



KES Co., Ltd.

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Test report No.:
KES-E1-120878
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EMI Test Report for FCC

CoC / Verification

Test Report No. : KES-E1-120878

Date of Issue : 09.21.2012

Description of Product : Induction Lamp

Model No. : ETP-2200U

Variant Model : ETP-2150U, ETP-2120U

FCC ID : PTMETP-2200U

Applicant : ETECH Co., Ltd.

862-12, Habuk-dong, Jeongeup-si, Jeonbuk, Korea

Manufacturer : Same as above

Same as above

Standards : Part 18.307(c): Conducted Emission

Part 18.305(c): Radiated Emission

Test Date : 09.04.2012 ~ 09.04.2012

Test Results : Pass Fail

The test results relate only to the items tested.

Tested by:

Jae Ju, Lee
Test Engineer

Reviewed by:

Won Wook, Kim
Technical Manager



Testing Laboratories for EMS and Safety and RF Compliance
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Testing Laboratories for EMI Compliance 477-6, Hageo-ri, Yeoju-eup, Yeoju-gun, Gyeonggi-do,
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1. General Information

1.1 Introduction

The EMI Test Report of Information Technology Equipment is prepared on behalf of named applicant in accordance with the ANSI C63.4-2003. The test results reported in this document relate only to the item that was tested.

The detailed description of the measurement facility was found to be in compliance with the requirement of Section 2.948 of the FCC Rules. The Federal Communications Commission has the reports on file and is listed under Registration Number: 0022025712. The scope of the accreditation covers the FCC Method - 47 CFR Part 15 or 18 of the Commission's Rules.

All measurements contained in this report were conducted in accordance with ANSI C63.4-2003. The instrumentation utilized for the measurements conforms with CISPR16 Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods. Some accessories are used to increase sensitivity and prevent overloading of the measuring instrument. Calibration checks are performed yearly on the instruments by a local calibration laboratories.

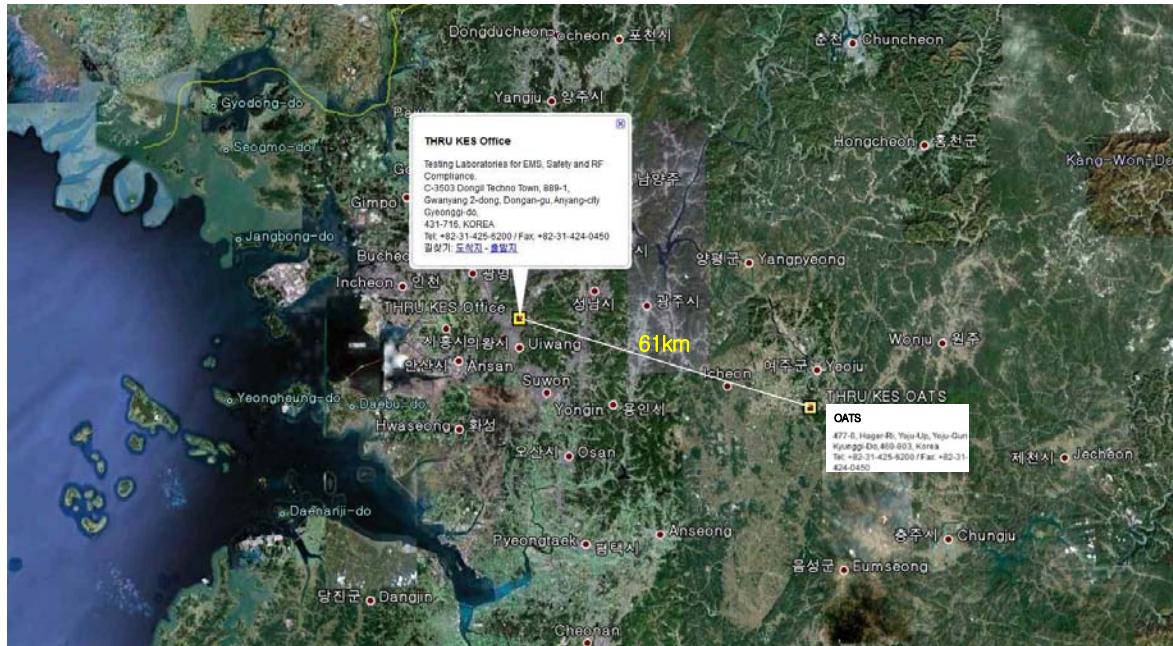
All radiated and conducted emission measurements are performed manually at KES Co., Ltd. (hereinafter referred to as "KES"), 477-6, Hageo-ri, Yeoju-eup, Yeoju-gun, Gyeonggi-do, 469-803, Korea

The radiated emission measurements required by the FCC Rules were performed on 3 meter or 10 meter, Open Area Test Site, test range maintained by KES. Complete ANSI 63.4-2003 description and site attenuation measurement data records are maintained at the test facility and have been placed on file with the Federal Communications Commission. The power line conducted emission measurements were performed in a shielded enclosure also located at the same facility.

The KES EMC test facilities in Anyang-City and Yeoju-eup are designated testing laboratory according to ISO/IEC 17025 by Radio Research Agency(RRA), Korea Communications Commission.

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1.2 Geographic location



KES Office Latitude : 37°23'54.59"N, Longitude : 126°58'14.66"E



KES OATS Latitude : 37°13'58.03"N, Longitude : 127°37'21.95"E



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1.3 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	0022025712
KOREA	KCC	EMC (10 meter Open Area Test Site and two conducted sites) Radio(3 & 10 meter Open Area Test Sites and one conducted site)	KR0100
Canada	IC	3 & 10 meter Open Area Test Sites and one conducted site	4769B-1

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1.4 Product Description

ETECH Co., Ltd., Induction Lamp, Model No: ETP-2200U, or the "EUT".

Main Specifications of EUT are:

Rating Input Voltage	277 V (ac) $\pm 10\%$
Rating Input Current	0.73 A
Rating Input Frequency	50 Hz ~ 60 Hz
Rating Power	200 W
Output Frequency	250 kHz
Size	(242 \times 115 \times 57) mm
Weight	1 100 g
Operating Temperature	- 20 °C ~ 50 °C (Max 70 °C)

- Variant Mode : ETP-2150U (Rating Power : 150 W), ETP-2120U (Rating Power : 120 W)

※ Test Operating Mode

- **Normal Operating mode .**



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1.5 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Induction Lamp	ETP-2200U	None	ETECH Co., Ltd.	EUT

1.6 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
N/A	N/A	N/A	N/A	N/A

1.7 External I/O Cabling

Description	Length (m)	Port/From	Port/To	Remarks
N/A	N/A	N/A	N/A	N/A

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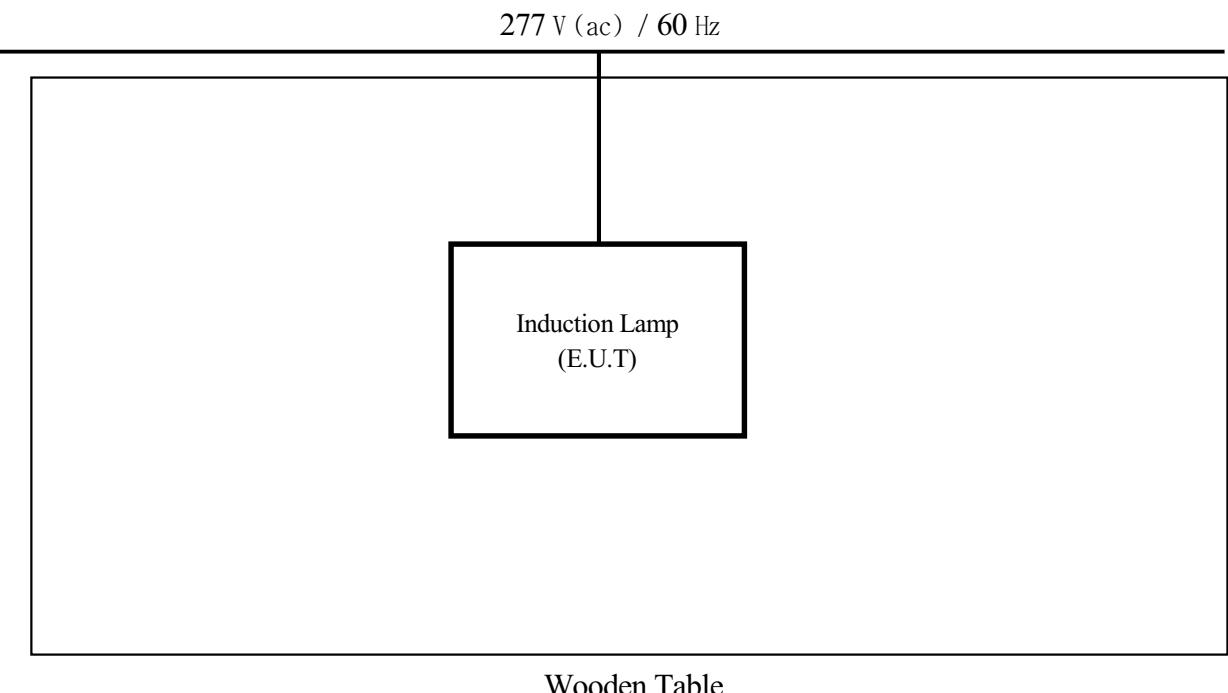
1.8 Special Accessories

As shown in section 1.10, all interface cables used for compliance testing are shielded as normally supplied or by use respective component manufacturers.

1.9 EUT Modifications

No modifications were made to the EUT in order to achieve and maintain compliance to the standards described in this report.

1.10 Configuration of Test System





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2. Summary of Tests

FCC Part Section(s)	Parameter	Test Condition	Status (note 1)
18.305	Emission limits	Radiated	C
18.307	Conducted limits	Conducted	C

Note 1 : C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

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2.1 Conducted Emission Measurements

2.1.1 Test Methods

The power line conducted emission measurements were performed in a shielded enclosure, using the setup in accordance with ANSI C63.4-2003 conducted emission measurement procedure.

2.1.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
EMI Test Receiver	R & S	ESHS10	862970/018	05. 2013
LISN	R & S	ENV216	101137	02. 2013
LISN	EMCO	3825/2	1409	04. 2013
Electromagnetic Shield Room	Korea Shield Room	-	-	-

2.1.3 Test Environments

Ambient Temperatures	Relative Humidity
15.0 °C ~ 35.0 °C	30 % ~ 60 %

2.1.4 Test Limits

Frequency (MHz)	18.307 Conducted limits	
	Max RF Voltage (uV)	Max RF Voltage (dBuV)
Non-Consumer Equipment		
0.45 to 1.60	1 000	60.0
1.60 to 30.00	3 000	69.5
Consumer Equipment		
0.45 to 2.51	250	48.0
2.51 to 3.00	3 000	69.5
3.00 to 30.00	250	48.0

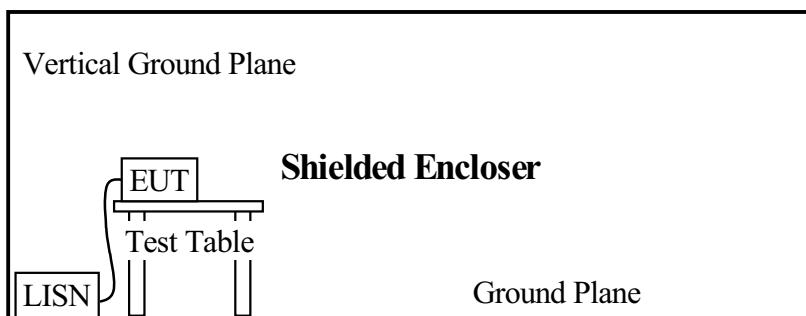
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2.1.5 Test Procedure

Conducted emission levels were measured on each current-carrying line with the EMI TEST Receiver operating in the CISPR quasi-peak mode (or peak mode if applicable). The Receiver's 6 dB bandwidth was set to 9 kHz. The initial step in collecting conducted data is a EMI TEST Receiver peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 450 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

The conducted emission test was performed with the EUT exercise program loaded, and the emissions were scanned between 450 kHz to 30 MHz on the HOT side and NEUTRAL side, herein referred to as H and N, respectively.

2.1.6 Test Configuration



2.1.7 Test Results

According to the data in section 2.1.8, the EUT complied with the FCC 18.307 limits.



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2.1.8 Test Data

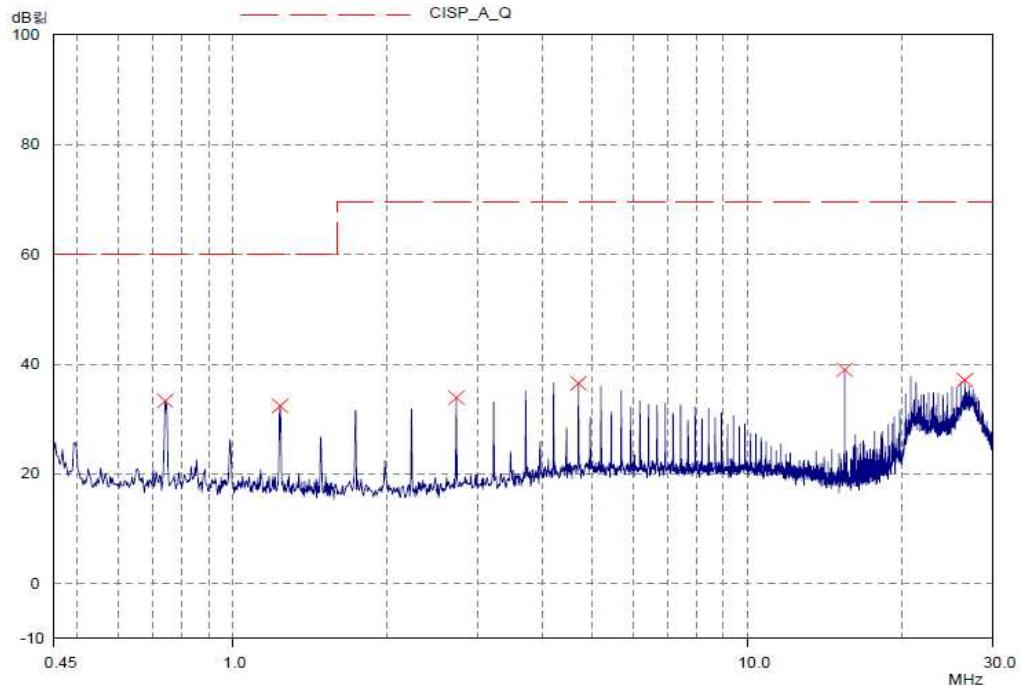
Frequency [MHz]	Correction		Phase Hot/ Neutral	Non-Consumer Equipment (dBuV)		
	LISN (dB)	Cable (dB)		Limit	Measure	Result
0.741	9.541	0.049	H	60.000	26.690	26.690
0.744	9.561	0.049	N	60.000	27.380	27.380
1.239	9.552	0.061	H	60.000	27.630	27.630
1.239	9.570	0.061	N	60.000	27.670	27.670
1.735	9.570	0.075	N	69.500	38.190	38.190
2.725	9.567	0.095	H	69.500	35.620	35.620
4.210	9.592	0.121	N	69.500	35.800	35.800
4.705	9.577	0.128	H	69.500	33.000	33.000
15.478	9.695	0.211	H	69.500	30.530	30.530
20.320	10.164	0.270	N	69.500	34.440	34.440
26.503	9.766	0.285	H	69.500	32.410	32.410
26.512	10.053	0.285	N	69.500	32.730	32.730

Temperature: 23.5 °C Humidity: 52 % Test Date: 09.04.2012 Tested by: Jae Ju, Lee

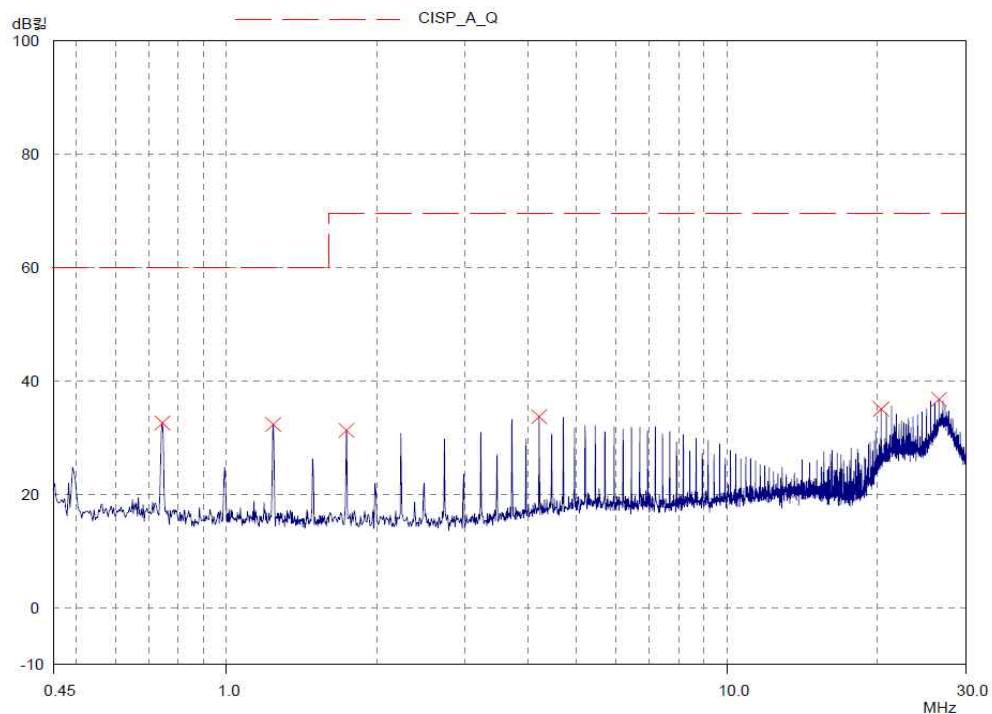
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2.1.9 Plots of Test Data

Polarization: HOT



Polarization: NEUTRAL



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2.2 Radiated Emission Measurements

2.2.1 Test Methods

The radiated emission measurements were performed in a Open Area Test Site (OATS), using the setup in accordance with ANSI C63.4-2003 radiated emission measurement procedure.

2.2.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
EMI TEST Receiver	R & S	ESVS10	826008/014	05. 2013
EMI Test Receiver	LIG NEX1	ISA-80	L0912K014	05. 2013
Pre-Amplifier	HP	8447F	2805A02570	02. 2013
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-350	03. 2013
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-385	04. 2013
Horn Antenna	A.H. SYSTEMS, INC	SAS-517	414	03. 2013

2.2.3 Test Environments

Ambient Temperatures	Relative Humidity
15.0 °C ~ 35.0 °C	30 % ~ 60 %

2.2.4 Test Limits

Frequency (MHz)	18.305 Radiated emission limits			
	Non-consumer Equipment @ 3 m		Consumer Equipment @ 3 m	
	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)
30 to 88	49.5	300	40.0	100
88 to 216	54	500	43.5	150
216 to 1 000	57	700	46.0	200

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2.2.5 Test Procedure

Before final measurements of radiated emission were made at the 3M Full Chamber, the EUT was scanned in semi-anechoic chamber in order to determine its emission spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emission in amplitude, direction and frequency. This process was repeated during final radiated emission measurements at the OATS range, at each frequency, in order to ensure that maximum emissions amplitudes were attained.

The radiated emission test was performed with EUT exercise program loaded, and the emissions were scanned between 30 MHz to 1 000 MHz using a R&S ESVS10 EMI TEST Receiver. The EMI TEST Receiver's 6 dB bandwidth was set to 120 kHz, and EMI TEST Receiver was operated in the CISPR quasi-peak detection mode.

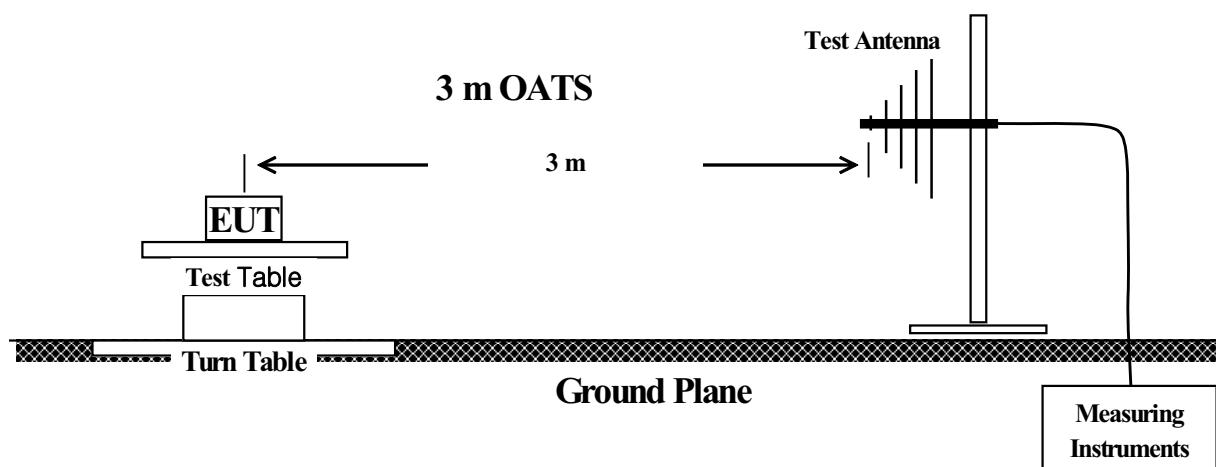
At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum emission levels. Measurements were taken using both HORIZONTAL and VERTICAL antenna polarization, herein referred to as H and V, respectively.

2.2.6 Field Strength Calculation

The Field Strength (FS) is calculated by adding the Antenna Factor (AF) and Cable Factor (CF) and Amplifier Gain(AG) from the Measured Reading (MR). The basic equation with a sample calculation is as follows:

$$FS(\text{dB}\mu\text{V}/\text{m}) = MR(\text{dB}\mu\text{V}) + [AF(\text{dB}/\text{m}) + CF(\text{dB})]$$

2.2.7 Test Configuration



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2.2.8 Test Results

A search was made of the spectrum from 30 to 1 000 and the measurements indicate that the unit DOES meet the FCC requirements.

2.2.9 Test Data

Indicated		Antenna		Correction Factor		Corrected Amplitude	Non-consumer Equipment	
Frequency (MHz)	Amplitude (dBuV/m)	Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)	(dBuV/m)	Applicable Limit (dBuV/m)	Margin (dB)
30.000	16.300	H	1.800	12.540	1.160	30.000	49.500	19.500
30.000	16.900	V	1.500	12.540	1.160	30.600	49.500	18.900
63.900	19.130	H	2.100	12.490	1.480	33.100	49.500	16.400
85.700	18.920	V	2.600	8.450	1.730	29.100	49.500	20.400
129.400	10.840	H	3.100	11.910	2.150	24.900	54.000	29.100
175.500	12.730	V	1.400	12.020	2.550	27.300	54.000	26.700
253.100	12.120	H	1.600	11.770	3.310	27.200	57.000	29.800
253.100	6.220	V	2.500	11.770	3.310	21.300	57.000	35.700

Temperature: 26.0 °C Humidity: 43 % Test Date: 09.04.2012 Tested by: Jae Ju, Lee

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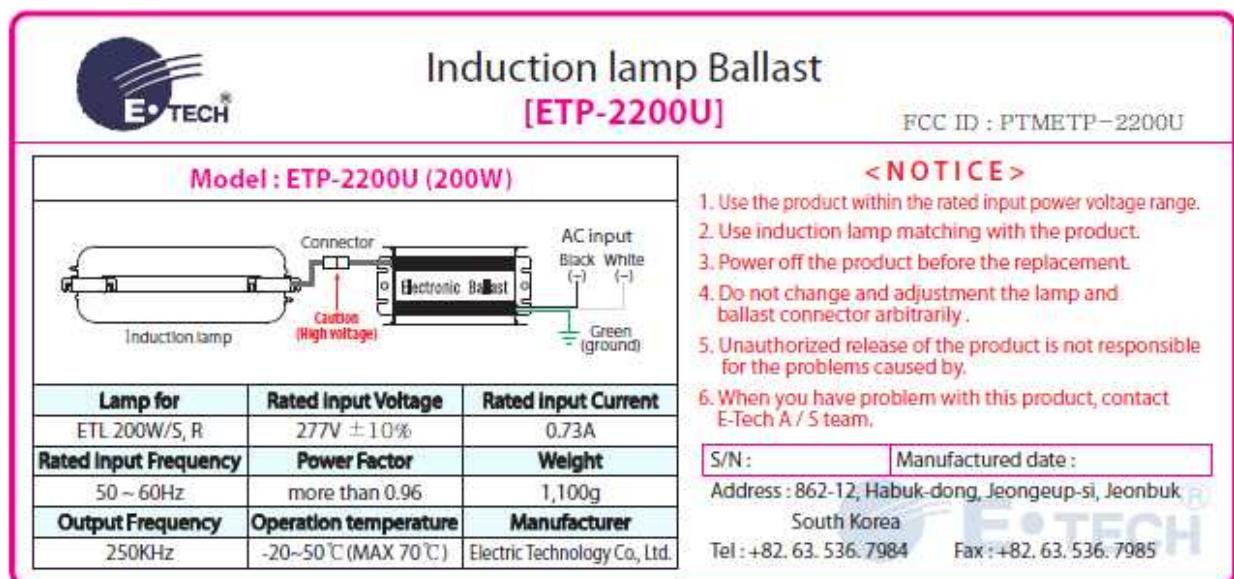
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3. Product Labelling Requirements

3.1 FCC Statement

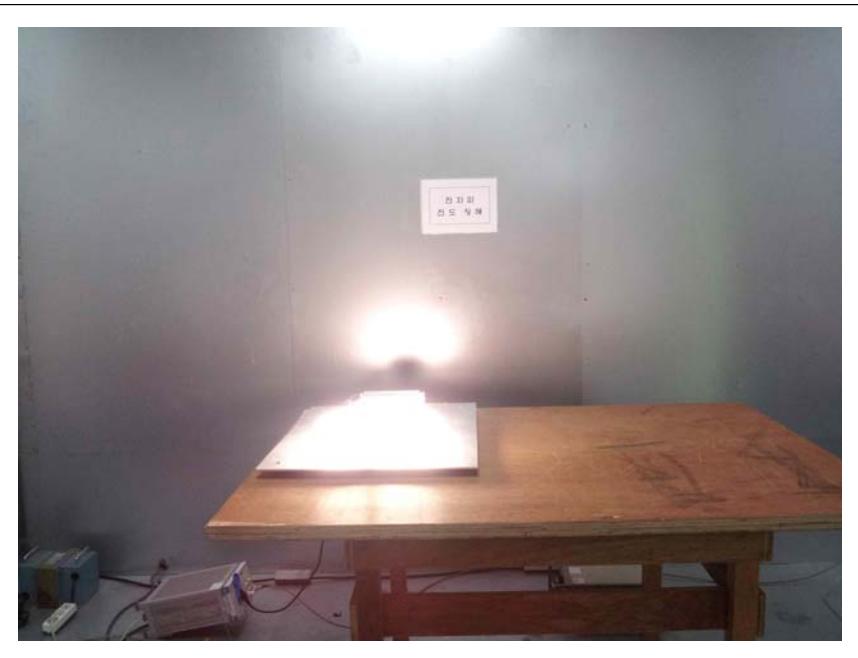
Product shall be labelled the following statement on the user's manual:



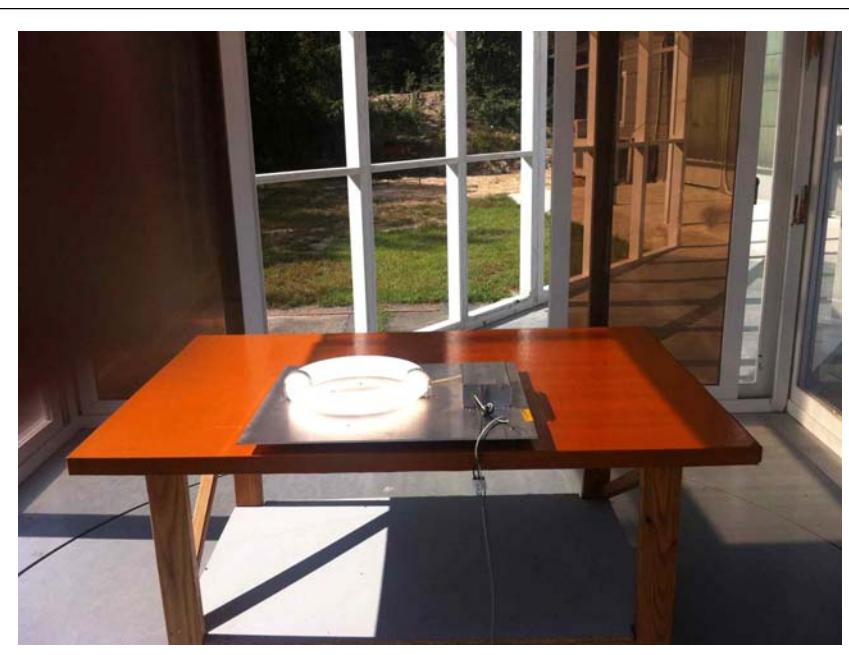
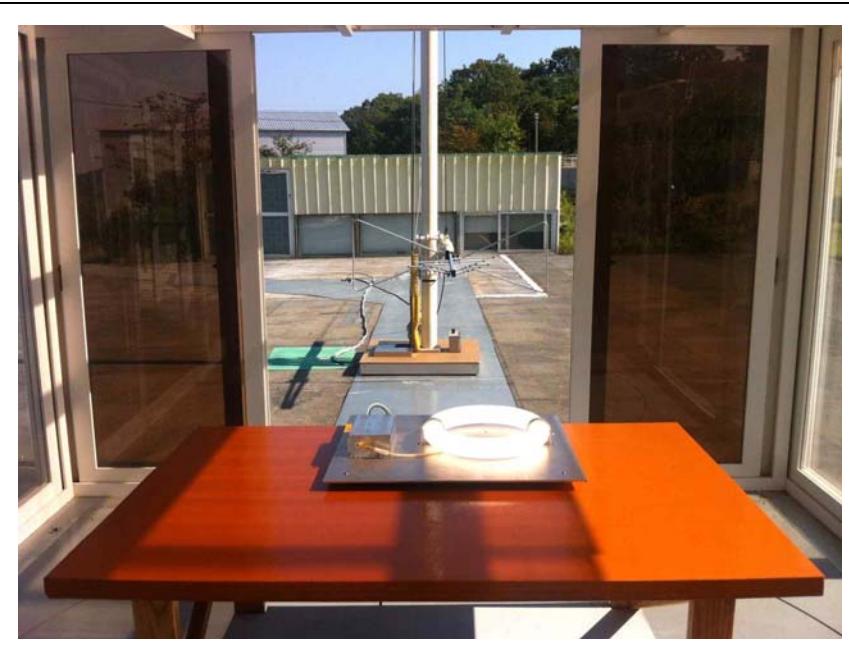
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4. Test Setup Photographs

4.1 Conducted Emission



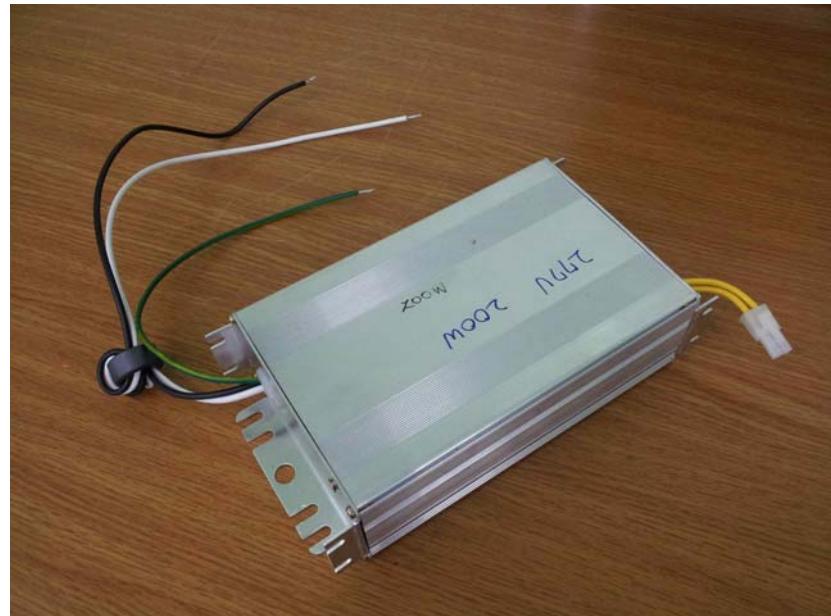
4.2 Radiated Emission



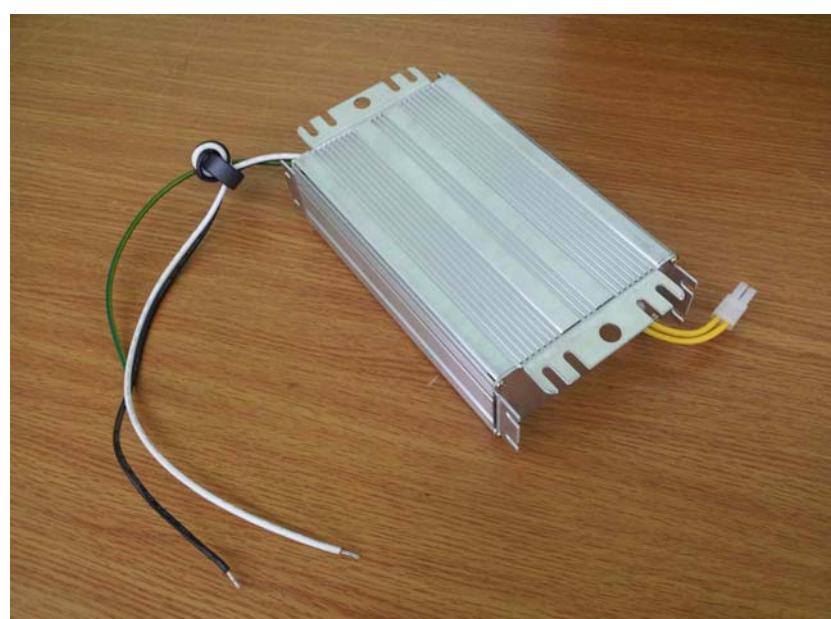
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5. External Photographs

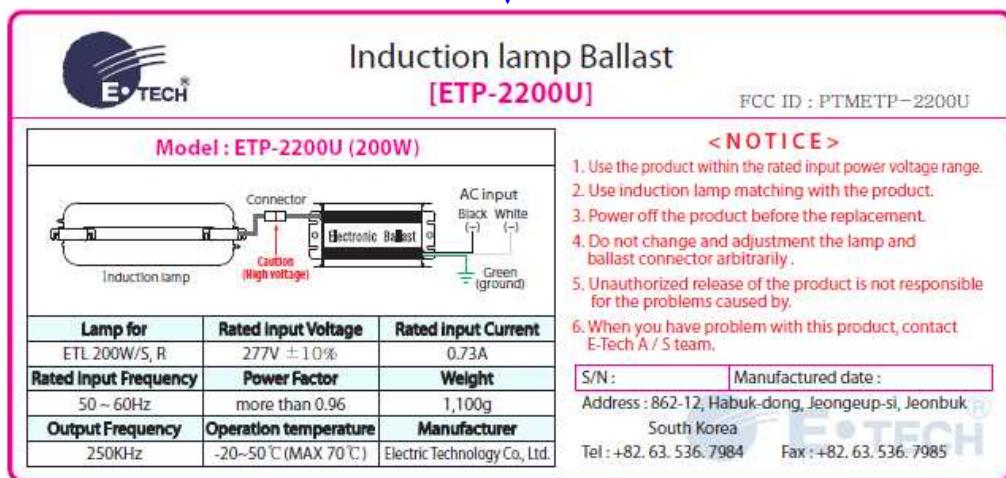
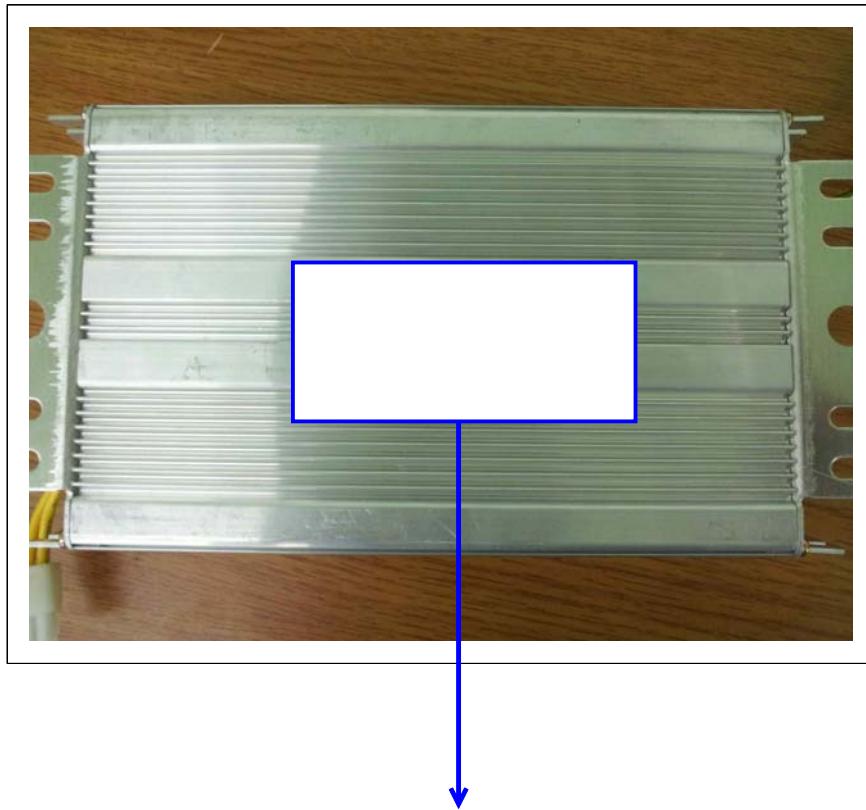
5.1 EUT: Front View



5.2 EUT: Rear View

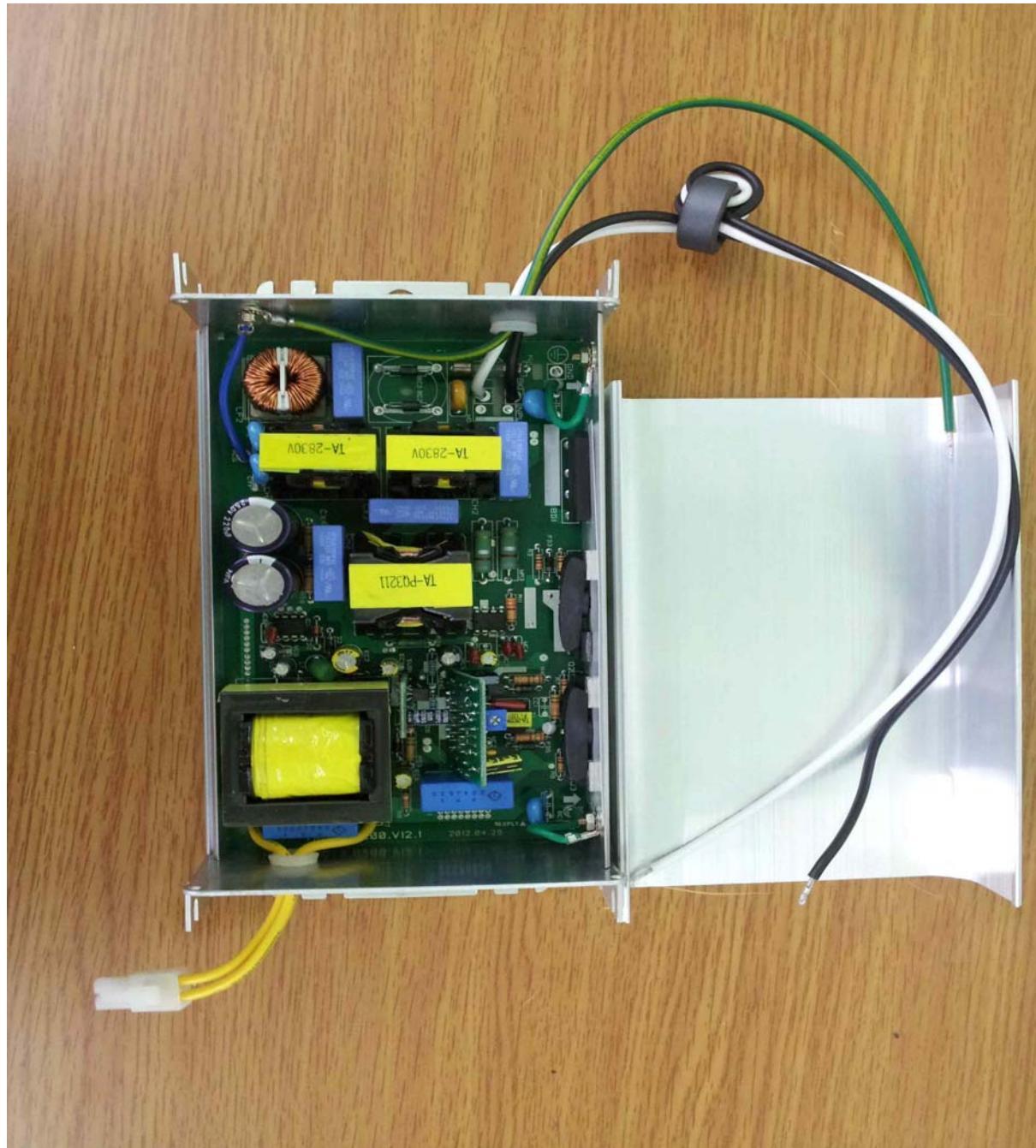


5.3 EUT: Label View(Location)



6. Internal Photographs

6.1 EUT: Internal View

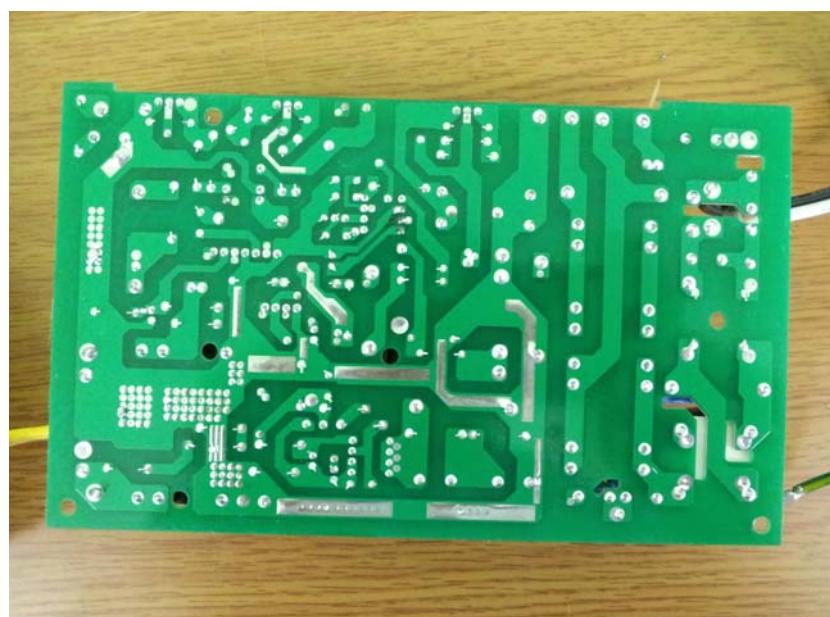


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6.2 EUT: Internal View(Top) - Main Board



6.3 EUT: Internal View(Bottom) - Main Board





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Appendix A - Schematics/Block Diagram

Please see attached document(s).

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Appendix B - User's Manual

Please see attached document(s).

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