

***Energy Federation Incorporated***

Application  
For  
Certification  
**(FCC ID: NLP549062099)**

RF Lighting

WO# 9808479  
CKL/at  
April 19, 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 : NLP549062099

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## INTERTEK TESTING SERVICES

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### LIST OF EXHIBITS

#### *INTRODUCTION*

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# INTERTEK TESTING SERVICES

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## MEASUREMENT/TECHNICAL REPORT

*Energy Federation Incorporated* - MODEL: CFT90W  
FCC ID: NLP549062099

April 19, 1999

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

Equipment Type: RF Lighting

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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:

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Intertek Testing Services  
2/F., Garment Center,  
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HONG KONG  
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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
Operation Description	Technical Description	descri.pdf
Test Setup Photo	Radiated Emission	radiated1.jpg, radiated2.jpg
Test Setup Photo	Conducted Emission	conduct1.jpg, conduct2.jpg
Test Report	Conducted Emission Test Result	conduct.pdf
External Photo	External Photo	ophoto1.jpg, ophoto2.jpg
Internal Photo	Internal Photo	iphoto1.jpg to iphoto6.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 RF lighting consisted of three halogen lamps (two 26W & one 42W) with one 42W electronic ballast and combined electronic ballast which is combined by two 26W electronic ballast. The model number of two electronic ballast are A42W-1 and A26W-2 respectively. The electronics ballasts are operated with 20kHz and powered by 120Vacm 60Hz.

The brief circuit description is listed in the following and saved with filename: descri.pdf  
For A26W-2:

- D1, D2 and associated circuit act as rectifier.
- N1, N2, N3 and associated circuit act as control circuit.
- M1, M2, associated circuit act as switch circuit.
- S1 and associated circuit act as protect circuit.
- L3A, L4A and associated circuit act as Feedback circuit
- L3, L4 and associated circuit act as Output circuit.

For A42W-1:

- D1, D2 and associated circuit act as rectifier.
- N1, N2, N3 and associated circuit act as control circuit.
- Q1, Q2, associated circuit act as switch circuit.
- S1 and associated circuit act as protect circuit.
- L3B and associated circuit act as Feedback circuit
- L3A and associated circuit act as Output circuit.

#### 1.2 Related Submittal(s) Grants

This is a single application for certification of RF Lighting.

#### 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

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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.

### 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-0014	R&S	ESVS30	842807/001	December 1999
Biconical Antenna	EI-088	CDI	B100 B200 B300	3098 3112 3118	June 1999
EMI Test Receiver	EW-0015	R&S	ESHS30	827128/009	December 1999

#### 2) Disturbance Voltage Tests for FCC Part 18

Equipment	Registration No.	Manufacturer	Model No.	Serial No.	Calibration Due Date
EMI Test Receiver	EW-0015	R&S	ESVS30	827128/009	June 1999
Absorbing Clamp	EI-128	R&S	MDS21	840031/001	November 1999
LISN	EI-130	R&S	RSH3-Z5	840731/013	April 1999

## 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 120Vac, 60Hz.

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 equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it).

#### 2.2 EUT Exercising Software

There was no special software to exercise the device. Once the button is depressed, the unit transmits the typical signal. For simplicity of testing, the unit was wired to transmit continuously.

#### 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 Energy Federation Incorporated 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 Energy Federation Incorporated*



\_\_\_\_\_  
Signature

April 19, 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 $\mu$ 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 $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ 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**

**45.481 MHz**

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

Judgement: Passed by 15.9 dB

### **TEST PERSONNEL:**



*Signature* \_\_\_\_\_

Kenneth H.M.Lam, Compliance Engineer

*Typed/Printed Name*

April 19, 1999

*Date*

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Company: Energy Federation Incorporated  
Model: CFT90W

Date of Test: October 27, 1999

Table 1

### Radiated Emissions

Polarity	Frequency (M H z)	Reading (dB $\mu$ V )	Antenna Factor (dB )	Pre-Amp Gain (dB )	Distance Factor (-dB )	Net at 30m (dB $\mu$ V /m )	Limit at 30m (dB $\mu$ V /m )	Margin (dB )
H	30.148	28.3	10	16	20	2.3	20	-17.7
H	35.246	29.4	10	16	20	3.4	20	-16.6
H	40.739	29.5	10	16	20	3.5	20	-16.5
H	45.481	30.1	10	16	20	4.1	20	-15.9
H	50.620	29.0	11	16	20	4.0	20	-16.0
H	55.748	28.8	11	16	20	3.8	20	-16.2

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: Kenneth H.M.Lam

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### **3.4 Line Conducted Configuration Photograph**

**Worst Case Line-Conducted Configuration**

**0.460 MHz**

For electronic filing, the worst case line-conducted configuration photograph are saved with filename: conduct1.jpg & conduct2.jpg

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Company: Energy Federation Incorporated  
Model: CFT90W

Date of Test: October 27, 1999

### **Conducted Emissions Section 15.107 Requirements**

For electronic filing, the conducted emission test result is saved with filename: conduct.pdf

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### 3.5 Line Conducted Emission Configuration Data

The data on the following page lists the significant emission frequencies, the limit, and the margin of compliance.

Judgement: Passed by 1.4 dB

\* All readings are peak unless stated otherwise.

### **TEST PERSONNEL:**

K. Glasm

Signature

Kenneth H.M.Lam, Compliance Engineer  
*Typed/Printed Name*

April 19, 1999  
*Date*

**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 iphoto6.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.