Application for FCC Certificate
On Behalf of
SHANGHAI HONGYUAN LIGHTING & ELECTRIC EQUIPMENT CO LTD

Highbay Luminaire

Model No. : LVD-GC00001-80

FCC ID : 2AAFG03022080

Prepared For : SHANGHAI HONGYUAN LIGHTING & ELECTRIC EQUIPMENT CO LTD
5028 ZHENNAN RD 201802 SHANGHAI, CHINA

Prepared By : Audix Technology (Shanghai) Co., Ltd.
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Report No. : ACI-F13117
Date of Test : Mar 09 – Jul 30, 2013
Date of Report : Jul 31, 2013

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TEST REPORT FOR FCC CERTIFICATE

Applicant	:	SHANGHAI HONGYUAN LIGHTING & ELECTRIC EQUIPMENT CO LTD
Manufacturer	:	SHANGHAI HONGYUAN LIGHTING & ELECTRIC EQUIPMENT CO LTD
Factory	:	Jiangsu LVD Lighting Industry Co., Ltd
EUT Description	:	Highbay Luminaire
		(A) Model No. : LVD-GC00001-80
		(B) Power Supply : 120V/60Hz

Test Procedure Used:

FCC RULES AND REGULATIONS PART 18 SUBPART C RF LIGHTING DEVICES OCTOBER 2012 AND MP-5/1986

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 18 Subpart C (RF Lighting Devices) limits both radiated and conducted emissions.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report shows that the EUT which was tested in 3m anechoic chamber on Mar 09 – Jul 30, 2013 is technically compliance with the FCC official limits also.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Mar 09 – Jul 30, 2013 **Date of Report :** Jul 31, 2013

Producer : KATHY WANG/ Supervisor

Review : DIO YANG / Assistant Manager

For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory : SAMMY CHEN / Deputy Manager
Authorized Signature EMC

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Meets Limit	Results
EMISSION			
Conducted Disturbance at the Mains Terminals	FCC RULES AND REGULATIONS PART 18 SUBPART C OCTOBER 2012 AND MP-5/1986	18.307(c) Consumer Equipment	Pass
Magnetic Field Strength	FCC RULES AND REGULATIONS PART 18 SUBPART C OCTOBER 2012 AND MP-5/1986	18.305(b) Any type, Non-ISM Frequency	Pass
Radiated Emission	FCC RULES AND REGULATIONS PART 18 SUBPART C OCTOBER 2012 AND MP-5/1986	18.305(c) Consumer Equipment	Pass

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description : Highbay Luminaire

Type of EUT : ☑ Production ☐ Pre-product ☐ Pro-type

Model No.	:	LVD-GC00001-80
Rated Power	:	80W

Applicant : SHANGHAI HONGYUAN LIGHTING & ELECTRIC EQUIPMENT CO LTD
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Manufacturer : SHANGHAI HONGYUAN LIGHTING & ELECTRIC EQUIPMENT CO LTD
5028 ZHENNAN RD 201802 SHANGHAI, CHINA

Factory : Jiangsu LVD Lighting Industry Co., Ltd
9 Minjiang Rd. Yancheng Economic and Technological Development Zone

2.2 Description of Test Facility

Site Description (Semi-Anechoic Chamber) : Sept. 17, 1998 file on
Mar 16, 2012 Renewed
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046, USA

Name of Firm : Audix Technology (Shanghai) Co., Ltd.

Site Location : 3F 34Bldg 680 Guiping Rd,
Caohejing Hi-Tech Park,
Shanghai 200233, China

NVLAP Lab Code : 200371-0

2.3 Measurement Uncertainty

Conducted Emission Expanded Uncertainty: U = 3.46 dB
Radiated Emission Expanded Uncertainty (30-200MHz):
U = 4.14 dB (Horizontal)
U = 4.28 dB (Vertical)
Radiated Emission Expanded Uncertainty (200M-1GHz):
U = 4.18 dB (Horizontal)
U = 4.26 dB (Vertical)

3 CONDUCTED EMISSION TEST

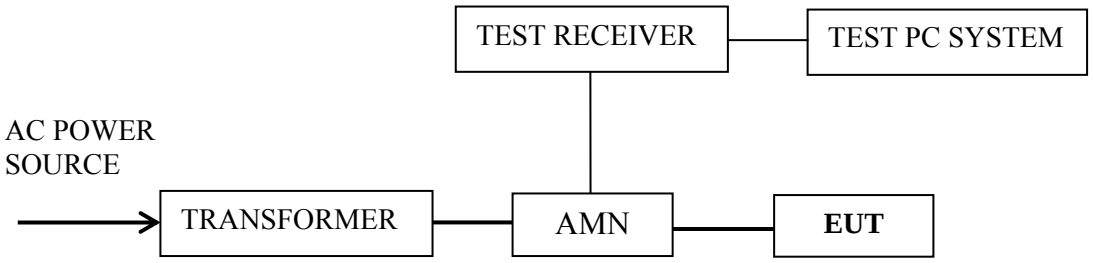
3.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	100841	Mar 20, 2013	Mar 20, 2014
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Feb 25, 2013	Feb 25, 2014
3.	50 Ω Coaxial Switch	Anritsu	MP59B	6200426389	Mar 18, 2013	Sep 18, 2013
4.	Software	Audix	E3	SET00200 9804M592	--	--

3.2 Block Diagram of Test Setup

3.2.1 Conducted Disturbance Test Setup



—— : Signal Line
▬▬ : Power Line

3.3 Conducted Emission Limits (FCC Part 18 Consumer Equipment)

Frequency (MHz)			Maximum RF Line Voltage	
			(μV)	dB(μV)
0.45	~	2.51	250	48
2.51	~	3.0	3000	70
3.0	~	30	250	48

NOTE 1 – RF Line Voltage dB (μV) = 20 log RF Line Voltage (μV)
NOTE 2 – The tighter limits shall apply at the boundary between two frequency ranges.

3.4 Test Configuration

The EUT (listed in Sec.2.1) was installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner that tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

3.5.1 Setup the EUT as shown in Sec. 3.2.

3.5.2 Turn on the power of EUT.

3.5.3 The EUT will be operated normally.

3.5.4 Set the EUT on the lighting test mode, and then test.

3.6 Test Procedures

The EUT was connected to the power mains through a Artificial Mains Network (AMN). This provided a 50 ohm coupling impedance for the measuring equipment.

Both sides of AC line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed or manipulated according to MP-5/1986 during conducted emission test.

The I.F bandwidth of Test Receiver ESCI was set at 9 kHz.

The frequency range from 450 kHz to 30 MHz for Lighting mode was checked.

The test modes were done on conducted test and the test results of the highest emissions are listed in Sec. 3.7.

3.7 Test Results

< PASS >

The frequency and amplitude of the highest conducted emission relative to the limit is reported. All emissions not reported below are too low against the prescribed limits.

Model No	Test Mode	Data Page
LVD-GC00001-80	Lighting	P8

NOTE 1 – Factor = Cable Loss + AMN Factor.
NOTE 2 – Emission Level = Meter Reading + Factor.
NOTE 3 – All readings are Quasi-Peak values. (QP)
NOTE 4 – The worst emission is detected at 18.048 MHz with corrected signal level of 36.89 dB (μV) (limit is 48.00 dB (μV)), when the Line of the EUT is connected to AMN.

EUT	:	Highbay Luminaire	Temperature :	22℃	
Model No.	:	LVD-GC00001-80	Humidity	:	48%RH
Serial No.	:	N/A	Date of Test	:	Mar 10, 2013
Test Mode	:	Lighting			

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.532	29.58	0.34	29.92	48.00	18.08	QP
	0.611	27.04	0.23	27.27	48.00	20.73	
	0.807	23.50	0.24	23.74	48.00	24.26	
	1.264	22.01	0.34	22.35	48.00	25.65	
	18.048	**35.99**	**0.90**	**36.89**	**48.00**	**11.11**	
	19.384	34.99	0.92	35.91	48.00	12.09	
Neutral	0.471	29.88	0.17	30.05	48.00	17.95	QP
	0.517	29.19	0.17	29.36	48.00	18.64	
	0.581	28.42	0.18	28.60	48.00	19.40	
	1.101	23.93	0.22	24.15	48.00	23.85	
	18.048	36.02	0.80	36.82	48.00	11.18	
	19.629	32.73	0.82	33.55	48.00	14.45	

TEST ENGINEER: WENCY YANG

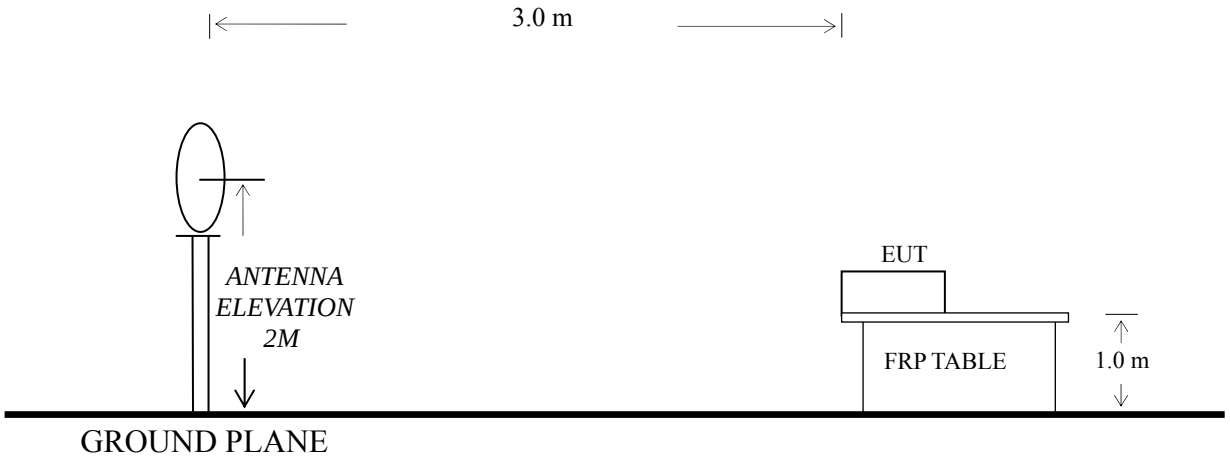
4 MAGNETIC FIELD EMISSION TEST

4.1 Test Equipment

The following test equipments are used during the field strength test in a shielded room:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Loop Antenna	Schaffner	HLA6120	1193	Apr 25, 2013	Apr 25, 2014
2.	Test Receiver	R&S	ESCI	101302	Sep 11, 2012	Sep 11, 2013
3.	50Ω Coaxial Switch	ANRITSU	MP59B	6200426390	Mar 18, 2013	Sep 18, 2013
4.	Software	Audix	E3	SET00200 9912M295-2	--	--

4.2 Block Diagram of Test Setup



4.3 Magnetic Field Emission Limit (FCC Part 18 305(b))

All emanations from Non-ISM frequency devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Frequency (MHz)	Distance (m)	Field Strength Limits (μV/m)	Converted Field Strength Limits By 3 Meters Measuring Distance dB (μV/m)
0.009~30	300	15	63.5
NOTE 1 - Distance refers to the distance in meters between the test antenna and the closed point of any part of the EUT. NOTE 2 - Audix Technology (Shanghai) Co., Ltd. only has a 3 meters Semi-anechoic Chamber to do the radiated disturbance test, therefore, Audix Shanghai used 3 meters measuring distance and converted limits to judge the EUT compliance with or not.			

4.4 Test Configuration

The FCC part 18 regulations test method must be used to find the maximum emission during Radiated Emission test.

The configuration of the EUT is same as used in conducted emission test. Please Refer to Section 3.4.

4.5 Operating Condition of EUT

4.5.1 Setup the EUT as shown on Section 4.2.

4.5.2 Turn on the power of all equipments.

4.5.3 Let the EUT work in test mode and test it.

4.6 Test Procedures

The EUT was placed on a table, which is 1.0 meter above ground. Measurements are performed at distance 3.0m with a 0.6m loop antenna as described in 2.2.4 of MP-5. The antenna shall be set at height 2m above the floor.

The bandwidth setting on the test receiver (R&S Test Receiver ESCI) is 200Hz from 9kHz to 150kHz and 9kHz from 150kHz to 30MHz. The EUT is tested in a semi-anechoic chamber.

All the test results are attached within Sec. 4.7.

4.7 Test Results

<**PASS**>

Refer to the following pages.

Model Number	Test Mode	Data Page
LVD-GC00001-80	Lighting	P12

NOTE 1 – Factor = Antenna Factor + Cable Loss
Emission Level = Meter Reading + Factor
NOTE 2 – All reading are Quasi-Peak Values.
NOTE 3 – The worst emission at horizontal polarization was detected at 0.015 MHz with corrected signal level of 56.64 dB (μV/m) (limit is 63.50 dB (μV/m)). The worst emission at vertical polarization was detected at 0.021 MHz with corrected signal level of 55.59 dB (μV/m) (limit is 63.50 dB (μV/m)).

EUT	:	Highbay Luminaire	Temperature :	22℃
Model No.	:	LVD-GC00001-80	Humidity :	52%RH
Serial No.	:	N/A	Date of Test :	Jul 30, 2013
Test Mode	:	Lighting		

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	0.011	33.90	20.39	0.03	54.32	63.50	9.18
	0.015	**36.11**	**20.50**	**0.03**	**56.64**	**63.50**	**6.86**
	0.020	35.11	20.16	0.03	55.30	63.50	8.20
	0.196	25.47	19.84	0.03	45.34	63.50	18.16
	0.254	26.81	20.06	0.03	46.90	63.50	16.60
	1.997	11.38	20.40	0.05	31.83	63.50	31.67
Vertical	0.011	33.32	20.37	0.03	53.72	63.50	9.78
	0.015	32.28	20.48	0.03	52.79	63.50	10.71
	0.021	**35.36**	**20.20**	**0.03**	**55.59**	**63.50**	**7.91**
	0.211	23.12	19.85	0.03	43.00	63.50	20.50
	0.244	24.10	19.98	0.03	44.11	63.50	19.39
	16.064	12.05	20.19	0.48	32.72	63.50	30.78

TEST ENGINEER: WENCY YANG

5 RADIATED EMISSION TEST

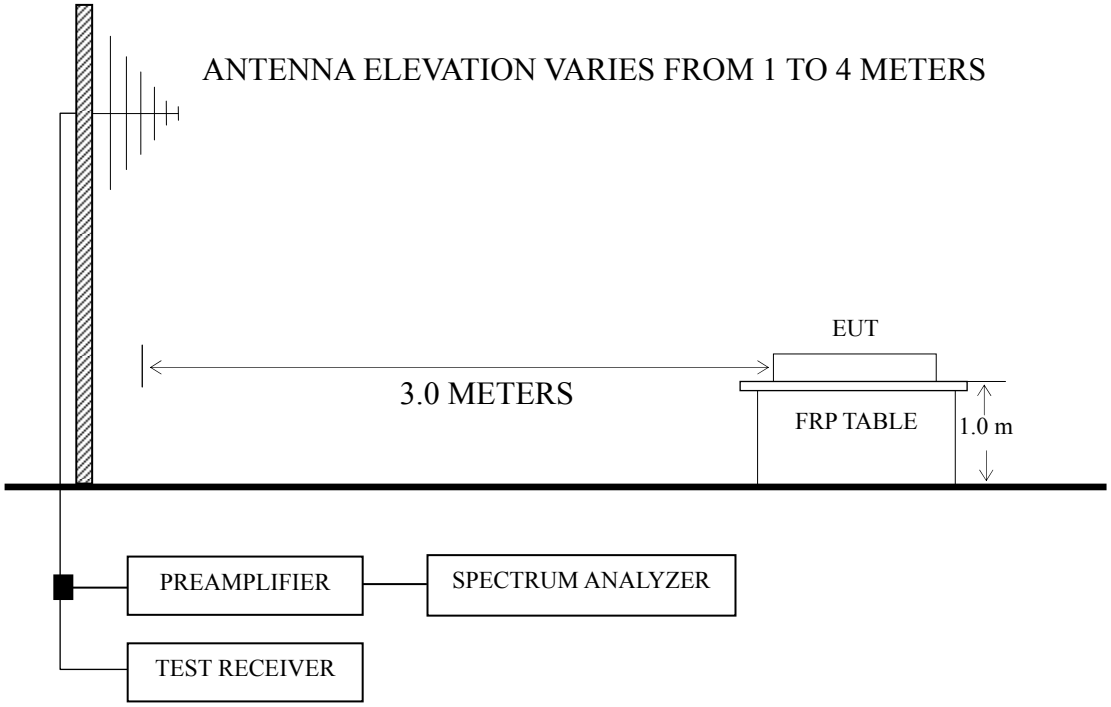
5.1 Test Equipment

The following test equipments are used during the radiated emission test in a semi-anechoic chamber:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Sep 11, 2012	Sep 11, 2013
2.	Preamplifier	Agilent	8447D	2944A10548	Mar 18, 2013	Sep 18, 2013
3.	Bi-log Antenna	TESEQ	CBL6112D	23192	Nov 29, 2012	Nov 29, 2013
4.	Spectrum	Agilent	E7405A	MY45106600	Dec 17, 2012	Dec 17, 2013
5.	Software	Audix	E3	SET00200 9912M295-2	--	--

5.2 Block Diagram of Test Setup

5.2.1 Radiated emission test setup



■ : 50 ohm Coaxial Switch

5.3 Radiated Emission Limit (FCC Part 18.305(c) Consumer Equipment)

Frequency (MHz)	Distance (m)	Field strength limits		Converted Field Strength Limits By 3 Meters Measuring Distance
		(μV/m)	dB (μV/m)	dB (μV/m)
30 ~ 88	30	10	20.0	40.0
88 ~ 216	30	15	23.5	43.5
216 ~ 1000	30	20	26.0	46.0

NOTE 1 - The lower limit shall apply at the transition frequency.
NOTE 2 - Measuring distance of 30 m is a primary requirement. However, 3 m (instead of 30 m) distance maybe allowed. In this case, the limits with measuring distance of 3 m shall be the above limit value increased 20lg(30/3)=20dB.
NOTE 3 - 1 μV/m is regarded as 0 dBμV/m.

5.4 Test Configuration

The configuration of the EUT and peripherals are same as those used in conducted emission test.

Please refer to Sec.3.4.

5.5 Operating Condition of EUT

Same as conducted emission test which is listed in Sec.3.5, except for the test setup replaced by Sec.5.2.

5.6 Test Procedures

The EUT was placed on a turntable that is 1.0 meter above ground. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to FCC MP-5: 1986 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz.

The frequency range from 30 MHz to 1000 MHz was checked.

The test mode was done on radiated disturbance test and all the test results are listed in Sec.5.7.

5.7 Test Results

<**PASS**>

Refer to the following pages.

Model No	Test Mode	Data Page
LVD-GC00001-80	Lighting	P16

NOTE 1 – Emission Level = Antenna Factor + Cable Loss + Meter Reading.

NOTE 2 – The emission levels that are 20dB below the official limit are not reported.

NOTE 3 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 4 – The worst emission at horizontal polarization was detected at 131.850 MHz with corrected signal level of 23.92 dB (μV/m) (limit is 43.50 dB (μV/m)), when the antenna was 1.00 m height and the turntable was at 204°. The worst emission at vertical polarization was detected at 30.100 MHz with corrected signal level of 20.30 dB (μV/m) (limit is 40.00 dB (μV/m)), when the antenna was 1.00 m height and the turntable was at 112°.

EUT	:	Highbay Luminaire	Temperature :	22℃
Model No.	:	LVD-GC00001-80	Humidity :	60%RH
Serial No.	:	N/A	Date of Test :	Mar 09, 2013
Test Mode	:	Lighting		

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	30.970	0.67	17.65	0.67	18.99	40.00	21.01
	36.790	0.49	14.92	0.74	16.15	40.00	23.85
	131.850	**10.83**	**11.54**	**1.55**	**23.92**	**43.50**	**19.58**
	148.340	8.90	10.15	1.63	20.68	43.50	22.82
	189.080	10.78	8.00	1.89	20.67	43.50	22.83
	431.580	1.00	17.55	2.78	21.33	46.00	24.67
Vertical	**30.100**	**0.99**	**18.66**	**0.65**	**20.30**	**40.00**	**19.70**
	43.580	6.91	10.60	0.80	18.31	40.00	21.69
	77.530	3.94	6.65	1.05	11.64	40.00	28.36
	95.960	3.38	9.57	1.29	14.24	43.50	29.26
	131.850	10.40	11.54	1.55	23.49	43.50	20.01
	432.550	1.32	17.55	2.78	21.65	46.00	24.35

TEST ENGINEER: NEAL WANG

6 DEBUG DESCRIPTION

The following components are used during the countermeasure procedures:

Name	M/N	Specifications	Manufacturer	Location
Ferrite core	F5B	T25*12*15-P.W	Kunshan Youci Electronic Co. Ltd.	See Internal Photo Figure 8, 9
			Wuxi Jianhua Electric Appliance Factory	

Note: We had required the applicant and manufacturer that all electrical and mechanical devices employed for spurious radiation suppression, including any modifications made during certification testing, must be incorporated in each unit marked

TEST ENGINEER: Neal_wang

(NEAL WANG)

7 DEVIATION TO TEST SPECIFICATIONS

None.