



**CENTRE OF TESTING SERVICE  
INTERNATIONAL**

**OPERATE ACCORDING TO ISO/IEC 17025**

# **EMC TEST REPORT**

**TEST REPORT NUMBER : CNB3090505-01585-E**



**CENTRE OF TESTING SERVICE CO., LTD.**

Building F, Dachuang Industrial Park, No.379, Zhongshan Dadao,  
Guangzhou, China





**EMC -- TEST REPORT**

<b>Test Report No. : CNB3090505-01585-E</b>	<u>05 June 2009</u> Date of issue
---	--------------------------------------

Type / Model.....	6U-E27-25W
EUT.....	Energy-saving lamp
<b>Applicant</b> .....	Megawatt Electronic (Zhenjiang) CO Ltd
Address.....	Floor 2, No 45, Areas 5, HuaShanWan, JingKou District, ZhenJiang, JiangSu, China
Telephone.....	+86-511-88850685
Fax.....	+86-511-88850685
Contact.....	WANG JIAN
<b>Manufacturer</b> .....	Megawatt Electronic (Zhenjiang) CO Ltd
Address.....	Floor 2, No 45, Areas 5, HuaShanWan, JingKou District, ZhenJiang, JiangSu, China
Telephone.....	+86-511-88850685
Fax.....	+86-511-88850685
Contact.....	WANG JIAN
<b>Test report holder</b> .....	Megawatt Electronic (Zhenjiang) CO Ltd
Address.....	Floor 2, No 45, Areas 5, HuaShanWan, JingKou District, ZhenJiang, JiangSu, China
Telephone.....	+86-511-88850685
Fax.....	+86-511-88850685
Contact.....	WANG JIAN

<b>Test Result</b> according to the standards on page 3: <b>Positive</b>
--

The test report merely corresponds to the test sample.  
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## 1 TEST STANDARDS

The tests were performed according to following standards:

[EN 55015:2006](#) Limits and methods of measurements of radio disturbance characteristics of electrical lighting and similar equipment.

[EN 61547:1995+A1:2000](#) Equipment for general lighting purposes-EMC immunity requirements.

[EN 61000-3-2: 2006](#) Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).

[EN 61000-3-3: 1995+A1: 2001+A2: 2005](#) Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current  $\leq 16$  A per phase and not subject to conditional connection.

## 2 SUMMARY

### 2.1 GENERAL REMARKS

Date of receipt of test sample	18 May 2009
Testing commenced on	25 May 2009
Testing concluded on	25 May 2009

### 2.2 FINAL ASSESSMENT

The EMC requirements pertaining to the technical standards and tested operation modes are

- fulfilled.
- **not** fulfilled.

The equipment under test

- fulfils the EMC requirements cited on page 3.
- **does not** fulfil the EMC requirements cited on page 3.



### 3 EQUIPMENT UNDER TEST

#### 3.1 Power supply system utilised

Power supply voltage :  AC 230V / 50Hz  AC 115V/60Hz  
 12 V DC  24 V DC  
 Other (Specified blank below)  Battery 1.5V\*3, DC 6V

#### 3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: 1  
 Serial number: Prototype

#### 3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

- Standby
- Test programme (H - Pattern)
- Test programme (colour bar)
- Operating mode 2500 U/min. (1 cylinder)
- Operating mode 1500 U/min. (> 1 cylinder)
- Ignition on , Motor off
- Speed 50 km/h
- Test program (customer specific)

Operation mode 1 : On

The equipment under test was operated during the measurement under the following conditions: Test program (customer specific)

Emissions tests.....: According to EN 55015, searching for the highest disturbance.

Immunity tests .....: According to EN 61547, searching for the highest susceptibility.

Harmonic current..... : According to EN 61000-3-2, searching for the highest disturbance.

Voltage fluctuation.....: According to EN 61000-3-3, searching for the highest disturbance.

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### 3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement:

Name	:	/
M/N	:	/
S/N	:	/
Manufacturer	:	/
Power Cord	:	/
Certificate	:	/

- unscreened power cables
- customer specific cables

### 3.5 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

### 3.6 Definition related to the performance level

- based on the used product standard
- based on the declaration of the manufacturer, requestor or purchaser

#### **Criterion A:**

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

#### **Criterion B:**

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

#### **Criterion C:**

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

#### **Criterion D:**

Definition: loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data:

## 4 TEST ENVIRONMENT

### 4.1 Address of the test laboratory

Building F, Dachuang Industrial Park, No.379, Zhongshan Dadao, Guangzhou, China

Tel: +86-20-85543113 (32 lines) Fax: +86-20-38780406

### 4.2 Test facility

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

#### CNAS-Lab Code: L3394

CENTRE OF TESTING SERVICE CO., LTD has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

### 4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	25-75 %
Atmospheric pressure:	86-106 kPa

### 4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

### 4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

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## 4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Radiatd Electromagnetic Disturbance	30MHz~300MHz	±1.38dB	(1)
Radiation emission (3m)	30MHz~300MHz	±3.14dB	(1)
	300MHz~1000MHz	±3.18dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

## 4.7 Test Description

### 4.7.1 Description of Standards and Results

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	EN 55015: 2006	-----	PASS
Radiatd Electromagnetic Disturbance	EN 55015: 2006	-----	PASS
Harmonic current emissions	EN 61000-3-2: 2006	Class C	PASS
Voltage fluctuations & flicker	EN 61000-3-3: 1995 +A1:2001+A2:2005	-----	PASS
IMMUNITY (EN 61547:1995+A1: 2000)			
Description of Test Item	Basic Standard	Performance Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2:1995 +A1:1998+A2:2000	B	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3: 2008	A	PASS
Electrical fast transient (EFT)	IEC 61000-4-4: 2007	B	PASS
Surge	IEC 61000-4-5: 2005	B	PASS
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6: 2008	A	PASS
Power frequency magnetic field	IEC 61000-4-8: 2001	A	PASS
Voltage dips and interruptions	IEC 61000-4-11: 2004	B&C	PASS
N/A is an abbreviation for Not Applicable.			

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## 5 TEST CONDITIONS AND RESULTS

### 5.1 Conducted disturbance

For test instruments and accessories used see section 6 part 6.3.

#### 5.1.1 Description of the test location

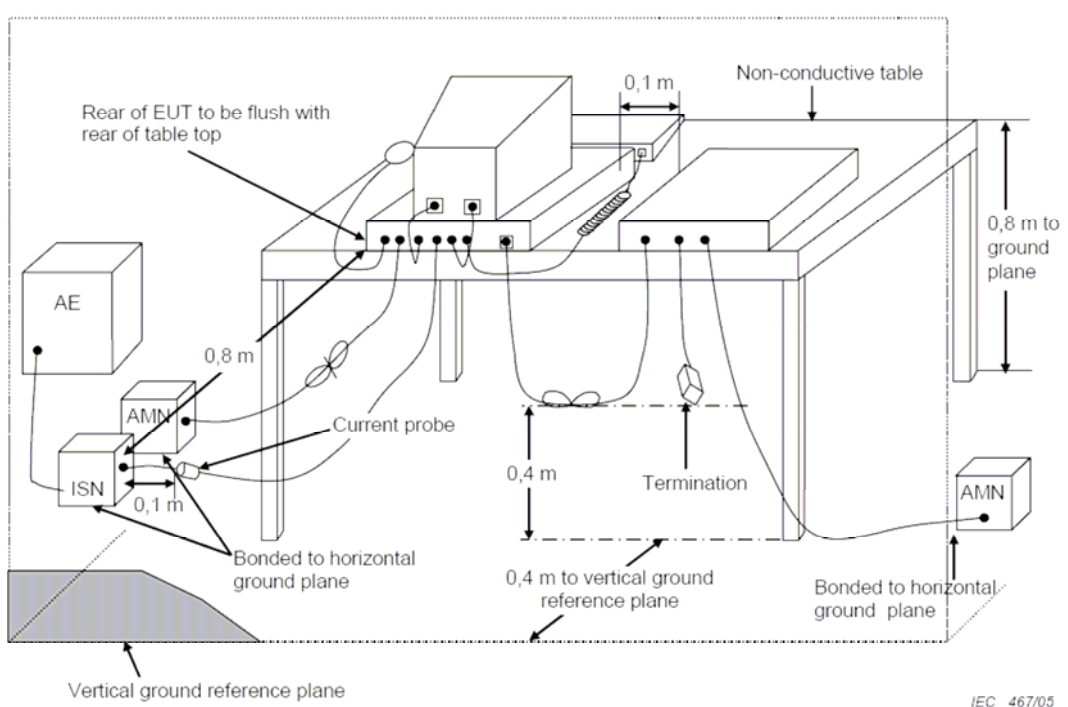
Test location: Shielded room

#### 5.1.2 Description of the test set-up

##### 5.1.2.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

##### 5.1.2.2 Block Diagram of Test Setup



#### 5.1.3 Limits disturbance

Frequency	At mains terminals (dB $\mu$ V)	
	Quasi-peak Level	Average Level
9kHz ~ 50kHz	110	--
50kHz ~ 150kHz	90 ~ 80*	--
150kHz ~ 0.5MHz	66 ~ 56*	56 ~ 46*
0.5MHz ~ 2.51MHz	56	46
2.51MHz ~ 3.0MHz	73	63
3.0MHz ~ 5.0MHz	56	46
5.0MHz ~ 30MHz	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

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**5.1.4 Test result**

The requirements are	<b>Fulfilled</b>
Band width	9kHz
Frequency range	9kHz - 30 MHz
Min. limit margin	>16dB at 9kHz - 30 MHz

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

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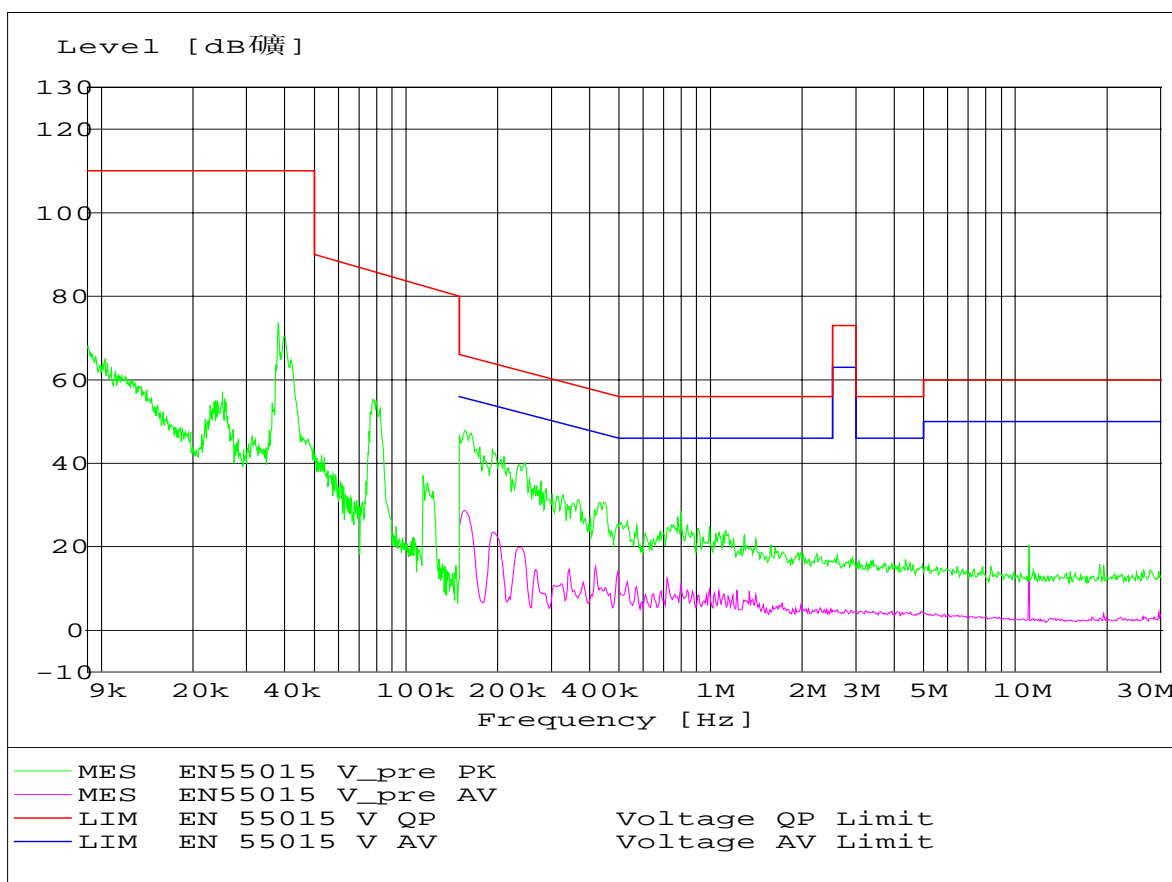
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5.1.5 Test protocol

Test point	L	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
Operation mode 1			
Remarks:			

EUT	Energy-saving lamp
Firm Name	Megawatt Electronic (Zhenjiang) CO Ltd
Operating Condition	AC 230V / 50Hz
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Operator	Jackson
Test Specification	MODE NO: 6U-E27-25W



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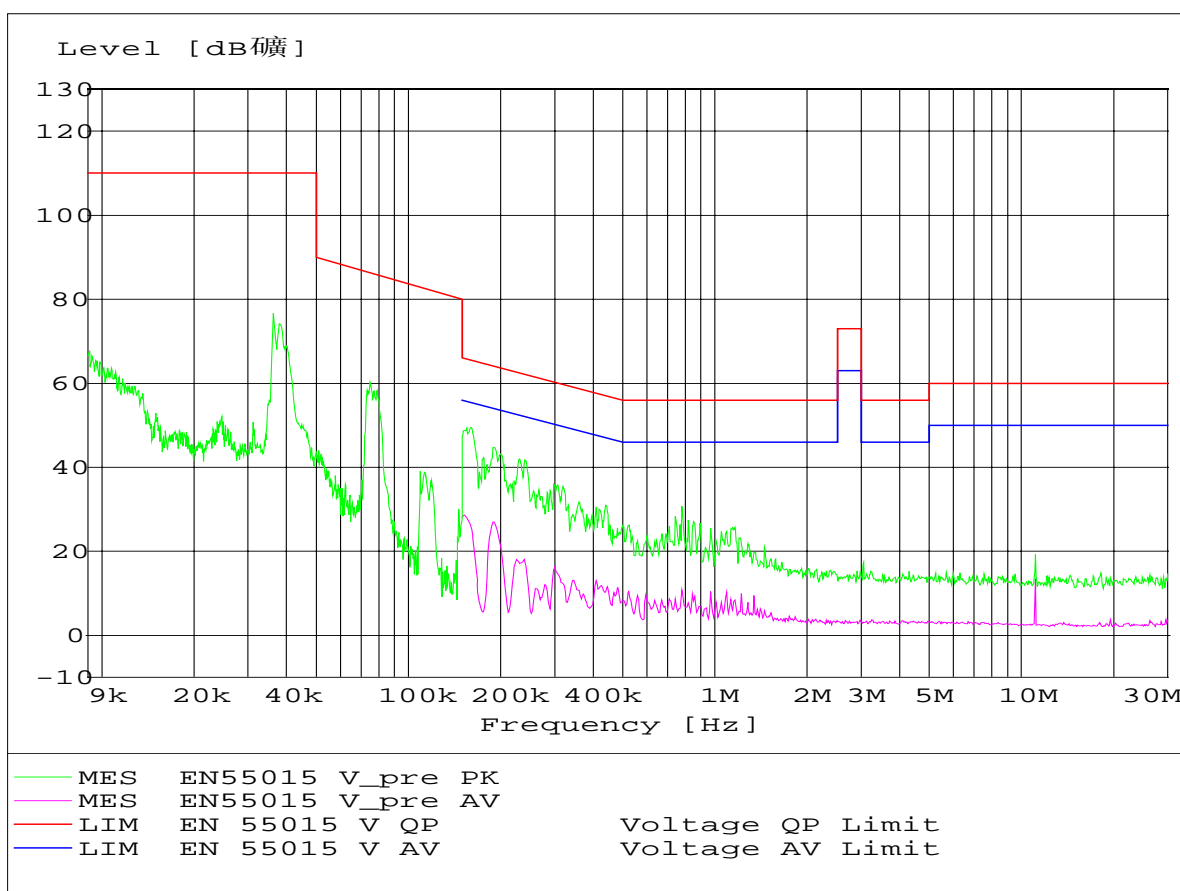
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Test point: N	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
Operation mode 1		
Remarks:		

EUT	Energy-saving lamp
Firm Name	Megawatt Electronic (Zhenjiang) CO Ltd
Operating Condition	AC 230V / 50Hz
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Operator	Jackson
Test Specification	MODE NO: 6U-E27-25W



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## 5.2 Radiated disturbance (magnetic field)

For test instruments and accessories used see section 6 part 6.1.

### 5.2.1 Description of the test location

Test location : Shielded room

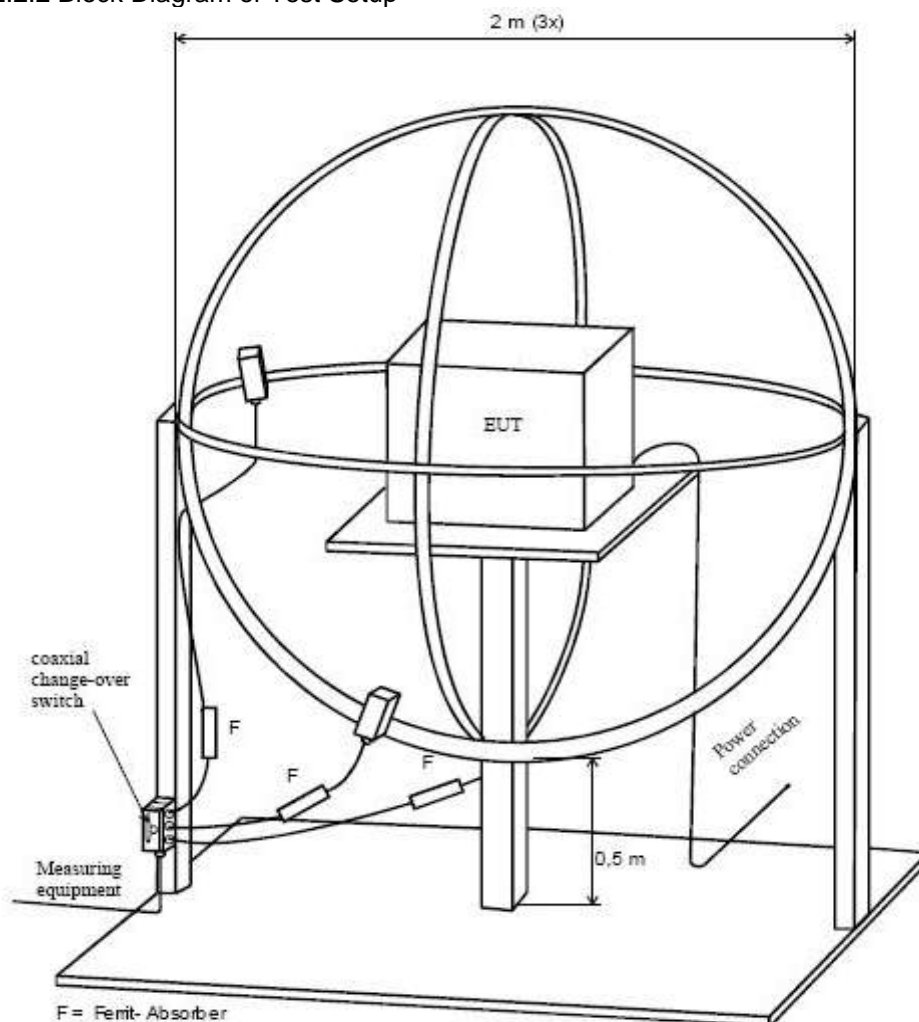
Test disturbance: 2 Meter

### 5.2.2 Description of the test set-up

#### 5.2.2.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

#### 5.2.2.2 Block Diagram of Test Setup



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### 5.2.3 Limits of disturbance

Frequency	Limits for loop diameter (dB $\mu$ A)	
	2m	
9kHz ~ 70kHz	88	
70kHz ~ 150kHz	88 ~ 58*	
150kHz ~ 2.2MHz	58 ~ 26*	
2.2MHz ~ 3.0MHz	58	
3.0MHz ~ 30MHz	22	

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

### 5.2.4 Test result

The requirements are	<b>Fulfilled</b>
Band width	9kHz
Frequency range	9kHz - 30 MHz
Min. limit margin MHz	>12.2 dB at 9kHz- 30MHz

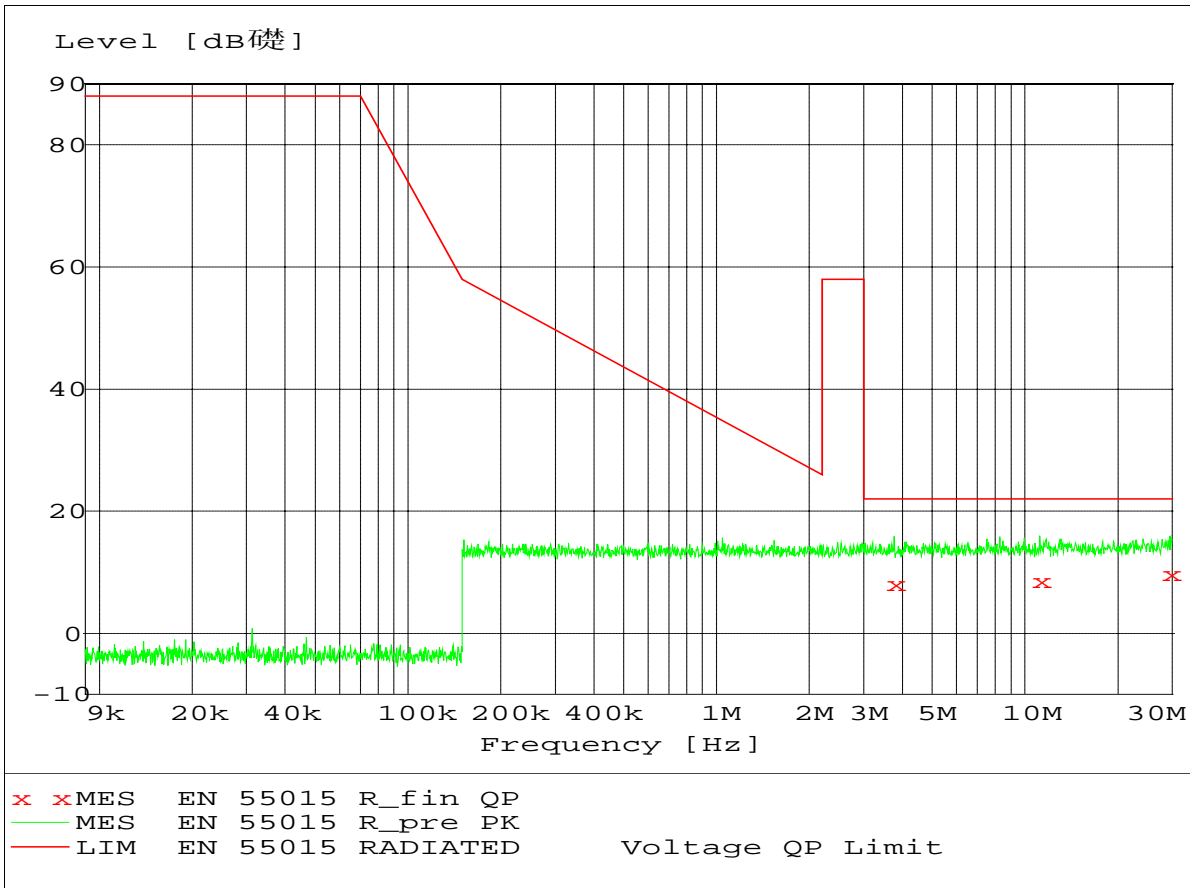
**Remarks:** The limits are kept. For detailed results, please see the following page(s).



5.2.5 Test protocol

Test point: X	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
Operation mode 1		
Remarks:		

EUT	Energy-saving lamp
Firm Name	Megawatt Electronic (Zhenjiang) CO Ltd
Operating Condition	AC 230V / 50Hz
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Operator	Jackson
Test Specification	MODE NO: 6U-E27-25W



MEASUREMENT RESULT: "EN 55015 R\_fin QP"

Frequency MHz	Level dBμA	Transd dB	Limit dBμA	Margin dB	Loop	Azimuth deg
3.760084	8.10	10.0	22	13.9	X	0.00
11.181526	8.50	10.0	22	13.5	X	0.00
29.498050	9.80	10.0	22	12.2	X	0.00

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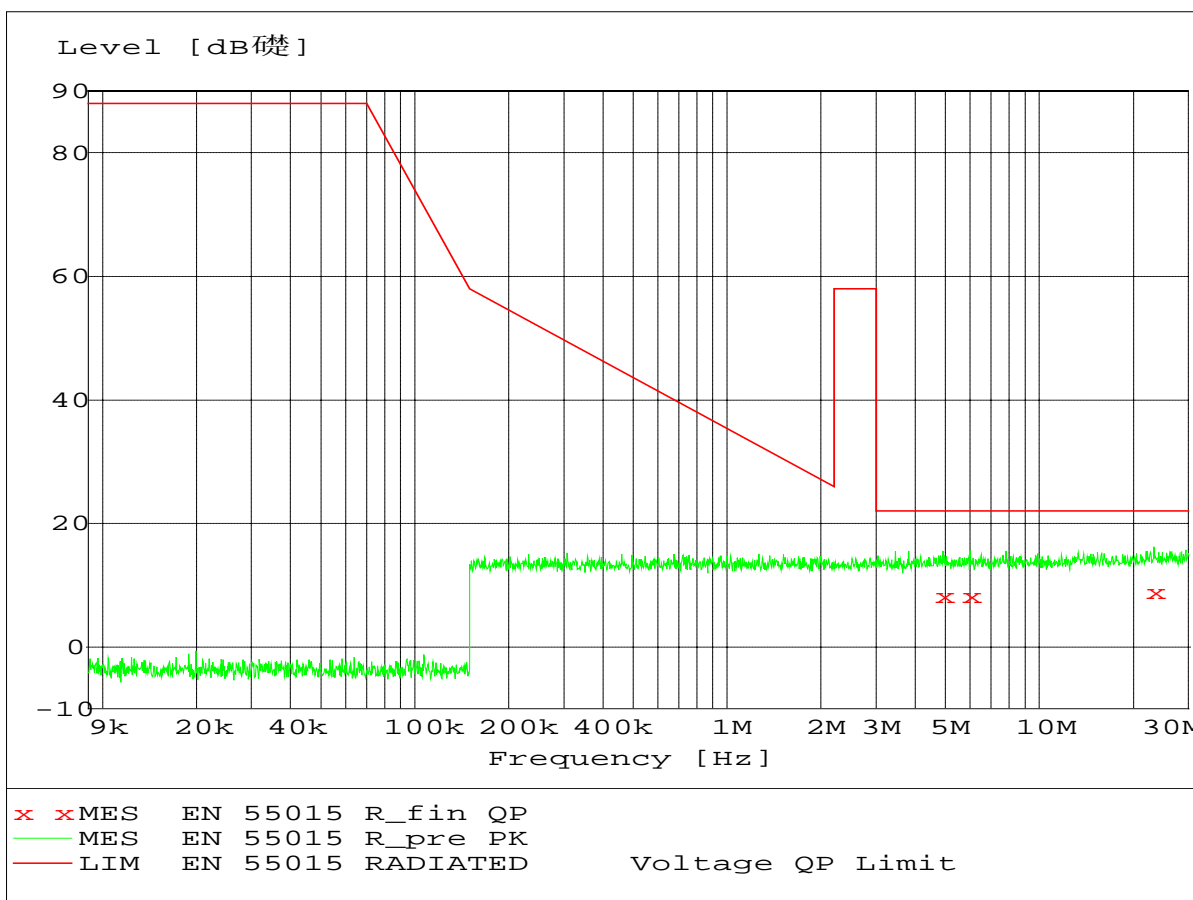
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Test point: Y	Result:	■ - passed □ - not passed
Operation mode 1		
Remarks:		

EUT	Energy-saving lamp
Firm Name	Megawatt Electronic (Zhenjiang) CO Ltd
Operating Condition	AC 230V / 50Hz
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Operator	Jackson
Test Specification	MODE NO: 6U-E27-25W



**MEASUREMENT RESULT: "EN 55015 R\_fin QP"**

Frequency	Level	Transd	Limit	Margin	Loop	Azimuth
MHz	dBμA	dB	dBμA	dB		deg
4.913107	8.30	10.0	22	13.7	Y	0.00
5.998489	8.20	10.0	22	13.9	Y	0.00
23.307959	8.90	10.0	22	13.1	Y	0.00

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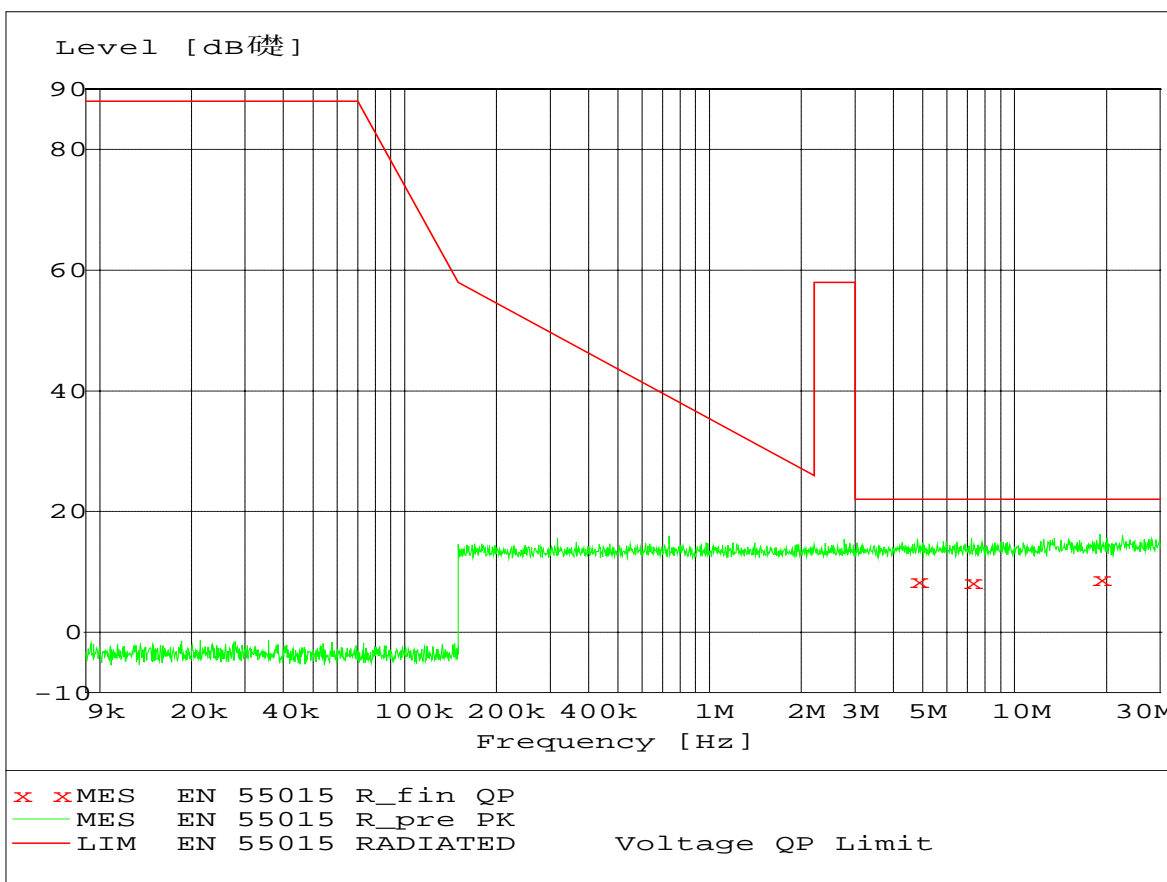
E-mail: cts@cts-lab.com.cn

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Test point: Z	Result:	■ - passed □ - not passed
Operation mode 1		
Remarks:		

EUT	Energy-saving lamp
Firm Name	Megawatt Electronic (Zhenjiang) CO Ltd
Operating Condition	AC 230V / 50Hz
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Operator	Jackson
Test Specification	MODE NO: 6U-E27-25W



**MEASUREMENT RESULT: "EN 55015 R\_fin QP"**

Frequency MHz	Level dBμA	Transd dB	Limit dBμA	Margin dB	Loop	Azimuth deg
4.796826	8.40	10.0	22	13.6	Z	0.00
7.236464	8.30	10.0	22	13.7	Z	0.00
19.090557	8.80	10.0	22	13.2	Z	0.00

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### 5.3 Harmonic current

For test instruments and accessories used see section 6 part 6.4.

#### 5.3.1 Description of the test location

Test location : Test location no. 1

#### 5.3.2 Limits of harmonic current

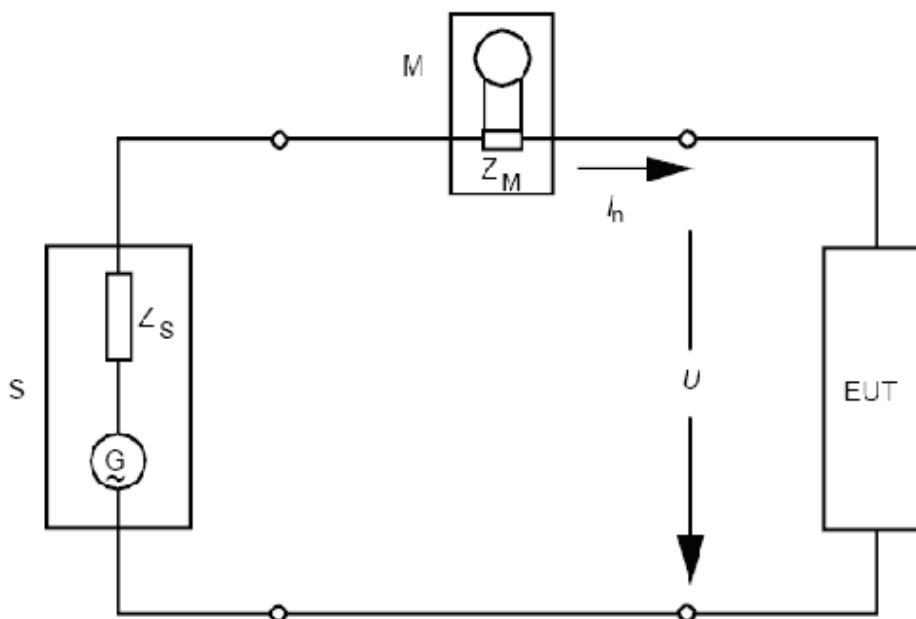
Test configuration and procedure see clause 7.1 of standard EN 61000-3-2: 2006.

#### 5.3.3 Description of the test set-up

##### 5.3.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

##### 5.3.3.2 Block Diagram of Test Setup



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**5.3.4 Test result**

The requirements are **Fulfilled**

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

**5.3.5 Test protocol**

<b>Operation mode 1</b> Remarks:	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
-------------------------------------	---------	---

Standard used:	EN 61000-3-2: 2006 Quasi-Stationary – Equipment class C
Observation time:	150s
Windows width:	10 periods – (EN/IEC 61000-4-7 Edition 2002)
Customer:	Megawatt Electronic (Zhenjiang) CO Ltd
Mains supply voltage:	AC 230V / 50Hz
Ambient Temperature:	25°C
Humidity:	56%
Barometric Pressure:	100kPa
E. U. T.:	Energy-saving lamp
	M/N: 6U-E27-25W
Date of test:	25 May 2009
Tester:	<b>Jackson</b>

<b>Test result</b>	
E. U. T.:	PASS
Power Source:	PASS

**Check harmonics 2..40 [exception odd 21..39]:**

<b>Harmonic(s) &gt; 150%:</b>	
Order (n):	None
<b>Harmonic(s) with average &gt; 100%:</b>	
Order (n):	None

**Check odd harmonics 21..39:**

<b>All Partial Odd Harmonics below partial limits.</b>
<b>Harmonic(s) &gt; 150%:</b> Order (n): None
<b>Harmonic(s) with average &gt; 150%:</b> Order (n): None

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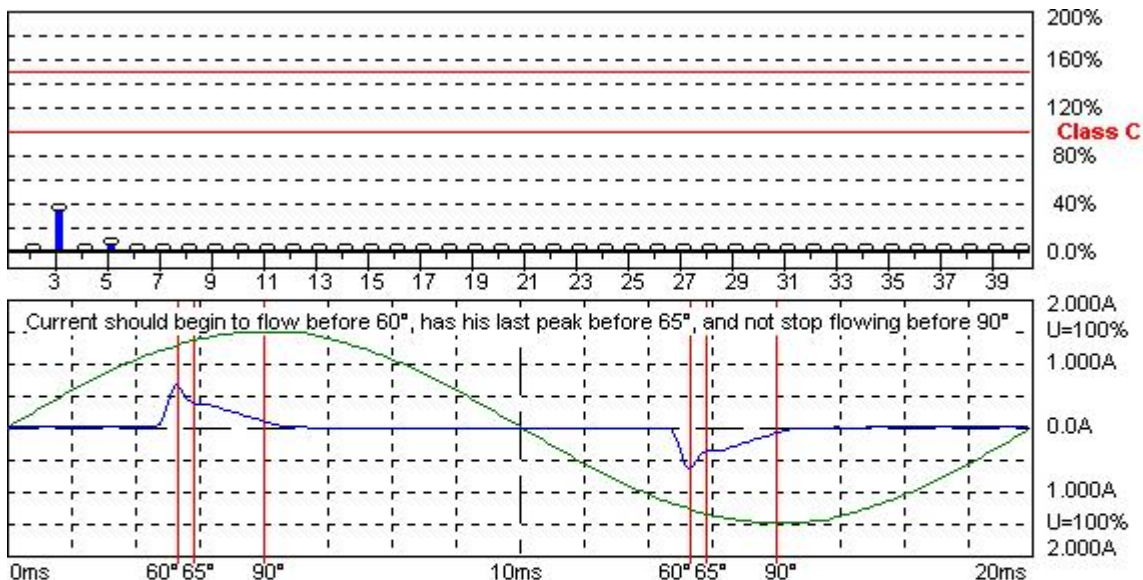
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**Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)**

Urms = 230.7 V    P = 19.88 W    THC = 0.086 A    Range: 2 A  
 Irms = 0.159 A    pf = 0.541    H1max = 0.296 A    V-nom: 230 V  
 TestTime: 1 min (100%)

**Test completed, Result: PASSED**

HAR-1000 EMC-Partner

Order	Freq. [Hz]	Iavg [A]	Iavg%L [%]	Imax [A]	Imax%L [%]	Limit [A]	Status
1	50	0.2944		0.2959			
2	100	0.0000		0.0023			
3	150	0.0831	32.668	0.0831	32.668	0.2545	
4	200	0.0000		0.0006			
5	250	0.0081	4.4636	0.0081	4.4636	0.1805	
6	300	0.0000		0.0001			
7	350	0.0095		0.0095			
8	400	0.0000		0.0001			
9	450	0.0079		0.0079			
10	500	0.0000		0.0004			
11	550	0.0050		0.0050			
12	600	0.0000		0.0004			
13	650	0.0051		0.0051			
14	700	0.0000		0.0002			
15	750	0.0000		0.0038			
16	800	0.0000		0.0004			
17	850	0.0000		0.0037			
18	900	0.0000		0.0000			
19	950	0.0000		0.0037			
20	1000	0.0000		0.0001			
21	1050	0.0051		0.0051			

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22	1100	0.0000		0.0001			
23	1150	0.0000		0.0022			
24	1200	0.0000		0.0004			
25	1250	0.0050		0.0050			
26	1300	0.0000		0.0001			
27	1350	0.0000		0.0024			
28	1400	0.0000		0.0001			
29	1450	0.0000		0.0028			
30	1500	0.0000		0.0001			
31	1550	0.0000		0.0017			
32	1600	0.0000		0.0002			
33	1650	0.0000		0.0022			
34	1700	0.0000		0.0004			
35	1750	0.0000		0.0018			
36	1800	0.0000		0.0002			
37	1850	0.0000		0.0018			
38	1900	0.0000		0.0001			
39	1950	0.0000		0.0016			
40	2000	0.0000		0.0002			

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## 5.4 Voltage fluctuations and flicker

For test instruments and accessories used see section 6 part 6.5.

### 5.4.1 Description of the test location

Test location : Test location no. 1

### 5.4.2 Limits of voltage fluctuation and flicker

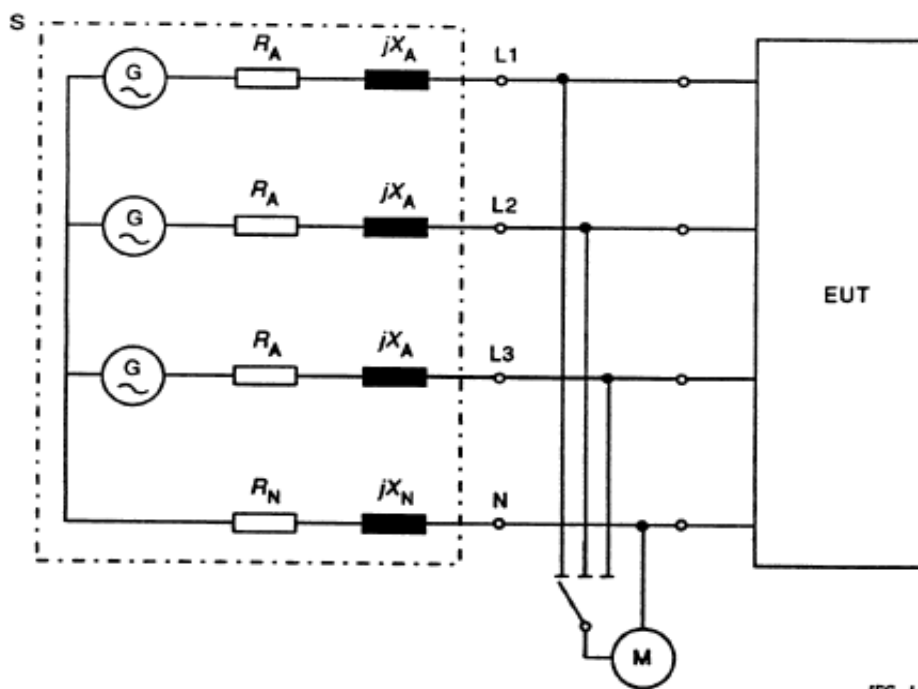
Test configuration and procedure see clause 5 of standard EN 61000-3-3: 1995+A1: 2001+A2: 2005.

### 5.4.3 Description of the test set-up

#### 5.4.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

#### 5.4.3.2 Block Diagram of Test Setup



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#### 5.4.4 Test result

The requirements are **Fulfilled**

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

#### 5.4.5 Test protocol

<b>Operation mode 1</b> Remarks:	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
Standard used:	EN 61000-3-3 Flicker	
Short time (Pst):	10 min	
Observation time:	10 min (1 Flicker measurement)	
Customer:	Megawatt Electronic (Zhenjiang) CO Ltd	
Flickermeter:	AC 230V / 50Hz	
Ambient Temperature:	25°C	
Humidity:	56%	
Barometric Pressure:	100kPa	
E. U. T.:	Energy-saving lamp	
	M/N: 6U-E27-25W	
Date of test:	25 May 2009	
Tester:	<b>Jackson</b>	

#### Maximum Flicker results

	EUT values	Limit	Result
Pst	0.07	1.00	PASS
dc [%]	0.00	3.30	PASS
dmax [%]	0.00	4.00	PASS
dt [s]	0.00	0.50	PASS

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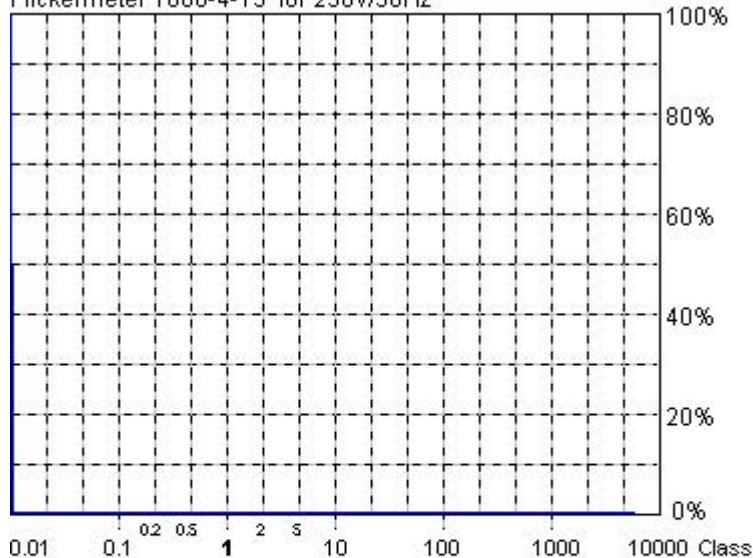
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Flickermeter 1000-4-15 for 230V/50Hz



<b>Actual Flicker (Fl):</b>	<b>0.00</b>
<b>Short-term Flicker (Pst):</b>	<b>0.07</b>
Limit (Pst):	1.00
<b>Long-term Flicker (Plt):</b>	<b>0.07</b>
Limit (Plt):	0.65
<b>Maximum Relative Volt. Change (dmax):</b>	<b>0.00%</b>
Limit (dmax):	4.00%
<b>Relative Steady-state Voltage Change (dc):</b>	<b>0.00%</b>
Limit (dc):	3.30%
<b>Maximum Interval exceeding 3.30% (dt):</b>	<b>0.00ms</b>
Limit (dt>Lim):	500ms

**Flicker Emission - IEC 61000-3-3 , EN 61000-3-3 , (EN60555-3)**

Urms = 230.7 V      P = 19.19 W  
 Irms = 0.154 A      pf = 0.539

Range: 2 A  
 V-nom: 230 V  
 TestTime: 1 min (100%)

**Test completed, Result: PASSED**

HAR-1000 EMC-Partner

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### 5.5 Electrostatic discharge

For test instruments and accessories used see section 6 part 6.6.

#### 5.5.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 25°C, Humidity: 56%
Date of test :	25 May 2009
Operator :	<b>Jackson</b>

#### 5.5.2 Severity of levels electrostatic discharge

5.5.2.1 Severity level: Contact discharge at  $\pm 4\text{KV}$  air discharge at  $\pm 8\text{KV}$

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X	Special	Special

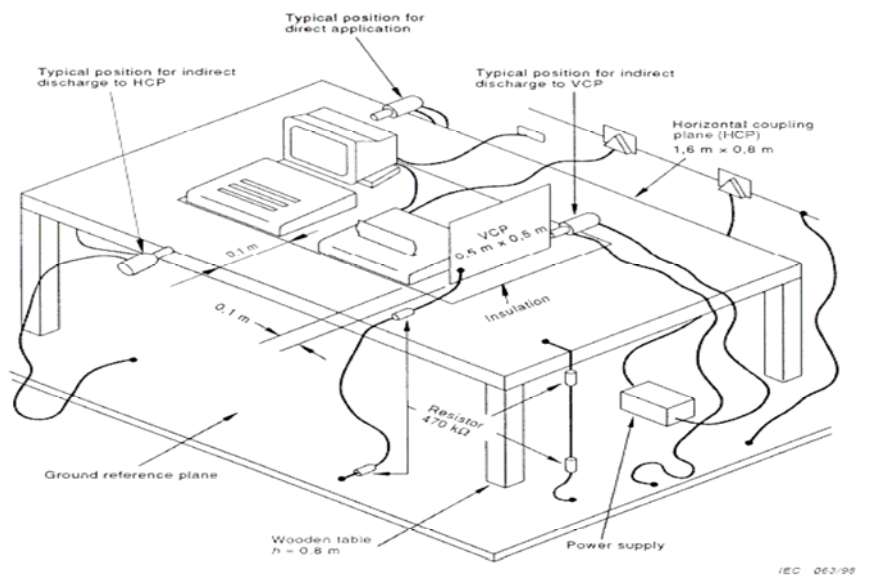
5.5.2.2 Performance criterion: **B**

#### 5.5.3 Description of the test set-up

##### 5.5.3.1 Operating Condition

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##### 5.5.3.2 Block Diagram of Test Setup



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### 5.5.4 Test specification:

Contact discharge voltage:	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV	
Air discharge voltage:	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV	<input type="checkbox"/> 8 kV
Discharge impedance:	<input type="checkbox"/> 330 $\Omega$ / 150 pF		
Discharge factor:	<input type="checkbox"/> $\geq 1$ sec.		
Number of discharges:	<input type="checkbox"/> $\geq 10$		
Type of discharge:	Direct discharge	<input type="checkbox"/> Air discharge	
		<input type="checkbox"/> Contact discharge	
	Indirect discharge	<input type="checkbox"/> Contact discharge	
Polarity:	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative	
Discharge location:	<input type="checkbox"/> see photo documentation of the test set-up		
	<input type="checkbox"/> all external locations accessible by hand		
	<input type="checkbox"/> horizontal plate (HCP)		
	<input type="checkbox"/> vertical coupling plate (VCP)		

### 5.5.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

## 5.6 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 6 part 6.7.

### 5.6.1 Description of the test location

Test location :	Semi-Anechoic chamber
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 25°C, Humidity: 56%
Date of test :	25 May 2009
Operator :	<b>Jackson</b>

### 5.6.2 Severity levels of radiated, Radio-frequency, electromagnetic field

#### 5.6.2.1 Severity level: 3V/m

Level	Field strenght(V/m)
1.	1
2.	3
3.	10
X	Special

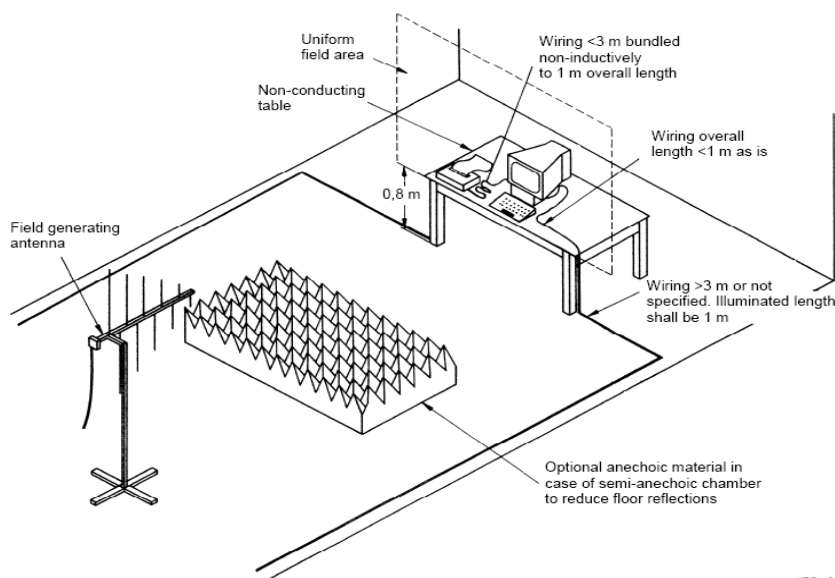
#### 5.6.2.2 Performance criterion: A

### 5.6.3 Description of the test set-up

#### 5.6.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

#### 5.6.3.2 Block Diagram of Test Setup



IEC 034/06

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### 5.6.4 Test specification:

Frequency range:	■ 80 MHz to 1000 MHz
Field strength:	■ 3 V/m
EUT - antenna separation:	■ 3 m
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time
Antenna polarisation:	■ horizontal                      ■ vertical

### 5.6.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:**        During the test no deviation was detected to the selected operation mode(s).

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### 5.7 Electrical fast transients / Burst

For test instruments and accessories used see section 6 part 6.8.

#### 5.7.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 25°C, Humidity: 56%
Date of test :	25 May 2009
Operator :	<b>Jackson</b>

#### 5.7.2 Severity levels of electrical fast transients / Burst

5.7.2.1 Severity level: ±1000V for AC power supply lines

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O signal, data and control ports	
	V peak(KV)	Repetition rate (KHz)	Voltage peak	Repetition rate (KHz)
1.	0.5	5 or 100	0.25	5 or 100
2.	1	5 or 100	0.5	5 or 100
3.	2	5 or 100	1	5 or 100
4.	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

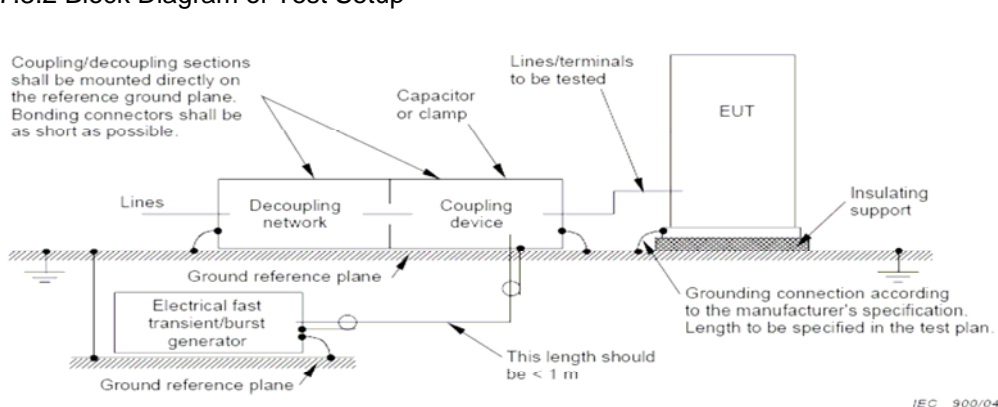
5.7.2.2 Performance criterion: **B**

#### 5.7.3 Description of the test set-up

##### 5.7.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

##### 5.7.3.2 Block Diagram of Test Setup



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## 5.8 Surge

For test instruments and accessories used see section 6 part 6.9.

### 5.8.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 25°C, Humidity: 56%
Date of test :	25 May 2009
Operator :	<b>Jackson</b>

### 5.8.2 Severity levels of surge

5.8.2.1 Severity level: Line to line:  $\pm 0.5\text{KV}$ , Line to earth:  $\pm 1\text{KV}$

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

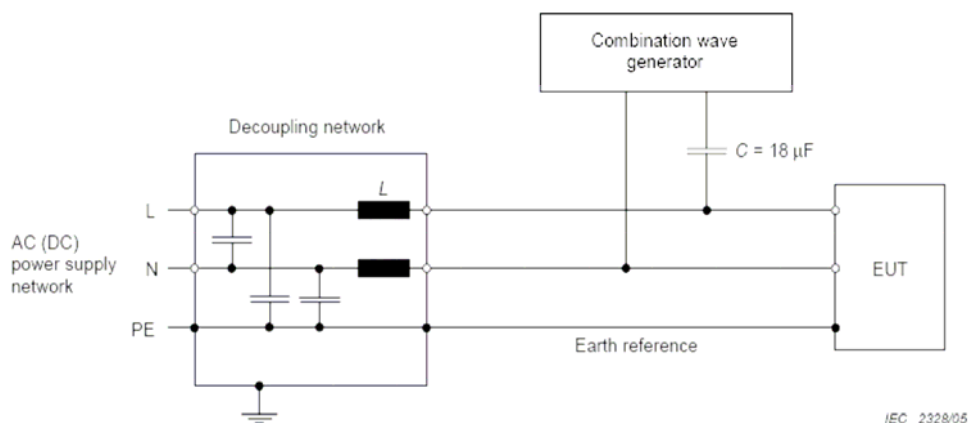
5.8.2.2 Performance Criterion: **B**

### 5.8.3 Description of the test set-up

#### 5.8.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

#### 5.8.3.2 Block Diagram of Test Setup



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#### 5.8.4 Test specification:

Pulse amplitude-Power line sym.: Source impedance: 2 $\Omega$ + 18 $\mu$ F	<input checked="" type="checkbox"/> 0.5 kV <input type="checkbox"/> 1 kV <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV
Pulse amplitude-Power line unsym.: Source impedance: 12 $\Omega$ + 9 $\mu$ F	<input checked="" type="checkbox"/> 0.5 kV <input checked="" type="checkbox"/> 1 kV <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV
Number of surges:	<input checked="" type="checkbox"/> 5 Surges/Phase angle
Phase angle:	<input checked="" type="checkbox"/> 0 ° <input checked="" type="checkbox"/> 90 ° <input checked="" type="checkbox"/> 180 ° <input checked="" type="checkbox"/> 270 °
Repetition rate:	<input checked="" type="checkbox"/> 60 s
Polarity:	<input checked="" type="checkbox"/> positive <input checked="" type="checkbox"/> negative

#### 5.8.5 Coupling points

Cable description:	AC power line:   L+N, L+PE, N+PE
Screening:	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unshielded
Status:	<input type="checkbox"/> passive <input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue <input type="checkbox"/> digital
Length:	<input checked="" type="checkbox"/> 1.5 m

#### 5.8.6 Test result

The requirements are **Fulfilled**

Performance Criterion : **B**

**Remarks:**      During the test no deviation was detected to the selected operation mode(s).

### 5.9 Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 6 part 6.10.

#### 5.9.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 25°C, Humidity: 56%
Date of test :	25 May 2009
Operator :	<b>Jackson</b>

#### 5.9.2 Severity levels of conducted disturbances induced by radio-frequency fields discharge

##### 5.9.2.1 Severity Level: 3V

Level	Field Strength (V)
1.	1
2.	3
3.	10
X	Special

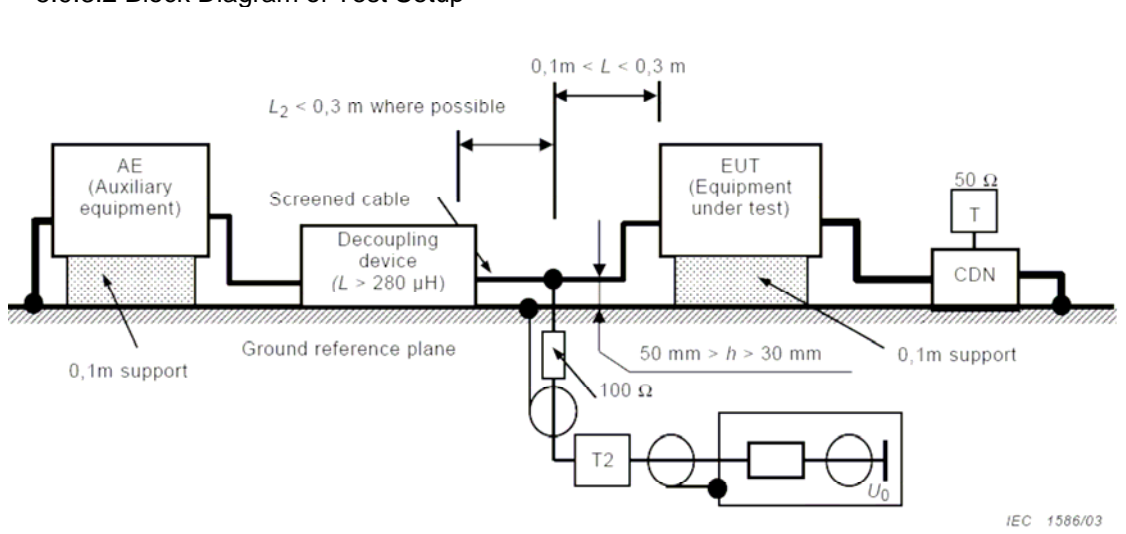
##### 5.9.2.2 Performance Criterion: A

#### 5.9.3 Description of the test set-up

##### 5.9.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

##### 5.9.3.2 Block Diagram of Test Setup



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#### 5.9.4 Test specification:

Frequency range:	■ 0.15 MHz to 80 MHz
Test voltage:	■ 3 V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

#### 5.9.5 Coupling points

Cable description (Port1):	AC power line	L+N, L+PE, N+PE
Screening:	<input type="checkbox"/> screened	■ unshielded
Status:	<input type="checkbox"/> passive	■ active
Signal transmission:	■ analogue	<input type="checkbox"/> digital
Length:	■ 0.3 m	

Cable description (Port2):	/	
Screening:	<input type="checkbox"/> screened	<input type="checkbox"/> unshielded
Status:	<input type="checkbox"/> passive	<input type="checkbox"/> active
Signal transmission:	<input type="checkbox"/> analogue	<input type="checkbox"/> digital
Length:	<input type="checkbox"/> 0.3 m	

#### 5.9.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

### 5.10 Power frequency magnetic field

For test instruments and accessories used see section 6 part 6.11.

#### 5.10.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 25°C, Humidity: 56%
Date of test :	25 May 2009
Operator :	<b>Jackson</b>

#### 5.10.2 Severity levels of magnetic field immunity

5.10.2.1 Severity Level: 3A/m

Level	Magnetic Field Strength (A/m)
1	1
2	3
3	10
4	30
5	100
X.	Special

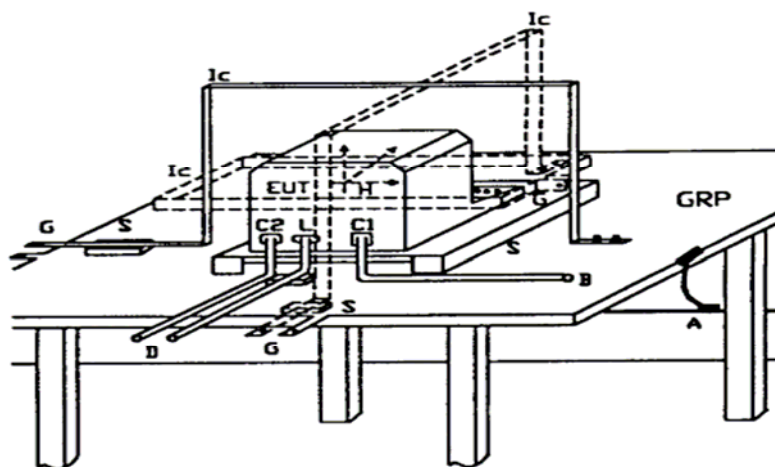
5.10.2.2 Performance Criterion: A

#### 5.10.3 Description of the test set-up

5.10.3.1 Operating Condition

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5.10.3.2 Block Diagram of Test Setup



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#### 5.10.4 Test specification:

Test frequency:	■ 50 Hz		
Continuous field:	■ 3 A/m		
Duration (Continuous field):	■ 60 s each Axis		
Short duration (1-3s):	■ 300 A/m		
Axis:	■ x-axis	■ y-axis	■ z-axis

#### 5.10.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

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### 5.11 Voltage dips

For test instruments and accessories used see section 6 part 6.12.

#### 5.11.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 25°C, Humidity: 56%
Date of test :	25 May 2009
Operator :	<b>Jackson</b>

#### 5.11.2 Severity levels of voltage dips

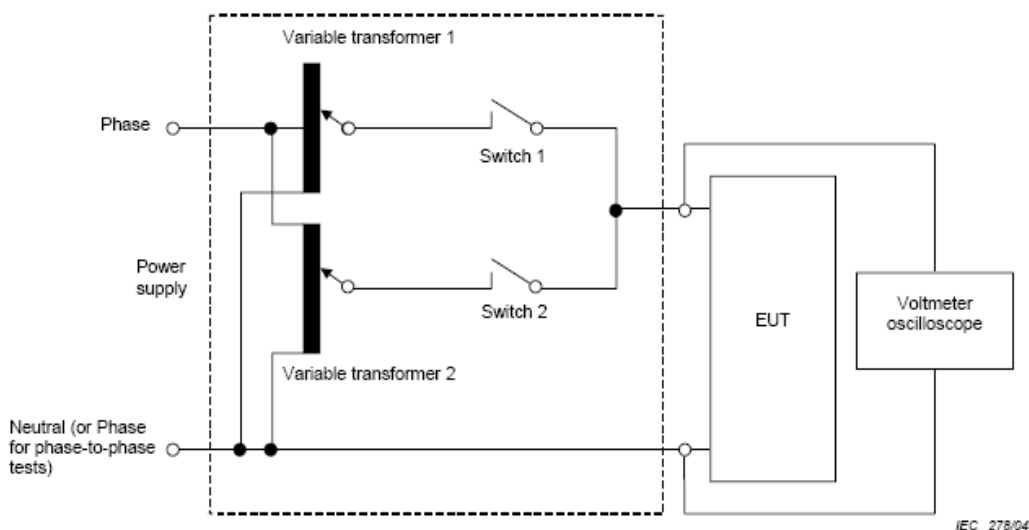
Test Level (%Ut)	Voltage Dips (%Ut)	Performance Criterion	Duration (in period)
70	30	C	10

#### 5.11.3 Description of the test set-up

##### 5.11.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

##### 5.11.3.2 Block Diagram of Test Setup



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**5.11.4 Test specification:**

Nominal Mains Voltage ( $V_N$ ):	■ AC 230 V
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 30 % / 200ms

**5.11.5 Test result**The requirements are **Fulfilled**Performance Criterion: **C****Remarks:** During the test no deviation was detected to the selected operation mode(s).**Centre of Testing Service**

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## 5.12 Voltage short interruptions

For test instruments and accessories used see section 6 part 6.13.

### 5.12.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 25°C, Humidity: 56%
Date of test :	25 May 2009
Operator :	<b>Jackson</b>

### 5.12.2 Severity levels of voltage short interruptions

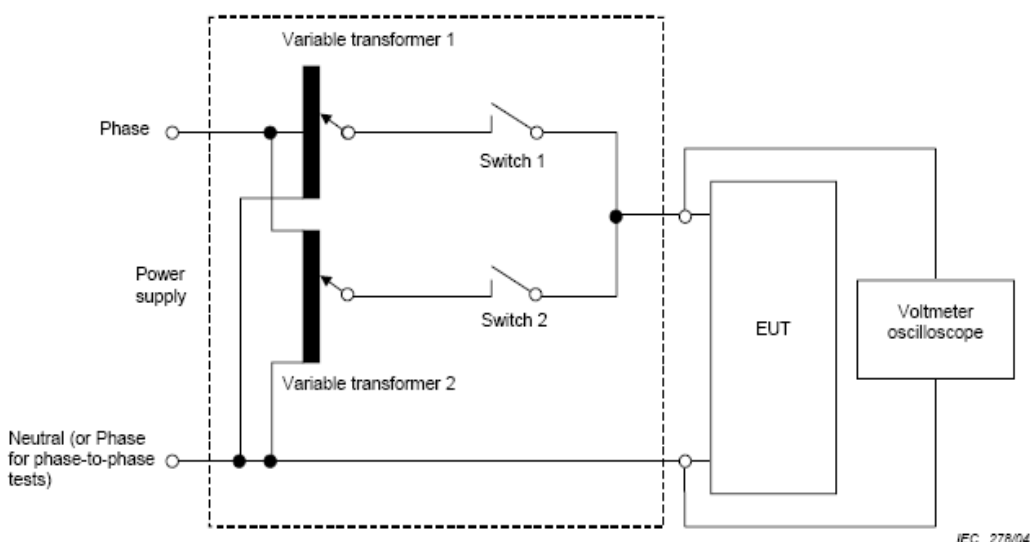
Test Level (%Ut)	Voltage Short Interruptions (%Ut)	Performance Criterion	Duration (in period)
0	100	B	0.5

### 5.12.3 Description of the test set-up

#### 5.12.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

#### 5.12.3.2 Block Diagram of Test Setup



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5.12.4 Test specification:

Nominal Mains Voltage ( $V_N$ ):	■ AC 230 V
Number of Interruptions:	■ 3
Duration of the Interruption:	■ 10 ms

5.12.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

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## 6 USED TEST EQUIPMENT

### 6.1

Radiated Disturbance (Magnetic field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESHS10	842884/012	2008/12
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2008/12
3	Triple-loop antenna	ROHDE & SCHWARZ	HM020	100015	2008/12
4	Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100301	2008/12
5	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

### 6.2

Power Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESVS10	842885/001	2008/12
2	Absorbing clamp	ROHDE & SCHWARZ	MDS 21	03466	2008/12
3	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

### 6.3

Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESHS10	842884/012	2008/12
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2008/12
3	Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100301	2008/12
4	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

### 6.4

Harmonic Current					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	HAR1H01B	HAR1000-48	2008/12

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## 6.5

Voltage fluctuation and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	HAR1H01B	HAR1000-48	2008/12

## 6.6

Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 200	0302016	2008/12

## 6.7

RF Field Strength Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	SIGNAL GENERATOR	ROHDE & SCHWARZ	SMY 01	843215/014	2008/12
2	AMPLIFIER	KALMUS	713FC	7385-1	2008/12
3	EMS Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

## 6.8

Electrical Fast Transient/Burst					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	TRA1H01B	HAR1000-78	2008/12
2	Coupling Clamp	EMC Partner	SFT 410	0302015	2008/12

## 6.9

Surge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	TRA1H01B	HAR1000-78	2008/12

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## 6.10

Conducted Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	RF generator / amplifier	Schlöder	CDG 6000	HU906007	2008/12
2	CDN	Schlöder	CDN M3	A3003008	2008/12
3	CDN	Schlöde	CDN T2	A3010005	2008/12
4	EM injection clamp	Liithi	EM101	35670	2008/12
5	EMS Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

## 6.11

Power Frequency Magnetic Field Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Power frequency mag-field generator System	EM TEST	EMS61000-8K	409001	2008/12

## 6.12

Voltage Dips					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	TRA1H01B	HAR1000-78	2008/12

## 6.13

Voltage Short Interruptions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	TRA1H01B	HAR1000-78	2008/12

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## 7 TEST PHOTOGRAPHS

### 7.1. Photos of power line conducted emission measurement



Front view of conducted measurement



Side view of Conducted measurement

### 7.2. Photos of radiated electromagnetic emission measurement



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7.3. Photo of harmonic current emission measurement



7.4. Photo of voltage fluctuations and flicker emission measurement



7.5. Photo of electrostatic discharge Immunity measurement



Air discharge

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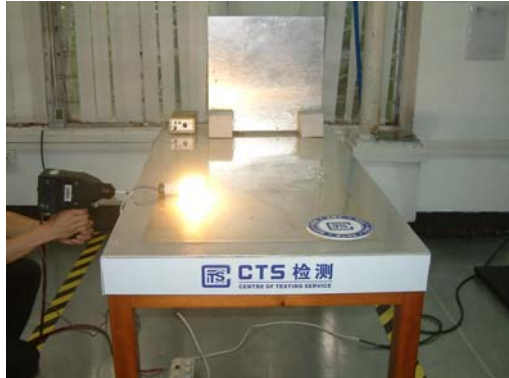
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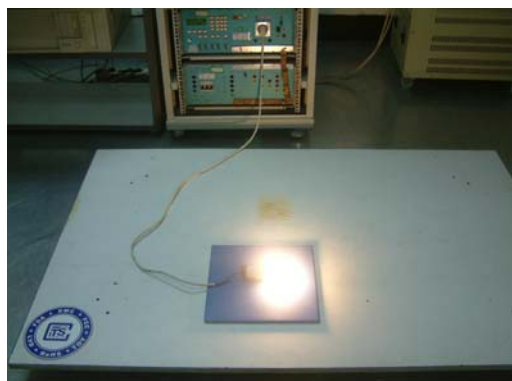


Contact discharge

### 7.6. Photo of RF field strength Immunity measurement



### 7.7. Photo of electrical fast transient/burst Immunity measurement



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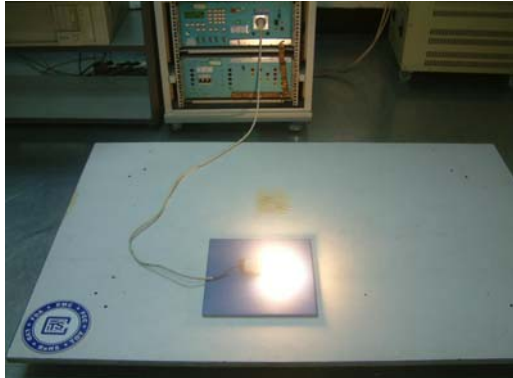
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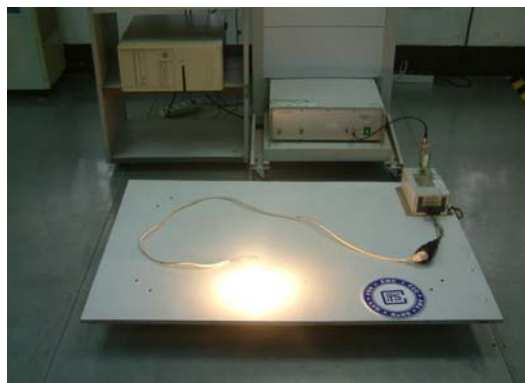
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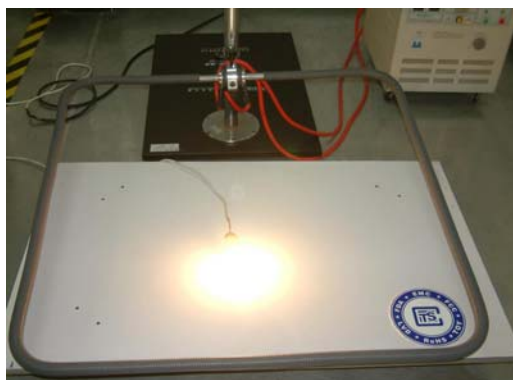
7.8. Photo of surge immunity measurement



7.9. Photo of conducted disturbance Immunity measurement



7.10 Photo of power frequency magnetic field immunity measurement



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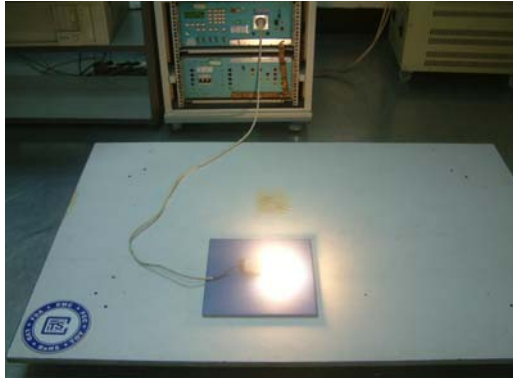
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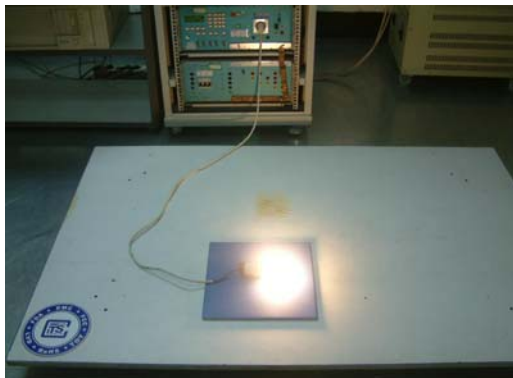
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7.11. Photo of voltage dips immunity measurement



7.12. Photo of voltage short interruptions immunity measurement



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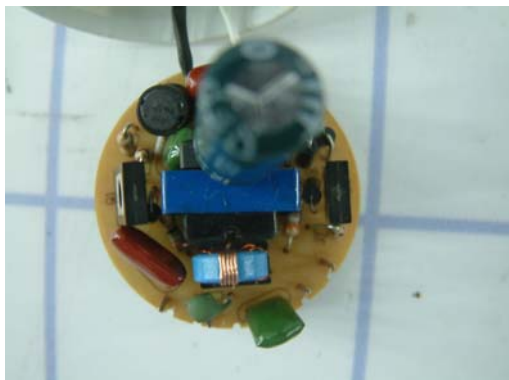
## 8 EXTERNAL AND INTERNAL PHOTOS OF THE EUT



External view-front



External view-inner



External view-pcb layout

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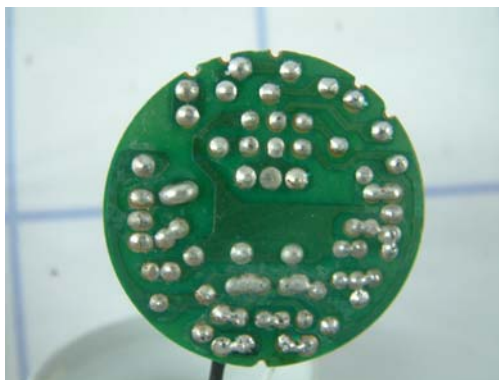
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**External view-pcb solder**

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## 9 Manufacturer/ Approval holder Declaration

The following identical model(s):

2U-E27-7W, 2U-E27-9W, 2U-E27-11W, 2U-E27-15W, 2U-E14-7W, 2U-E14-9W,  
2U-E14-11W, 2U-E14-15W, 3U-E27-15W, 3U-E27-18W, 3U-E27-20W, 3U-E27-25W,  
3U-E14-15W, 4U-E27-11W, 4U-E27-13W, 4U-E27-15W, 4U-E27-18W, 4U-E27-20W,  
4U-E27-25W, 4U-E14-11W, 4U-E14-13W, 4U-E14-15W, 5U-E27-15W, 5U-E27-18W,  
5U-E27-20W, 5U-E14-15W, 6U-E27-11W, 6U-E27-13W, 6U-E27-15W, 6U-E27-18W,  
6U-E27-20W, 6U-E14-11W, 6U-E14-13W, 6U-E14-15W,  
full spiral-E27-7W, full spiral-E27-9W, full spiral-E27-11W, full spiral-E27-13W,  
full spiral-E27-15W, full spiral-E27-20W, full spiral-E14-7W, full spiral-E14-9W,  
full spiral-E14-11W, full spiral-E14-13W, full spiral-E14-15W, semi-spiral-E27-9W,  
semi-spiral-E27-11W, semi-spiral-E27-13W, semi-spiral-E27-15W, semi-spiral-E27-18W,  
semi-spiral-E27-23W, semi-spiral-E14-9W, semi-spiral-E14-11W, semi-spiral-E14-13W,  
semi-spiral-E14-15W, candle-2U-E27-5W, candle-2U-E27-7W, candle-2U-E27-9W,  
candle -2U-E14-5W, candle -2U-E14-7W, candle -2U-E14-9W, candle -3U-E27-9W,  
candle -3U-E27-11W, candle-3U-E14-9W, candle-3U-E14-11W, candle -full spiral-E14-9W,  
candle -full spiral-E14-11W, global-2u-E27-7W, global-2u-E27-9W, global-2U-E27-11W,  
global-2U-E14-7W, global-2U-E14-9W, global-2U-E14-11W, global-3U-E27-9W,  
global-3U-E27-11W, global-3U-E27-13W, global-3U-E27-15W, global-3U-E27-20W,  
global-3U-E27-25W, global-3U-E14-9W, global-3U-E14-11W, global-3U-E14-13W,  
global-4U-E27-13W, global-4U-E27-15W, global-4U-E27-18W, global-4U-E27-25W,  
global-4U-E14-13W, global-4U-E14-15W, global-4U-E14-18W, global-6U-E27-15W,  
global-6U-E27-18W, global-6U-E27-20W, global-6U-E14-15W, global-6U-E14-18W,  
global-6U-E14-20W, global-full spiral-E27-15W, global-full spiral-E27-20W,  
global-full spiral-E27-25W, global-semi spiral-E27-15W, global-semi spiral-E27-20W  
global-semi spiral-E27-25W, 6U-E14-25W

Belong to the tested device:

Product description: **Energy-saving lamp**  
Model name: **6U-E27-25W**

**No additional models were tested.**

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