REPORT No. : SZ16030119E02

FCC TEST REPORT

APPLICANT	:	Shenzhen Renqing Technology Co., Ltd
PRODUCT NAME	:	Mulite S Bluetooth Speaker
MODEL NAME	:	RAU0514
TRADE NAME	:	ROCK
BRAND NAME	:	ROCK
FCC ID		2ADYI-RAU0514
STANDARD(S)	:	47 CFR Part 15 Subpart B
TEST DATE	:	2016-06-07 to 2016-06-29
ISSUE DATE	:	2016-06-30

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	2016-06-30	First edition

Test Report Declaration

Applicant	Shenzhen Renqing Technology Co., Ltd
Applicant Address	3/F, Block A7 Nanshan iPark, NO.1001 Xueyuan Road, Nanshan District, Shenzhen
Manufacturer	Shenzhen Highstar Electrical Co., Ltd
Manufacturer Address	2F&4F, Building 6, Highstar Industrial zone, Gangtou, BantianStreet, LonggangDistrict, ShenZhen
Product Name	Mulite S Bluetooth Speaker
Model Name	RAU0514
Brand Name	ROCK
HW Version	V2.0
SW Version	V1.2
Test Standards	47 CFR Part 15 Subpart B
Test Result	PASS

Tested by : Qin Weida

Qin Weida (Test Engineer)

Reviewed by : Xiao Xiong

Xiao Xiong (EMC Manager)

Approved by : Zeng Dexin

Zeng Dexin (Chief Engineer)

1. Technical Information

Note: Provided by applicant

1.1. Applicant Information

Company: Shenzhen Renqing Technology Co., Ltd
Address: 3/F, Block A7 Nanshan iPark, NO.1001 Xueyuan Road, Nanshan District, Shenzhen

1.2. Equipment under Test (EUT) Description

EUT Type:	Mulite S Bluetooth Speaker
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	V2.0
Software Version:	V1.2

Power supply:	**Battery**	
	Brand Name:	Vikli
	Model No.:	PL872530-600mAh
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	600mAh
	Rated Voltage:	3.7V
	Charge Limit:	4.2V

NOTE:

1. The EUT is a Mulite S Bluetooth Speaker which supports ISM 2.4GHz Bluetooth band.The EUT is equipped with a Micro-B USB input port for charging itself when it is connected with other device, an USB output port for charging other device.
2. For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.

2. Test Results

2.1. Applied Reference Documents

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart B:

No.	Identity	Document Title
1	47 CFR Part 15(June 14, 2016 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Result
1	15.107	Conducted Emission	2016.06.18	PASS
2	15.109	Radiated Emission	2016.06.18	PASS

NOTE: The tests were performed according to the method of measurements prescribed in ANSI C63.4-2014.

3. Test Conditions Setting

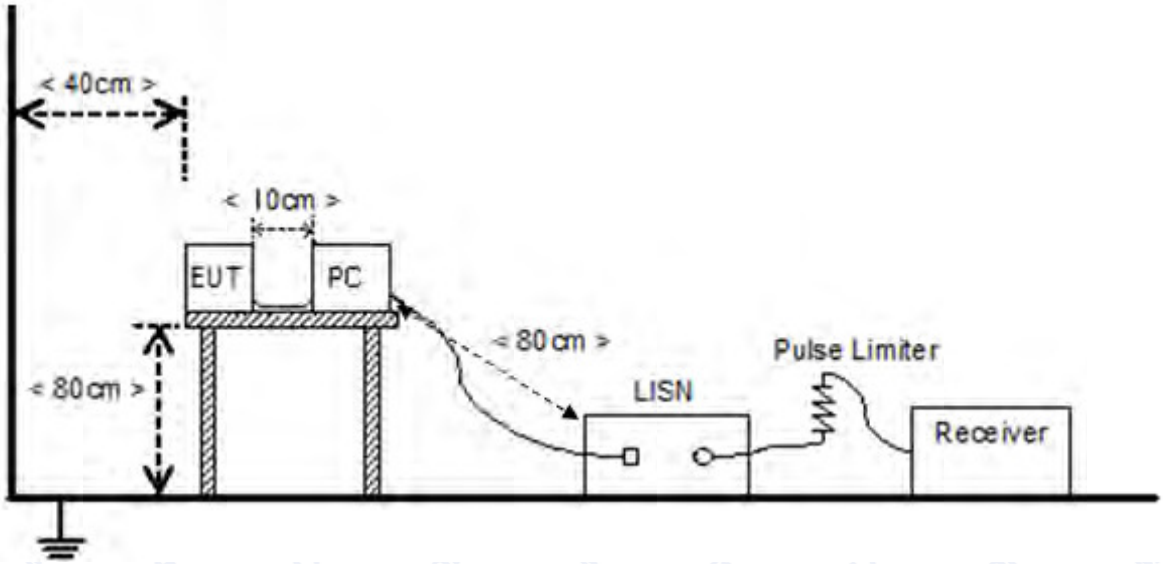
3.1. Test Mode

1	**The first test mode(Micro-B USB)**
	The EUT configuration of the emission tests is EUT + Battery+ PC. During the measurement, the EUT was connected with a PC and kept charging by the PC, open the LED light of EUT, the EUT was working normally as an intentional device.
2	**The second test mode(USB output)**
	The EUT configuration of the emission tests is EUT + Battery + Phone. The EUT was charged fully before the test. During the test, the EUT was connected with a phone via the USB output port, the EUT was kept Max output current and working normally.
3	**The third test mode (AUX IN)**
	The EUT configuration of the emission tests is EUT + Battery + PC. In this test mode, the EUT was connected to a PC via the AUX IN port. During the measurement, the EUT was kept working normally as an audio device.
NOTE: All test modes are performed in radiated emission test, only the worst case(Micro-B USB) is recorded in this report. The conducted emission is only applied to the first mode.	

3.2. Test Setup and Equipments List

3.2.1. Conducted Emission

A. Test Setup:



The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.

The power strip or extension cord has been investigated to make sure that the LISN integrity in maintained with respect to the impedance characteristics as prescribed in ANSI C63.4-2014 at Clause 4.3.

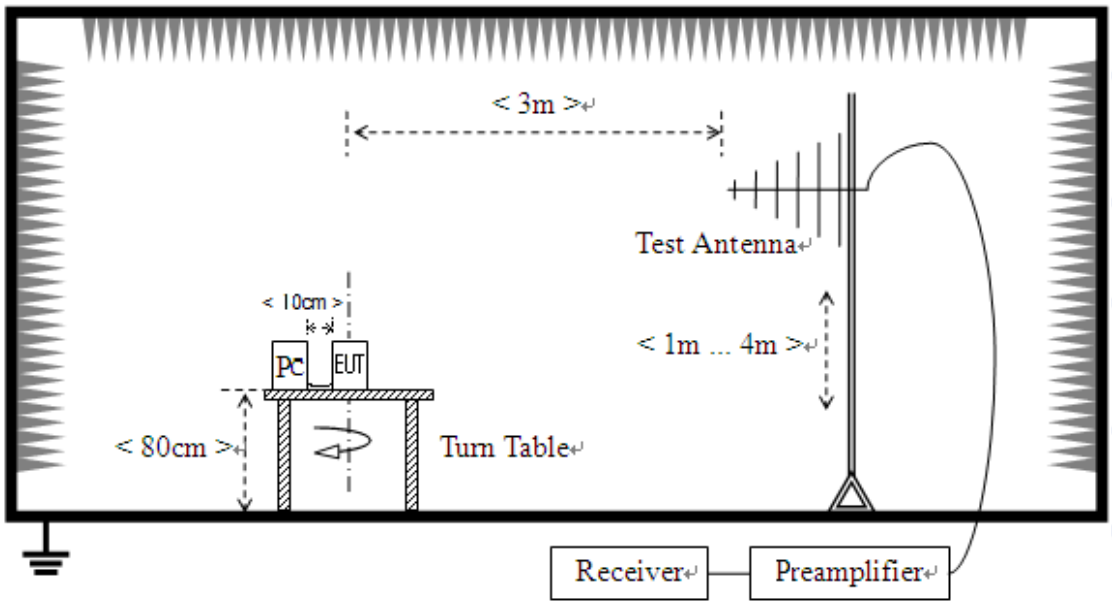
B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
Receiver	Narda	PMM 9060	001WX11001	2015.11.26	2016.11.25
Receiver	Narda	PMM 9010	595WX11007	2016.01.13	2017.01.12
LISN	Schwarzbeck	NSLK 8127	812744	2016.01.13	2017.01.12
Pulse Limiter (20dB)	Schwarzbeck	VTSD 9561-D	9391	2016.01.13	2017.01.12
PC	Apple	A1370	C02FQ2PYDDQW	N/A	N/A

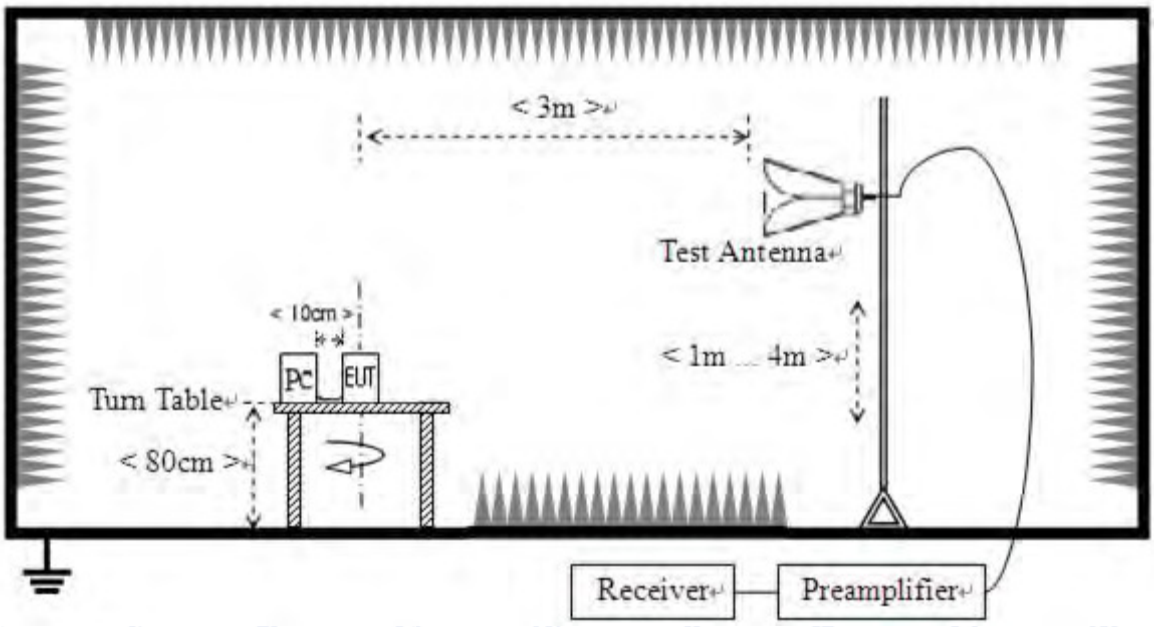
3.2.2. Radiated Emission

A. Test Setup:

1. For radiated emissions from 30MHz to1GHz



2. For radiated emissions above 1GHz



The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
MXE EMI Receiver	Agilent	N9038A	MY54130016	2016.01.13	2017.01.12
Semi-Anechoic Chamber	Albatross	9m*6m*6m	N/A	2016.01.13	2017.01.12
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2016.01.13	2017.01.12
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	9120D-963	2016.01.13	2017.01.12
PC	Apple	A1370	C02FQ2PYDDQW	N/A	N/A

4. 47 CFR Part 15B Requirements

4.1. Conducted Emission

4.1.1. Requirement

According to FCC section 15.107, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

a) The limit subjects to the Class B digital device.

b) The lower limit shall apply at the band edges.

c) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

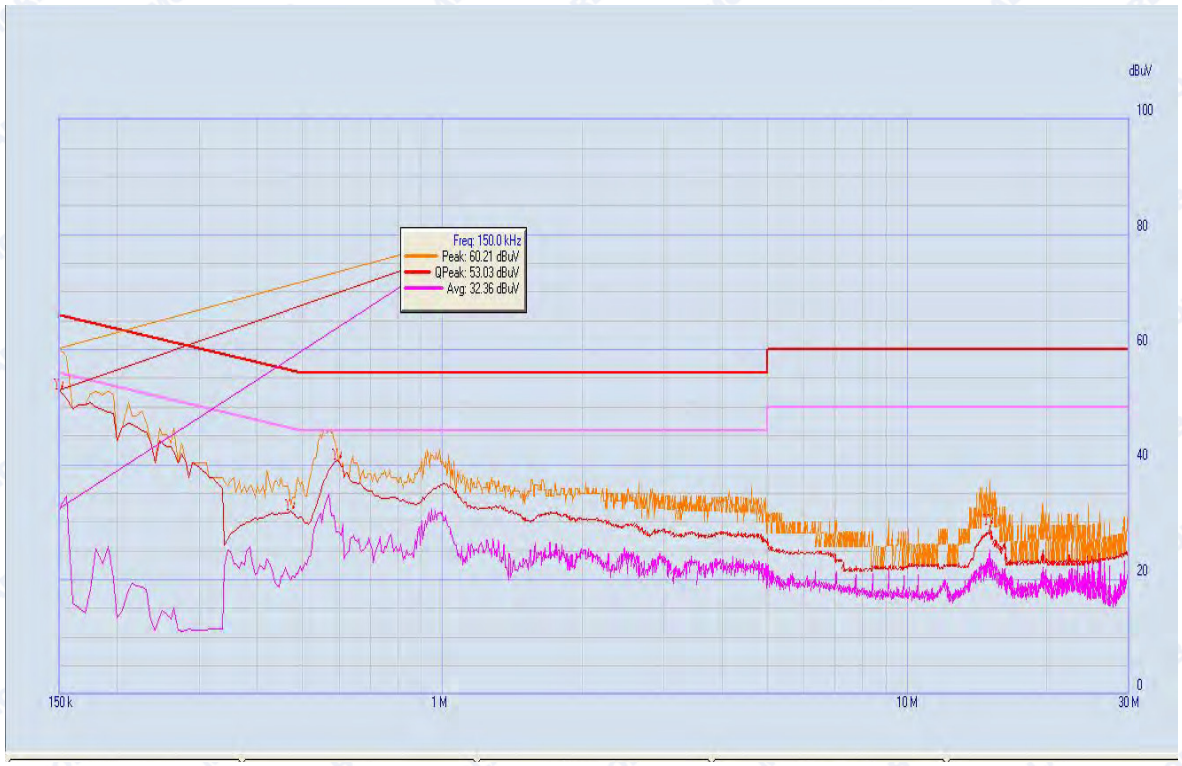
4.1.2. Test Description

See section 3.2.1 of this report.

4.1.3. Test Result

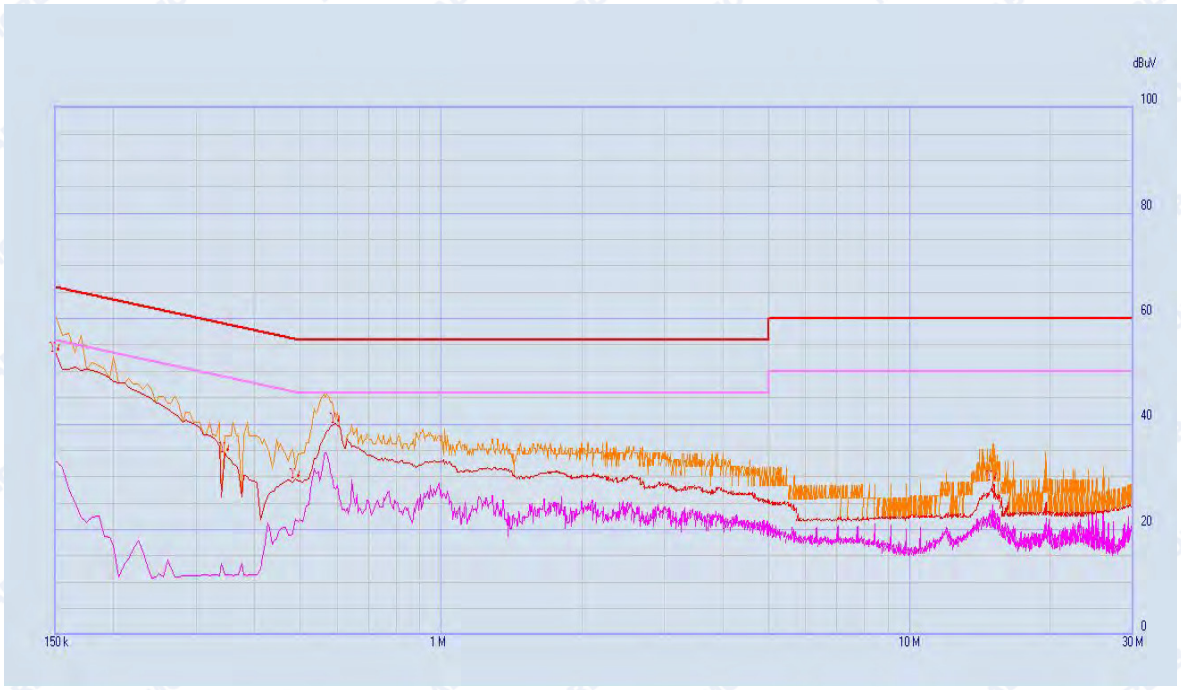
The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. All test modes are considered, refer to recorded points and plots below.

A. Test Plot and Suspicious Points:



(Plot A: L Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.15	53.03	32.36	66.00	56.00	Line	PASS
2	0.29	40.32	11.19	62.00	52.00		PASS
3	0.47	31.97	19.92	56.86	46.86		PASS
4	0.595	40.67	28.38	56.00	46.00		PASS
5	1.02	36.74	29.82	56.00	46.00		PASS
6	14.97	28.57	22.70	60.00	50.00		PASS



(Plot B: N Phase)

NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.15	57.83	36.64	66.00	56.00	Neutral	PASS
2	0.205	53.76	37.14	64.43	54.43		PASS
3	0.375	40.33	35.65	59.57	49.57		PASS
4	0.47	35.58	37.90	56.86	46.86		PASS
5	0.63	40.03	35.20	56.00	46.00		PASS
6	1.085	35.36	37.37	56.00	46.00		PASS

Test Result: PASS

4.2. Radiated Emission

4.2.1. Requirement

According to FCC section 15.109(a), the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency range (MHz)	Field Strength Limitation at 3m Measurement Dist	
	(μV/m)	(dBμV/m)
30.0 - 88.0	100	20log 100
88.0 - 216.0	150	20log 150
216.0 - 960.0	200	20log 200
Above 960.0	500	20log 500

As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

Note:

1) The tighter limit shall apply at the boundary between two frequency range.
2) Limitation expressed in dBμV/m is calculated by 20log Emission Level(μV/m).
3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of $Ld1 = Ld2 * (d2/d1)^{2.}$
   Example:
   F.S Limit at 30m distance is 30μV/m, then F.S Limitation at 3m distance is adjusted as
   $Ld1 = L1 = 30\mu V/m * (10)^2 = 100 * 30\mu V/m$

4.2.2. Test Description

See section 3.2.2 of this report.

4.2.3. Frequency range of measurement

According to 15.33(b)(1), the frequency range of radiated measurement for the EUT is listed in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705–108	1000.
108–500	2000.
500–1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

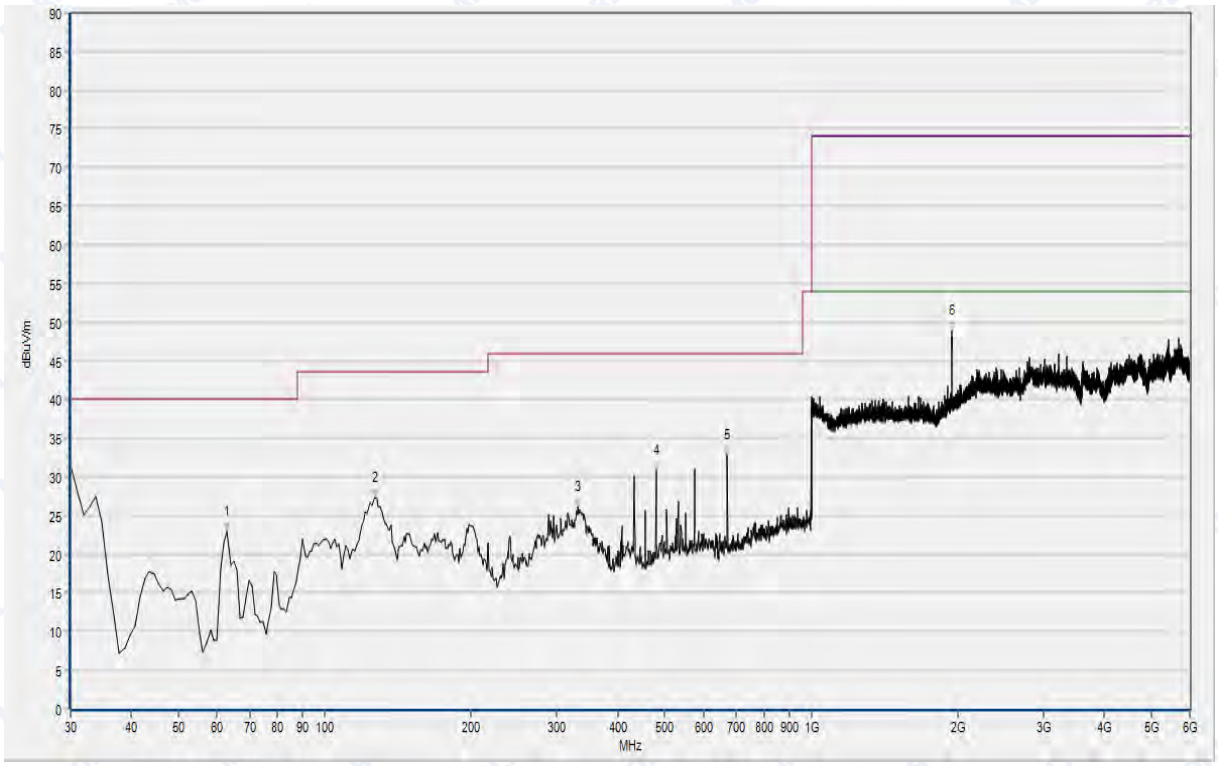
4.2.4. Test Result

The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

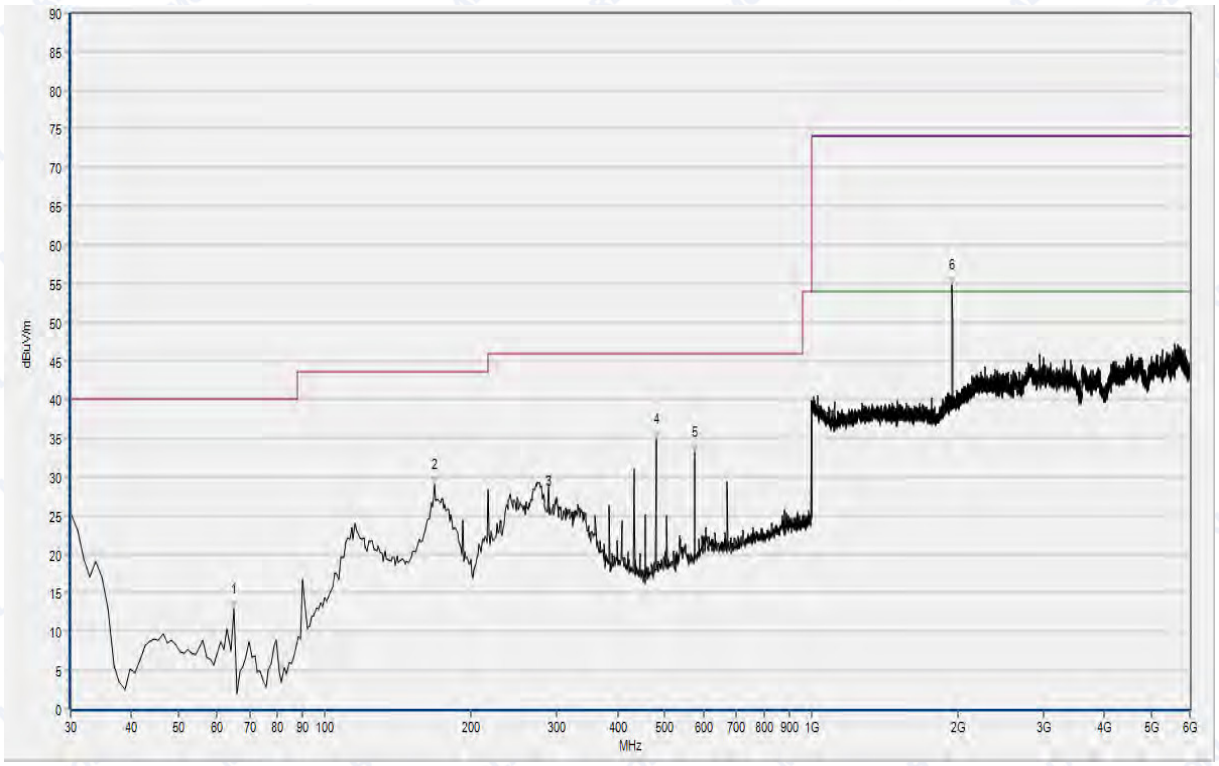
Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.

A. Test Plots and Suspicious Points:



(Plot A: 30MHz – 6GHz, Test Antenna Vertical)

No.	Fre. MHz	Pk dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	62.980	N.A.	23.01	N.A.	N.A.	40.00	N.A.	V	PASS
2	127.000	N.A.	27.28	N.A.	N.A.	43.50	N.A.	V	PASS
3	331.670	N.A.	26.08	N.A.	N.A.	46.00	N.A.	V	PASS
4	480.080	N.A.	30.76	N.A.	N.A.	46.00	N.A.	V	PASS
5	672.140	N.A.	32.89	N.A.	N.A.	46.00	N.A.	V	PASS
6	1942.400	49.00	N.A.	42.13	74.00	N.A.	54.00	V	PASS



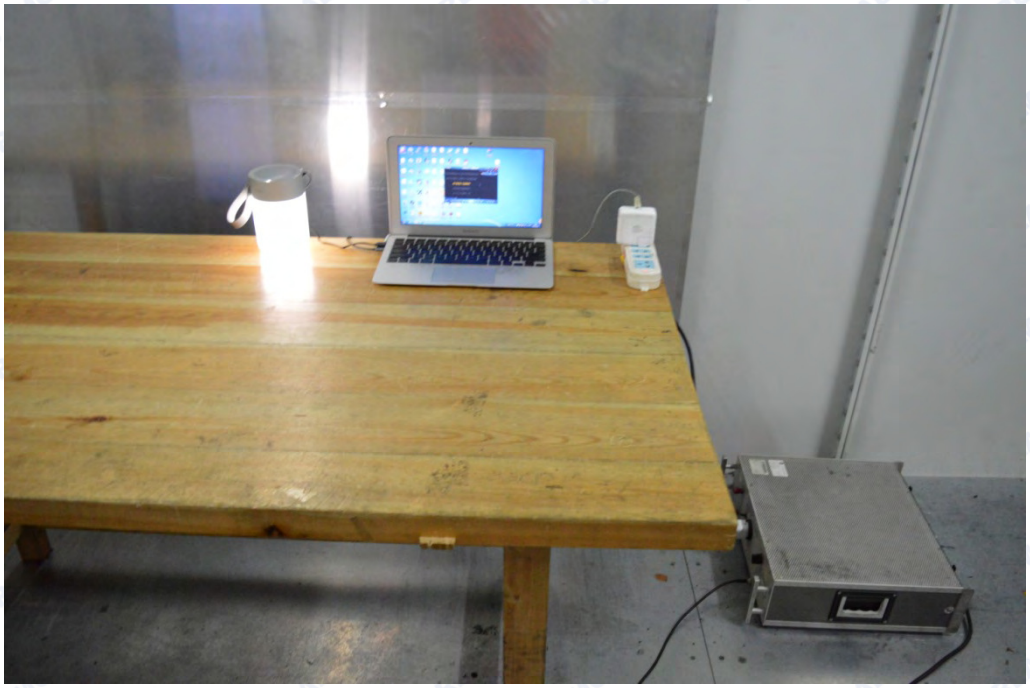
(Plot B: 30MHz – 6GHz, Test Antenna Horizontal)

No.	Fre. MHz	Pk dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	64.920	N.A.	12.89	N.A.	N.A.	40.00	N.A.	H	PASS
2	167.740	N.A.	28.96	N.A.	N.A.	43.50	N.A.	H	PASS
3	288.020	N.A.	29.23	N.A.	N.A.	46.00	N.A.	H	PASS
4	480.080	N.A.	34.90	N.A.	N.A.	46.00	N.A.	H	PASS
5	576.110	N.A.	33.24	N.A.	N.A.	46.00	N.A.	H	PASS
6	1948.267	54.86	N.A.	46.78	74.00	N.A.	54.00	H	PASS

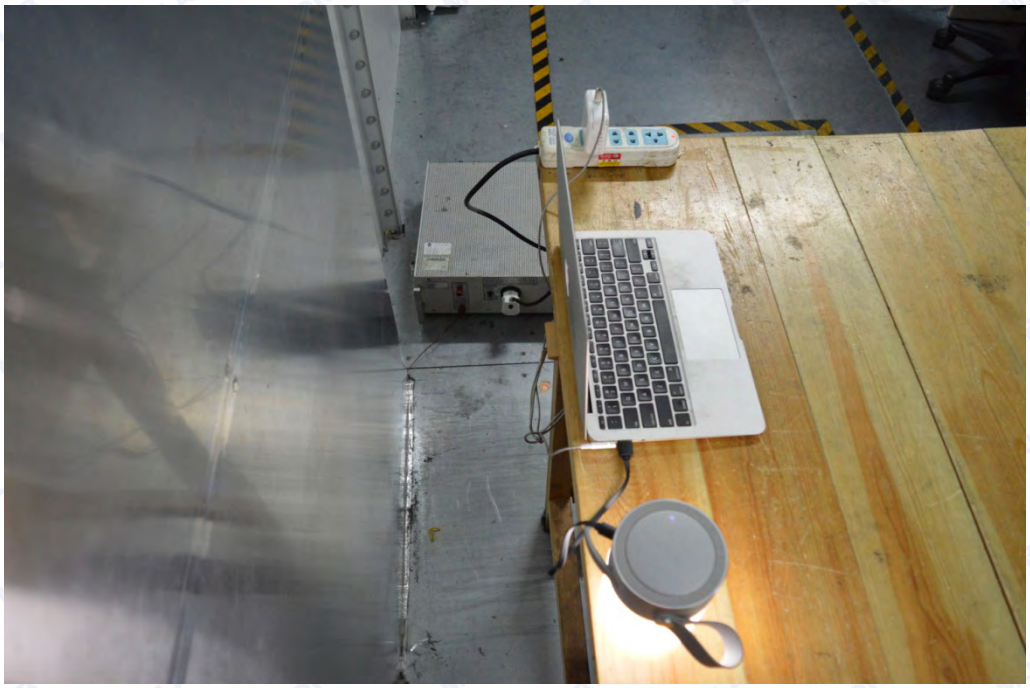
Test Result: PASS

Annex A Photographs of Test Setup

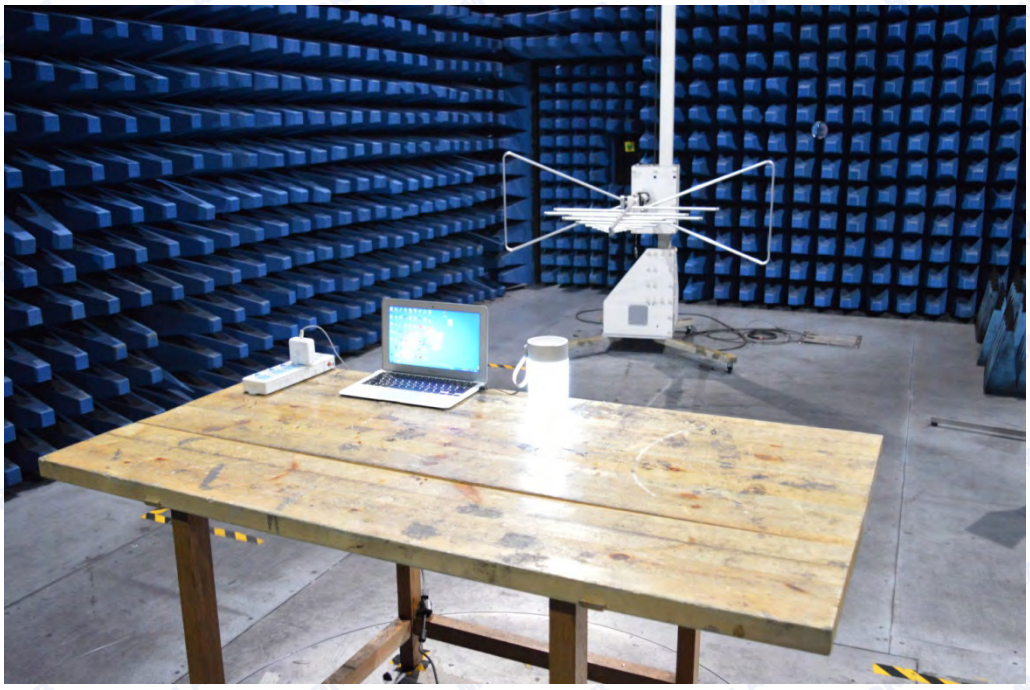
1. Conducted emission main's port front view



2. Conducted emission main's port side view



3. Radiated emission (30MHz-1GHz)



4. Radiated emission (above 1GHz)

Annex B Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission:	±1.8dB
Uncertainty of Radiated Emission:	±3.1dB

Annex C Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Responsible Test Lab Manager:	Mr. Su Feng
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Accreditation Certificate

Accredited Testing Laboratory: The FCC registration number is 695796.
(Shenzhen Morlab Communications Technology Co., Ltd.)

4. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 - 60
Atmospheric Pressure (kPa):	86 - 106

***** END OF REPORT *****