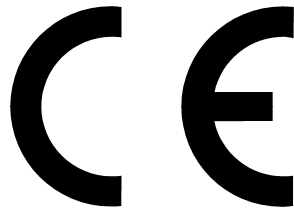


# EC declaration Of Conformity



**according to EMC Directive 2014/30/EU**

*that the following equipment complies with the appropriate basic safety and health requirements of the EC Directive based on its design and type, as brought into circulation by us. In case of alteration of the equipment, not agreed upon by us, this declaration will lose its validity.*

**Applicant :** KGAUTO CO.,LTD.

**Address :** NAE-DONG71-4,OJEONG-GU,BUCHEON-SI, GYEONGI-DO,  
KOREA

**Manufacturer :** KGAUTO CO.,LTD.

**Address :** NAE-DONG71-4,OJEONG-GU,BUCHEON-SI, GYEONGI-DO,  
KOREA

**Report No. :** STD-CE-15092

**Equipment Description :** LED PANEL LAMP

**Equipment Type :** KG-PL200V

**Family Model :** KG-PL100V, KG-PL300V, KG-PL500V

**Test Required :** EN 55015:2013  
EN 61547:2009  
EN 61000-3-2:2014  
EN 61000-3-3:2013

TESTED by :

Date: April 20, 2016

Signature

Standard Engineering Co. Ltd.  
EMC Laboratory

145, Hwangeumteo-gil, Eumam-myeon, Seosan-si,  
Chungcheongnam-do 356-844, Republic of Korea  
Tel.: +82-41-663-9436, Fax :+82-41-663-9434  
e-mail: stdeng@stdeng.com

*KIM GI DEOK / President*



## COMPLIANCE REPORT

### Emission & Immunity of Electromagnetic disturbance

**Test Report No.:** STD-CE-15092

**Equipment:** LED PANEL LAMP

**Type/Model:** KG-PL200V

**Family Model:** KG-PL100V, KG-PL300V, KG-PL500V

**Applicant:** KGAUTO CO.,LTD.

**Manufacturer:** KGAUTO CO.,LTD.

**Date of Test:** June 5, 2015 ~ June 8, 2015


**Date of Issued:** June 10, 2015

**Test Standard:** EN 55015:2013  
EN 61547:2009  
EN 61000-3-2:2014  
EN 61000-3-3:2013

**Test Result:**  Positive  Negative

This product complies with the requirements of the EMC Directive 2004/108/EC. The results in this report apply only to the sample tested. This test report shall not be reproduced except in full, without the written approval of Standard Engineering Laboratory.

Tested by:   
DJ Jo / Engineer

Approved by:   
SS Seo / Senior Researcher



# Contents

---

## 1. Information of EMC Laboratory

## 2. General information

- 2.1 Product Information
- 2.2 Client information
- 2.3 Peripherals

## EMI Test Report

## 3. Procedure of measurement

- 3.1 Conducted emission
  - 3.1.1 Configuration of measurement
  - 3.1.2 Detector function selection
  - 3.1.3 Frequency range to be scanned
- 3.2 Radiated emission
  - 3.2.1 Configuration of measurement
  - 3.2.2 Detector function selection
  - 3.2.3 Frequency range to be scanned
- 3.3 Radiated Electromagnetic Disturbance
  - 3.3.1 Test set-up and procedure
  - 3.3.2 Test instrumentation
- 3.4 Harmonic Currents
  - 3.4.1 Test set-up and procedure
  - 3.4.2 Test instrumentation
- 3.5 Voltage Fluctuations and Flicker
  - 3.5.1 Test set-up and procedure
  - 3.5.2 Test instrumentation
- 3.6 Method of calculation

## 4. Environment of measurement

- 4.1 Condition of environment
- 4.2 Measurement uncertainty
- 4.3 List of Test equipments for EMI Test
- 4.4 List of peripherals and cables

---

## 5. Result of measurement

- 5.1 Conducted Emission
  - 5.1.1 Test data
  - 5.1.2 Result
- 5.2 Radiated Emission
  - 5.2.1 Test data
  - 5.2.2 Result
- 5.3 Radiated Electromagnetic Disturbance
  - 5.3.1 Test data
  - 5.3.2 Result
- 5.4 Harmonic Currents
  - 5.4.1 Test data
  - 5.4.2 Result
- 5.5 Voltage Fluctuations and Flicker
  - 5.5.1 Test data
  - 5.5.2 Result

---

## EMS Test Report

### 6. Test Specifications

- 6.1 Standards
- 6.2 Performance criteria

### 7. Test and Results

- 7.1 Electrostatic discharge Immunity Test
  - 7.1.1 Configuration of measurement
  - 7.1.2 Operating environment
  - 7.1.3 Test Equipment
  - 7.1.4 Test Conditions
  - 7.1.5 Test Result
- 7.2 Radiated, RF Electromagnetic Field Immunity Test
  - 7.2.1 Configuration of measurement
  - 7.2.2 Operating environment
  - 7.2.3 Test Equipment
  - 7.2.4 Test Conditions
  - 7.2.5 Test Result
- 7.3 Electrical Fast Transient/Burst Immunity Test
  - 7.3.1 Configuration of measurement
  - 7.3.2 Operating environment
  - 7.3.3 Test Equipment
  - 7.3.4 Test Conditions
  - 7.3.5 Test Result
- 7.4 Surge Immunity Test
  - 7.4.1 Configuration of measurement
  - 7.4.2 Operating environment
  - 7.4.3 Test Equipment
  - 7.4.4 Test Conditions
  - 7.4.5 Test Result

- 
- 7.5 Immunity to Conducted Disturbance, Induced by RF Field
    - 7.5.1 Configuration of measurement
    - 7.5.2 Operating environment
    - 7.5.3 Test Equipment
    - 7.5.4 Test Conditions
    - 7.5.5 Test Result
  - 7.6 Voltage Dips, Short Interruptions & Voltage variations Immunity Test
    - 7.6.1 Configuration of measurement
    - 7.6.2 Operating environment
    - 7.6.3 Test Equipment
    - 7.6.4 Test Conditions
    - 7.6.5 Test Result

## 8. Appendix

- 8.1 Photographs of Set-up
- 8.2 Photographs of EUT



## 1. Information of EMC Laboratory

### Name of test laboratory

Standard Engineering Co., Ltd.

### Location

145, Hwanggeumteo-gil, Eumam-myeon, Seosan-si, Chungcheongnam-do 356-844,  
Republic of Korea.

Phone No. : +82-41-663-9436~7

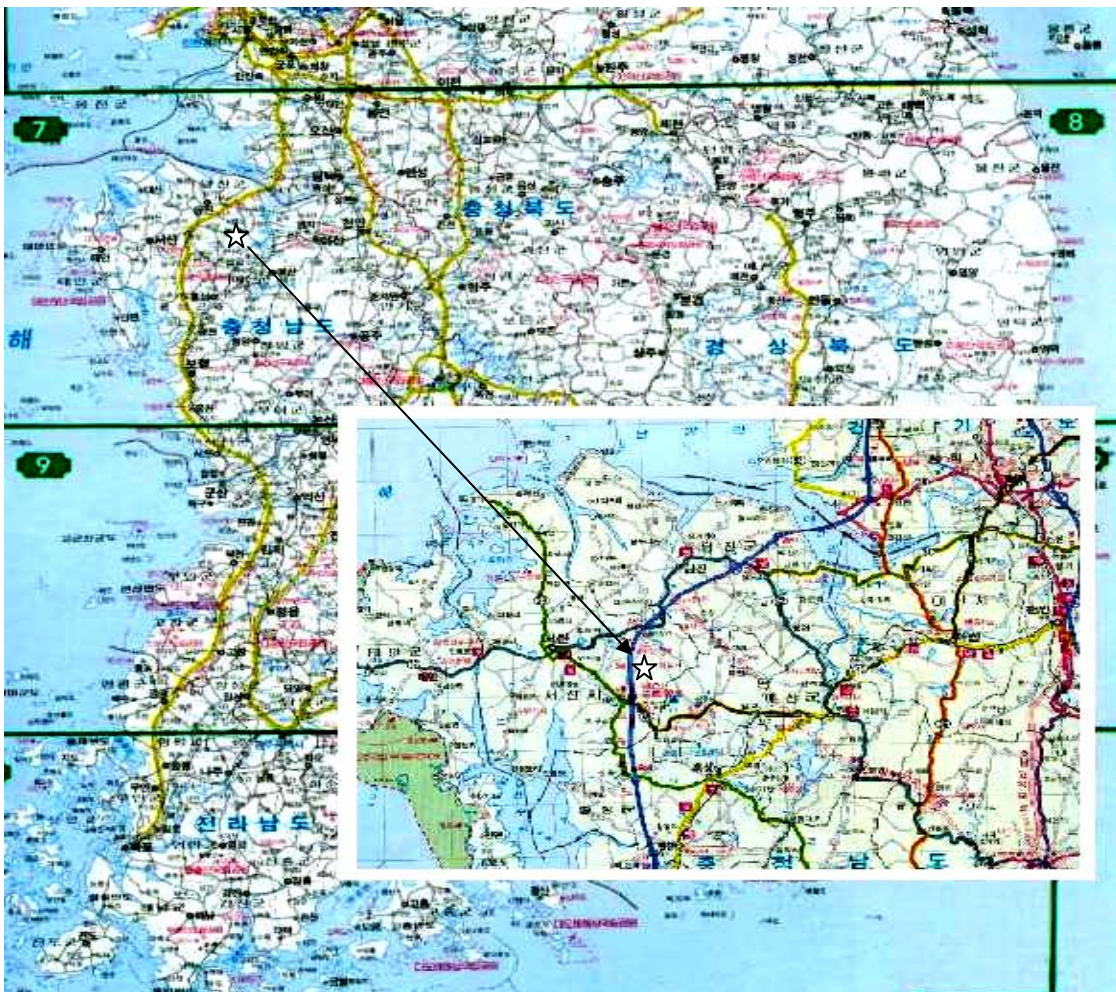
Fax. No. : +82-41-663-9434

Homepage: www.stdeng.com

### Environment of Laboratory

This location can keep accuracy in measuring more than anywhere because surrounding noise ambient is low and silent excellently to be suitable in EMI's measuring.

### Map



## 2. General Information

---

### 2.1 Product information

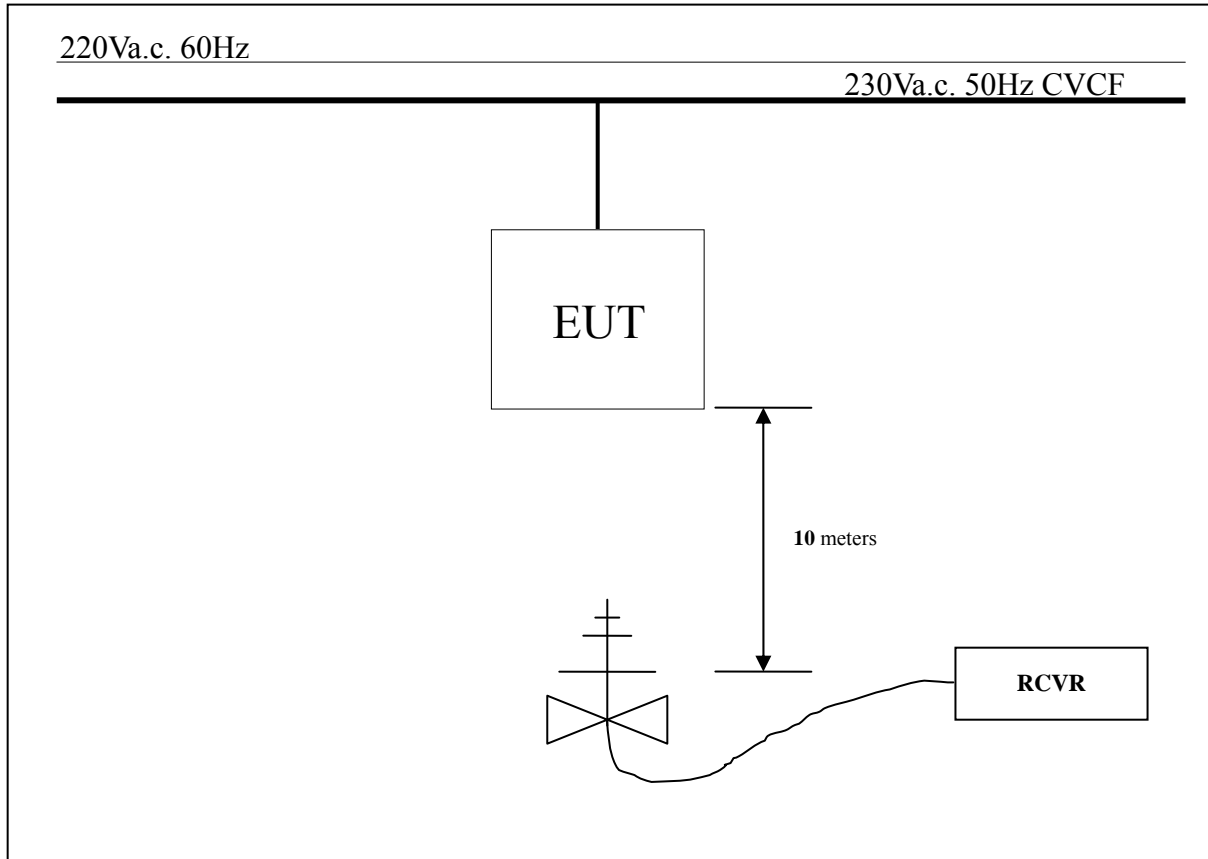
Description of EUT : LED PANEL LAMP  
Model number : KG-PL200V  
Family Model : KG-PL100V, KG-PL300V, KG-PL500V  
Specification : AC 100-240 V, 50/60Hz, 20 W, 90 mA  
Crystal & Clock Freq. : Below 108 MHz  
Applied Standard : EN 55015:2013  
EN 61547:2009  
EN 61000-3-2:2014  
EN 61000-3-3:2013  
EN 61000-4-2:2009  
EN 61000-4-3/A2:2010  
EN 61000-4-4:2012  
EN 61000-4-5:2006  
EN 61000-4-6:2009  
EN 61000-4-11:2004

### 2.2 Client information

Applicant : KGAUTO CO.,LTD.  
Address : NAE-DONG71-4,OJEONG-GU,BUCHEON-SI, GYEONGI-DO,  
KOREA  
Phone No. : +82-2-684-5400  
Fax. No. : +82-2-684-5477  
Contact person : kindhong@hanmail.net  
  
Manufacturer : KGAUTO CO.,LTD.  
Address : NAE-DONG71-4,OJEONG-GU,BUCHEON-SI, GYEONGI-DO,  
KOREA  
Phone No.: +82-2-684-5400  
Fax. No.: +82-2-684-5477



### 2.3 Peripherals



### Used Peripherals

Descriptions	Maker	Type	S/No.	Remarks
EUT	KG AUTO CO.,LTD.	KG-PL200V	N/A	

### EUT Operation

Lamp On mode.

## EMI Test Report

---

### Emission of Electromagnetic disturbance

#### 3. Procedure of measurement

---

##### 3.1 Conducted emission

###### 3.1.1 Configuration of measurement

This measurement executed in shield-room and EUT was tested on wooden table height 0.8 m above the reference ground plane.

EUT's rear part had 0.4 m distance from VCP(Vertical Conducted Plane), 0.8 m any other grounded conducting surface and LISN placed on the grounded plane with 1m distance from EUT's side part .

Excess power cord and cables fixed in bundle style of 30 cm ~ 40 cm length with non-inductive material, and power line was connected to power source through LISN to detect maximum EMI without external RFI from aux. instruments.

The conducted common mode disturbance voltage at telecommunication port was measured with the EUT in shield room. The measurement was conducted with ISN. The EUT was placed on non-metallic table 0.4 m above the metallic grounded floor.

Measuring equipments and EUT confirmed that warming-up was performed during enough time and calibration of antenna as well as calibration of measuring equipment also completed beforehand.

This measurement was performed on condition of worst-case emission.

###### 3.1.2 Detector function selection

Amplitude measurements were performed with quasi-peak and an average detector.

###### 3.1.3 Frequency range to be scanned

For conducted emissions measurement, frequency range of 9 kHz ~ 30 MHz included, was investigated.

---

## **3.2 Radiated Emission**

### **3.2.1 Configuration of measurement**

Preliminary measurement was performed in 3 meter semi-anechoic chamber to detect correct EMI frequency.

Final measurement was executed at 10 meters OATS(Open Area Test Site) using Quasi-peak detector and TRILOG antenna.

EUT was placed on 0.8m height wooden table located on the reference ground plane. Excess power cord and other excess cables fixed in bundle style of 30~40cm length with non-inductive material to detect maximum EMI emission from EUT.

The height of the measuring antenna is varied 1 to 4 meters and table was rotated a full revolution in order to obtain maximum electric field intensity. The measurement is made in both the vertical and horizontal polarization, and measurement is performed with a quasi-peak detector.

The highest emissions between 1 GHz to 6 GHz were analyzed in details by operating the spectrum analyzer in peak and average mode to determine the precise amplitude of the emissions.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading.

The interconnecting cables were arranged and moved to get the maximum measurement.

Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings.

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes. If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

### **3.2.2 Detector function selection**

Amplitude measurements were performed with quasi-peak and an average detector.

### **3.2.3 Frequency range to be scanned**

For Radiated emissions measurement, frequency range of 30 MHz ~ 300 MHz included, was investigated.

---

### **3.3 Radiated Electromagnetic Disturbance**

#### **3.3.1 Test set-up and procedure**

The quasi-peak limits of the magnetic component of the radiated disturbance field strength in the frequency range 9 kHz - 30MHz measured as a current in 2 m, 3 m or 4 m loop antennas around the lighting equipment.

The limits for the 2 m loop diameter apply to equipment not exceeding a length of 1,6 m, those for the 3 m loop diameter for equipment having a length in between 1,6 m and 2,6 m and those for the 4 m loop diameter for equipment having a length in between 2,6 m and 3,6 m.

#### **3.3.2 Test instrumentation**

	<b>Model Number</b>	<b>Manufacturer</b>	<b>Description</b>	<b>Serial Number</b>	<b>Last Cal.(Interval)</b>
■	ESIB7	Rohde & Schwarz	EMI Test Receiver	100119	Mar. 16, 2015 (1Y)
■	VVL1530	AFJ Instruments	Triple-loop antenna	SD060X	Sep. 26, 2013 (2Y)

### **3.4 Harmonic Currents**

#### **3.4.1 Test set-up and procedure**

Emission tests shall be conducted with the user's operation controls or automatic programs set to the mode expected to produce the maximum total harmonic current(THC) under normal operating conditions. This defines the equipment set-up during emission tests and not a requirement to measure THC or to conduct searches for worst-case emissions. The equipment is tested as presented by, and in accordance with information provided by, the manufacturer.

#### **3.4.2 Test instrumentation**

Equipment	Model No.	Serial No.	Makers	RMKS
Power Simulation System	PM6000	200006700411	Voltech	

### **3.5 Voltage Fluctuations and Flicker**

#### **3.5.1 Test set-up and procedure**

Unless the test conditions for the measurement of voltage fluctuations and flicker are given. A controls or automatic program shall be set to produce the most unfavorable sequence of voltages, using only those combinations of controls and programs which are mentioned by the manufacturer in the instruction manual.

#### **3.5.2 Test instrumentation**

Equipment	Model No.	Serial No.	Makers	RMKS
Power Simulation System	PM6000	200006700411	Voltech	

---

### **3.6 Method of Calculation**

#### **3.6.1 Unit of Conducted emission measurement**

Conducted Emission Test results for conducted emissions are reported in micro-volts.

#### **3.6.2 Unit of Radiated emission measurement**

Test results of radiated emissions measurement are reported in micro-volts per meter at the specific distance. Using the unit of dBuV on the test instrument, the indication unit was converted to field strength unit of uV/m as following method;

$$F (\mu V/m) = 10^{\{(R+CL+AF)/20\}} (\mu V/m)$$

F: Field Strength in uV/m, R: Meter Reading Level in dB(μV),

CL: Cable Loss from antenna to meter in dB,

AF: Antenna Factor of receiving antenna in dB(/m)

#### **Sample calculation (Radiated emission)**

Emission level is calculated as follows;

Emission Level(dBμV/m)

= Reading Level + Ant. Factor + Cable Loss – Amp Gain

Margin Level is calculated as follows;

Margin(dBμV) = Limit Level – Emission Level

Example) Standard limit = 40 dBμV/m,

Reading Level = 10 dBμV,

Ant. Factor = 15 dB,

Cable Loss= 1 dB

**Emission Level(dBμV/m) = 10 + 15 + 1 = 26 (dBμV/m)**

**Margin(dBμV) = 40 – 26 = 14 (dBμV)**

#### 4. Environments of measurement

---

##### 4.1 Condition of environment

Shield room	Temperature	21 °C
	Humidity	42 %R.H.
	Pressure	1008 hPa
OATS	Temperature	24 °C
	Humidity	50 %R.H.
	Pressure	1008 hPa

##### 4.2 Measurement uncertainty

All measurements, especially EUT's measurement includes uncertain level that can happen for the reason as following;

Variation of antenna factor by changes of height, center, polarization, directivity.

Uncertainty factor by change of measurement distance, site's imperfection.

Radiated emissions measurements:  $\pm 4.04$  dB

Mains terminal disturbance voltage: Quasi-peak & Average Detection:  $\pm 2.64$  dB

Telecom terminal disturbance voltage: Quasi-peak & Average Detection:  $\pm 3.01$  dB

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT in the above mentioned way.

The measurement uncertainty was calculated in accordance with NAMAS NIS 81 : The treatment of uncertainty in EMC measurement.”

The measurement uncertainty was given with a confidence of 95 %.



#### **4.3 List of Test equipments for EMI test**

Used	Equipment	Maker	Model No.	S/No.	Cal.due date.
<input checked="" type="checkbox"/>	EMI Test Receiver	Rhode & Schwarz	ESIB7	100119	03/16/2016
<input checked="" type="checkbox"/>	EMI Test Receiver	LIG	LSA-30	L07126028	10/04/2015
<input checked="" type="checkbox"/>	Artificial Mains	Rhode & Schwarz	ESH2-Z5	100064	12/01/2015
<input type="checkbox"/>	Artificial Mains	Rhode & Schwarz	ESH3-Z5	100204	11/12/2015
<input type="checkbox"/>	Signal Generator	Rhode & Schwarz	SML03	101003	11/12/2015
<input type="checkbox"/>	Absorbing Clamp	Rhode & Schwarz	MDS-21	100076	11/03/2015
<input checked="" type="checkbox"/>	TRILOG Antenna	Schwarzbeck	VULB9163	164	09/15/2016
<input checked="" type="checkbox"/>	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100137	11/12/2015
<input checked="" type="checkbox"/>	Power Simulation System	Voltech	PM6000	200006700411	11/26/2015
<input type="checkbox"/>	Horn Antenna	Schwarzbeck	BBHA9120A	346	01/27/2016
<input checked="" type="checkbox"/>	Triple-loop antenna	AFJ Instruments	VVL1530	SD060X	09/26/2015
<input type="checkbox"/>	ISN CAT3	Schwarzbeck	NTFM8158	8158-0030	11/19/2015
<input type="checkbox"/>	ISN CAT5	Schwarzbeck	NTFM8158	8158-0040	11/19/2015
<input type="checkbox"/>	ISN CAT6	Schwarzbeck	NTFM8158	8158-0039	03/13/2016
<input type="checkbox"/>	Attenuator	Rhode & Schwarz	MDS-2	100274	11/03/2015
<input type="checkbox"/>	Click Meter	AFJ INSTRUMENTS	CL55C	55041331216	03/13/2016
<input type="checkbox"/>	Switching Box	AFJ INSTRUMENTS	SW04	SW041304057	03/13/2016

#### **4.4 List of Peripherals & Cables for EMI test**

Used	Descriptions	Maker	Type	S/No.	Approval
<input type="checkbox"/>	DC Power Supply	HP	6574A	US36340515	CE
<input checked="" type="checkbox"/>	M/W Cable/2GHz 5m	H+Suhner	SF104/2x11BNC	14354	
<input type="checkbox"/>	M/W Cable/2GHz10m	“	“	14353	
<input type="checkbox"/>	M/W Cable/18GHz18m	“	SF104/2x11N	6025	
<input type="checkbox"/>	M/W Cable/18GHz18m	“	“	6026	
<input checked="" type="checkbox"/>	M/W Cable/18GHz10m	“	“	6027	
<input checked="" type="checkbox"/>	M/W Cable/2GHz43m	Thermax	MS-P400		
<input type="checkbox"/>	Function Generator	HP	3311A	1244A25104	
<input checked="" type="checkbox"/>	CCD Color Camera	Sung Eun	PSS-C5327		

## 5. Result of Measurement

### 5.1 Conducted Emission

#### 5.1.1 Test data

a) Mains terminal disturbance voltage

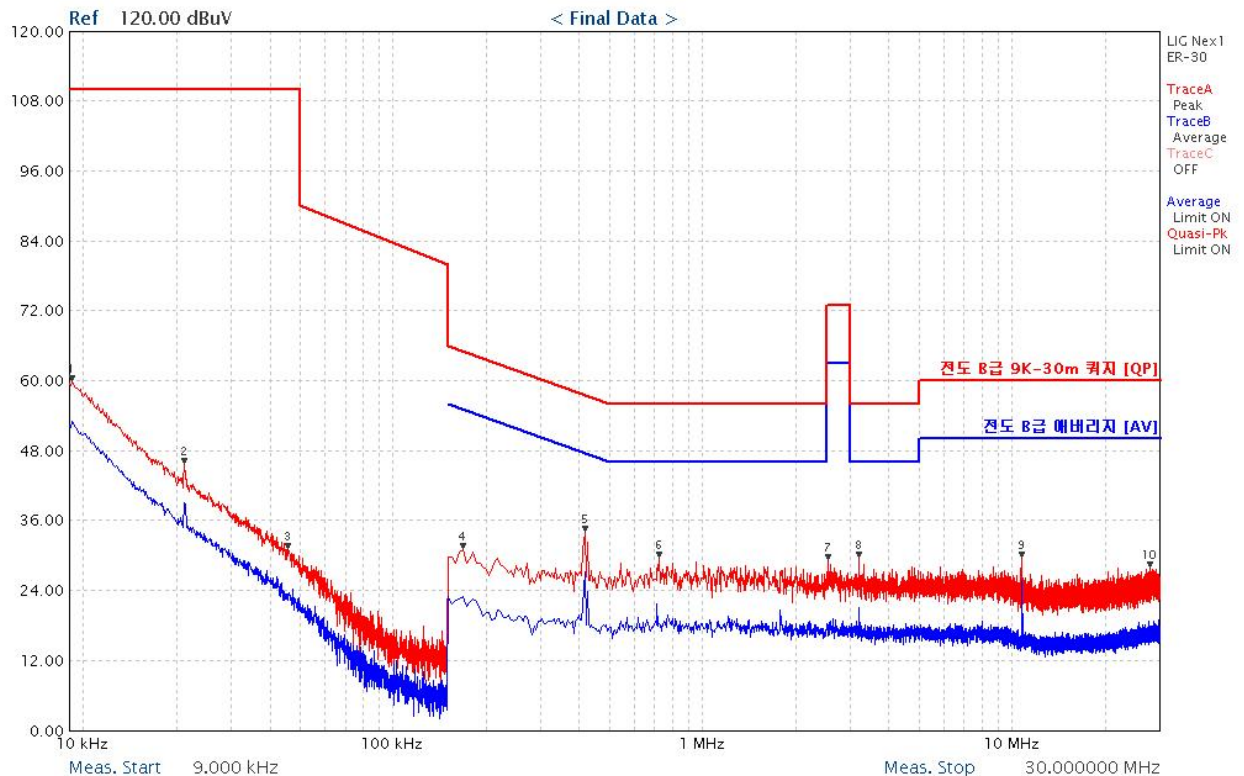
#### Standard Engineering Co., Ltd. Conducted Emission Measurement

EUT: KG-PL200V  
 Manufacturer: KGAUTO CO.,LTD..  
 Operating Condition:  
 Test Site: Shield Room  
 Operator: DJ Jo  
 Test Specification: EN 55015  
 Comment: Phase N

#### SCAN TABLE: "ZFCCCEA"

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	5.0 kHz	MaxPeak Average	1.0 ms	9 kHz	ESH3-Z2

#### Scan Measurement Mode



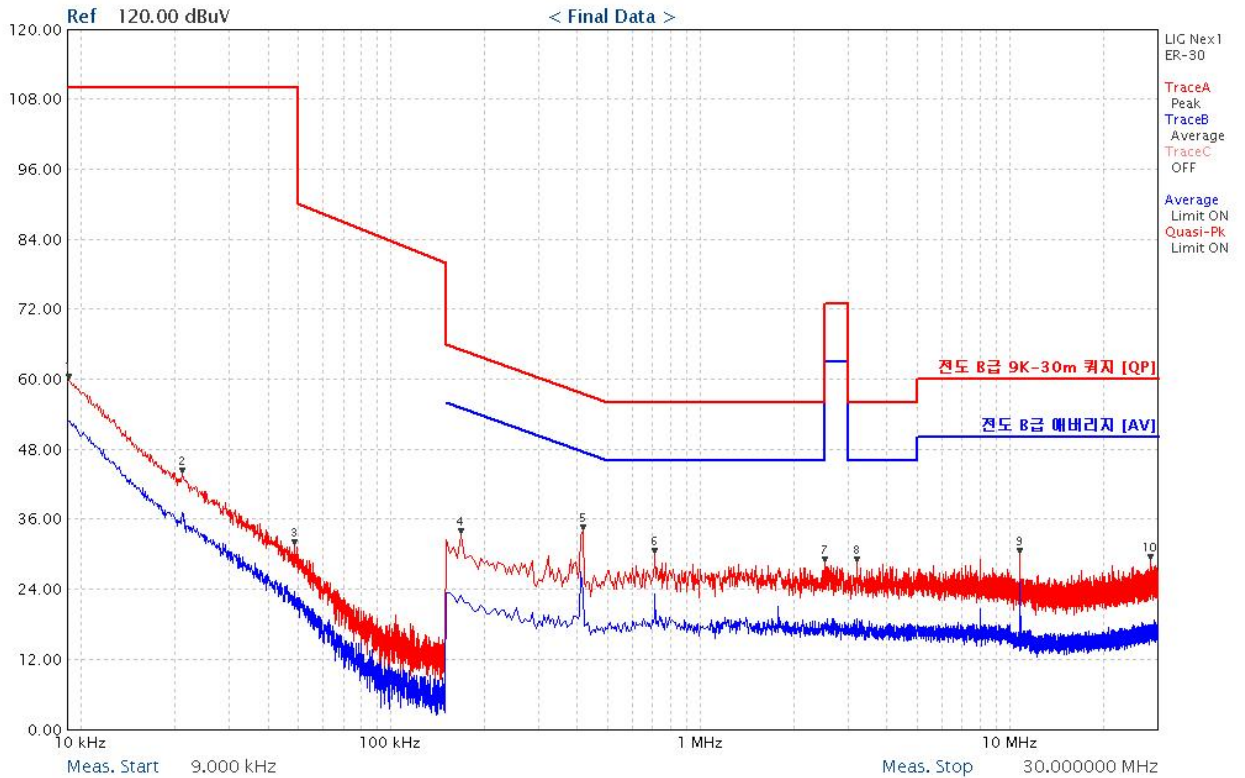
**Standard Engineering Co., Ltd.**  
**Conducted Emission Measurement**

EUT: KG-PL200V  
 Manufacturer: KGAUTO CO.,LTD.  
 Operating Condition:  
 Test Site: Shield Room  
 Operator: DJ Jo  
 Test Specification: EN 55015  
 Comment: Phase L

**SCAN TABLE: "ZFCCCEA"**

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	5.0 kHz	MaxPeak Average	1.0 ms	9 kHz	ESH3-Z2

Scan Measurement Mode



### FINAL TABLE

Frequency [MHz]	Line	Limit[dBuV]		Result[dBuV]		Factor [dB]	Margin[dBuV]	
		QP	AV	QP	AV		QP	AV
0.415	L	57.55	47.55	24.03	18.03	10.13	33.52	29.52
0.708	L	56.00	46.00	27.87	18.37	10.16	28.13	27.63
10.698	L	60.00	50.00	28.22	25.61	10.69	31.78	24.39
0.415	N	57.55	47.55	24.04	17.99	10.13	33.51	29.56
0.726	N	56.00	46.00	27.00	18.21	10.16	29.00	27.79
10.698	N	60.00	50.00	28.17	25.62	10.69	31.83	24.38

\* Detector function was set into Quasi-peak & Average mode.

\* Factor = LISN Factor + Cable loss + Pulse Limiter

### 5.1.2 Result

*Complied*

## 5.2 Radiated Emission

### 5.2.1 Test data

#### **FINAL TABLE**

Frequency [MHz]	Polarization [Ver/Hor]	Limit [dBuV/m]	Result [dBuV/m]	Factor [dB]	Margin [dBuV/m]
30.94	H	30.00	22.05	12.66	7.95
54.51	H	30.00	24.75	14.36	5.25
65.73	H	30.00	19.86	12.51	10.14

\* Detector function was set into Quasi-peak mode.

\* Factor = Antenna Factor + Cable loss

### 5.2.2 Result

*Complied*

### 5.3 Radiated Electromagnetic Disturbance

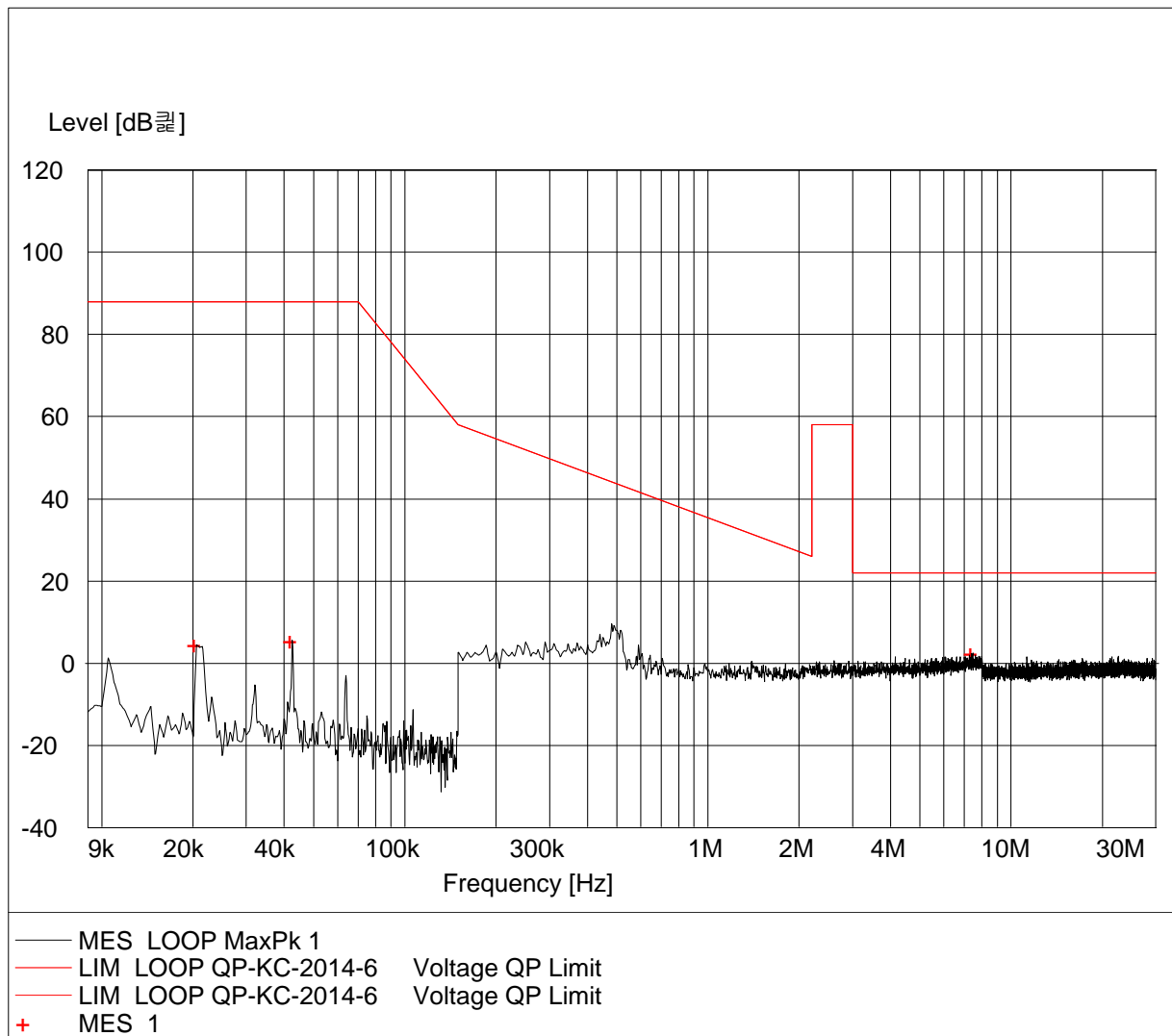
#### 5.3.1 Test data

**Radiated electromagnetic disturbance(Loop)**

EUT: KG-PL200V  
 Manufacturer: KGAUTO CO.,LTD.  
 Operating Condition: X  
 Test Specification: EN 55011  
 Comment:

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
9kHz	150kHz	500Hz	200Hz	PK	10msec	Auto	ON
150kHz	30MHz	5kHz	10kHz	PK	10msec	Auto	ON

Prescan Measurement                      Detector: X PK

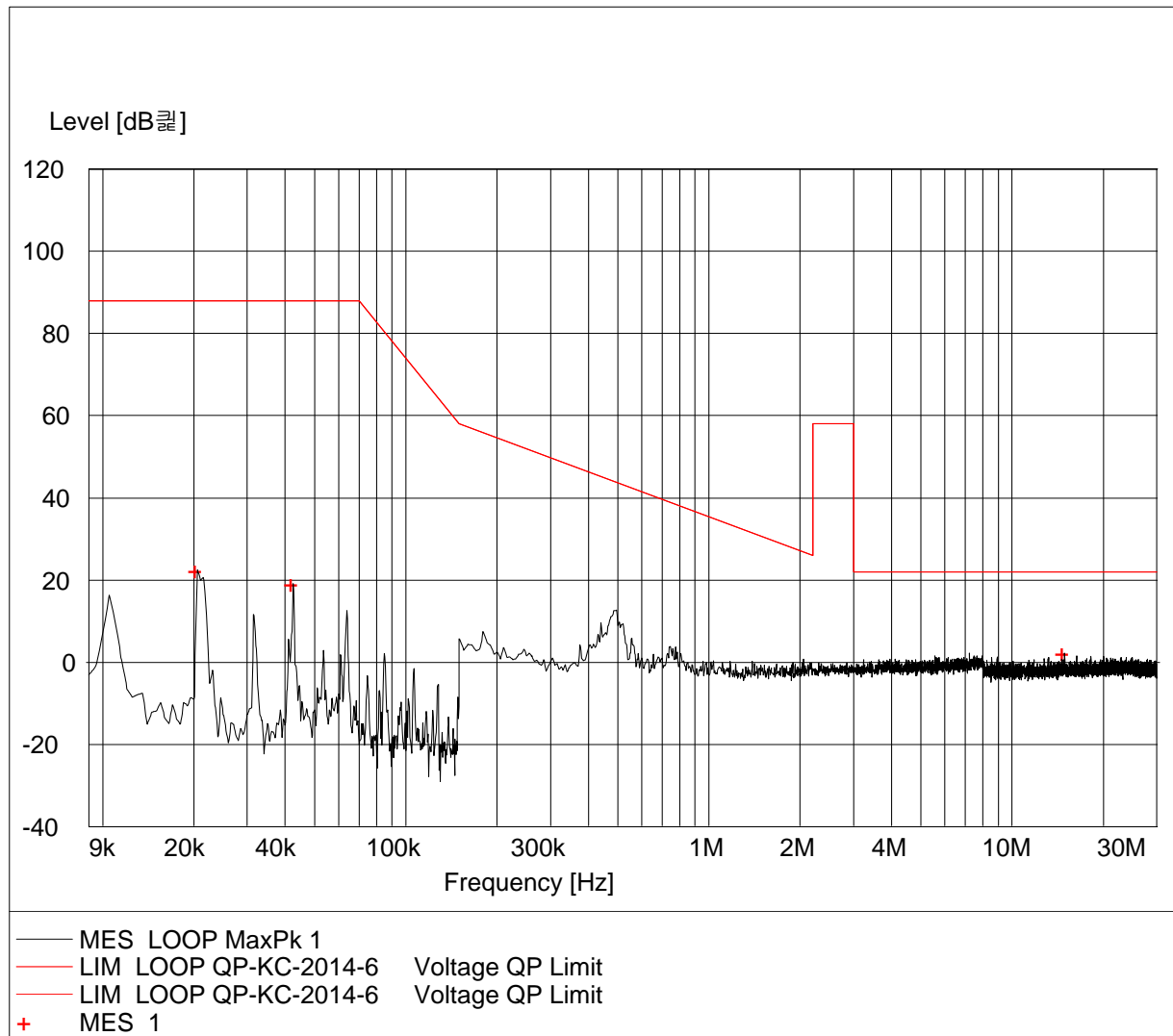


**Radiated electromagnetic disturbance(Loop)**

EUT: KG-PL200V  
 Manufacturer: KGAUTO CO.,LTD.  
 Operating Condition: Y  
 Test Specification: EN 55011  
 Comment:

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
9kHz	150kHz	500Hz	200Hz	PK	10msec	Auto	ON
150kHz	30MHz	5kHz	10kHz	PK	10msec	Auto	ON

Prescan Measurement                      Detector: Y PK



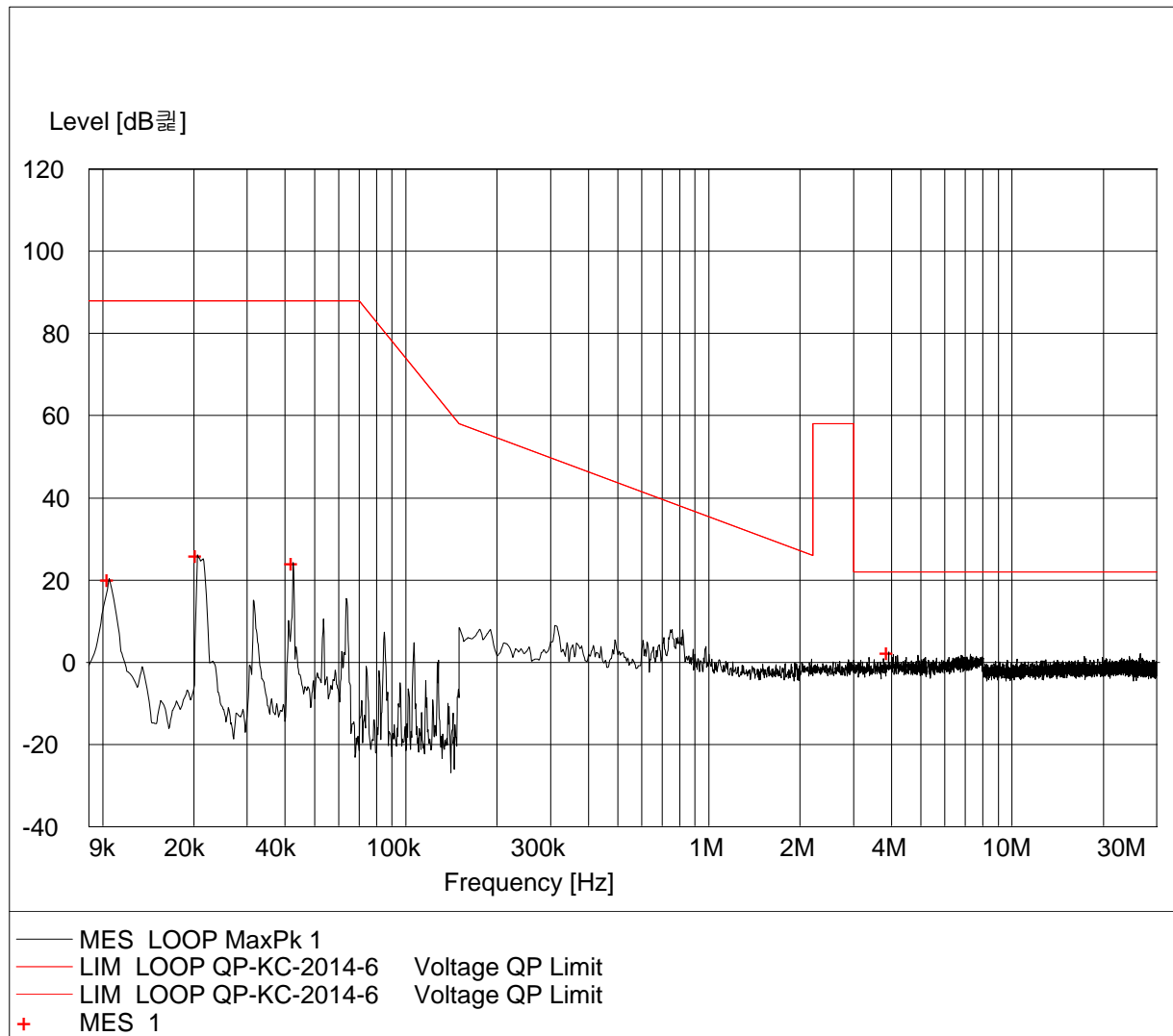


**Radiated electromagnetic disturbance(Loop)**

EUT: KG-PL200V  
 Manufacturer: KGAUTO CO.,LTD.  
 Operating Condition: Z  
 Test Specification: EN 55011  
 Comment:

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
9kHz	150kHz	500Hz	200Hz	PK	10msec	Auto	ON
150kHz	30MHz	5kHz	10kHz	PK	10msec	Auto	ON

Prescan Measurement                      Detector: Z PK



***Radiated electromagnetic disturbance(Loop)***

EUT: KG-PL200V  
Manufacturer: KGAUTO CO.,LTD.  
Operating Condition: X,Y,Z  
Test Specification: EN 55011  
Comment:

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
9kHz	150kHz	500Hz	200Hz	PK	10msec	Auto	ON
150kHz	30MHz	5kHz	10kHz	PK	10msec	Auto	ON

Peak Search Results

Frequency	PK Level	PK Limit	PK Delta
MHz	dB $\mu$ V	dB $\mu$ V	dB $\mu$ V

The highest Emission 20dB below the Limit.

**5.3.2 Result**

*Complied*

## 5.4 Harmonic Currents

### 5.4.1 Test data

Product:	KG-PL200V	2015 Jun 8 4:56pm Page 1 of 1
Serial no:		
Description:		
Result Name:		
Voltech IEC61000-3 Windows Software 1.24.12		Test Date: 2015 Jun 8 4:50pm
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2006)	
Power Analyzer:	Voltech PM6000 SN: 200006700411 Firmware version: v1.21.07RC2	
Channel(s):	1. SN: 090015501623, 28 Adjusted Date: 11 AUG 2010. 2. SN: 090015501634, 28 Adjusted Date: 12 AUG 2010. 3. SN: 090015501637, 28 Adjusted Date: 19 AUG 2010. 4. SN: None Adjusted Date: None 5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
Shunt(s):	1. SN: 091024301248, 4 Adjusted Date: 3 AUG 2010. 2. SN: 091024301249, 4 Adjusted Date: 3 AUG 2010. 3. SN: 091024301250, 4 Adjusted Date: 3 AUG 2010. 4. SN: None Adjusted Date: None 5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
AC Source:	Mains / Manual Source	
Overall Result:	Notes: Specified power more than +/- 10% different from measured power Voltage harmonics outside permitted limits Voltage Crest Factor outside permitted limits	
<b>N/A</b>		

Class	Class C <= 25W
Class Multiplier	1

Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL	Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL
2	None	None	0.273mA		0.296mA		N/A	3	57.79mA	86.69mA	15.64mA	✓✓	15.69mA	✓	N/A
4	None	None	0.328mA		0.362mA		N/A	5	32.29mA	48.45mA	6.188mA	✓✓	6.208mA	✓	N/A
6	None	None	0.193mA		0.225mA		N/A	7	17.00mA	25.50mA	6.766mA	✓✓	6.799mA	✓	N/A
8	None	None	0.256mA		0.321mA		N/A	9	8.500mA	12.75mA	6.964mA	✓✓	7.048mA	✓	N/A
10	None	None	0.338mA		0.412mA		N/A	11	5.950mA	8.925mA	3.336mA	N/A	3.369mA	N/A	N/A
12	None	None	0.500mA		0.545mA		N/A	13	5.034mA	7.551mA	0.366mA	N/A	0.418mA	N/A	N/A
14	None	None	0.325mA		0.374mA		N/A	15	4.363mA	6.545mA	4.679mA	N/A	4.733mA	N/A	N/A
16	None	None	0.201mA		0.258mA		N/A	17	3.850mA	5.775mA	2.246mA	N/A	2.272mA	N/A	N/A
18	None	None	0.203mA		0.231mA		N/A	19	3.444mA	5.167mA	0.788mA	N/A	0.822mA	N/A	N/A
20	None	None	0.151mA		0.171mA		N/A	21	3.116mA	4.675mA	2.545mA	N/A	2.567mA	N/A	N/A
22	None	None	0.221mA		0.242mA		N/A	23	2.845mA	4.268mA	1.562mA	N/A	1.588mA	N/A	N/A
24	None	None	0.158mA		0.176mA		N/A	25	2.618mA	3.927mA	1.221mA	N/A	1.274mA	N/A	N/A
26	None	None	0.134mA		0.156mA		N/A	27	2.424mA	3.636mA	1.542mA	N/A	1.558mA	N/A	N/A
28	None	None	0.199mA		0.217mA		N/A	29	2.256mA	3.385mA	0.970mA	N/A	0.985mA	N/A	N/A
30	None	None	0.095mA		0.109mA		N/A	31	2.111mA	3.166mA	0.762mA	N/A	0.791mA	N/A	N/A
32	None	None	0.115mA		0.131mA		N/A	33	1.963mA	2.975mA	1.110mA	N/A	1.124mA	N/A	N/A
34	None	None	0.115mA		0.127mA		N/A	35	1.870mA	2.805mA	0.883mA	N/A	0.899mA	N/A	N/A
36	None	None	0.100mA		0.115mA		N/A	37	1.768mA	2.653mA	0.797mA	N/A	0.819mA	N/A	N/A
38	None	None	0.094mA		0.106mA		N/A	39	1.678mA	2.517mA	0.737mA	N/A	0.752mA	N/A	N/A
40	None	None	0.095mA		0.107mA		N/A								

<L1 : Reading is below limit 1.

<L2 : Reading is below limit 2.

N/A : Overall Result is N/A

### 5.4.2 Result : *Complied*

## 5.5 Voltage Fluctuations and Flicker

### 5.5.1 Test data

Product: KG-PL200V		2015 Jun 8 5:18pm		
Serial no:		Page 1 of 1		
Description:				
Result Name:				
Voltech IEC61000-3 Windows Software 1.24.12		Test Date: 2015 Jun 8 4:57pm		
Type of Test:	Flickermeter Test - Table			
Power Analyzer:	Voltech PM6000 SN: 200006700411 Firmware Version: v1.21.07RC2			
Channel(s):	1. SN: 090015501623, 28 Adjusted Date: 11 AUG 2010. 2. SN: 090015501634, 28 Adjusted Date: 12 AUG 2010. 3. SN: 090015501637, 28 Adjusted Date: 19 AUG 2010. 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None			
Shunt(s):	1. SN: 091024301248, 4 Adjusted Date: 3 AUG 2010. 2. SN: 091024301249, 4 Adjusted Date: 3 AUG 2010. 3. SN: 091024301250, 4 Adjusted Date: 3 AUG 2010. 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None			
AC Source:	Mains / Manual Source			
Overall Result:	Notes: Measurement method - Voltage			
<b>PASS</b>				
	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	6.000	500
Reading 1	0.270	0.015	0.337	0

**5.5.2 Result:** *Complied*

## EMS Test Report

### Immunity of Electromagnetic disturbance

#### 6. Test Specifications

##### 6.1 Standards

EN 61547:2013	Equipment for general lighting purposes – EMC immunity requirements
---------------	---

##### Basic standards

<input checked="" type="checkbox"/> EN 61000-4-2:2009 Required test level	Electrostatic discharge immunity test Contact discharge $\pm 4$ kV, Air discharge $\pm 8$ kV
<input checked="" type="checkbox"/> EN 61000-4-3/A2:2010 Required test level	Radiated disturbance induced by RF fields 3 V/m, AM 80 %(1 kHz), 80-2700 MHz
<input checked="" type="checkbox"/> EN 61000-4-4:2012 Required test level	Electrical fast transient burst immunity test AC input $\pm 1$ kV, DC & Telecomm. & signal line $\pm 0.5$ kV
<input checked="" type="checkbox"/> EN 61000-4-5:2006 Required test level	Surge immunity test Differential mode $\pm 1$ kV on AC supply Common mode $\pm 2$ kV on AC supply
<input checked="" type="checkbox"/> EN 61000-4-6:2009 Required test level	Conducted disturbance induced by RF fields 3 V, AM 80%(1 kHz), 0.15~80 MHz AC/DC Mains, Telecommunication & Signal line.
<input type="checkbox"/> EN 61000-4-8:2010 Required test level <sup>(a)</sup>	Magnetic field immunity test 3 A/m(RMS), 60 Hz
<input checked="" type="checkbox"/> EN 61000-4-11:2004 Required test level	Voltage dips, short interruptions and voltage variation immunity tests 70 % 10 cycle, 100 % 0.5 cycle
<i>(a) The EUT is not affected by magnetic fields, so this test was not applied.</i>	

---

## **6.2 Performance criteria**

The performance criteria are based on the general criteria of the standard and specified by the manufacturer.

**Criterion A :** The EUT shall be operated to the normal mode. The measurement shall be done by the subjective observation of a observer to operate a intended during the test.

**Criterion B :** The EUT shall continue to operate as intended after the test. During the test, degradation of performance is allowed however.

**Criterion C :** Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by power on/off.

The monitoring performance of EUT during the test was performed by observation of the EUT communication condition.

## 7. Test and Results

### 7.1 Electrostatic discharge Immunity Test

#### 7.1.1 Configuration of measurement

The EUT was placed on a non-metallic support 0.8m above a reference ground plane(RGP) and floor standing EUT was placed on 0.1m wooden table above the RGP. The return cable of the ESD generator was connected to the RGP.

A vertical coupling plane(VCP) and horizontal coupling plan(HCP) connected to the RGP with a cable through two 470 k ohms register's each ends.

0.5mm insulating supporter between EUT and HCP was used to locate the EUT.

#### 7.1.2 Operating environment

This test was performed in a shield room

Temperature: 21 °C(15~35°C) Relative Humidity: 42 %R.H. (30~60 %)

#### 7.1.3 Test Equipment

	Equipment	Model No.	Maker	Serial No.	Cal. due date
<input checked="" type="checkbox"/>	ESD Simulator	ESS-2000	Noiseken	ESS0281014	11/19/2015
<input checked="" type="checkbox"/>	Discharge gun	TC-815P	Noiseken	ESS02X1137	11/19/2015
<input type="checkbox"/>	Loading Resistor	05-00001A	Noiseken	-	N/A
<input checked="" type="checkbox"/>	HCP	-	-	-	N/A
<input checked="" type="checkbox"/>	VCP	-	-	-	N/A

#### 7.1.4 Test Conditions

Discharge voltage	$\pm 4$ kV contact, $\pm 8$ kV Air discharge
Polarity	Positive and Negative
Discharge method	Direct & Indirect(VCP/HCP)
Discharge impedance	330 ohm / 150 pf
Discharge interval	1 second
Number of discharge	20 of each polarity
Criterion	B
Test point Air discharge Contact discharge	EUT

#### 7.1.5 Test result: There was no change of operation status during above testing

**Pass**



## 7.2 Radiated, RF Electromagnetic Field Immunity Test

### 7.2.1 Configuration of measurement

The EUT was placed on a non-metallic table 0.8m above the reference ground plane covered with ferrite tiles in semi-anechoic chamber which field uniformity chamber was calibrated for 18V/m.

The horizontal/vertical polarization and all side of EUT was tested.

### 7.2.2 Operating environment

Temperature: 21 °C Relative Humidity: 42 %R.H.

### 7.2.3 Test Equipment

	Equipment	Model No.	Maker	Serial No.	Cal.due date
<input checked="" type="checkbox"/>	RF Amplifier	NA80MF3G201003	Noiseken	A30358	11/12/2015
<input checked="" type="checkbox"/>	Signal Generator	SML03	R & S	101003	11/12/2015
<input checked="" type="checkbox"/>	Power Meter	ECC418B	Agilent	GB42421309	11/12/2015
<input checked="" type="checkbox"/>	E-Field Meter	EMC-20	Narda	AP-0182	07/14/2015
<input checked="" type="checkbox"/>	E-Field Probe	Type 8.4	Narda	AR-0041	07/14/2015
<input checked="" type="checkbox"/>	Bi-Log Antenna	CC5131	Schaffner	2740	09/15/2016
<input checked="" type="checkbox"/>	Power Sensor	8482A	Agilent	MY41091630	11/12/2015
<input type="checkbox"/>	Horn Antenna	BBHA9120A	Schwarzbeck	346	01/27/2016

### 7.2.4 Test Conditions

Frequency Range	80 ~ 1000 MHz
Field strength	3 V/m
Modulation	AM 80% with 1 kHz sine wave
Frequency Step	1 %
Field Polarization	Horizontal and Vertical
Exposed sides	Front/Back/Right/Left
Antenna distance from EUT	3 m
Dwell time	3 seconds
Criterion	A

### 7.2.5 Test result: There was no change of operation status during above testing

**Pass**

### **7.3 Electrical Fast Transient/Burst Immunity Test**

#### **7.3.1 Configuration of measurement**

The EUT was placed on a non-metallic table 0.8m above the reference ground plane and floor standing EUT was placed on 0.1m wooden table above the RGP. The capacitive coupling clamp was also placed at a distance of 0.1 m above the RGP and the length between clamp and EUT should not be more than 1m.

#### **7.3.2 Operating environment**

This test was performed in a shield room

Temperature: 21 °C(15~35)    Relative Humidity: 42 %R.H.(25~75)

Atmosphere pressure: 1025hPa(860~1060)

#### **7.3.3 Test Equipment**

	Equipment	Model	Maker	S/N	Cal.due date
<input checked="" type="checkbox"/>	Fast Transient Noise Simulator	FNS-2002	Noiseken	FNS0240087	09/10/2015
<input type="checkbox"/>	Attenuator	AT810	Noiseken	INS0260279	N/A
<input type="checkbox"/>	Coupling Clamp	15-00001A	Noiseken	-	09/10/2015

#### **7.3.4 Test Conditions**

Severity Level	Power line $\pm$ 1 kV
Type of Line	Power line : unshielded
Polarity	Positive and Negative
Rise time/width	5 ns / 50 ns
Pulse repetition	5.0 kHz
Duration	120 seconds
Coupling Mode	L+N (Power line)
Criterion	B

#### **7.3.5 Test result: There was no change of operation status during above testing**

**Pass**

## 7.4 Surge Immunity Test

### 7.4.1 Configuration of measurement

The EUT was placed on a non-metallic table 0.8m above the reference ground plane and floor standing EUT was placed on 0.1m wooden table above the RGP.

### 7.4.2 Operating environment

This test was performed in a shield room

Temperature: 21 °C(15~35) Relative Humidity: 42 %R.H.(10~75)

Atmosphere pressure: 1008 hPa(861~1061)

### 7.4.3 Test Equipment

	Equipment	Model	Maker	S/N	Cal.due date
<input checked="" type="checkbox"/>	Surge Simulator	LSS-6030	Noiseken	LSS0270120	11/12/2015
<input type="checkbox"/>	CDN (Telecom. Lines)	IJ6401tel	Noiseken	LSS0310164	11/12/2015
<input type="checkbox"/>	EM clamp	EM23	Noiseken	-	-

### 7.4.4 Test Conditions

Severity Level	Differential mode $\pm 1$ kV on AC supply
Number of transient	5 positive & 5 negative
Rise time/width	1.2(8,0)us / 50(20)us
Repetition rate	1 min
Phase angles	N/A
Application method	Direct coupling
Criterion	B

### 7.4.5 Test result : There was no change of operation status during above testing

**Pass**

## **7.5 Immunity to Conducted Disturbances, Induced by RF Field**

### **7.5.1 Configuration of measurement**

The EUT was placed on a non-metallic table 0.8m above the RGP and floor standing EUT was placed on 0.1m isolating support above the RGP.

This test was performed using CDN for mains, clamp for signal and injection probe.

A power meter for calibration was connected to the EUT side of the CDN through a 150-50ohms adapter. The auxiliary equipment(AE) side of the network was terminated with 150 ohm to ground during the calibration.

### **7.5.2 Operating environment**

Temperature: 21 °C    Relative Humidity: 42 %R.H.

### **7.5.3 Test Equipment**

	Equipment	Model No.	Maker	Serial No.	Cal.due date
<input checked="" type="checkbox"/>	Amplifier	NA10K230M75	Noiseken	A30358-2	11/12/2015
<input checked="" type="checkbox"/>	Signal Generator	SML01	R & S	101539	11/12/2015
<input type="checkbox"/>	CDN	NCDN-M3-16A	FCC	03005	12/02/2015
<input checked="" type="checkbox"/>	CDN	NCDN-M2-16A	FCC	03006	12/02/2015
<input type="checkbox"/>	EM clamp	NEM-23MM	FCC	412	03/13/2016
<input checked="" type="checkbox"/>	Power Meter	ECC418B	Agilent	GB42421306	11/12/2015
<input type="checkbox"/>	De/Coupling Network	NAE-23MM	FCC	32	N/A

### **7.5.4 Test Conditions**

Frequency Range	0.15 ~ 80 MHz
Field strength	3 V (AC mains)
Modulation	AM 80% with 1 kHz sine wave
Frequency Step	1 %
Application method	CDN (AC mains), EM clamp (Signal line)
Dwell time	3 seconds
Criterion	A

### **7.5.5 Test result: There was no change of operation status during above testing**

**Pass**

## **7.6 Voltage Dips, Short Interruptions & Voltage variations Immunity Test**

### **7.6.1 Configuration of measurement**

The shortest possible mains cable is used, unless otherwise specified by the manufacturer.

### **7.6.2 Operating environment**

This test was performed in a shield room

Temperature: 21 °C(15~35)

Relative Humidity: 42 %R.H.(25~75)

Atmosphere pressure: 1008 hPa(860~1060)

### **7.6.3 Test Equipment**

	Equipment	Model	Maker	S/N	Cal.due date
■	Voltage dip/interruption Simulator	VDS-2002	Noiseken	VDS0290031	11/12/2015

### **7.6.4 Test Conditions**

Test level	30 %, 100 %
Mains Voltage	230 Va.c., 50 Hz
Voltage / Duration	30 % 10 cycle, 100 % 0.5 cycle
Phase angle of insertion	0°, 90°, 180°, 270°
Recovery time between pulse	10 seconds
Criterion	C, B

### **7.6.5 Test result :**

Test	Reduction (% of V <sub>NOM</sub> )	Duration /Period	Pass /Fail	Description
Voltage dips	30	10	Pass	There was no change of operation status during above testing
Voltage interruptions	100	0.5	Pass	There was no change of operation status during above testing

## 8. Appendix

### 8.1 Photograph of Set-up

#### Conducted Emission (Power line)

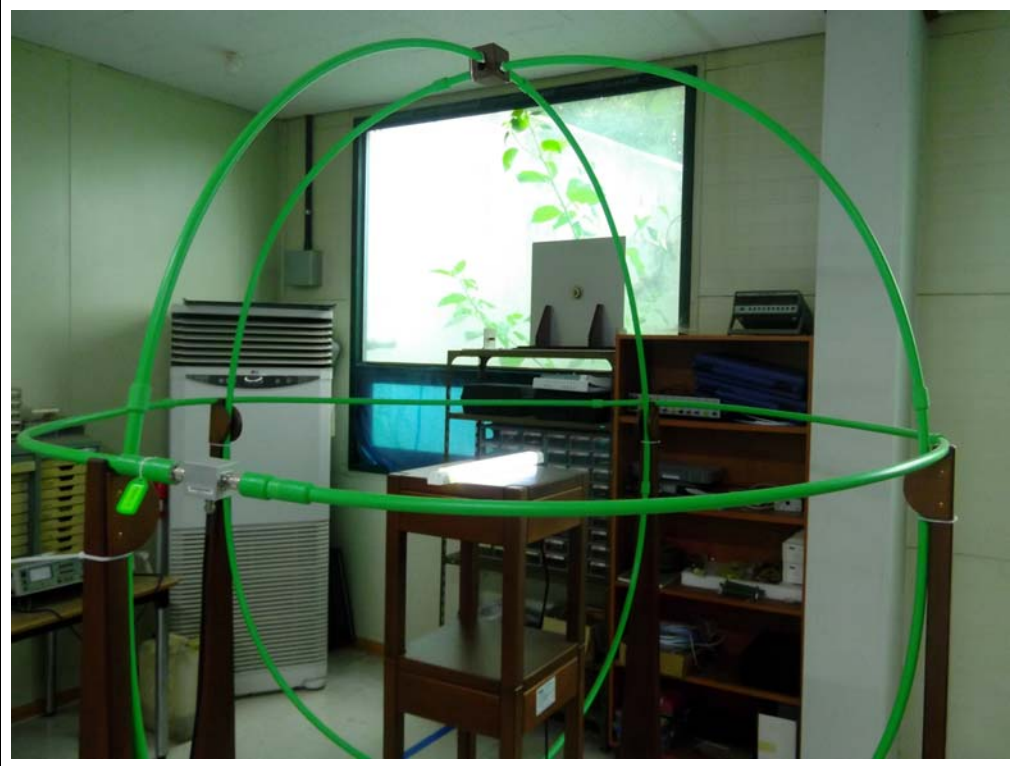


#### Radiated Emission (Below 1GHz)

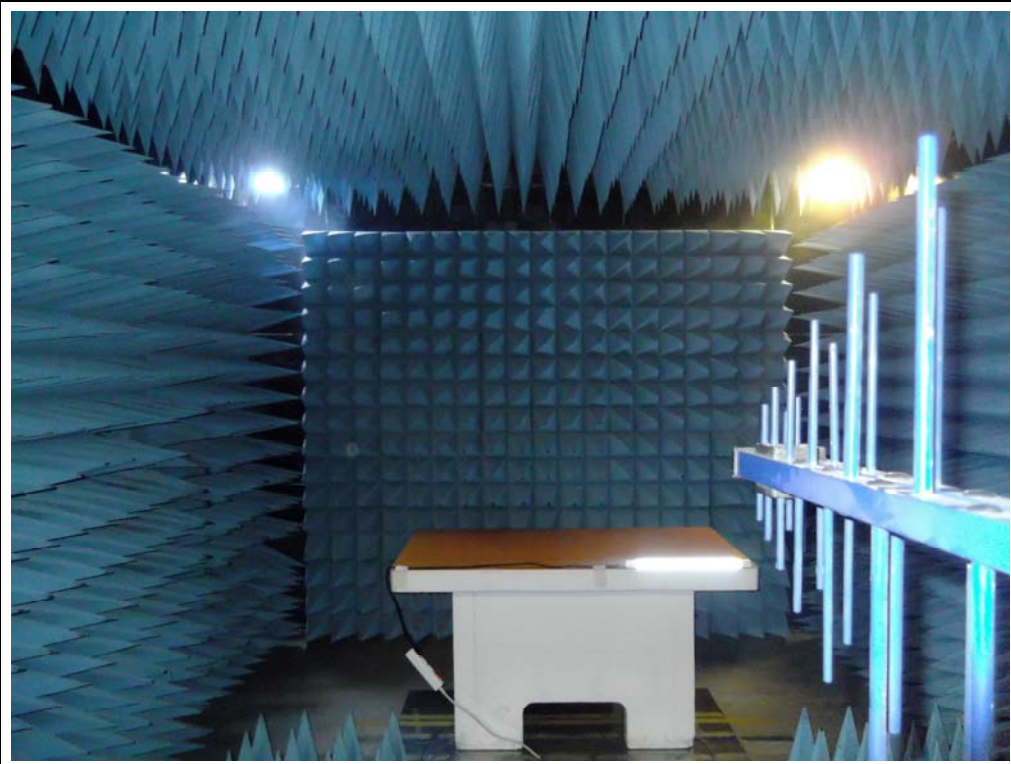




### Radiated, RF Electromagnetic Field

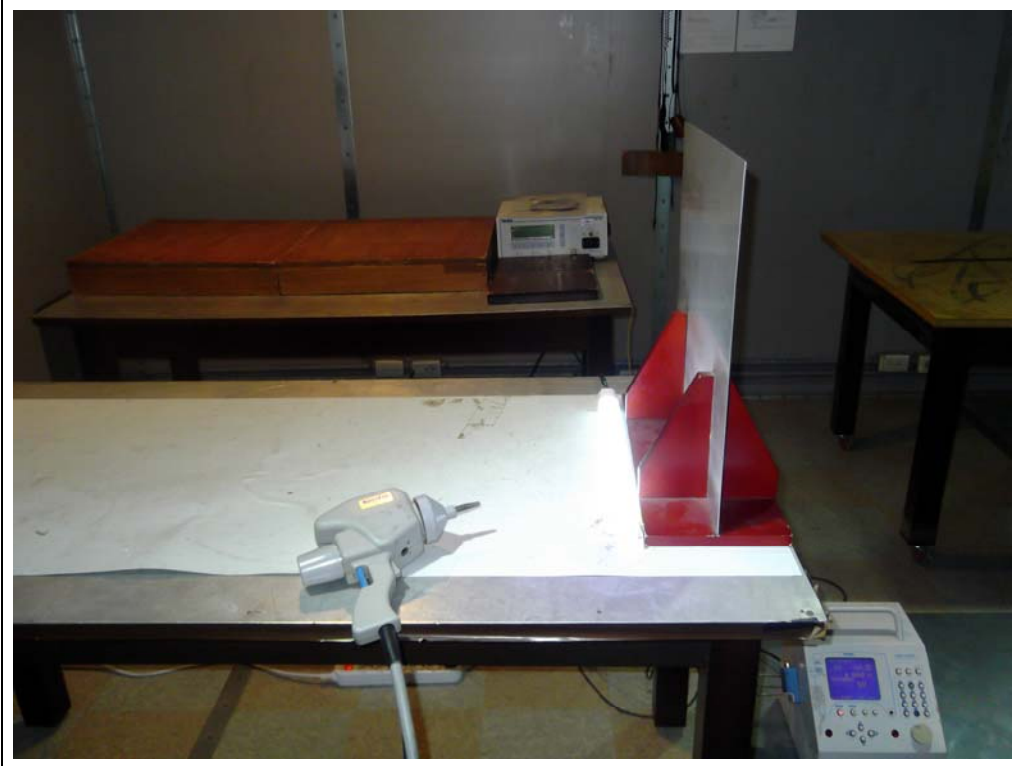


### Radiated Electromagnetic Disturbance

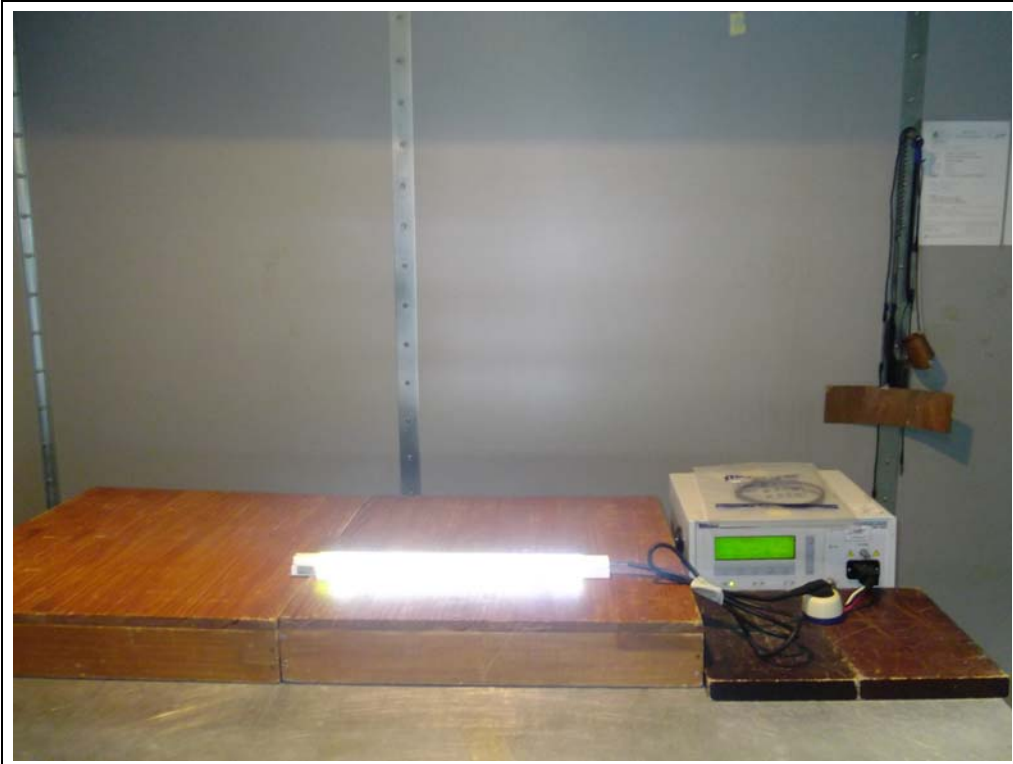




**Electrostatic discharge**



**Electrical Fast Transient/Burst (Power line)**



## Surge



## Immunity to Conducted Disturbance (Power line)



### Voltage Dips, Short Interruptions & Voltage variations Immunity Test



## 8.2 Photographs of EUT

### Top View





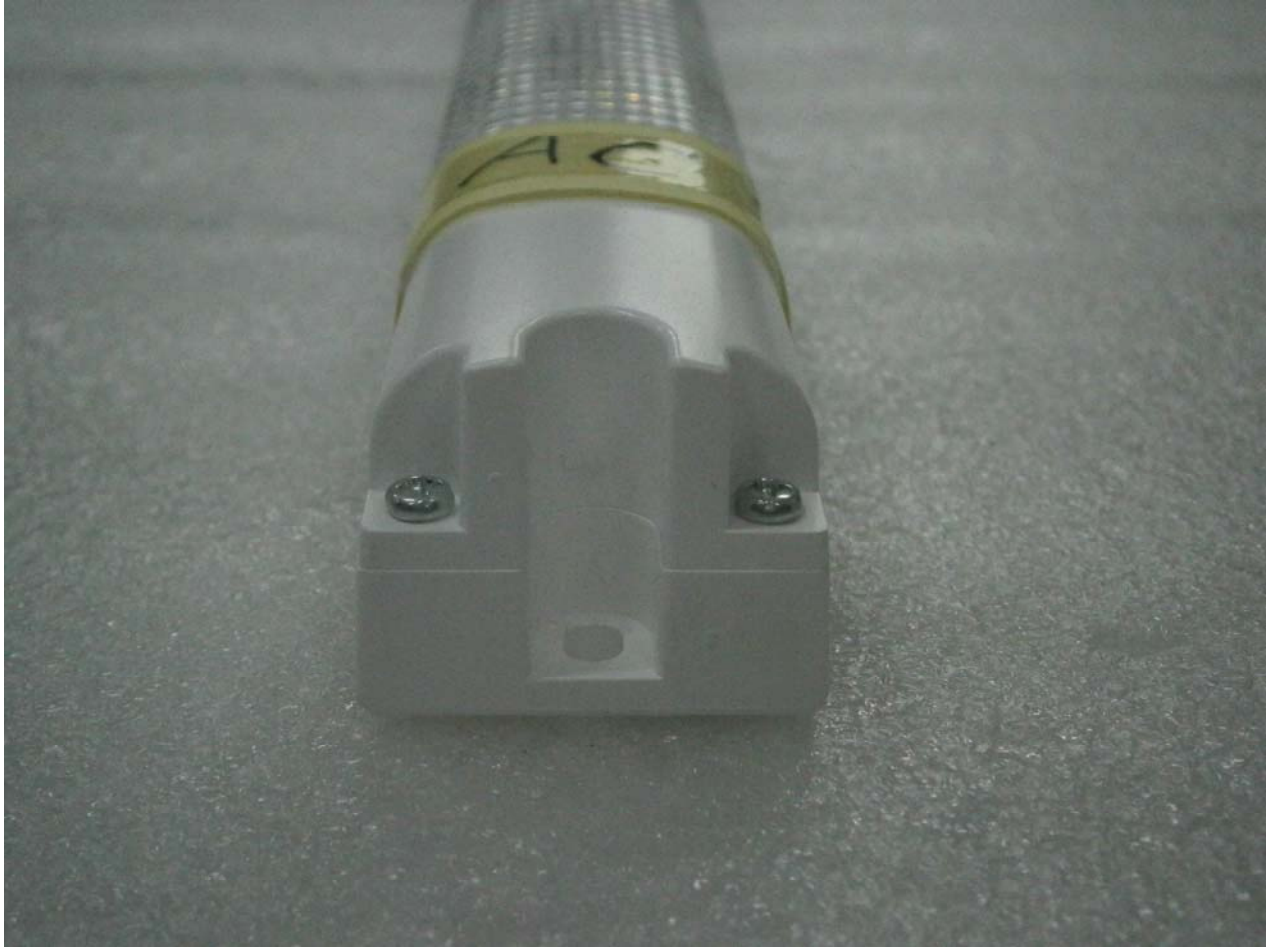
**Bottom View**



**Side View-1**



Side View-2

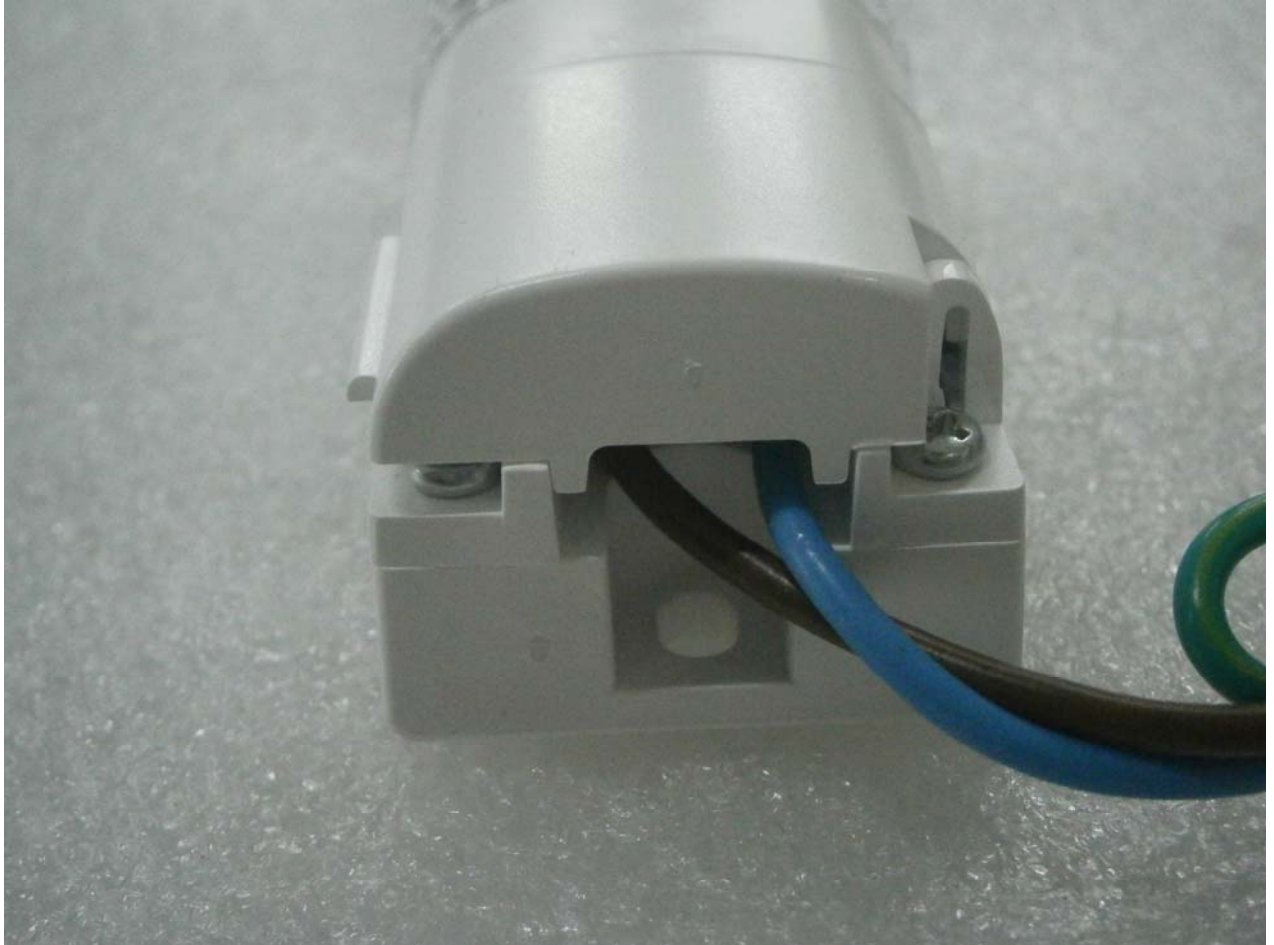


**Side View-3**

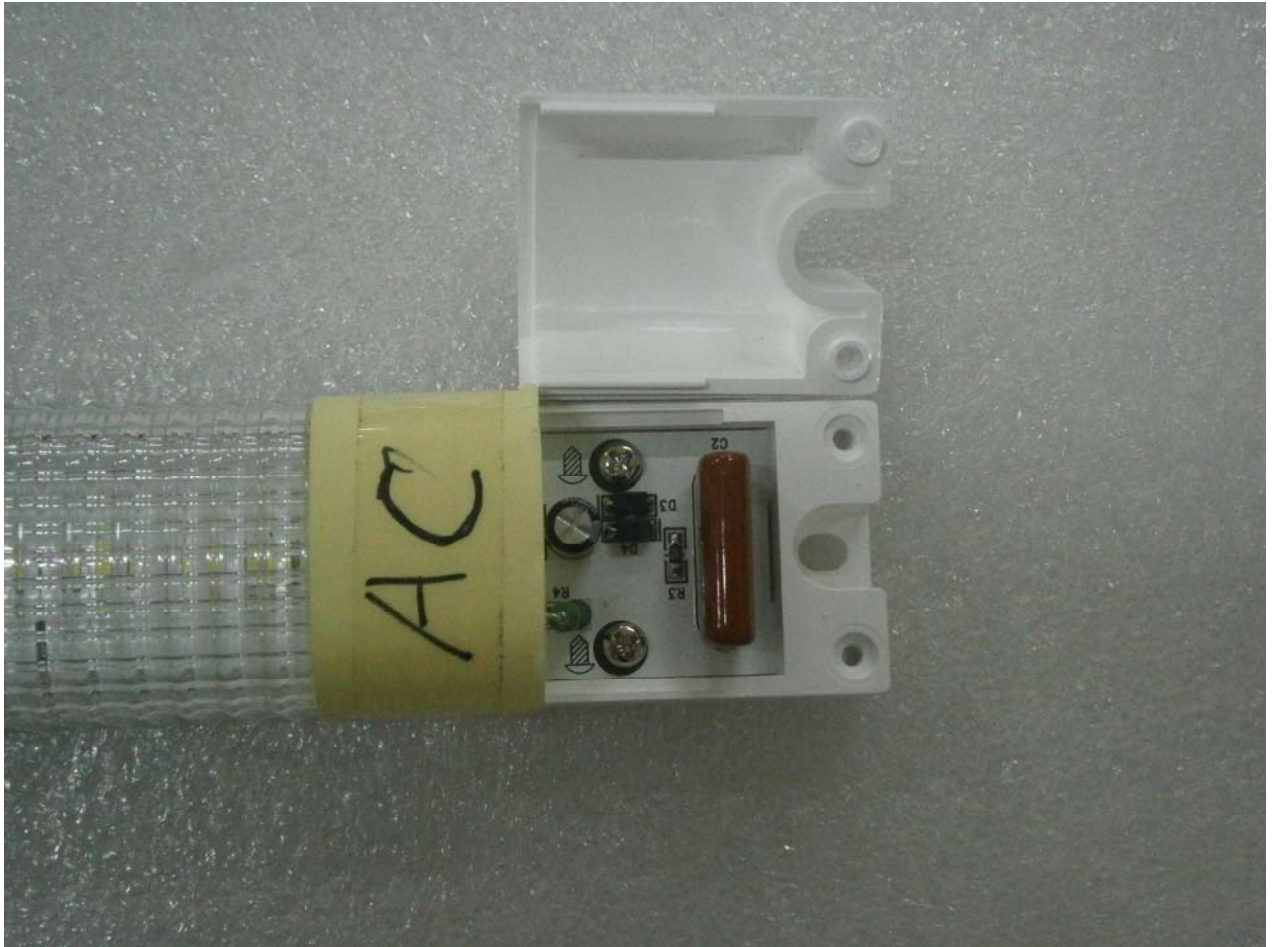




**Side View-4**



**Inside View-1**



Inside View-2

