FCC / Certification Test Report

Golden Scorpion Co.,Ltd

Electronic Ballast

Model：GS-SHWXUXAXXX

REPORT# 14WB0905022F Rev 0
FCC ID: 2AC8ZGS-SHWXUXAXXX

Sep.18, 2014

Prepared for:

Golden Scorpion Co.,Ltd

Floor 2, Building 2, Changping Science Park, No.27, Chuangxin Road,

Changping District, Beijing, China

Prepared by:

WASHINGTON TECHNOLOGY INTERNATIONAL LIMITED

This report applies only to the sample evaluated prior to the preparation date stated above.
This report must be copied in its entirety, including all technical documents

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For the

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MODEL: **GS-SHWXUXAXXX**

FCC ID:2AC8ZGS-SHWXUXAXXX

WLL REPORT# 14WB0905022F Rev 0
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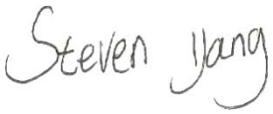
Henry guo

Reviewed by:



Steven yang

Abstract

This report has been prepared on behalf of Golden Scorpion Co.,Ltd to document compliance with the limits for a digital device required under Part 18 of the FCC Rules and Regulations This Industrial scientific and medical equipment (FCC) Test Report documents the test configuration and test results for the Golden Scorpion Co.,Ltd Electronic Ballast. Testing was performed on Audix Technology (Shenzhen) Co., Ltd. has been accepted by the FCC, the FCC Registration Number is 90454.

The Golden Scorpion Co.,Ltd Electronic Ballast complies with the requirements for a FCC Part 18 consumer RF lighting device.

Revision History	Reason	Date
Rev 0	Initial Release	**Sep.18, 2014**

Table of Contents

List of Tables

List of Figures

List of Photographs

1 Introduction

1.1 Compliance Statement

The Golden Scorpion Co.,Ltd Electronic Ballast complied with the requirements for a consumer RF lighting device under Part 18 of the FCC Rules and Regulations

1.2 Test Scope Summary

Tests for radiated and conducted emissions were performed. All measurements were performed according to the 2009 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

Test Specification	Specific Description	Date Completed	Result	Test location	Modifications (Y/N)
CFR47 Part 18	Conducted Emissions at the Mains Port	Sep.16, 2014	Complied	Audix Technology (Shenzhen) Co., Ltd.	N
CFR47 Part 18	Radiated Emissions	Sep.16, 2014	Complied	Audix Technology (Shenzhen) Co., Ltd.	N

1.3 Contract Information

Customer: Golden Scorpion Co.,Ltd

Floor 2, Building 2, Changping Science Park, No.27, Chuangxin Road,

Changping District, Beijing, China

Abbreviations

A	**A**mpere
ac	**a**lternating **c**urrent
AM	Amplitude Modulation
Amps	**Amp**ere**s**
b/s	**b**its per **s**econd
BW	**B**and**W**idth
CE	**C**onducted **E**mission
cm	**c**enti**m**eter
CW	**C**ontinuous **W**ave
dB	**d**eci**B**el
dc	**d**irect **c**urrent
EMI	**E**lectro**m**agnetic **I**nterference
EUT	**E**quipment **U**nder **T**est
FM	**F**requency **M**odulation
G	**g**iga - prefix for 10^9 multiplier
Hz	**H**ertz
IF	**I**ntermediate **F**requency
k	**k**ilo - prefix for 10^3 multiplier
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
M	**M**ega - prefix for 10^6 multiplier
m	**m**eter
µ	**m**icro - prefix for 10^{-6} multiplier
NB	**N**arrow**b**and
QP	**Q**uasi-**P**eak
RE	**R**adiated **E**missions
RF	**R**adio **F**requency
rms	**r**oot-**m**ean-**s**quare
SN	**S**erial **N**umber
S/A	**S**pectrum **A**nalyzer
V	**V**olt

2 Equipment Under Test

2.1 EUT Identification

The results obtained relate only to the item(s) tested.

Table 1: Overview of Electronic Ballast, Equipment Under Test

Model(s) Tested:	GS-SHW1U2A001
EUT Specifications:	In the tests the primary power was provided by AC 240V/60Hz
Test Date(s):	Sep.16, 2014

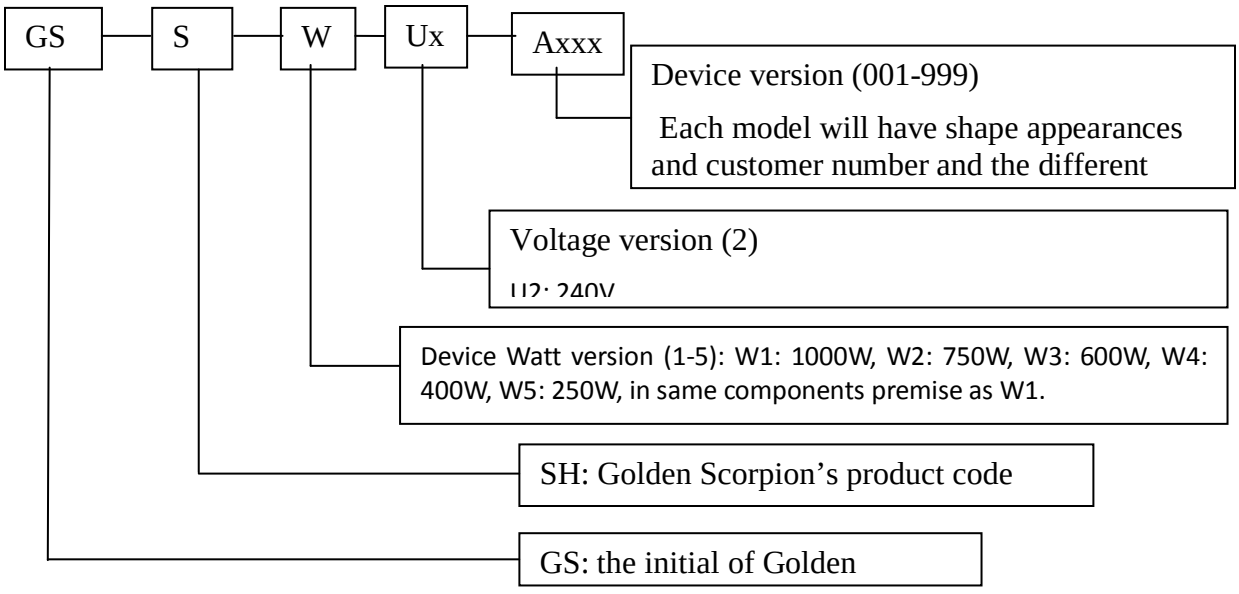
2.2 EUT Description

Product Name: Electronic Ballast

Model No. : GS-SHWXUXAXXX

Test Model: GS-SHW1U2A001

EUT Rated Voltage: AC 240V±10%，60Hz



2.3 Test Configuration

The Golden Scorpion Co.,Ltd Electronic Ballast, Equipment Under Test (EUT), was operated from AC power supply.

EUT connect to the Adapter, Running test soft and PC running ping to EUT, Check or Repair it.

The Electronic Ballast was configured as below:

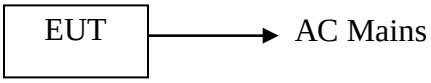


Figure 1: Test Configuration

2.4 Equipment Configuration

The EUT was set up as outlined in Figure 1. The EUT was comprised of the following equipment. (All Modules, PCBs, etc. listed were considered as part of the EUT, as tested.)

Table 2: Equipment Configuration

Slot #	Name / Description	Model Number	Part Number	Serial Number	Revision
1.	Electronic Ballast	GS-SHW1U2A001	/	/	/

2.5 Tested Supporting System Details

Table 3: Tested Supporting System Details

Slot #	Port Identification	Connector Type	Cable Length	Shielded (Y/N)	Termination Point
1.	Power Cord	Unshielded, Detachable	2m	N	AE
2	Lighting	Unshielded, Detachable	N/A	N	AE

2.6 Testing Algorithm

The Electronic Ballast was operated continuously by normal operating conditions.

2.7 Test Location

NAME: Audix Technology (Shenzhen) Co., Ltd.

FCC Registration Number: 90454.

Address: No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park, Nantou, Shenzhen, Guangdong, China

2.8 Measurements

2.8.1 Measurement Method

All measurements herein were performed according to the 2009 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation. Calibration checks are made periodically to verify proper performance of the measuring instrumentation.

2.8.2 Measurement Uncertainty

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see Equation 2). A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_c = \pm\sqrt{\frac{a^2}{div_a{}^2} + \frac{b^2}{div_b{}^2} + \frac{c^2}{div_c{}^2} + ...}$$

where u_c = standard uncertainty

a, b, c,.. = individual uncertainty elements

$div_{a,\ b,\ c}$ = the individual uncertainty element divisor based on the probability distribution

divisor = 1.732 for rectangular distribution

divisor = 2 for normal distribution

divisor = 1.414 for trapezoid distribution

Equation 2: Expanded Uncertainty

$$U = ku_c$$

where U = expanded uncertainty

k = coverage factor

$k \leq 2$ for 95% coverage (ANSI/NCSL Z540-2 Annex G)

u_c = standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is not used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in Table 4 below.

Table 4: Expanded Uncertainty List

Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	FCC Part 18	3.10 dB(150KHz to 30MHz)
Radiated Emissions (30MHz-1GHz)	FCC Part 18	3.22dB (30~200MHz, Polarize: H)
		3.23dB (30~200MHz, Polarize: V)
		3.49dB (200M~1GHz, Polarize: H)
		3.39dB (200M~1GHz, Polarize: V)
Radiated Emissions (9kHz-30MHz)	FCC Part 18	2.72 dB(9KHz~30MHz, Distance: 3m)

3 Test Results

3.1 Conducted Emissions

3.1.1 Requirements

Test Arrangement: Table Top

Compliance Standard: FCC Part 18

Compliance Limits	
Frequency	**Quasi-Peak Level dB(μV)**
450kHz~2.51MHz	48
2.51MHz~3.0MHz	70
3.0MHz~30MHz	48

3.1.2 Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	1# Shielding Room	AUDIX	N/A	N/A	Apr.17,14	1 Year
2.	Test Receiver	Rohde & Schwarz	ESHS10	838693/001	Oct.31, 13	1 Year
3.	L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	100429	Jan.22, 14	1 Year
4.	L.I.S.N.#3	Kyoritsu	KNW-242C	8-1920-1	Apr. 28,14	1 Year
5.	Terminator	Hubersuhner	50Ω	No. 1	Apr. 28,14	1 Year
6.	Terminator	Hubersuhner	50Ω	No. 2	Apr. 28,14	1 Year
7.	RF Cable	Hubersuhner	RG58	0100.6954.20#	Jan.22, 14	1Year
8.	Coaxial Switch	Anritsu	MP59B	6200298346	Apr. 28,14	1 Year
9.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	101838	Jan.22, 14	1 Year

3.1.3 Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#3).Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4: 2009 on conducted Emission test.

The bandwidth of the R&S Test Receiver ESHS20 was set at 9kHz.

The frequency range from 450kHz to 30MHz is checked.

3.1.4 Test Data

The EUT Electronic Ballast complied with the Conducted Emissions requirements.

Table 5 provides the test results for Conducted emissions.

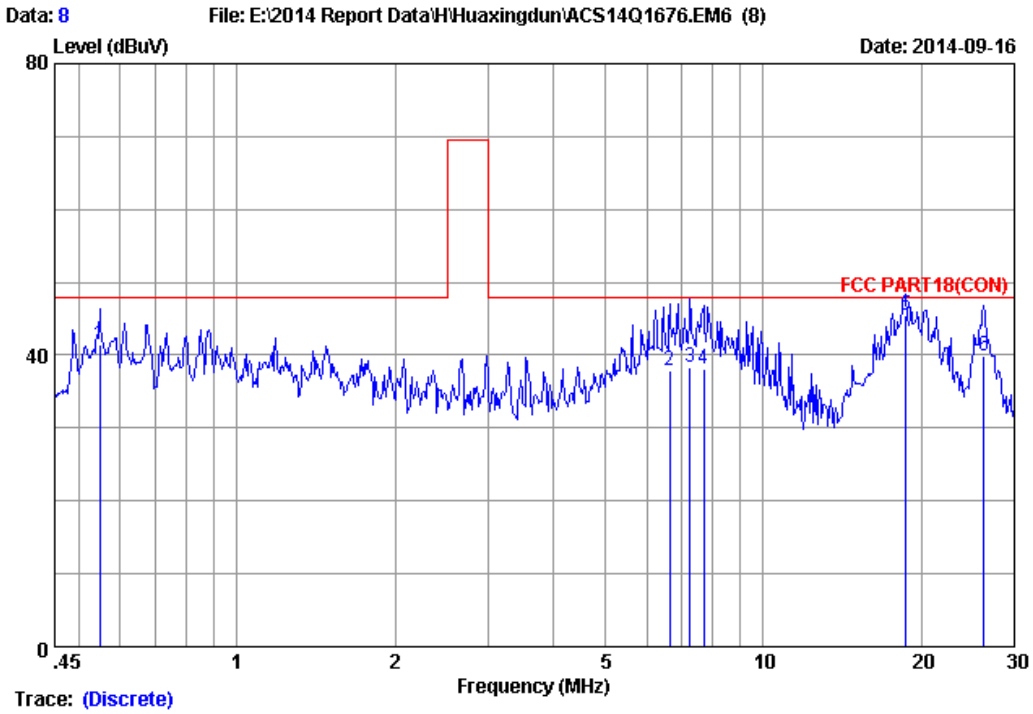
Photograph 1 and Photograph 2 show the Conducted emission test configuration.

Test Engineer(s): Andy

Test Date(s): Sep.16, 2014

Test Location: Audix Technology (Shenzhen) Co., Ltd.

Table 5: Conducted Emissions Test Data

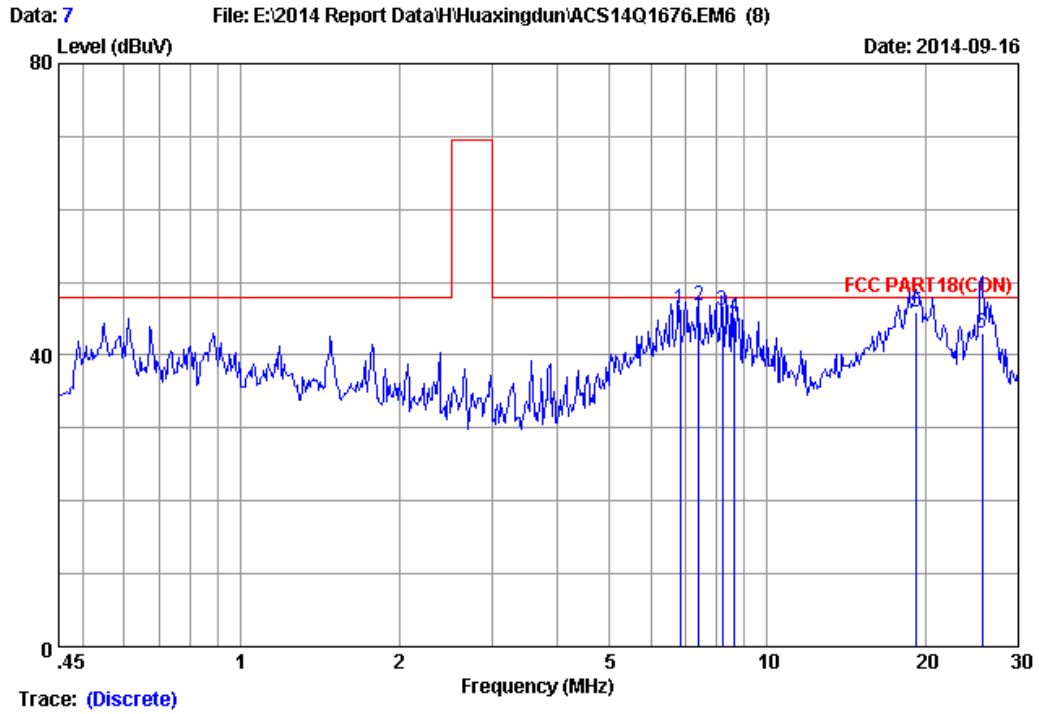


Site no :1# Conduction
Dis./Ant. :2014 ESH2-Z5 LINE
Limit :FCC PART18(CON)
Env./Ins. :26.6*C/52%
EUT :HID Ballast
Power Rating :AC 240V/60Hz
Test Mode :ON
M/N:GS-SHW1U2A001

Data No :8
Engineer :Nick_Huang

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.54800	0.15	9.88	31.51	41.54	48.00	6.46	QP
2	6.642	0.32	9.97	27.50	37.79	48.00	10.21	QP
3	7.255	0.34	9.97	28.10	38.41	48.00	9.59	QP
4	7.694	0.34	9.98	27.70	38.02	48.00	9.98	QP
5	18.664	0.77	10.07	34.70	45.54	48.00	2.46	QP
6	26.227	0.88	10.14	28.90	39.92	48.00	8.08	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)
+Reading.
2.If the average limit is met when useing a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.



Site no :1# Conduction
Dis./Ant. :2014 ESH2-Z5 NEUTRAL
Limit :FCC PART18(CON)
Env./Ins. :26.6*C/52%
EUT :HID Ballast
Power Rating :AC 240V/60Hz
Test Mode :ON
M/N:GS-SHW1U2A001

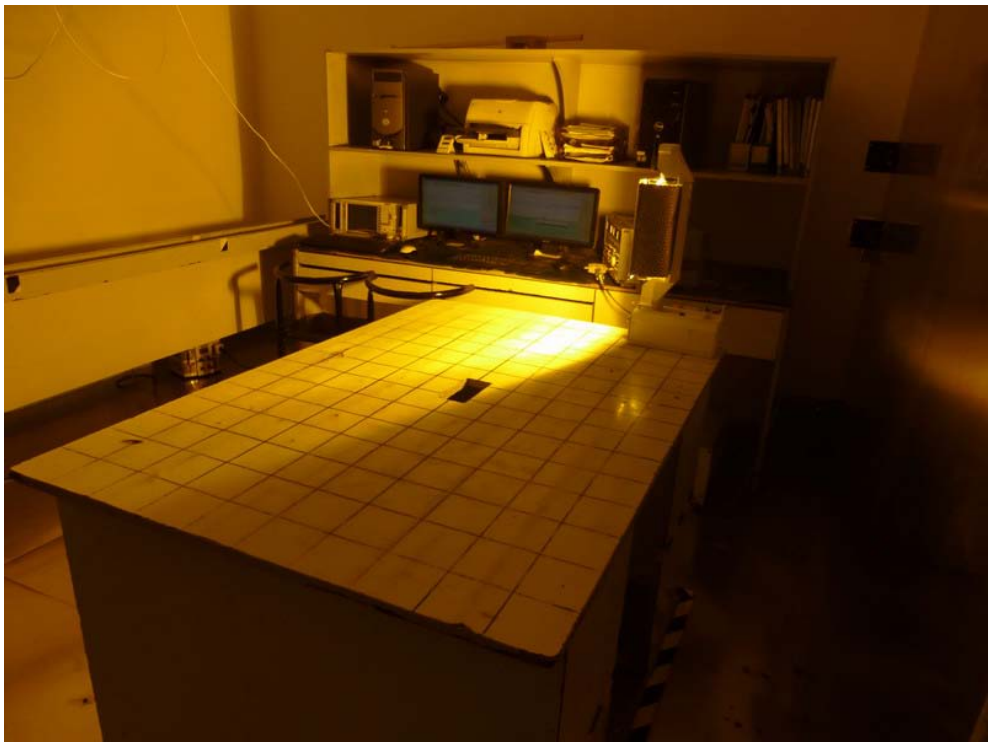
Data No :7
Engineer :Nick_Huang

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	6.820	0.36	9.97	36.10	46.43	48.00	1.57	QP
2	7.422	0.38	9.97	36.40	46.75	48.00	1.25	QP
3	8.222	0.40	9.98	35.70	46.08	48.00	1.92	QP
4	8.669	0.41	9.98	34.90	45.29	48.00	2.71	QP
5	19.241	1.02	10.07	34.71	45.80	48.00	2.20	QP
6	25.574	1.07	10.14	31.79	43.00	48.00	5.00	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)
+Reading.
2.If the average limit is met when useing a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

Photograph 1: Conducted Emissions, Front

Photograph 2: Conducted Emissions, Back



3.2 Radiated Emissions

3.2.1 Requirements

Test Arrangement: Table Top

Compliance Standard: FCC Part 18

FCC Compliance Limits	
Frequency	**Limits**
30~88 MHz	40.0dBuV
88~216 MHz	43.5dBuV
216~1000 MHz	46.0dBuV
0.009~30 MHz	67.95dBuV

3.2.2 Test Equipment

For frequency range 30MHz~1000MHz (At 3m Anechoic Chamber)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber	AUDIX	N/A	N/A	Nov.24, 13	1 Year
2.	EMI Spectrum	Agilent	E4407B	MY41440292	Apr. 28,14	1 Year
3.	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	Apr. 28,14	1 Year
4.	Amplifier	HP	8447D	2648A04738	Apr. 28,14	1 Year
5.	Bilog Antenna	TESEQ	CBL6112D	35375	Jun. 18, 14	1 Year
6.	RF Cable	MIYAZAKI	CFD400-NL	3# Chamber No.1	Apr. 28,14	1 Year
7.	Coaxial Switch	Anritsu	MP59B	6200313662	Apr. 28,14	1 Year

For frequency range 0.009MHz~30MHz (At 3m Anechoic Chamber)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Loop Antenna	Chase	HLA6120	1062	May.09, 14	1 Year
2	Test Receiver	Rohde & Schwarz	ESHS20	836600/006	Apr. 28,14	1 Year
3	RF Cable	/	RG400	No.1	Apr. 28,14	1 Year

3.2.3 Test Procedure

The requirements of FCC Part 18 call for the EUT to be placed on an 80 cm (100cm for 9kHz-30MHz) high 1 X 1.5 meters non-conductive motorized turntable for radiated testing on a 3-meter chamber. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Bi-conical and log periodic broadband antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The output of the antenna was connected to the input of the spectrum analyzer and the emissions in the frequency range of 9 KHz to 1 GHz were measured. The peripherals were placed on the table in accordance with ANSI C63.4-2009. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The output from the antenna was connected, via a preamplifier, to the input of the spectrum analyzer. The detector function was set to quasi-peak or peak, as appropriate. Above 1GHz average measurement are recorded. The measurement bandwidth of the spectrum analyzer system was set to at least 120 kHz, with all post-detector filtering no less than 10 times the measurement bandwidth. Frequencies above 1GHz were performed using a measurement bandwidth of 1MHz with a video bandwidth setting of 10 Hz for the average measurement.

3.2.4 Radiated Data Reduction and Reporting

To convert the raw spectrum analyzer radiated data into a form that can be compared with the FCC limits, it is necessary to account for various calibration factors that are supplied with the antennas and other measurement accessories. These factors are included into the antenna factor (AF) column of the table and in the cable factor (CF) column of the table. The AF (in dB/m) and the CF (in dB) is algebraically added to the raw Spectrum Analyzer Voltage in dBµV to obtain the Radiated Electric Field in dBµV/m. This logarithm amplitude is converted to a linear amplitude, then compared to the FCC limit. Example:

Spectrum Analyzer Voltage: VdBµV

Antenna Correction Factor: dB/m

Electric Field: EdBµV/m = V dBµV + AFdB/m + CFdB - *GdB*

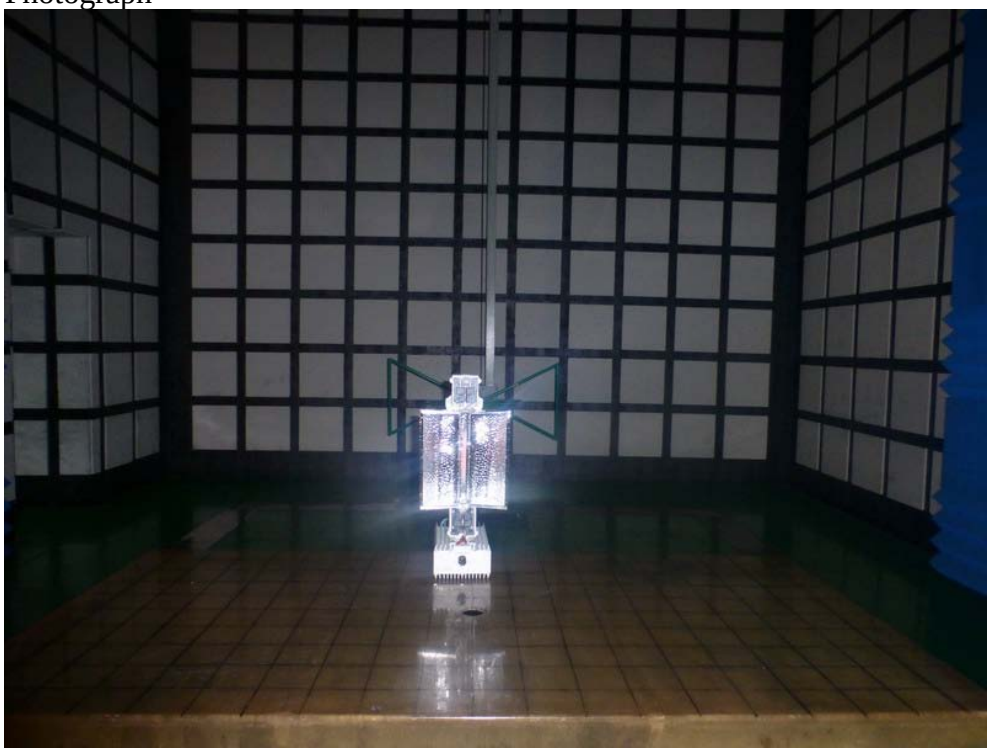
To convert to linear units of measure: EdBV/m/20 Inv log

3.2.5 Test Data

The EUT Hair removal & rejuvenation instrument complied with the Radiated Emissions requirements.

Table 6 provides the test results for radiated emissions.

Photograph 3,



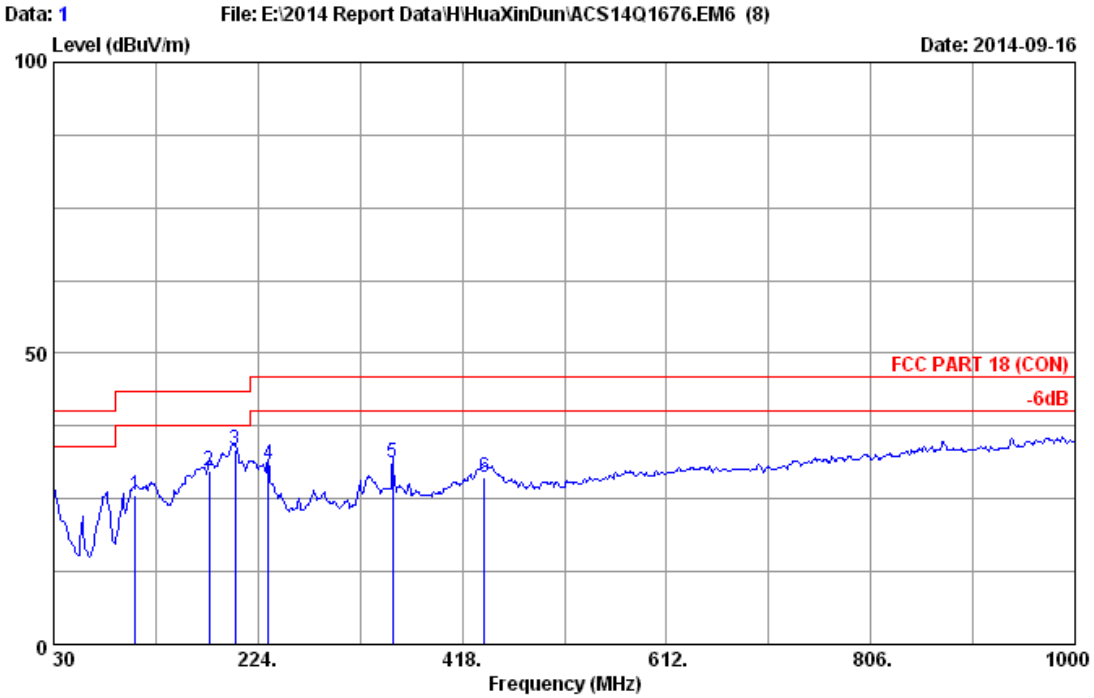
Photograph 4, Photograph 5 show the radiated emission test configuration.

Test Engineer(s): Andy & Sun

Test Date(s): Sep.16, 2014

Test Location: Audix Technology (Shenzhen) Co., Ltd.

Table 6: Radiated Emission Test Data

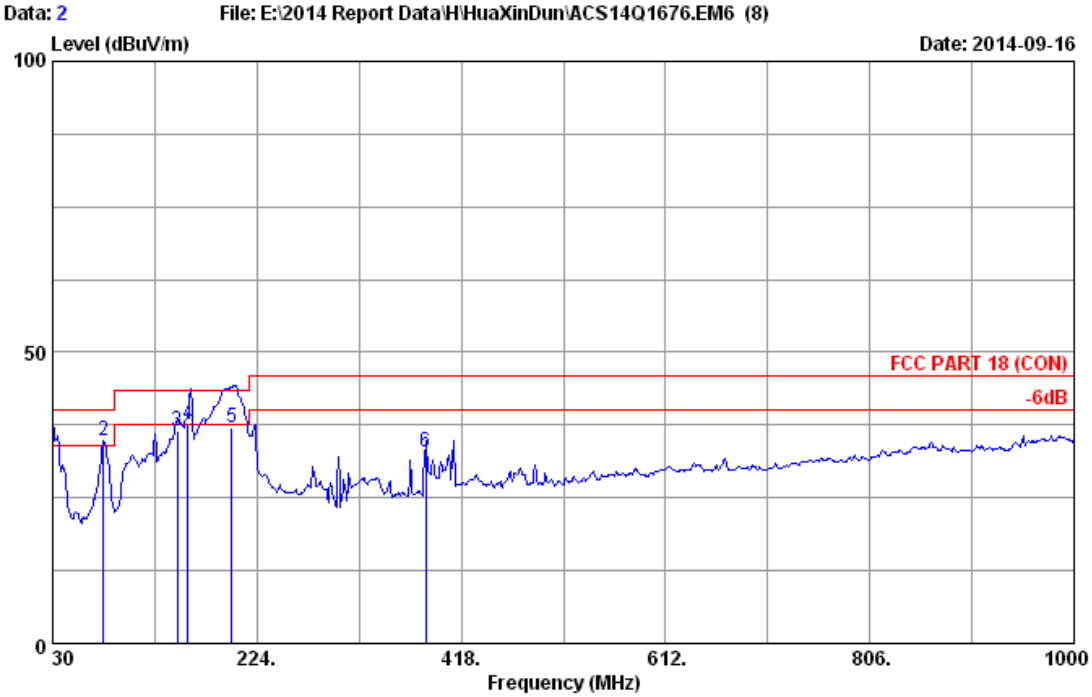


Site no. : 3m Chamber
Dis. / Ant. : 3m 2014 CBL6112D 35375
Limit : FCC PART 18 (CON)
Env. / Ins. : 26*C/58%
EUT :HID Ballast
Power Rating :AC 240V/60Hz
Test Mode :ON
M/N:GS-SHW1U2A001

Data no. : 1
Ant. pol. : HORIZONTAL
Engineer : ANDY

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	107.600	11.98	1.19	12.57	25.74	43.50	17.76	QP
2	177.440	9.73	1.72	18.40	29.85	43.50	13.65	QP
3	202.660	10.43	1.86	21.03	33.32	43.50	10.18	QP
4	233.700	11.67	2.01	17.14	30.82	46.00	15.18	QP
5	352.040	15.54	2.57	13.10	31.21	46.00	14.79	QP
6	439.340	17.19	2.98	8.54	28.71	46.00	17.29	QP

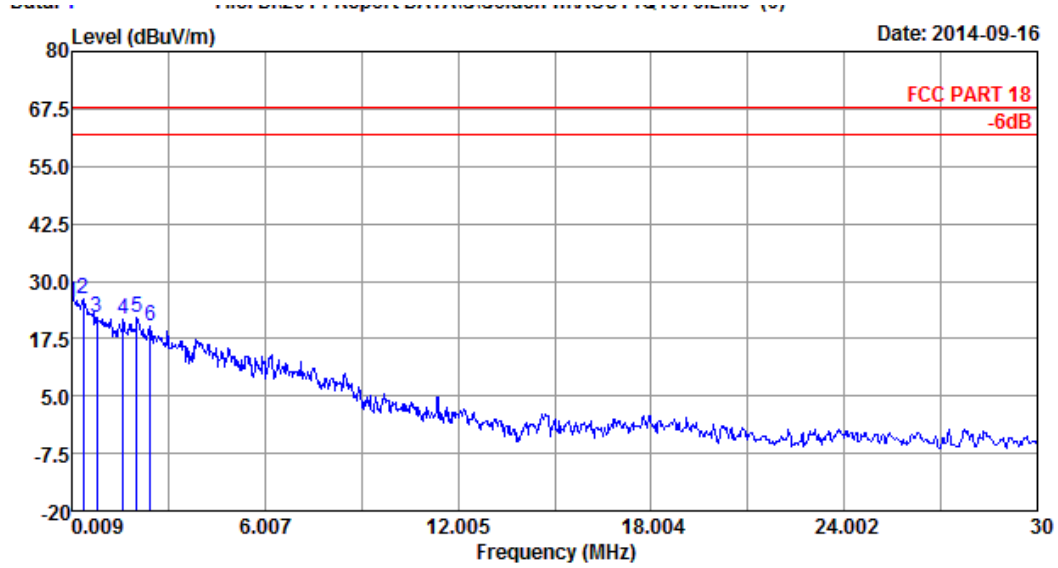
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 2
Dis. / Ant. : 3m 2014 CBL6112D 35375 Ant. pol. : VERTICAL
Limit : FCC PART 18 (CON)
Env. / Ins. : 26*C/58% Engineer : ANDY
EUT :HID Ballast
Power Rating :AC 240V/60Hz
Test Mode :ON
M/N:GS-SHW1U2A001

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	30.000	19.60	0.60	16.08	36.28	40.00	3.72	QP
2	78.500	7.35	0.99	26.52	34.86	40.00	5.14	QP
3	148.340	11.38	1.53	23.46	36.37	43.50	7.13	QP
4	158.580	10.94	1.60	25.00	37.54	43.50	5.96	QP
5	199.980	10.30	1.84	25.00	37.14	43.50	6.36	QP
6	384.050	16.06	2.73	14.15	32.94	46.00	13.06	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



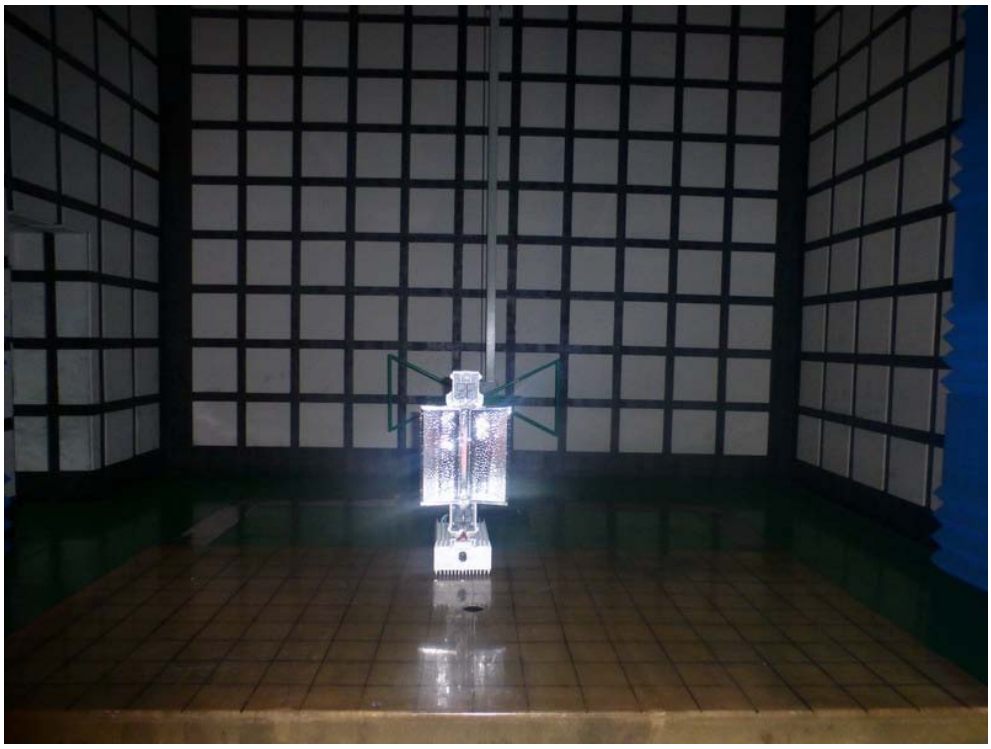
Site no :10m Chamber Test Site
Dis./Lisn :2014 LOOP HLA6120
Limit :FCC PART 18
Env./Ins. :24*C/56%
EUT :HID Ballast
Power Rating :AC 240V/60Hz
Test Mode :ON
M/N:GS-SHW1U2A001

Data No :1
LISN phase:
Pre :101.2kPa
Engineer :Sun

No	Freq (MHz)	Ant Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.0090	19.60	0.06	5.59	25.25	67.95	42.70	QP
2	0.3689	19.48	0.10	6.39	25.97	67.95	41.98	QP
3	0.7888	19.98	0.13	2.09	22.20	67.95	45.75	QP
4	1.5985	19.72	0.18	1.72	21.62	67.95	46.33	QP
5	2.0184	19.59	0.21	2.09	21.89	67.95	46.06	QP
6	2.4383	19.42	0.23	0.64	20.29	67.95	47.66	QP

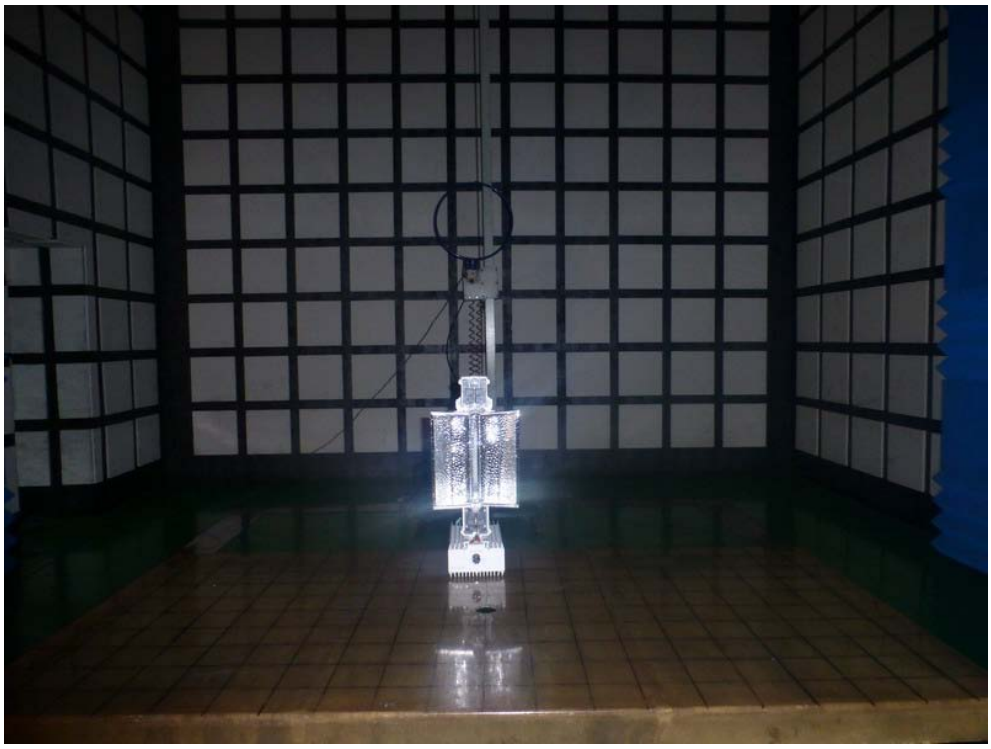
Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)+Reading.
2.If the average limit is met when useing a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

Photograph 3: Radiated Emission Test Configuration, (30-1000MHz), Front



Photograph 4: Radiated Emission Test Configuration, (30-1000MHz), Back

Photograph 5: Radiated Emission Test Configuration, (9kHz-30MHz)



3.3 Information to User

The following warning or similar statement shall be provided in a conspicuous location in the operator's manual so that the user of a RF lighting devices is aware of its interference potential. Additional information about corrective measures may also be provided to the user at the manufacturer's option.

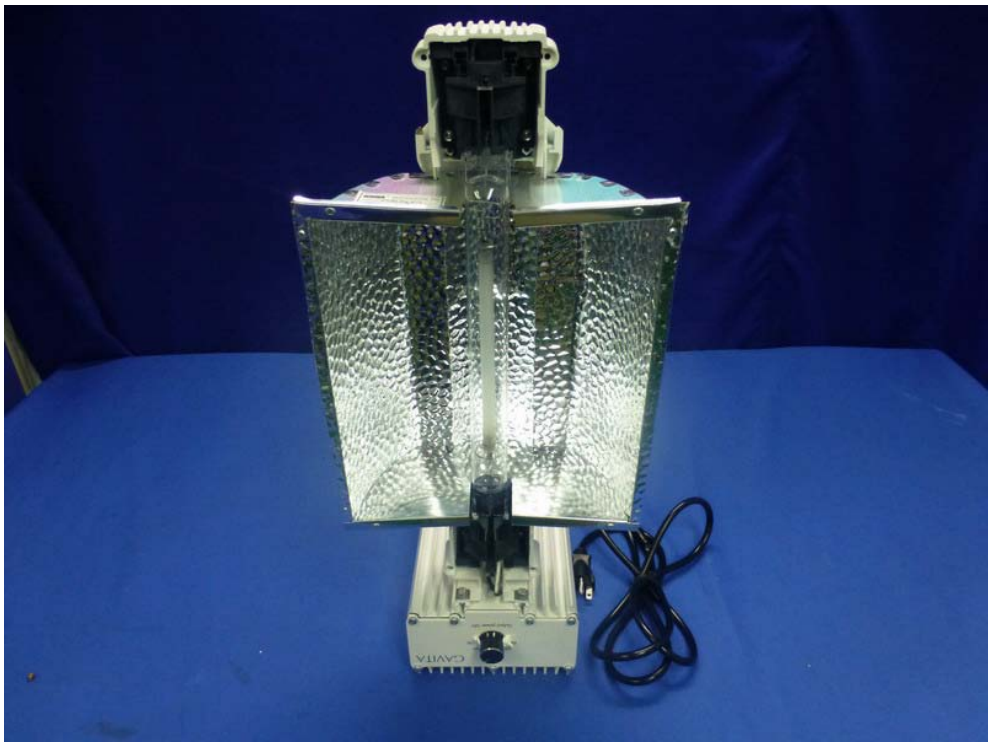
This device complies with Part 18 of the FCC Rules.
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This product may cause interference to radio equipment and should not be installed near maritime safety communications equipment or other critical navigation or communication equipment operating between 0.45–30 MHz. If this occurs, please change outlet or move the lamp far away from other appliance.
(a) The interference potential of device or system:
"Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."
(b) Simple measures that can be taken by the user to correct interference:
"NOTE: This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help."

In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required above may be included in the manual in that alternative form, provided that the user can be reasonably expected to have the capability to access information in that form.

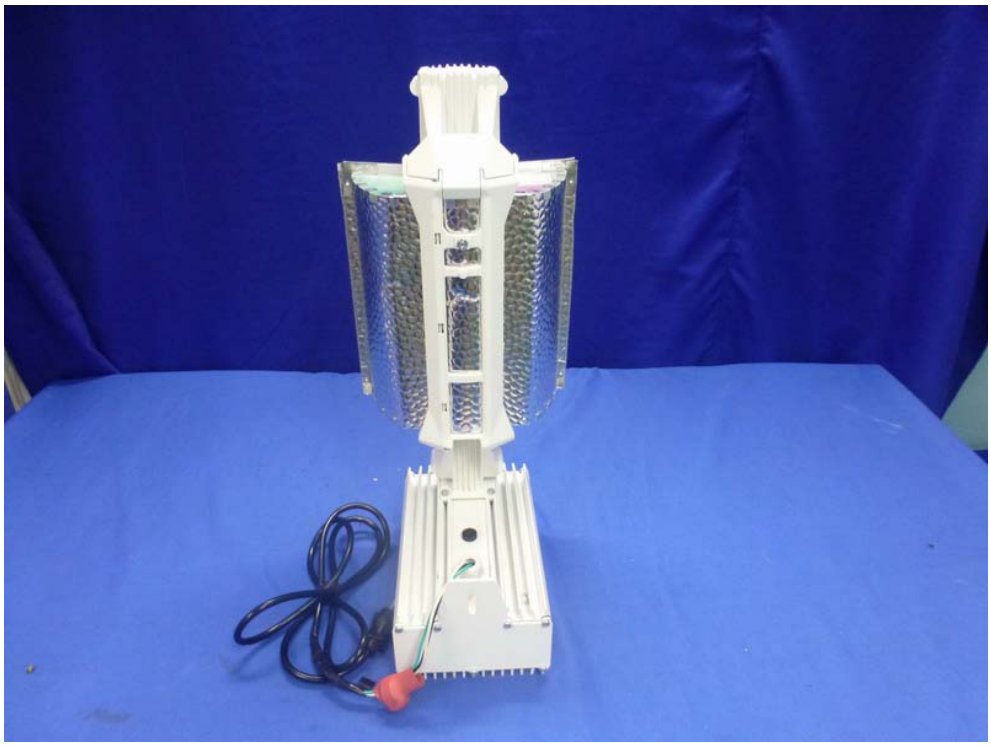
4 Attachment (EUT Photograph)

EUT Model: GS-SHW1U2A001

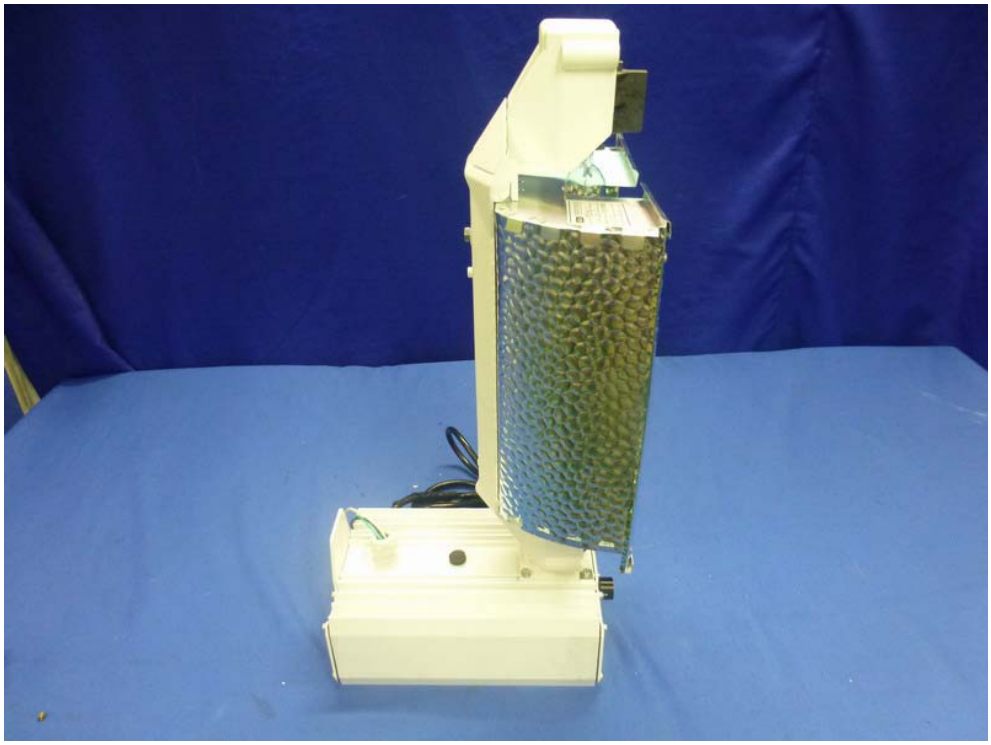
EUT Photo #1 Front View



EUT Photo #2 Back View

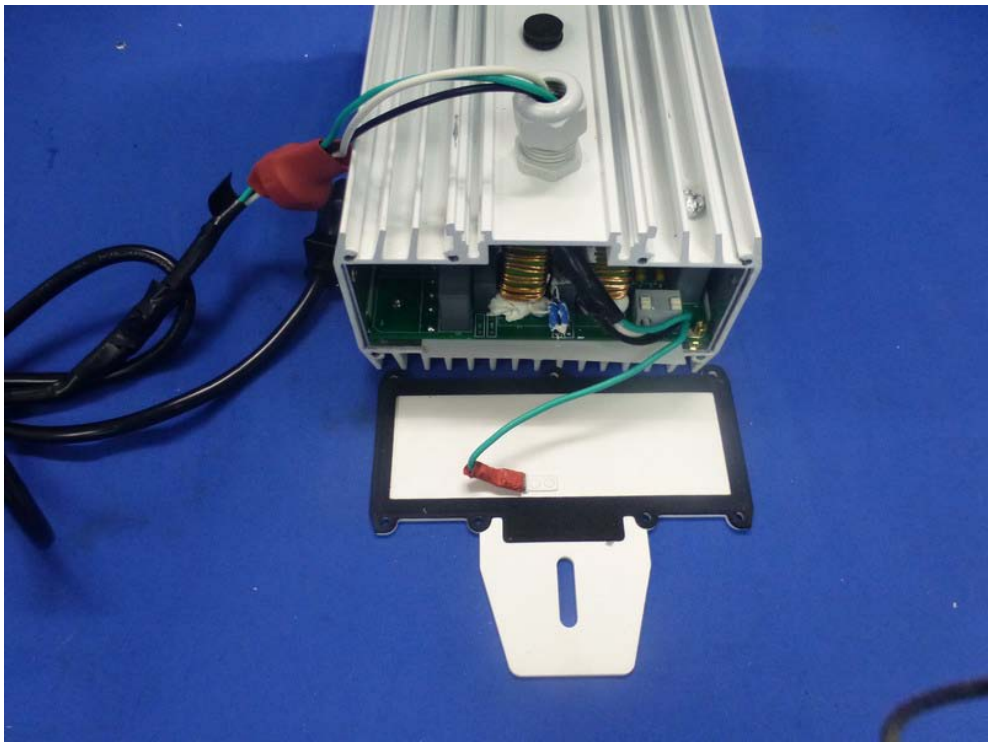


EUT Photo #3 Right-Side View

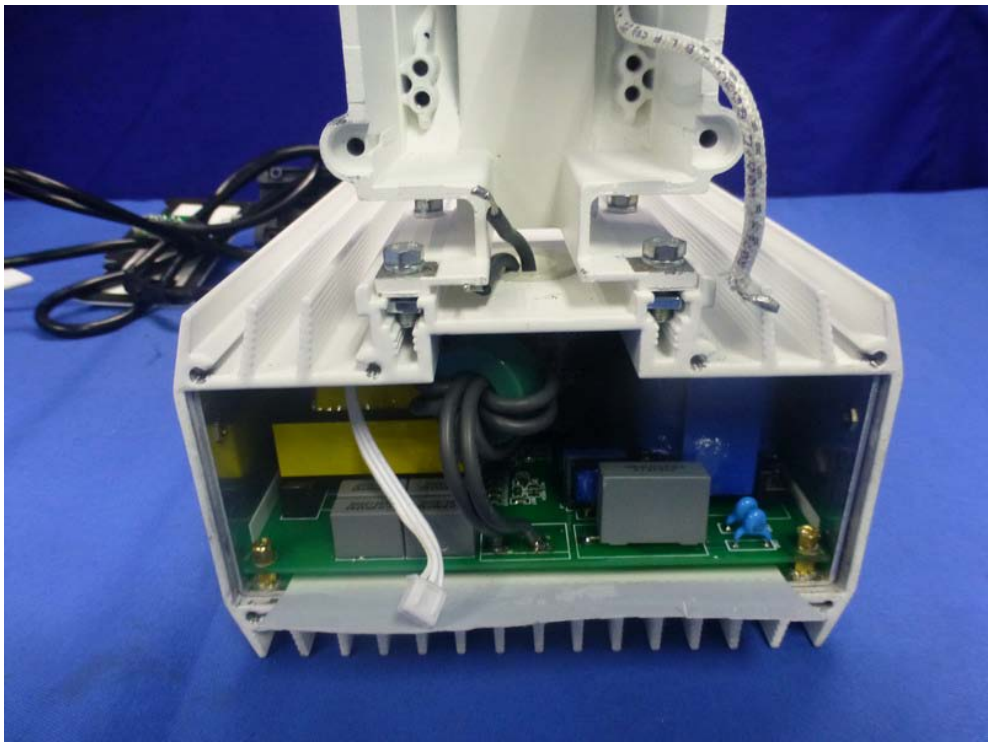


EUT Photo #4 Left-Side View

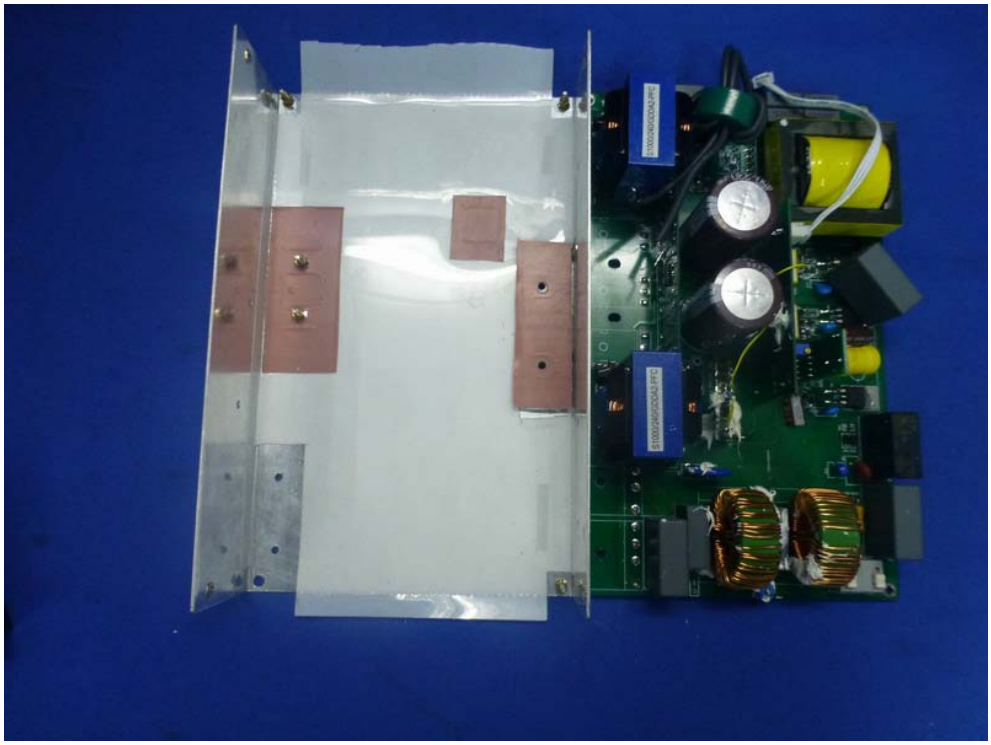
EUT Photo #5 - Inside View



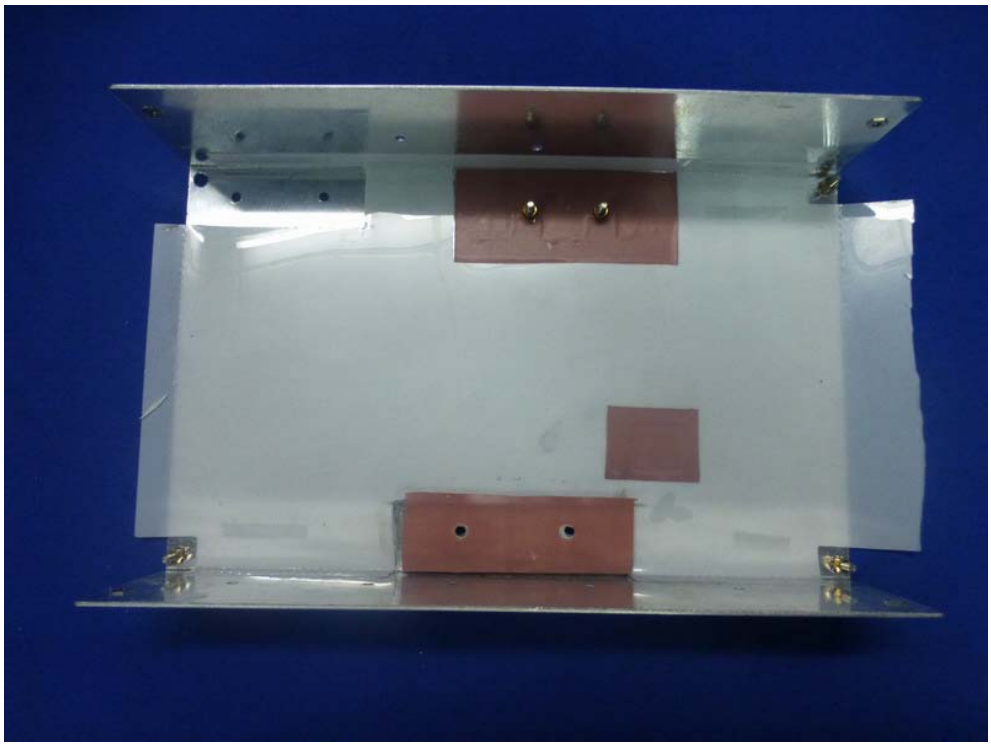
EUT Photo #6 - Inside View



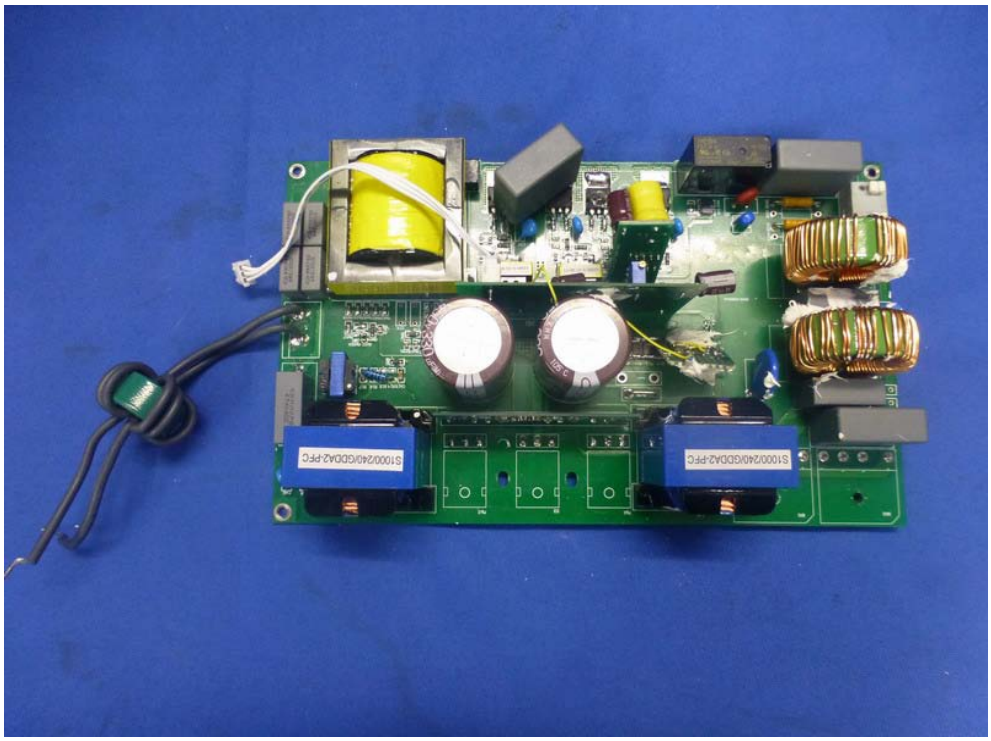
EUT Photo #7 - Inside View



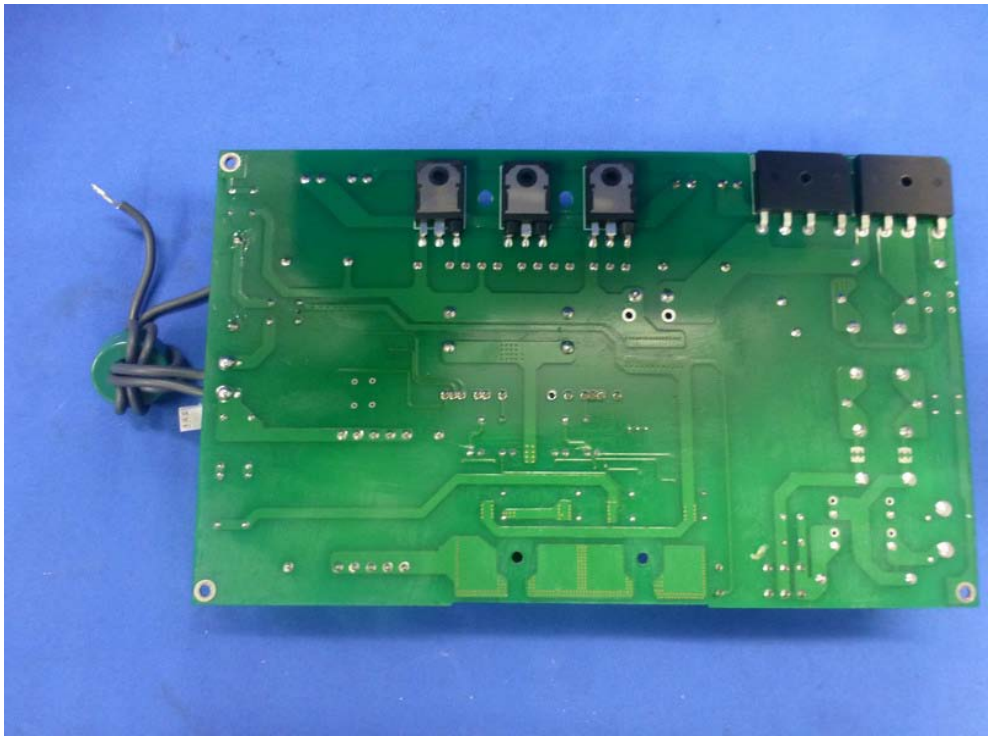
EUT Photo #8 - Inside View



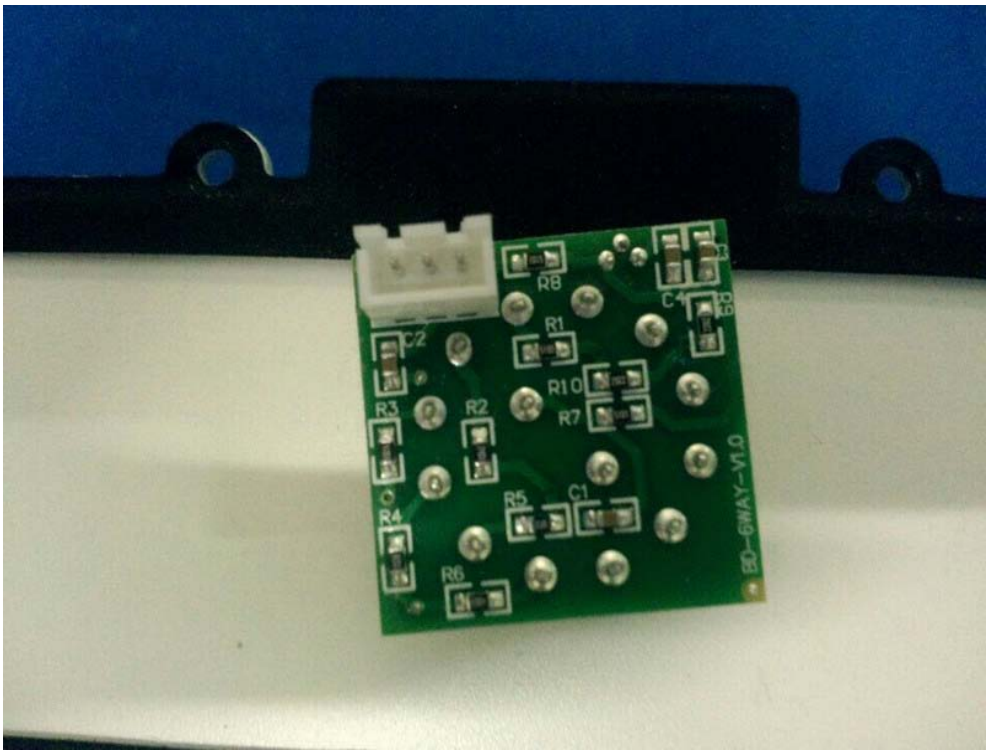
EUT Photo #9 –Power Board View



EUT Photo #10 –Power Board View



EUT Photo #11 - Inside View



----------The End----------

