

# FCC PART 15B, CLASS B TEST REPORT

For

## Guangde Ledup Enterprise Inc.

Jingtang Road, Economic Development Zone, Xuancheng City, Anhui Province, China

**FCC ID: 2AEBHR41501B1C**

<b>Report Type:</b> Original Report	<b>Product Type:</b> control box for light string
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<b>Report Number:</b> RSZ150428550-00	
<b>Report Date:</b> 2015-05-05	
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**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *Guangde Ledup Enterprise Inc.*'s product, model number: *3R4-1501B1 (FCC ID: 2AEBHR41501B1C)* or the "EUT" in this report was a *control box for light string*, which was measured approximately: 9.8 cm (L) x 5.0 cm (W) x 2.7 cm (H), rated with input voltage: DC 28-30 V from adapter.

*Note: This series products model: 3R4-1501B1, 7R4-1501B1, 7R4-1502B1, 12R4-1501B1, 30R4-1501B1, 11R4-1501B1 and 8R4-1501B1 are identical schematics, the difference among them is just the model number due to marketing purpose, and model 3R4-1501B1 was selected for fully testing, the detailed information can be referred to the attached declaration letter that stated and guaranteed by the applicant.*

*\* All measurement and test data in this report was gathered from production sample serial number: 1504028 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2015-04-28.*

### Objective

This test report is prepared on behalf of *Guangde Ledup Enterprise Inc.* in accordance with Part 2-Subpart J, Part 15-Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine the compliance of the EUT with FCC Part 15 B.

### Related Submittal(s)/Grant(s)

Part 15.231 DSC submissions with transmitter FCC ID: *2AEBHR41501B1*.

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a manufacturer testing fashion.

EUT operation mode: Receiving single and control light.

### EUT Exercise Software

N/A

### Special Accessories

No special accessory.

### Equipment Modifications

No modification was made to the EUT tested.

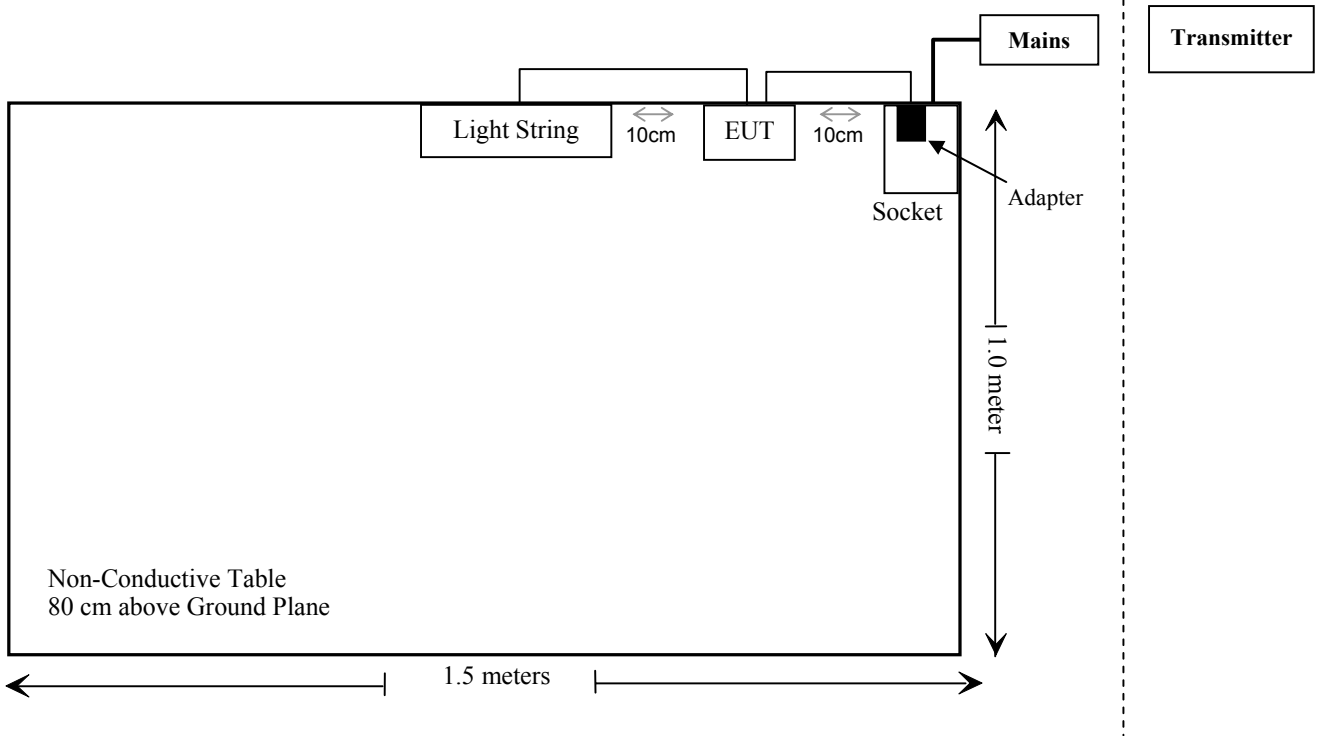
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
N/A	Socket	N/A	CZ001
Ledup	Adapter	J-29V14W	ZL201320760997.1
Ledup	Light string	N/A	N/A
Ledup	Remote Control	3R4-1501B1	N/A

### External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Un-detachable AC Cable	1.0	Mains	Socket
Un-shielding Un-detachable DC Cable	0.8	Socket	EUT
Un-shielding Un-detachable DC Cable	0.8	EUT	Light string

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Results</b>
§15.107	AC Line Conducted Emissions	Compliance
§15.109	Radiated Spurious Emissions	Compliance

## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

According to FCC §15.107

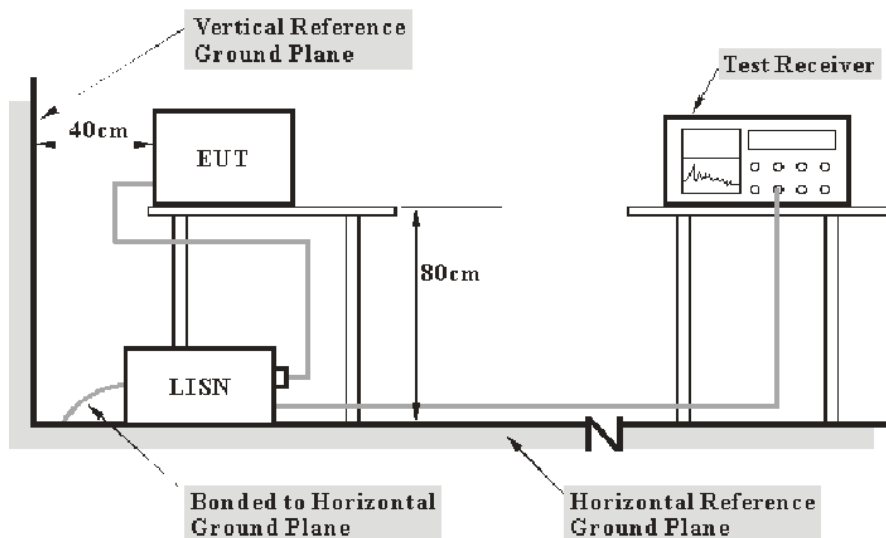
### Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN/ISN and receiver, LISN/ISN voltage division factor, LISN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

### EUT Setup



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

The measurement procedure of EUT setup is according with per ANSI C63.4-2009. The related limit was specified in FCC Part 15.107 Class B.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120 VAC/60 Hz power source.

### EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

### Test Procedure

During the conducted emission test, the adapter was connected to the first LISN and the other relevant equipments were connected to the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2014-06-03	2015-06-03
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2014-12-01	2015-12-01
Rohde & Schwarz	LISN	ESH3-Z5	100113	NCR	NCR
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2014-10-15	2015-10-15
Rohde & Schwarz	CE Test software	EMC 32	V8.53	NCR	NCR

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$



## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107, the worst margin reading as below:

**4.4 dB at 2.421130 MHz in the Neutral conducted mode**

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in complies with the limit if

$$L_m + U_{(L_m)} \leq L_{lim} + U_{cispr}$$

in BACL.,  $U_{(L_m)}$  is less than  $U_{cispr}$ , if  $L_m$  is less than  $L_{lim}$ , it implies that the EUT complies with the limit.

## Test Data

### Environmental Conditions

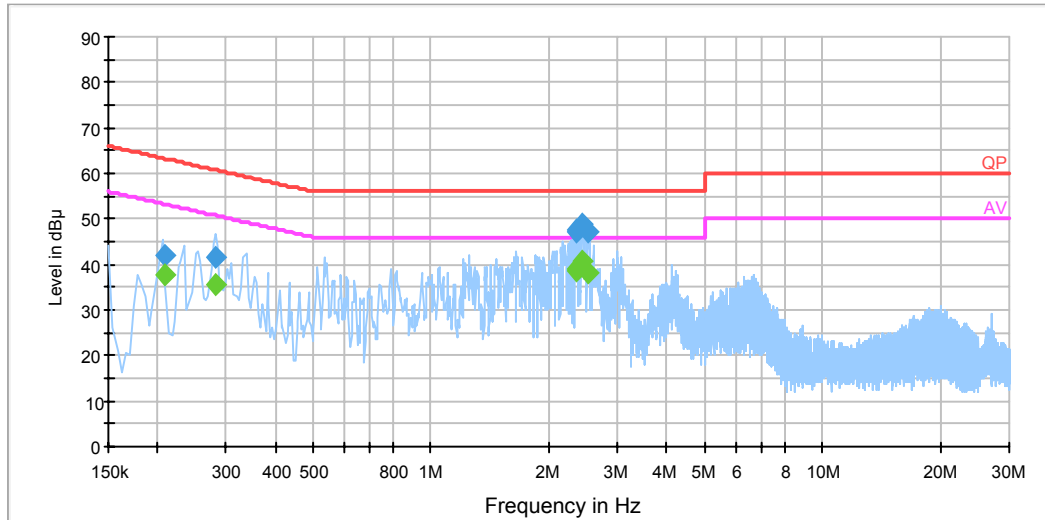
<b>Temperature:</b>	27 °C
<b>Relative Humidity:</b>	51 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Joanna Jiao on 2015-05-04.*

*EUT Operation Mode: Receiving single and control light*

**AC 120V/60 Hz, Line**

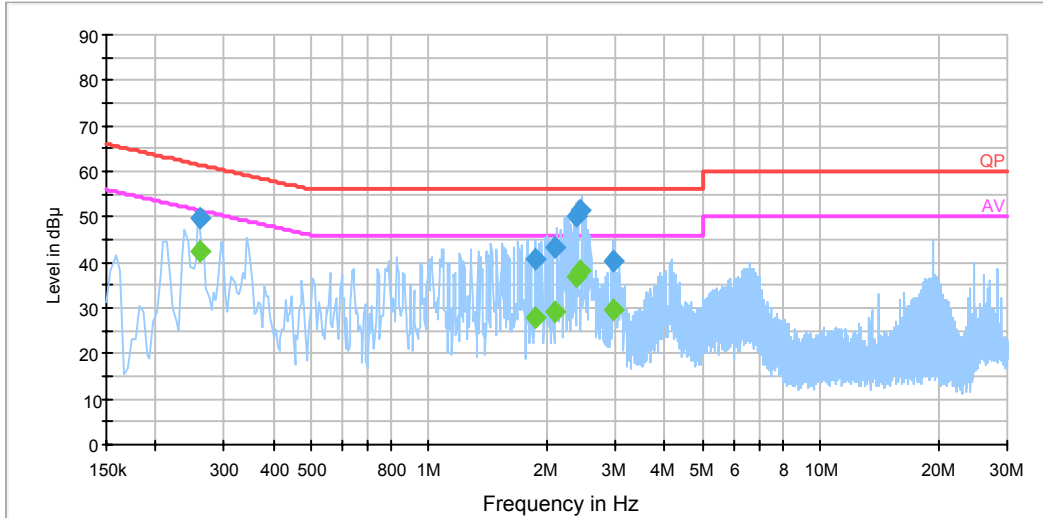
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.209500	42.0	19.3	63.2	21.3	QP
0.209500	37.8	19.3	53.2	15.4	Ave.
0.281500	41.6	19.2	60.8	19.2	QP
0.281500	35.7	19.2	50.8	15.1	Ave.
2.343290	47.0	19.4	56.0	9.0	QP
2.343290	38.6	19.4	46.0	7.4	Ave.
2.350690	47.5	19.4	56.0	8.5	QP
2.350690	39.0	19.4	46.0	7.0	Ave.
2.429310	49.0	19.4	56.0	7.0	QP
2.429310	40.7	19.4	46.0	5.3	Ave.
2.523870	47.0	19.4	56.0	9.0	QP
2.523870	38.0	19.4	46.0	8.0	Ave.

**AC 120V/60 Hz, Neutral**

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.261500	49.5	19.2	61.4	11.9	QP
0.261500	42.3	19.2	51.4	9.1	Ave.
1.866010	40.9	19.4	56.0	15.1	QP
1.866010	27.8	19.4	46.0	18.2	Ave.
2.102230	43.1	19.4	56.0	12.9	QP
2.102230	29.3	19.4	46.0	16.7	Ave.
2.378810	50.0	19.4	56.0	6.0	QP
2.378810	36.9	19.4	46.0	9.1	Ave.
2.421130	51.6	19.4	56.0	4.4	QP
2.421130	38.2	19.4	46.0	7.8	Ave.
2.945570	40.4	19.4	56.0	15.6	QP
2.945570	29.5	19.4	46.0	16.5	Ave.

**Note:**

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation  
The corrected factor has been input into the transducer of the test software.
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

## FCC §15.109 - RADIATED SPURIOUS EMISSIONS

### Applicable Standard

FCC §15.109

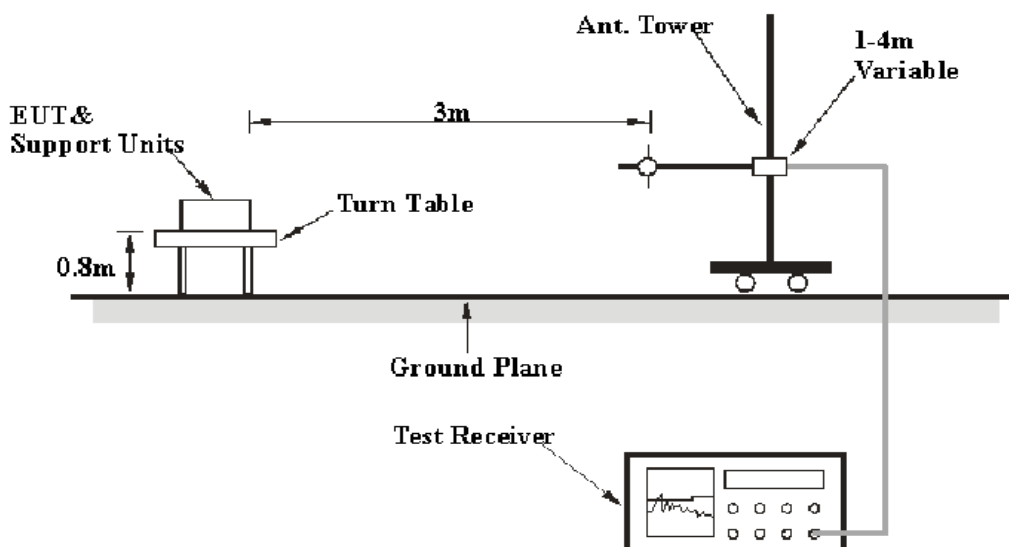
### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

Frequency	Polarity	Measurement uncertainty
30 MHz~200 MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200 MHz~1 GHz	Horizontal	4.84 dB (k=2, 95% level of confidence)
	Vertical	5.91 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	Horizontal/Vertical	4.68 dB (k=2, 95% level of confidence)
Above 6 GHz	Horizontal/Vertical	4.92 dB (k=2, 95% level of confidence)

### EUT Setup



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15.109 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

### EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

### Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2014-05-06	2015-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2014-11-03	2015-11-03
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2014-12-07	2017-12-06
Mini	Amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
A.H. System	Horn Antenna	SAS-200/571	135	2013-02-11	2016-02-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2014-08-22	2015-08-22
TDK	Chamber	Chamber A	2#	2012-10-15	2015-10-15
TDK	Chamber	Chamber B	1#	2014-07-22	2015-07-22
DUCOMMUN	Pre-amplifier	ALN-22093530-01	991373-01	2014-08-03	2015-08-03
R&S	Auto test Software	EMC32	V9.10	NCR	NCR

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.109 Class B, the worst margin reading as below:

**7.99 dB at 30.25 MHz in the Vertical polarization**

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL,  $U_{(Lm)}$  is less than  $U_{cispr}$ , if  $L_m$  is less than  $L_{lim}$ , it implies that the EUT complies with the limit.

## Test Data

### Environmental Conditions

<b>Temperature:</b>	27 °C
<b>Relative Humidity:</b>	51 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Joanna Jiao on 2015-05-04.*

*EUT Operation Mode: Receiving single and control light*

**30 MHz – 6 GHz**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part15B	
	Reading (dB $\mu$ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dB $\mu$ V/m)	Margin (dB)
30.25	38.11	QP	229.0	1.0	V	-6.1	32.01	40	7.99
31.49	35.82	QP	265.0	1.0	V	-7.2	28.62	40	11.38
36.05	26.64	QP	177.0	1.2	V	-10.9	15.74	40	24.26
77.335	33.75	QP	135.0	2.2	V	-19.3	14.45	40	25.55
110.12	31.95	QP	224.0	1.0	V	-14.3	17.65	43.5	25.85
798.35	21.99	PK	115.0	1.1	H	-4.4	17.59	46	28.41
1593.18	39.72	PK	129	2.5	V	1.91	41.63	74	32.37
1593.18	25.85	Ave.	129	2.5	V	1.91	27.76	54	26.24
1665.33	39.74	PK	20	1.8	H	1.38	41.12	74	32.88
1665.33	25.12	Ave.	20	1.8	H	1.38	26.5	54	27.5
1759.51	39.51	PK	70	1.6	H	-0.03	39.48	74	34.52
1759.51	26.13	Ave.	70	1.6	H	-0.03	26.1	54	27.9

Note:

- 1) Correction Factor=Antenna factor (RX) + cable loss – amplifier factor
- 2) Corrected Amplitude = Correction Factor + Reading
- 3) Margin = Limit - Corrected Amplitude

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## PRODUCT SIMILARITY DECLARATION LETTER

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Guangde Ledup Enterprise Inc.

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China

Tel: Tel: 0563-6988761

Fax: 0563-6767225

2015-5-11

### Product Similarity Declaration

To Whom It May Concern,

We, Guangde Ledup Enterprise Inc. , hereby declare that we have a product named as Control Box (Model number: 3R4-1501B1 ) was tested by BACL, meanwhile, for our marketing purpose, we would like to list a series models 7R4-1501B1, 7R4-1502B1, 12R4-1501B1, 30R4-1501B1, 11R4-1501B1, 8R4-1501B1 on reports and certificate, all the models are identical schematics.

No other changes are made to them.

We confirm that all information above is true, and we'll be responsible for all the consequences. Please contact me if you have any question.

A handwritten signature in black ink that reads "Lianfeng Ma".

Signature:

Printed Name: Lianfeng Ma

Title: General Manager

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