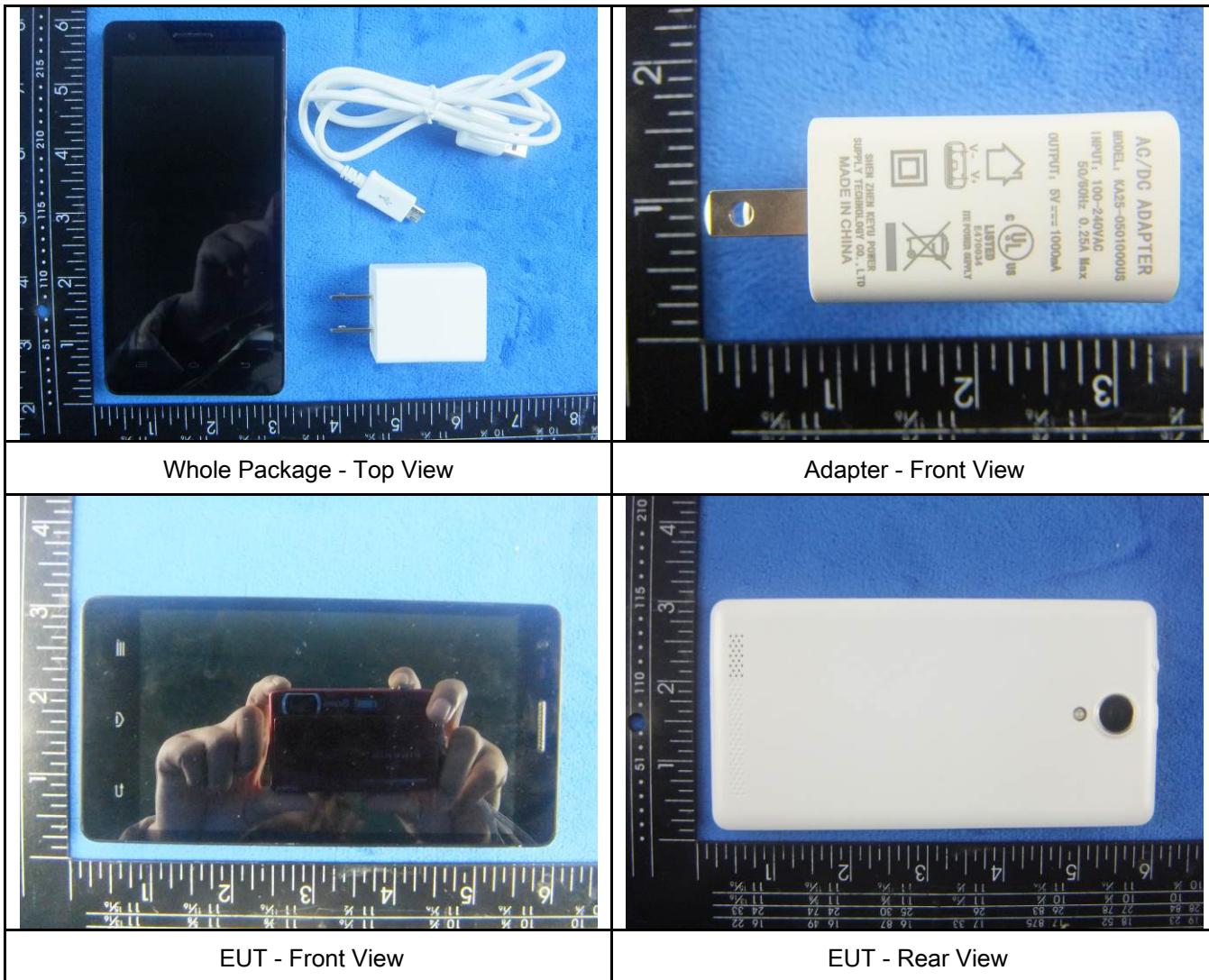
Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
4960	34.96	AV	V	33.9	4.87	26.72	47.01	54	-6.99
4960	35.01	AV	H	33.9	4.87	26.72	47.06	54	-6.94
4960	43.67	PK	V	33.9	4.87	26.72	55.72	74	-18.28
4960	44.17	PK	H	33.9	4.87	26.72	56.22	74	-17.78

## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>AC Line Conducted</b>					
EMI test receiver	ESCS30	8471241027	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
Line Impedance	LI-125A	191106	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>
Line Impedance	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"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/25/2014	09/24/2015	<input checked="" type="checkbox"/>
Transient Limiter	LIT-153	531118	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
<b>RF conducted test</b>					
Agilent ESA-E SERIES	E4407B	MY45108319	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
DC Power Supply	E3640A	MY40004013	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
EMI test receiver	ESL6	100262	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
Positioning Controller	UC3000	MF780208282	11/20/2014	11/19/2015	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
Microwave Preamplifier (0.5 ~ 18GHz)	PAM-118	443008	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/22/2014	09/21/2015	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/25/2014	09/24/2015	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMU200	121393	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>

## Annex B. EUT And Test Setup Photographs

### Annex B.i. Photograph: EUT External Photo

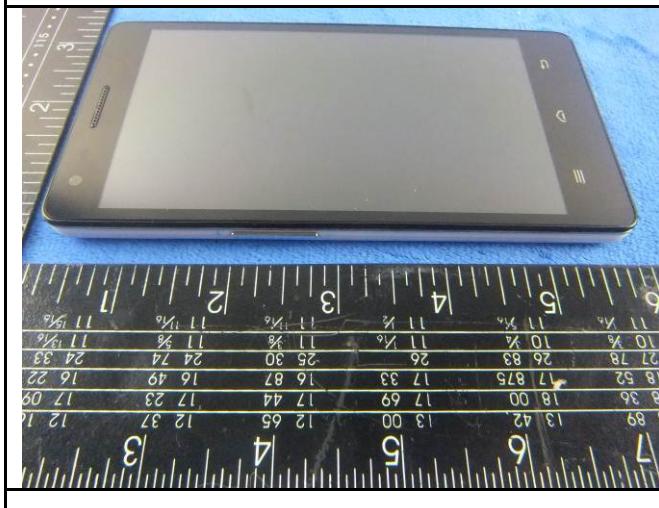




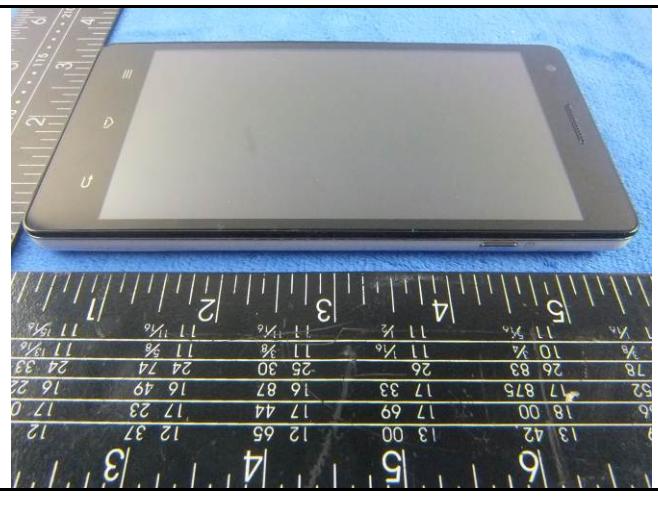
EUT - Top View



EUT - Bottom View

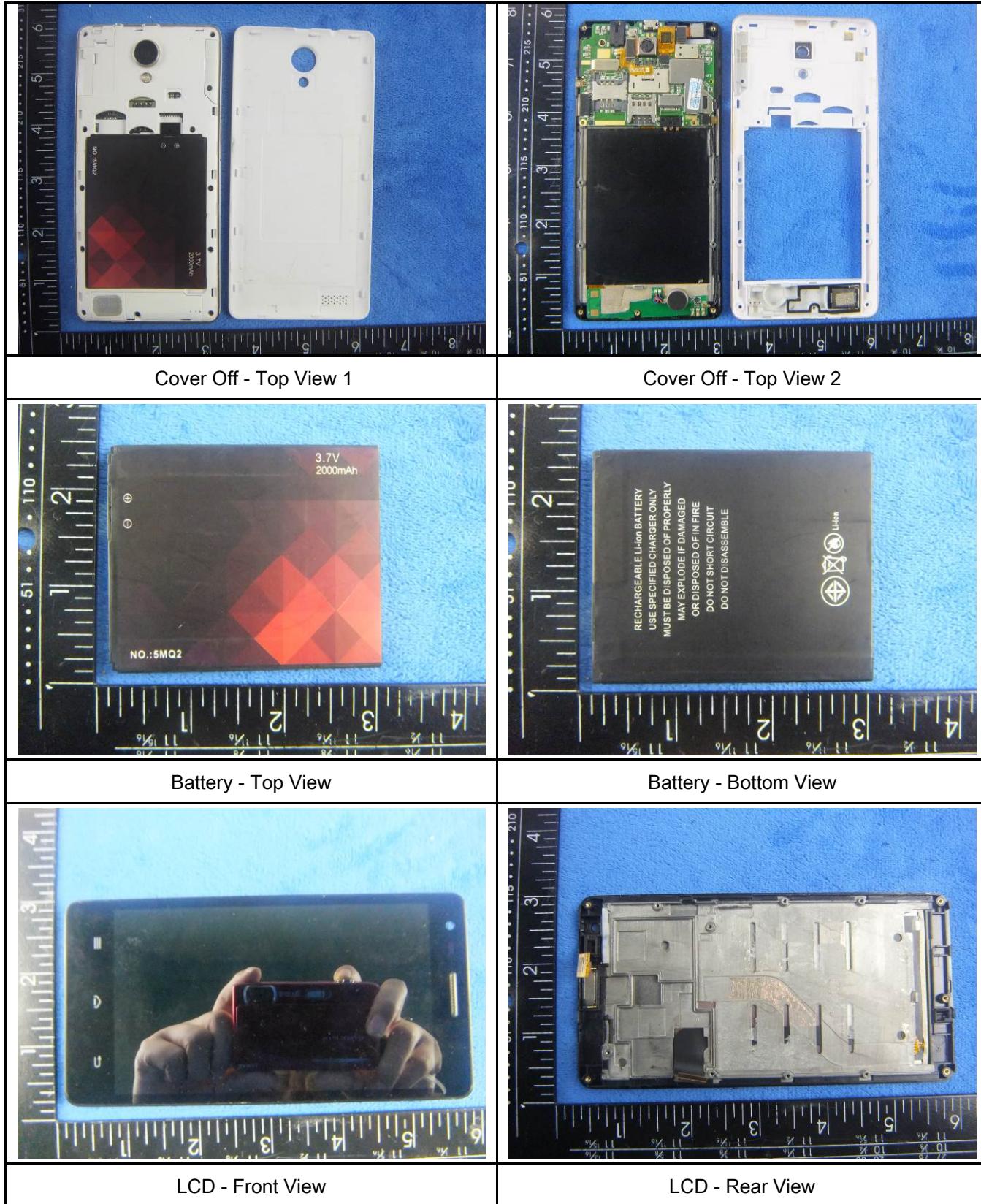


EUT - Left View



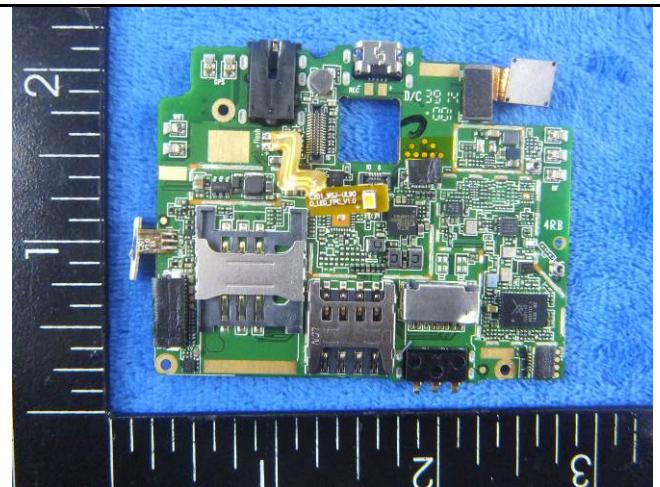
EUT - Right View

Annex B.ii. Photograph: EUT Internal Photo

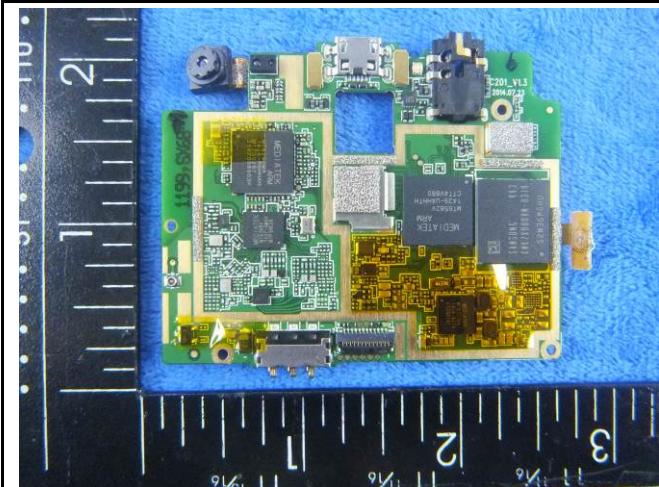




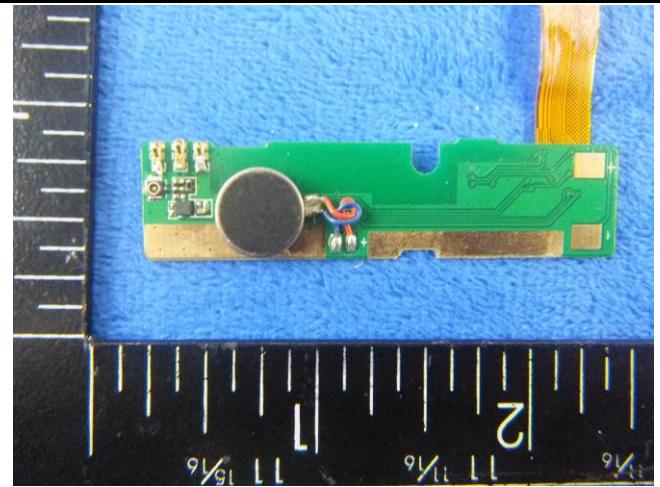
Mainborad With Shielding - Front View



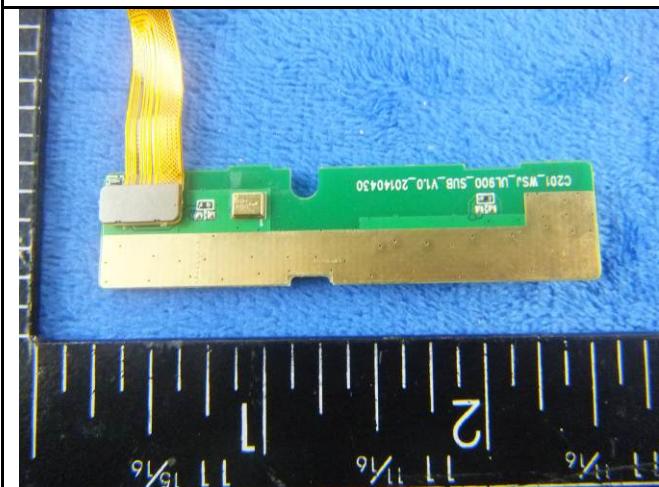
Mainborad Without Shielding - Front View



Mainborad - Rear View



Connect borad - Front View



Connect borad - Rear View

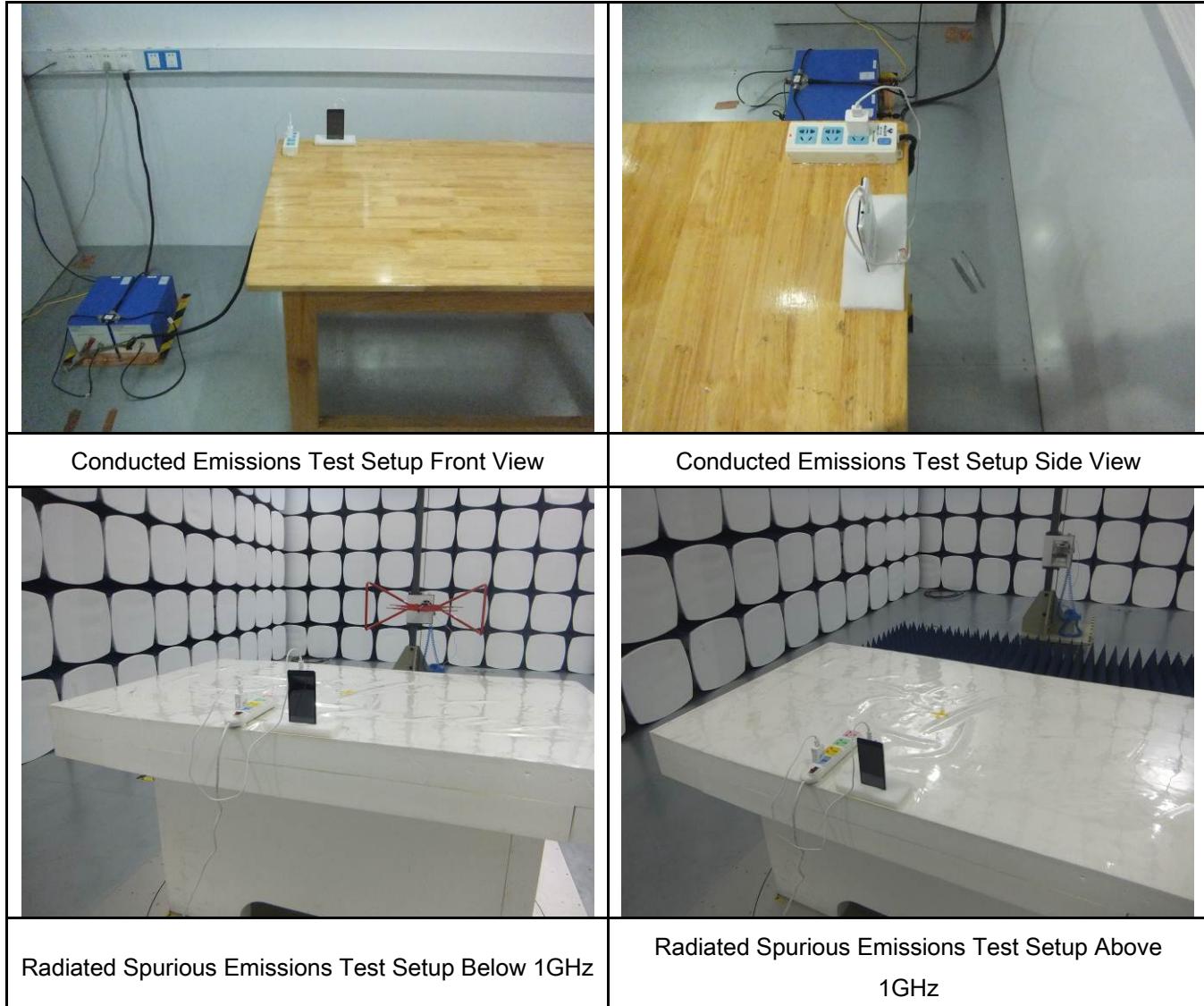


GSM/PCS/UMTS-FDD/LTE Antenna View



BT/BLE/WIFI Antenna View

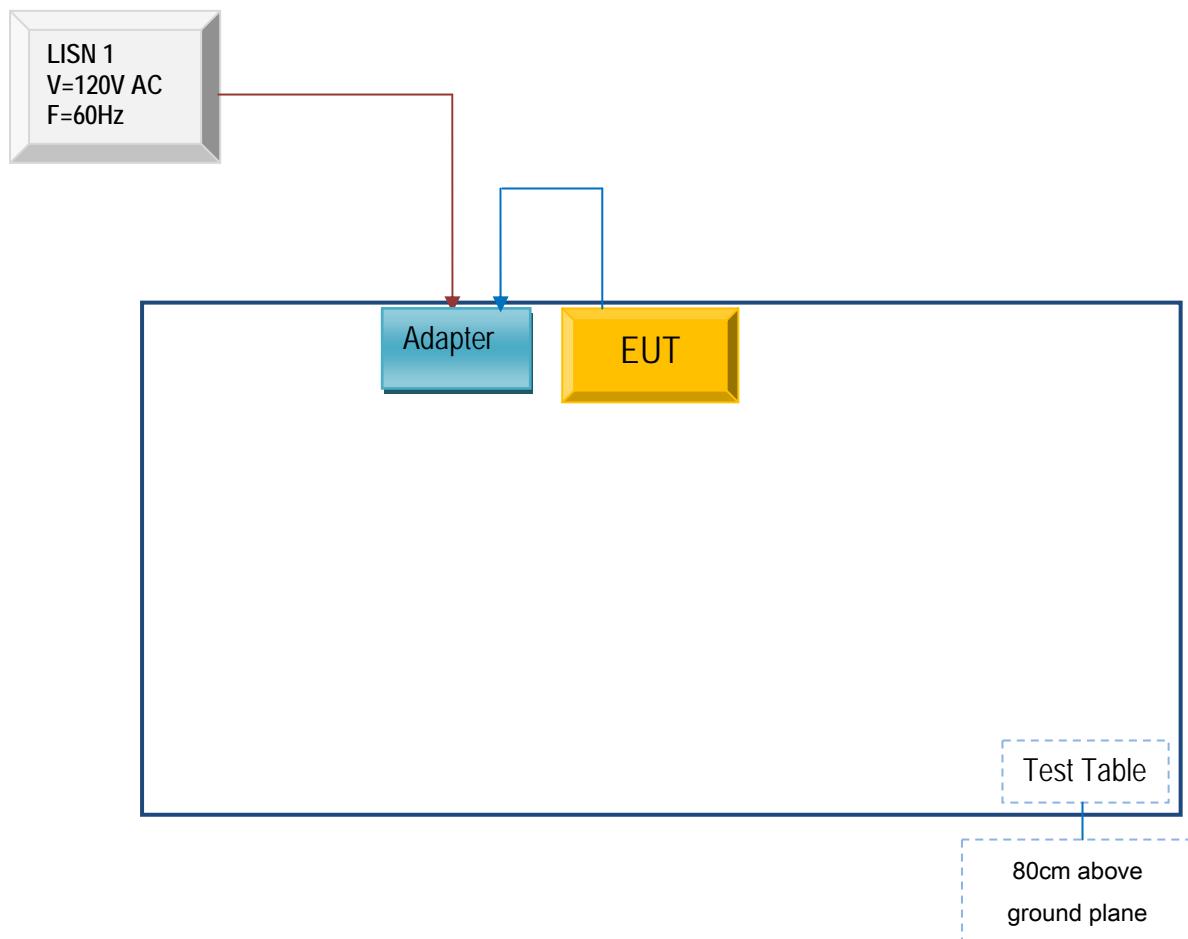
**Annex B.iii. Photograph: Test Setup Photo**



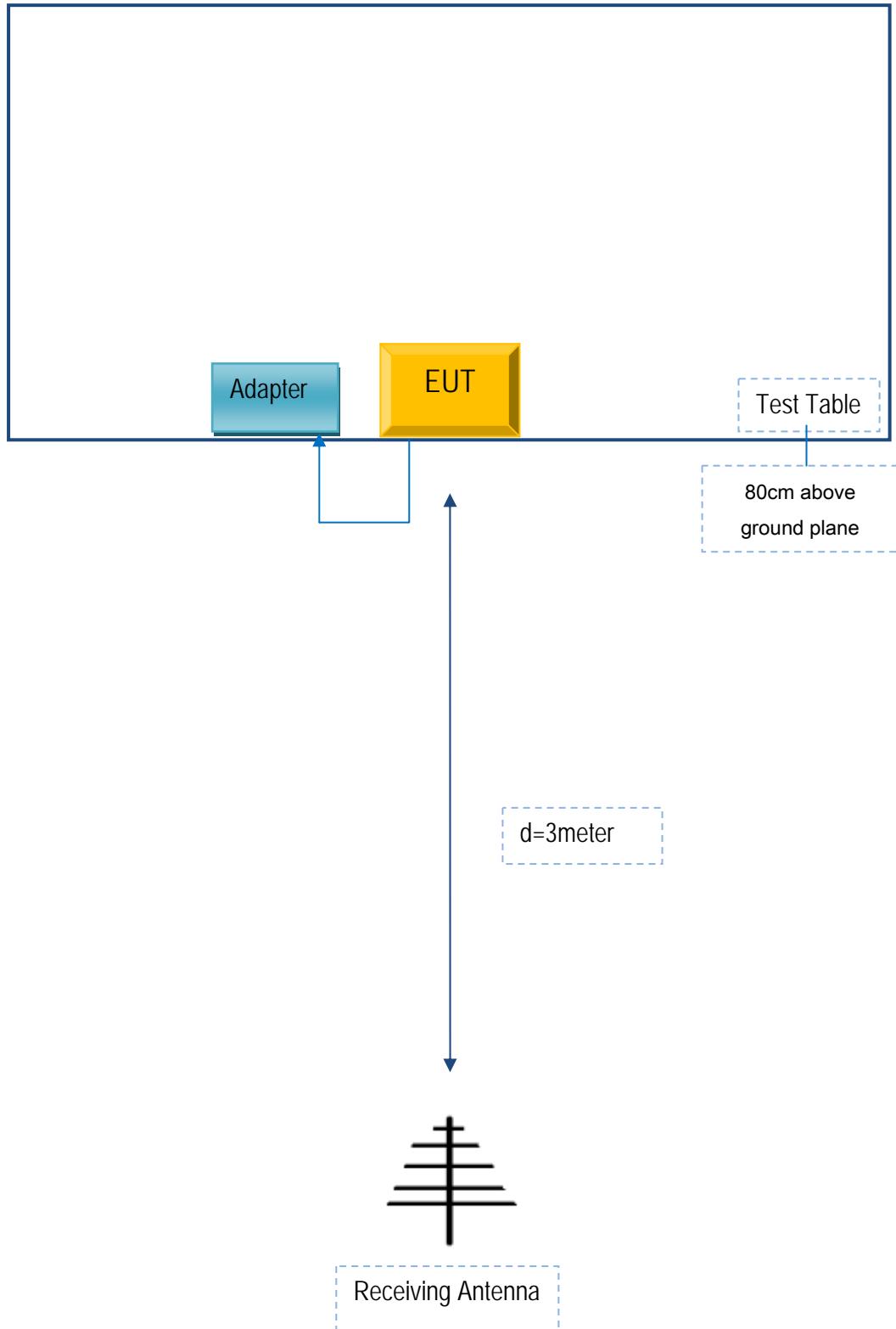
## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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

Block Configuration Diagram for AC Line 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
N/A	N/A	N/A	N/A	N/A

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

Please see attachment

## Annex E. DECLARATION OF SIMILARITY

N/A