

# ***FCC TEST REPORT***

**FCC ID** : WZEQS-MR16G2

**Applicant** : Quasar Optoelectronics, Inc.

**Address** : Shagang Industrial Areas, Xinhui Sanjiang Town Jiangmen, Guangdong

**Equipment Under Test (EUT) :**


Product description : LED Energy Saving Lamp

Model No. : QS-MR16E1, QS-MR16E2, QS-MR16G2, QS-MR16G1

**Standards** : FCC Part18

**Date of Test** : March. 06, 2009

**Test Engineer** : Maikou.zhang

**Reviewed By** : 

PREPARED BY:

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# Contents

	Page
<b>1 COVER PAGE.....</b>	<b>1</b>
<b>CONTENTS.....</b>	<b>2</b>
<b>2 TEST SUMMARY.....</b>	<b>3</b>
<b>3 GENERAL INFORMATION.....</b>	<b>4</b>
3.1 CLIENT INFORMATION .....	4
3.2 GENERAL DESCRIPTION OF E.U.T.....	4
3.3 DETAILS OF E.U.T.....	4
3.4 DESCRIPTION OF SUPPORT UNITS .....	4
3.5 STANDARDS APPLICABLE FOR TESTING.....	4
3.6 TEST METHODOLOGY .....	4
3.7 TEST FACILITY.....	5
3.8 TEST LOCATION.....	5
<b>4 EQUIPMENT USED DURING TEST .....</b>	<b>6</b>
<b>5 CONDUCTED EMISSION TEST .....</b>	<b>8</b>
5.1 TEST EQUIPMENT.....	8
5.2 TEST PROCEDURE .....	8
5.3 CONDUCTED TEST SETUP .....	9
5.4 EUT OPERATING CONDITION .....	9
5.5 CONDUCTED EMISSION LIMITS .....	10
5.6 SPECTRUM ANALYZER.....	10
5.7 CONDUCTED EMISSION TEST RESULT .....	10
5.7.1 <i>Measurement Data</i> .....	10
<b>6 EMISSIONS TEST RESULTS.....</b>	<b>13</b>
6.1 RADIATION EMISSION DATA.....	13
6.1.1 <i>Measurement Uncertainty</i> .....	13
6.1.2 <i>EUT Setup</i> .....	13
6.1.3 <i>Spectrum Analyzer Setup</i> .....	14
6.1.4 <i>Test Procedure</i> .....	14
6.1.5 <i>Corrected Amplitude &amp; Margin Calculation</i> .....	14
6.1.6 <i>Summary of Test Results</i> .....	15
<b>7 PHOTOGRAPHS OF TESTING.....</b>	<b>17</b>
7.1 CONDUCTED EMISSION TEST VIEW.....	17
7.2 RADIATION EMISSION TEST VIEW .....	17
<b>8 PHOTOGRAPHS - CONSTRUCTIONAL DETAILS .....</b>	<b>18</b>
8.1 EUT1 - SIDE VIEW (MODEL: QS-MR16G1, QS-MR16G2) .....	18
8.2 EUT3 - SIDE VIEW (MODEL: QS-MR16E1, QS-MR16E2) .....	18
8.3 PCB - FRONT VIEW .....	19
8.4 PCB - BACK VIEW .....	19
<b>9 FCC ID LABEL.....</b>	<b>20</b>

## 2 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 1GHz)	FCC PART 18: 2007	ANSI C63.4:2003	N/A	PASS
Conducted Emission (450KHz to 30MHz)	FCC PART 18: 2007	ANSI C63.4:2003	N/A	PASS

### **3 General Information**

#### **3.1 Client Information**

Applicant: Quasar Optoelectronics, Inc.  
Address of Applicant: Shagang Industrial Areas, Xinhui Sanjiang Town Jiangmen, Guangdong

#### **3.2 General Description of E.U.T.**

Product description: LED Energy Saving Lamp  
Model No.: QS-MR16E1, QS-MR16E2, QS-MR16G2, QS-MR16G1

Note: The PCB of all the models are same except that the appearance and output power difference(the model of QS-MR16E1 and QS-MR16G1 output power are the same except appearance difference,the QS-MR16E2 and QS-MR16G2 output power are the same except appearance difference), the model QS-MR16G2 and QS-MR16G1 were testing samples , so the final test data show was the testing samples only in the report .

#### **3.3 Details of E.U.T.**

Power Supply: 120VAC / 60Hz

#### **3.4 Description of Support Units**

The EUT has been tested as an independent unit.

#### **3.5 Standards Applicable for Testing**

The customer requested FCC tests for a LED Energy Saving Lamp. The standards used were FCC Part18.

#### **3.6 Test Methodology**

All measurements contained in this report are conducted with FCC Measurement Procedure MP-5, technical requirements for Methods of Measurement of Radio-Noise Emission from ISM Equipment.

### **3.7 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, June 24, 2008.

- **IC – Registration No.: IC7760**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration IC7760, July 24, 2008.

### **3.8 Test Location**

All Emissions tests were performed at:-  
1/F, Fukangtai Building, West Baima Rd., Songgang Street,  
Baoan District, Shenzhen 518105, Guangdong, China.

#### 4 Equipment Used during Test

NO	Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
1.	EMC Analyzer	Agilent/ E7405A	MY45114943	W2008001	9k-26.5GHz	Aug-08	Aug-09	Wws20081596	±1d B
2.	Trilog Broadband Antenne 30-3000 MHz	SCHWARZBECK MESS-ELEKTROM/ VULB9163	336	W2008002	30-3000 MHz	Jul-08	Jul-09		±1d B
3.	Broadband Horn Antenna 1-18 GHz	SCHWARZBECK MESS-ELEKTROM/ VULB9163	667	W2008003	1-18GHz	Jul-08	Jul-09		f < 10 GHz: ±1d B 10GHz < f < 18 GHz : ±1.5d B
4.	Broadband Preamplifier 0.5-18 GHz	SCHWARZBECK MESS-ELEKTROM/ BBV 9718	9718-148	W2008004	0.5-18GHz	Jul-08	Jul-09		±1.2d B
5.	10m Coaxial Cable with N-male Connector usable up to 18GHz,	SCHWARZBECK MESS-ELEKTROM/ AK 9515 H	-	-	-	Jul-08	Jul-09		-
6.	10m 50 Ohm Coaxial Cable with N-plug, individual length, usable up to 3(5)GHz, Connector	SCHWARZBECK MESS-ELEKTROM/ AK 9513				Jul-08	Jul-09		
7.	Positioning Controller	C&C LAB/ CC-C-IF							
8.	Color Monitor	SUNSPOT/ SP-14C							

NO	Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
9.	Test Receiver	ROHDE&SCHWARZ/ ESPI	101155	W2005001	9k-3GHz	Jul-08	Jul-09	Wws20080942	$\pm 1$ dB
10.	EMI Receiver	Beijingkehuan	KH3931		9k-1GHz	Aug-08			
11.	Two-Line V-Network	ROHDE&SCHWARZ/ ENV216	100115	W2005002	50 $\Omega$ /50 $\mu$ H	Jul-08	Jul-09	Wws20080941	$\pm 10\%$
12.	V – LISN	SCHWARZBECK MESS – ELEKTRONIK	NSLK 8128	8128-259	9k-30MHz	Jul-08	Jul-09		
13.	Absorbing Clamp	ROHDE&SCHWARZ/ MDS-21	100205	W2005003	impedance 50 $\Omega$ loss : 17 dB	Jul-08	Jul-09	Wws20080943	$\pm 1$ dB
14.	10m 50 Ohm Coaxial Cable with N-plug, individual length, usable up to 3(5)GHz, Connectors	SCHWARZBECK MESS-ELEKTROM/ AK 9514				Jul-08	Jul-09		

## **5 Conducted Emission Test**

Product Name:	LED Energy Saving Lamp
Test Requirement:	FCC Part 18
Test Method:	Based on ANSI C63.4:2003
Test Date:	March. 06, 2009
Frequency Range:	450kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

### **5.1 Test Equipment**

Please refer to Section 4 this report.

### **5.2 Test Procedure**

1. During the conducted emission test, the power cord of the EUT is connected to the auxiliary outlet of the LISN.
2. The EUT was tested according to FCC MP-5. The frequency spectrum from 450kHz to 30MHz was investigated.
3. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

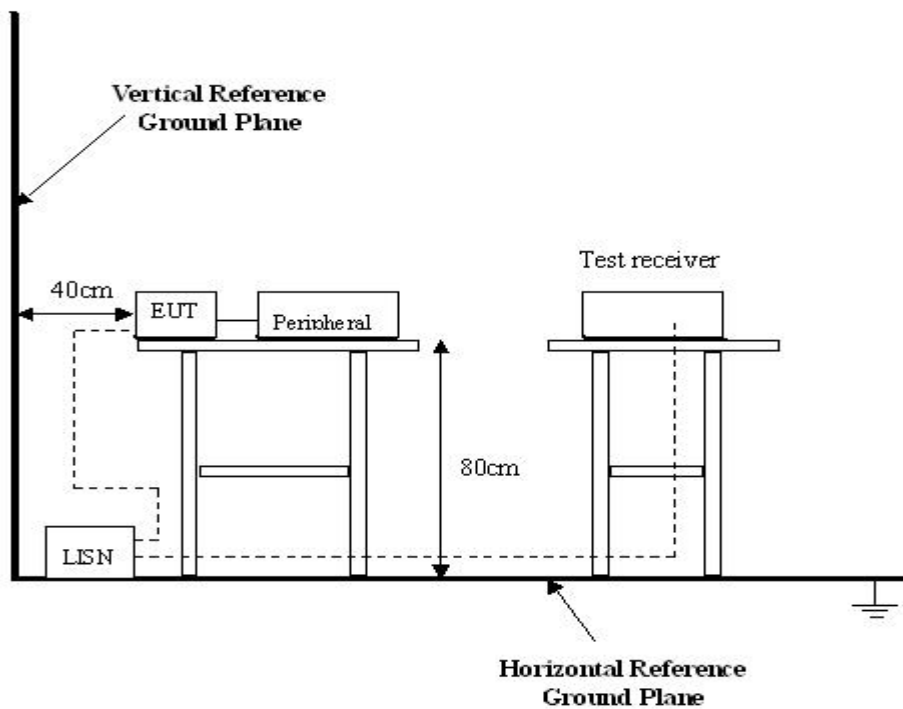


### 5.3 Conducted Test Setup

The conducted emission tests were performed using the setup accordance with the FCC MP-5 measurement procedure.

The EUT is tested independently.

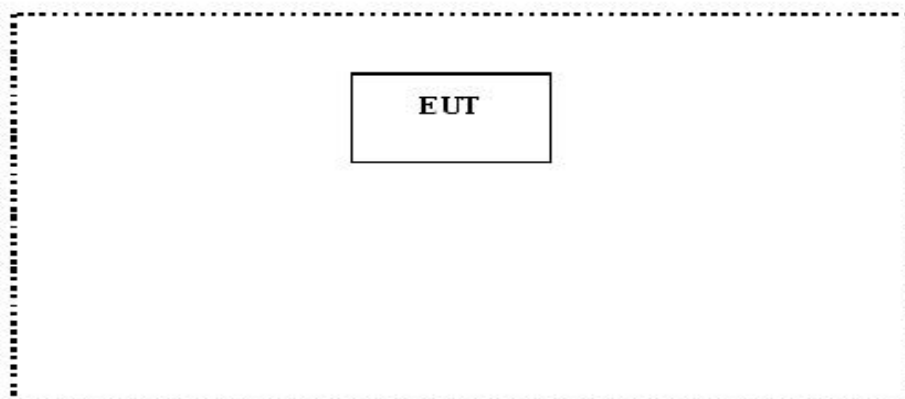
The power supply used by the EUT is connected to a 120VAC / 60Hz power source.



### 5.4 EUT Operating Condition

Operating condition is according to FCC MP-5.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- C. Modulate output capacity of EUT up to specification.



## 5.5 Conducted Emission Limits

Frequency of Emission (MHz)	Conducted Limit (dBuV)- Quasi-peak
0.45— 2.51	48
2.51 — 3.0	69.54
3.0 — 30	48

**Note:** In the above limits, the tighter limit applies at the band edges.

## 5.6 Spectrum Analyzer

The spectrum analyzer is configured during the conduction test is as follows:

Start Frequency..... 450 kHz  
 Stop Frequency..... 30 MHz  
 Sweep Speed..... Auto  
 IF Bandwidth..... 9 kHz  
 Video Bandwidth..... 100 kHz  
 Quasi-Peak Adaptor Bandwidth..... 9 kHz  
 Quasi-Peak Adaptor Mode..... Normal

## 5.7 Conducted Emission Test Result

Test Item: Conducted Emission Test  
 Test Voltage: 120VAC / 60Hz  
 Test Mode: Normal  
 Temperature: 25.5 °C  
 Humidity: 51%RH  
 Test Result: PASS

### 5.7.1 Measurement Data

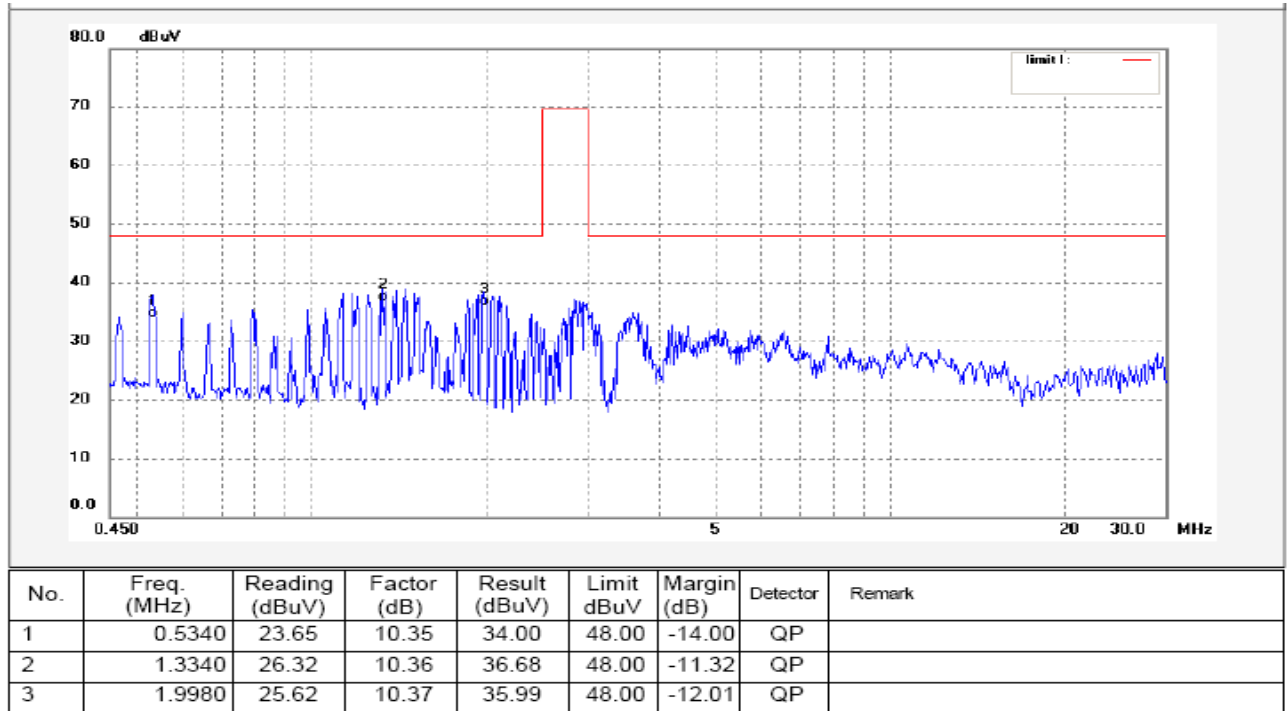
An initial pre-scan was performed on the live and neutral lines.

No further quasi-peak or average measurements were performed since no peak emissions were detected within 10dB line below the average limit.

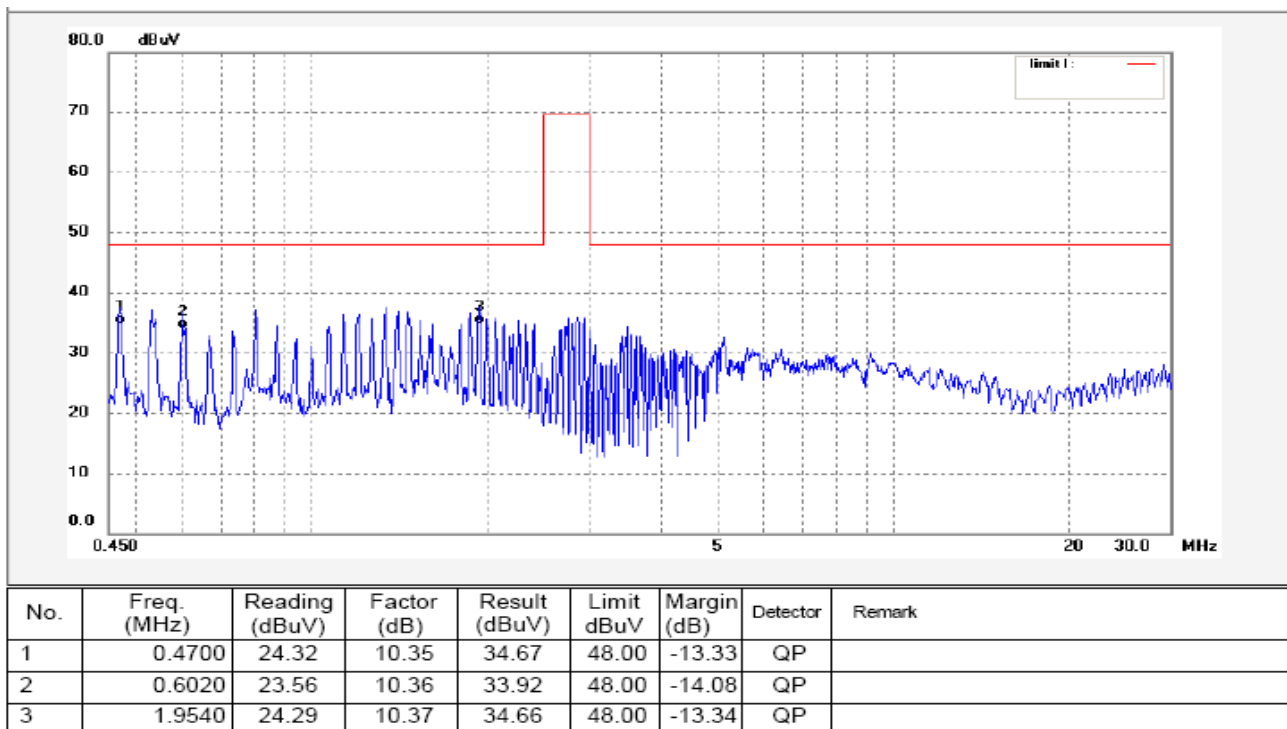
Please refer to the following peak scan graph for reference.

Model : QS-MR16G2(5W)

### LIVE LINE

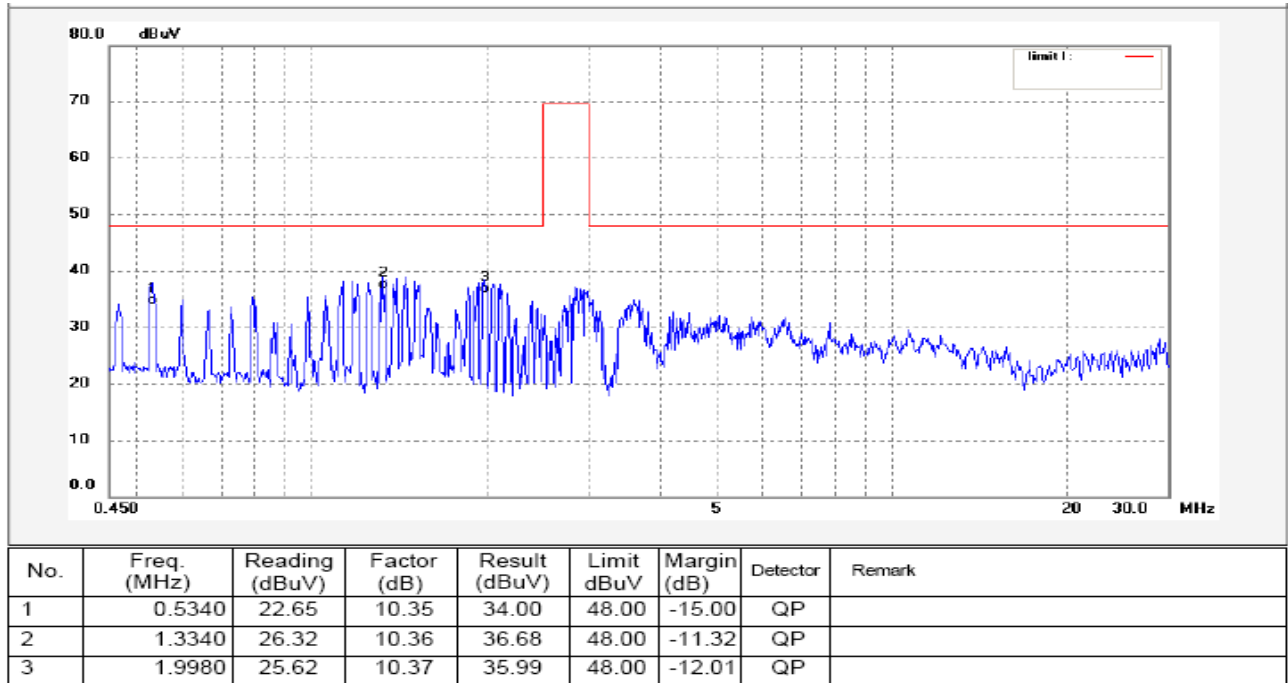


### NEUTRAL LINE

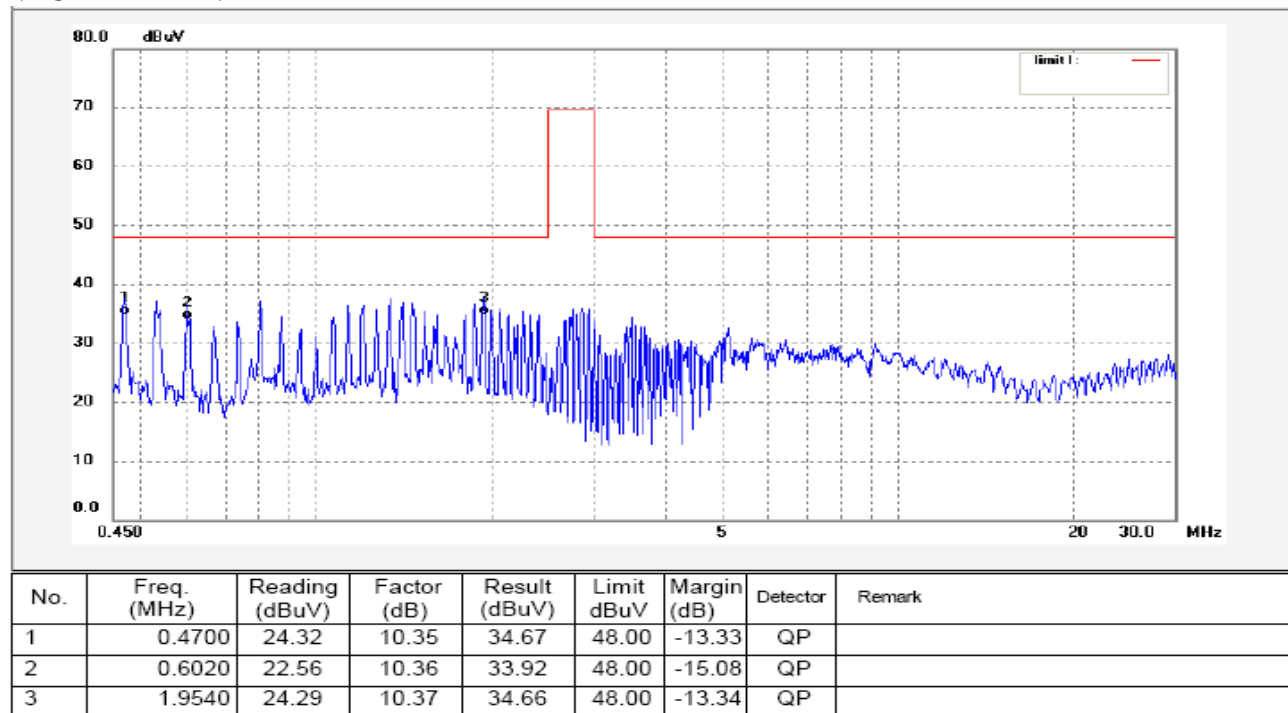


Model : QS-MR16G1(4W)

### LIVE LINE



### NEUTRAL LINE



## 6 Emissions Test Results

### 6.1 Radiation Emission Data

Test Requirement:	FCC Part18.305
Test Method:	ANSI C63.4:2003
Test Date:	Mar. 06, 2009
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Class:	Class B
Limit:	40 dB $\mu$ V/m between 30MHz & 88MHz 43.5 dB $\mu$ V/m between 88MHz & 216MHz 46 dB $\mu$ V/m between 216MHz & 1000MHz
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

#### 6.1.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on ANSI C63.4:2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek Lab is +5.05 dB.

#### 6.1.2 EUT Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part18.305 (C) Consumer equipment limits.

The EUT was placed on the test table in ON mode.

### 6.1.3 Spectrum Analyzer Setup

According to FCC Part18.305 Rules, the system was tested 30 to 1000MHz.

Start Frequency .....	30 MHz
Stop Frequency .....	1 GHz
Sweep Speed	Auto
IF Bandwidth .....	120 kHz
Video Bandwidth .....	100KHz
Quasi-Peak Adapter Bandwidth .....	120 kHz
Quasi-Peak Adapter Mode.....	Normal
Resolution Bandwidth .....	100KHz

### 6.1.4 Test Procedure

For the radiated emissions test, maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dBμV of specification limits), and are distinguished with a "Qp" in the data table. But any frequency above 1000 MHz, the limit is based on average detector.

The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.

### 6.1.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

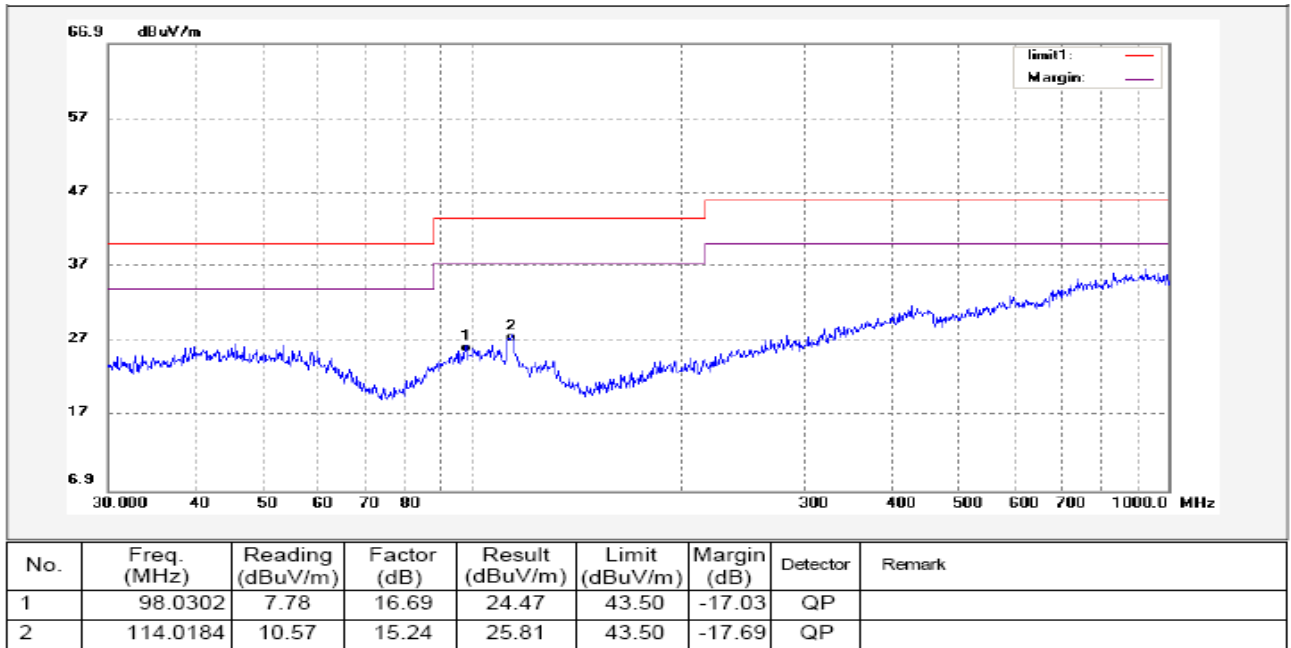
$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

### 6.1.6 Summary of Test Results

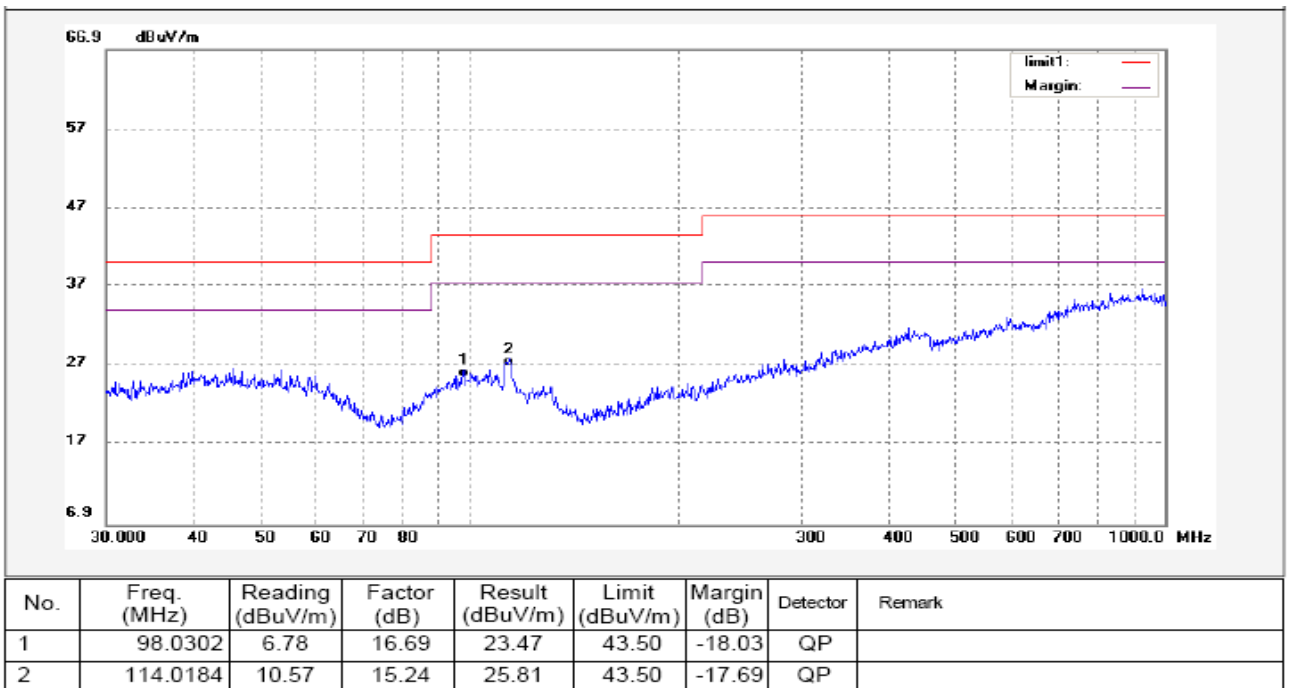
According to the data in this section , the EUT complied with the FCC Part18. standards.

**Model : QS-MR16G2(5W)**

**Horizontal:**

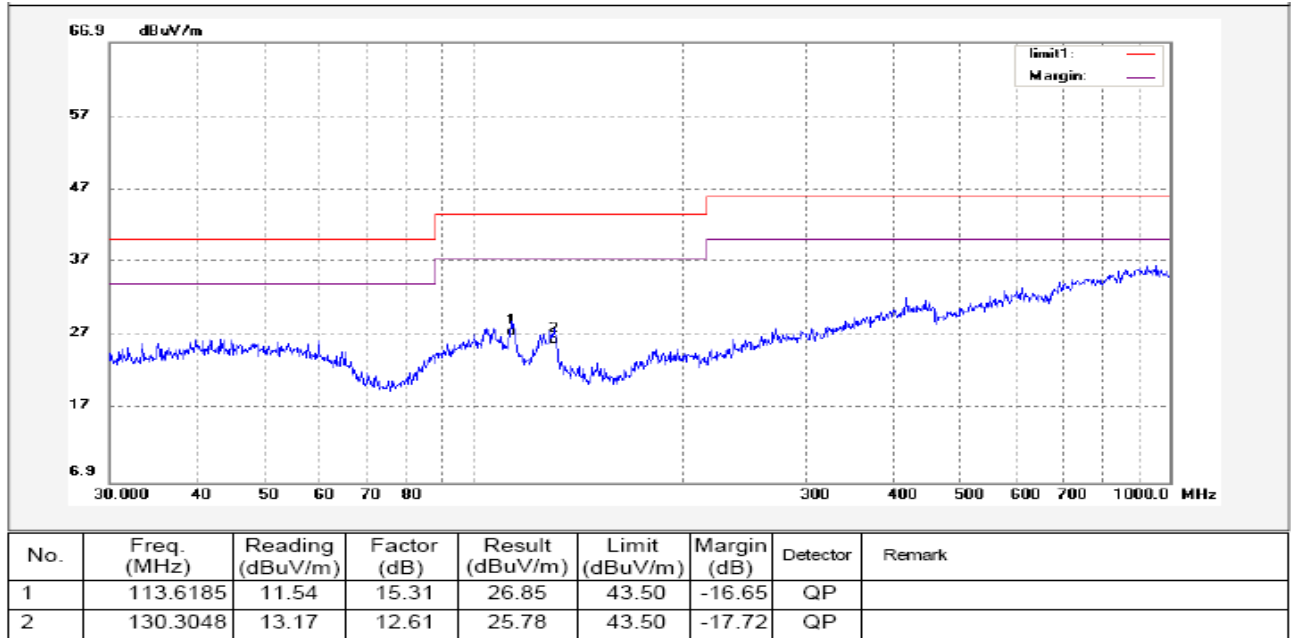


**Vertical:**

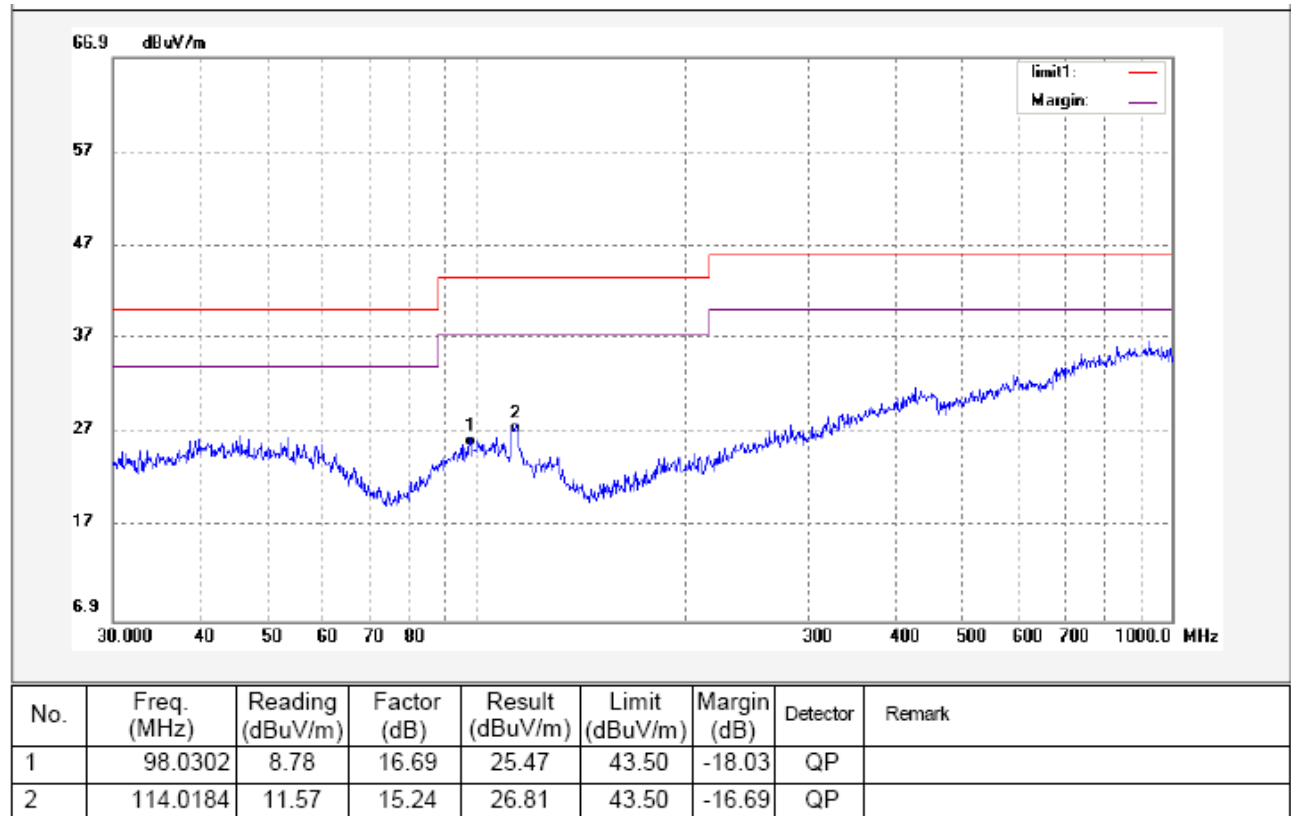


Model : QS-MR16G1(4W)

Horizontal:



Vertical:

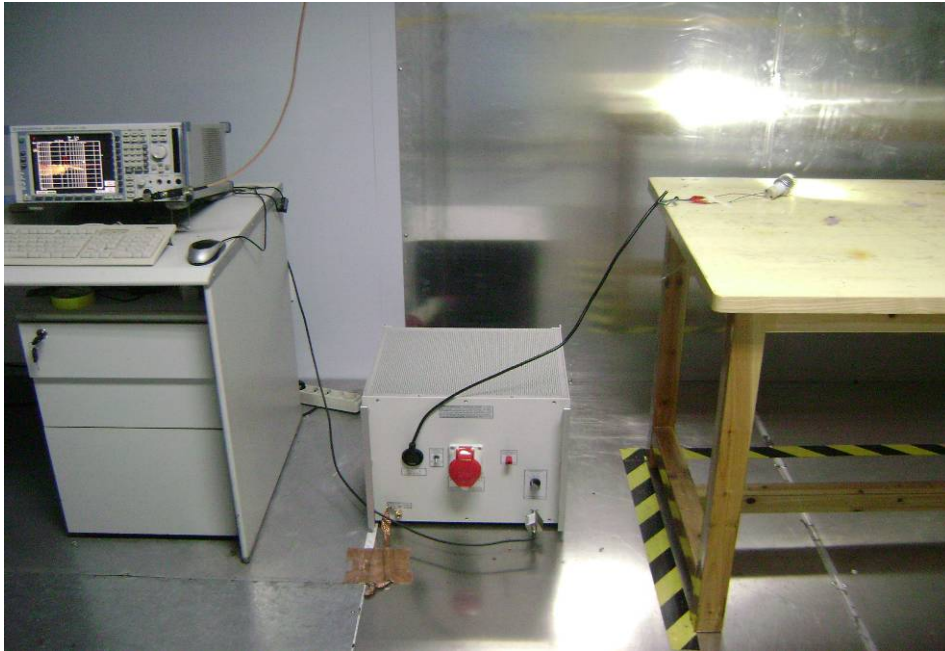




## 7 Photographs of Testing

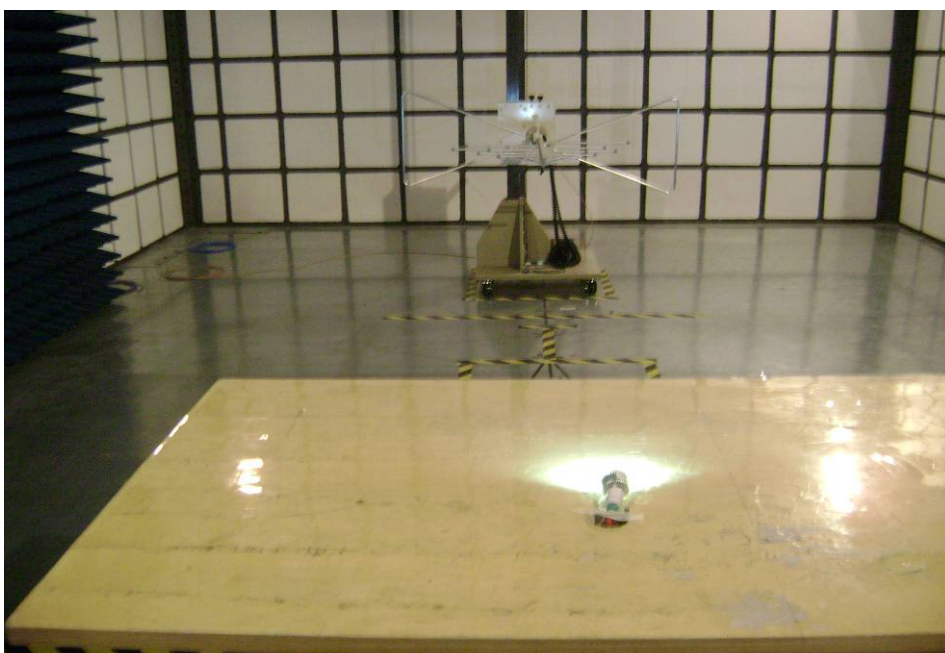
### 7.1 Conducted Emission Test View

Note : the test setup view of two Model : QS-MR16G1 and QS-MR16G2 are the same.



### 7.2 Radiation Emission Test View

Note : the test setup view of two Model : QS-MR16G1 and QS-MR16G2 are the same.



## 8 Photographs - Constructional Details

### 8.1 EUT1 - Side View (Model: QS-MR16G1, QS-MR16G2)

The appearance of both models are the same.



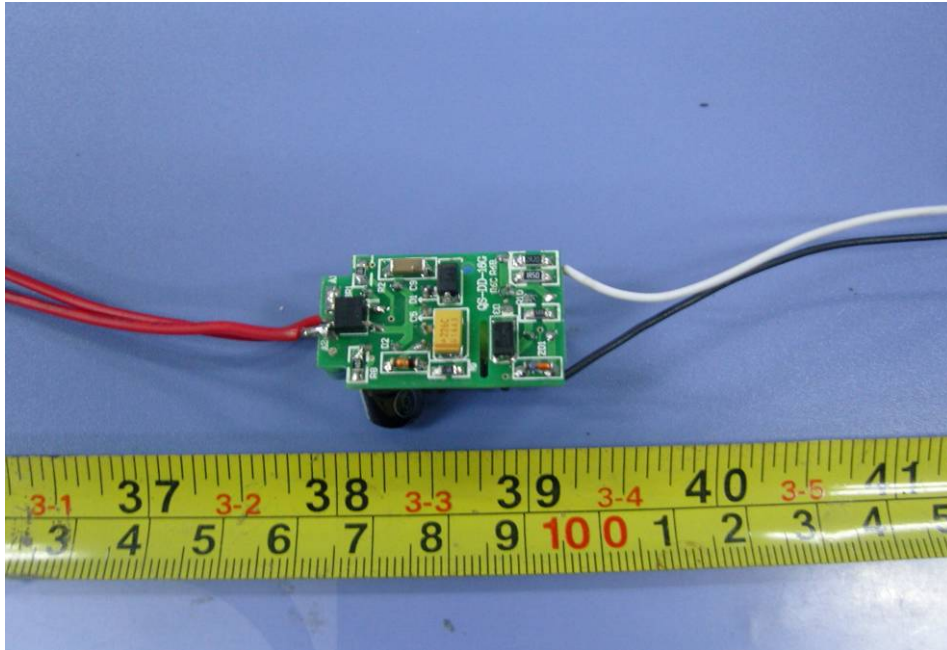
### 8.2 EUT3 - Side View (Model: QS-MR16E1, QS-MR16E2)

The appearance of both models are the same.

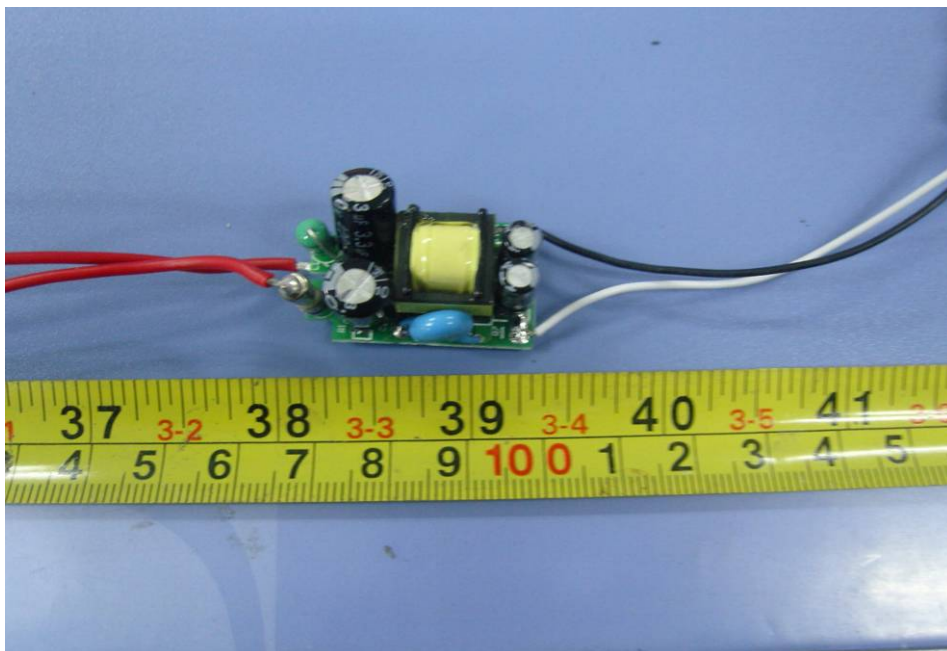


### 8.3 PCB - Front View

The PCB of the all models are the same



### 8.4 PCB - Back View





## 9 FCC ID Label

This device complies with FCC PART 18 of the FCC Rules.

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT  
EUT Top View/ proposed FCC Label Location

