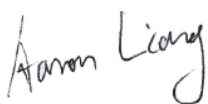
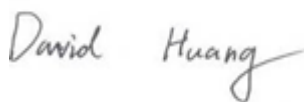


RF TEST REPORT



Report No.: 18071027-FCC-R

Supersede Report No.: N/A

Applicant	Ningbo Lumiaudio Electronic Technology LTD	
Product Name	Bluetooth ceiling speaker	
Model No.	FLC-6BTS	
Serial No.	FLC-6BT, 24760, FLC-6BT-DC, FLC-6BTS-DC, FLE-6BT, FLE-6BTS, FLE-6BT-DC, FLE-6BTS-DC	
Test Standard	FCC Part 15.247, ANSI C63.10: 2013	
Test Date	September 07 to 18, 2018	
Issue Date	October 12, 2018	
Test Result	☒ Pass ☐ Fail	
Equipment complied with the specification	☒	
Equipment did not comply with the specification	☐	
		
Aaron Liang 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	18071027-FCC-R
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1. Report Revision History

Report No.	Report Version	Description	Issue Date
18071027-FCC-R	NONE	Original	September 29, 2018
18071027-FCC-R	V1	Updated the test data from “ September 07 to 28, 2018” to September 07 to 18, 2018”	October 12, 2018

2. Customer information

Applicant Name	Ningbo Lumiaudio Electronic Technology LTD
Applicant Add	22/F., Building 1, Lisi Plaza, Huifeng East Road ,Ningbo, China 315100
Manufacturer	Ningbo Lumiaudio Electronic Technology LTD
Manufacturer Add	22/F., Building 1, Lisi Plaza, Huifeng East Road ,Ningbo, China 315100

3. Test site information

Test Lab A:

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.	535293
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

Test Lab B:

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	694825
IC Test Site No.	4842B-1
Test Software	EZ_EMG(ver.lcp-03A1)

Note: We just perform Radiated Spurious Emission above 18GHz in the test Lab. B.

4. Equipment under Test (EUT) Information

Description of EUT:	Bluetooth ceiling speaker
Main Model:	FLC-6BTS
Serial Model:	FLC-6BT, 24760, FLC-6BT-DC, FLC-6BTS-DC, FLE-6BT, FLE-6BTS, FLE-6BT-DC, FLE-6BTS-DC
Date EUT received:	September 06, 2018
Test Date(s):	September 07 to 18, 2018
Equipment Category :	DSS
Antenna Gain:	0dBi
Antenna Type:	PCB antenna
Type of Modulation:	Bluetooth: GFSK, $\pi/4$ DQPSK, 8DPSK
RF Operating Frequency (ies):	Bluetooth: 2402-2480 MHz
Number of Channels:	Bluetooth: 79CH
Port:	Power Port, Earphone Port
Input Power:	Adapter Model: TDX-2402500 Input:100-240V 50/60Hz 2A Output:24V/2.5A

Trade Name : N/A

FCC ID: 2AKKHFLC

Mark:

Revision Number	Model	Report Number	Description of Revision	Date of Revision
0	FLC-6BTS, FLC-6BT, 24760	17020664-FCC-R1	Original Report	June 28, 2017
1	FLC-6BTS, FLC-6BT, 24760, FLC-6BTS, FLC-6BT-DC, FLC-6BTS-DC, FLE-6BT, FLE-6BTS, FLE-6BT-DC, FLE-6BTS-DC	18071027-FCC-R	Amended Report	September 29, 2018

Note: This is the amended report application (18071027-FCC-R) of the device, the original submission (17020664-FCC-R1) was granted on June 28, 2017.

The difference between the original devices, please refer to the Declaration Letter (on page 26), and based on the Declaration Letter, we will retest the " AC Power Line Conducted Emissions and Radiated Emissions" test data, and others please refer to report 17020664-FCC-R1.

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	Please refer to 17020664-FCC-R1
§15.247(a)(1)	Channel Separation	Please refer to 17020664-FCC-R1
§15.247(a)(1)	20 dB Bandwidth	Please refer to 17020664-FCC-R1
§15.247(b)(1)	Peak Output Power	Please refer to 17020664-FCC-R1
§15.247(a)(1)(iii)	Number of Hopping Channel	Please refer to 17020664-FCC-R1
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Please refer to 17020664-FCC-R1
§15.247(d)	Band Edge& Restricted Band	Please refer to 17020664-FCC-R1
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions& Restricted Band	Compliance

Measurement Uncertainty

Emissions		
Test Item	Description	Uncertainty
Band Edge& Restricted Band and Radiated Emissions& Restricted Band	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

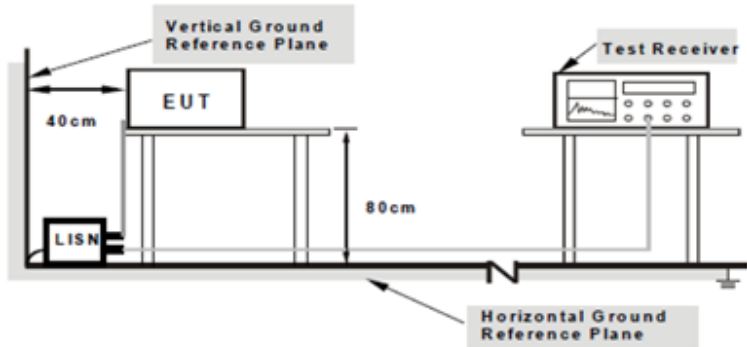
6. Measurements, Examination And Derived Results

6.1 AC Power Line Conducted Emissions

Temperature	26°C
Relative Humidity	55%
Atmospheric Pressure	1017mbar
Test date :	September 18, 2018
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable		
47CFR§15.207, RSS210 (A8.1)	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.			
		Frequency ranges (MHz)		Limit (dBµV)	
				QP	Average
		0.15 ~ 0.5		66 – 56	56 – 46
		0.5 ~ 5		56	46
5 ~ 30	60	50			

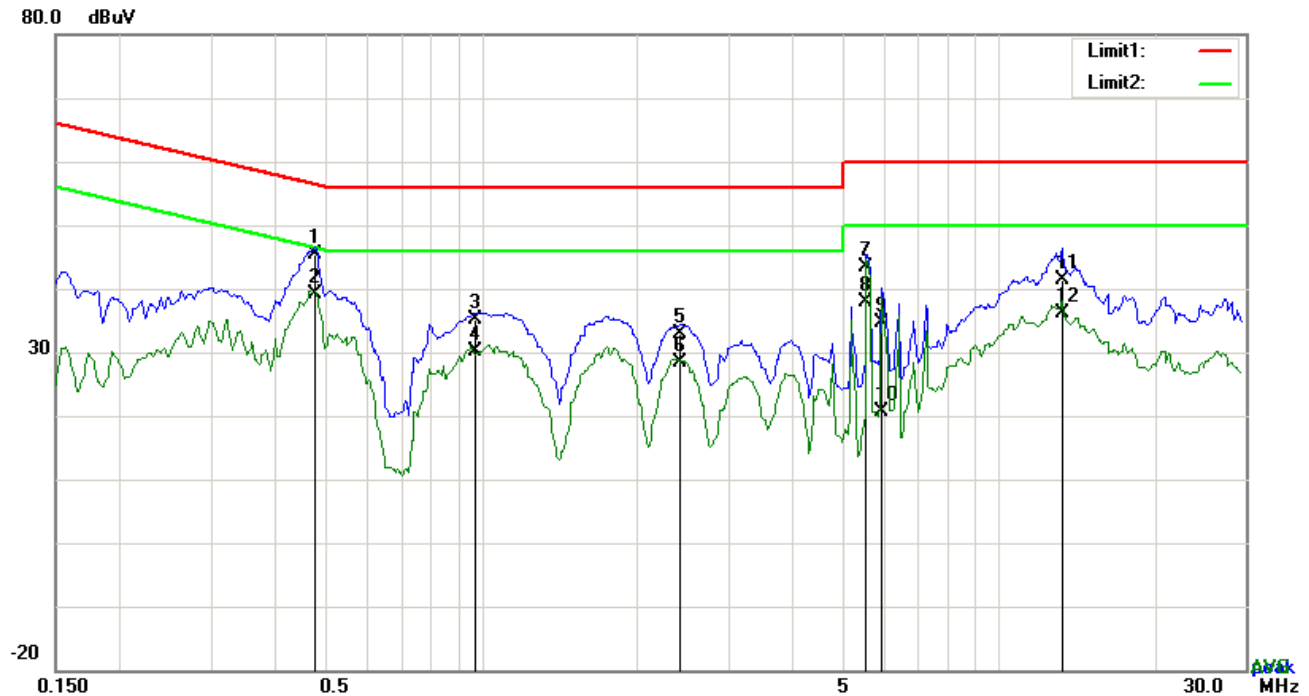
Test Setup	 Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.
------------	---

Procedure	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 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: Bluetooth Mode

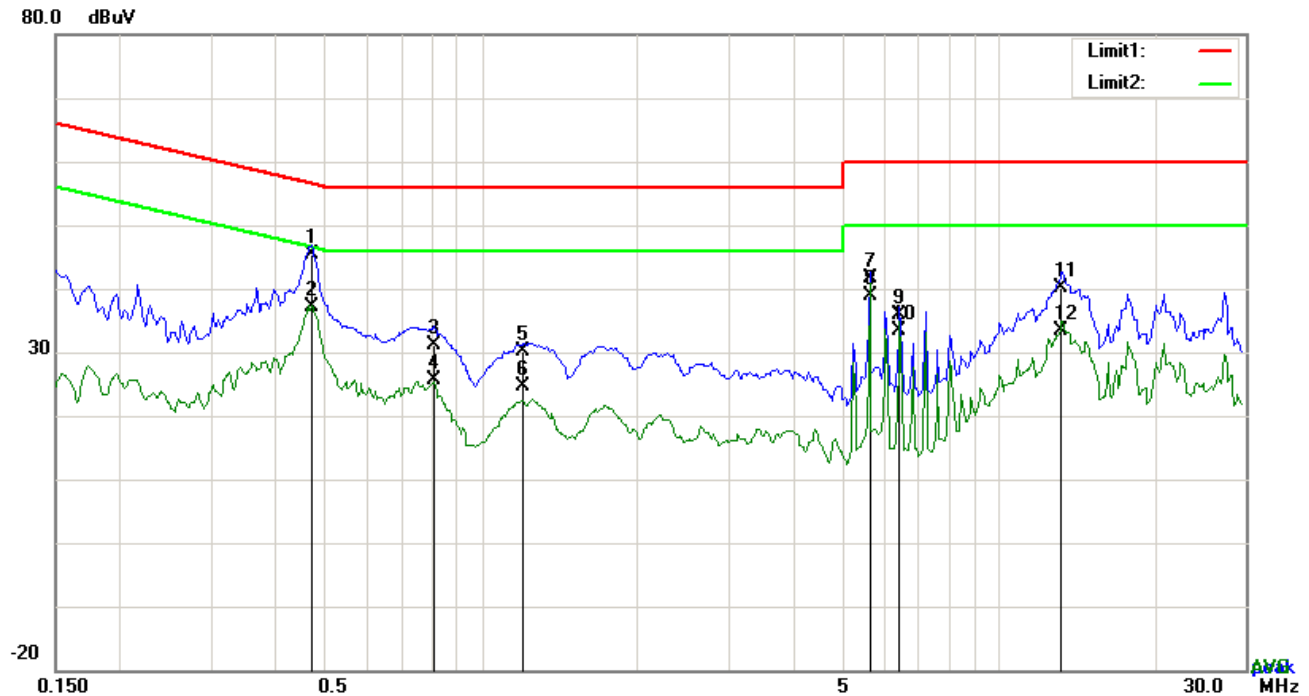


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	L1	0.4776	35.39	QP	10.03	45.42	56.38	-10.96
2	L1	0.4776	29.17	AVG	10.03	39.20	46.38	-7.18
3	L1	0.9729	25.00	QP	10.03	35.03	56.00	-20.97
4	L1	0.9729	20.14	AVG	10.03	30.17	46.00	-15.83
5	L1	2.4159	22.90	QP	10.05	32.95	56.00	-23.05
6	L1	2.4159	18.27	AVG	10.05	28.32	46.00	-17.68
7	L1	5.5623	33.17	QP	10.09	43.26	60.00	-16.74
8	L1	5.5623	27.86	AVG	10.09	37.95	50.00	-12.05
9	L1	5.9601	24.62	QP	10.09	34.71	60.00	-25.29
10	L1	5.9601	10.57	AVG	10.09	20.66	50.00	-29.34
11	L1	13.2726	31.12	QP	10.20	41.32	60.00	-18.68
12	L1	13.2726	25.84	AVG	10.20	36.04	50.00	-13.96

Test Mode: Bluetooth Mode

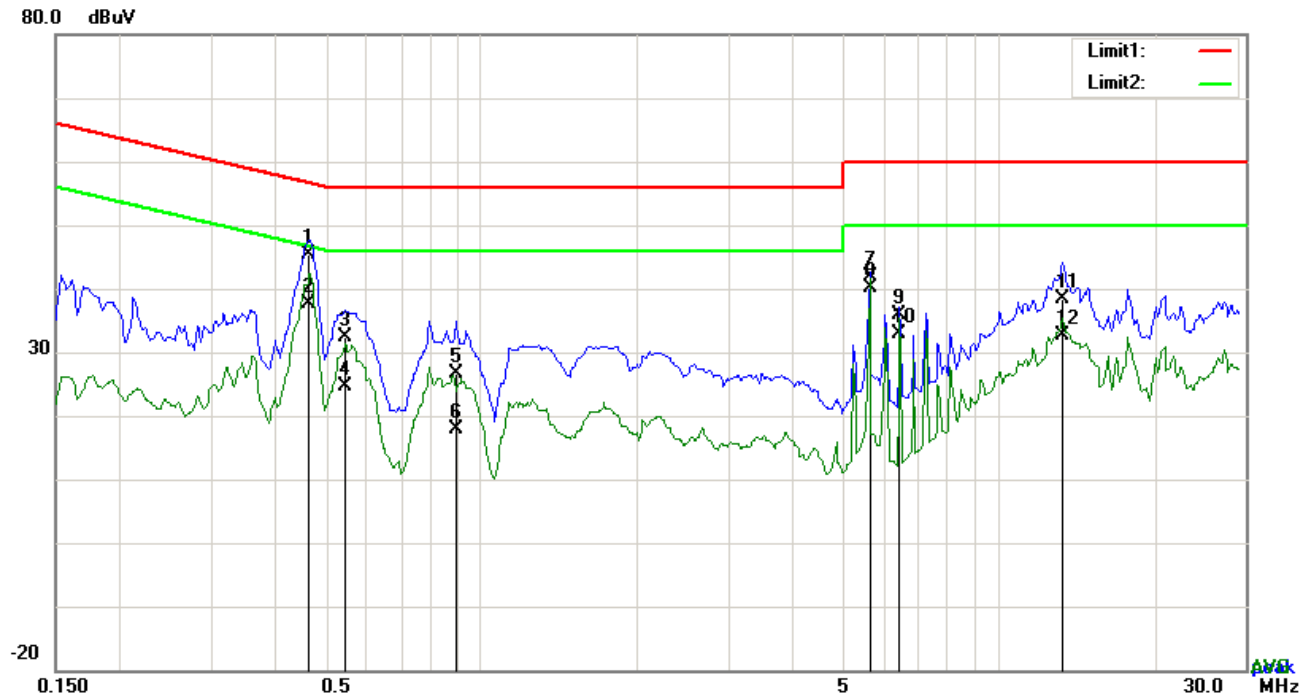


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	N	0.4698	35.27	QP	10.02	45.29	56.52	-11.23
2	N	0.4698	27.05	AVG	10.02	37.07	46.52	-9.45
3	N	0.8091	21.00	QP	10.03	31.03	56.00	-24.97
4	N	0.8091	15.51	AVG	10.03	25.54	46.00	-20.46
5	N	1.2069	19.98	QP	10.03	30.01	56.00	-25.99
6	N	1.2069	14.53	AVG	10.03	24.56	46.00	-21.44
7	N	5.6286	31.57	QP	10.08	41.65	60.00	-18.35
8	N	5.6286	28.83	AVG	10.08	38.91	50.00	-11.09
9	N	6.4320	25.71	QP	10.09	35.80	60.00	-24.20
10	N	6.4320	23.20	AVG	10.09	33.29	50.00	-16.71
11	N	13.2609	29.98	QP	10.18	40.16	60.00	-19.84
12	N	13.2609	23.11	AVG	10.18	33.29	50.00	-16.71

Test Mode: Bluetooth Mode

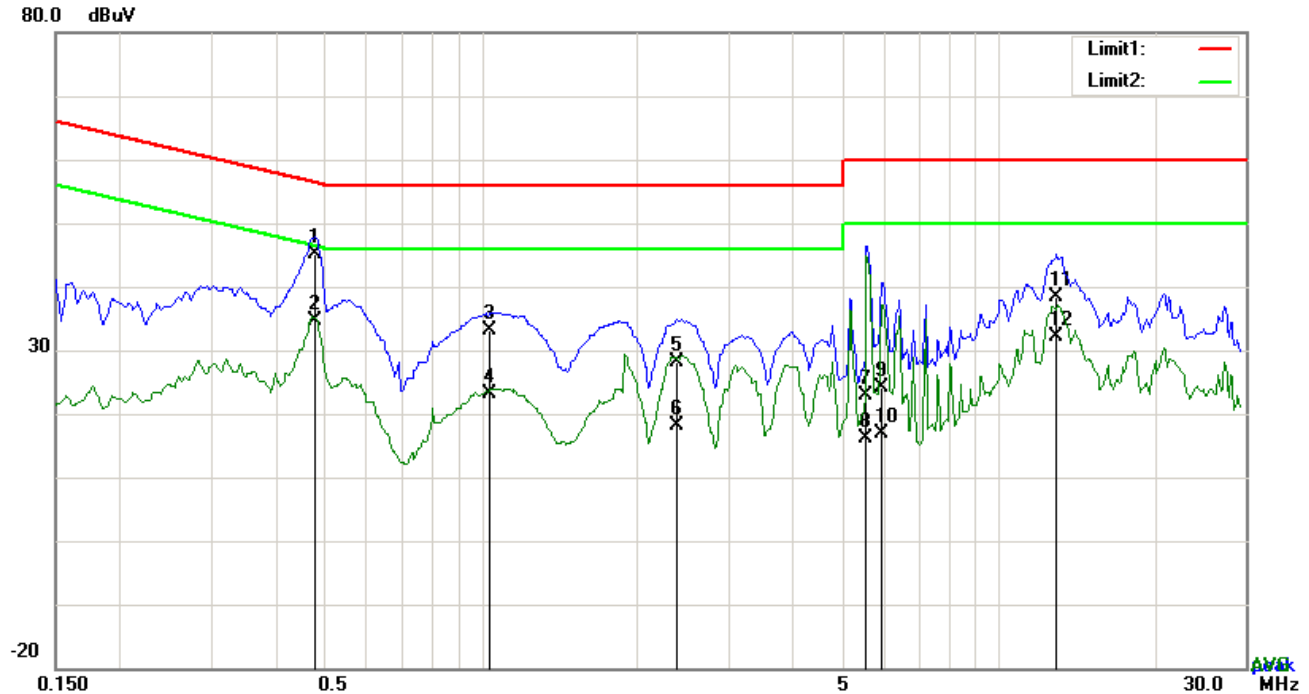


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	L1	0.4659	35.28	QP	10.03	45.31	56.59	-11.28
2	L1	0.4659	27.64	AVG	10.03	37.67	46.59	-8.92
3	L1	0.5439	22.47	QP	10.03	32.50	56.00	-23.50
4	L1	0.5439	14.71	AVG	10.03	24.74	46.00	-21.26
5	L1	0.8910	16.51	QP	10.03	26.54	56.00	-29.46
6	L1	0.8910	7.95	AVG	10.03	17.98	46.00	-28.02
7	L1	5.6325	31.88	QP	10.09	41.97	60.00	-18.03
8	L1	5.6325	29.92	AVG	10.09	40.01	50.00	-9.99
9	L1	6.4359	25.88	QP	10.10	35.98	60.00	-24.02
10	L1	6.4359	22.80	AVG	10.10	32.90	50.00	-17.10
11	L1	13.2804	28.25	QP	10.20	38.45	60.00	-21.55
12	L1	13.2804	22.43	AVG	10.20	32.63	50.00	-17.37

Test Mode: Bluetooth Mode



Test Data

Phase Neutral Plot at 240Vac, 60Hz

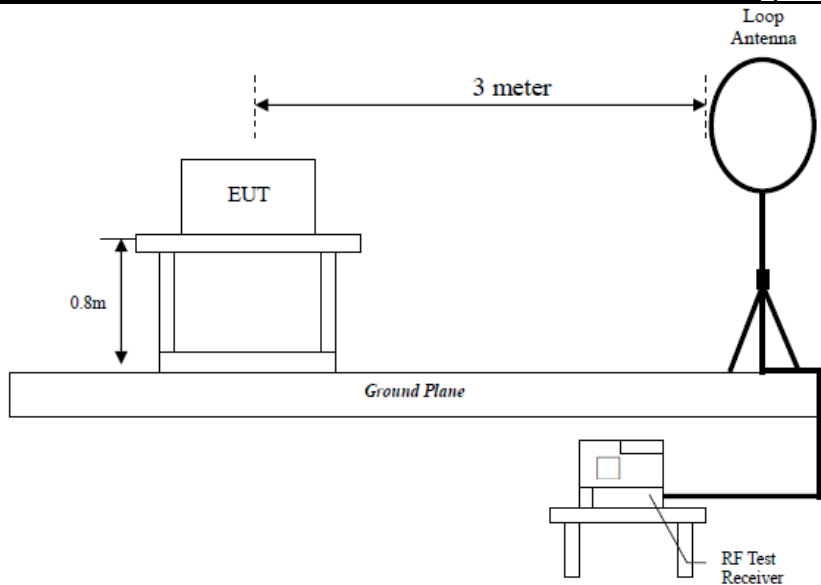
No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	N	0.4776	35.14	QP	10.02	45.16	56.38	-11.22
2	N	0.4776	24.54	AVG	10.02	34.56	46.38	-11.82
3	N	1.0392	23.20	QP	10.03	33.23	56.00	-22.77
4	N	1.0392	13.22	AVG	10.03	23.25	46.00	-22.75
5	N	2.3886	18.21	QP	10.04	28.25	56.00	-27.75
6	N	2.3886	8.11	AVG	10.04	18.15	46.00	-27.85
7	N	5.5623	12.80	QP	10.08	22.88	60.00	-37.12
8	N	5.5623	6.17	AVG	10.08	16.25	50.00	-33.75
9	N	5.9562	14.15	QP	10.08	24.23	60.00	-35.77
10	N	5.9562	6.89	AVG	10.08	16.97	50.00	-33.03
11	N	12.9840	28.19	QP	10.18	38.37	60.00	-21.63
12	N	12.9840	21.84	AVG	10.18	32.02	50.00	-17.98

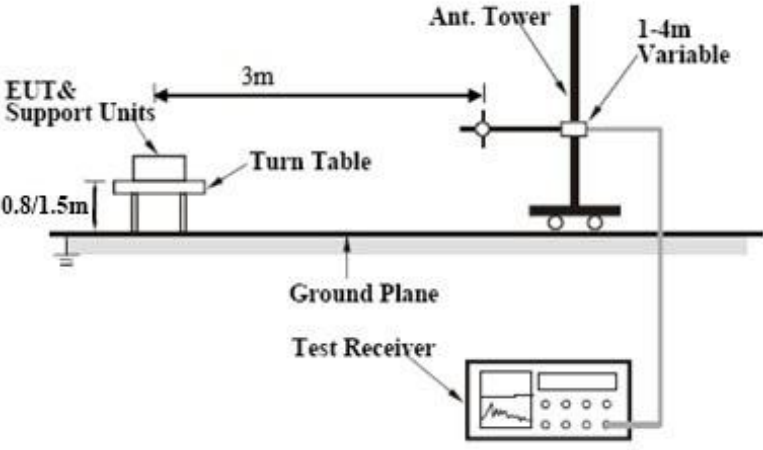
6.2 Radiated Emissions & Restricted Band

Temperature	26°C
Relative Humidity	55%
Atmospheric Pressure	1017mbar
Test date :	September 18, 2018
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable																
47CFR§15.205, §15.209, §15.247(d)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges	☒																
		<table><tr><th>Frequency range (MHz)</th><th>Field Strength (µV/m)</th></tr><tr><td>0.009~0.490</td><td>2400/F(KHz)</td></tr><tr><td>0.490~1.705</td><td>24000/F(KHz)</td></tr><tr><td>1.705~30.0</td><td>30</td></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)	0.009~0.490	2400/F(KHz)	0.490~1.705	24000/F(KHz)	1.705~30.0	30	30 – 88	100	88 – 216	150	216 960	200	Above 960	500
		Frequency range (MHz)		Field Strength (µV/m)															
		0.009~0.490		2400/F(KHz)															
		0.490~1.705		24000/F(KHz)															
		1.705~30.0		30															
		30 – 88		100															
		88 – 216		150															
		216 960		200															
Above 960	500																		

Test Setup	 The diagram illustrates the test setup for radiated emissions. It shows an Equipment Under Test (EUT) placed on a stand that is 0.8 meters high. A Loop Antenna is positioned 3 meters away from the EUT. The entire setup is on a Ground Plane. An RF Test Receiver is connected to the antenna.
------------	---

	
Procedure	- 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: - 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	
Result	☒ Pass ☐ Fail

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Result:

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

Frequency range: 9KHz - 30MHz

Freq.	Detection	Factor	Reading	Result	Limit@3m	Margin
(MHz)	value	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
--	--	--	--	--	--	>20
--	--	--	--	--	--	>20

Note:

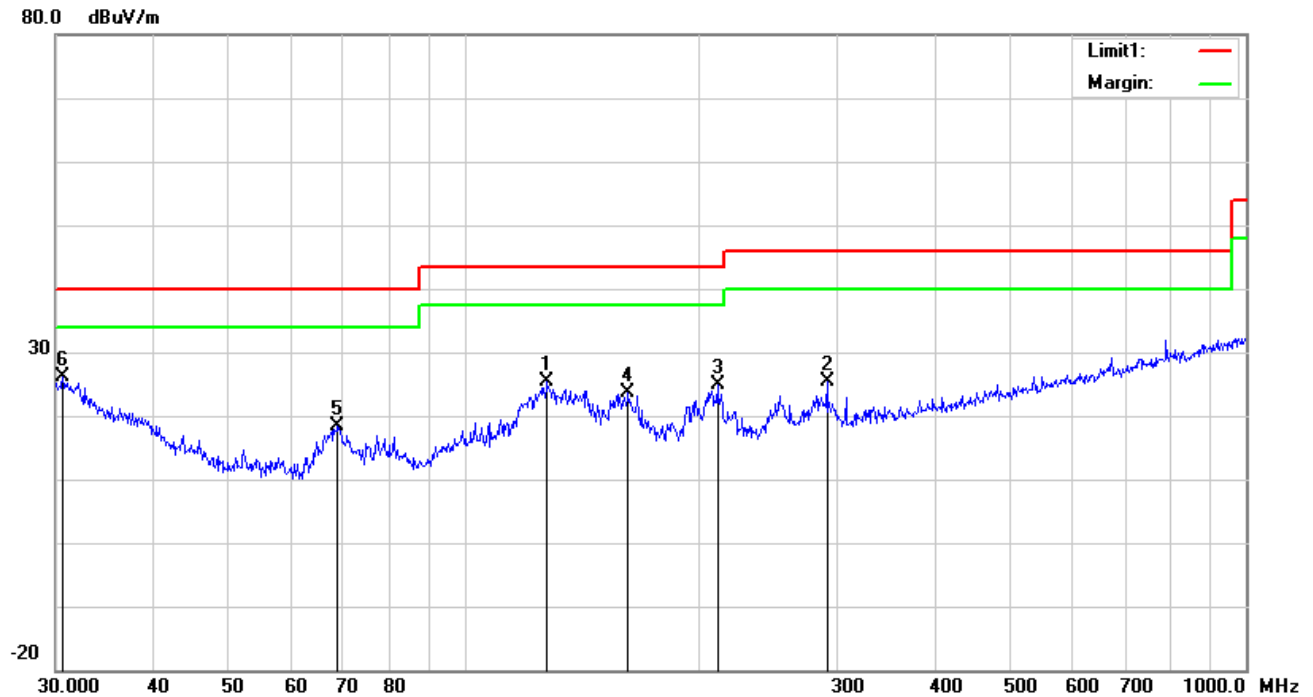
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

Test Mode: Bluetooth Mode

30MHz -1GHz



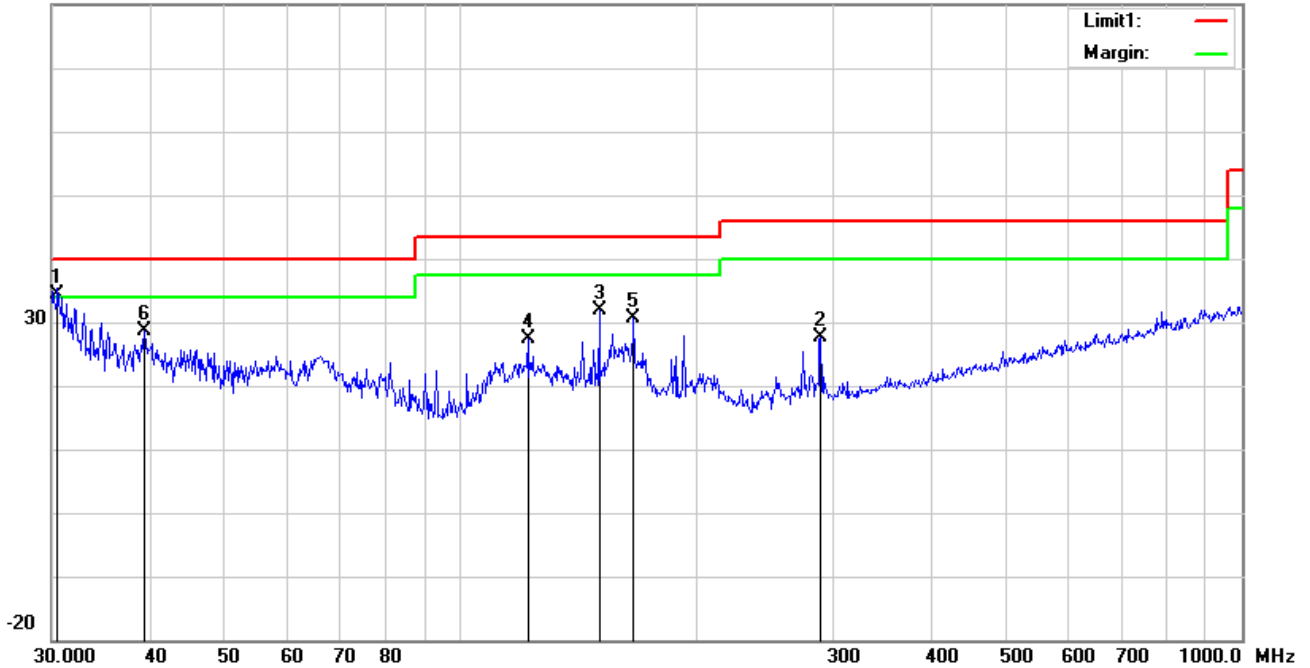
Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	H	127.6645	33.27	13.40	22.38	1.19	25.48	43.50	-18.02	100	226
2	H	291.0360	32.57	13.21	22.29	1.77	25.26	46.00	-20.74	200	122
3	H	210.7860	33.66	11.95	22.36	1.57	24.82	43.50	-18.68	100	259
4	H	162.0414	32.10	12.44	22.27	1.38	23.65	43.50	-19.85	100	299
5	H	68.8721	32.00	7.74	22.38	0.96	18.32	40.00	-21.68	100	55
6	H	30.6379	26.75	20.91	22.28	0.64	26.02	40.00	-13.98	100	107

30MHz -1GHz

80.0 dBuV/m



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	()
1	V	30.5306	34.94	20.99	22.28	0.63	34.28	40.00	-5.72	100	246
2	V	289.0021	35.09	13.12	22.29	1.77	27.69	46.00	-18.31	100	73
3	V	150.5378	40.33	12.60	22.34	1.34	31.93	43.50	-11.57	100	286
4	V	121.9755	34.89	13.77	22.36	1.17	27.47	43.50	-16.03	100	113
5	V	166.6514	39.41	12.07	22.26	1.37	30.59	43.50	-12.91	100	84
6	V	39.4372	35.76	14.31	22.28	0.79	28.58	40.00	-11.42	100	344

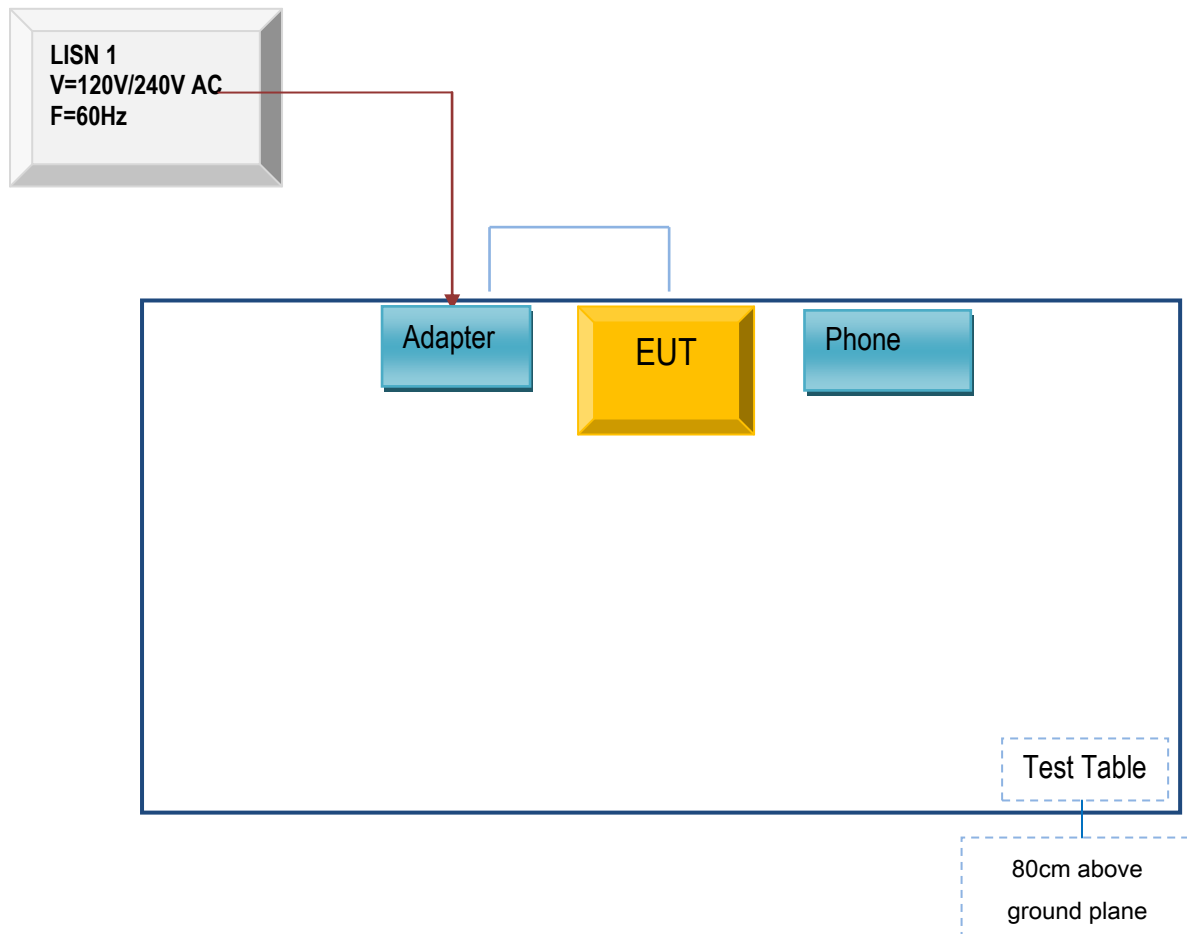
Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted					
EMI test receiver	ESCS30	8471241027	09/14/2018	09/13/2019	☒
Line Impedance	LI-125A	191106	09/23/2017	09/22/2018	☒
Line Impedance	LI-125A	191107	09/23/2017	09/22/2018	☒
ISN	ISN T800	34373	09/23/2017	09/22/2018	☐
Transient Limiter	LIT-153	531118	08/29/2018	08/28/2019	☐
Radiated Emissions					
EMI test receiver	ESL6	100262	09/14/2018	09/13/2019	☒
Positioning Controller	UC3000	MF780208282	11/17/2017	11/16/2018	☒
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/29/2018	08/28/2019	☒
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/22/2018	03/21/2019	☒
Horn Antenna	BBHA9170	3145226D1	09/27/2017	09/26/2018	☒
Active Antenna (9kHz-30MHz)	AL-130	121031	10/12/2017	10/11/2018	☒
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/18/2018	09/17/2019	☒
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/22/2017	09/21/2018	☒
Universal Radio Communication Tester	CMU200	121393	09/23/2017	09/22/2018	☒

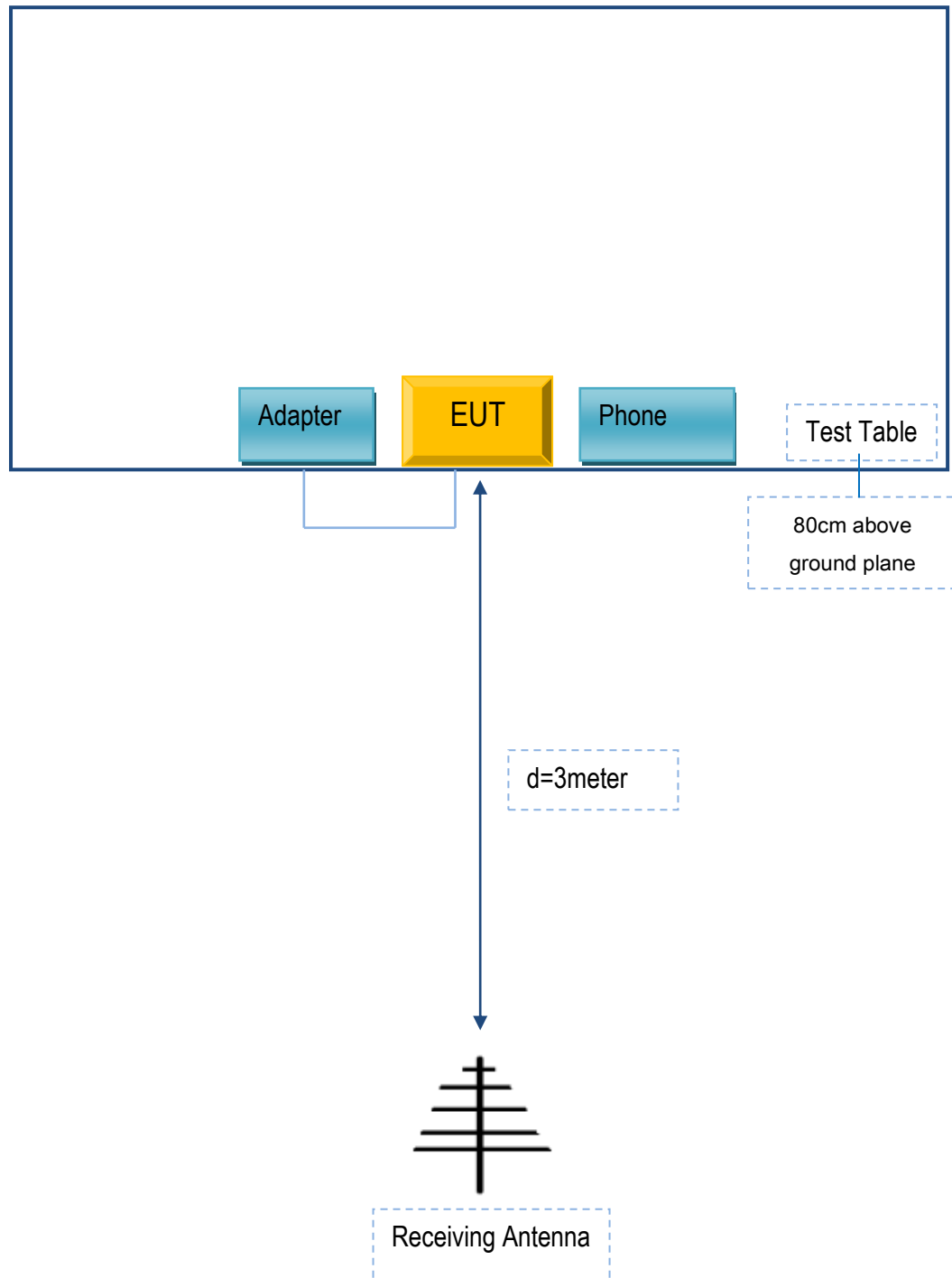
Annex B. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

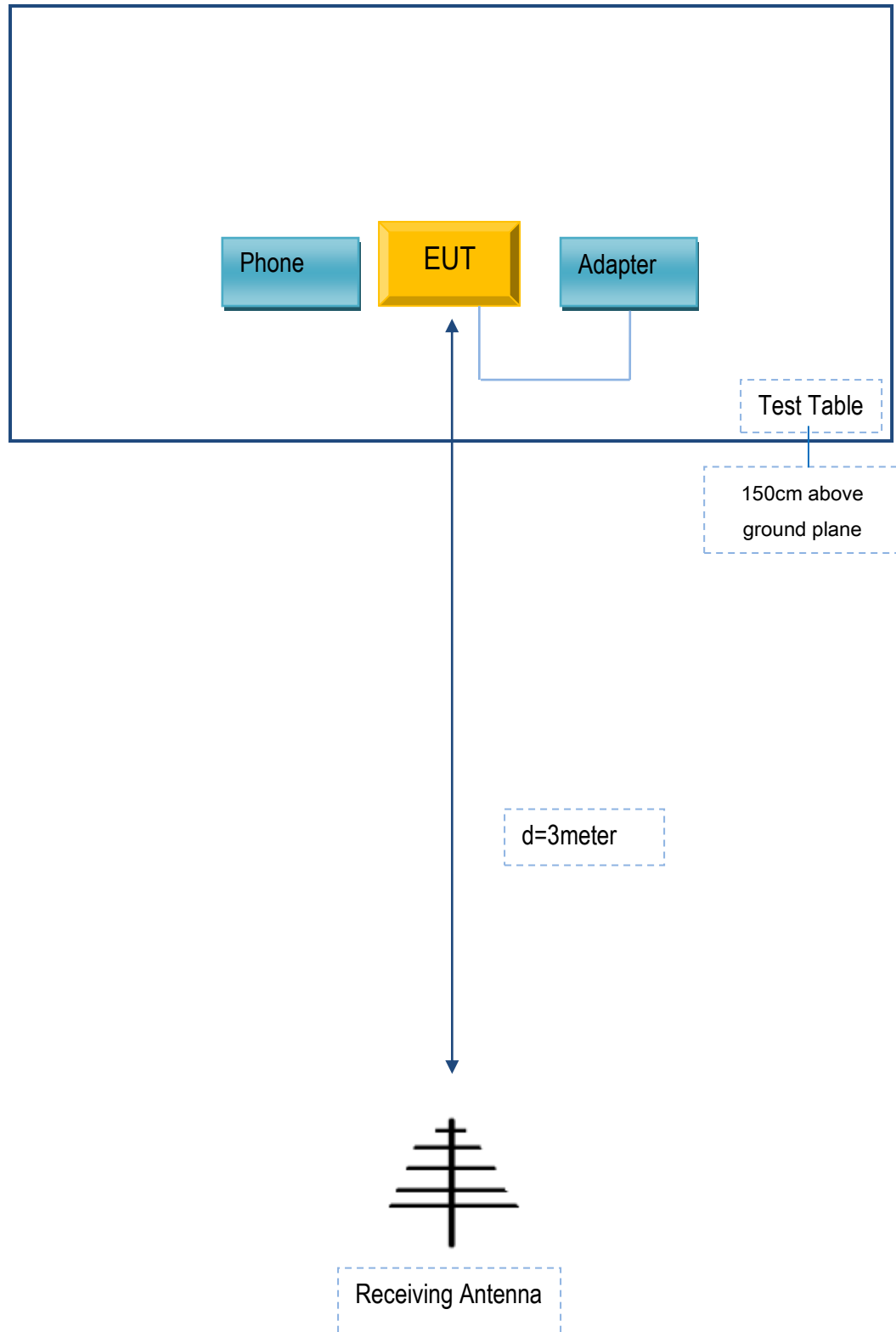
Block Configuration Diagram for AC Line Conducted Emissions



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
ShenZhen Teng Da Xing Electron Co.,Ltd	Adapter	TDX-2402500	N/A

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
Power Cable	Un-shielding	No	0.8m	N/A

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

Please see the attachment

Annex D. DECLARATION OF SIMILARITY

DECLARATION

We, Ningbo Lumiaudio Electronic Technology LTD here by declare that product Bluetooth Ceiling Speaker, models FLC-6BT-DC FLC-6BTS-DC FLE-6BT FLE-6BTS FLE-6BT-DC FLE-6BTS-DC are electrically identical with the model FLC-6BT FLC-6BTS (FCC ID 2AKKHFLC) which was tested by SIEMIC with the same electromagnetic emissions and electromagnetic compatibility characteristics.

The detail differences description as below

They are same products just have a little bit difference, such as one more feature is added to the speaker which is Daisy Chian, or there is one more passive speaker to constitutes a suit.

Signature

Printed name

Title:

