RF TEST REPORT

Report No.: 15070695-FCC-R2

Supersede Report No.: N/A

Applicant	SHENZHEN TONGKE ELECTRONICS CO., LTD
Product Name	Bluetooth Speaker
Model No.	F8
Serial No.	Schultz Crystal
Test Standard	FCC Part 15.247: 2014, ANSI C63.10: 2013
Test Date	October 12 to October 19, 2015
Issue Date	October 21,2015
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Winnie Zhang	David Huang	
Winnie Zhang Test Engineer	David Huang Checked By	

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Test result presented in this test report is applicable to the tested sample only

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

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Laboratories Introduction

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

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

Accreditations for Conformity Assessment

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

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
15070695-FCC-R2	NONE	Original	October 21,2015

2. Customer information

Applicant Name	SHENZHEN TONGKE ELECTRONICS CO., LTD
Applicant Add	The Second Industrial Zone, Phoenix Village, Fuyong Town,Shenzhen,China
Manufacturer	SHENZHEN TONGKE ELECTRONICS CO., LTD
Manufacturer Add	The Second Industrial Zone, Phoenix Village, Fuyong Town,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:	Bluetooth Speaker
Main Model:	F8
Serial Model:	Schultz Crystal
Date EUT received:	August 27, 2015
Test Date(s):	October 12 to October 19, 2015
Equipment Category：	DTS
Antenna Gain:	Bluetooth& BLE: 0dBi
Type of Modulation:	Bluetooth: GFSK, π /4DQPSK, 8DPSK BLE: GFSK
RF Operating Frequency (ies):	Bluetooth& BLE: 2402-2480 MHz
Max. Output Power:	4.628dBm
Number of Channels:	Bluetooth: 79CH BLE: 40CH
Input Power:	Battery: Spec: 7.4V 2200mAh DC: 5V
Port:	USB Port, Power Port, AUX-IN
Trade Name :	SIGN, SCHULTZ
FCC ID:	2ABM9F8

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	N/A
§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

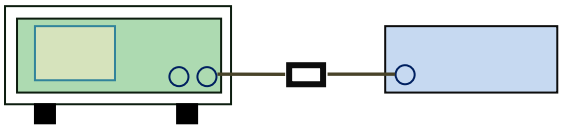
The EUT has 1 antennas:
A permanently attached PCB antenna for Bluetooth and BLE, the gain is 0dBi.

The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2 DTS (6 dB) Channel Bandwidth

Temperature	24℃
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2015
Tested By :	Winnie Zhang

Spec	Item	Requirement	Applicable
§ 15.247(a)(2)	a)	6dB BW≥ 500kHz;	☑
RSS Gen(4.6.1)	b)	99% BW: For FCC reference only; required by IC.	☑
Test Setup	 Spectrum Analyzer EUT		
Test Procedure	558074 D01 DTS MEAS Guidance v03r02, 8.1 DTS bandwidth 6dB Emission bandwidth measurement procedure - 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. 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.		
Remark			
Result	☑ Pass ☐ Fail		

Test Data ☑ Yes ☐ N/A

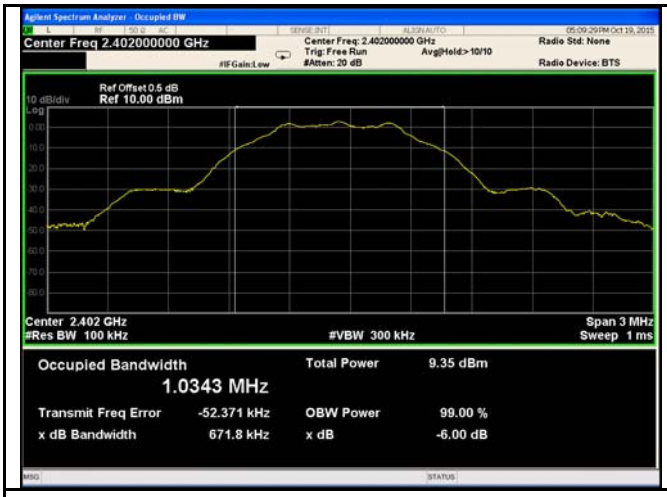
Test Plot ☑ Yes (See below) ☐ N/A

6dB Bandwidth measurement result

Test Data

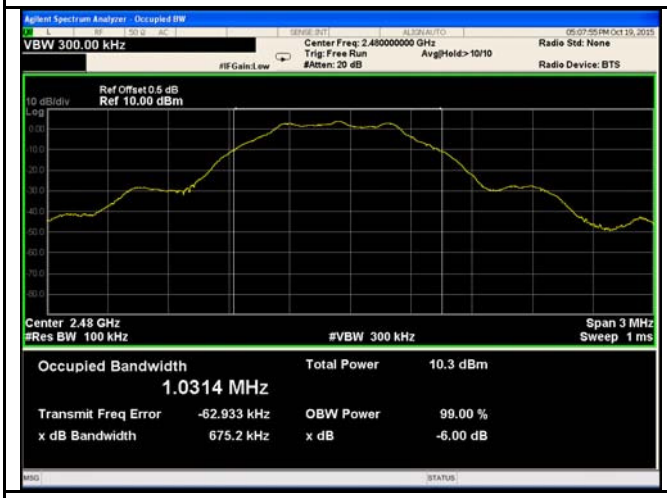
CH	Freq (MHz)	6dB Bandwidth (kHz)	99% Occupied Bandwidth (MHz)
Low	2402	671.8	1.0343
Mid	2440	671.7	1.0331
High	2480	675.2	1.0314

Test Plots



6dB Bandwidth - Low CH 2402

6dB Bandwidth - Mid CH 2440

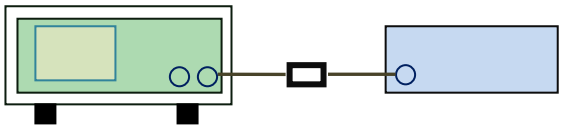


6dB Bandwidth - High CH 2480

6.3 Maximum Output Power

Temperature	24℃
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 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 ≥ 75 channels: ≤ 1 Watt	☐
	b)	FHSS in 5725-5850MHz: ≤ 1 Watt	☐
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤ 0.125 Watt.	☐
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤ 1 Watt	☐
	e)	FHSS in 902-928MHz with ≥ 25 & <50 channels: ≤ 0.25 Watt	☐
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: ≤ 1 Watt	☑
Test Setup	 Spectrum Analyzer EUT		
Test Procedure	558074 D01 DTS MEAS Guidance v03r02, 9.1.2 Integrated band power method Maximum output power measurement procedure a) Set the RBW ≥ DTS bandwidth. b) Set VBW ≥ 3 × RBW. c) Set span ≥ 3 x RBW d) Sweep time = auto couple. e) Detector = peak. f) Trace mode = max hold. g) Allow trace to fully stabilize. h) Use peak marker function to determine the peak amplitude level.		
Remark			

Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

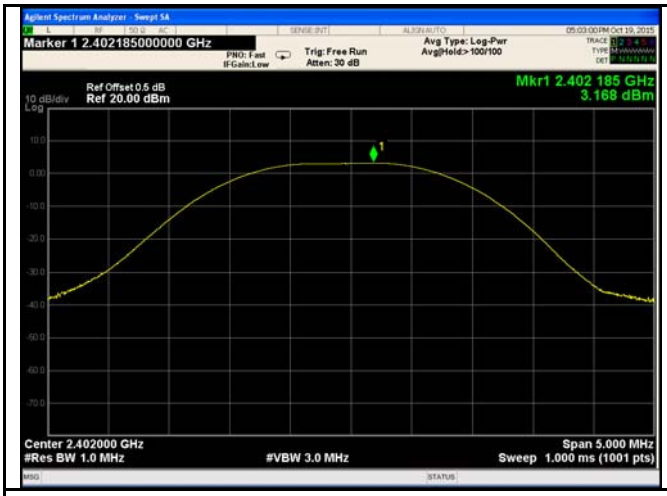
Test Plot ☑ Yes (See below) ☐ N/A

Output Power measurement result

Test Data

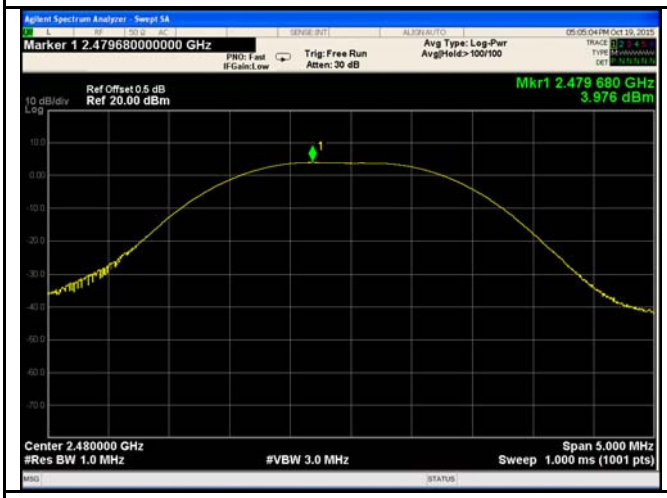
Type	CH	Freq (MHz)	Conducted Power (dBm)	Limit (dBm)	Result
Output power	Low	2402	3.168	30	Pass
	Mid	2440	**4.628**	30	Pass
	High	2480	3.976	30	Pass

Test Plots



AV Output power - Low CH 2402

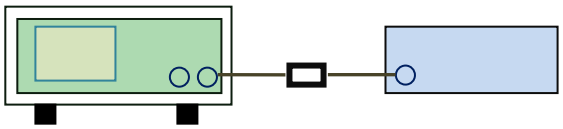
AV Output power - Mid CH 2440



AV Output power - High CH 2480

6.4 Power Spectral Density

Temperature	24℃
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 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.	☑
Test Setup			
Test Procedure	558074 D01 DTS MEAS Guidance v03r02, 10.2 power spectral density method power spectral density measurement procedure - 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 kHz ≤ RBW ≤ 100 kHz. - d) Set the VBW ≥ 3 × 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	☑ Pass ☐ 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	-4.526	8	Pass
	Mid	2440	-2.822	8	Pass
	High	2480	-3.701	8	Pass

Test Plots

PSD - Low CH 2402

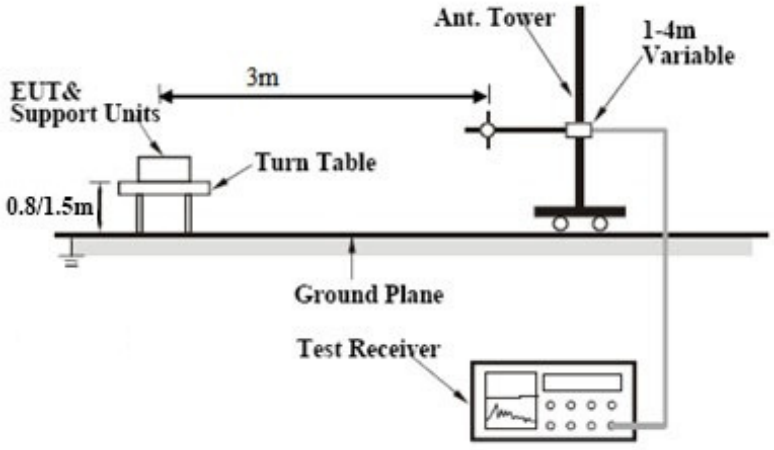
PSD - Mid CH 2440

PSD - High CH 2480

6.5 Band-Edge

Temperature	24℃
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 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.	☑
Test Setup			
Test Procedure	Radiated Method Only - 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.		

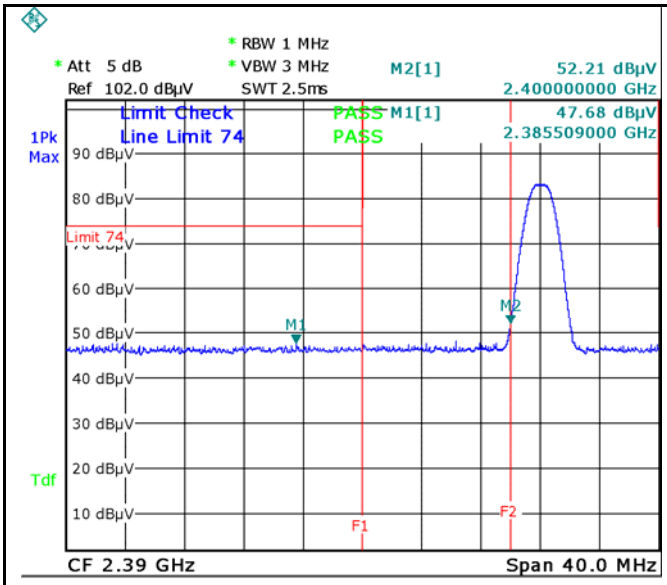
	- 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 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	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

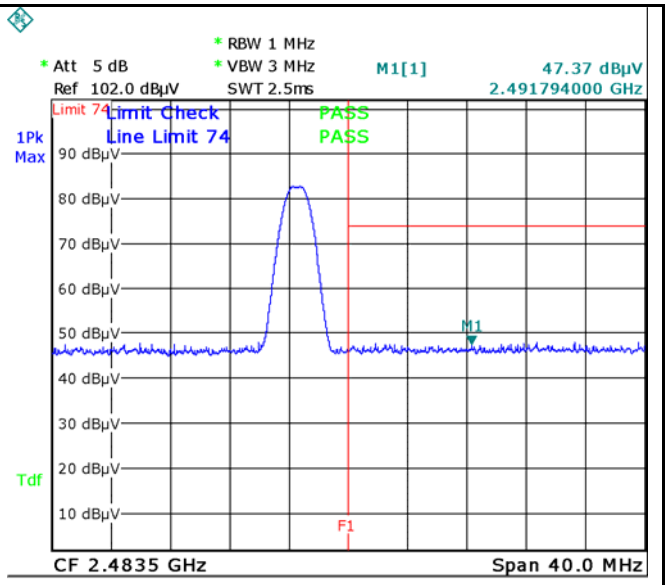
Test Plots

Band Edge measurement result



Band Edge, Left Side (Peak)

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



Band Edge, Right Side (Peak)

Note: F1 is frequency 2483.5MHz

Note: (no need if PK value less than the AV limit)

Note: (no need if PK value less than the AV limit)

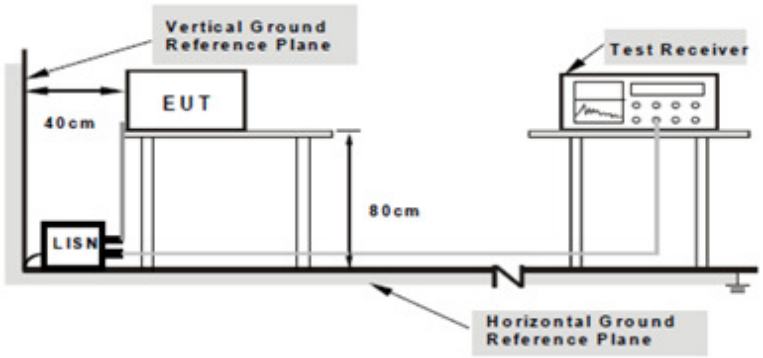
Band Edge, Left Side-AV

Band Edge, Right Side-AV

6.6 AC Power Line Conducted Emissions

Temperature	24℃
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2015
Tested By :	Winnie Zhang

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.207, RSS210 (A8.1)</td><td>a)</td><td>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>
</td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 

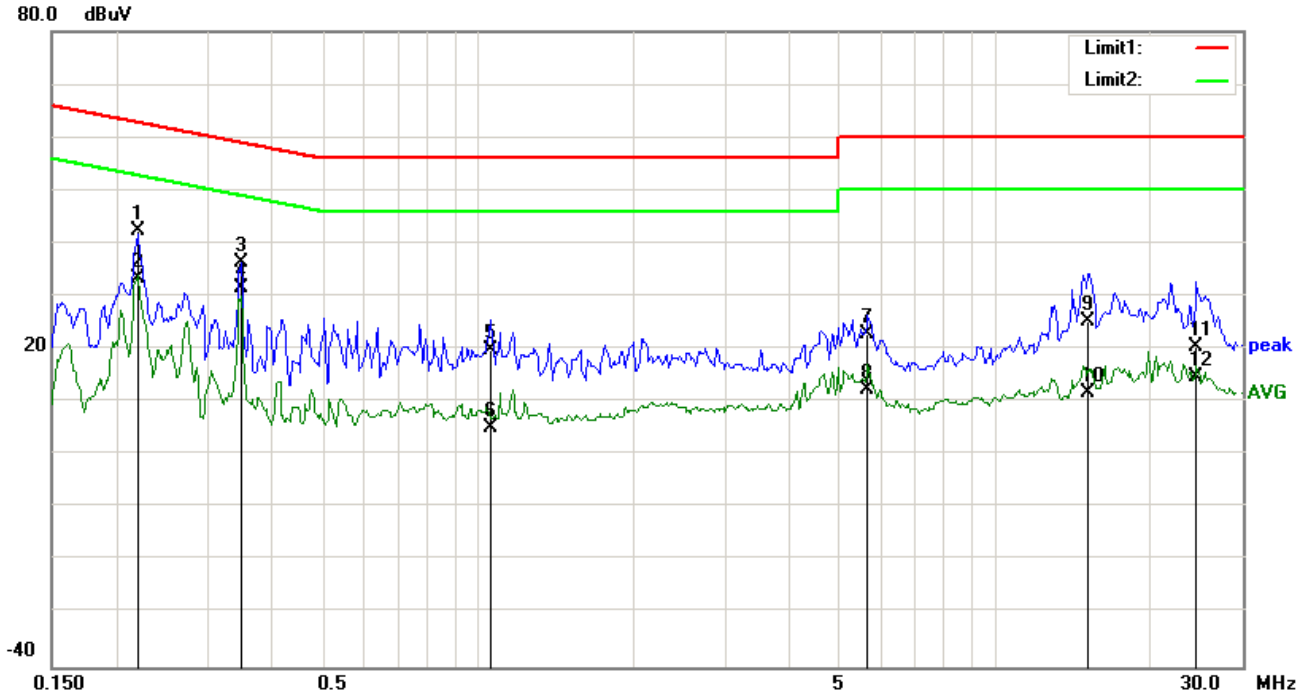
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss</td></tr>
</table>

	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	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode:	Transmitting Mode

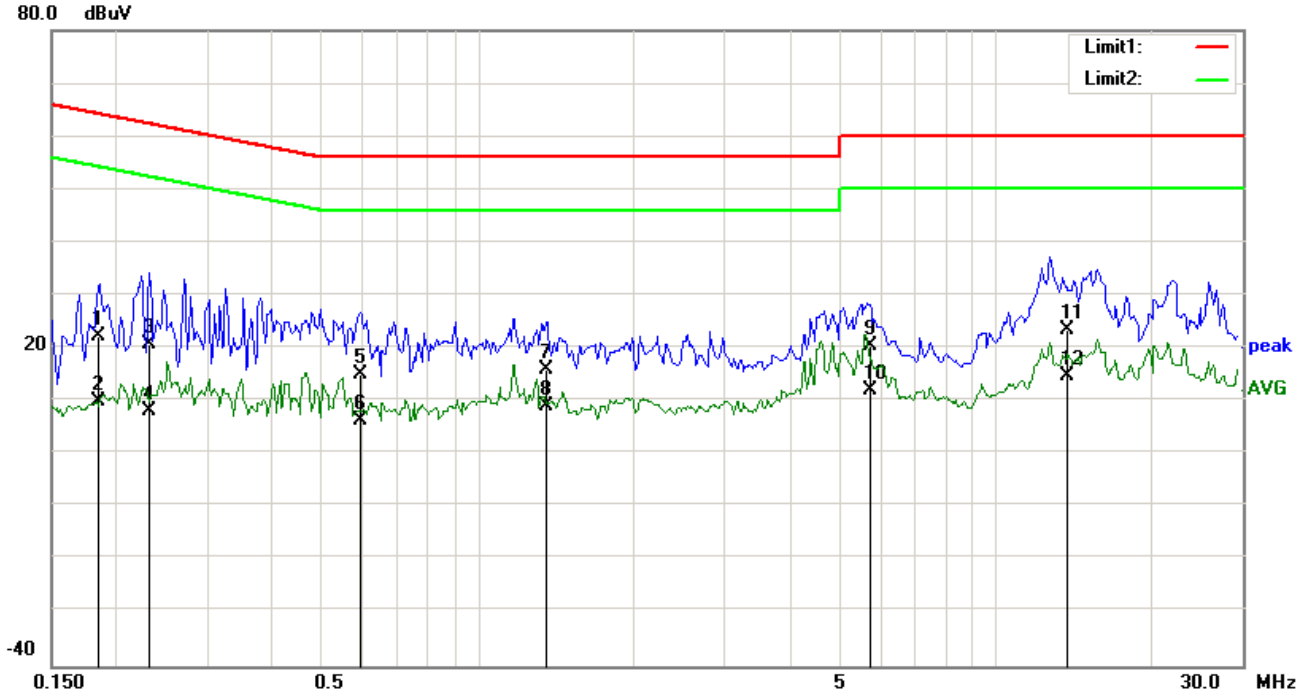


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	L1	0.2202	32.39	QP	10.03	42.42	62.81	-20.39
2	L1	0.2202	23.29	AVG	10.03	33.32	52.81	-19.49
3	L1	0.3489	26.30	QP	10.03	36.33	58.99	-22.66
4	L1	0.3489	21.56	AVG	10.03	31.59	48.99	-17.40
5	L1	1.0587	9.71	QP	10.03	19.74	56.00	-36.26
6	L1	1.0587	-4.89	AVG	10.03	5.14	46.00	-40.86
7	L1	5.6559	12.85	QP	10.09	22.94	60.00	-37.06
8	L1	5.6559	2.23	AVG	10.09	12.32	50.00	-37.68
9	L1	15.0744	14.90	QP	10.23	25.13	60.00	-34.87
10	L1	15.0744	1.59	AVG	10.23	11.82	50.00	-38.18
11	L1	24.4890	10.14	QP	10.39	20.53	60.00	-39.47
12	L1	24.4890	4.38	AVG	10.39	14.77	50.00	-35.23

Test Mode:	Transmitting Mode

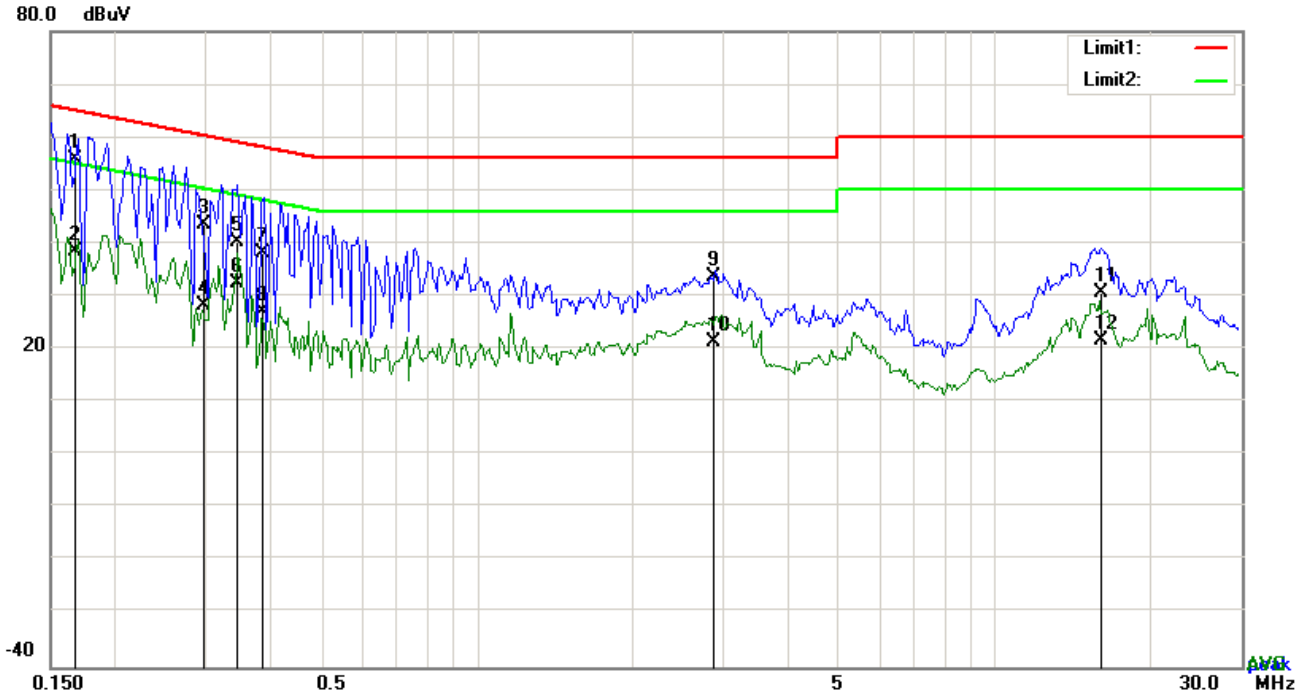


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	N	0.1851	12.11	QP	10.03	22.14	64.25	-42.11
2	N	0.1851	-0.09	AVG	10.03	9.94	54.25	-44.31
3	N	0.2319	10.81	QP	10.03	20.84	62.38	-41.54
4	N	0.2319	-2.01	AVG	10.03	8.02	52.38	-44.36
5	N	0.5946	5.00	QP	10.03	15.03	56.00	-40.97
6	N	0.5946	-3.76	AVG	10.03	6.27	46.00	-39.73
7	N	1.3590	5.96	QP	10.03	15.99	56.00	-40.01
8	N	1.3590	-0.98	AVG	10.03	9.05	46.00	-36.95
9	N	5.7222	10.23	QP	10.09	20.32	60.00	-39.68
10	N	5.7222	2.07	AVG	10.09	12.16	50.00	-37.84
11	N	13.7578	13.31	QP	10.21	23.52	60.00	-36.48
12	N	13.7578	4.45	AVG	10.21	14.66	50.00	-35.34

Test Mode:	Transmitting Mode

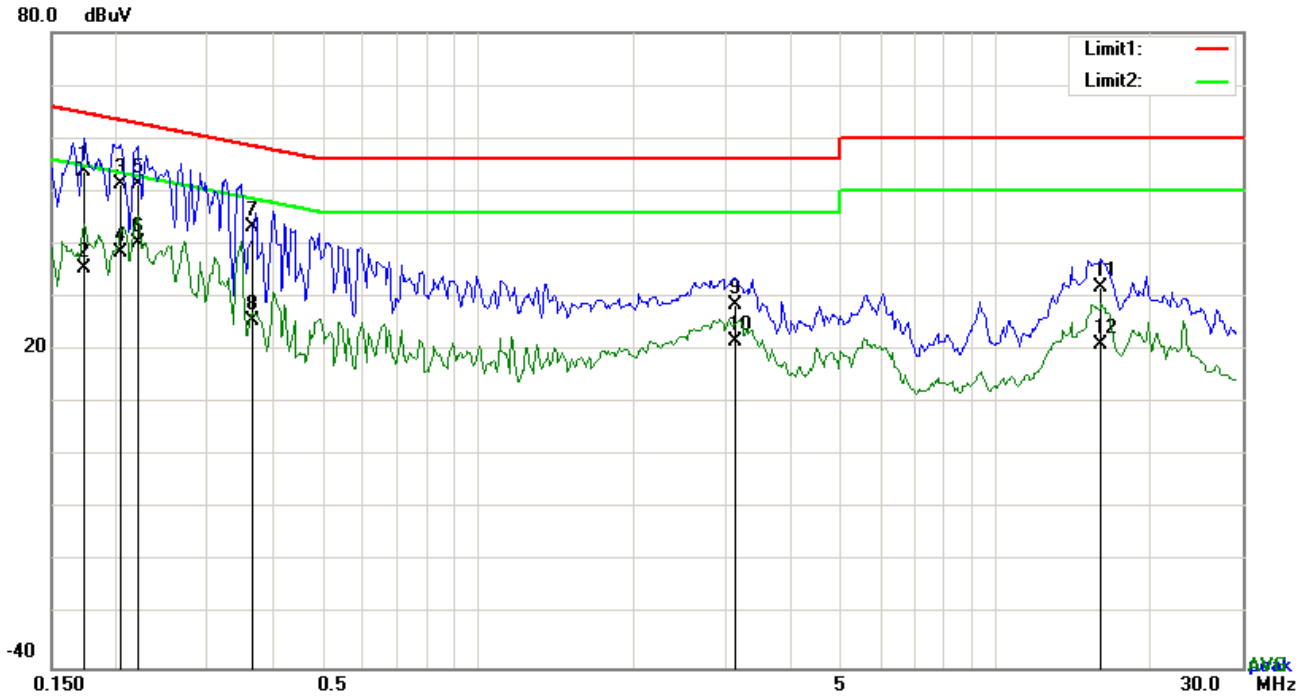


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	L1	0.1675	45.80	QP	10.03	55.83	65.08	-9.25
2	L1	0.1675	28.38	AVG	10.03	38.41	55.08	-16.67
3	L1	0.2956	33.53	QP	10.03	43.56	60.37	-16.81
4	L1	0.2956	18.19	AVG	10.03	28.22	50.37	-22.15
5	L1	0.3450	30.36	QP	10.03	40.39	59.08	-18.69
6	L1	0.3450	22.53	AVG	10.03	32.56	49.08	-16.52
7	L1	0.3852	28.00	QP	10.03	38.03	58.17	-20.14
8	L1	0.3852	17.05	AVG	10.03	27.08	48.17	-21.09
9	L1	2.8653	23.75	QP	10.05	33.80	56.00	-22.20
10	L1	2.8653	11.34	AVG	10.05	21.39	46.00	-24.61
11	L1	16.1001	20.39	QP	10.24	30.63	60.00	-29.37
12	L1	16.1001	11.46	AVG	10.24	21.70	50.00	-28.30

Test Mode:	Transmitting Mode



Test Data

Phase Neutral Plot at 240Vac, 60Hz

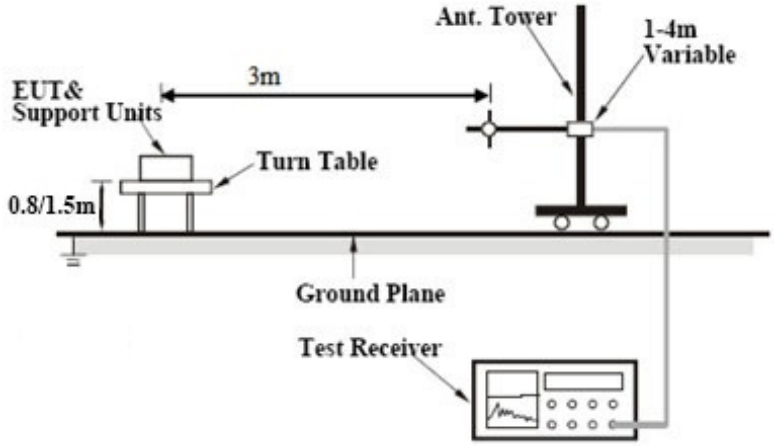
No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	N	0.1734	43.72	QP	10.02	53.74	64.80	-11.06
2	N	0.1734	25.51	AVG	10.02	35.53	54.80	-19.27
3	N	0.2046	41.27	QP	10.02	51.29	63.42	-12.13
4	N	0.2046	28.49	AVG	10.02	38.51	53.42	-14.91
5	N	0.2202	41.37	QP	10.02	51.39	62.81	-11.42
6	N	0.2202	30.29	AVG	10.02	40.31	52.81	-12.50
7	N	0.3655	33.19	QP	10.02	43.21	58.60	-15.39
8	N	0.3655	15.57	AVG	10.02	25.59	48.60	-23.01
9	N	3.1560	18.39	QP	10.05	28.44	56.00	-27.56
10	N	3.1560	11.50	AVG	10.05	21.55	46.00	-24.45
11	N	15.8624	21.54	QP	10.21	31.75	60.00	-28.25
12	N	15.8624	10.75	AVG	10.21	20.96	50.00	-29.04

6.7 Radiated Emissions

Temperature	24℃
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2015
Tested By :	Winnie Zhang

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td rowspan="3">47CFR§15.247(d), RSS210 (A8.5)</td><td>a)</td><td>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
<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></td><td>☑</td></tr>
<tr><td>b)</td><td>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
☒ 20 dB down ☐ 30 dB down</td><td>☑</td></tr>
<tr><td>c)</td><td>or restricted band, emission must also comply with the radiated emission limits specified in 15.209</td><td>☑</td></tr>
</table>

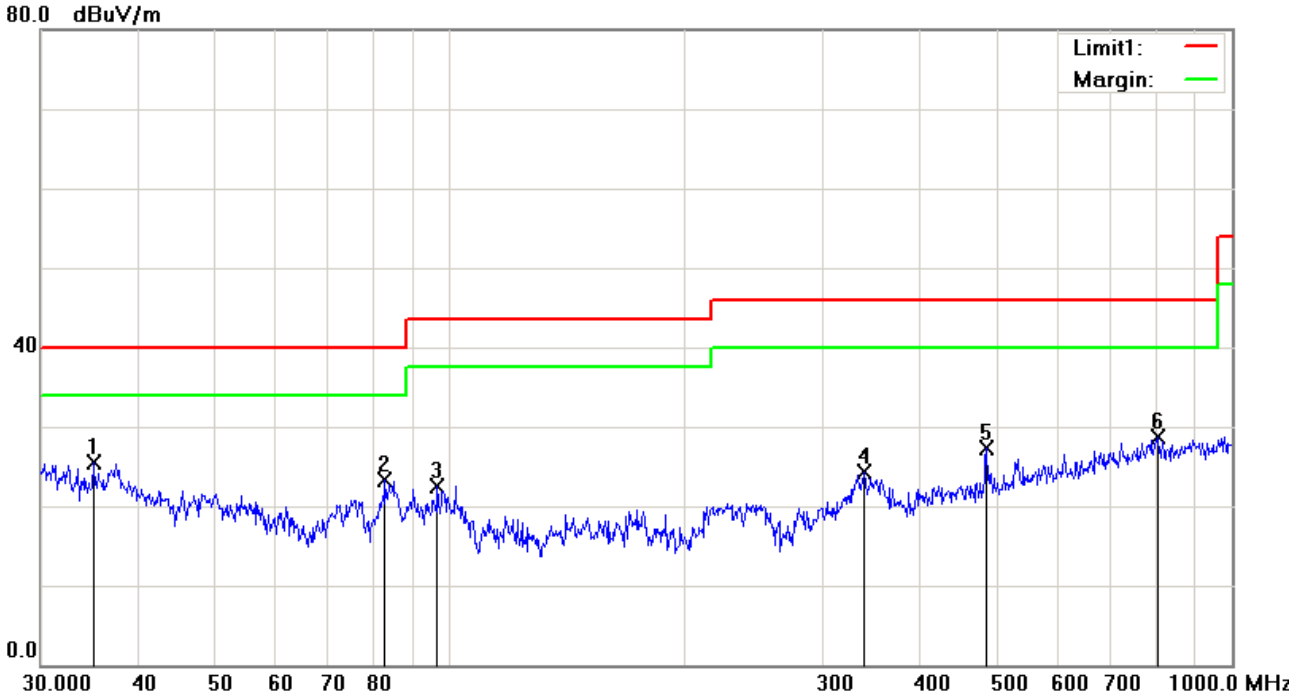
Test Setup	
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: 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	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode:	Transmitting Mode

Below 1GHz

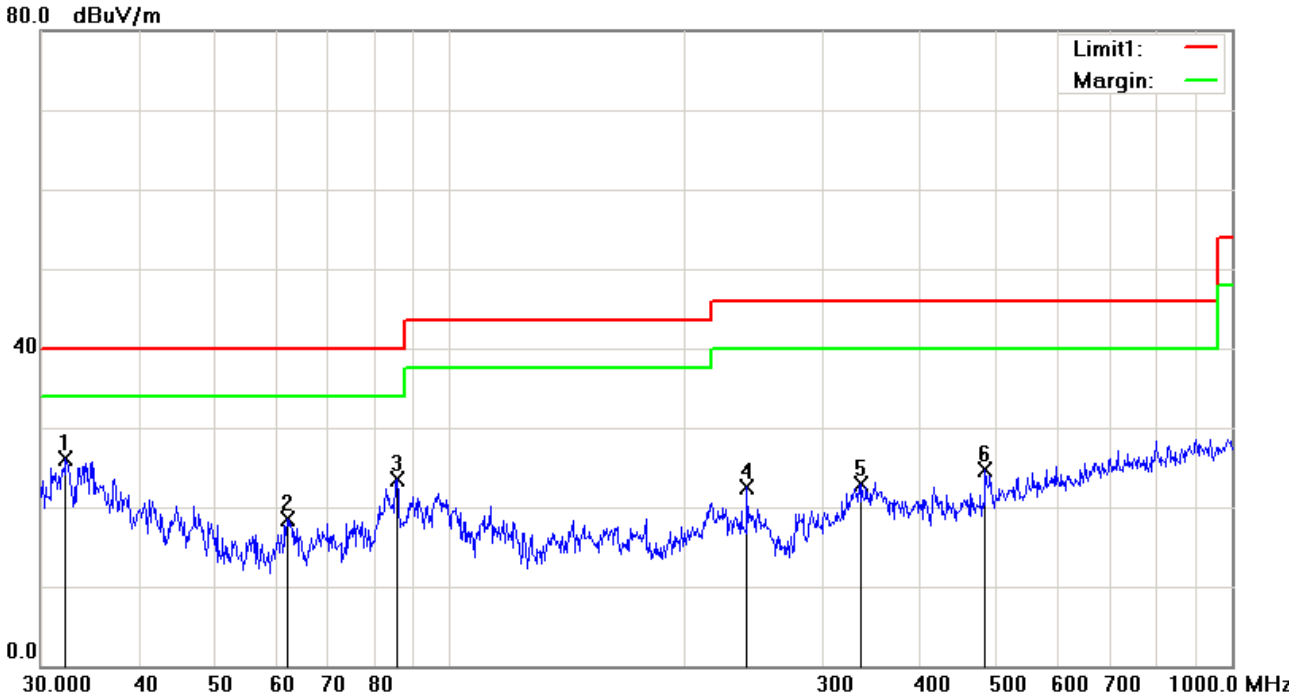


Test Data

Vertical Polarity Plot @3m

No	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Height	Degree
1	V	35.0048	29.44	peak	-3.94	25.50	40.00	-14.50	100	183
2	V	82.6482	36.83	peak	-13.62	23.21	40.00	-16.79	100	0
3	V	96.4362	34.32	peak	-11.75	22.57	43.50	-20.93	100	125
4	V	338.4001	30.09	peak	-5.79	24.30	46.00	-21.70	100	52
5	V	485.6093	29.31	peak	-2.09	27.22	46.00	-18.78	100	177
6	V	804.6028	25.47	peak	3.26	28.73	46.00	-17.27	100	308

Below 1GHz



Test Data

Horizontal Polarity Plot @3m

No	P/L	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Height	Degree
1	H	32.2925	28.13	peak	-1.96	26.17	40.00	-13.83	100	31
2	H	61.9951	32.62	peak	-14.20	18.42	40.00	-21.58	100	0
3	H	85.5977	36.97	peak	-13.48	23.49	40.00	-16.51	100	149
4	H	239.9873	31.57	peak	-9.10	22.47	46.00	-23.53	100	283
5	H	336.0352	28.79	peak	-5.86	22.93	46.00	-23.07	100	122
6	H	483.9094	26.81	peak	-2.13	24.68	46.00	-21.32	100	348

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	37.59	AV	V	33.83	6.86	31.72	46.56	54	-7.44
4804	35.13	AV	H	33.83	6.86	31.72	44.1	54	-9.9
4804	47.45	PK	V	33.83	6.86	31.72	56.42	74	-17.58
4804	46.28	PK	H	33.83	6.86	31.72	55.25	74	-18.75

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	37.83	AV	V	33.86	6.82	31.82	46.69	54	-7.31
4880	35.61	AV	H	33.86	6.82	31.82	44.47	54	-9.53
4880	47.37	PK	V	33.86	6.82	31.82	56.23	74	-17.77
4880	46.04	PK	H	33.86	6.82	31.82	54.9	74	-19.1

High Channel (2480 MHz)

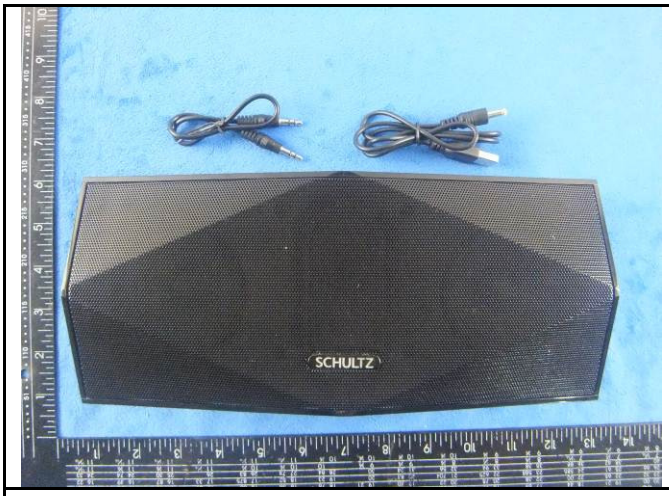
Frequency (MHz)	S.A. Reading (dBµV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
4960	37.69	AV	V	33.9	6.76	31.92	46.43	54	-7.57
4960	35.42	AV	H	33.9	6.76	31.92	44.16	54	-9.84
4960	47.15	PK	V	33.9	6.76	31.92	55.89	74	-18.11
4960	46.38	PK	H	33.9	6.76	31.92	55.12	74	-18.88

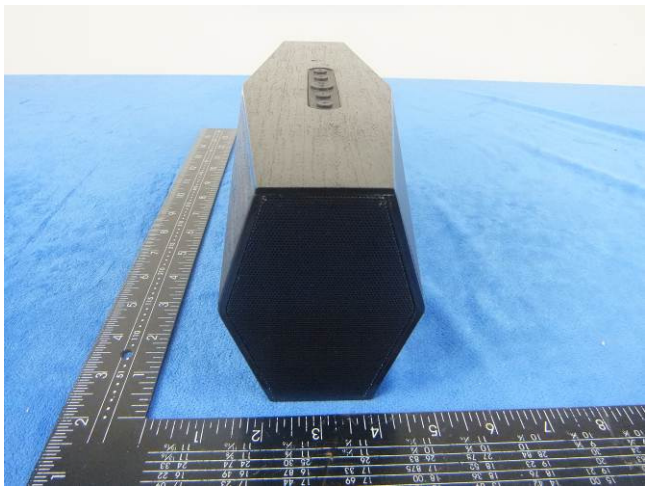
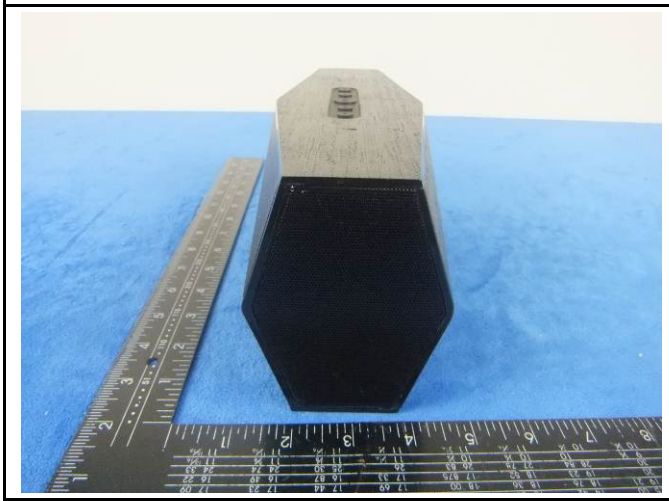
Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	☑
Line Impedance	LI-125A	191106	09/25/2015	09/24/2016	☑
Line Impedance	LI-125A	191107	09/25/2015	09/24/2016	☑
LISN	ISN T800	34373	09/25/2015	09/24/2016	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	☑
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	☑
RF conducted test					
Agilent ESA-E SERIES	E4407B	MY45108319	09/17/2015	09/16/2016	☑
Power Splitter	1#	1#	09/01/2015	08/31/2016	☑
DC Power Supply	E3640A	MY40004013	09/17/2015	09/16/2016	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	☑
Positioning Controller	UC3000	MF780208282	11/20/2014	11/19/2015	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	☑
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/25/2015	03/24/2016	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	☑
Universal Radio Communication Tester	CMU200	121393	09/25/2015	09/23/2016	☑

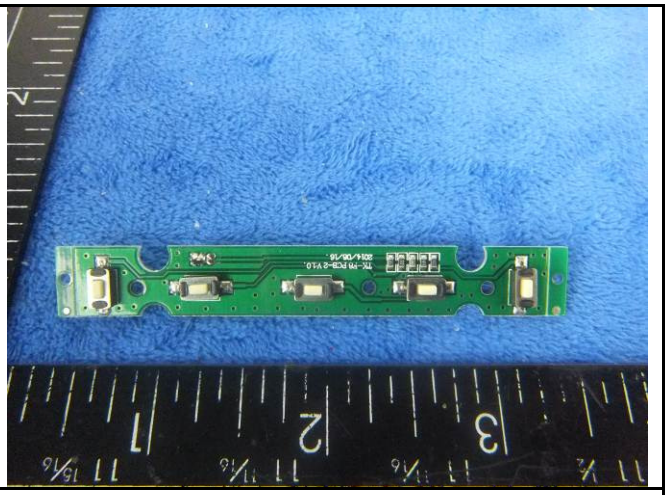
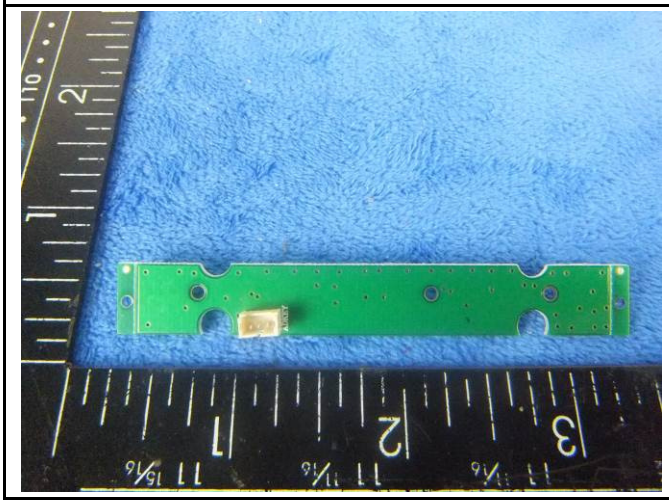
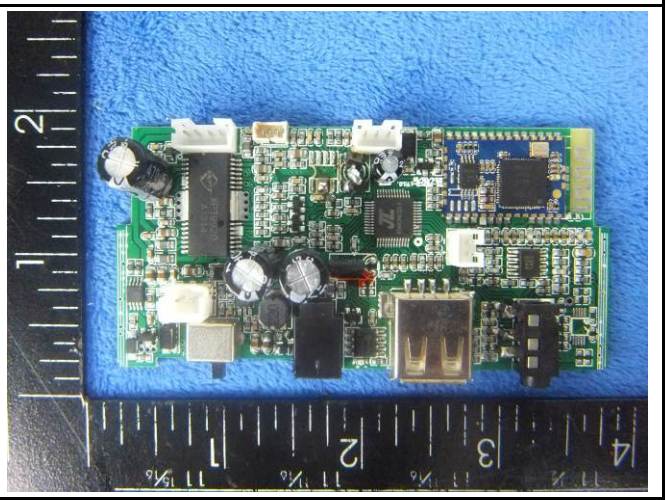
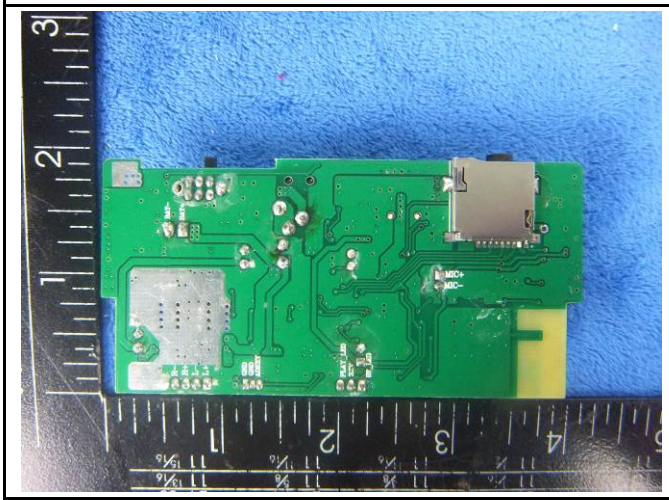
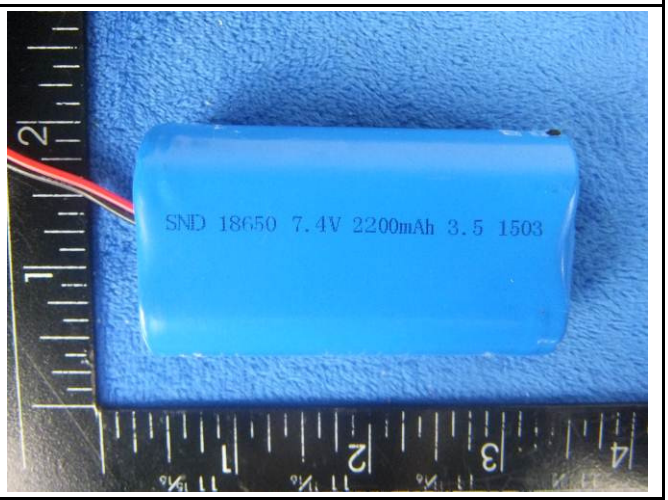
Annex B. EUT And Test Setup Photographs

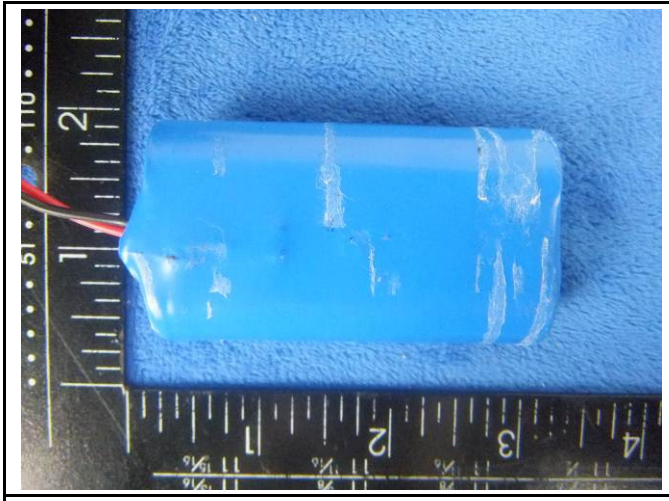
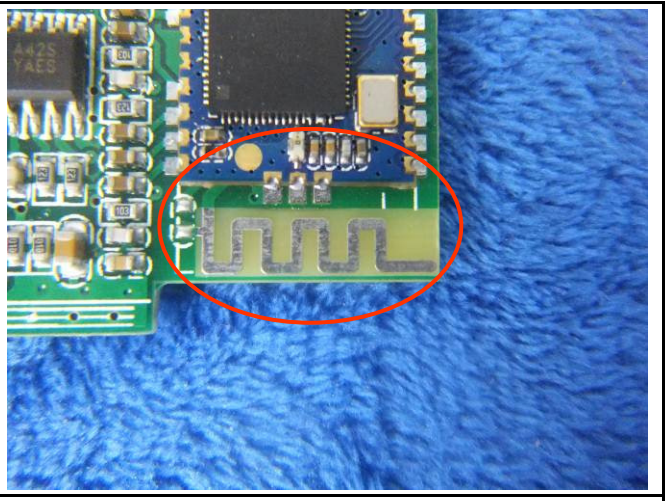
Annex B.i. Photograph: EUT External Photo

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Whole Package - Top View</td><td>EUT - Front View</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>EUT - Rear View</td><td>EUT – Top View</td></tr>
</table>

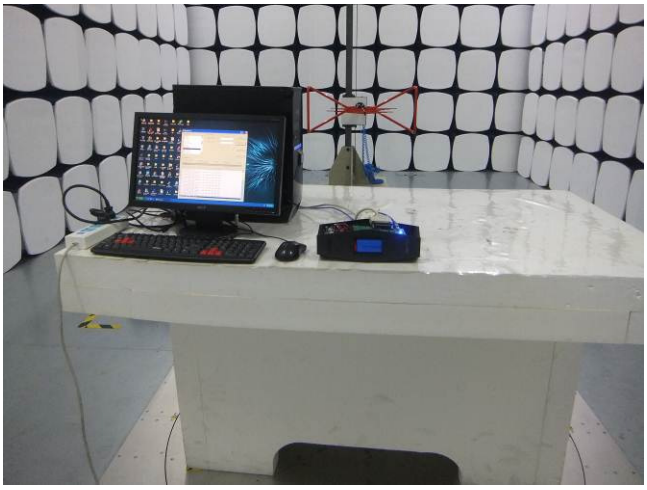
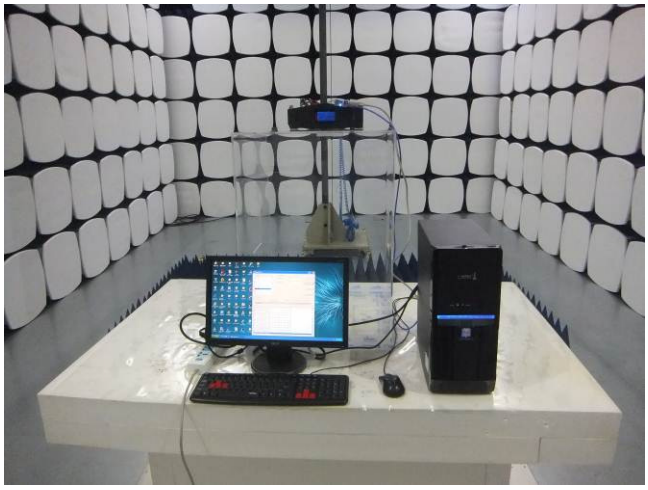
	
EUT - Bottom View	EUT - Left View
	
EUT - Right View	

Annex B.ii. Photograph: EUT Internal Photo

	
Cover Off - Top View 1	Small Mainborad - Front View
	
Small Mainborad - Rear View	Mainborad - Front View
	
Mainborad - Rear View	Battery - Front View

	
Battery - Rear View	BT/BLE - Antenna View

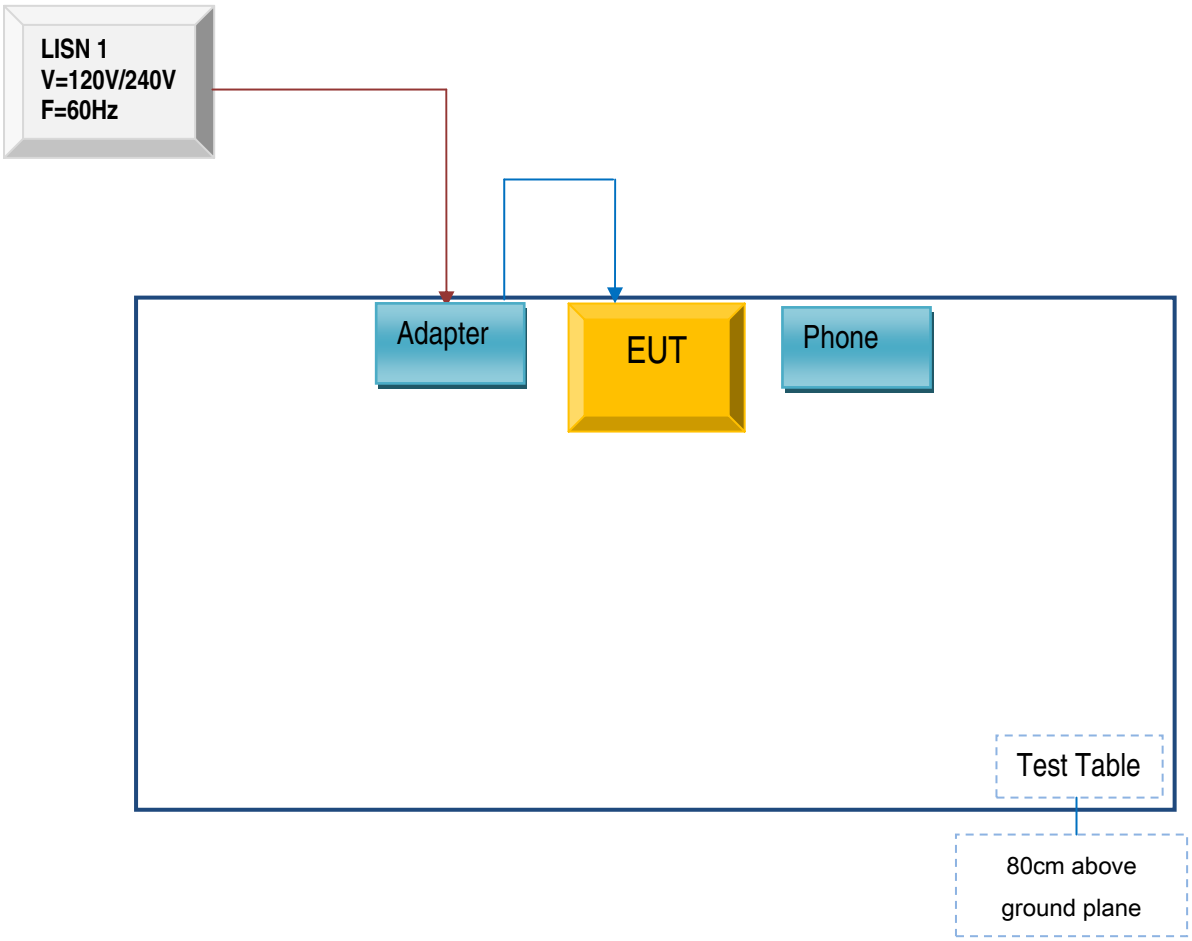
Annex B.iii. Photograph: Test Setup Photo

	
Conducted Emissions Test Setup Front View	Conducted Emissions Test Setup Side View
	
Radiated Spurious Emissions Test Setup Below 1GHz	Radiated Spurious Emissions Test Setup Above 1GHz

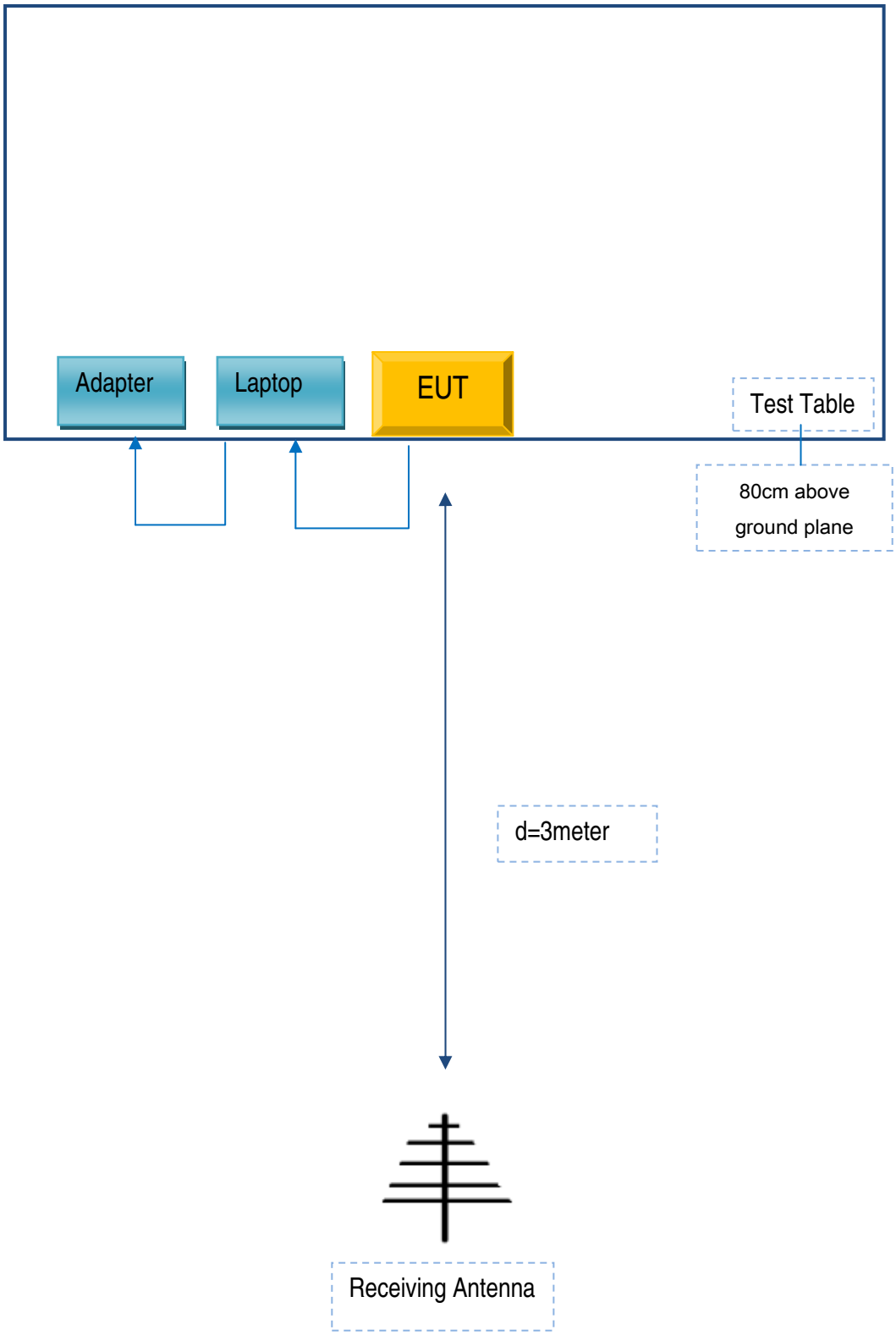
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

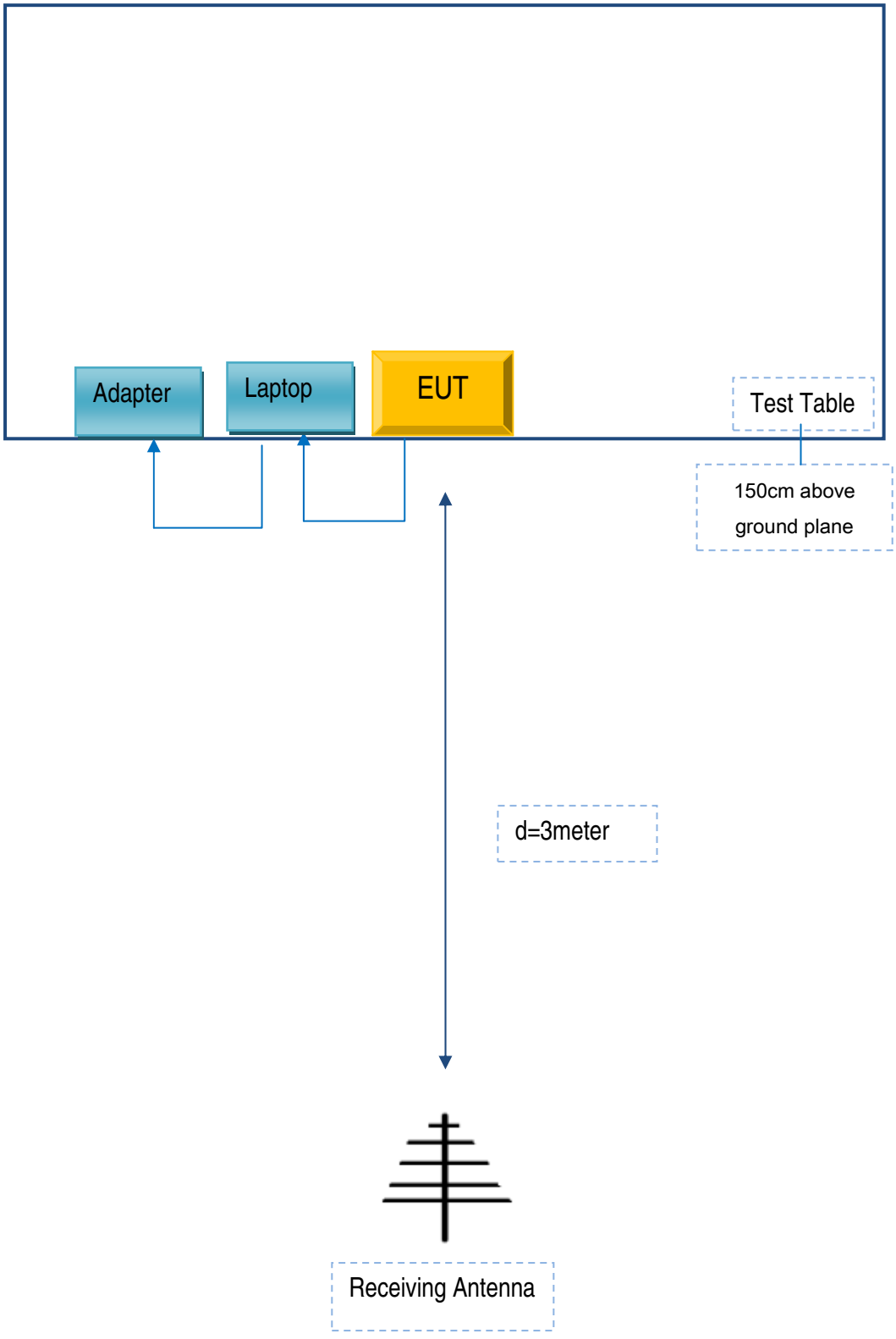
Block Configuration Diagram for AC Line Conducted Emissions



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



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



Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
Lenovo	Lenovo Laptop	E40& 0579A52	N/A	N/A
Lenovo	Mobile phone	X1	N/A	N/A

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

Please see attachment

Annex E. DECLARATION OF SIMILARITY

SHENZHEN TONGKE ELECTRONICS CO., LTD

To: SIEMIC , 775 Montague Expressway, Milpitas, CA 95035,USA

Declaration Letter

Dear Sir,

For our business issue and marketing requirement, we would like to list 2 model numbers on the FCC certificates and reports, as following:

Model No.:F8/ Schultz Crystal
We declare that the difference of these is listed as below:

Main Model No	Serial Model No	Difference
F8	Schultz Crystal	Difference model

Thank you!

Signature: 

Printed name/title: SHENZHEN TONGKE ELECTRONICS CO., LTD
Tel: 0755-33856710
Fax: 7550-33893336
Address: The Second Industrial Zone, Phoenix Village, Fuyong Town,Shenzhen,China