REPORT No. : SZ16070055E01

FCC TEST REPORT

APPLICANT	:	Shenzhen Liown Electronics Co., Ltd.
PRODUCT NAME	:	LightLi App Connection Card
MODEL NAME	:	10014,10015,10016,10017,10018,10019,10020
TRADE NAME	:	LightLi
BRAND NAME	:	LightLi
FCC ID	:	2AI66LIGHTLI
STANDARD(S)	:	47 CFR Part 15 Subpart B
TEST DATE	:	2016-07-07 to 2016-07-28
ISSUE DATE	:	2016-07-29

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

MORLAB GROUP
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DIRECTORY

Test Report Declaration

Applicant	Shenzhen Liown Electronics Co., Ltd.
Applicant Address	Room 301, No. 7, Gongye 3rd Road, Shekou, Nanshan District, Shenzhen
Manufacturer	Shenzhen Liown Electronics Co., Ltd.
Manufacturer Address	Room 301, No. 7, Gongye 3rd Road, Shekou, Nanshan District, Shenzhen
Product Name	LightLi App Connection Card
Model Name	10014,10015,10016,10017,10018,10019,10020
Brand Name	LightLi
HW Version	A0
SW Version	A0
Test Standards	47 CFR Part 15 Subpart B
Test Result	PASS

Tested by : Peng Shiqing
Peng Shiqing(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 Liown Electronics Co., Ltd.
Address： Room 301, No. 7, Gongye 3rd Road, Shekou, Nanshan District, Shenzhen

1.2. Equipment under Test (EUT) Description

EUT Type:	LightLi App Connection Card
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	A0
Software Version:	A0
Rated Voltage:	N/A
Rated Current:	N/A

NOTE:

1. The LIGHTLi and battery are supplied by applicant for test purpose.
2. The EUT is a LightLi App Connection Card which supports ISM 2.4GHz Bluetooth band.
3. 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(July 27, 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	N/A	N/A
2	15.109	Radiated Emission	2016.07.25	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

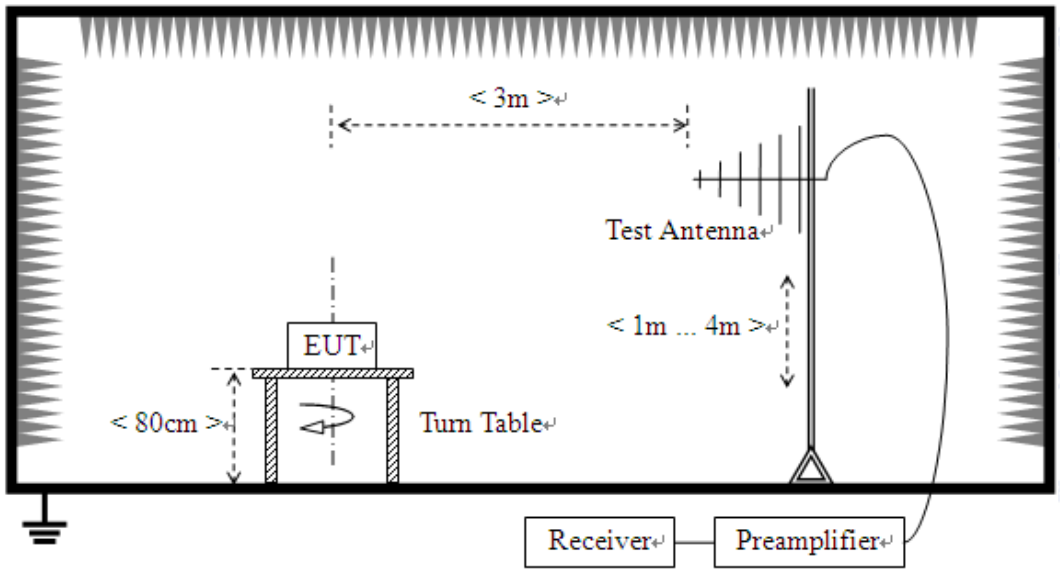
The EUT configuration of the emission tests is EUT + Battery + LIGHTLi. During the measurement, the EUT was connected with a LIGHTLi powered by the batteries, the EUT was kept normal work until test end.

3.2. Test Setup and Equipments List

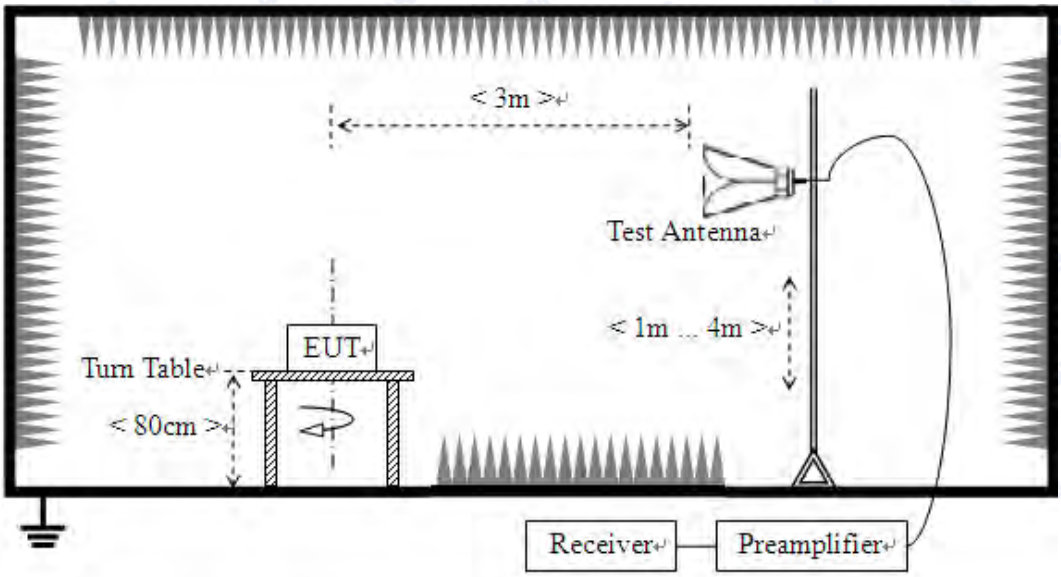
3.2.1 Radiated Emission

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

4. 47 CFR Part 15B Requirements

4.1. Radiated Emission

4.1.1. 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
   $Ld1 = L1 = 30\mu V/m * (10)^2 = 100 * 30\mu V/m$

4.1.2. Test Description

See section 3.2.1 of this report.

4.1.3. 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.

The highest frequency of the internal sources of the EUT is less than 108MHz, the measurement shall only be made up to 1G.

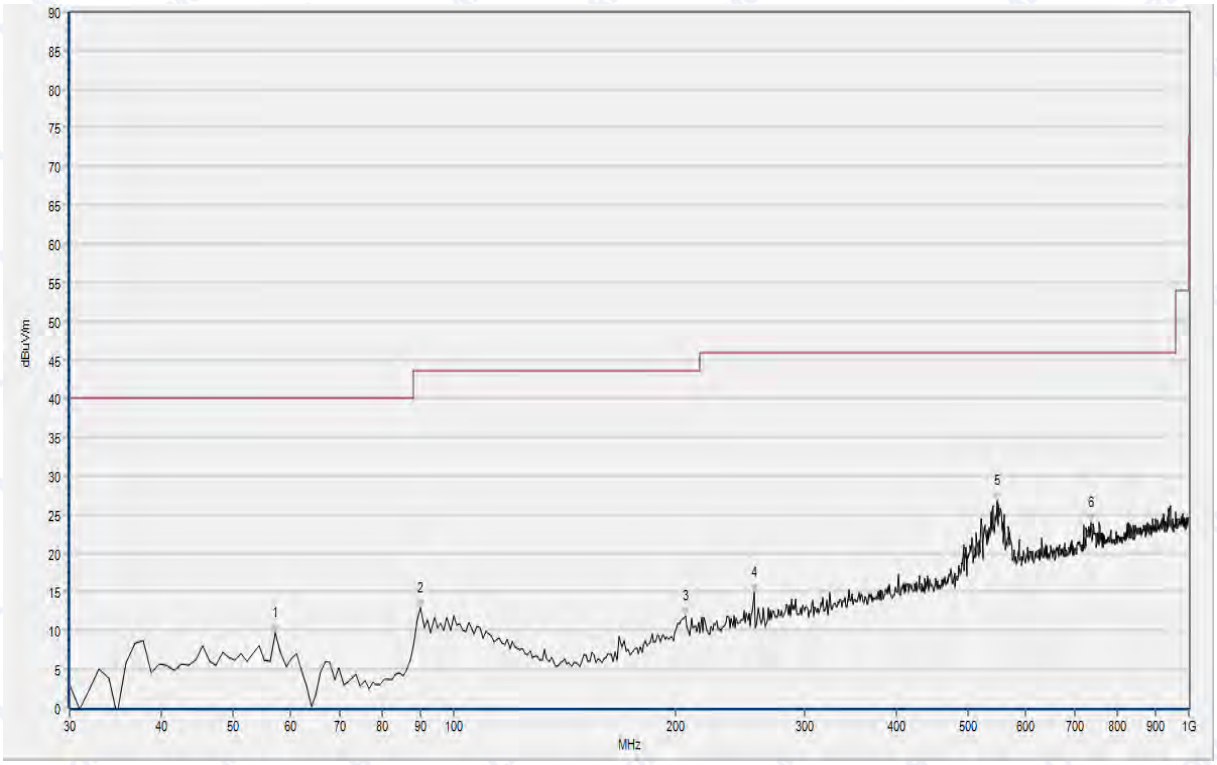
4.1.4. Test Result

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.

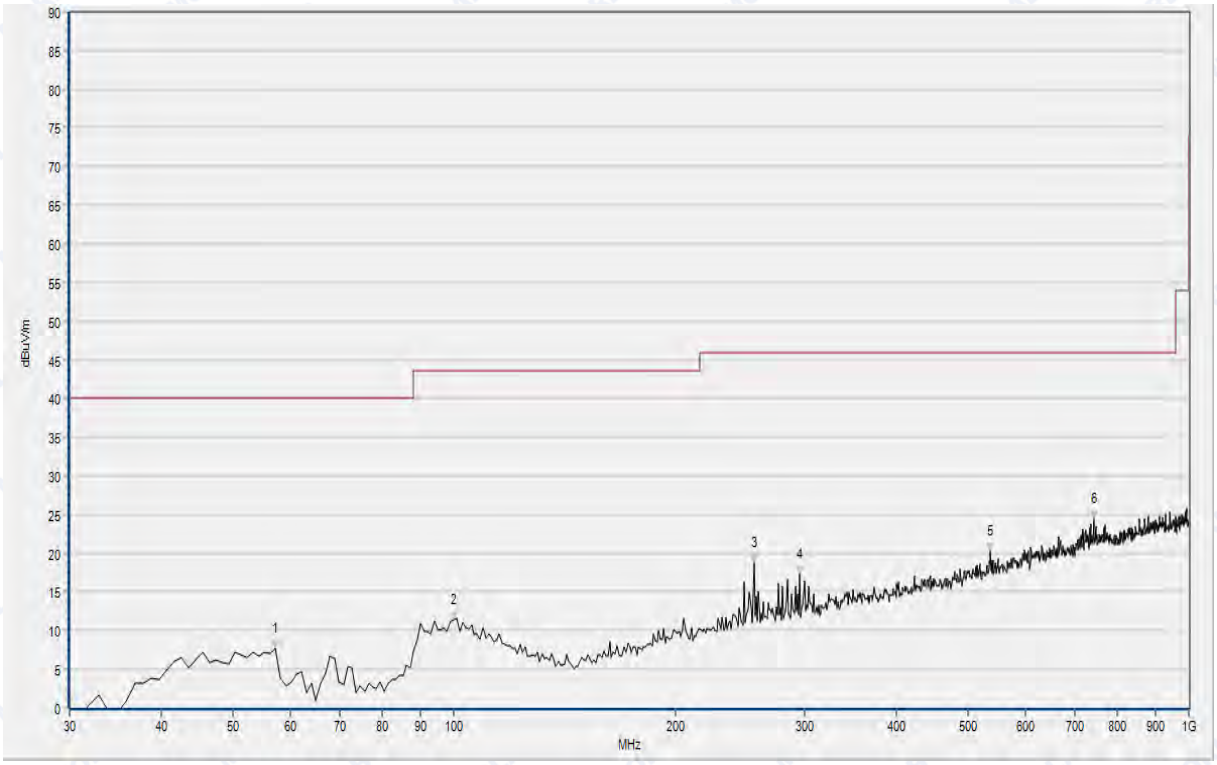
Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.

A. Test Plot and Suspicious Points:



(Plot A: 30MHz – 1GHz, 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	57.160	N.A.	9.75	N.A.	N.A.	40.00	N.A.	V	PASS
2	90.140	N.A.	12.86	N.A.	N.A.	43.50	N.A.	V	PASS
3	206.540	N.A.	11.90	N.A.	N.A.	43.50	N.A.	V	PASS
4	256.010	N.A.	14.86	N.A.	N.A.	46.00	N.A.	V	PASS
5	547.980	N.A.	26.89	N.A.	N.A.	46.00	N.A.	V	PASS
6	735.190	N.A.	24.03	N.A.	N.A.	46.00	N.A.	V	PASS



(Plot B: 30MHz – 1GHz, 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	57.160	N.A.	7.73	N.A.	N.A.	40.00	N.A.	H	PASS
2	99.840	N.A.	11.39	N.A.	N.A.	43.50	N.A.	H	PASS
3	256.010	N.A.	18.83	N.A.	N.A.	46.00	N.A.	H	PASS
4	295.780	N.A.	17.21	N.A.	N.A.	46.00	N.A.	H	PASS
5	537.310	N.A.	20.26	N.A.	N.A.	46.00	N.A.	H	PASS
6	741.980	N.A.	24.43	N.A.	N.A.	46.00	N.A.	H	PASS

Result: Pass

Annex A 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 B 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 *****