Application for FCC Certificate
On Behalf of
Firefly Lighting Co., Ltd.

Energy Saving Lamp

Model No.: XEU38-25T (26T)
XEU38-26T (25T)

FCC ID : PGESXEU38

Prepared For : Firefly Lighting Co., Ltd.
4th/FL, No.8 Industrial Building, Huli Industrial area,
Xiamen, P.R. China

Prepared By : AUDIX Technology (Shanghai) Co., Ltd.
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Report No. : ACI-F01035
Date of Test : May 24 ~ 26, 2001
Date of Report : May 29, 2001

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TEST REPORT FOR FCC CERTIFICATE

Applicant : Firefly Lighting Co., Ltd.

Manufacturer : Firefly Lighting Co., Ltd.

EUT Description : Energy Saving Lamp

(A) Model No. (B) Serial No.
XEU38-25T (26T) E20010524-1
XEU38-26T (25T) E20010524-2

(C) Power Supply: 120V/60Hz

Test Procedure Used:

FCC RULES AND REGULATIONS PART 18 CONSUMER DEVICES (1998) 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 RF Lighting Device 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. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

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 applicant to claim product endorsement by NVLAP or any agency of the U.S. Government.

Date of Test : May 24 ~ 26, 2001

Prepared by : Louise Lu 6.1.2001 / Test Engineer : Winston Hua . 6.1.2001

Louise Lu / Assistant

Winston Hua / Engineer

For and on behalf of
AUDIX TECHNOLOGY (SHANGHAI) CO.,LTD.

Reviewer : Hall Wang / Supervisor

Approved Signatory : Aaron Su / Assistant General Manager...

Authorized Signature(s)

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test

Description	:	Energy Saving Lamp
Type of EUT	:	☑ Production ☐ Pre-product ☐ Pro-type
Model Number	:	XEU38-25T (26T) XEU38-26T (25T)
Applicant	:	Firefly Lighting Co., Ltd. 4th/FL, No.8 Industrial Building, Huli Industrial area, Xiamen, P.R. China
Manufacturer	:	Firefly Lighting Co., Ltd. 4th/FL, No.8 Industrial Building, Huli Industrial area, Xiamen, P.R. China

1.2 Description of Test Facility

Site Description (Semi-Anechoic Chamber)	:	Sept. 17, 1998 file on Federal Communications Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, USA
Name of Firm	:	AUDIX Technology (Shanghai) Co., Ltd.
Site Location	:	3 F., 34 Bldg., 680 Guiping Rd., Caohejing Hi-Tech Park, Shanghai, China
NVLAP Lab Code	:	200371-0

1.3 Measurement Uncertainty

Conducted Emission Uncertainty	:	U = 2.66dB
Radiated Emission Uncertainty	:	U = 3.90dB

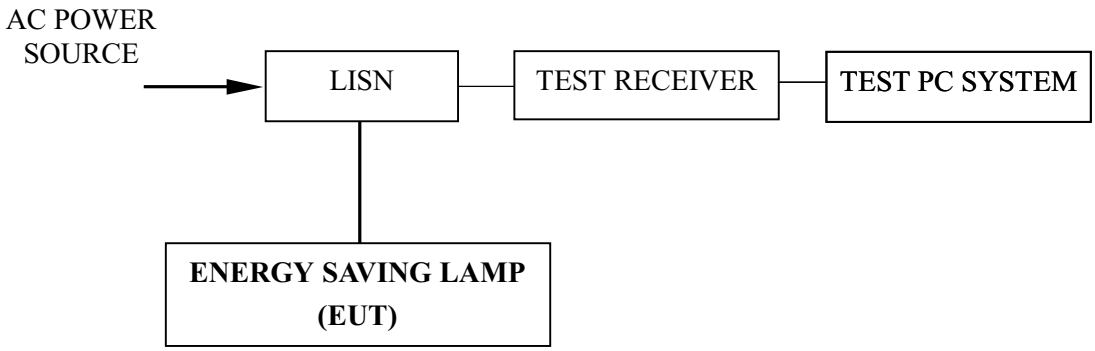
2 AC POWERLINE CONDUCTED EMISSION TEST

2.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS10	844077/020	Apr 24, 2001	1 Year
2.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-5	Apr 15, 2001	1 Year

2.2 Block Diagram of Test Setup



2.3 Conducted Emission Limits

Frequency (MHz)	Maximum RF Line Voltage	
	(μV)	dB(μV)
0.45 ~ 2.51	250	48
2.51 ~ 3	3000	70
3 ~ 30	250	48
NOTE 1 – RF Line Voltage dB(μV) = 20 log RF Line Voltage (μV)		

2.4 Test Configuration

The EUT (listed in Sec. 1.1) was installed as shown on Sec. 2.2 to meet FCC requirement and operating in a manner which tends to maximize its emission level in a normal application.

2.5 Operating Condition of EUT

The EUT was connected to the power mains through a Line Impedance Stabilization Network (LISN). 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 bandwidth of Test Receiver ESHS10 was set at 10 kHz.

The frequency range from 450 kHz to 30 MHz was checked. The test mode (ON) was done on conducted test and the test results of the highest emissions are listed in Sec. 2.7.

2.6 Test Procedures

2.6.1 Setup the EUT as shown in Sec. 2.2.

2.6.2 Turn on the power of all equipment.

2.6.3 The EUT will be operated normally.

2.7 Test Results

< PASS >

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

EUT	:	Energy Saving Lamp	Temperature :	21.8℃
Model No.	:	XEU38-25T (26T)	Humidity :	53%
Test Mode	:	ON	Date of Test :	May 26, 2001

Test Line	Frequency (MHz)	Factor (dB)	Meter Reading dB(μV)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)
VA	0.458	0.06	44.70	44.76	48.00	3.24
	0.503	0.06	39.00	39.06	48.00	8.94
	0.549	0.05	42.20	42.25	48.00	5.75
	0.594	0.04	37.20	37.24	48.00	10.76
	0.638	0.04	39.60	39.64	48.00	8.36
	0.729	0.03	37.80	37.83	48.00	10.17
VB	**0.455**	**0.10**	**44.70**	**44.80**	**48.00**	**3.20**
	0.499	0.09	43.10	43.19	48.00	4.81
	0.546	0.09	40.20	40.29	48.00	7.71
	0.593	0.08	38.40	38.48	48.00	9.52
	0.639	0.08	39.00	39.08	48.00	8.92
	0.684	0.08	39.50	39.58	48.00	8.42

NOTE 1 – Emission Level = Meter Reading + Factor
NOTE 2 – Factor = Insertion Loss + Cable Loss
NOTE 3 – All reading are Quasi-Peak Values.
NOTE 4 – The worst emission is detected at 0.455 MHz with corrected signal level of 44.80 dB(μV) (limit is 48.00 dB(μV)), when the VB of the EUT is connected to LISN.

TEST ENGINEER: Winston Hua
(WINSTON HUA)

EUT	:	Energy Saving Lamp	Temperature :	21.8℃
Model No.	:	XEU38-26T (25T)	Humidity :	53%
Test Mode	:	ON	Date of Test :	May 26, 2001

Test Line	Frequency (MHz)	Factor (dB)	Meter Reading dB(μV)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)
VA	0.451	0.07	42.80	42.87	48.00	5.13
	0.499	0.06	41.80	41.86	48.00	6.14
	0.547	0.05	38.10	38.15	48.00	9.85
	0.691	0.03	40.70	40.73	48.00	7.27
	0.751	0.03	38.50	38.53	48.00	9.47
	0.796	0.04	38.00	38.04	48.00	9.96
VB	**0.451**	**0.10**	**44.20**	**44.30**	**48.00**	**3.70**
	0.499	0.09	43.20	43.29	48.00	4.71
	0.549	0.09	40.00	40.09	48.00	7.91
	0.643	0.08	38.00	38.08	48.00	9.92
	0.692	0.08	42.50	42.58	48.00	5.42
	0.798	0.08	40.70	40.78	48.00	7.22

NOTE 1 – Emission Level = Meter Reading + Factor
NOTE 2 – Factor = Insertion Loss + Cable Loss
NOTE 3 – All reading are Quasi-Peak Values.
NOTE 4 – The worst emission is detected at 0.451 MHz with corrected signal level of 44.30 dB(μV) (limit is 48.00 dB(μV)), when the VB of the EUT is connected to LISN.

TEST ENGINEER: Winston Hua
(WINSTON HUA)

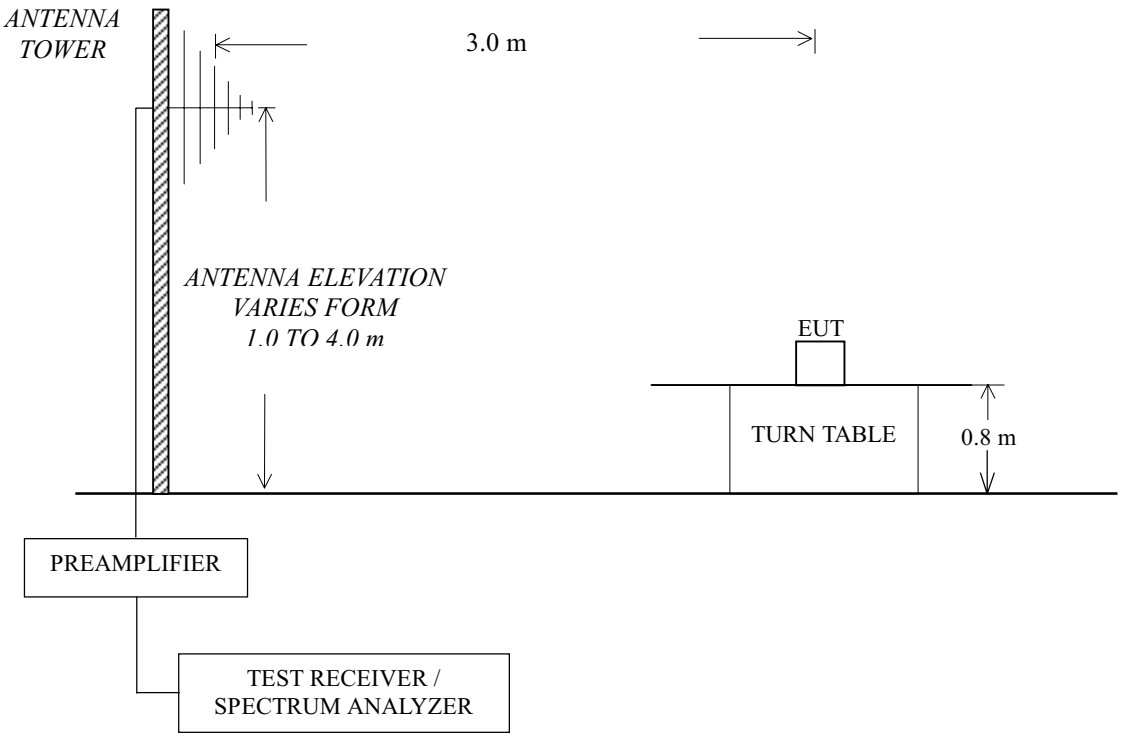
3 RADIATED EMISSION TEST

3.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	HP	8593EM	3628A00167	Apr 24, 2001	1 Year
2.	Preamplifier	HP	8447D	2944A06849	May 02, 2001	1/2 Year
3.	Bilog Antenna	Chase	CBL6111	1146	May 02, 2001	1/2 Year
4.	Test Receiver	Rohde & Schwarz	ESVS10	844594/001	Sept 20, 2000	1 Year

3.2 Block Diagram of Test Setup



3.3 Radiated Emission Limits

Frequency (MHz)	Distance (m)	Field strength limits (μV/m)	Converted Field Strengths Limits By 3 meters Measuring Distance	
			μV/m	dB(μV/m)
30 ~ 88	30	10	100	40.0
88 ~ 216	30	15	150	43.5
216 ~ 1000	30	20	200	46.0

NOTE 1 - Emission Level dB(μV/m) = 20 log Emission Level (μV/m)
NOTE 2 - The tighter limit applies at the band edges.
NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
NOTE 4 - The measurements are made at 3 meters distance, then the permissible field strength limits be adjusted using 1/d as an attenuation factor.

3.4 Test Configuration

The configuration of the EUT is same as those used in conducted emission test.

Please refer to Sec. 2.4.

3.5 Operating Condition of EUT

The EUT was placed on a turn table which is 0.8 meter above ground. The turn table 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) or dipole antenna were used as receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to MP-5/1986 requirements during radiated test.

The bandwidth setting on Test Receiver ESVS10 was 120 kHz.

The frequency range from 30 MHz to 1000 MHz was checked. The test mode (ON) was done on radiated emission test and the test results of the highest emissions are listed in Sec. 3.7.

3.6 Test Procedures

Same as conducted emission test which is listed in Sec. 2.6, except the test set up replaced by Sec. 3.2.

3.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emissions relative the limit is reported. All the emissions not reported below are too low against the FCC Part 18 limit.

EUT	:	Energy Saving Lamp	Temperature :	20.8℃
Model No.	:	XEU38-25T (26T)	Humidity :	53%
Test Mode	:	ON	Date of Test :	May 24, 2001

Polarization	Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Meter Reading dB(μV)	Emission Level dB(μV/m)	Limits dB(μV/m)	Margin (dB)
Horizontal	53.280	7.39	0.91	25.34	31.19	14.15	40.00	25.85
	58.130	6.00	0.95	25.31	30.13	11.77	40.00	28.23
	75.590	7.37	1.06	25.21	27.80	11.02	40.00	28.98
	120.210	13.11	1.40	25.10	26.83	16.24	43.50	27.26
	158.040	10.84	1.73	25.10	31.44	18.91	43.50	24.59
	589.690	**20.54**	**3.81**	**26.70**	**28.66**	**26.31**	**46.00**	**19.69**
Vertical	38.730	14.45	0.78	25.47	37.08	26.84	40.00	13.16
	51.340	**8.00**	**0.90**	**25.36**	**46.32**	**29.86**	**40.00**	**10.14**
	58.130	6.00	0.95	25.31	46.26	27.90	40.00	12.10
	80.440	7.60	1.09	25.18	40.42	23.93	40.00	16.07
	96.930	9.50	1.17	25.11	40.08	25.64	43.50	17.86
	123.120	12.21	1.43	25.10	36.49	25.03	43.50	18.47

NOTE 1 – Emission Level = Meter Reading + Antenna Factor + Cable Loss – Preamp Factor
NOTE 2 – All reading are Quasi-Peak values.
NOTE 3 – The worst emission at horizontal polarization was detected at 589.690 MHz with corrected signal level of 26.31 dB(μV/m) (limit is 46.00 dB(μV/m)), when the antenna was 1.33m height and the turn table was at 172°.
NOTE 4 – The worst emission at vertical polarization was detected at 51.340 MHz with corrected signal level of 29.86 dB(μV/m) (limit is 40.00 dB(μV/m)), when the antenna was 1.01 m height and the turn table was at 357°.
NOTE 5 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

TEST ENGINEER: Winston Hua
(WINSTON HUA)

EUT	:	Energy Saving Lamp	Temperature :	20.8℃
Model No.	:	XEU38-26T (25T)	Humidity :	53%
Test Mode	:	ON	Date of Test :	May 24, 2001

Polarization	Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Meter Reading dB(μV)	Emission Level dB(μV/m)	Limits dB(μV/m)	Margin (dB)
Horizontal	41.640	12.76	0.81	25.44	25.10	13.23	40.00	26.77
	119.240	13.18	1.39	25.10	26.04	15.51	43.50	27.99
	140.580	11.53	1.59	25.10	27.12	15.14	43.50	28.36
	159.980	10.84	1.74	25.10	29.45	16.93	43.50	26.57
	264.740	13.24	2.34	25.10	24.99	15.47	46.00	30.53
	356.890	**15.72**	**2.83**	**25.65**	**31.24**	**24.14**	**46.00**	**21.86**
Vertical	48.430	9.05	0.87	25.38	33.96	18.50	40.00	21.50
	140.580	11.53	1.59	25.10	34.42	22.44	43.50	21.096
	164.830	10.40	1.78	25.10	32.77	19.85	43.50	23.65
	201.690	9.49	2.02	25.10	32.86	19.27	43.50	24.23
	281.230	13.76	2.41	25.10	28.37	19.44	46.00	26.56
	526.640	**19.99**	**3.59**	**26.70**	**28.13**	**25.01**	**46.00**	**20.99**

NOTE 1 – Emission Level = Meter Reading + Antenna Factor + Cable Loss – Preamp Factor
NOTE 2 – All reading are Quasi-Peak values.
NOTE 3 – The worst emission at horizontal polarization was detected at 356.890 MHz with corrected signal level of 24.14dB(μV/m) (limit is 46.00 dB(μV/m)), when the antenna was 1.42m height and the turn table was at 177°.
NOTE 4 – The worst emission at vertical polarization was detected at 526.640 MHz with corrected signal level of 25.01 dB(μV/m) (limit is 46.00 dB(μV/m)), when the antenna was 1.01 m height and the turn table was at 7°.
NOTE 5 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

TEST ENGINEER: Winston Hua
(WINSTON HUA)