

RF TEST REPORT



Report No.: 15070302-FCC-R4

Supersede Report No.: N/A

Applicant	Verykool USA Inc	
Product Name	Mobile Phone	
Model No.	s5017	
Serial No.	N/A	
Test Standard	FCC Part 15.247: 2014, ANSI C63.10: 2013	
Test Date	April 24 to May 11, 2015	
Issue Date	May 12, 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>Wiky.Jam</i>	<i>Chris You</i>	
Wiky.Jam Test Engineer	Chris You Checked By	
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only		

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park

South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108

Phone: +86 0755 2601 4629801 Email: China@siemic.com.cn

Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

Test Report No.	15070302-FCC-R4
Page	3 of 39

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	28
ANNEX B. EUT AND TEST SETUP PHOTOGRAPHS	29
ANNEX C. TEST SETUP AND SUPPORTING EQUIPMENT	错误!未定义书签。
ANNEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PARTLIST	38
ANNEX E. DECLARATION OF SIMILARITY	39

1. Report Revision History

Report No.	Report Version	Description	Issue Date
15070302-FCC-R4	NONE	Original	May 12, 2015

2. Customer information

Applicant Name	Verykool USA Inc
Applicant Add	3636 Nobel Drive, Suite 325, San Diego, CA 92122 USA
Manufacturer	Zechin Communications Co.,Ltd
Manufacturer Add	Unit804,8th Floor Desay Tech Building Gaoxin, Road South, Nanshan District Shenzhen,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: Mobile Phone

Main Model: s5017

Serial Model: N/A

Date EUT received: April 23, 2015

Test Date(s): April 24 to May 11, 2015

Equipment Category : DTS

Antenna Gain:

- GSM850: 1.6dBi
- PCS1900: 3.8dBi
- UMTS-FDD Band V: 1.7 dBi
- UMTS-FDD Band II: 1.75 dBi
- Bluetooth/BLE: 3 dBi
- WIFI: 2.9 dBi
- GPS: 1.6 dBi

Type of Modulation:

- GSM / GPRS: GMSK
- EGPRS: GMSK, 8PSK
- UMTS-FDD: QPSK, 16QAM
- 802.11b/g/n: DSSS, OFDM
- Bluetooth: GFSK, $\pi/4$ DQPSK, 8DPSK
- BLE: GFSK

RF Operating Frequency (ies):

- GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz
- PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz
- UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz
- UMTS-FDD Band II TX: 1852.4 ~ 1907.6 MHz;
- RX: 1932.4 ~ 1987.6 MHz
- UMTS-FDD Band IV TX : 1712.4 ~ 1752.6 MHz;
- RX : 2112.4 ~ 2152.6 MHz
- WIFI: 802.11b/g/n(20M): 2412-2462 MHz
- Bluetooth& BLE: 2402-2480 MHz

Test Report No.	15070302-FCC-R4
Page	7 of 39

Max. Output Power: -2.237 dBm

Number of Channels: GSM 850: 124CH
PCS1900: 299CH
UMTS-FDD Band V : 102CH
UMTS-FDD Band II : 277CH
UMTS-FDD Band IV: 202CH
WIFI :802.11b/g/n(20M): 11CH
Bluetooth: 79CH
BLE: 40CH

Port: Power Port, Earphone Port, USB Port

Input Power: Battery:
Model: 344786A
Spec: 3.8V 1850mAh 7.03Wh
Limited charger voltage:4.35V
Adapter:
Model: S0500100-US
Input: AC 100-240V; 50/60Hz 0.4A Max
Output: 5.0V; 1A

Trade Name : verykool

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

FCC ID: WA6S5017

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 3 antennas:

A permanently attached PIFA antenna for Bluetooth/BLE/WIFI, the gain is 3 dBi for Bluetooth/BLE, 2.9 dBi for WIFI

A permanently attached PIFA antenna for GSM and UMTS, the gain is 1.6 dBi for GSM850, 1.75 dBi for UMTS-FDD Band V, 3.7 dBi for UMTS-FDD Band IV, 3.8 dBi for PCS1900, 3.7 dBi for UMTS-FDD Band II ,

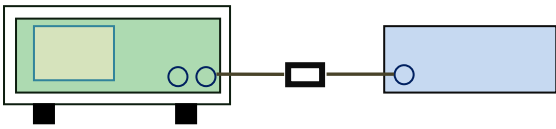
A permanently attached PIFA antenna for GPS, the gain is 1.6 dBi for GPS

The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2 DTS (6 dB) Channel Bandwidth

Temperature	21°C
Relative Humidity	52%
Atmospheric Pressure	1010mbar
Test date :	April 30, 2015
Tested By :	Wiky.Jam

Spec	Item	Requirement	Applicable
§ 15.247(a)(2)	a)	6dB BW≥ 500kHz;	<input checked="" type="checkbox"/>
	b)	99% BW: For FCC reference only; required by IC.	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
Test Procedure	<p>558074 D01 DTS MEAS Guidance v03r02, 8.1 DTS bandwidth <u>6dB Emission bandwidth measurement procedure</u></p> <ul style="list-style-type: none"> - Set RBW = 100 kHz. - Set the video bandwidth (VBW) ≥ 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

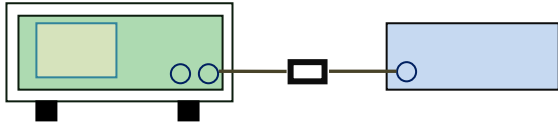
Test Plot ☒ Yes (See below) ☐ N/A

6dB Bandwidth - High CH 2480

6.3 Maximum Output Power

Temperature	21°C
Relative Humidity	52%
Atmospheric Pressure	1010mbar
Test date :	April 30, 2015
Tested By :	Wiky.Jam

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b) (2),	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤ 1 Watt	<input type="checkbox"/>
	b)	FHSS in 5725-5850MHz: ≤ 1 Watt	<input type="checkbox"/>
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤ 0.125 Watt.	<input type="checkbox"/>
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤ 1 Watt	<input type="checkbox"/>
	e)	FHSS in 902-928MHz with ≥ 25 & <50 channels: ≤ 0.25 Watt	<input type="checkbox"/>
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: ≤ 1 Watt	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
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"> 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

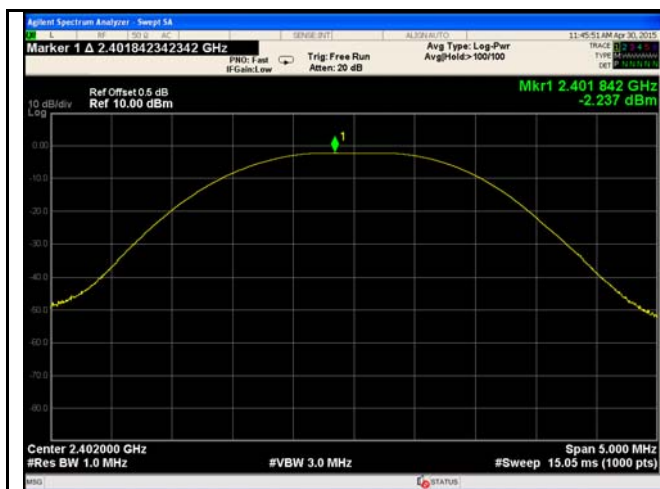
Test Plot ☒ Yes (See below) ☐ N/A

Output Power measurement result

Test Data

Type	CH	Freq (MHz)	Conducted Power (dBm)	Limit (dBm)	Result
Output power	Low	2402	-2.237	30	Pass
	Mid	2440	-2.302	30	Pass
	High	2480	-2.728	30	Pass

Test Plots



AV Output power - Low CH 2402



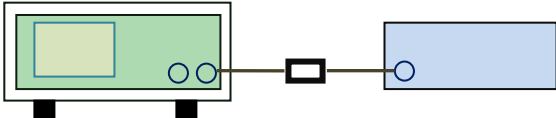
AV Output power - Mid CH 2440



AV Output power - High CH 2480

6.4 Power Spectral Density

Temperature	21°C
Relative Humidity	52%
Atmospheric Pressure	1010mbar
Test date :	April 30, 2015
Tested By :	Wiky.Jam

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	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
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"> - 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)	PSD (dBm)	Limit (dBm)	Result
PSD	Low	2402	-12.400	8	Pass
	Mid	2440	-12.437	8	Pass
	High	2480	-12.914	8	Pass

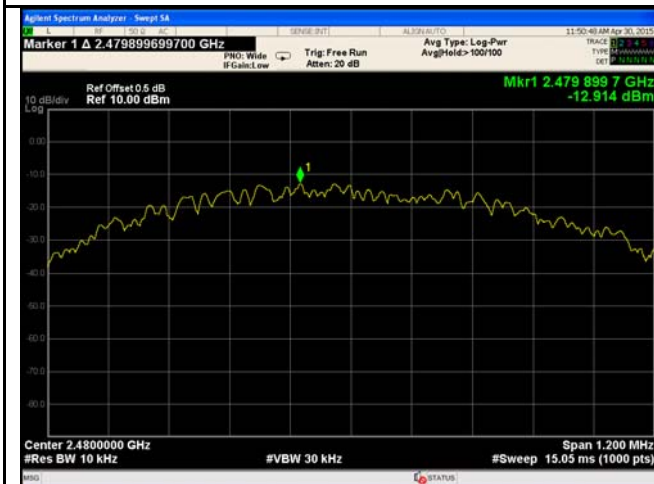
Test Plots



PSD - Low CH 2402



PSD - Mid CH 2440

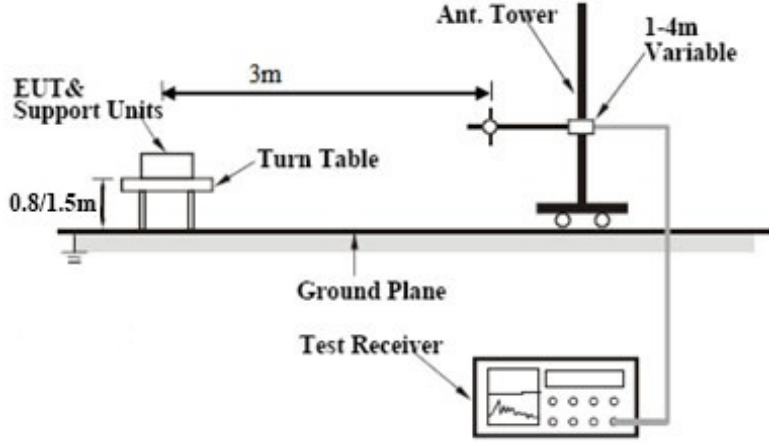


PSD - High CH 2480

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

Temperature	33°C
Relative Humidity	57%
Atmospheric Pressure	1007mbar
Test date :	May 04, 2015
Tested By :	Wiky.Jam

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"> 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. 		

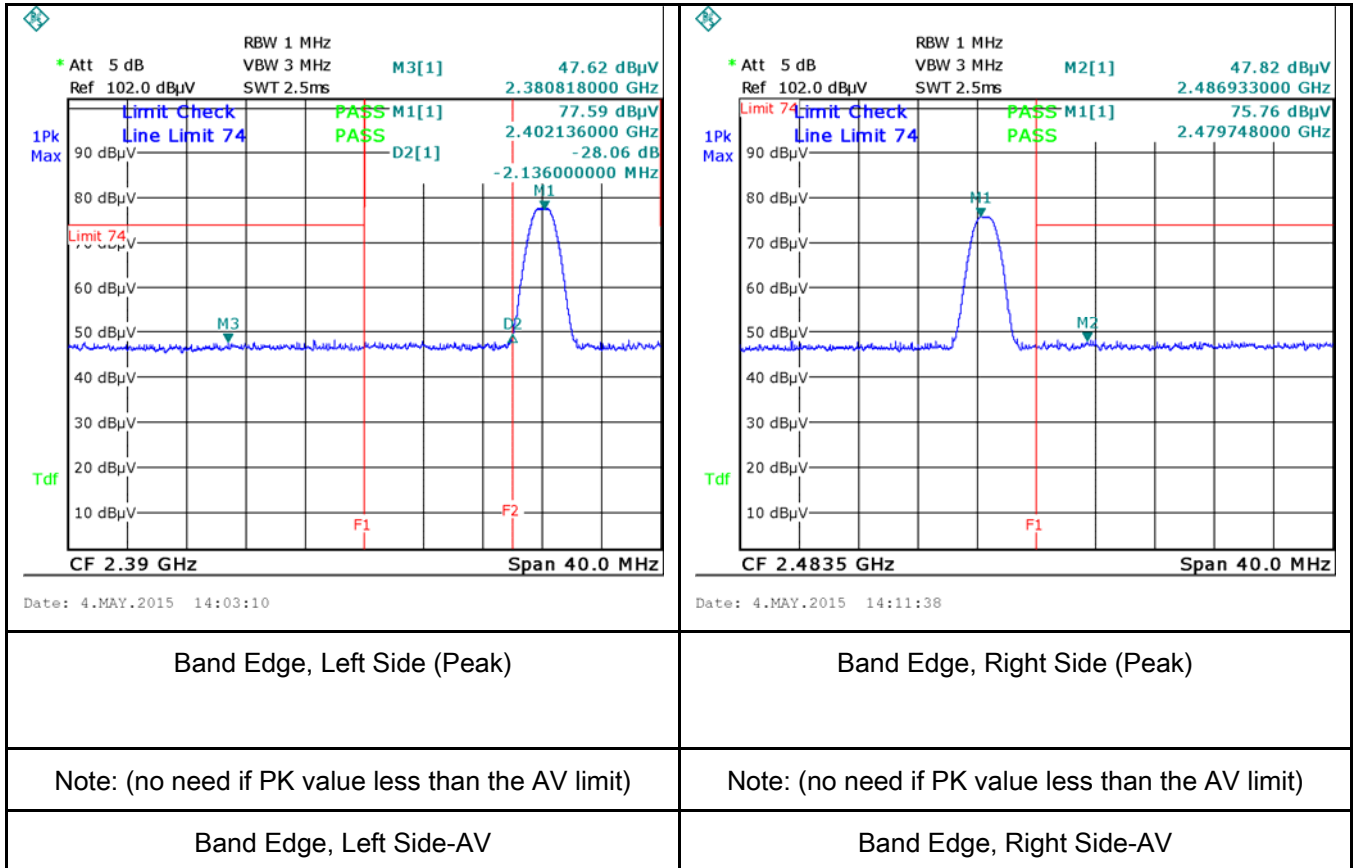
Test Report No.	15070302-FCC-R4
Page	17 of 39

	<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	33°C
Relative Humidity	57%
Atmospheric Pressure	1007mbar
Test date :	May 04, 2015
Tested By :	Wiky.Jam

Requirement(s):

Spec	Item	Requirement	Applicable														
47CFR§15.207,	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>
------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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
-----------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

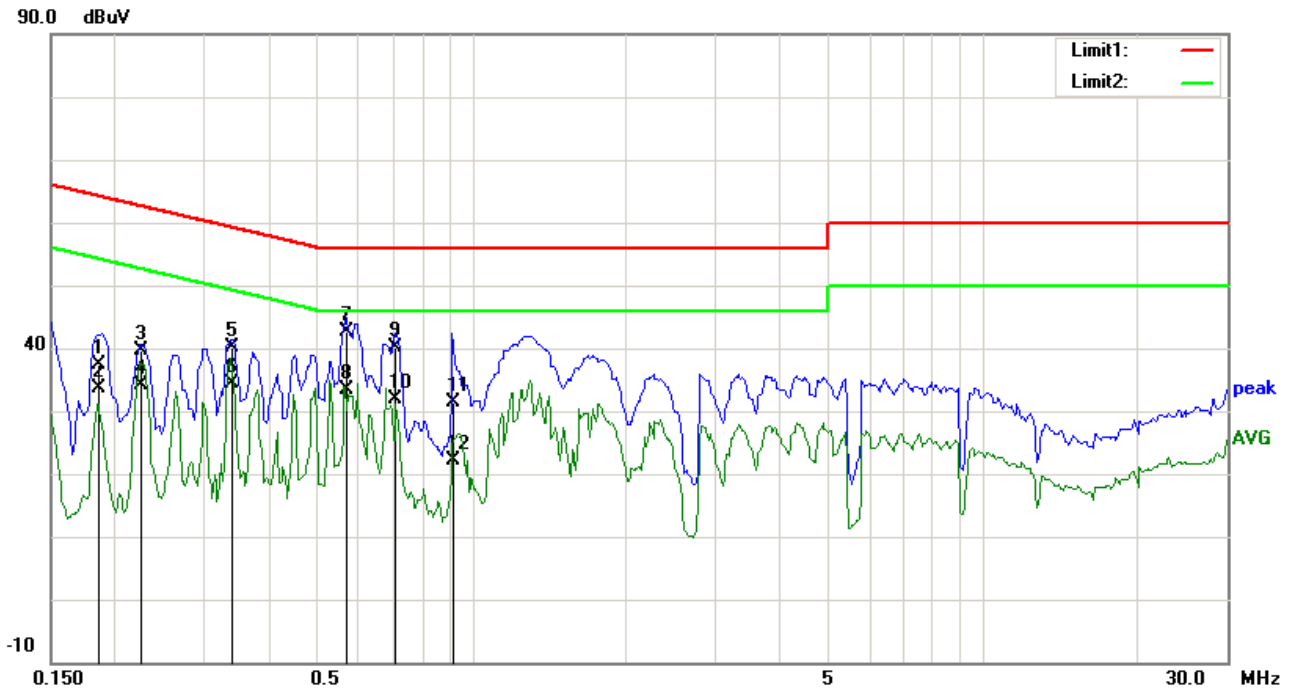
Test Report No.	15070302-FCC-R4
Page	20 of 39

	<p>coaxial cable.</p> <ol style="list-style-type: none"> 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: BLE Mode

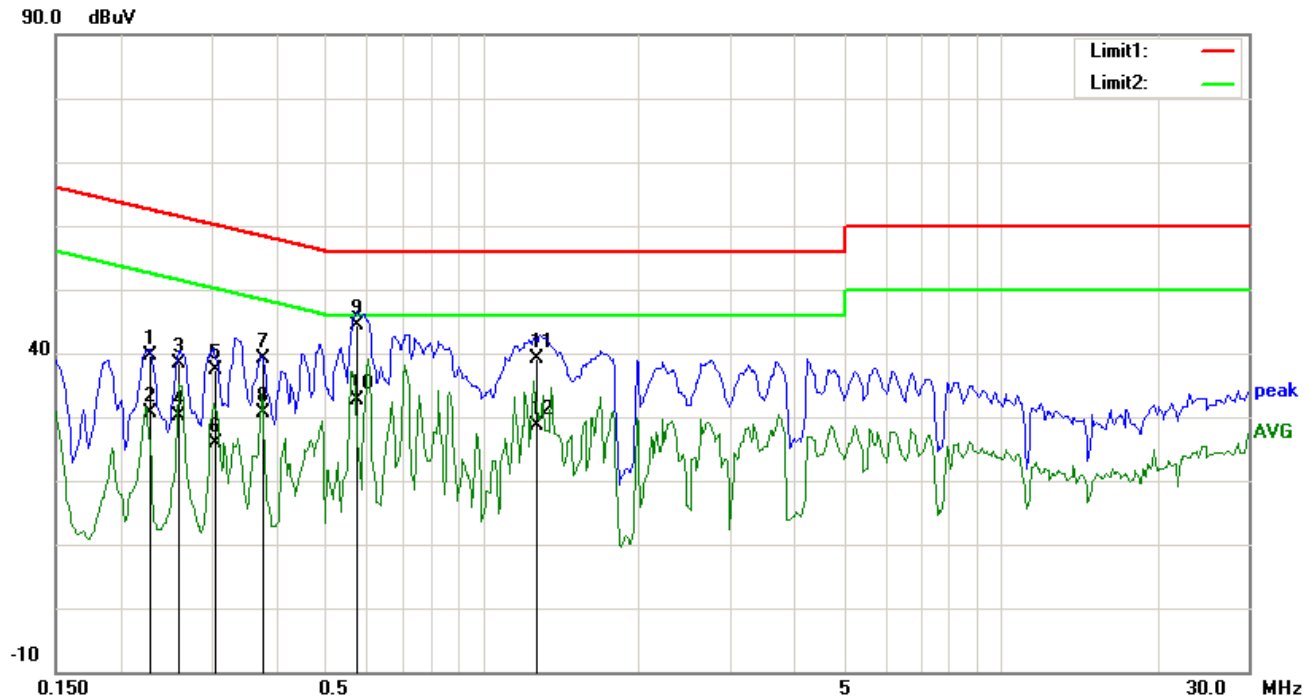


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Comment
1	L1	0.1864	24.36	QP	13.06	37.42	64.20	-26.78	
2	L1	0.1864	20.51	AVG	13.06	33.57	54.20	-20.63	
3	L1	0.2256	26.61	QP	12.92	39.53	62.61	-23.08	
4	L1	0.2256	21.15	AVG	12.92	34.07	52.61	-18.54	
5	L1	0.3392	27.74	QP	12.50	40.24	59.22	-18.98	
6	L1	0.3392	21.97	AVG	12.50	34.47	49.22	-14.75	
7	L1	0.5680	30.91	QP	11.83	42.74	56.00	-13.26	
8	L1	0.5680	21.67	AVG	11.83	33.50	46.00	-12.50	
9	L1	0.7086	28.53	QP	11.69	40.22	56.00	-15.78	
10	L1	0.7086	20.20	AVG	11.69	31.89	46.00	-14.11	
11	L1	0.9184	19.94	QP	11.48	31.42	56.00	-24.58	
12	L1	0.9184	10.59	AVG	11.48	22.07	46.00	-23.93	

Test Mode: BLE Mode



Test Data

Phase Neutral Plot at 120Vac, 60Hz

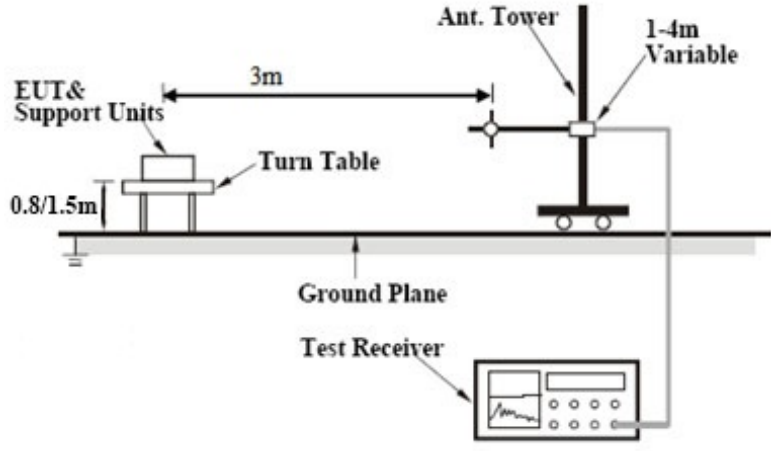
No.	P/L	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Comment)
1	N	0.2281	26.61	QP	12.91	39.52	62.52	-23.00	
2	N	0.2281	17.64	AVG	12.91	30.55	52.52	-21.97	
3	N	0.2594	25.49	QP	12.79	38.28	61.45	-23.17	
4	N	0.2594	17.26	AVG	12.79	30.05	51.45	-21.40	
5	N	0.3063	24.85	QP	12.62	37.47	60.07	-22.60	
6	N	0.3063	13.14	AVG	12.62	25.76	50.07	-24.31	
7	N	0.3771	26.74	QP	12.36	39.10	58.34	-19.24	
8	N	0.3771	18.21	AVG	12.36	30.57	48.34	-17.77	
9	N	0.5680	32.47	QP	11.83	44.30	56.00	-11.70	
10	N	0.5680	20.83	AVG	11.83	32.66	46.00	-13.34	
11	N	1.2688	27.67	QP	11.43	39.10	56.00	-16.90	
12	N	1.2688	17.14	AVG	11.43	28.57	46.00	-17.43	

6.7 Radiated Spurious Emissions

Temperature	33°C
Relative Humidity	57%
Atmospheric Pressure	1007mbar
Test date :	May 04, 2015
Tested By :	Wiki.Jam

Requirement(s):

Spec	Item	Requirement	Applicable										
47CFR§15.247(d), RSS210 (A8.5)	a)	<div>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</div> <table><tr><th>Frequency range (MHz)</th><th>Field Strength (µV/m)</th></tr><tr><td>30 – 88</td><td>100</td></tr><tr><td>88 – 216</td><td>150</td></tr><tr><td>216 960</td><td>200</td></tr><tr><td>Above 960</td><td>500</td></tr></table>	Frequency range (MHz)	Field Strength (µV/m)	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	<div><input checked="" type="checkbox"/></div>
	Frequency range (MHz)	Field Strength (µV/m)											
	30 – 88	100											
	88 – 216	150											
216 960	200												
Above 960	500												
b)	<div>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</div> <div><input checked="" type="checkbox"/> 20 dB down <input type="checkbox"/> 30 dB down</div>	<div><input checked="" type="checkbox"/></div>											
c)	<div>or restricted band, emission must also comply with the radiated emission limits specified in 15.209</div>	<div><input checked="" type="checkbox"/></div>											

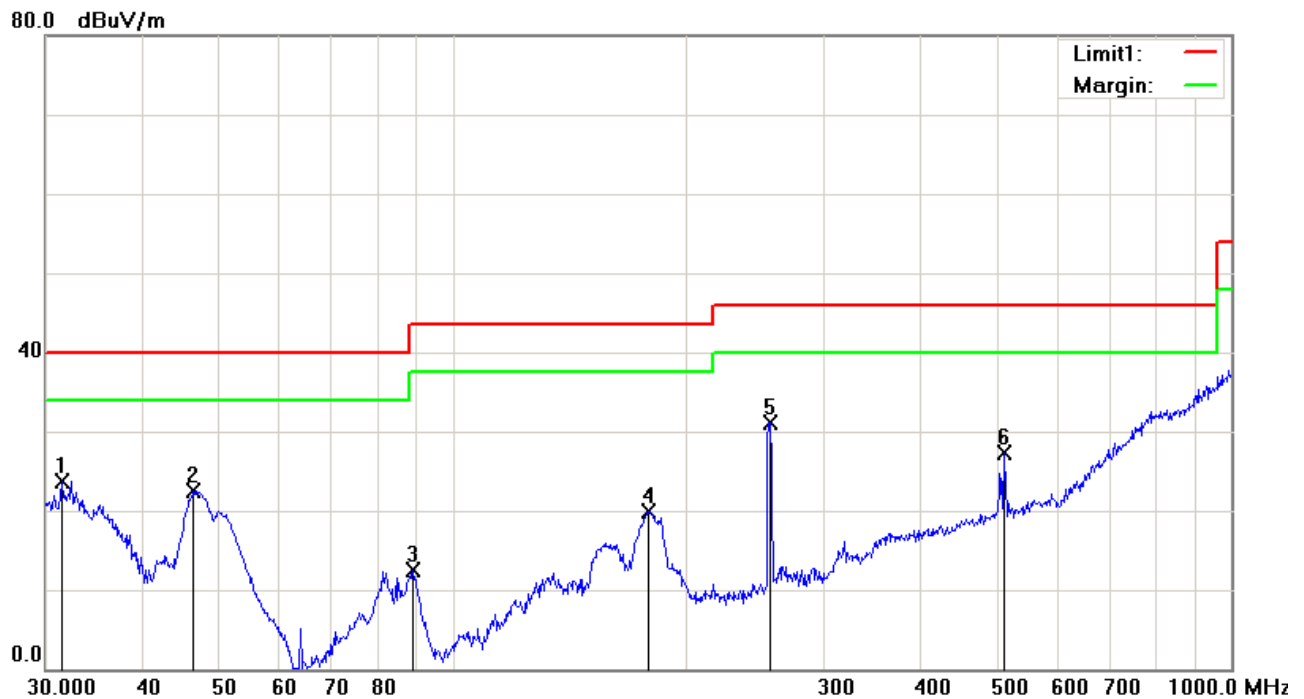
Test Setup	
Procedure	<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, 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 over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. 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. 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 ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Mode: BLE Mode

Below 1GHz



Test Data

Vertical Polarity Plot @3m

No	P/L	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Height	Degree	Comment
1	V	31.5095	26.04	peak	-2.36	23.68	40.00	-16.32	100	201	
2	V	46.5030	34.79	peak	-12.30	22.49	40.00	-17.51	100	253	
3	V	88.9639	26.33	peak	-13.85	12.48	43.50	-31.02	100	201	
4	V	178.7584	28.81	peak	-8.84	19.97	43.50	-23.53	200	190	
5	V	255.6231	38.15	peak	-7.05	31.10	46.00	-14.90	200	263	
6	V	510.0436	29.64	peak	-2.31	27.33	46.00	-18.67	100	242	

Below 1GHz



Test Data

Horizontal Polarization Plot @3m

No	P/L	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Height	Degree	Comment
1	H	30.6379	24.18	peak	-0.73	23.45	40.00	-16.55	200	239	
2	H	46.1780	22.36	peak	-3.37	18.99	40.00	-21.01	200	205	
3	H	177.5092	32.19	peak	-9.69	22.50	43.50	-21.00	200	97	
4	H	255.6231	43.11	peak	-8.93	34.18	46.00	-11.82	100	169	
5	H	511.8352	25.15	peak	-1.48	23.67	46.00	-22.33	100	211	
6	H	989.5355	31.50	peak	5.65	37.15	54.00	-16.85	100	64	

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

Low Channel (2402 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804	35.08	AV	V	33.83	6.86	31.72	44.05	54	-9.95
4804	33.31	AV	H	33.83	6.86	31.72	42.28	54	-11.72
4804	47.94	PK	V	33.83	6.86	31.72	56.91	74	-17.09
4804	47.47	PK	H	33.83	6.86	31.72	56.44	74	-17.56

Middle Channel (2440 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4880	33.25	AV	V	33.86	6.82	31.82	42.11	54	-11.89
4880	34.62	AV	H	33.86	6.82	31.82	43.48	54	-10.52
4880	47.95	PK	V	33.86	6.82	31.82	56.81	74	-17.19
4880	47.56	PK	H	33.86	6.82	31.82	56.42	74	-17.58

High Channel (2480 MHz)

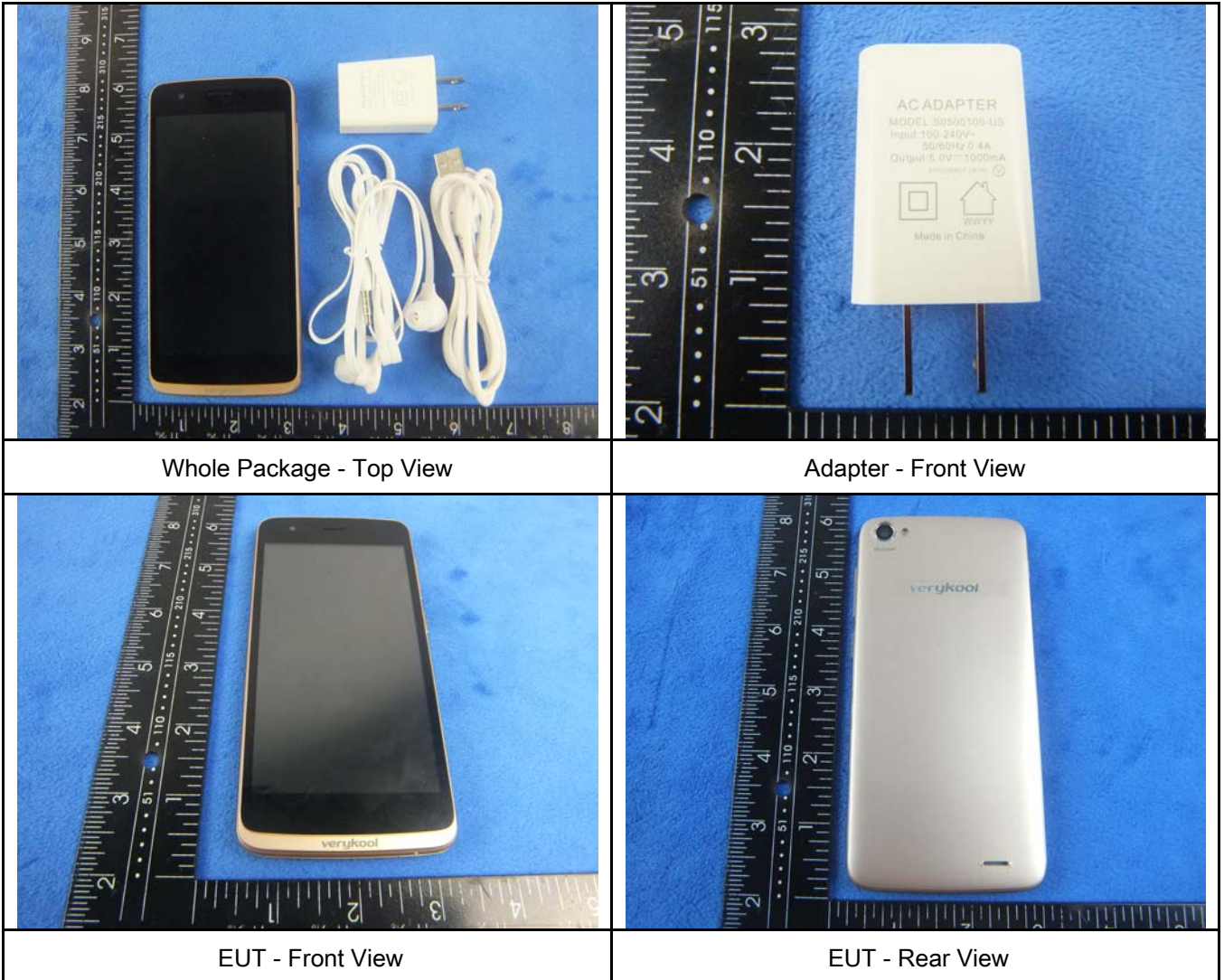
Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4960	34.68	AV	V	33.9	6.76	31.92	43.42	54	-10.58
4960	35.54	AV	H	33.9	6.76	31.92	44.28	54	-9.72
4960	47.57	PK	V	33.9	6.76	31.92	56.31	74	-17.69
4960	47.88	PK	H	33.9	6.76	31.92	56.62	74	-17.38

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted					
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"/>
RF conducted test					
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"/>
Radiated Emissions					
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 (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 (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

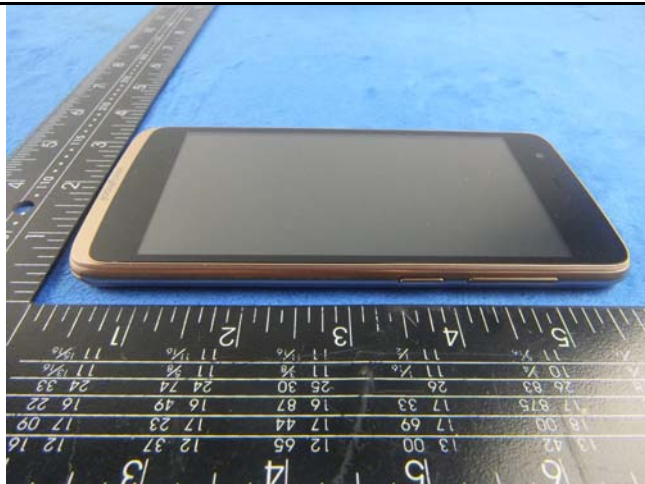




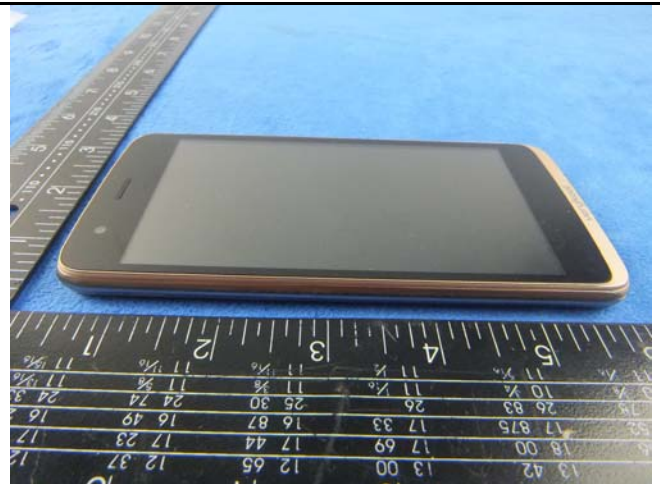
EUT - Top View



EUT - Bottom View



EUT - Left View



EUT - Right View

Annex B.ii. Photograph: EUT Internal Photo



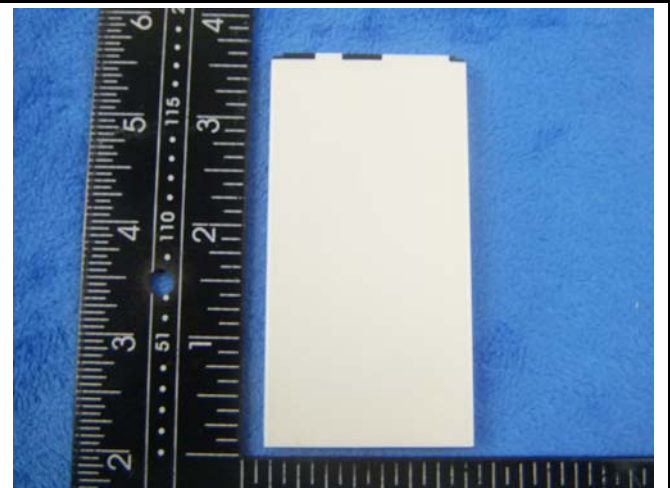
Cover Off - Top View 1



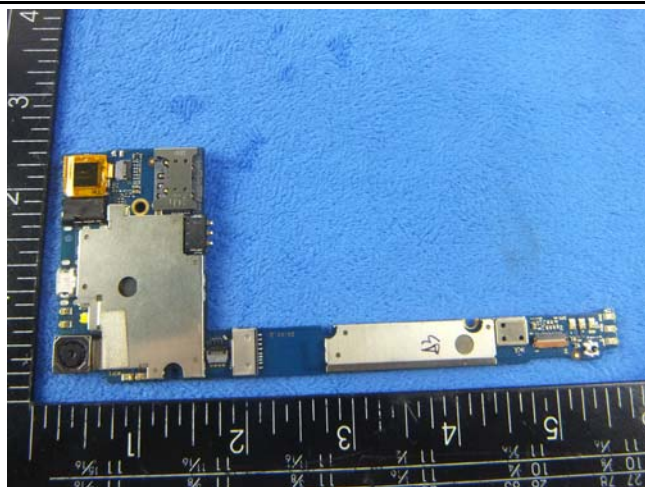
Cover Off - Top View 2



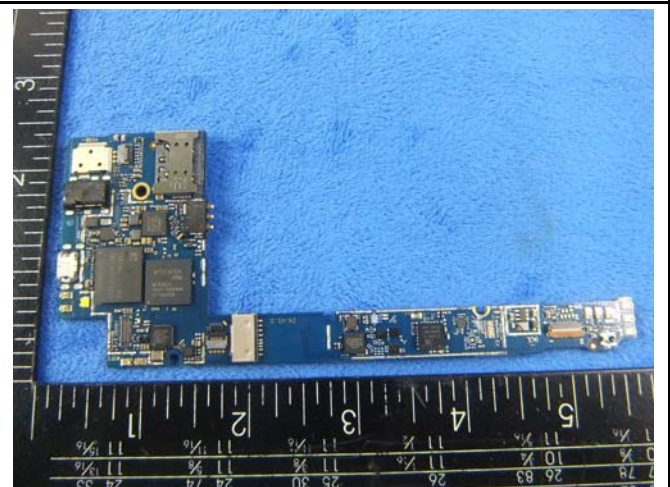
Battery - Top View



Battery - Bottom View

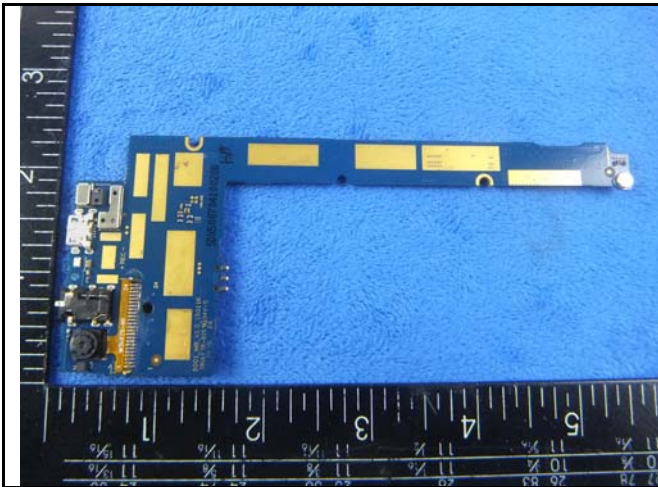


Main board - Front View



Main uncovered board - Front View

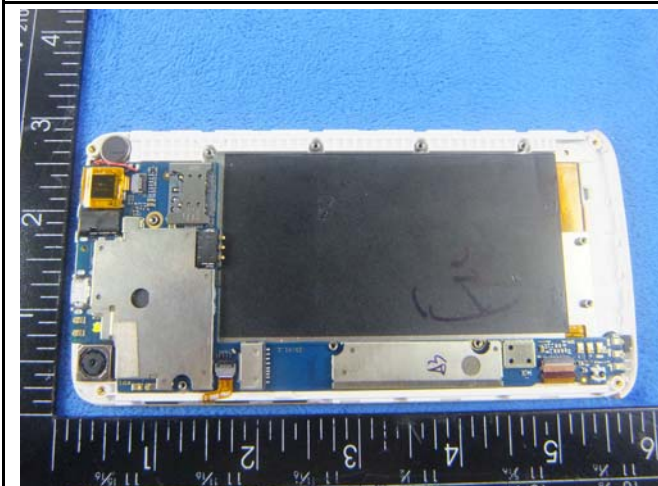
Test Report No.	15070302-FCC-R4
Page	32 of 39



Mainboard - rear View



LCD - Front View



LCD - Rear View



GSM/PCS/UMTS-FDD Antenna View



WIFI/BT/BLE - Antenna View



GPS - Antenna View

Annex B.iii. Photograph: Test Setup Photo



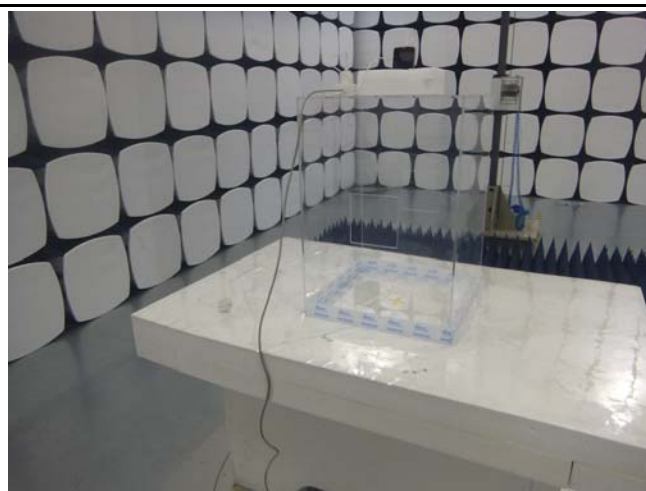
Conducted Emissions Test Setup Front View



Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Below 1GHz

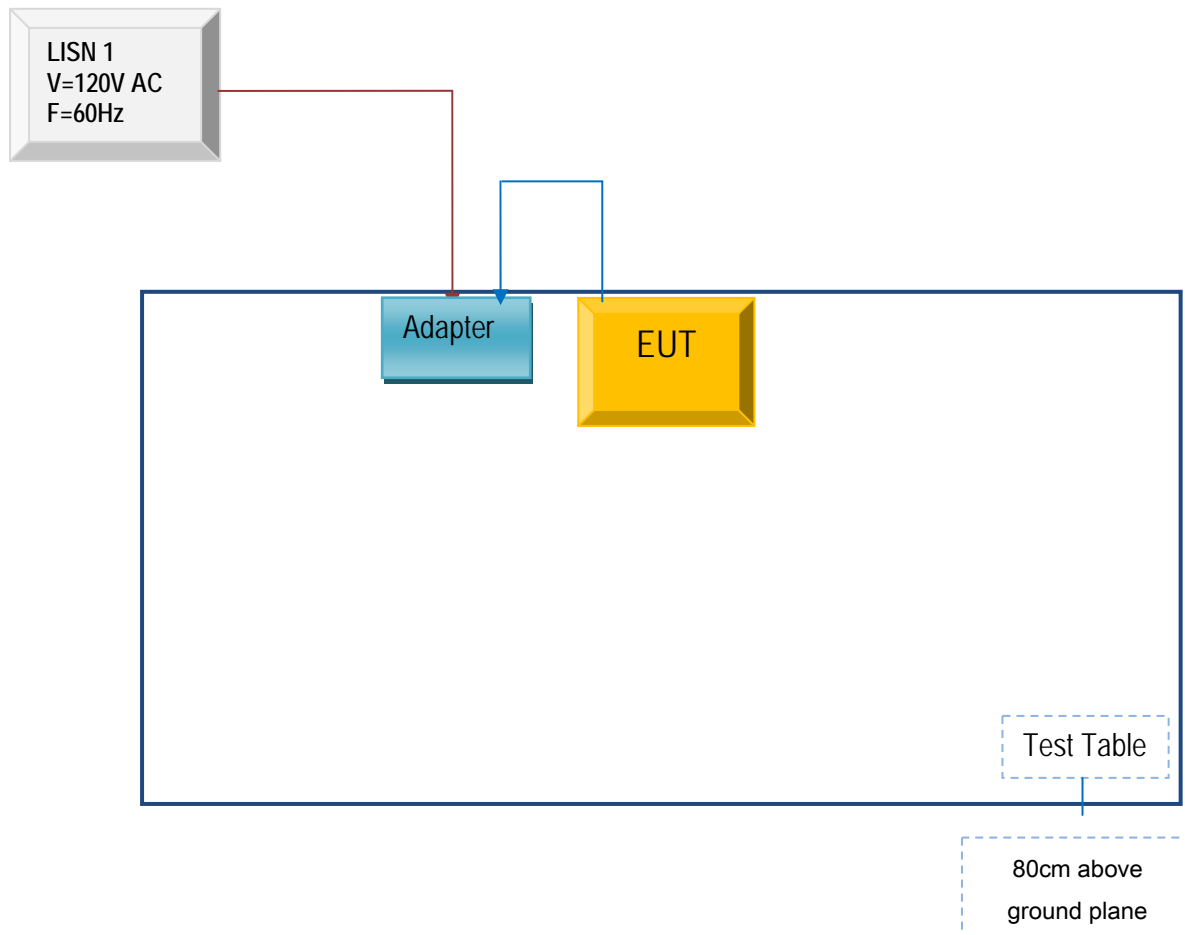


Radiated Spurious Emissions Test Setup Above
1GHz

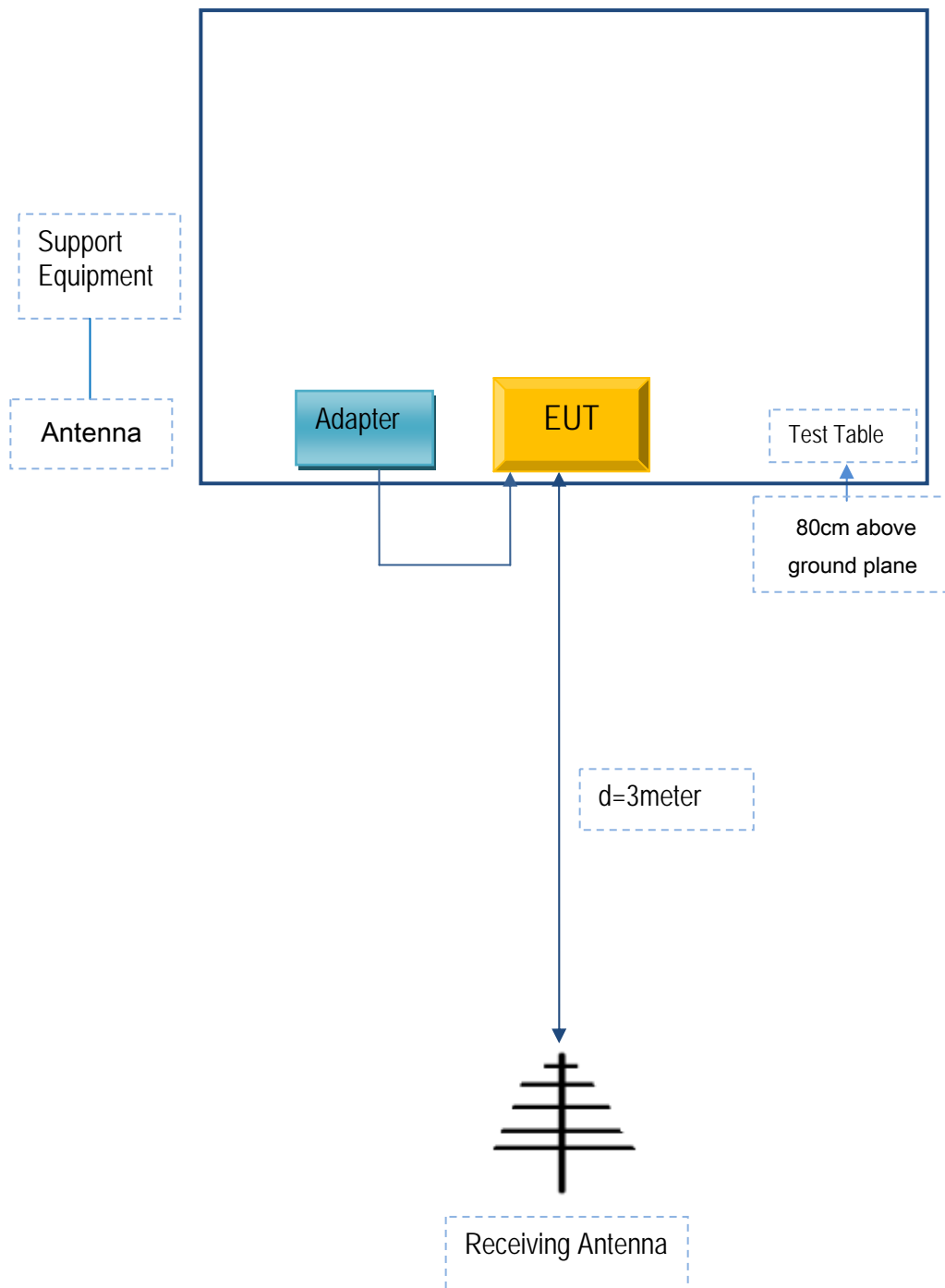
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

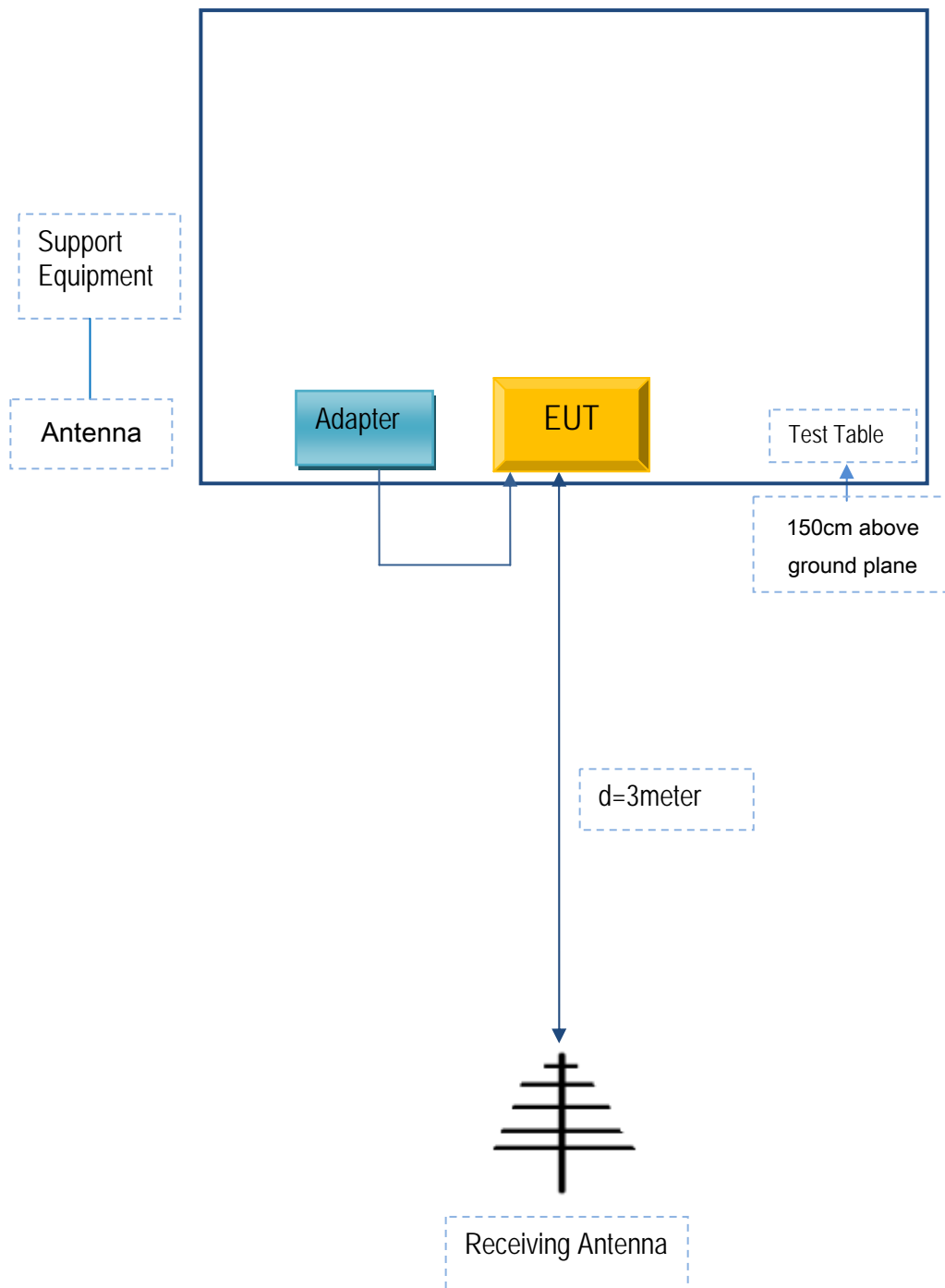
Block Configuration Diagram for AC Line Conducted Emissions



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



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



Test Report No.	15070302-FCC-R4
Page	37 of 39

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

Test Report No.	15070302-FCC-R4
Page	38 of 39

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

Please see attachment

Test Report No.	15070302-FCC-R4
Page	39 of 39

Annex E. DECLARATION OF SIMILARITY

N/A