

RF TEST REPORT



Report No.: 16070911-FCC-R4

Supersede Report No.: N/A

Applicant	Verykool USA Inc	
Product Name	Mobile phone	
Model No.	SL5200	
Serial No.	N/A	
Test Standard	FCC Part 15.247: 2015, ANSI C63.10: 2013	
Test Date	August 1 to August 29, 2016	
Issue Date	August 31, 2016	
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"/>
Loren Luo	David Huang	
Loren Luo 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

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

Test Report No.	16070911-FCC-R4
Page	3 of 43

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	9
6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS	10
6.1 ANTENNA REQUIREMENT.....	10
6.2 DTS (6 DB) CHANNEL BANDWIDTH	11
6.3 MAXIMUM OUTPUT POWER	13
6.4 POWER SPECTRAL DENSITY.....	15
6.5 BAND-EDGE & UNWANTED EMISSIONS INTO RESTRICTED FREQUENCY BANDS.....	17
6.6 AC POWER LINE CONDUCTED EMISSIONS.....	20
6.7 RADIATED SPURIOUS EMISSIONS & RESTRICTED BAND.....	26
ANNEX A. TEST INSTRUMENT.....	32
ANNEX B. EUT AND TEST SETUP PHOTOGRAPHS.....	33
ANNEX C. TEST SETUP AND SUPPORTING EQUIPMENT.....	39
ANNEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PARTLIST	43

1. Report Revision History

Report No.	Report Version	Description	Issue Date
16070911-FCC-R4	NONE	Original	August 31, 2016

2. Customer information

Applicant Name	Verykool USA Inc
Applicant Add	3636 Nobel Drive, Suite 325, San Diego, California 92122 United States
Manufacturer	Kozen Mobile Co.,Ltd
Manufacturer Add	Floor 3rd, Building 29, No.368 Zhangjiang Road, Pudong District, Shanghai, China 201203

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:	SL5200
Serial Model:	N/A
Date EUT received:	July 26, 2016
Test Date(s):	August 1 to August 29, 2016
Equipment Category :	DTS
	GSM850: -3.2dBi
	PCS1900: -2.21dBi
	UMTS-FDD Band V: -3.62dBi
	UMTS-FDD Band IV: -2.42dBi
	UMTS-FDD Band II: -2.42dBi
	LTE Band 2: -2.5dBi
Antenna Gain:	LTE Band 4: -3.0dBi
	LTE Band 5: -3.20dBi
	LTE Band 7: -3.0dBi
	LTE Band 12: -4.2dBi
	LTE Band 17: -4.2dBi
	Bluetooth/BLE/WIFI: 0dBi
	GPS: 0dBi
Antenna Type:	PIFA antenna
	Adapter:
	Model: TPA-46B050100UU
	Input: 100-240V~50/60Hz,0.2A
Input Power:	Output:5.0V,1000mA
	Battery:
	Model: MLP415879
	Spec: 3.8V,2960mAh(11.248Wh)
	Charge limited voltage: 4.35V

Test Report No.	16070911-FCC-R4
Page	7 of 43

Max. Output Power: -0.986dBm

GSM / GPRS: GMSK

EGPRS: GMSK,8PSK

UMTS-FDD: QPSK

LTE Band: 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 IV TX: 1712.4 ~ 1752.6 MHz;

RX : 2112.4 ~ 2152.6 MHz

UMTS-FDD Band II TX: 1852.4 ~ 1907.6 MHz;

RX: 1932.4 ~ 1987.6 MHz

LTE Band 2 TX: 1852.5 ~ 1907.5 MHz; RX : 1932.5 ~ 1987.5 MHz

RF Operating Frequency (ies): 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 12 TX: 699.7 ~ 715.3 MHz; RX : 729.7~ 745.3MHz

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

GPS: 1575.42 MHz

GSM 850: 124CH

PCS1900: 299CH

UMTS-FDD Band V: 102CH

UMTS-FDD Band IV: 202CH

UMTS-FDD Band II: 277CH

WIFI :802.11b/g/n(20M): 11CH

WIFI :802.11n(40M): 7CH

Bluetooth: 79CH

BLE: 40CH

GPS:1CH

Number of Channels:

Test Report No.	16070911-FCC-R4
Page	8 of 43

Port: Earphone Port, USB Port

Trade Name : verykool

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

FCC ID: WA6SL5200

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 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

A permanently attached PIFA antenna for Bluetooth/BLE/WIFI/GPS, the gain is 0dBi for Bluetooth/BLE/WIFI/ GPS.

A permanently attached PIFA antenna for GSM/PCS/UMTS, the gain is -3.2dBi for GSM850, -2.21dBi for PCS1900, -3.62dBi for UMTS-FDD Band V, -2.42dBi for UMTS-FDD Band IV/ II.

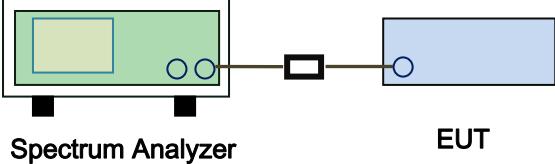
A permanently attached PIFA antenna for LTE Band 2/4/5/7/12/17, the gain is -2.5 dBi for LTE Band 2, the gain is -3.0dBi for LTE Band 4/7, the gain is -3.20dBi for LTE Band 5, the gain is -4.2dBi for LTE Band 12/17.

The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2 DTS (6 dB) Channel Bandwidth

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	August 19, 2016
Tested By :	Loren Luo

Spec	Item	Requirement	Applicable
§ 15.247(a)(2)	a)	6dB BW \geq 500kHz;	<input checked="" type="checkbox"/>
RSS Gen(4.6.1)	b)	99% BW: For FCC reference only; required by IC.	<input checked="" type="checkbox"/>
Test Setup	 Spectrum Analyzer EUT		
Test Procedure	<p>558074 D01 DTS MEAS Guidance v03r03, 8.1 DTS bandwidth</p> <p><u>6dB Emission bandwidth measurement procedure</u></p> <ul style="list-style-type: none"> - Set RBW = 100 kHz. - Set the video bandwidth (VBW) \geq 3 RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. <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

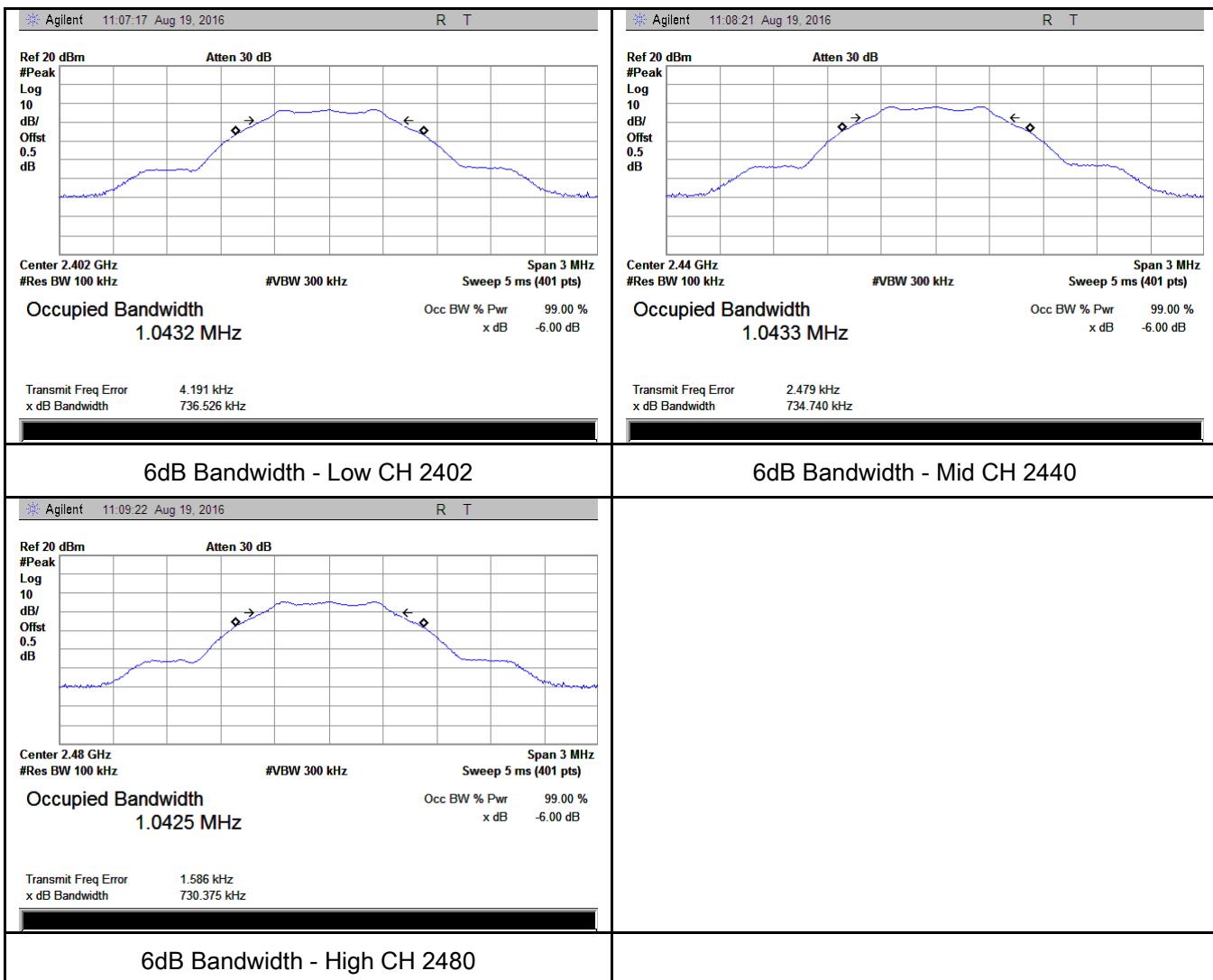
Test Plot Yes (See below) N/A

6dB Bandwidth measurement result

Test Data

CH	Frequency (MHz)	6dB Bandwidth (kHz)	99% Occupied Bandwidth (MHz)
Low	2402	736.526	1.0432
Mid	2440	734.740	1.0433
High	2480	730.375	1.0425

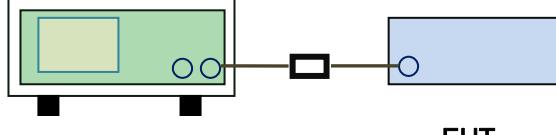
Test Plots



6.3 Maximum Output Power

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	August 19, 2016
Tested By :	Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b) (3), 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)	DTS in 902-928MHz, 2400-2483.5MHz: \leq 1 Watt	<input checked="" type="checkbox"/>
Test Setup		 Spectrum Analyzer EUT	
Test Procedure		<p>558074 D01 DTS MEAS Guidance v03r03, 9.1.2 Integrated band power method</p> <p>Maximum output power measurement procedure</p> <ol style="list-style-type: none"> Set the RBW \geq DTS bandwidth. Set VBW \geq $3 \times$ RBW. Set span \geq $3 \times$ RBW Sweep time = auto couple. Detector = peak. Trace mode = max hold. Allow trace to fully stabilize. Use peak marker function to determine the peak amplitude level. 	
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data Yes N/A

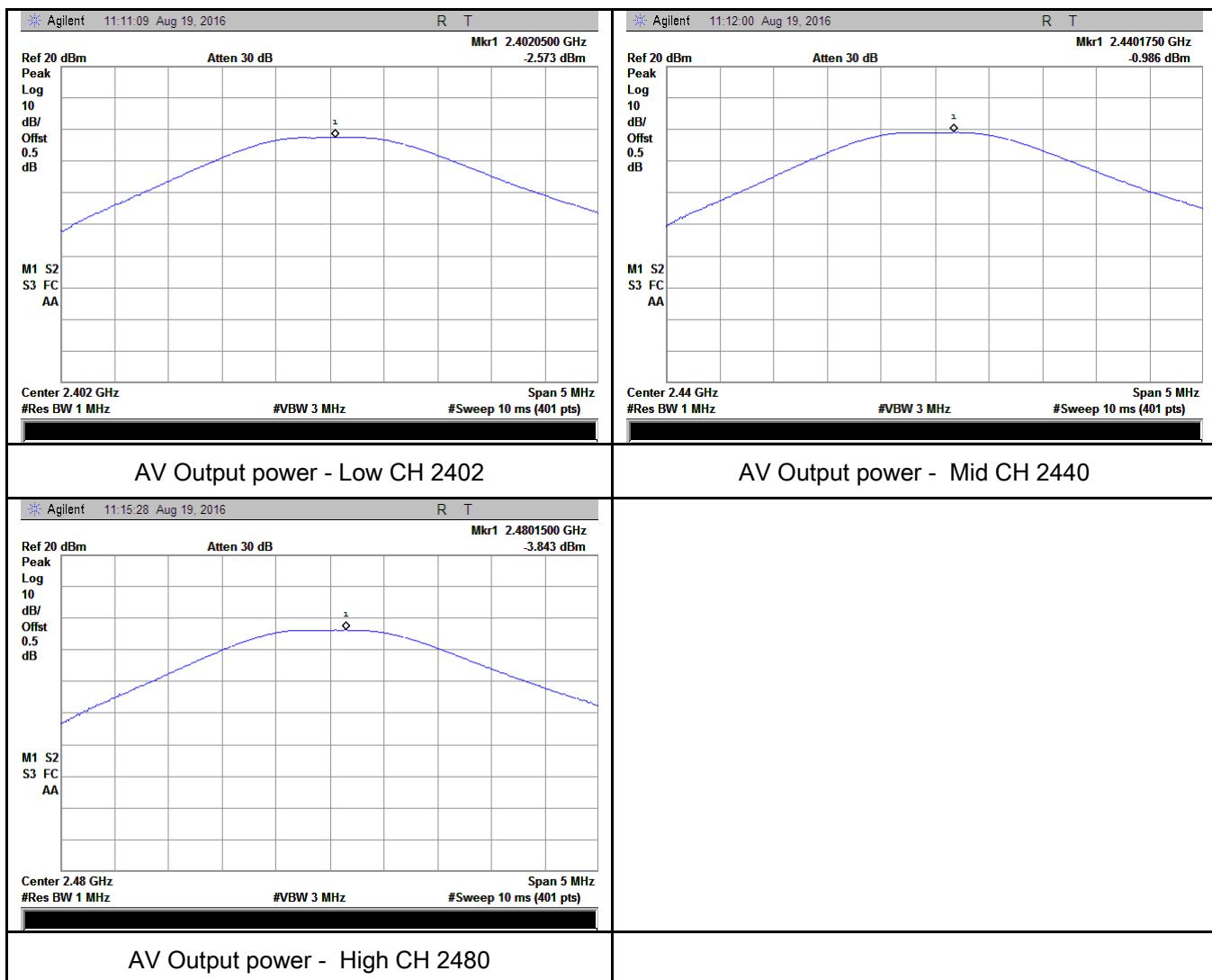
Test Plot Yes (See below) N/A

Output Power measurement result

Test Data

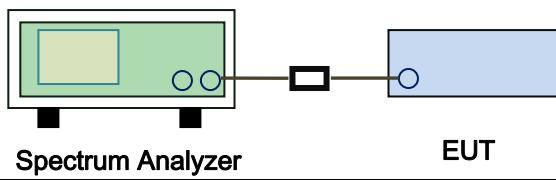
Type	CH	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Result
Output power	Low	2402	-2.773	30	Pass
	Mid	2440	-0.986	30	Pass
	High	2480	-3.843	30	Pass

Test Plots



6.4 Power Spectral Density

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	August 19, 2016
Tested By :	Loren Luo

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 v03r03, 10.2 power spectral density method power spectral density measurement procedure</p> <ul style="list-style-type: none"> - a) Set analyzer center frequency to DTS channel center frequency. - b) Set the span to 1.5 times the DTS bandwidth. - c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$. - d) Set the VBW $\geq 3 \times \text{RBW}$. - e) Detector = peak. - f) Sweep time = auto couple. - g) Trace mode = max hold. - h) Allow trace to fully stabilize. - i) Use the peak marker function to determine the maximum amplitude level within the RBW. - j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat. 		
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

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

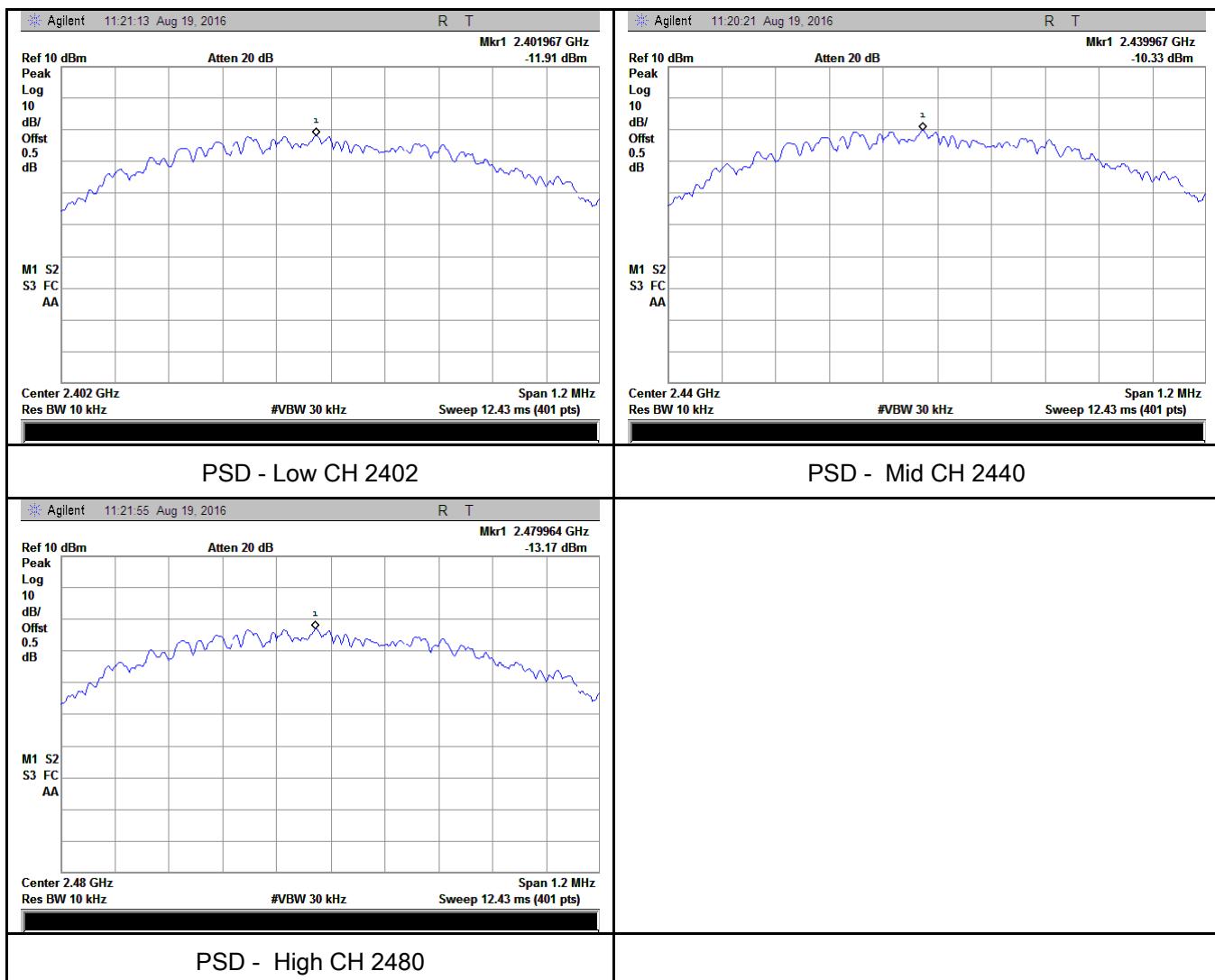
Power Spectral Density measurement result

Test Data

Type	CH	Freq (MHz)	Reading (dBm)	Factor (dB)	Result (dBm)	Limit (dBm)	Result
PSD	Low	2402	-11.91	-5.23	-17.14	8	Pass
	Mid	2440	-10.33	-5.23	-15.56	8	Pass
	High	2480	-13.17	-5.23	-18.40	8	Pass

Note: factor=10log(3/10)=-5.23

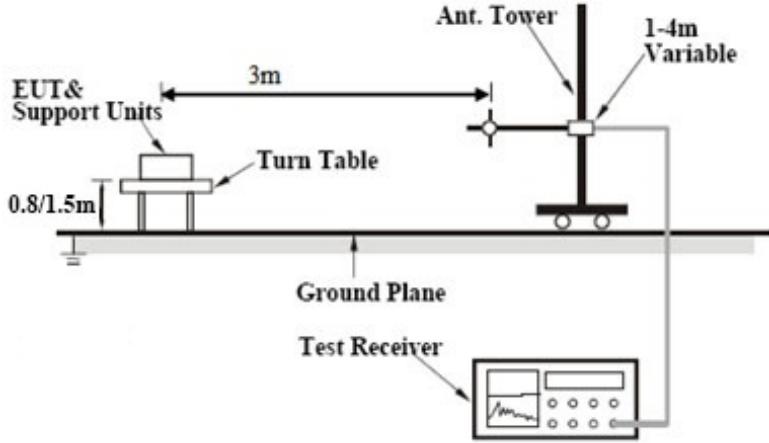
Test Plots



6.5 Band-Edge & Unwanted Emissions into Restricted Frequency Bands

Temperature	24°C
Relative Humidity	57%
Atmospheric Pressure	1015mbar
Test date :	August 15, 2016
Tested By :	Loren Luo

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	 <p>The diagram illustrates the test setup. An 'EUT & Support Units' is positioned on a 'Turn Table' at a height of '0.8/1.5m' above a 'Ground Plane'. A 'Test Receiver' is connected to the EUT. A '1-4m Variable' length 'Ant. Tower' is mounted on the turn table, extending vertically above the ground plane. A horizontal dimension line indicates a distance of '3m' between the EUT and the base of the antenna tower.</p>		
Test Procedure	<p>Radiated Method Only</p> <ul style="list-style-type: none"> - 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. - 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. 		

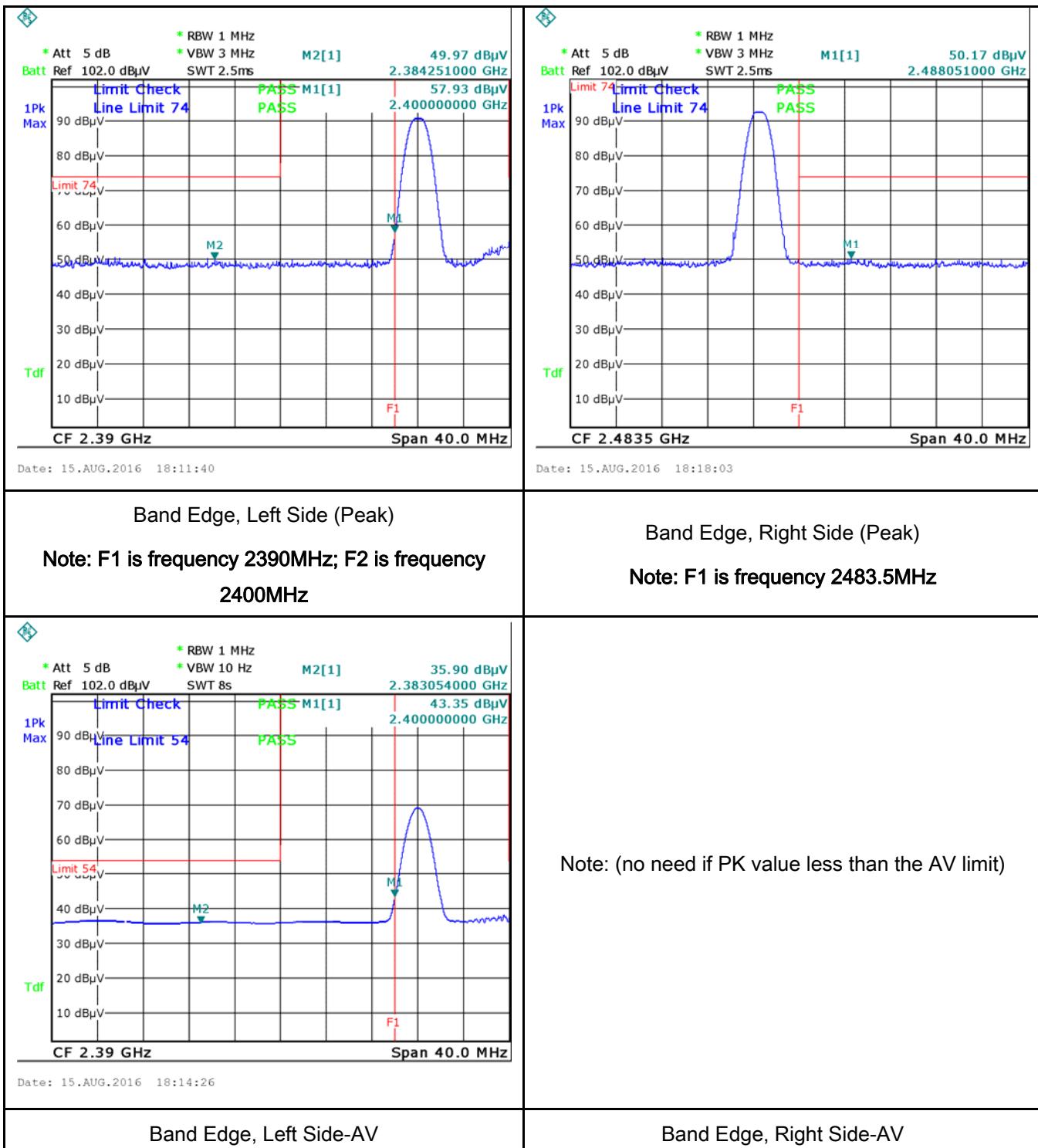
	<ul style="list-style-type: none"> - 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: <ul style="list-style-type: none"> a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. 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. 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. - 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. - 5. Repeat above procedures until all measured frequencies were complete.
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

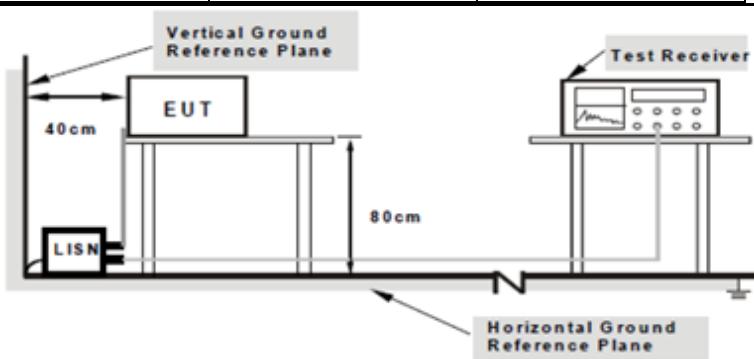
Band Edge measurement result



6.6 AC Power Line Conducted Emissions

Temperature	24°C
Relative Humidity	53%
Atmospheric Pressure	1001mbar
Test date :	August01, 2016
Tested By :	Loren Luo

Requirement(s):

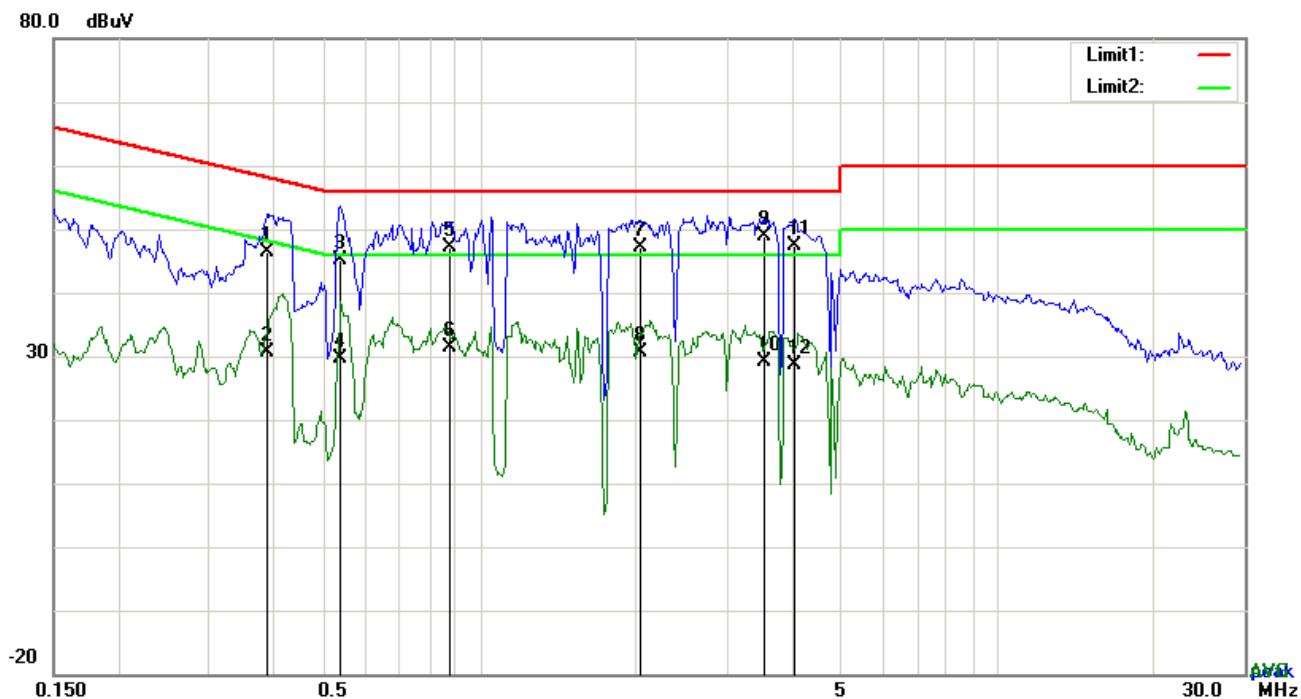
Spec	Item	Requirement	Applicable														
47CFR§15.207, RSS210 (A8.1)	a)	<p>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within 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 rowspan="2">Frequency ranges (MHz)</th> <th colspan="2">Limit (dBμV)</th> </tr> <tr> <th>QP</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15 ~ 0.5</td> <td>66 – 56</td> <td>56 – 46</td> </tr> <tr> <td>0.5 ~ 5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5 ~ 30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>	Frequency ranges (MHz)	Limit (dB μ 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 μ V)																
	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>																
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. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss 																

	coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver. 7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. 8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data Yes N/A

Test Plot Yes (See below) N/A

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

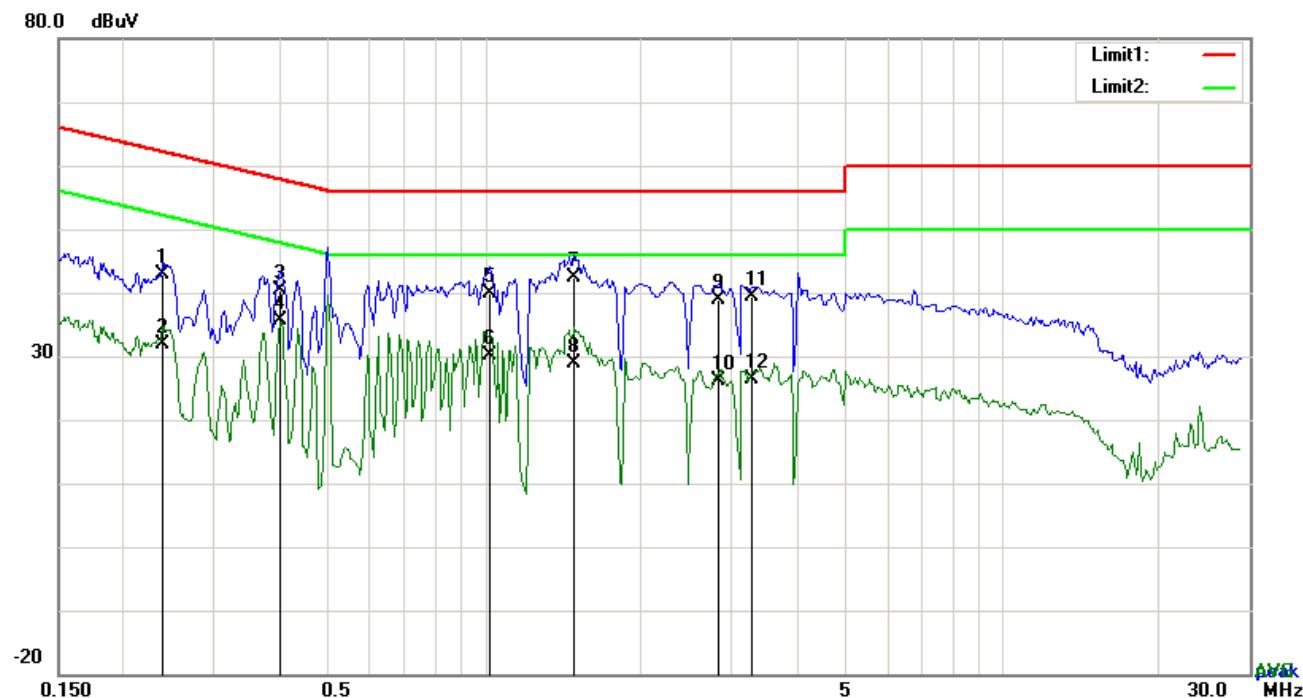


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)
1	L1	0.3879	36.44	QP	10.03	46.47	58.11	-11.64
2	L1	0.3879	20.72	AVG	10.03	30.75	48.11	-17.36
3	L1	0.5400	35.02	QP	10.03	45.05	56.00	-10.95
4	L1	0.5400	19.72	AVG	10.03	29.75	46.00	-16.25
5	L1	0.8793	36.98	QP	10.03	47.01	56.00	-8.99
6	L1	0.8793	21.32	AVG	10.03	31.35	46.00	-14.65
7	L1	2.0441	37.10	QP	10.04	47.14	56.00	-8.86
8	L1	2.0441	20.67	AVG	10.04	30.71	46.00	-15.29
9	L1	3.5278	38.92	QP	10.06	48.98	56.00	-7.02
10	L1	3.5278	19.00	AVG	10.06	29.06	46.00	-16.94
11	L1	4.0647	37.29	QP	10.07	47.36	56.00	-8.64
12	L1	4.0647	18.53	AVG	10.07	28.60	46.00	-17.40

Test Mode: Transmitting Mode

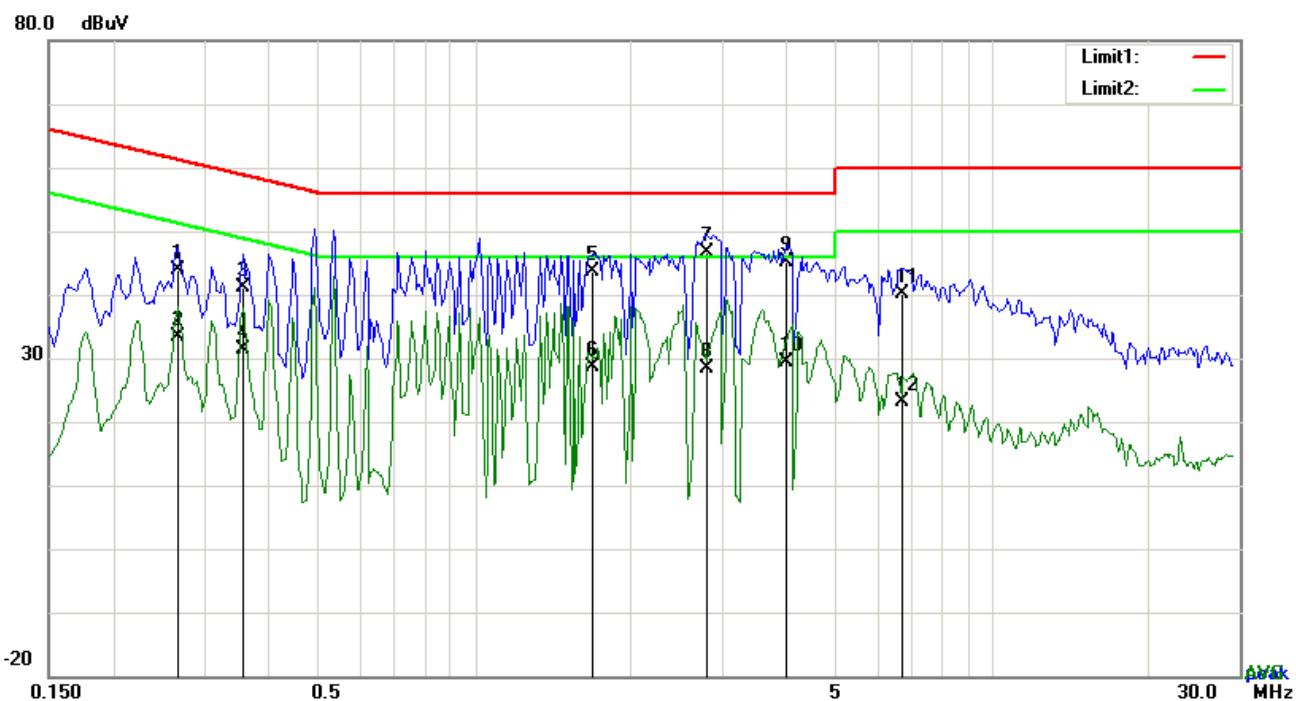


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)
1	N	0.2378	32.94	QP	10.02	42.96	62.17	-19.21
2	N	0.2378	21.98	AVG	10.02	32.00	52.17	-20.17
3	N	0.4035	30.30	QP	10.02	40.32	57.78	-17.46
4	N	0.4035	25.70	AVG	10.02	35.72	47.78	-12.06
5	N	1.0236	29.79	QP	10.03	39.82	56.00	-16.18
6	N	1.0236	20.00	AVG	10.03	30.03	46.00	-15.97
7	N	1.4877	32.34	QP	10.03	42.37	56.00	-13.63
8	N	1.4877	18.86	AVG	10.03	28.89	46.00	-17.11
9	N	2.8371	28.85	QP	10.05	38.90	56.00	-17.10
10	N	2.8371	16.00	AVG	10.05	26.05	46.00	-19.95
11	N	3.2756	29.30	QP	10.05	39.35	56.00	-16.65
12	N	3.2756	16.35	AVG	10.05	26.40	46.00	-19.60

Test Mode: Transmitting Mode

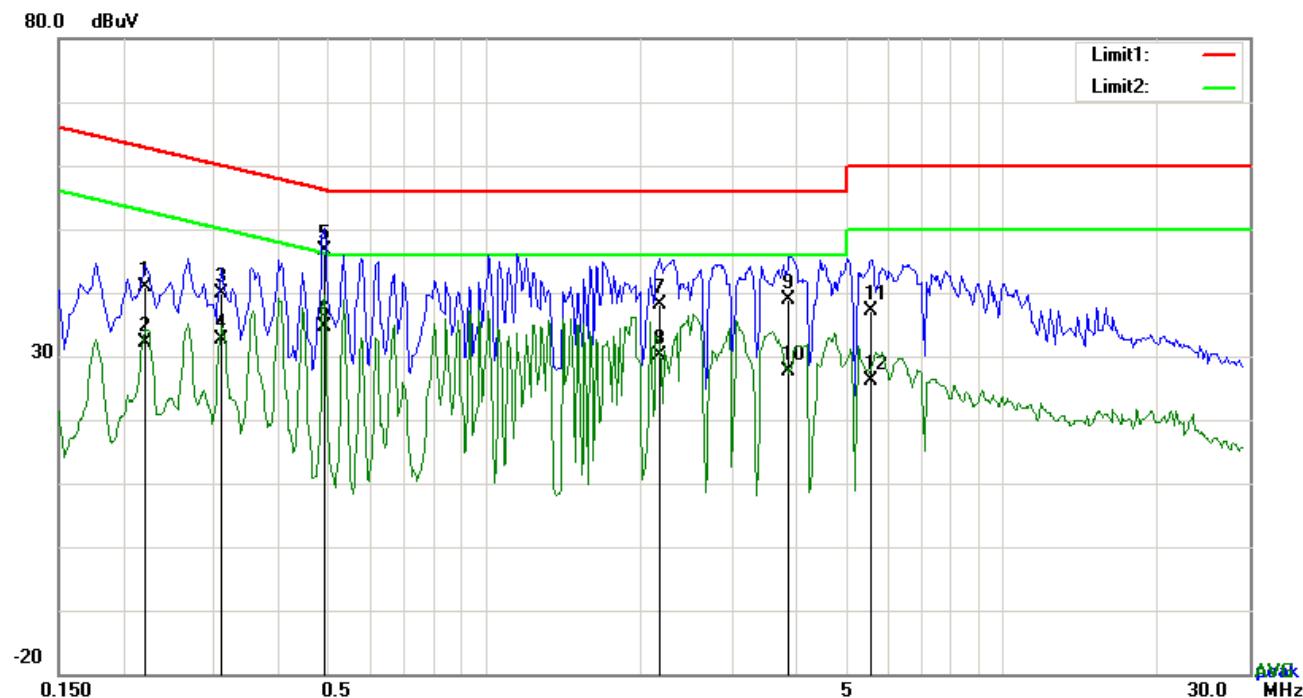


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)
1	L1	0.2670	33.84	QP	10.03	43.87	61.21	-17.34
2	L1	0.2670	23.43	AVG	10.03	33.46	51.21	-17.75
3	L1	0.3567	30.98	QP	10.03	41.01	58.80	-17.79
4	L1	0.3567	21.31	AVG	10.03	31.34	48.80	-17.46
5	L1	1.6944	33.59	QP	10.04	43.63	56.00	-12.37
6	L1	1.6944	18.68	AVG	10.04	28.72	46.00	-17.28
7	L1	2.8020	36.55	QP	10.05	46.60	56.00	-9.40
8	L1	2.8020	18.23	AVG	10.05	28.28	46.00	-17.72
9	L1	4.0023	35.15	QP	10.07	45.22	56.00	-10.78
10	L1	4.0023	19.25	AVG	10.07	29.32	46.00	-16.68
11	L1	6.7167	29.95	QP	10.10	40.05	60.00	-19.95
12	L1	6.7167	13.09	AVG	10.10	23.19	50.00	-26.81

Test Mode: Transmitting Mode



Test Data

Phase Neutral Plot at 240Vac, 60Hz

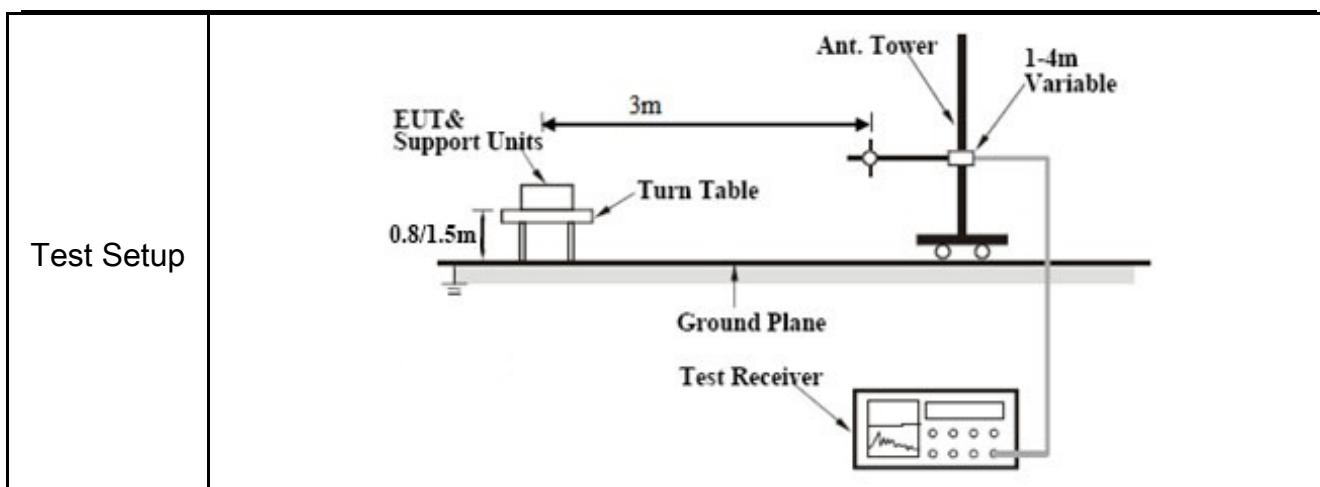
No.	P/L	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)
1	N	0.2202	30.87	QP	10.02	40.89	62.81	-21.92
2	N	0.2202	22.18	AVG	10.02	32.20	52.81	-20.61
3	N	0.3099	29.85	QP	10.02	39.87	59.97	-20.10
4	N	0.3099	22.50	AVG	10.02	32.52	49.97	-17.45
5	N	0.4893	36.72	QP	10.02	46.74	56.18	-9.44
6	N	0.4893	24.66	AVG	10.02	34.68	46.18	-11.50
7	N	2.1780	28.15	QP	10.04	38.19	56.00	-17.81
8	N	2.1780	20.01	AVG	10.04	30.05	46.00	-15.95
9	N	3.8658	28.78	QP	10.06	38.84	56.00	-17.16
10	N	3.8658	17.51	AVG	10.06	27.57	46.00	-18.43
11	N	5.5641	26.95	QP	10.08	37.03	60.00	-22.97
12	N	5.5641	16.00	AVG	10.08	26.08	50.00	-23.92

6.7 Radiated Spurious Emissions & Restricted Band

Temperature	23°C
Relative Humidity	58%
Atmospheric Pressure	1006mbar
Test date :	August 06, 2016
Tested By :	Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable										
47CFR§15. 247(d), RSS210 (A8.5)	a)	<p>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</p> <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 (μ V/m)	30 – 88	100	88 – 216	150	216 – 960	200	Above 960	500	<input checked="" type="checkbox"/>
Frequency range (MHz)	Field Strength (μ V/m)												
30 – 88	100												
88 – 216	150												
216 – 960	200												
Above 960	500												
b)	<p>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</p> <p><input checked="" type="checkbox"/> 20 dB down <input type="checkbox"/> 30 dB down</p>	<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"/>										



Procedure	<ol style="list-style-type: none"> 1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> a. Vertical or horizontal polarization (whichever gave the higher emission level 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 is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz. 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
-----------	---

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.
--------	---

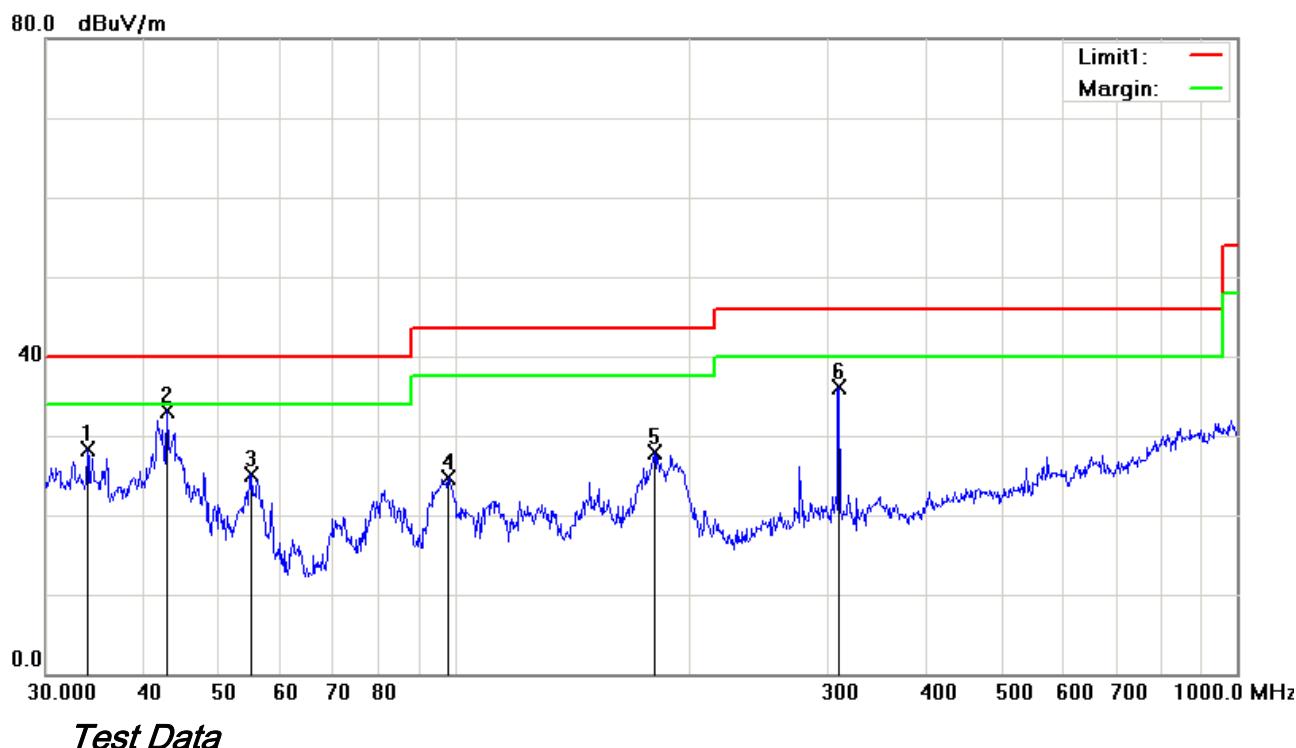
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
--------	--

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

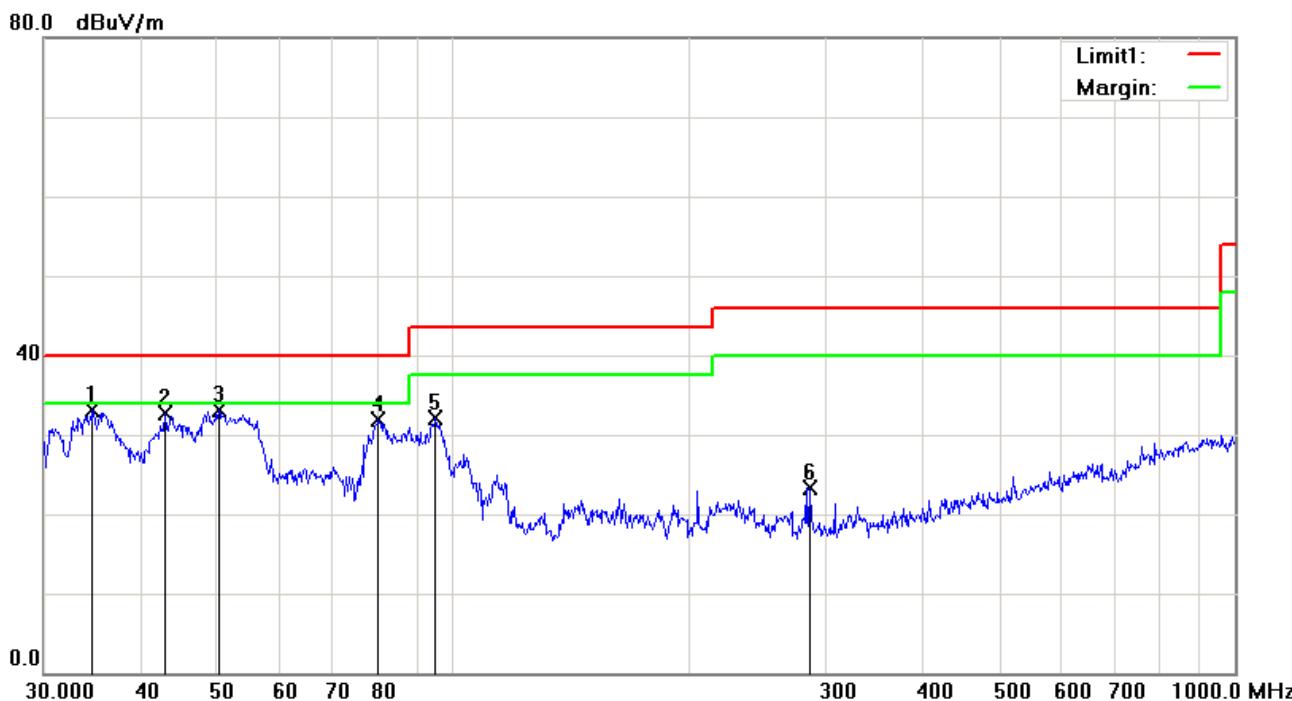
Below 1GHz



Vertical Polarity Plot @3m

No	P/L	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)	Height	Degree
1	H	33.9174	31.37	peak	-3.15	28.22	40.00	-11.78	100	227
2	H	42.8998	42.61	peak	-9.53	33.08	40.00	-6.92	100	126
3	H	55.0274	38.81	peak	-13.77	25.04	40.00	-14.96	100	171
4	H	98.1419	35.96	peak	-11.30	24.66	43.50	-18.84	100	153
5	H	180.0165	37.86	peak	-9.89	27.97	43.50	-15.53	100	230
6	H	309.9977	42.79	peak	-6.61	36.18	46.00	-9.82	100	195

Below 1GHz



Test Data

Horizontal Polarity Plot @3m

No	P/L	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)	Height	Degree
1	V	34.6385	36.82	peak	-3.67	33.15	40.00	-6.85	100	139
2	V	42.8998	42.30	peak	-9.53	32.77	40.00	-7.23	100	167
3	V	50.2325	46.35	peak	-13.21	33.14	40.00	-6.86	100	62
4	V	80.3619	45.65	peak	-13.76	31.89	40.00	-8.11	100	158
5	V	95.0930	44.23	peak	-12.11	32.12	43.50	-11.38	100	220
6	V	285.9778	30.92	peak	-7.55	23.37	46.00	-22.63	100	341

Above 1GHz

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

Low Channel (2402 MHz)

Frequency (MHz)	S.A. Reading (dB μ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4804	40.21	AV	V	33.83	6.86	31.72	49.18	54	-4.82
4804	39.47	AV	H	33.83	6.86	31.72	48.44	54	-5.56
4804	49.25	PK	V	33.83	6.86	31.72	58.22	74	-15.78
4804	48.19	PK	H	33.83	6.86	31.72	57.16	74	-16.84
17813	25.36	AV	V	45.03	11.21	32.38	49.22	54	-4.78
17813	25.18	AV	H	45.03	11.21	32.38	49.04	54	-4.96
17813	41.54	PK	V	45.03	11.21	32.38	65.4	74	-8.6
17813	41.27	PK	H	45.03	11.21	32.38	65.13	74	-8.87

Middle Channel (2440 MHz)

Frequency (MHz)	S.A. Reading (dB μ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4880	40.57	AV	V	33.86	6.82	31.82	49.43	54	-4.57
4880	40.16	AV	H	33.86	6.82	31.82	49.02	54	-4.98
4880	50.02	PK	V	33.86	6.82	31.82	58.88	74	-15.12
4880	48.76	PK	H	33.86	6.82	31.82	57.62	74	-16.38
17824	25.89	AV	V	45.15	11.18	32.41	49.81	54	-4.19
17824	25.34	AV	H	45.15	11.18	32.41	49.26	54	-4.74
17824	42.16	PK	V	45.15	11.18	32.41	66.08	74	-7.92
17824	41.73	PK	H	45.15	11.18	32.41	65.65	74	-8.35

High Channel (2480 MHz)

Frequency (MHz)	S.A. Reading (dB μ V)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4960	40.33	AV	V	33.9	6.76	31.92	49.07	54	-4.93
4960	39.92	AV	H	33.9	6.76	31.92	48.66	54	-5.34
4960	49.97	PK	V	33.9	6.76	31.92	58.71	74	-15.29
4960	48.61	PK	H	33.9	6.76	31.92	57.35	74	-16.65
17819	25.64	AV	V	45.22	11.35	32.38	49.83	54	-4.17
17819	25.28	AV	H	45.22	11.35	32.38	49.47	54	-4.53
17819	42.05	PK	V	45.22	11.35	32.38	66.24	74	-7.76
17819	41.67	PK	H	45.22	11.35	32.38	65.86	74	-8.14

Note:

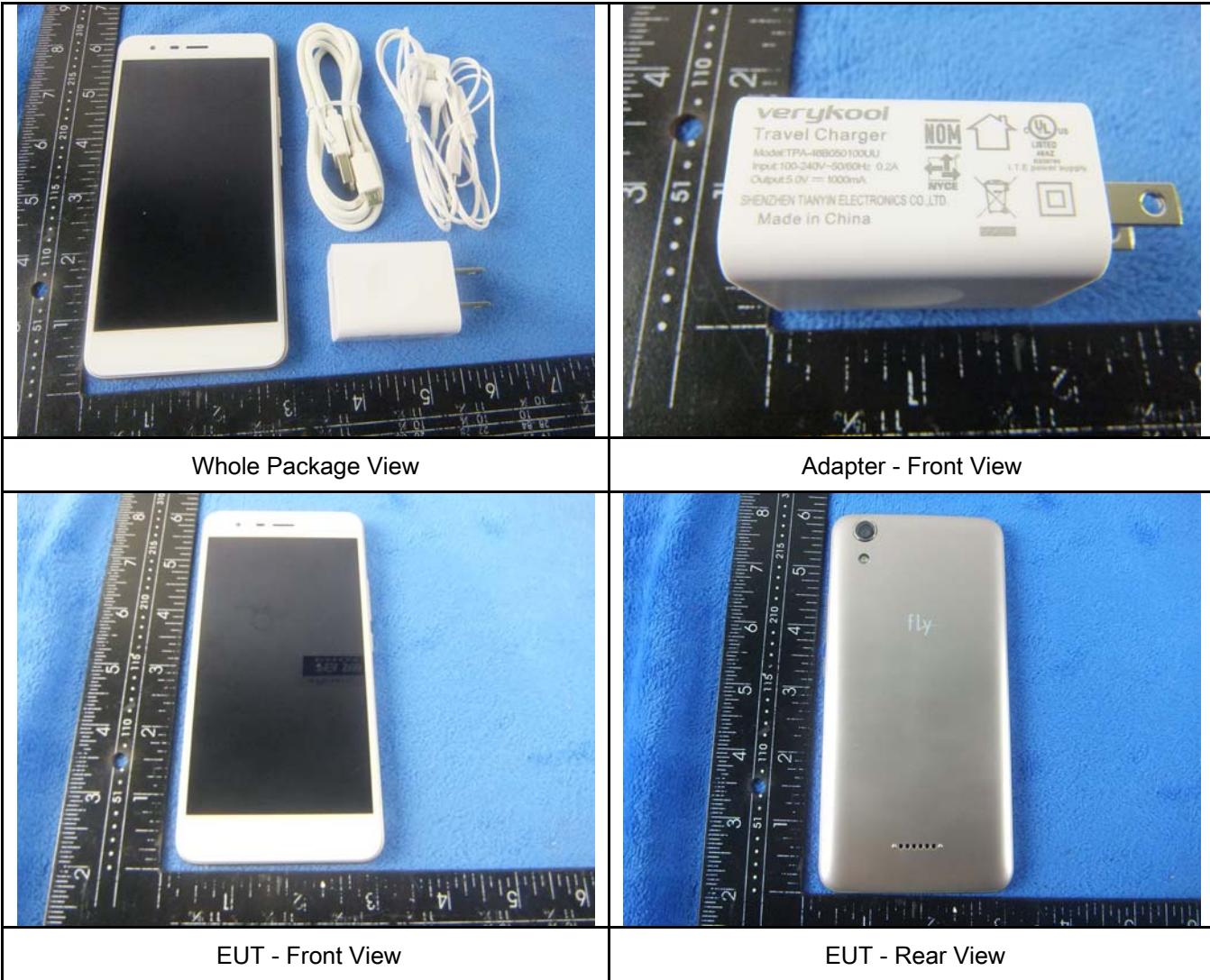
- 1, The testing has been conformed to $10*2480\text{MHz}=24,800\text{MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, X-Axis, Y-Axis and Y-Axis were investigated. The results above show only the worst case.

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Line Impedance	LI-125A	191106	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
Line Impedance	LI-125A	191107	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
LISN	ISN T800	34373	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	<input checked="" type="checkbox"/>
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
RF conducted test					
Agilent ESA-E SERIES	E4407B	MY45108319	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
DC Power Supply	E3640A	MY40004013	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Positioning Controller	UC3000	MF780208282	11/19/2015	11/18/2016	<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	03/24/2016	03/23/2017	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMU200	121393	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

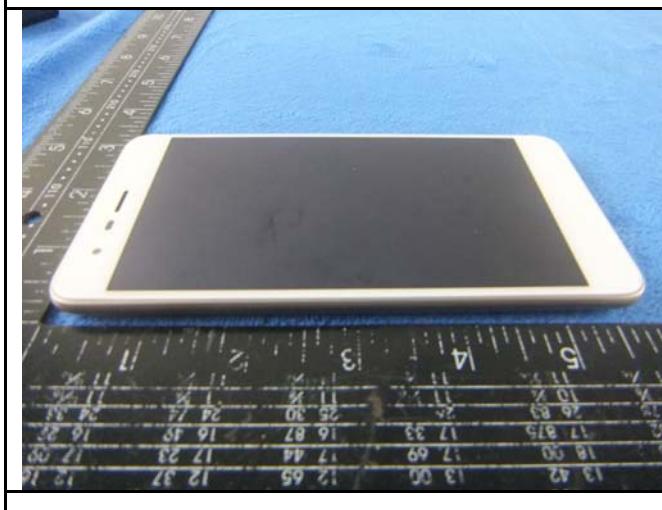




EUT - Top View



EUT - Bottom View



EUT - Left View



EUT - Right View

Annex B.ii. Photograph: EUT Internal Photo

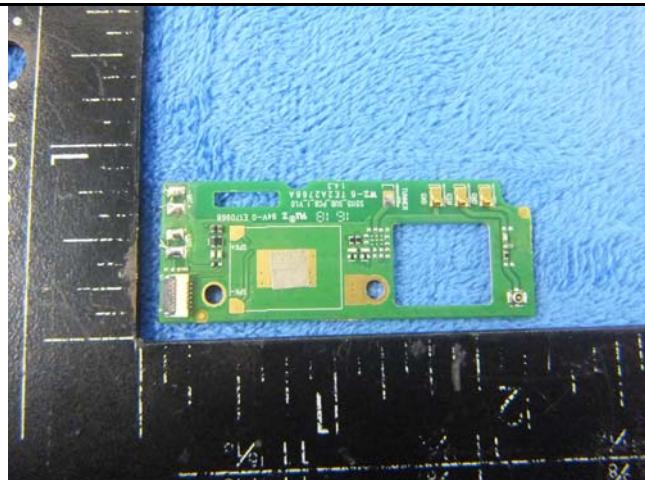




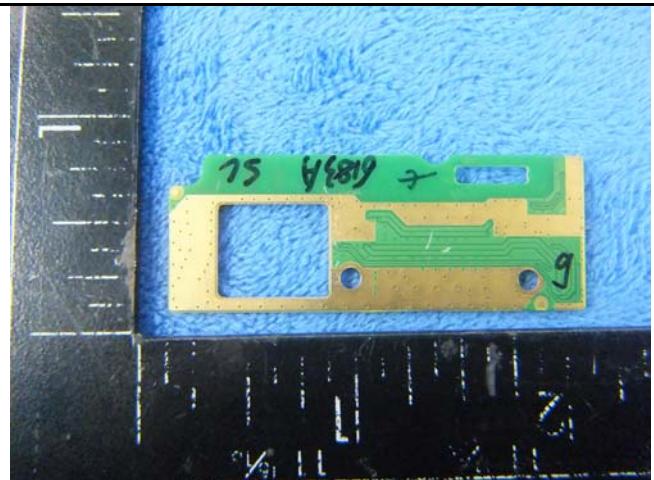
Mainboard with Shielding - Rear View



Mainboard without Shielding - Rear View



Small Board - Front View



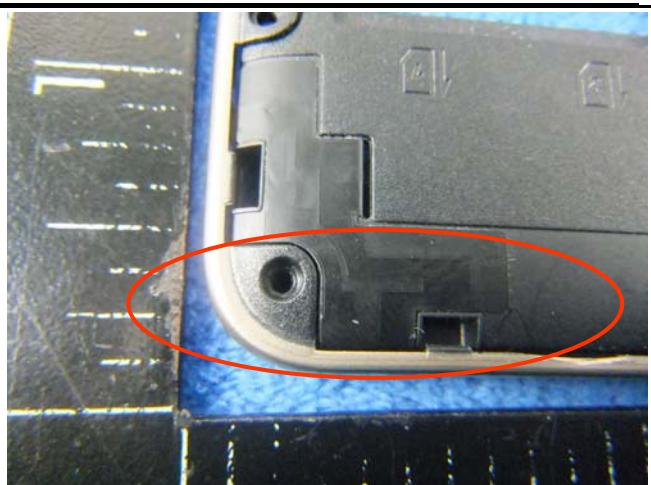
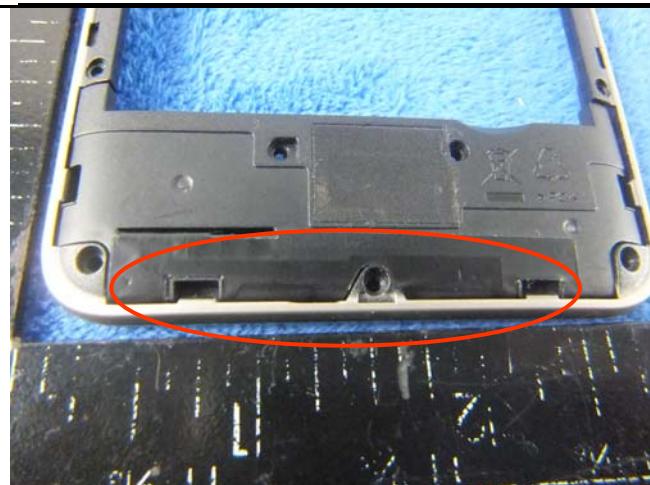
Small Board - Rear View



LCD – Front View



LCD – Rear View



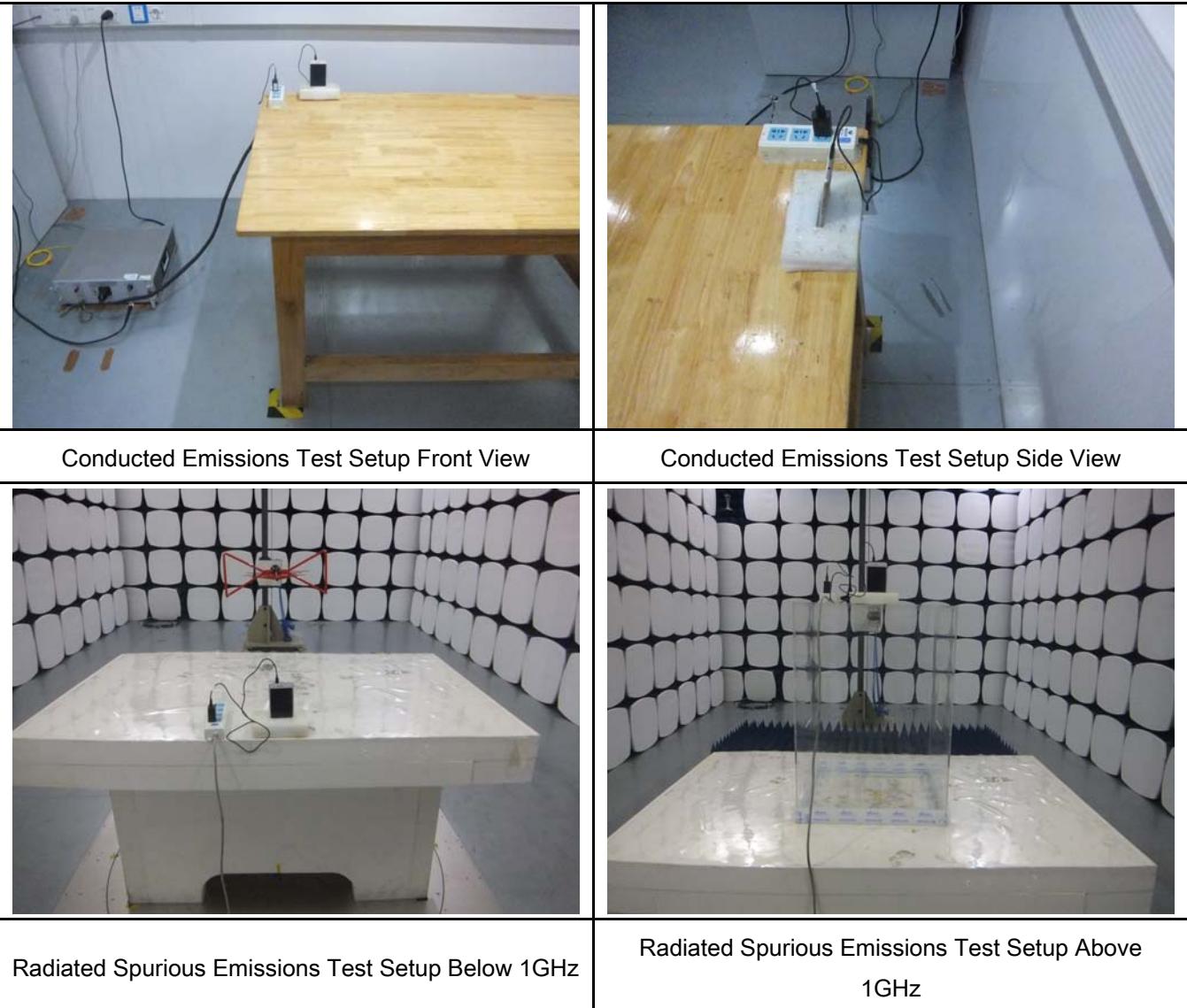
GSM/PCS/UMTS-FDD-Antenna View

WIFI/BT/BLE/GPS - Antenna View



LTE - Antenna View

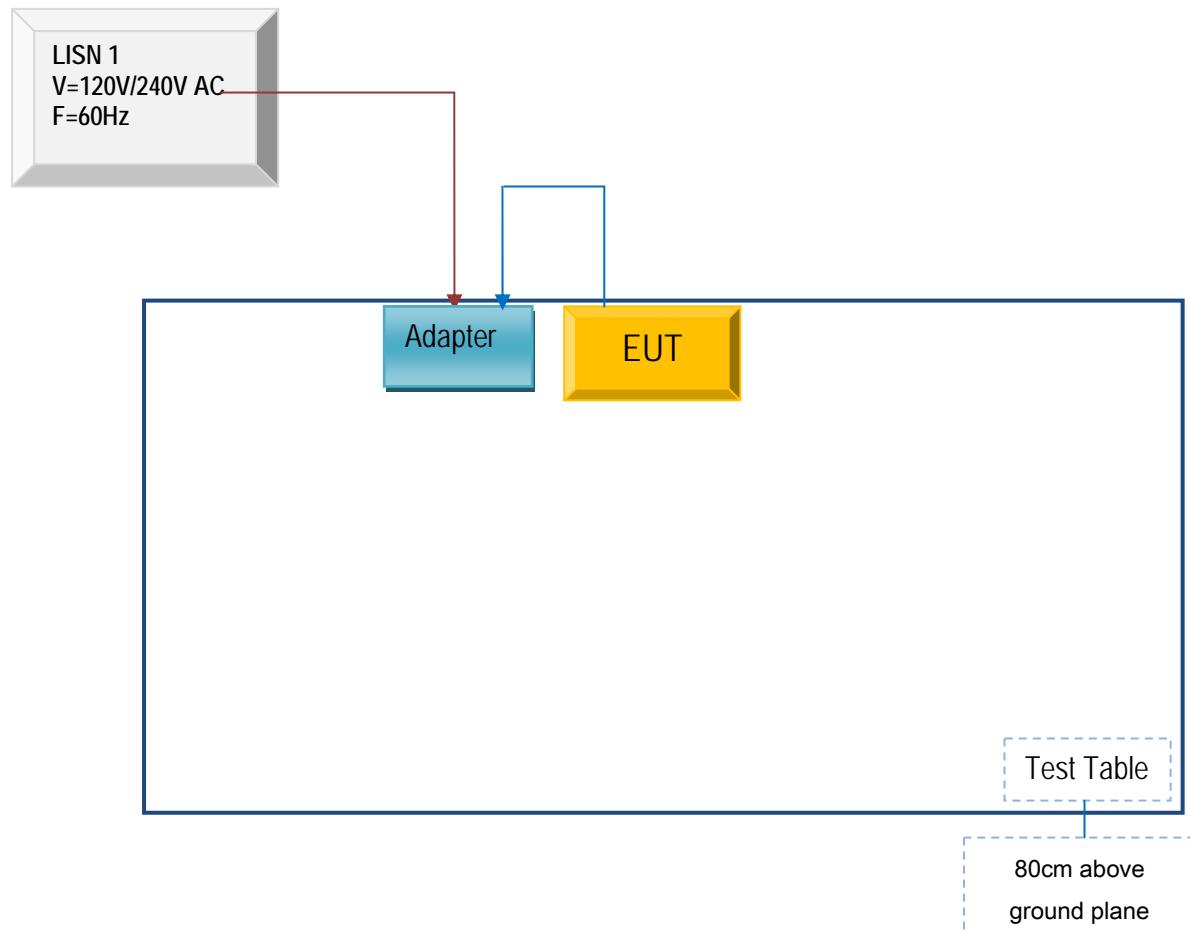
Annex B.iii. Photograph: Test Setup Photo



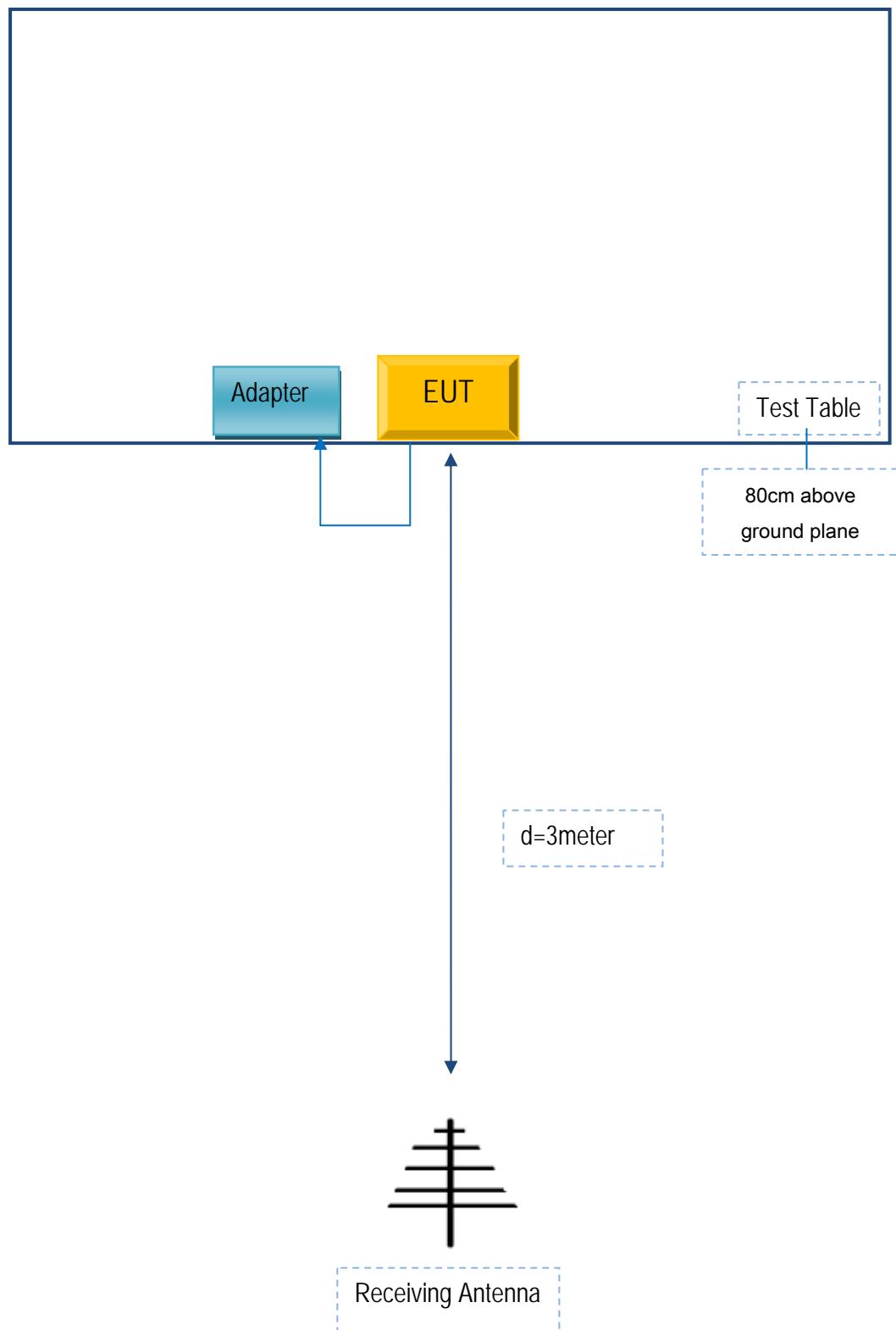
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

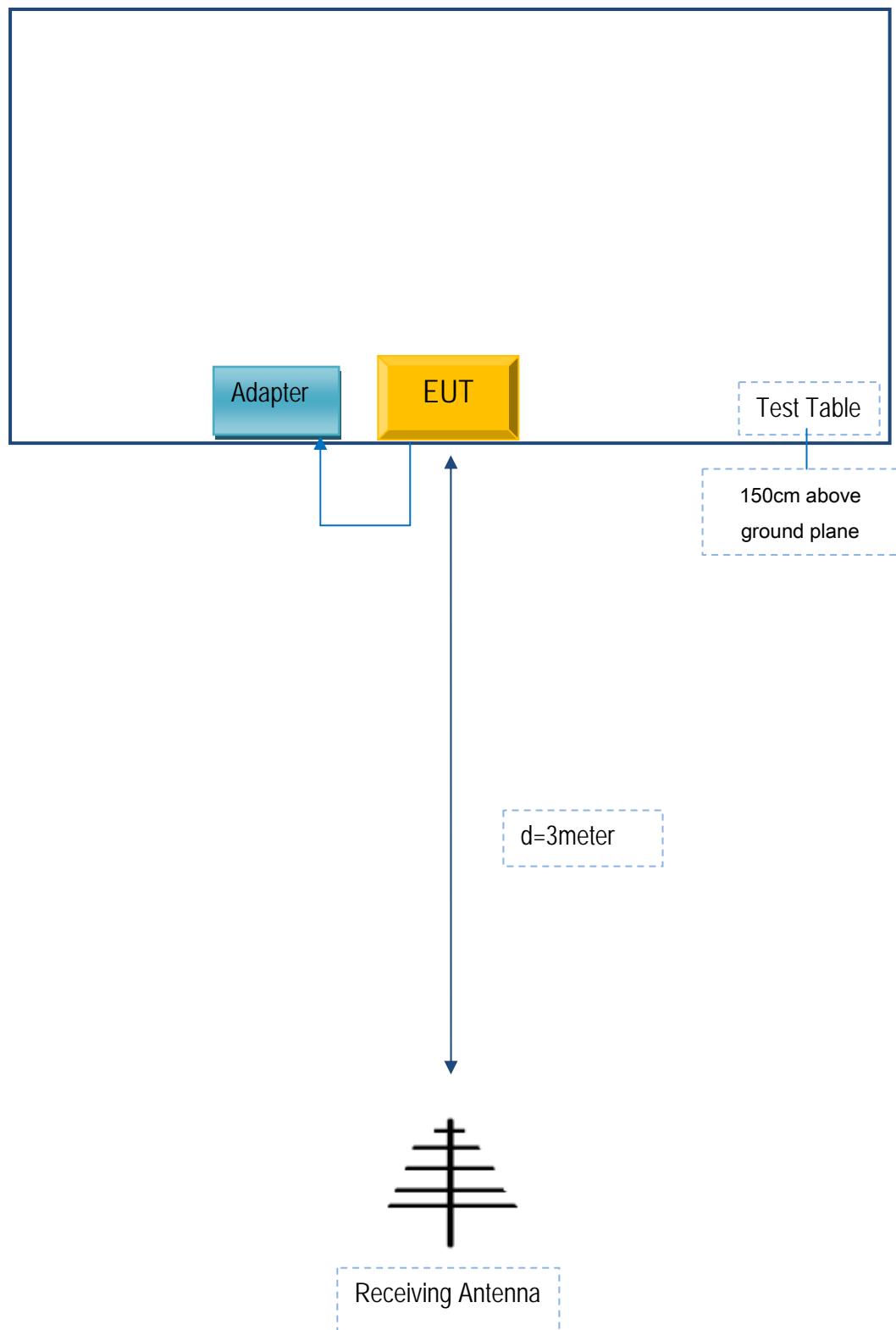
Block Configuration Diagram for AC Line Conducted Emissions



Block Configuration Diagram for Radiated Emissions (Below 1GHz) .



Block Configuration Diagram for Radiated Emissions (Above 1GHz) .



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
Verykool USA Inc	Adapter	TPA-46B050100UU	SL-003

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	SL-003

Test Report No.	16070911-FCC-R4
Page	43 of 43

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

Please see attachment