

EN 55015:2013+A1:2015

EN 61547:2009

EN 61000-3-2:2014

EN 61000-3-3:2013

TEST REPORT

For

DongGuan City TianHua Photoelectric Technology Co., Ltd.

2nd Road, JinQianLing Industrial Zone, JiTiGang Village, HuangJiang Town, DongGuan City,
GuangDong Province, China

Test Model: 1606
Multiple Models: 1608, 1308, 1306

Report Type: Original Report	Product Type: Motion Lamp/Glitter Lamp
Report Number: RDG190404005-01	
Report Date: 2019-04-24	
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GENERAL INFORMATION**Product Description for Equipment under Test (EUT)**

EUT Name:	Motion Lamp/Glitter Lamp
EUT Model:	1606
Multiple Models:	1608,1308,1306
Rated Input Voltage:	240V/50Hz
The Highest Operating Frequency:	N/A
External Dimension:	100mm(L)*100mm(w)*420mm(H)
Serial Number:	190404005
EUT Received Date:	2019.04.11

Note: The series product, models 1606, 1608, 1308, 1306 are electrically identical, we selected 1606 for fully testing .The difference between them was explained in the declaration letter.

Objective

This report is prepared on behalf of *DongGuan City TianHua Photoelectric Technology Co., Ltd.* in accordance with EN 55015:2013+A1:2015 Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment; EN 61547:2009 Equipment for general lighting purposes – EMC immunity requirements; EN 61000-3-2:2014 Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase); EN 61000-3-3:2013 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 ≤ 16 A per phase and not subject to conditional connection.

The objective is to determine the compliance of EUT with:

EN 55015:2013+A1:2015

EN 61547:2009

EN 61000-3-2:2014

EN 61000-3-3:2013.

Test Methodology

All measurements contained in this report were conducted with EN 55015:2013+A1:2015 Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment; EN 61547:2009 Equipment for general lighting purposes – EMC immunity requirements; EN 61000-3-2:2014 Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase); EN 61000-3-3:2013 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 ≤ 16 A per phase and not subject to conditional connection.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

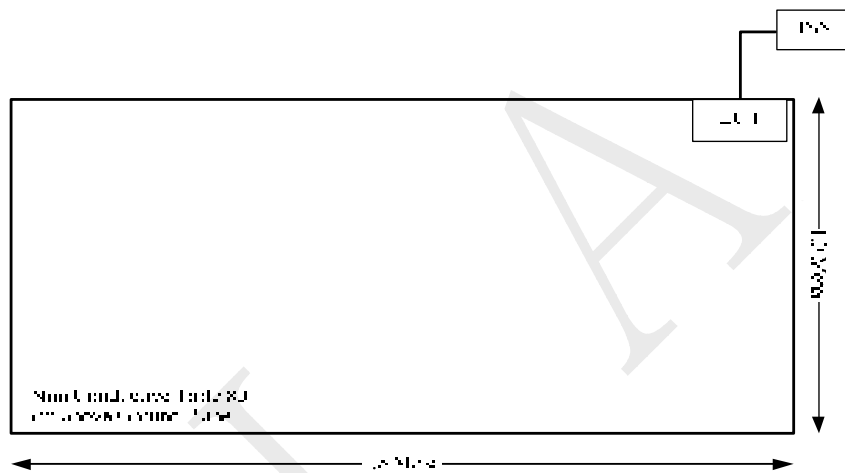
Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No EUT software was used for testing.

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission					
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2018-12-10	2019-12-10
R&S	EMI Test Receiver	ESCI	101121	2019-03-23	2020-03-23
Radiated electromagnetic					
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2018-12-10	2019-12-10
EVERFINE	TRIPLE-LOOP antenna	LLA-2	903002	2018-07-12	2021-07-12
R&S	EMI Test Receiver	ESCI	101121	2019-03-23	2020-03-23
Radiated emissions below 1GHz					
R&S	EMI Test Receiver	ESCI	100035	2018-08-03	2019-08-03
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-3	2017-07-21	2019-07-21
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2018-09-24	2019-09-24
Sonoma	Amplifier	310N	185914	2018-10-13	2019-10-13
Flicker & Harmonic					
ELGAR	AC Power Source	1751SX	5611	2018-09-10	2019-09-10
EM TEST	Harmonic & Flicker Analyzer	DPA 500	303278	2018-12-14	2019-12-14
CS					
Werlatone	Dual Directional Coupler	C5091-10	113192	2019-02-09	2020-02-09
HP	Power Meter	HP EPM-441A	GB37481494	2018-08-13	2019-08-13
Agilent	8482A Power sensor	8482A	US37296108	2018-08-13	2019-08-13
HP	Signal Generator	8648A	3246A00831	2018-12-14	2019-12-14
R&S	Power Amplifier	15A250	12934	N/A	N/A
NARDA	Attenuator	769-6	2754	N/A	N/A
COM-POWER	CDN	M325E	521064	2018-12-14	2019-12-14
EFT & Surge & Dips					
EM TEST	Ultra Compact Generator	UCS500-M6	V6016101357	2019-01-04	2020-01-04
EM TEST	Auto Transformer	MV2616	0403-16	N/A	N/A

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ESD					
SCHAFFNER	ESD Tester	NSG435	005 101	2018-07-27	2019-07-27
RS					
Sunol Sciences	Antenna	JB3	A060611-2	2017-08-25	2020-08-25
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
AR	Power Amplifier	100W1000M1	13410	N/A	N/A
Microwave	Directional Coupler	441490	488Z	2018-07-16	2019-07-16
Agilent	EPM Series Power Meter	E4419B	MY45103907	2018-04-11	2019-04-11
Agilent	E-Series Avg Power Sensor	E9301A	MY41497625	2018-04-11	2019-04-11
Agilent	E-Series Avg Power Sensor	E9301A	MY41497628	2018-04-11	2019-04-11

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Temperature:	23.5~28.8°C
Relative Humidity:	46-66%*
ATM Pressure:	100.2~ 100.6 kPa
Tester:	Sunny Cen, Lily Xie, Sky Lu, Lucy Lu
Test Date:	2019.4.12~2019.4.18

Note:

*The relative humidity of ESD test environment is 54%.

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	EN 55015 Clause 4.3.1	Conducted emissions	Compliance
2	EN 55015 Clause 4.4.1	Radiated electromagnetic disturbances 9 kHz to 30 MHz	Compliance
3	EN 55015 Clause 4.4.2	Radiated electromagnetic disturbances 30 MHz to 300 MHz	Compliance
4	EN 61547 Clause 5.2	Electrostatic discharges IEC 61000-4-2	Compliance
5	EN 61547 Clause 5.3	Radio-frequency electromagnetic fields IEC 61000-4-3	Compliance
6	EN 61547 Clause 5.4	Power frequency magnetic fields IEC 61000-4-8	Not applicable*
7	EN 61547 Clause 5.5	Fast transients IEC 61000-4-4	Compliance
8	EN 61547 Clause 5.6	Injected currents (radio-frequency common mode) IEC 61000-4-6	Compliance
9	EN 61547 Clause 5.7	Surges IEC 61000-4-5	Compliance
10	EN 61547 Clause 5.8	Voltage dips and short interruptions IEC 61000-4-11	Compliance
11	EN 61000-3-2	Harmonic current emissions	Compliance
12	EN 61000-3-3	Voltage fluctuations and flicker	Compliance

Note:

Not applicable*: EUT is not sensitive to magnetic fields.

1 – CONDUCTED EMISSIONS

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

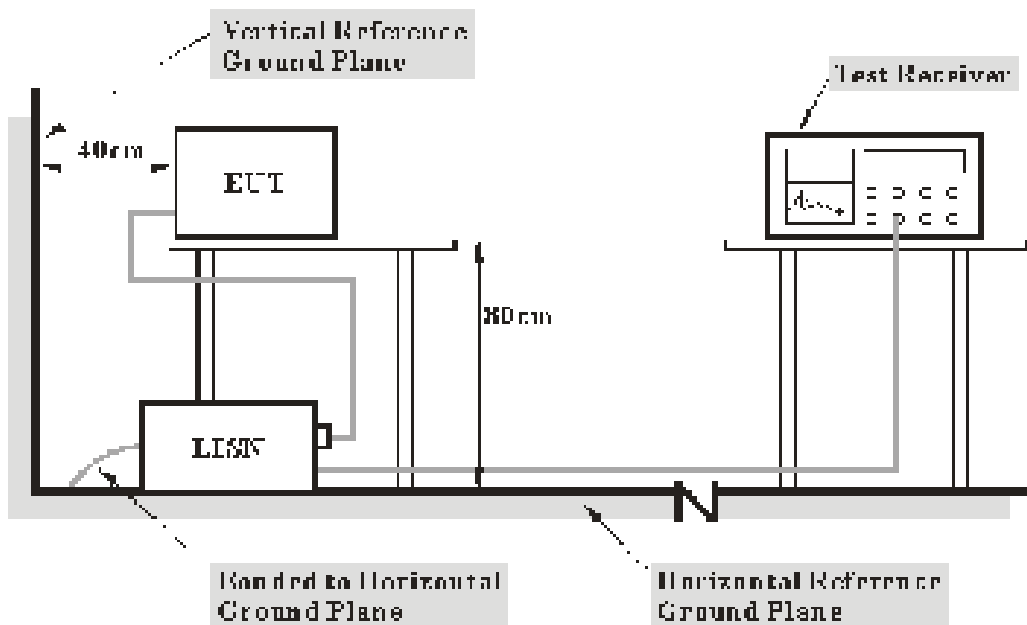
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.12 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

Test System Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (ADMIN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with CISPR 16-1-1:2010+A1:2010, CISPR 16-2-1:2014 measurement procedure. The specification used was the EN 55015 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The power of EUT was connected to a 240 V/50Hz AC power source.

EMI Test Receiver Setup

The EMI Test Receiver was set to investigate the spectrum from 9 kHz to 30 MHz.

During the conducted emission test, the EMI Test Receiver was set with the following configurations:

Frequency Range	IF B/W
9 kHz – 150 kHz	200 Hz
150 kHz – 30 MHz	9 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result (QuasiPeak or Average) = Meter Reading + Corr.

Note:

Corr. = Cable loss + Factor of coupling device

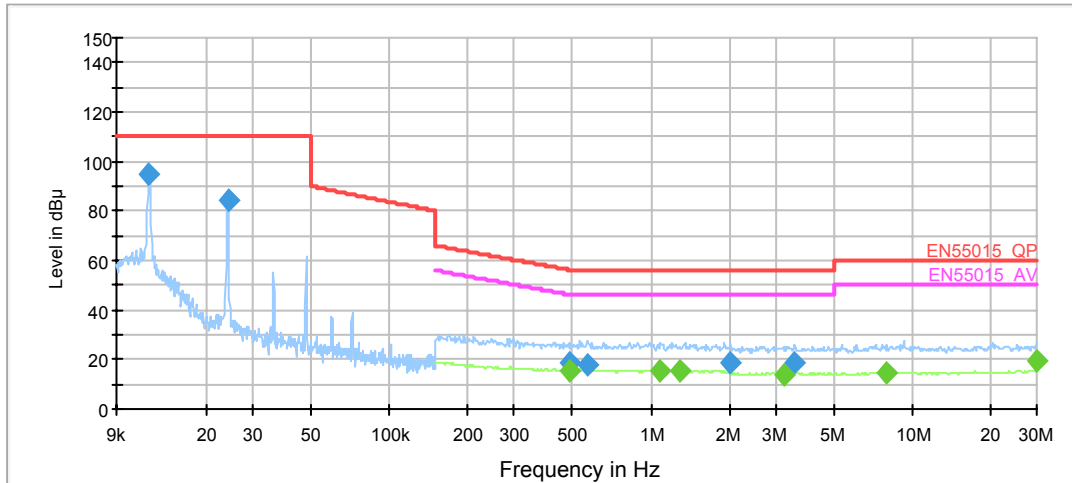
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Result

Test Data

Please refer to following table and plots:

Model Number: 1606
 Port: L
 Test Mode: On
 Power Source: AC 240V/50Hz
 Note:



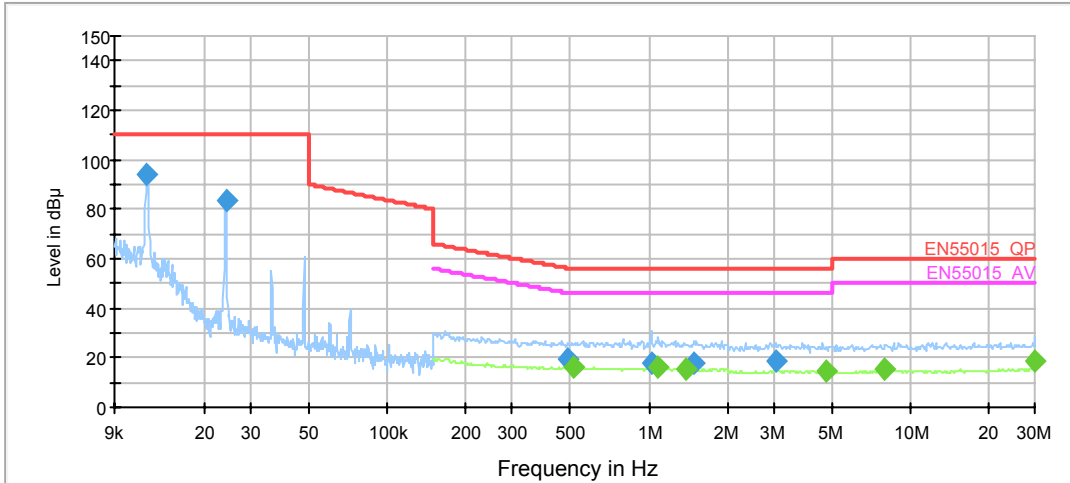
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.012019	95.0	0.200	L1	23.0	15.0	110.0
0.024041	84.0	0.200	L1	20.5	26.0	110.0
0.485304	18.2	9.000	L1	9.9	38.0	56.2
0.569057	17.9	9.000	L1	9.8	38.1	56.0
2.013586	18.6	9.000	L1	9.7	37.4	56.0
3.550491	18.6	9.000	L1	9.8	37.4	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.485304	15.4	9.000	L1	9.9	30.8	46.2
1.086538	15.8	9.000	L1	9.8	30.2	46.0
1.286792	15.4	9.000	L1	9.8	30.6	46.0
3.246355	14.2	9.000	L1	9.8	31.8	46.0
8.028623	14.8	9.000	L1	9.8	35.2	50.0
30.000000	19.3	9.000	L1	10.1	30.7	50.0

Model Number: 1606
 Port: N
 Test Mode: On
 Power Source: AC 240V/50Hz
 Note:

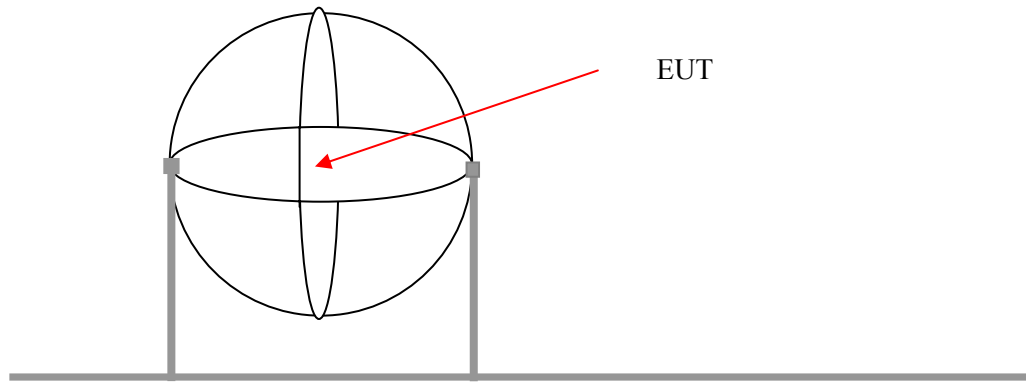


Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.012019	94.3	0.200	N	23.0	15.7	110.0
0.024041	83.6	0.200	N	20.5	26.4	110.0
0.490157	19.5	9.000	N	9.9	36.7	56.2
1.023568	18.1	9.000	N	9.8	37.9	56.0
1.493925	17.9	9.000	N	9.8	38.1	56.0
3.058214	18.6	9.000	N	9.8	37.4	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.515160	15.9	9.000	N	9.9	30.1	46.0
1.086538	16.4	9.000	N	9.8	29.6	46.0
1.393411	15.3	9.000	N	9.8	30.7	46.0
4.785525	14.3	9.000	N	9.8	31.7	46.0
8.028623	15.1	9.000	N	9.8	34.9	50.0
30.000000	19.0	9.000	N	10.1	31.0	50.0

2 – RADIATED ELECTROMAGNETIC DISTURBANCES 9 KHZ TO 30 MHZ**EUT System Setup****EMI Test Receiver Setup**

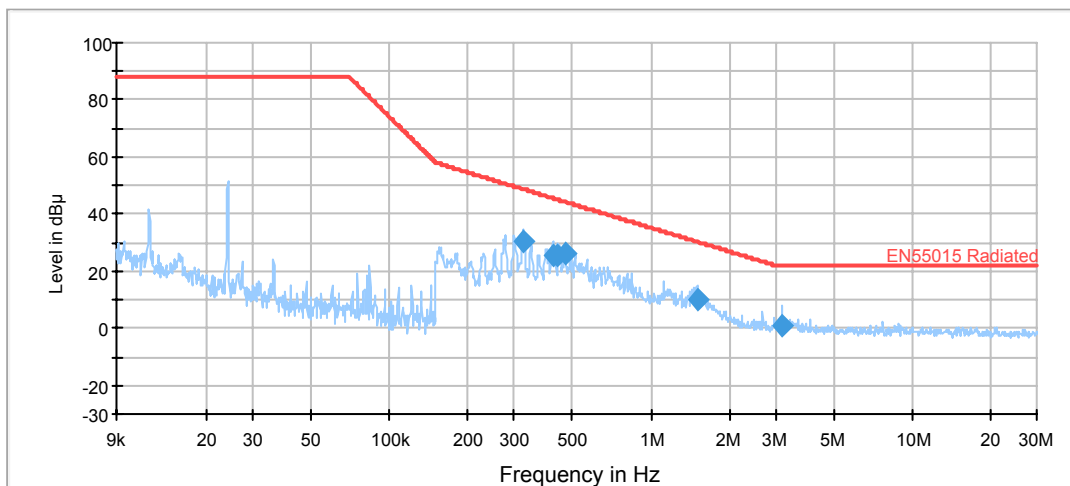
During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
9 kHz – 150 kHz	200 Hz
150 kHz – 30 MHz	9 kHz

Test Data

Please refer to following table and plots:

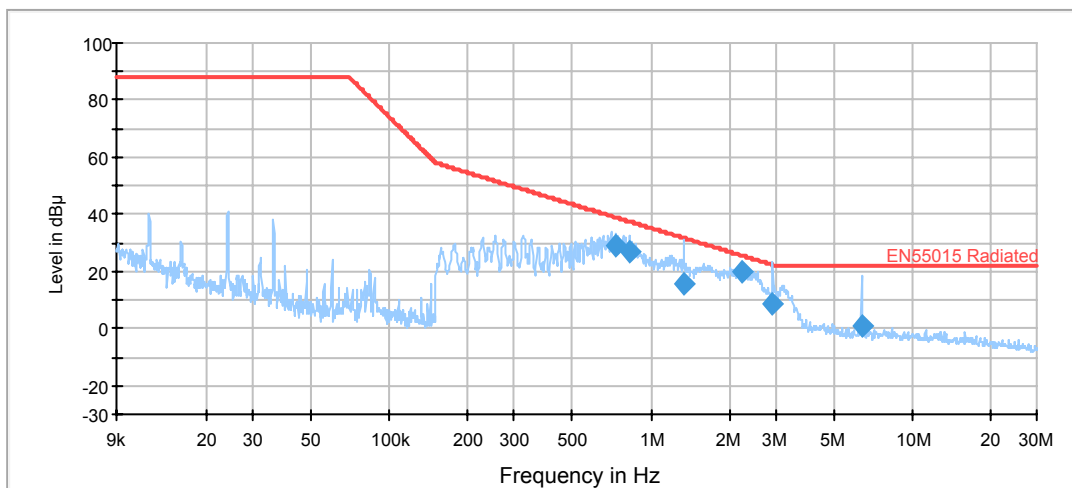
Model Number: 1606
 Port: X
 Test Mode: On
 Power Source: AC 240V/50Hz
 Note:



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ A)	Bandwidth (kHz)	Triple Loop frame	Corr. (dB)	Margin (dB)	Limit (dB µ A)
0.323344	30.2	9.000	X	-15.3	18.6	48.8
0.421179	25.6	9.000	X	-15.5	19.9	45.5
0.442718	25.4	9.000	X	-15.5	19.6	45.0
0.467685	25.9	9.000	X	-15.5	18.4	44.3
1.502492	10.4	9.000	X	-15.5	19.9	30.3
3.190711	1.0	9.000	X	-15.4	21.0	22.0

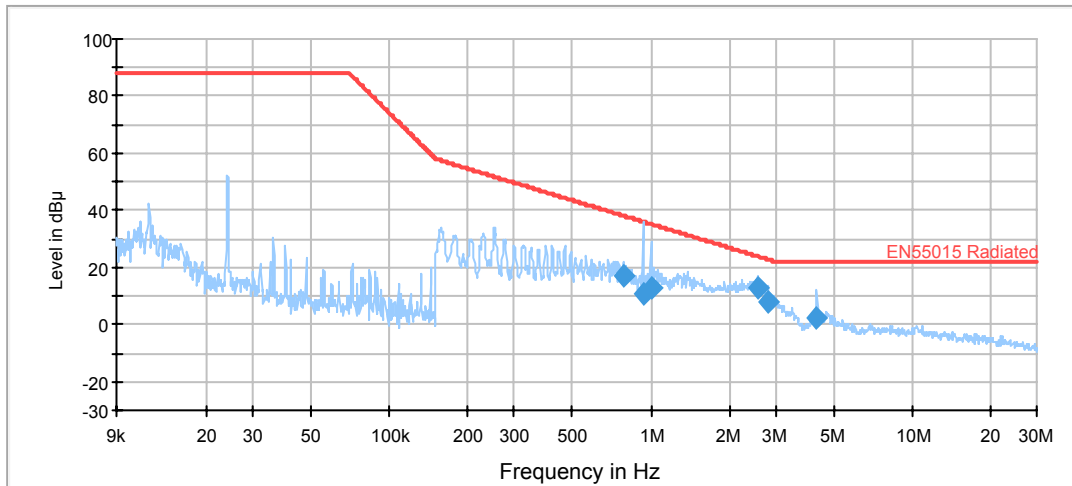
Model Number: 1606
 Port: Y
 Test Mode: On
 Power Source: AC 240V/50Hz
 Note:



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ A)	Bandwidth (kHz)	Triple Loop frame	Corr. (dB)	Margin (dB)	Limit (dB µ A)
0.736318	29.3	9.000	Y	-15.7	9.6	38.9
0.829948	27.0	9.000	Y	-15.8	10.4	37.4
1.339654	15.7	9.000	Y	-15.7	16.0	31.7
2.239221	19.7	9.000	Y	-15.6	5.8	25.5
2.931328	8.6	9.000	Y	-15.8	13.7	22.3
6.414105	0.8	9.000	Y	-16.4	21.2	22.0

Model Number: 1606
 Port: Z
 Test Mode: On
 Power Source: AC 240V/50Hz
 Note:



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ A)	Bandwidth (kHz)	Triple Loop frame	Corr. (dB)	Margin (dB)	Limit (dB µ A)
0.781732	16.7	9.000	Z	-15.9	21.5	38.2
0.935484	11.0	9.000	Z	-15.9	25.0	36.0
1.003139	12.5	9.000	Z	-15.9	22.7	35.2
2.562009	13.2	9.000	Z	-15.8	10.7	23.9
2.816669	7.7	9.000	Z	-15.8	15.1	22.8
4.325309	2.0	9.000	Z	-16.2	20.0	22.0

3 – RADIATED ELECTROMAGNETIC DISTURBANCES 30 MHZ TO 300 MHZ

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

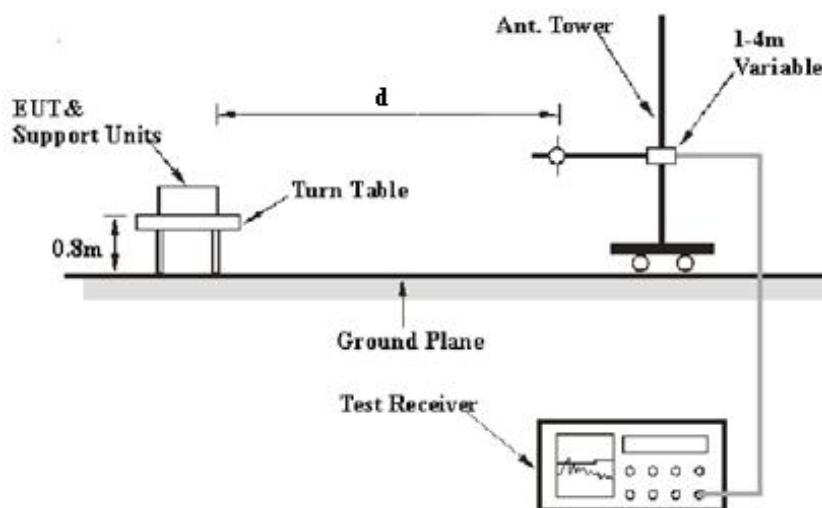
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 10m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.55 dB for Horizontal, 4.57 dB for Vertical; 200M~1GHz: 4.66 dB for Horizontal, 4.56 dB for Vertical; measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB.

Table 1 – Values of U_{cispr}

Measurement		U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC)	(30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR)	(1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR)	(6 GHz to 18 GHz)	5.5 dB

Test System Setup



The radiated emission tests were performed in the 10 meters chamber test site, using the setup accordance with the CISPR 16-1-1:2010+A1:2010, CISPR16-2-3:2010. The specification used was EN 55015.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The power was connected to 240 V/50Hz AC power source.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 300 MHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 300 MHz	120 kHz	300 kHz	120kHz	QP

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Meter Reading + Corrected

Note:

Corrected = Antenna Factor + Cable Loss - Amplifier Gain

or

Corrected = Antenna Factor + Cable Loss + Insertion loss of attenuator - Amplifier Gain

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

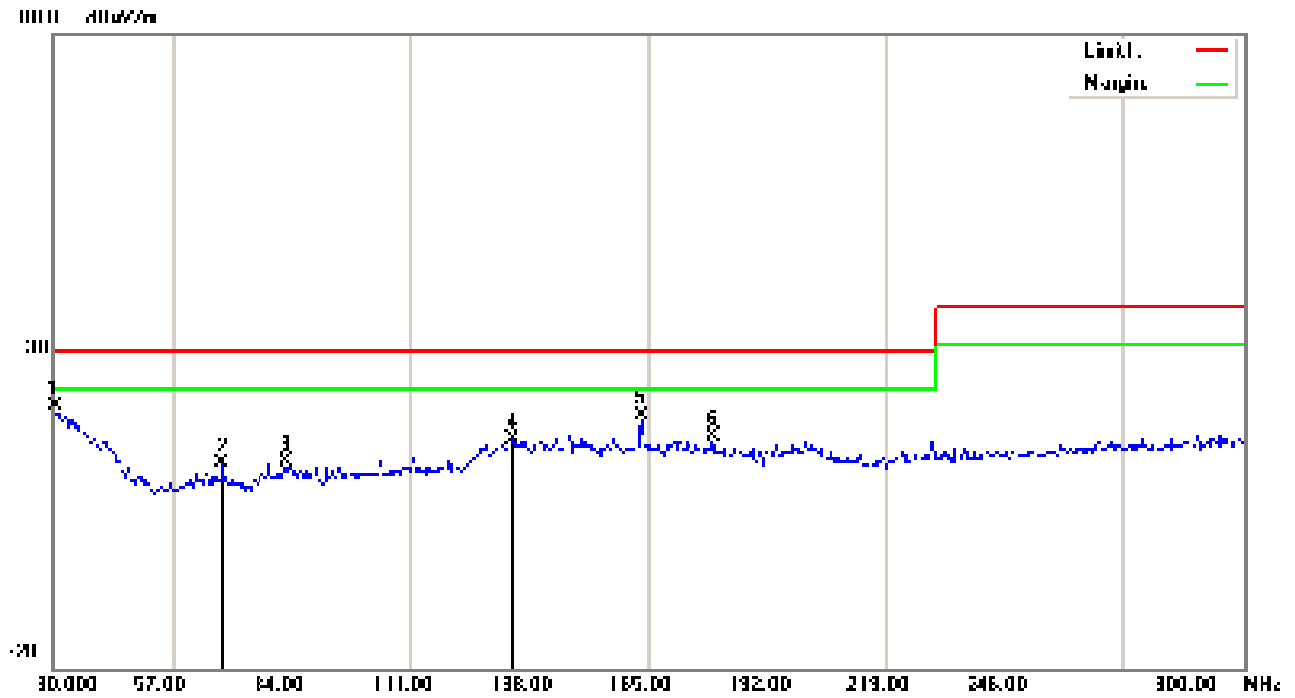
$$\text{Margin} = \text{Limit} - \text{Result}$$

Test Data

Please refer to following table and plots:

Condition: EN 55015 10m Radiation
EUT: Motion LampGlitter Lamp
Model: 1606
Test Mode: On
Note:

Polarization: Horizontal
Power: AC 240V/50Hz
Distance: 10m

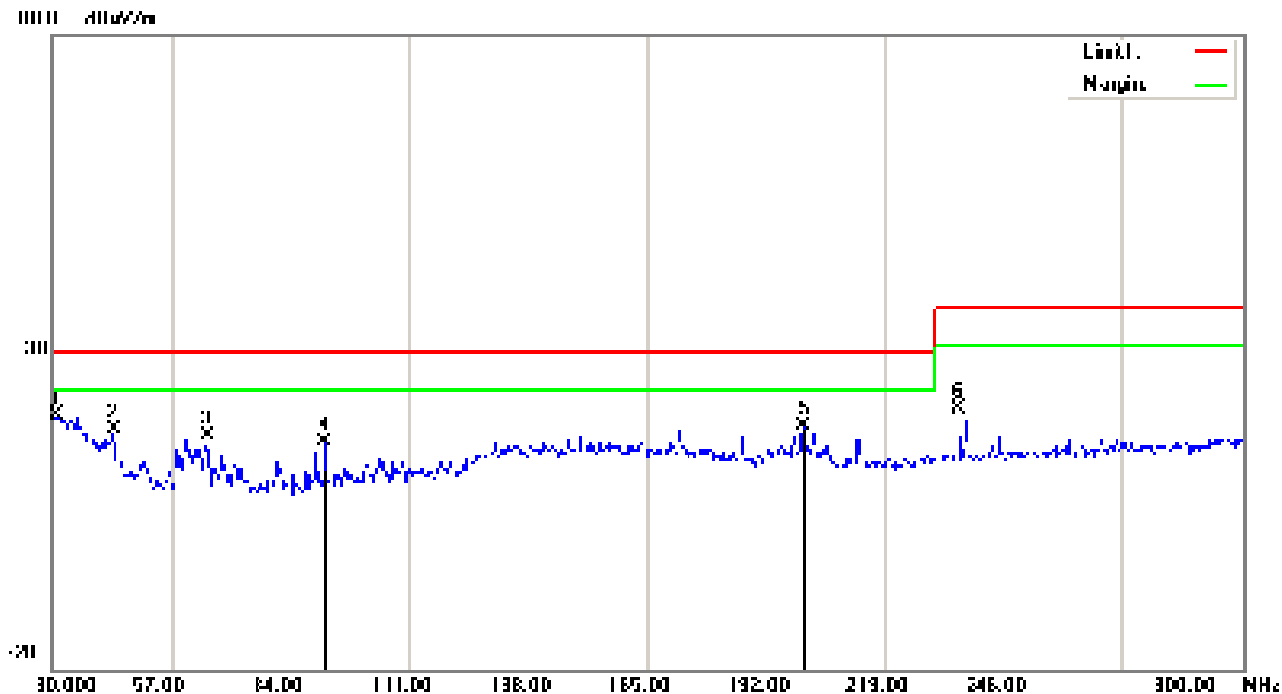


No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	30.2700	29.39	peak	-8.07	21.32	30.00	8.68
2	68.0700	32.54	peak	-20.10	12.44	30.00	17.56
3	82.6500	31.90	peak	-19.32	12.58	30.00	17.42
4	134.2200	29.12	peak	-13.11	16.01	30.00	13.99
5	163.3800	32.81	peak	-12.87	19.94	30.00	10.06
6	179.8500	29.84	peak	-13.25	16.59	30.00	13.41

Note: Since peak value is meeting the Limit requirement, so the QP value is not recorded.

Condition: EN 55015 10m Radiation
EUT: Motion LampGlitter Lamp
Model: 1606
Test Mode: On
Note:

Polarization: Vertical
Power: AC 240V/50Hz
Distance: 10m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	30.8100	28.52	peak	-8.33	20.19	30.00	9.81
2	43.7700	33.39	peak	-15.51	17.88	30.00	12.12
3	64.8300	37.05	peak	-20.11	16.94	30.00	13.06
4	91.8300	34.53	peak	-18.61	15.92	30.00	14.08
5	200.3700	31.25	peak	-12.83	18.42	30.00	11.58
6	235.4700	34.76	peak	-13.70	21.06	37.00	15.94

Note: Since peak value is meeting the Limit requirement, so the QP value is not recorded.

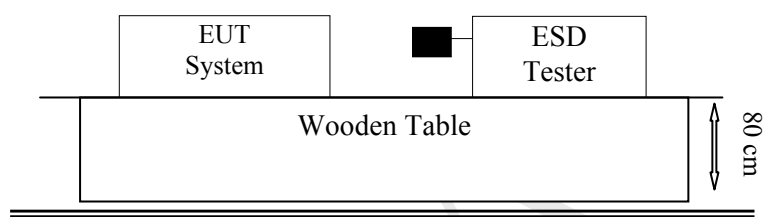
4 – ELECTROSTATIC DISCHARGES IEC 61000-4-2

Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-2) please refer to the following:

Parameter	U_{EN}	U_{lab}
Rise time t_r	$\leq 15\%$	15%
Peak current I_p	$\leq 7\%$	6.30%
Current at 30 ns	$\leq 7\%$	6.30%
Current at 60 ns	$\leq 7\%$	6.30%

Test System Setup



Remark: ■ is the tip of the electrode

IEC 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Standard

EN 61547:2009 (IEC 61000-4-2:2008)
 Test level 3 for Air Discharges at ± 8 kV
 Test level 2 for Contact Discharges at ± 4 kV

Test Level

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

Performance criterion: B**Test Procedure****Air Discharges:**

This test is done on a non-conductive surface. The round Discharges tip of the Discharges electrode shall be approached as fast as possible to touch the EUT. After each Discharges, the Discharges electrode shall be removed from the EUT. The generator is then re-triggered for a new single Discharges and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air Discharges completed.

Contact Discharges:

All the procedure shall be same as Section 8.3.1 of IEC 61000-4-2, except that the tip of the Discharges electrode shall touch the EUT before the Discharges switch is operated.

Indirect Discharges for horizontal coupling plane

At least 20 single Discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The Discharges electrode positions vertically at a distance of 0.1 m from the EUT and with the Discharges electrode touching the coupling plane.

Indirect Discharges for vertical coupling plane

At least 20 single Discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Test Data

Please refer to following tables:

Test Mode: On

Note:

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Glass Shell	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Metal Shell	A	A	A	A	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

ESD Location Photo



Air Discharge:



Direct Contact:



Test Setup Photo



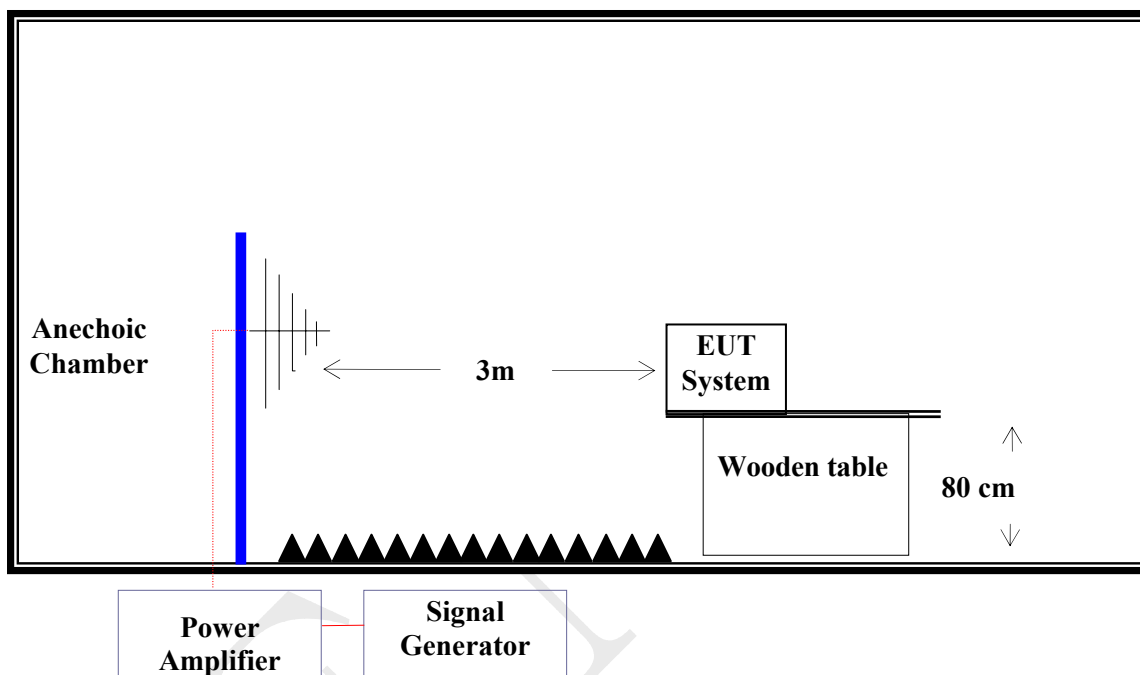
5 – RADIO-FREQUENCY ELECTROMAGNETIC FIELDS IEC 61000-4-3

Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-3) please refer to the following:

Parameter	U_{EN}	U_{lab}
Calibration process	1.88 dB	1.88 dB
Level setting	2.19 dB	2.19 dB

Test System Setup



Test Standard

EN 61547:2009 (IEC 61000-4-3:2006+A1:2008+A2:2010)
 Test level 2 at 3 V/ m (unmodulated, r.m.s.)

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

Performance criterion: A

Test Procedure

The EUT and its simulators are placed on a turn table which is 0.1 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower.

Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor the EUT. All the scanning conditions are as follows:

Test Data

Please refer to following tables:

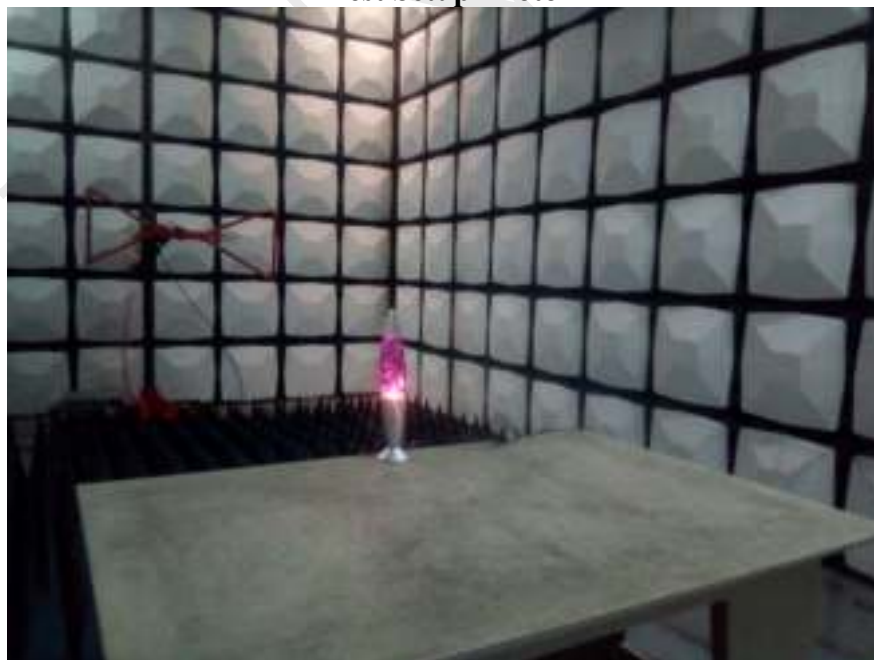
Test Mode: On

Note:

Condition of Test	Remarks
Field Strength	3 V/m (Test Level 2)
RF Signal	1 kHz, 80% AM, sine wave
Sweep Frequency Step	1%, logarithmic
Dwell Time	1 Sec

Frequency Range (MHz)	Front Side		Rear Side		Left Side		Right Side	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A

Test Setup Photo



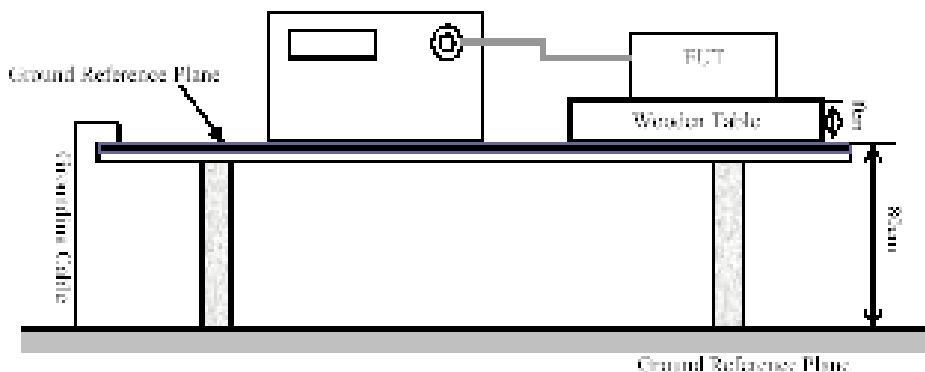
7 – FAST TRANSIENTS IEC 61000-4-4

Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-4) please refer to the following:

Parameter	U_{EN}	U_{lab}
Rise time t_r	6.20%	6.20%
Peak voltage value V_p	8.60%	8.60%
Voltage pulse width t_w	5.90%	5.90%

Test System Setup



Test Standard

EN 61547:2009 (IEC 61000-4-4:2004)
 Test Level 2 at 1.0 kV

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance criterion: B

Test Procedure

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility's electrical earth.

Test Data

Please refer to following tables:

Test Mode: On

Note:

Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
<u>AC</u> mains power input ports	L	A	A	A	A	/	/	/	/
	N	A	A	A	A	/	/	/	/
	Earth	A	A	A	A	/	/	/	/
	L+N	A	A	A	A	/	/	/	/
	L + Earth	A	A	A	A	/	/	/	/
	N + Earth	A	A	A	A	/	/	/	/
	L+N+Earth	A	A	A	A	/	/	/	/
Signal ports	/	/	/	/	/	/	/	/	

AC Port Test Setup Photo



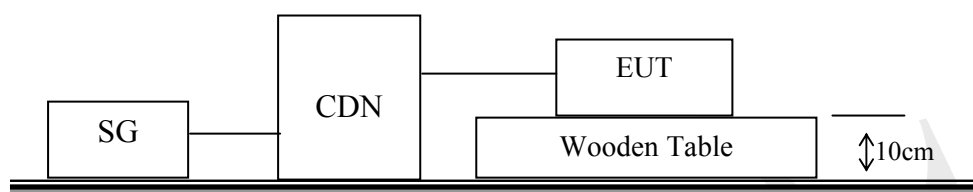
8 – INJECTED CURRENTS (RADIO-FREQUENCY COMMON MODE) IEC 61000-4-6

Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-6) please refer to the following:

Parameter	U_{EN}	U_{lab}
CDN calibration process	1.27 dB	1.27 dB
CDN test process	1.36 dB	1.36 dB

Test setup



Test Standard

EN 61547: 2009 (IEC 61000-4-6:2009)

Test Level 2 at 3 V r.m.s. (unmodulated), 0.15 MHz ~ 80 MHz

Level	Voltage Level (r.m.s.) V
1	1
2	3
3	10
X	Special

Performance criterion: A

Test Procedure

- 1) Let the EUT work in test mode and test it.
- 2) The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 3) The disturbance signal described below is injected to EUT through CDN.
- 4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 5) The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
- 6) Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value. The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5 s.
- 7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data

Please refer to following tables:

Test Mode: On

Note:

Table 1: AC mains power input port

Frequency range: 150 kHz to 80 MHz
 Modulated: Amplitude 80%, 1kHz sine wave Unmodulated Other:
 Severity Level: 3 V Un modulated , r.m.s

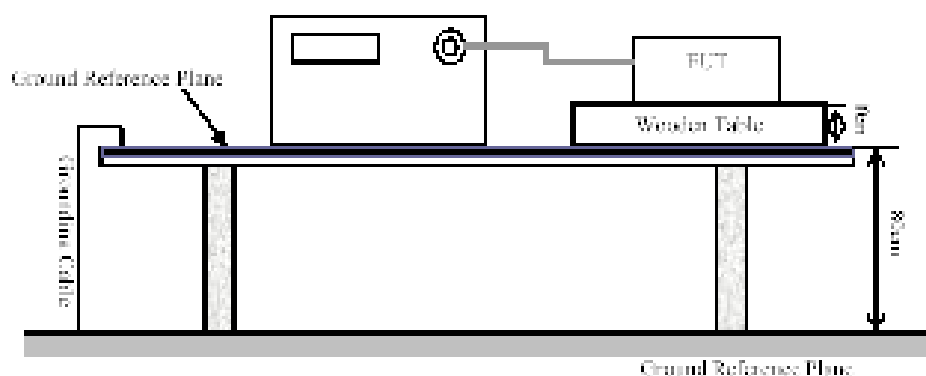
Level	Voltage Level (e.m.f.) U ₀	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

AC Port Test Setup Photo



9 – SURGES IEC 61000-4-5

Test system Setup



Test Standard

EN 61547:2009 (IEC 61000-4-5:2006)
AC Mains: Line-Line: Test level 1 at 0.5 kV

Level	Open Circuit Output Test Voltage $\pm 10\%$
1	0.5 kV
2	1 kV
3	2 kV
4	4 kV
X	Special

Performance criterion: C

Test Procedure

- 1) Provide disturbance signal described below is injected to EUT.
- 2) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 3) Different phase angles are done individually.
- 4) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data

Please refer to following tables:

Test Mode: On

Note:

Table 1: _____ AC _____ mains power input port

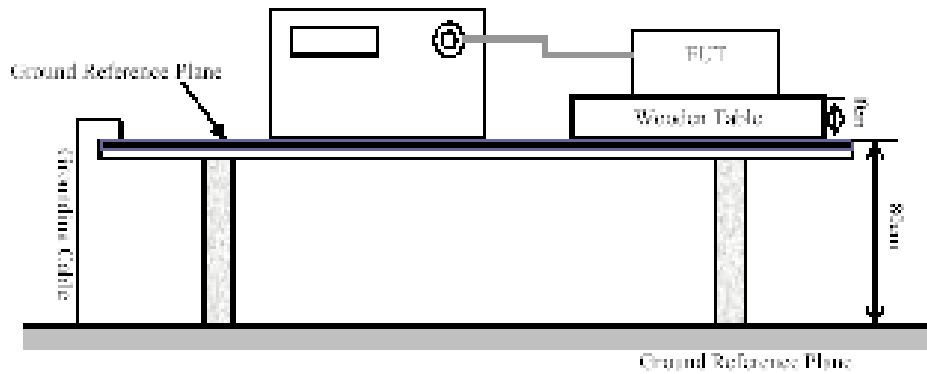
Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	Line-Line,Line-Ground	A	/
2	1kV	±	Line-Line,Line-Ground	A	/
3	2kV	±	Line-Ground	A	/
4	4kV	±	/	/	/

AC Port Test Setup Photo



10 – VOLTAGE DIPS AND SHORT INTERRUPTIONS IEC 61000-4-11

Test setup



Test Standard

EN 61547:2009 (IEC 61000-4-11:2004)

Test Levels and Performance Criterion

Level	U2 (% Reduction)	Duration (in period)	Performance criterion
1	30	10	C
2	100	0.5	B

Test Procedure

- 1) The interruption is introduced at selected phase angles with specified duration.
- 2) Record any degradation of performance.

Test Data

Please refer to following tables:

Test Mode: On

Note:

Table 1: Voltage Tips/Interruptions Test

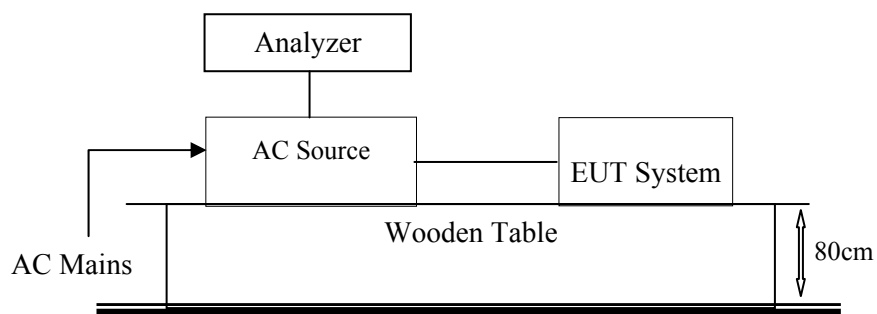
Level	U2 (% Reduction)	Td (Periods)	Phase Angle	N	Result
1	30	10	0/90/180/270	3	A
2	100	0.5	0/90/180/270	3	A

Test Setup Photo



11 – HARMONIC CURRENT EMISSIONS

Test System Setup



Test Standard

EN 61000-3-2:2014

Test product class

Class A: - Balanced three-phase equipment

- Household appliances excluding equipment identified as class D
- Tools excluding portable tools
- Dimmers for incandescent lamps
- Audio equipment

Class B: - Portable tools

- Arc welding equipment, which is not professional equipment

Class C: - Lighting equipment

Class D: Equipment having a specified power less than or equal to 600w, of the following type:

- Personal computer and personal computer monitors
- Television receivers

Table 1 – Limits for Class A equipment

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
15 ≤ n ≤ 39	$0,5 \frac{250}{n}$
Even harmonics	
2	1,38
4	0,40
6	0,30
8 ≤ n ≤ 40	$0,25 \frac{250}{n}$

Table 2 – Limits for Class C equipment

Harmonic order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
11 ≤ n ≤ 39 (odd harmonics only)	3

* λ is the circuit power factor

Table 3 – Limits for Class D equipment

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3,4	2,30
5	1,9	1,14
7	1,0	0,77
9	0,5	0,40
11	0,35	0,33
13 ≤ n ≤ 39 (odd harmonics only)	$\frac{3,85}{n}$	See Table 1

Test Data

Please refer to following tables:

Standard used:	EN/IEC 61000-3-2 A14 (2000) Quasi-stationary Equipment class C
Observation time:	150s
Windows width:	10 periods - (EN/IEC 61000-4-7 Edition 2002)

FINAL

Average harmonic current results

Hn	I _{eff} [A]	I _{eff} [%]	Limit [%]	Result
1	116.779E-3	95.939		
2	714.590E-6	0.587	2.00	PASS
3	2.797E-3	2.298	29.99	PASS
4	957.811E-6	0.787		PASS
5	2.719E-3	2.234	10.00	PASS
6	689.705E-6	0.567		PASS
7	742.358E-6	0.610	7.00	PASS
8	670.901E-6	0.551		PASS
9	1.295E-3	1.064	5.00	PASS
10	654.038E-6	0.537		PASS
11	712.885E-6	0.586	3.00	PASS
12	635.309E-6	0.522		PASS
13	736.454E-6	0.605	3.00	PASS
14	1.161E-3	0.954		PASS
15	704.358E-6	0.579	3.00	PASS
16	664.944E-6	0.546		PASS
17	670.989E-6	0.551	3.00	PASS
18	1.109E-3	0.911		PASS
19	755.029E-6	0.620	3.00	PASS
20	671.714E-6	0.552		PASS
21	689.530E-6	0.566	4.50	PASS
22	679.025E-6	0.558		PASS
23	1.165E-3	0.957	4.50	PASS
24	680.062E-6	0.559		PASS
25	717.233E-6	0.589	4.50	PASS
26	661.897E-6	0.544		PASS
27	708.887E-6	0.582	4.50	PASS
28	1.070E-3	0.879		PASS
29	712.212E-6	0.585	4.50	PASS
30	653.719E-6	0.537		PASS
31	704.962E-6	0.579	4.50	PASS
32	1.046E-3	0.859		PASS
33	737.336E-6	0.606	4.50	PASS
34	655.437E-6	0.538		PASS
35	710.330E-6	0.584	4.50	PASS
36	706.206E-6	0.580		PASS
37	1.002E-3	0.823	4.50	PASS
38	673.068E-6	0.553		PASS
39	726.186E-6	0.597	4.50	PASS
40	674.647E-6	0.554		PASS

Maximum harmonic current results

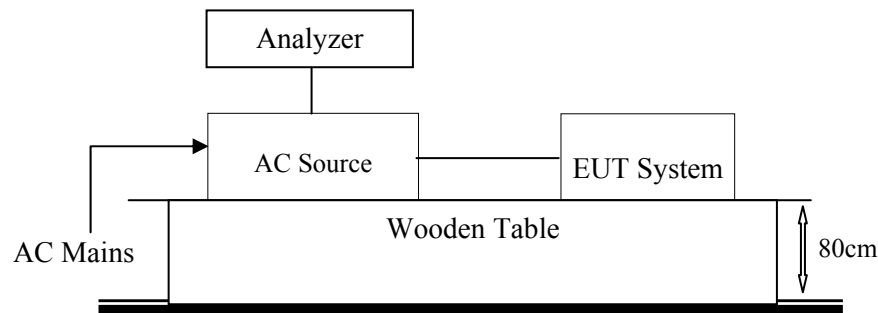
Hn	I _{eff} [A]	I _{eff} [%]	Limit [%]	Result
1	121.721E-3	100.000		
2	992.875E-6	0.816	3.00	PASS
3	4.345E-3	3.570	44.99	PASS
4	1.141E-3	0.937		PASS
5	3.132E-3	2.573	15.00	PASS
6	828.702E-6	0.681		PASS
7	899.894E-6	0.739	10.50	PASS
8	789.914E-6	0.649		PASS
9	1.487E-3	1.222	7.50	PASS
10	802.644E-6	0.659		PASS
11	903.608E-6	0.742	4.50	PASS
12	769.363E-6	0.632		PASS
13	893.966E-6	0.734	4.50	PASS
14	1.308E-3	1.074		PASS
15	873.743E-6	0.718	4.50	PASS
16	906.351E-6	0.745		PASS
17	828.274E-6	0.680	4.50	PASS
18	1.294E-3	1.063		PASS
19	941.018E-6	0.773	4.50	PASS
20	798.687E-6	0.656		PASS
21	848.431E-6	0.697	4.50	PASS
22	800.198E-6	0.657		PASS
23	1.322E-3	1.086	4.50	PASS
24	800.932E-6	0.658		PASS
25	802.539E-6	0.659	4.50	PASS
26	828.294E-6	0.680		PASS
27	810.725E-6	0.666	4.50	PASS
28	1.219E-3	1.002		PASS
29	828.446E-6	0.681	4.50	PASS
30	795.649E-6	0.654		PASS
31	864.560E-6	0.710	4.50	PASS
32	1.190E-3	0.978		PASS
33	887.909E-6	0.729	4.50	PASS
34	790.041E-6	0.649		PASS
35	818.052E-6	0.672	4.50	PASS
36	861.562E-6	0.708		PASS
37	1.123E-3	0.923	4.50	PASS
38	843.271E-6	0.693		PASS
39	877.325E-6	0.721	4.50	PASS
40	842.831E-6	0.692		PASS

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	239.33	104.057		
2	229.21E-3	0.100	0.2	PASS
3	459.84E-3	0.200	0.9	PASS
4	65.83E-3	0.029	0.2	PASS
5	49.10E-3	0.021	0.4	PASS
6	29.04E-3	0.013	0.2	PASS
7	26.86E-3	0.012	0.3	PASS
8	18.32E-3	0.008	0.2	PASS
9	14.43E-3	0.006	0.2	PASS
10	17.47E-3	0.008	0.2	PASS
11	21.12E-3	0.009	0.1	PASS
12	20.42E-3	0.009	0.1	PASS
13	17.46E-3	0.008	0.1	PASS
14	18.15E-3	0.008	0.1	PASS
15	11.52E-3	0.005	0.1	PASS
16	17.62E-3	0.008	0.1	PASS
17	14.23E-3	0.006	0.1	PASS
18	17.52E-3	0.008	0.1	PASS
19	14.63E-3	0.006	0.1	PASS
20	18.77E-3	0.008	0.1	PASS
21	12.34E-3	0.005	0.1	PASS
22	16.94E-3	0.007	0.1	PASS
23	12.71E-3	0.006	0.1	PASS
24	17.82E-3	0.008	0.1	PASS
25	10.82E-3	0.005	0.1	PASS
26	19.23E-3	0.008	0.1	PASS
27	14.34E-3	0.006	0.1	PASS
28	17.77E-3	0.008	0.1	PASS
29	15.03E-3	0.007	0.1	PASS
30	14.68E-3	0.006	0.1	PASS
31	16.09E-3	0.007	0.1	PASS
32	13.44E-3	0.006	0.1	PASS
33	15.44E-3	0.007	0.1	PASS
34	15.81E-3	0.007	0.1	PASS
35	16.09E-3	0.007	0.1	PASS
36	13.10E-3	0.006	0.1	PASS
37	14.87E-3	0.006	0.1	PASS
38	11.19E-3	0.005	0.1	PASS
39	15.41E-3	0.007	0.1	PASS
40	12.01E-3	0.005	0.1	PASS

12 – VOLTAGE FLUCTUATIONS AND FLICKER

Test System Setup



Test Standard

EN 61000-3-3:2013

Flicker Test Limits :

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A.

Tests made to prove compliance with the limits are considered to be type tests.

The following limits apply:

- the value of Pst shall not be greater than 1,0;
- the value of Plt shall not be greater than 0,65;
- the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3,3 %;
- the maximum relative voltage change dmax, shall not exceed

a) 4 % without additional conditions;

b) 6 % for equipment which is:

- switched manually, or
 - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0,65.

c) 7 % for equipment which is

- attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
- switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

In the case of equipment having several separately controlled circuits in accordance with 6.6, limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

Test Data

Please refer to following tables:

Short time (Pst): 10 min
 Observation time: 10 min (1 Flicker measurement)
 Test Mode: On
 Power Source: AC 240V/50Hz
 Test Result: PASS

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.178	1.00	PASS
Plt	0.178	0.65	PASS
dc [%]	0.005	3.30	PASS
dmax [%]	0.146	4.00	PASS
dt [s]	0.000	0.50	PASS

Test Setup Photo



EXHIBIT A – EUT PHOTOGRAPHS

1606



1608



1306



1308







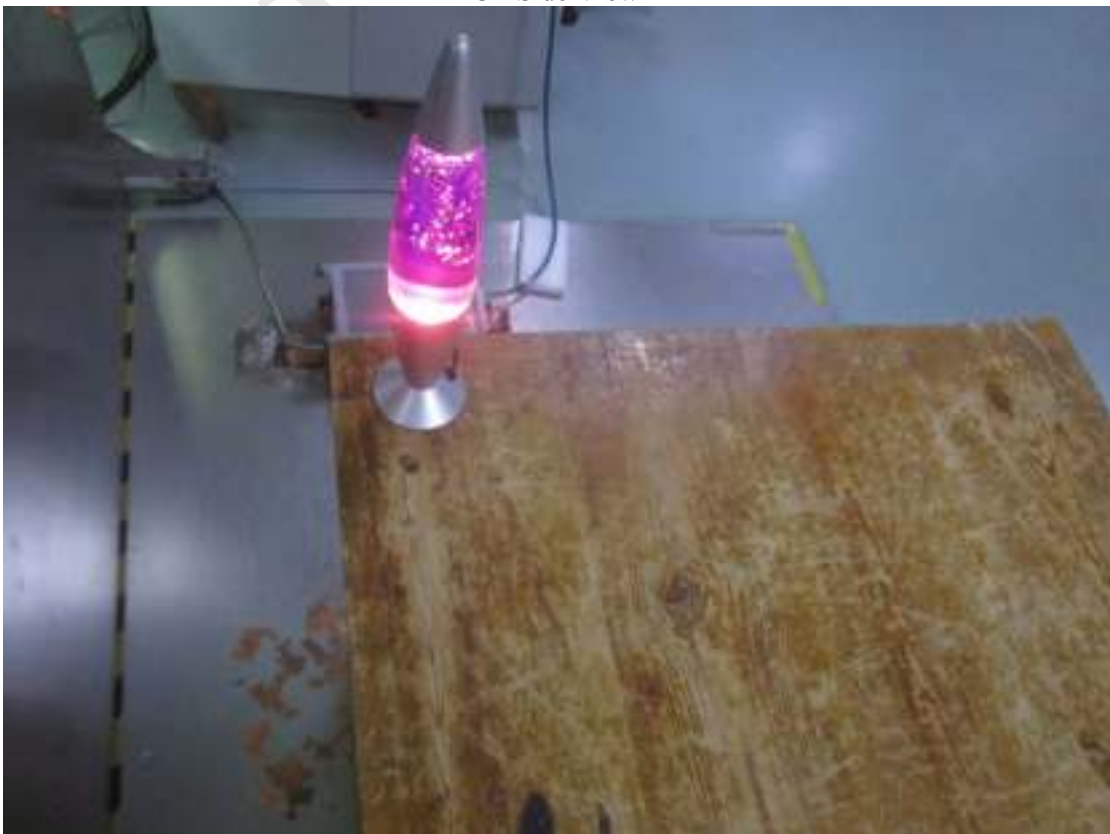
FEN

EXHIBIT B – TEST SETUP PHOTOGRAPHS

CE Front View



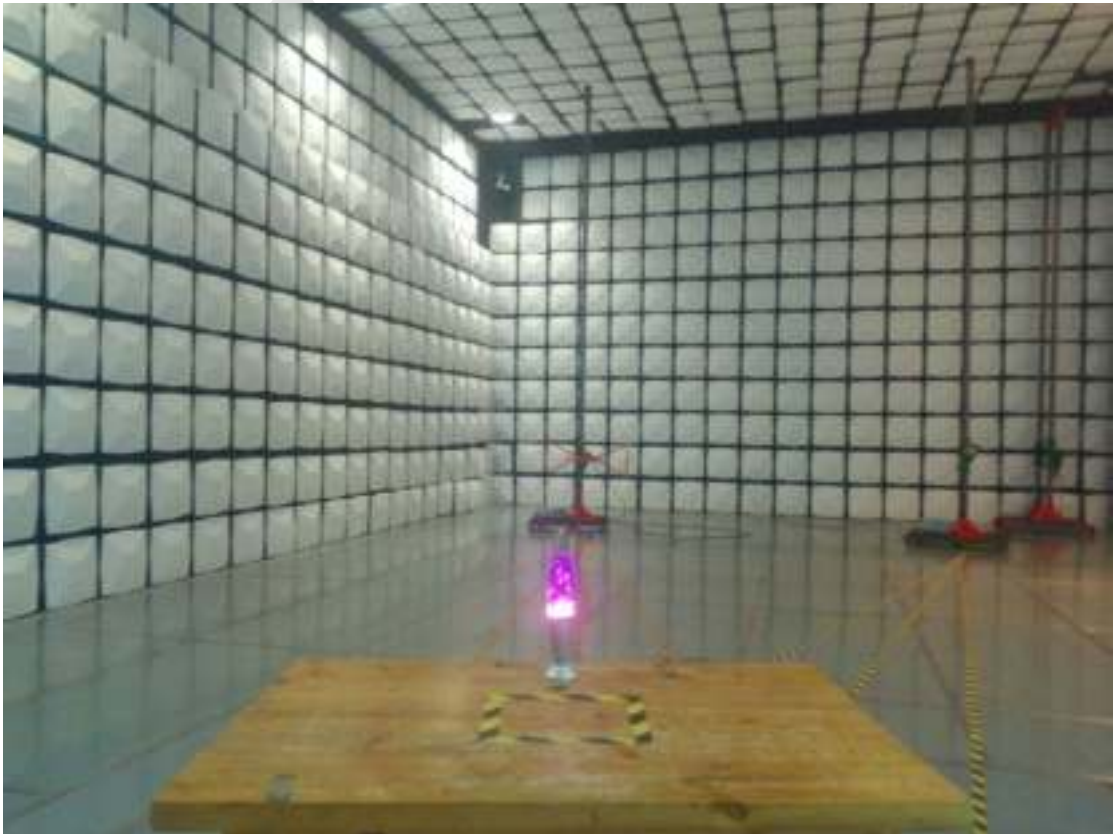
CE Side View



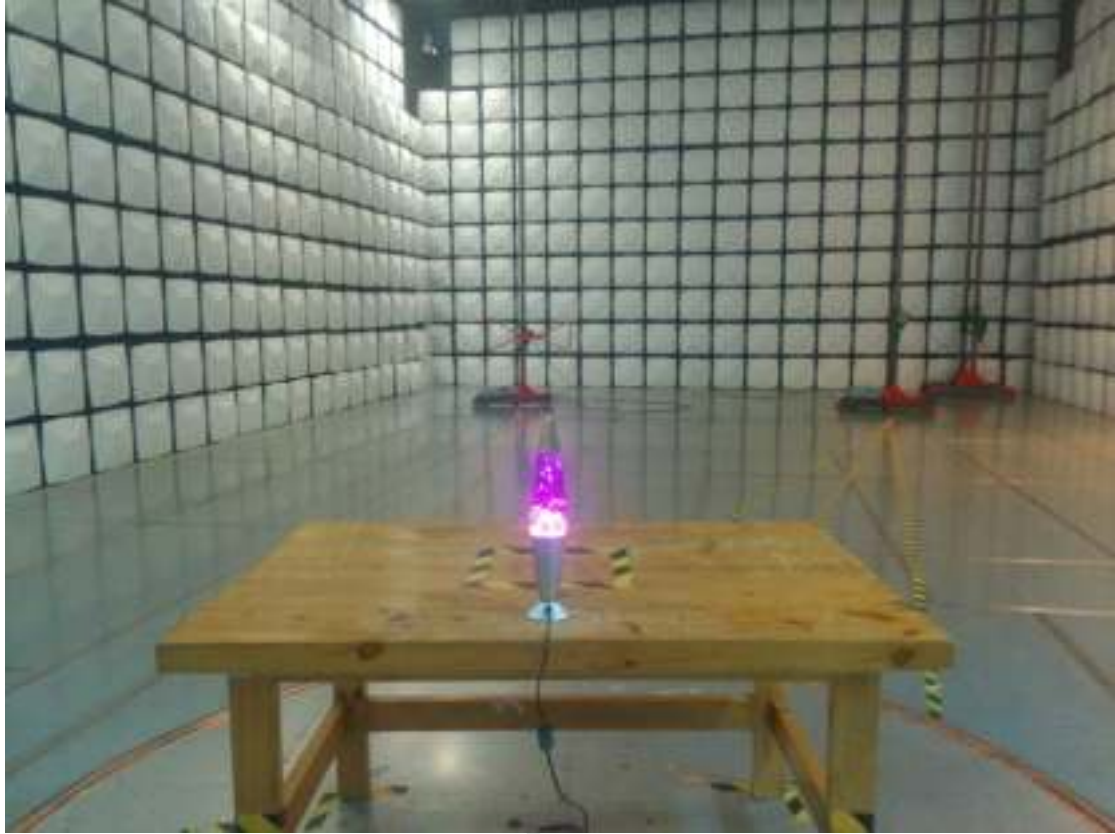
RE(Magnetic) View



RE Below 1G front View



RE Below 1G rear View



FEN

EXHIBIT C – DECLARATION LETTER

DongGuan City TianHua Photoelectric Technology Co., Ltd.

Declaration of Alteration

To Whom It May Concern,

We, DongGuan City TianHua Photoelectric Technology Co., Ltd., hereby declare that the products of these models are the same except the power, size and color, the details are as below:

Products Description	Name	Motion Lamp/Glitter Lamp		
	Brand			
	Project No.	RDG190404005		
Differences Description				
Model No.	Power	Size	Color	
1606	25W	16"	Red or purple	
1608	25W	16"	Blue or green	
1306	20W	13"	Red or purple	
1308	20W	13"	Blue or green	

Besides the differences in the table above, we declare the products are identical
 We guarantee all the information provided above is true, and notice that we'll bear all the consequences caused by any false information or concealing

Best Regards,

Signature: _____
 Print Name: _____
 Title: _____



*******END OF REPORT*******