Korea Technology Institute Co., Ltd.

Test Report

Test Report No.:	**KTI02EF0159**		
Registration No.:	**99058**		
Applicant:	**Jung Woo International Inc.**		
Applicant Address:	**495-4, Chowonjee-Ri, Daegoc-Myun, Kimpo-City, Kyunggi-Do, Korea**		
Product:	**SELF-BALLASTED LAMP**		
FCC ID:	**NTHES1225**	**Model No.**	**ES1225**
Receipt No.:	**02-0200**	**Date of receipt:**	**January 2,2002**
Date of Issue:	**February 22, 2002**		
Testing location	**Korea Technology Institute Co., Ltd. 51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeungki-Do, Korea**		
Test Standards:	**FCC/OET MP-5**		
Rule Parts:	**FCC Part 18,**		
Equipment Class:	**RF lighting devices (Consumer Equipment)**		
Test Result:	**The above mentioned product has been tested and passed.**		

Tested by: S. B. Kim/ Engineer

Signature Date

Approved by: G. C. Min/ President

Signature Date

Other Aspects :	
Abbreviations :	**• OK, Pass=passed • Fail=failed • N/A=not applicable**

This test report is not permitted to copy partly without our permission.
This test result is dependent on only equipment to be used.
This test result is based on a single evaluation of one sample of the above mentioned.
This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government.
We certify this test report has been based on the measurement standards that is traceable to the national or international standards.

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1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. All measurements reported herein were performed by Korea Technology Institute Co., LTD. And were made under Chief Engineer's supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

Korea Technology Institute Co., LTD

2.1 Location

51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeungki-Do, Korea

The Test Site is in compliance with ANSI C63.4/1992 for measurement of radio Interference.

2.2 List of Test and Measurement Instruments

Table 1 : List of Test and Measurement Equipment

• **Conducted Emissions**

Kind of Equipment	Type	S/N	Calibrated until
Spectrum Analyzer	R3261C	61720417	11.2002
Field Strength Meter	ESPC	832827/011	9.2002
LISN	KNW407	8-1157-2	10.2002
LISN	ESH2-Z5	8254601019	6.2002
Conducted Cable	N/A	N/A	11.2002

• **Radiated Emissions**

Kind of Equipment	Type	S/N	Calibrated until
Field Strength Meter	ESPC	832827/011	9.2002
Spectrum Analyzer	R3261C	61720417	11.2002
Pre Amplifier	HP 8447D	2944A06874	11.2002
BiconiLog Antenna	EMCO 3142B	1705	12.2002

3. Description of the tested samples

The EUT is SELF-BALLASTED LAMP

3.1 Rating and Physical Characteristics

- **Consumption Power: 25W**
- **Input Voltage: AC 120V**
- **Frequency of input line: 60Hz**
- **Life: 10,000Hrs**

3.2 Submitted Documents

- **User's Guide**
- **Block Diagram**

4. Measurement Conditions

Testing Input Voltage: AC 120V.

4.1 Modes of Operation

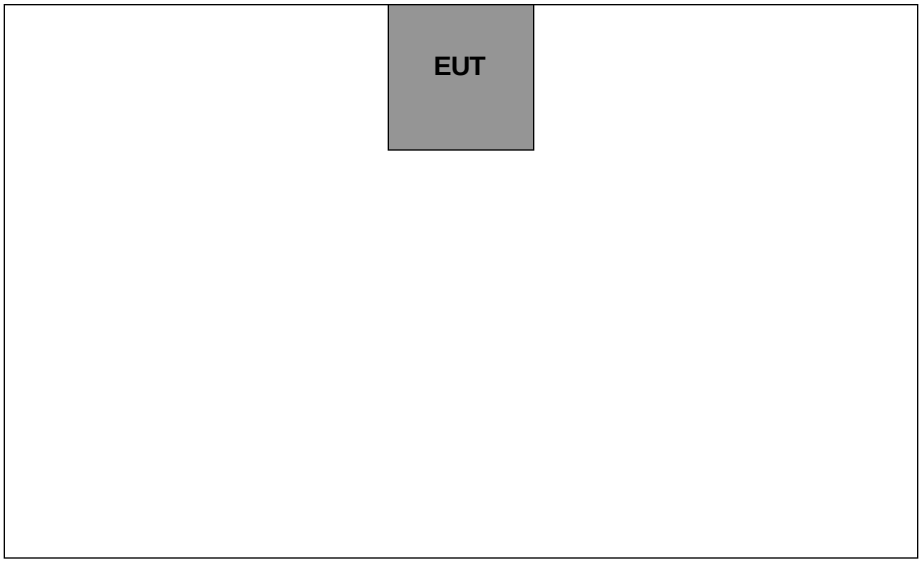
The EUT was in the following operation mode during all testing;
After warming up time of 30 minutes, Testing in mode of Lamp on.

4.2 Additional Equipment

DEVICE TYPE
Manufacturer
M/N
S/N
FCC ID

4.3 Uncertainty

1) Radiated disturbance
Uc (Combined standard Uncertainty) = ± 1.8dB
Expanded uncertainty U=KUc
K = 2
U = ± 3.6dB
2) Conducted disturbance
Uc = ± 0.88dB
U = KUc=2xUc = ± 1.8dB



4.4 Test setup

5. EMISSION Test

5.1 Conducted Emissions

Result : **Pass**

The line-conducted facility is located inside a 2.3M x 3.5M x 5.5M shielded closure.
The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 605-05.
A 1m x 1.5m wooden table 40cm high is placed 40cm away from the conducting ground plane and 40cm away from the sidewall of the shielded room. Kyoritsu Model KNW-407 (10kHz-30MHz) 50ohm/50 uH Line-Impedance Stabilization Networks (LISN) are bonded to the shielded room.
The EUT is powered from the R&S LISN and the support equipment is powered from the Kyoritsu LISN. Power to the LISN are filtered by a high-current high-insertion loss shield enclosures power line filters (100dB 14kHz-1GHz).
The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure.
All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2".
If the EUT is a DC-Powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the R&S LISN.
All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.
Sufficient time for the EUT, Support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.
The spectrum was scanned from 450kHz to 30MHz with 1msec. Sweep time.
The frequency producing the maximum level was reexamined using EMI field Intensity meter (ESPC) and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode.
The bandwidth of the receiver was set to 10kHZ. The EUT, support equipment, and interconnecting Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; if applicable; whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of conducted test.
Each EME reported was calibrated using self-calibrating mode.

Figure 1 : Spectral Diagram, LINE – PE

FCC PAER18 Calss B 18 Jan 2002 10:58

EUT: ES1225
Manuf:
Op Cond:
Operator: K.B.JUNG
Test Spec:
Comment: LINE -PE

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	OpRge
450kHz	30MHz	50kHz	10kHz	QP	1msec	10 dB	60dB

Prescan Measurement:
Detector: X QP
Meas Time: see scan settings
Peaks: 8
Acc Margin: 25 dB

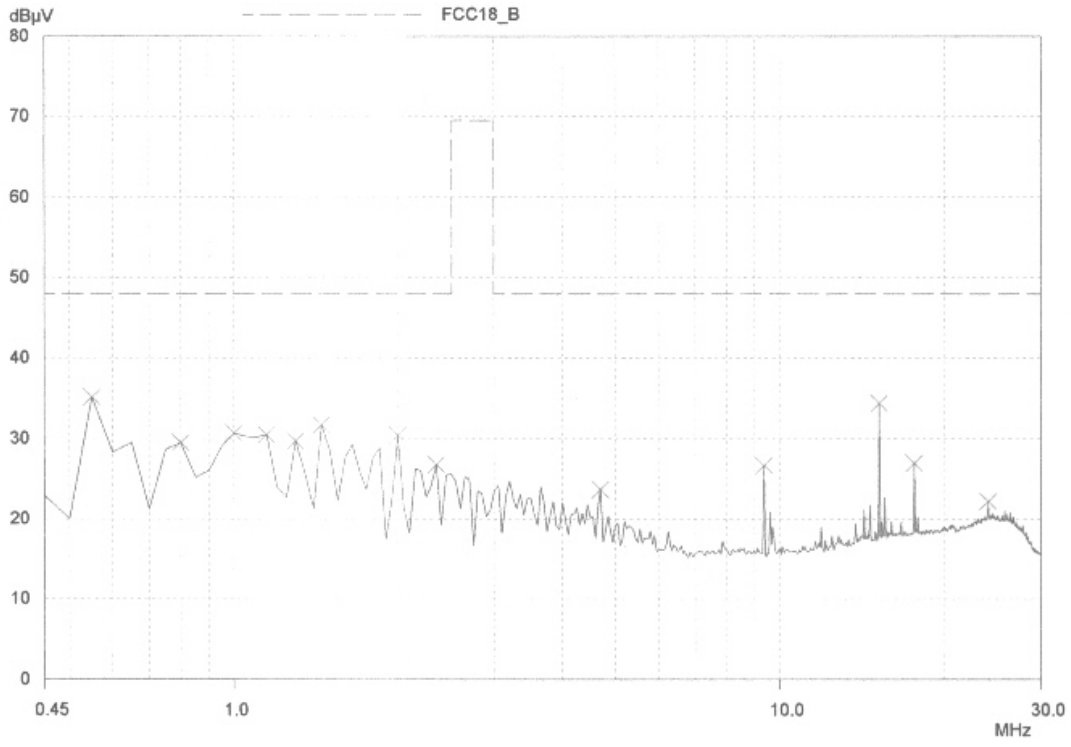


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Figure 2 : Spectral Diagram, NEUTRAL – PE

FCC PART 18 Calss B 18 Jan 2002 10:49

EUT: ES1225
Manuf:
Op Cond:
Operator: K.B.Jung
Test Spec:
Comment: Netural - PE

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	OpRge
450kHz	30MHz	50kHz	10kHz	QP	1msec	10 dB	60dB

Prescan Measurement: Detector: X QP
Meas Time: see scan settings
Peaks: 8
Acc Margin: 25 dB

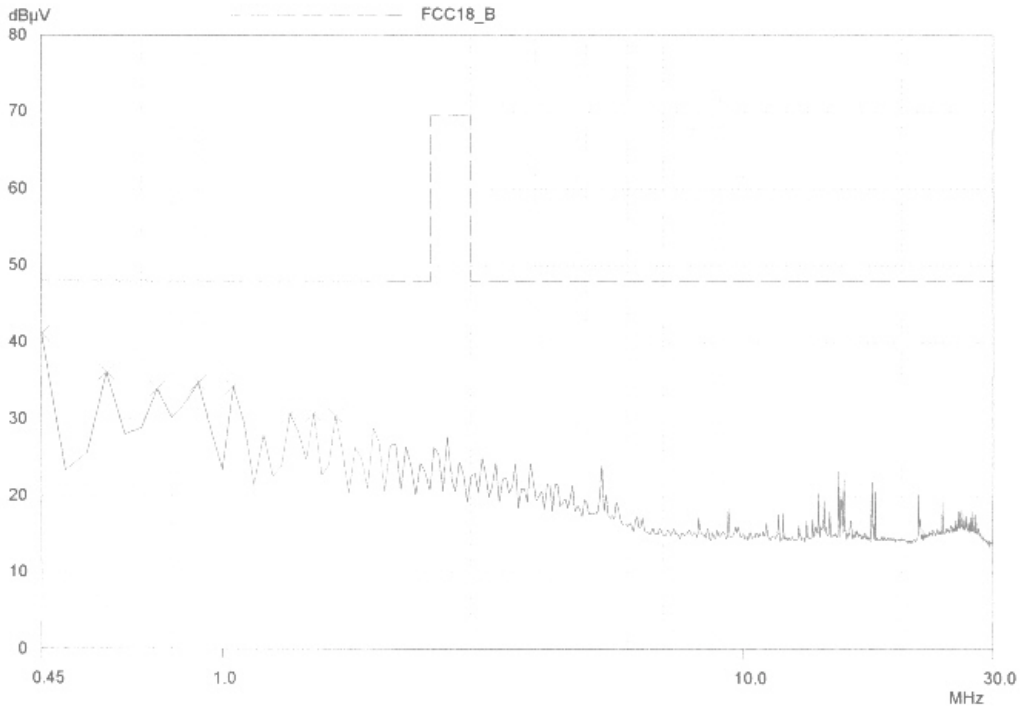

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Table 2 : Test Data, Conducted Emissions

Frequency (MHz)	(1)Reading (dB V)	Line	(2)Limit (dB V)	(3)Margin (dB)
0.45	41.10	N	48.00	6.90
0.55	35.10	H	48.00	12.90
0.6	36.04	N	48.00	11.96
0.75	33.85	N	48.00	14.15
0.9	34.70	N	48.00	13.30
1.05	34.17	N	48.00	13.83
15.2	34.35	H	48.00	13.65

NOTES:

1. All modes of operation were investigated
   And the worst-case emission are reported.
2. All other emissions are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR quasi-peak mode.
5. Line H = LINE-PE, Line N = NEUTRAL-PE
6. C/F = Correction Factor
7. C/L = Cable Loss
8. The limit for Consumer equipment is 250 uV (48dBuV) from 450KHz to 2.51MHz and 3.0 to 30.0MHz. The limit from 2.51MHz to 3.0MHz

5.2 Radiated Emissions

Result: Pass

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband Amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and Investigated. The system configurations, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found.
The spectrum was scanned from 30MHz to 1000 MHz using BiLog antenna.

Final measurements were made outdoors at 10-meter test range using EMCO antennas. The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with Polyethylene film. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter (ESPC) R & S. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1 MHz depending on the frequency or type or signal.

The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.4meter high non-metallic 1 x 1.5 meter table.
The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of radiated emission test.
Each EME reported was calibrated using self-calibrating mode.

Table 3 : Test Data, Radiated Emissions

Frequency (MHz)	Pol.	Height [m]	Angle [°]	(1) Reading (dB V)	(2) AFCL (dB/m)	(3) Actual ((dB V/m)	(4) Limit (dB V/m)	(5) Margin (dB)

Table. Radiated Measurements at 10-meters

Test Results were under the required limit with 20dB margin or more.

Notes:

1. All modes of operation were investigated
   And the worst-case emission are reported.
2. All other emission are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR quasi-peak mode.
5. AFCL = Antenna factor and cable loss
6. H = Horizontal, V = Vertical Polarization
7. The limit for Part 18 lighting device is 29.5dBuV/m from 30MHz to 88MHz, 33dBuV/m from 88MHz to 216MHz, 35.5dBuV/m from 216MHz to 1000MHz.

• Margin Calculation

(5)Margin = (4)Limit – (3)Actual

[(3)Actual = (1)Reading + (2)AFCL]