

Shenzhen Jiadianbao Electrical Products Co., Ltd.

Application
For
Certification
(FCC ID: MMIG988F)

RF Lighting Device

WO# 9910392
CKL/at
November 8, 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 : MMIG988F

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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

Shenzhen Jiadianbao Electrical Products Co., Ltd. - MODEL: G988F
FCC ID: MMIG988F

November 8, 1999

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

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

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

If yes, defer until:
date

Company Name agrees to notify the Commission by:
date

Report prepared by:	C. K. Lam
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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	12
3.4 Line Conducted Configuration Photograph (cont)	14
3.5 Line Conducted Emission Data	16
4.0 <u>Equipment Photographs</u>	19
5.0 <u>Product Labelling</u>	21
6.0 <u>Technical Specifications</u>	23
7.0 <u>Instruction Manual</u>	25

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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
Test Setup Photo	Conducted Emission	conduct1.jpg to conduct3.jpg
Test Report	Conducted Emission Test Result	conduct.pdf
External Photo	External Photo	ophoto1.jpg to ophoto2.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 two fluorescent tubes with electronic ballast. The EUT is operated at 47 kHz and powered by 120 VAC, 60 Hz.

The brief circuit description is listed as follows :

- R₀, C₂₀, L₁, C₁₇, C₁₈ and associated circuit act as ballast filter.
- D₄, D₅, C₁₃, C₁₄ and associated circuit act as voltage doubling bridge.
- D₁, D₂, D₃, D₁₂, C₁, C₂, C₆ and associated circuit act as Rectify.
- D₇, D₁₃ and associated circuit act as Transistor protection.
- R₁, R₂, R₃, R₄, R₅, R₈, C₁₁, C₁₅, C₁₆, D₈, D₉, Q₁, Q₂ and associated circuit act as Frequency Converter Mutiharmonic.
- C₇, T and associated circuit act as choked high frequency output.

1.2 Related Submittal(s) Grants

This is a single application for certification of a RF Lighting Device.

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1.3 Test Methodology

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	EI-0014	R&S	ESVS30	842807/001	December 1999
EMI Test Receiver	EW-0016	R&S	ESVS30	8693342/008	January, 2000
Antenna Set	EW-0446	EMCO	3146	9905-5219	November, 2000
	EW-0448	EMCO	3104C	9904-4850	November, 2000

2) Disturbance Voltage Tests for FCC Part 18

Equipment	Registration No.	Manufacturer	Model No.	Serial No.	Calibration Due Date
EMI Test Receiver	EI-0015	R&S	ESHS30	827128/009	December, 1999
Absorbing Clamp	EW-0613	R&S	MDS21	840031/001	October, 1999
LISN	EW-0090	R&S	ESH3-Z5	840731/0013	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 120 VAC.

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 placed on the turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

The worst case bit sequence was applied during test.

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 Shenzhen Jiadianbao Electrical Products Co., 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 Shenzhen Jiadianbao Electrical Products Co., Ltd.*



Signature

November 8, 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 dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ 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

55.647 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 16.3 dB

TEST PERSONNEL:

Signature

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

Date

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Company: Shenzhen Jiadianbao Electrical Products Co., Ltd.
Model: G988F

Date of Test: October 2, 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	40.837	27.7	10	16	21.7	1.7	20	-18.3
H	45.866	27.4	10	16	21.4	1.4	20	-18.6
H	51.032	27.8	11	16	22.8	2.8	20	-17.2
H	55.647	28.7	11	16	23.7	3.7	20	-16.3
H	60.874	28.6	10	16	22.6	2.6	20	-17.4
H	64.988	28.9	9	16	21.9	1.9	20	-18.1

- 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.
 4. Horn antenna and average detector are used for the emission over 1000MHz.

*Emission within the restricted band meets the requirement of Section 6.3. The corresponding limit as per Section 6.2.1 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Test Engineer: Danny T. L. Chui

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3.4 Line Conducted Configuration Photograph

Worst Case Line-Conducted Configuration

0.455 MHz

For electronic filing, the worst case line-conducted configuration photograph are saved with filename: conduct1.jpg to conduct3.jpg

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Company: Shenzhen Jiadianbao Electrical Products Co., Ltd.
Model: G988F

Date of Test: October 2, 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. Numbers with a minus sign are below the limit.

Judgement: Passed by 10.5 dB

* All readings are peak unless stated otherwise.

TEST PERSONNEL:



Signature

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

November 8, 1999
Date

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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 iphoto3.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.