

Favour Light Enterprises Ltd.

Application
For
Certification
(FCC ID: OR3-RSC-811U-R)

RF Lighting

WO# 9912345
CKL/at
December 9, 1999

- The test results reported in this report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
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FCC ID : OR3-RSC-811U-R

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LIST OF EXHIBITS

INTRODUCTION

<i>EXHIBIT 1:</i>	General Description
<i>EXHIBIT 2:</i>	System Test Configuration
<i>EXHIBIT 3:</i>	Emission Results
<i>EXHIBIT 4:</i>	Equipment Photographs
<i>EXHIBIT 5:</i>	Product Labelling
<i>EXHIBIT 6:</i>	Technical Specifications
<i>EXHIBIT 7:</i>	Instruction Manual

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MEASUREMENT/TECHNICAL REPORT

Favour Light Enterprises Ltd. - MODEL: RU-811R
FCC ID: OR3-RSC-811U-R

December 9, 1999

This report concerns (check one): Original Grant Class II Change _____

Equipment Type: RF Lighting (example: computer, printer, modem, etc.)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes No

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

C. K. Lam
Intertek Testing Services
2/F., Garment Center,
576, Castle Peak Road,
HONG KONG
Phone: 852-2173-8512
Fax: 852-2742-9149

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Table of Contents

1.0 <u>General Description</u>	2
1.1 Product Description.....	2
1.2 Related Submittal(s) Grants	2
1.3 Test Methodology	3
1.4 Test Facility.....	3
1.5 Equipment List	4
2.0 <u>System Test Configuration</u>	6
2.1 Justification.....	6
2.2 EUT Exercising Software.....	6
2.3 Special Accessories	6
2.4 Equipment Modification	7
2.5 Support Equipment List and Description.....	7
3.0 <u>Emission Results</u>	9
3.1 Field Strength Calculation.....	10
3.1 Field Strength Calculation (cont).....	11
3.2 Radiated Emission Configuration Photograph.....	12
3.3 Radiated Emission Data	13
4.0 <u>Equipment Photographs</u>	16
5.0 <u>Product Labelling</u>	18
6.0 <u>Technical Specifications</u>	20
7.0 <u>Instruction Manual</u>	22

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List of attached file

Exhibit type	File Description	filename
Cover Letter	Letter of Agency	letter.pdf
Test Report	Test Report	report.doc
Test Setup Photo	Radiated Emission	radiated1.jpg to radiated2.jpg
External Photo	External Photo	ophoto1.jpg
Internal Photo	Internal Photo	iphoto1.jpg to iphoto3.jpg
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf

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EXHIBIT 1

GENERAL DESCRIPTION

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1.0 **General Description**

1.1 Product Description

The equipment under test (EUT) is a RF lighting consisting of an electronic ballast and fluorescent tube. The EUT is operated at 15 kHz and powered by four 1.5V size D batteries.

The brief circuit description is listed as follows :

- IC₁A, IC₁B and associated circuit act as an amplifier.
- IC₂ and associated circuit act as an decoder and
- T₄ and associated circuit act as oscillator for lighting equipment.
- T₁ and associated circuit act as a RF oscillator.

The model: SU-811R and CU-911R are the same as the model: RU-811R in hardware aspect. The difference in model numbers show the difference in color of the case.

1.2 Related Submittal(s) Grants

This is a single application for certification of a lighting equipment. The receiver for this composite device is authorized by Certification procedure.

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1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in MP-5. All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

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1.5 Equipment List

1) Radiated Emission Test for FCC Part 18

Equipment	Registration No.	Manufacturer	Model No.	Serial No.	Calibration Due Date
EMI Test Receiver	EW-0016	R&S	ESVS30	8693342/008	January 1999
Antenna Set	EW-0446	EMCO	3146	9905-5219	November 2000
	EW-0448	EMCO	3104C	9904-4850	November 2000
EMI Test Receiver	EW-0017	R&S	ESHS30	842053/002	January 2000

2) Disturbance Voltage Tests for FCC Part 18

Equipment	Registration No.	Manufacturer	Model No.	Serial No.	Calibration Due Date
EMI Test Receiver	EW-0017	R&S	ESHS30	842053/002	January 2000
Absorbing Clamp	EW-0019	R&S	MDS21	828228/006	February 2000
LISN	EW-0090	R&S	ESH3-Z5	840731/013	February 2000

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EXHIBIT 2

SYSTEM TEST CONFIGURATION

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2.0 **System Test Configuration**

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in MP-5.

The EUT was powered from four 1.5V size D batteries.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a cardboard box, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the EUT is turned on, it emits the RF noise.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

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2.4 Equipment Modification

Any modifications installed previous to testing by Favour Light Enterprises Ltd. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services.

2.5 Support Equipment List and Description

This product was tested in a standalone configuration.

All the items listed under section 2.0 of this report are

Confirmed by:

*C. K. Lam
Technical Manager
Intertek Testing Services
Agent for Favour Light Enterprises Ltd.*



Signature

December 9, 1999

Date

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EXHIBIT 3

EMISSION RESULTS

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3.0 Emission Results

Data is included worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

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3.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

where FS = Field Strength in $\text{dB}\mu\text{V}/\text{m}$

RA = Receiver Amplitude (including preamplifier) in $\text{dB}\mu\text{V}$

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

PD = Pulse Desensitization in dB

AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

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3.1 Field Strength Calculation (cont)

Example

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in mV/m} = \text{Common Antilogarithm} [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission

55.732 MHz

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated1.jpg to radiated2.jpg

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3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 13.3 dB

TEST PERSONNEL:



Signature

Danny T. L. Chui, Compliance Engineer
Typed/Printed Name

December 9, 1999
Date

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Company: Favour Light Enterprises Ltd.
Model: RU-811R

Date of Test: December 1, 1999

Table 1

Radiated Emissions

Polarity	Frequency (MHz)	Reading (dB μ V)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Measured at 3m (dB μ V/m)	Net at 30m (dB μ V/m)	Limit at 30m (dB μ V/m)	Margin (dB)
H	30.481	30.1	10	16	24.1	4.1	20	-15.9
H	35.642	30.5	10	16	24.5	4.5	20	-15.5
H	40.801	31.6	10	16	25.6	5.6	20	-14.4
H	45.709	31.9	10	16	25.9	5.9	20	-14.1
H	50.826	31.3	11	16	26.3	6.3	20	-13.7
H	55.732	31.7	11	16	26.7	6.7	20	-13.3

Notes: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.

Test Engineer: Danny T. L. Chui

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EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

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4.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: ophoto1.jpg to ophoto2.jpg and iphoto1.jpg to iphoto2.jpg

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EXHIBIT 5

PRODUCT LABELLING

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5.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf

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EXHIBIT 6

TECHNICAL SPECIFICATIONS

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6.0 Technical Specifications

For electronic filing, the block diagram and schematics are saved with filename: block.pdf and circuit.pdf respectively.

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EXHIBIT 7

INSTRUCTION MANUAL

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7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

This manual will be provided to the end-user with each unit sold/leased in the United States.