



# TEST REPORT

**Reference No.**..... : WTU21U03018622E  
**Applicant**..... : LUMATEK LTD.  
**Address**..... : Ewropa Business centre Level 3 - 701 Dun Karm Street  
Birkirkara BKR 9034 MALTA  
**Manufacturer** ..... : LUMATEK LTD.  
**Address**..... : Ewropa Business centre Level 3 - 701 Dun Karm Street  
Birkirkara BKR 9034 MALTA  
**Product Name** ..... : HID Luminaires  
**Model No.**..... : LUMFK011(Lumatek Utopia 630W/600W CMH/HPS DE Fixture)  
**Standards** ..... : EN IEC 55015:2019  
EN 61547:2009  
EN IEC 61000-3-2:2019  
EN 61000-3-3:2013+A1:2019  
**Date of Receipt sample** .... : 2020-12-10  
**Date of Test** ..... : 2020-12-11 to 2020-12-16  
**Date of Issue** ..... : 2021-04-12  
**Test Report Form No.**..... : WEL-55015A-02A  
**Test Result** ..... : **Pass**

**Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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## 1 Test Summary

EMISSION			
Test Item	Test Standard	Class / Severity	Result
Mains Terminal Disturbance Voltage, 9kHz to 30MHz	EN IEC 55015:2019	Clause 4.3.1	Pass
Radiated electromagnetic disturbance, 9kHz to 30MHz	EN IEC 55015:2019	Clause 4.5.2	Pass
Radiated Emission, 30MHz to 1000MHz	EN IEC 55015:2019	Clause 4.5.3	Pass
Harmonic Current emission	EN IEC 61000-3-2:2019	Clause 7	Pass
Voltage Fluctuation and Flicker	EN 61000-3-3:2013+A1:2019	Clause 5	Pass
IMMUNITY (EN 61547:2009)			
Test Item	Test Method	Performance Criteria	Result
Electrostatic Discharge(ESD)	IEC 61000-4-2:2008	B	Pass
Radio-frequency electromagnetic fields (80MHz to 1GHz)	IEC 61000-4-3:2006+A1:2007	A	Pass
Electrical Fast Transients (EFT)	IEC 61000-4-4:2004	B	Pass
Surge	IEC 61000-4-5:2005	C	Pass
Injected Currents, 0.15MHz to 80MHz	IEC 61000-4-6:2008	A	Pass
Power-frequency magnetic field	IEC 61000-4-8:1993+A1:2000	A	N/A
Voltage Dips	IEC 61000-4-11:2004	C	Pass
Voltage short interruptions		B	Pass

Remark:

Pass

Test item meets the requirement

Fail

Test item does not meet the requirement

N/A

Test case does not apply to the test object





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### 3 General Information

#### 3.1 General Description of E.U.T.

<b>Product Name</b> .....	:	HID Luminaires
<b>Model No.</b> .....	:	LUMFK011(Lumatek Utopia 630W/600W CMH/HPS DE Fixture)
<b>Protection Class</b> .....	:	Class I
<b>Remark</b> .....	:	<ol style="list-style-type: none"><li>1. The EUT (equipment under test) is an ordinary HID Luminaires for Lighting and similar use. For the further information, refer to the user's manual.</li><li>2. In electrical characteristics, all models are same circuit principle and PCB layout, except for appearance.For details information, refer to the section 3.2.</li><li>3. For the test results, the EUT had been tested with the rated input range. But only the worst case was shown in test report.</li><li>4. The derived report is based on original report 错误!未找到引用源。 which is prepared by Waltek Testing Group (Ningbo) Co., Ltd. to change applicant、 manufacturer and model No.</li></ol>

#### 3.2 Description of Support Units

The EUT has been tested as an independent unit. LUMFK011 is the tested sample. All tests were performed in the condition of 230V~, 50Hz input.

#### 3.3 Standards Applicable for Testing

The tests were performed according to following standards:

EN IEC 55015:2019	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 IEC 61000-3-2:2019	Electromagnetic compatibility (EMC) Part 3-2: Limits — Limits for harmonic current emissions (equipment input current $\leq$ 16 A per phase).
EN 61000-3-3:2013+A1:2019	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.

#### 3.4 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

Yes       No

If Yes, list the related test items and lab information:

Test items: Radio-frequency electromagnetic fields (80MHz to 1GHz)

Lab information: Waltek Services (Foshan) Co., Ltd.

Waltek Testing Group (Suzhou) Co., Ltd.

<http://www.waltek.com.cn>



### 3.5 Abnormalities from Standard Conditions

None.

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#### 4 Equipment Used during Test

<b>Mains Terminal Disturbance Voltage (Conducted Emission)</b>					
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Status</b>
1	EMI Test Receiver	R&S	ESCI	101406	Valid
2	TWO-LINE V-NETWORK	R&S	ENV216	101208	Valid
<b>Radiated electromagnetic disturbance(9kHz to 30MHz)</b>					
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Status</b>
1	EMI Test Receiver	R&S	ESCI	101406	Valid
2	3-dimensional large loop antenna	SCHWARZBECK	HXYZ9170	256	Valid
<b>3m Semi-anechoic Chamber for Radiated Emission</b>					
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Status</b>
1	EMI Test Receiver	R&S	ESR7	101777	Valid
2	TRILOG Biconic logarithmic periodic broadband antenna	SCHWARZBECK	VULB9163	01025	Valid
3	coupling-Decoupling Network	SCHWARZBECK	CDNE M3	00081	Valid
4	coupling-Decoupling Network	SCHWARZBECK	CDNE M2	00093	Valid
<b>Harmonics and Flicker Measuring System</b>					
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Status</b>
1	Harmonics /Flicker Analyzer	KIKUSUI	KHA1000	TL002966	Valid
2	line Power Supply	KIKUSUI	PCR4000LE	TL003094	Valid
3	Line Impedance Network	KIKUSUI	LIN40MA-PCR-LE	TM001297	Valid
<b>ESD</b>					
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Status</b>
1	electrostatic discharge generator	TESEQ	NSG437	699	Valid
<b>Radio-frequency electromagnetic fields</b>					
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Status</b>
1	RF Power Amplifier	OPHIR	5225R	1051/1712	Valid
2	RF Power Amplifier	OPHIR	5293RE	1051/171	Valid
3	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP9128E-SPECIAL	142	Valid
4	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP 9149	476	Valid



5	RF signal generator	Agilent	N5181A	MY48080720	Valid
6	Power meter	RS	NRP6A	101133	Valid
7	Power meter	RS	NRP6A	101134	Valid
8	Electric field probe	Narda	EP 601	611WX70311	Valid
<b>EFT &amp; Voltage Dips and Interruptions</b>					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	Multifunction Generator Systems	TESEQ	NSG3040	2094	Valid
2	Single way manual Step regulator	TESEQ	INA 6501	243	Valid
<b>Surge</b>					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	Multifunction Generator Systems	TESEQ	NSG3060	1654	Valid
2	coupling-Decoupling Network	TESEQ	CDN3061	1485	Valid
<b>Injected Currents</b>					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	Test System for Conducted and Radiated Immunity	TESEQ	NSG4070	37519	Valid
2	Coupling and Decoupling Network	TESEQ	CDN M016	37358	Valid
3	Attenuator	TESEQ	ATN6075	36917	Valid

#### 4.1 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Mains Terminal Disturbance Voltage	9kHz~30MHz	±2.66dB	(1)
Radiated electromagnetic disturbance	9kHz ~30MHz	±3.00dB	(1)
Radiated Emission	30MHz~1GHz	±5.03dB	(1)

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





## 5 Emission Test Results

### 5.1 Mains Terminals Disturbance Voltage, 9kHz to 30MHz

Test Requirement.....	: EN IEC 55015
Test Method.....	: CIPR 16-2-1 and Clause 8.3 of EN IEC 55015
Test Result.....	: Pass
Frequency Range.....	: 9kHz to 30MHz
Class/Severity.....	: Table 1 of EN IEC 55015

#### 5.1.1 E.U.T. Operation

##### Operating Environment:

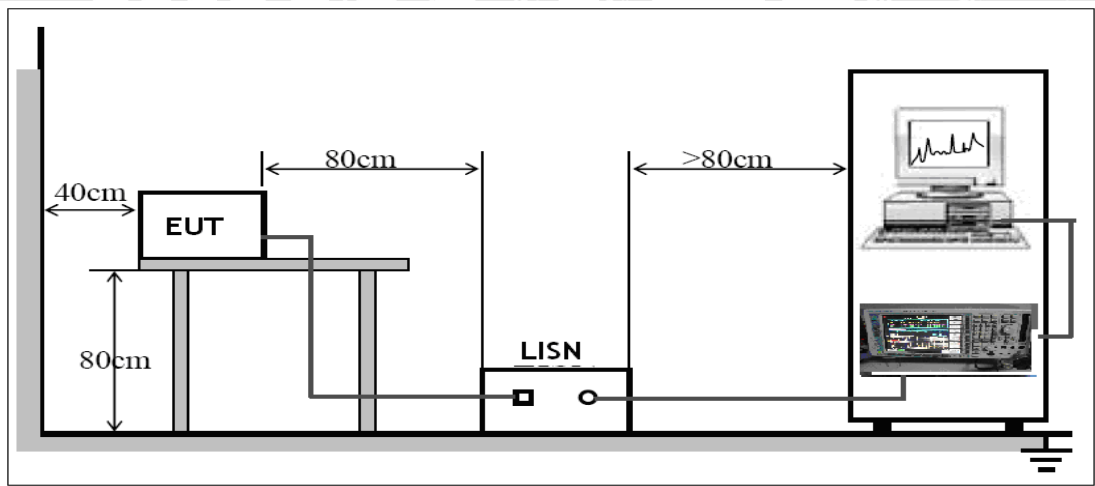
Temperature.....	: 20.7°C
Humidity.....	: 52%RH

##### EUT Operation:

Input Voltage.....	: 230V~, 50Hz
Operating Mode.....	: On mode

#### 5.1.2 Block Diagram of Test Setup

The Mains Terminals Disturbance Voltage tests were performed in accordance with the EN IEC 55015.



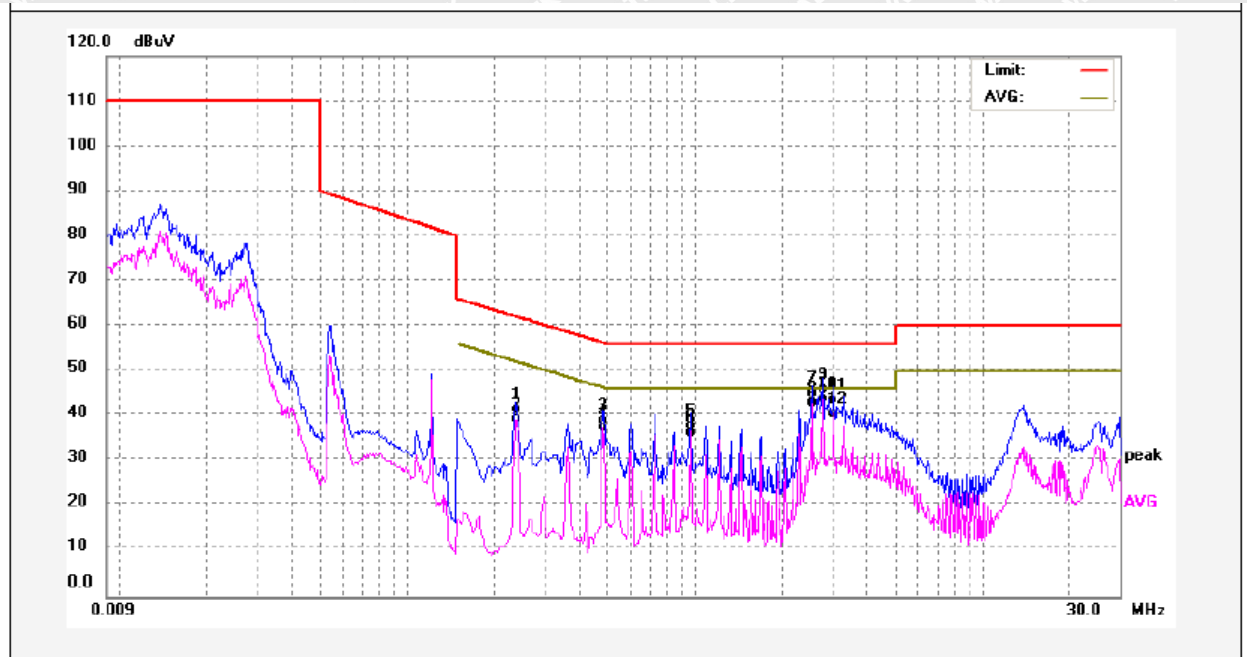
#### 5.1.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.



### 5.1.4 Mains Terminals Disturbance Voltage Test Data

#### Live Line

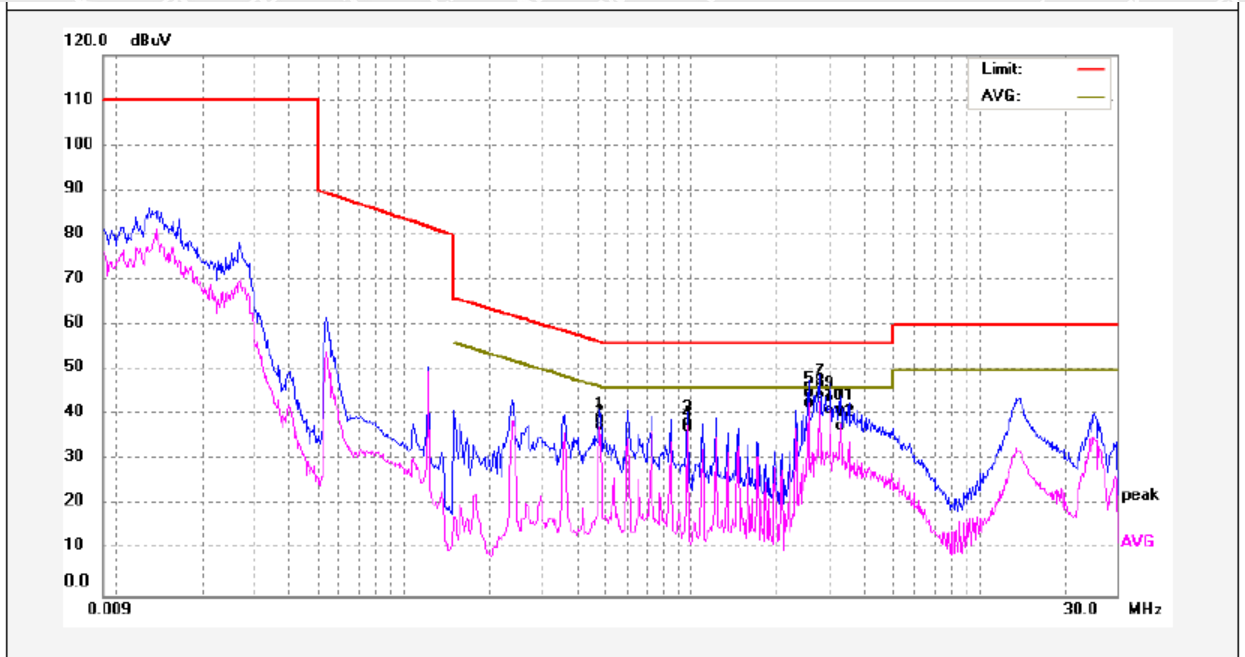


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2443	31.78	9.63	41.41	61.95	-20.54	QP	
2	0.2443	29.95	9.63	39.58	51.95	-12.37	AVG	
3	0.4863	29.65	9.63	39.28	56.23	-16.95	QP	
4	0.4863	27.96	9.63	37.59	46.23	-8.64	AVG	
5	0.9747	28.16	9.67	37.83	56.00	-18.17	QP	
6	0.9747	26.81	9.67	36.48	46.00	-9.52	AVG	
7	2.5570	35.32	9.72	45.04	56.00	-10.96	QP	
8	2.5570	33.27	9.72	42.99	46.00	-3.01	AVG	
9	2.8000	36.40	9.73	46.13	56.00	-9.87	QP	
10	2.8000	34.11	9.73	43.84	46.00	-2.16	AVG	
11	3.0430	33.87	9.73	43.60	56.00	-12.40	QP	
12	3.0430	30.89	9.73	40.62	46.00	-5.38	AVG	





Neutral Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.4864	29.50	9.63	39.13	56.23	-17.10	QP	
2	0.4864	28.09	9.63	37.72	46.23	-8.51	AVG	
3	0.9730	28.92	9.67	38.59	56.00	-17.41	QP	
4	0.9730	27.74	9.67	37.41	46.00	-8.59	AVG	
5	2.5560	34.98	9.72	44.70	56.00	-11.30	QP	
6	2.5560	33.08	9.72	42.80	46.00	-3.20	AVG	
7	2.7981	36.84	9.73	46.57	56.00	-9.43	QP	
8	2.7981	34.79	9.73	44.52	46.00	-1.48	AVG	
9	3.0420	34.25	9.73	43.98	56.00	-12.02	QP	
10	3.0420	31.54	9.73	41.27	46.00	-4.73	AVG	
11	3.2860	31.44	9.74	41.18	56.00	-14.82	QP	
12	3.2860	27.84	9.74	37.58	46.00	-8.42	AVG	



## 5.2 Radiated Electromagnetic Disturbance, 9kHz to 30MHz

Test Requirement.....	:	EN IEC 55015
Test Method.....	:	CISPR 16-2-3 and Clause 9.3.2 of EN IEC 55015
Test Result.....	:	Pass
Frequency Range.....	:	9kHz to 30MHz
Class/Severity.....	:	Table 7 and Table 8 of EN IEC 55015

### 5.2.1 E.U.T. Operation

#### Operating Environment:

Temperature..... : 20.7°C

Humidity..... : 52%RH

#### EUT Operation:

Input Voltage..... : 230V~, 50Hz

Operating Mode..... : On mode

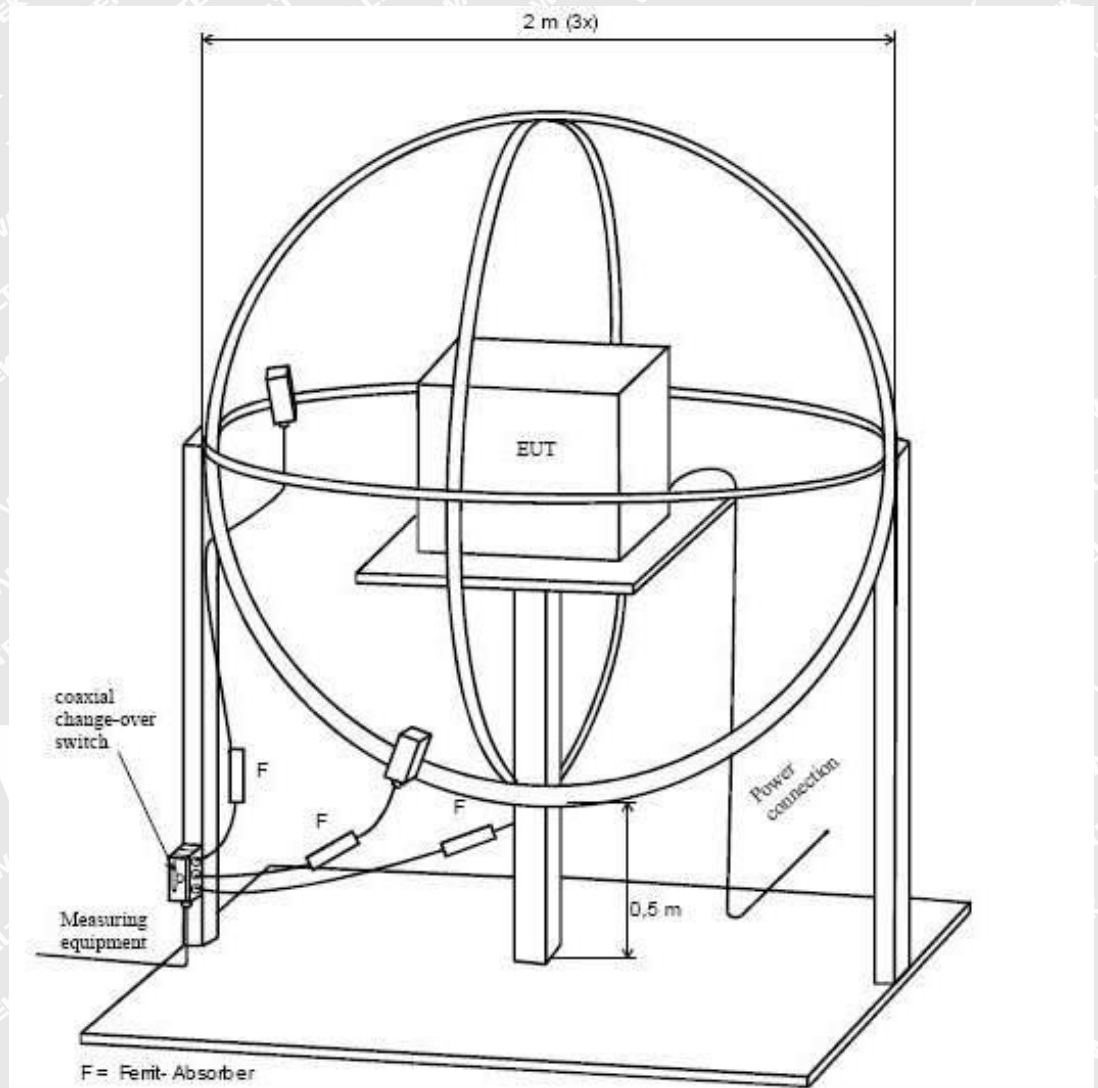
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### 5.2.2 Block Diagram of Test Setup

The Radiated Electromagnetic Disturbance (9kHz to 30MHz) test was performed in accordance with the EN IEC 55015.



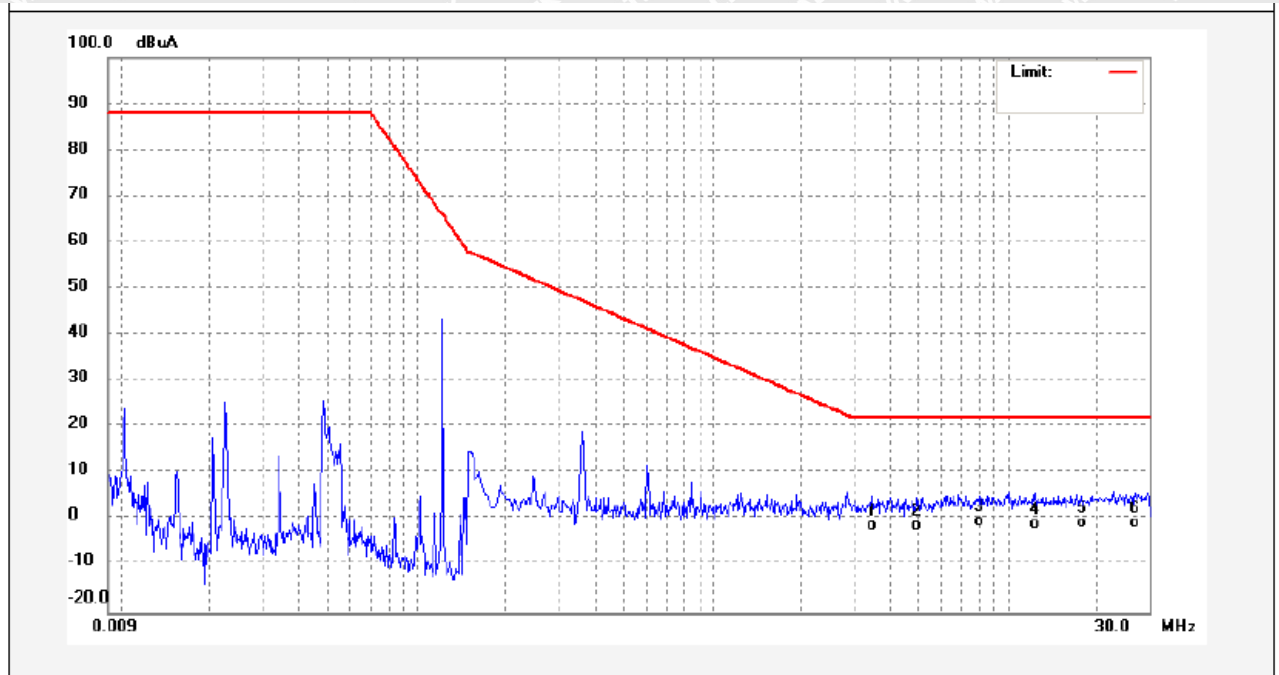
### 5.2.3 Measurement Data

According to the data in section 5.2.4, the EUT complied with the EN IEC 55015 standards.



**5.2.4 Radiated Electromagnetic Disturbance test data, 9kHz to 30MHz**

Loop X

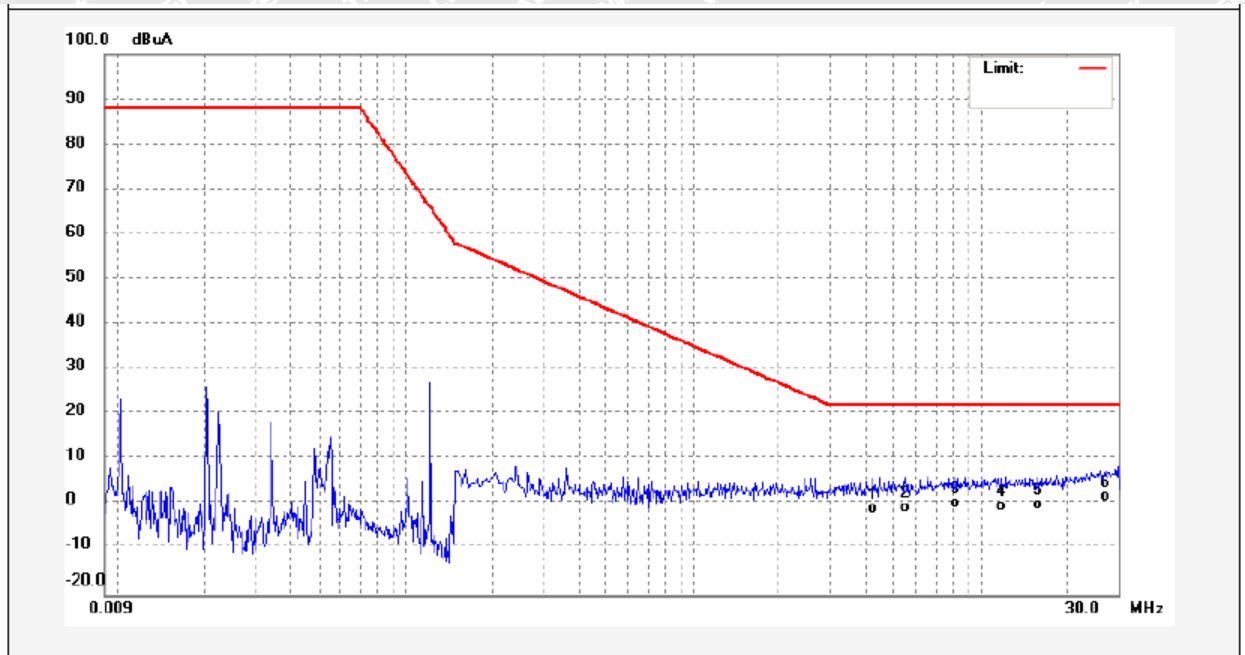


No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.4821	-34.77	33.59	-1.18	22.00	-23.18	QP	
2	4.9381	-34.88	33.65	-1.23	22.00	-23.23	QP	
3	8.0461	-34.07	33.69	-0.38	22.00	-22.38	QP	
4	12.3661	-34.90	33.89	-1.01	22.00	-23.01	QP	
5	17.7141	-34.50	33.99	-0.51	22.00	-22.51	QP	
6	26.9301	-34.40	33.73	-0.67	22.00	-22.67	QP	





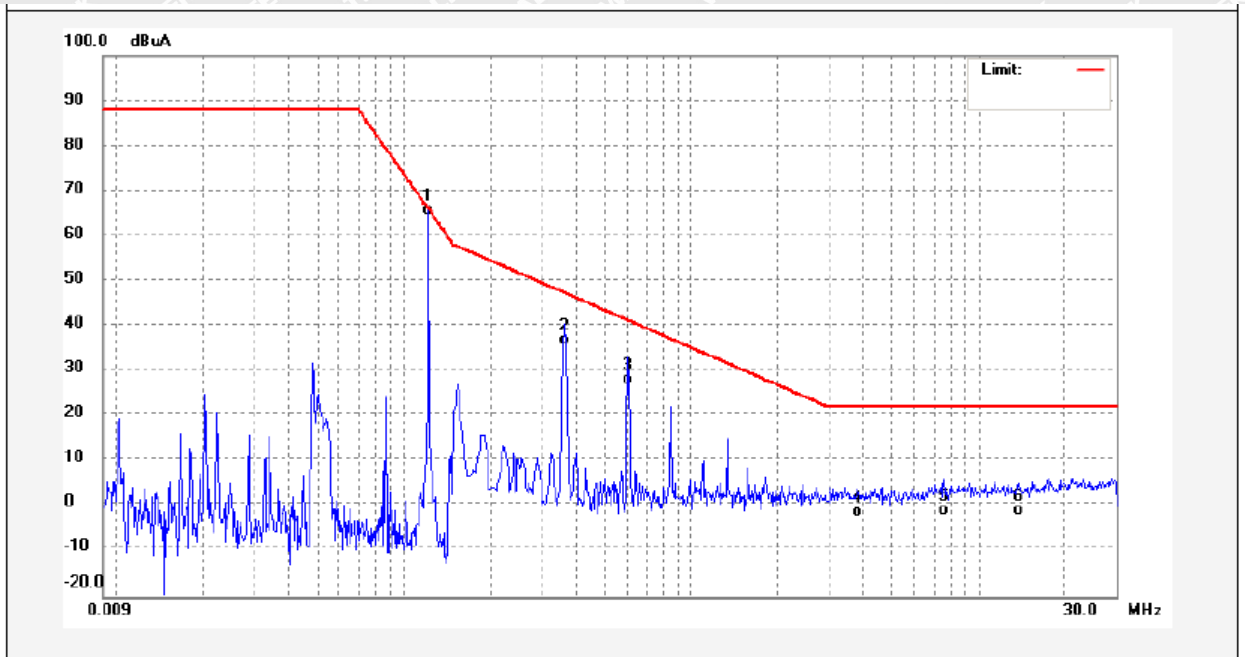
## Loop Y



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	4.2421	-34.89	34.09	-0.80	22.00	-22.80	QP	
2	5.4741	-35.01	34.26	-0.75	22.00	-22.75	QP	
3	8.1821	-34.08	34.21	0.13	22.00	-21.87	QP	
4	11.7141	-34.73	34.52	-0.21	22.00	-22.21	QP	
5	15.8221	-34.87	34.93	0.06	22.00	-21.94	QP	
6	27.1181	-34.46	36.23	1.77	22.00	-20.23	QP	



Loop Z



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	0.1219	32.18	33.59	65.77	66.15	-0.38	QP	
2	0.3621	3.42	33.39	36.81	47.40	-10.59	QP	
3	0.6060	-5.18	33.38	28.20	41.22	-13.02	QP	
4	3.8101	-34.72	33.57	-1.15	22.00	-23.15	QP	
5	7.6021	-34.47	33.62	-0.85	22.00	-22.85	QP	
6	13.7661	-34.93	34.07	-0.86	22.00	-22.86	QP	



### 5.3 Radiated Emission, 30MHz to 1GHz

Test Requirement.....	: EN IEC 55015
Test Method.....	: CISPR 16-2-3
Test Result.....	: Pass
Frequency Range.....	: 30MHz to 1GHz
Class/Severity.....	: Table 10 of EN IEC 55015

#### 5.3.1 E.U.T. Operation

##### Operating Environment:

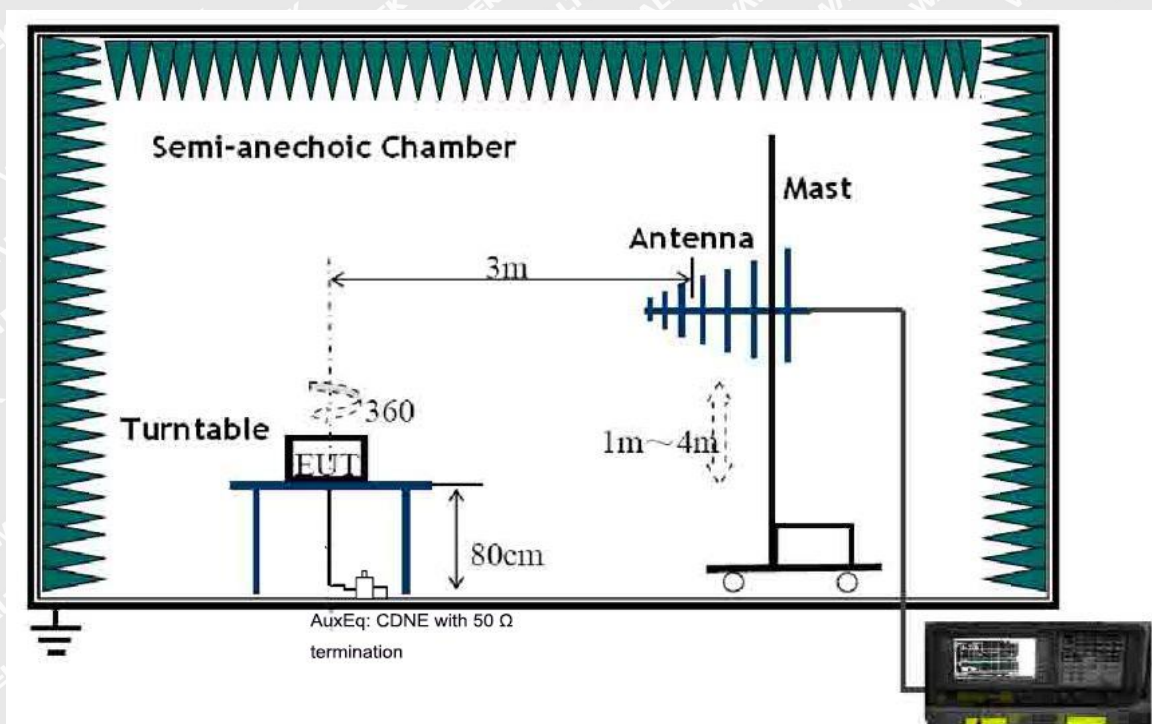
Temperature.....	: 21.5°C
Humidity.....	: 53%RH

##### EUT Operation :

Input Voltage.....	: 230V~, 50Hz
Operating Mode.....	: On mode

#### 5.3.2 Block Diagram of Setup

The Radiated Emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the CISPR 16-2-3.



#### 5.3.3 Measurement Data

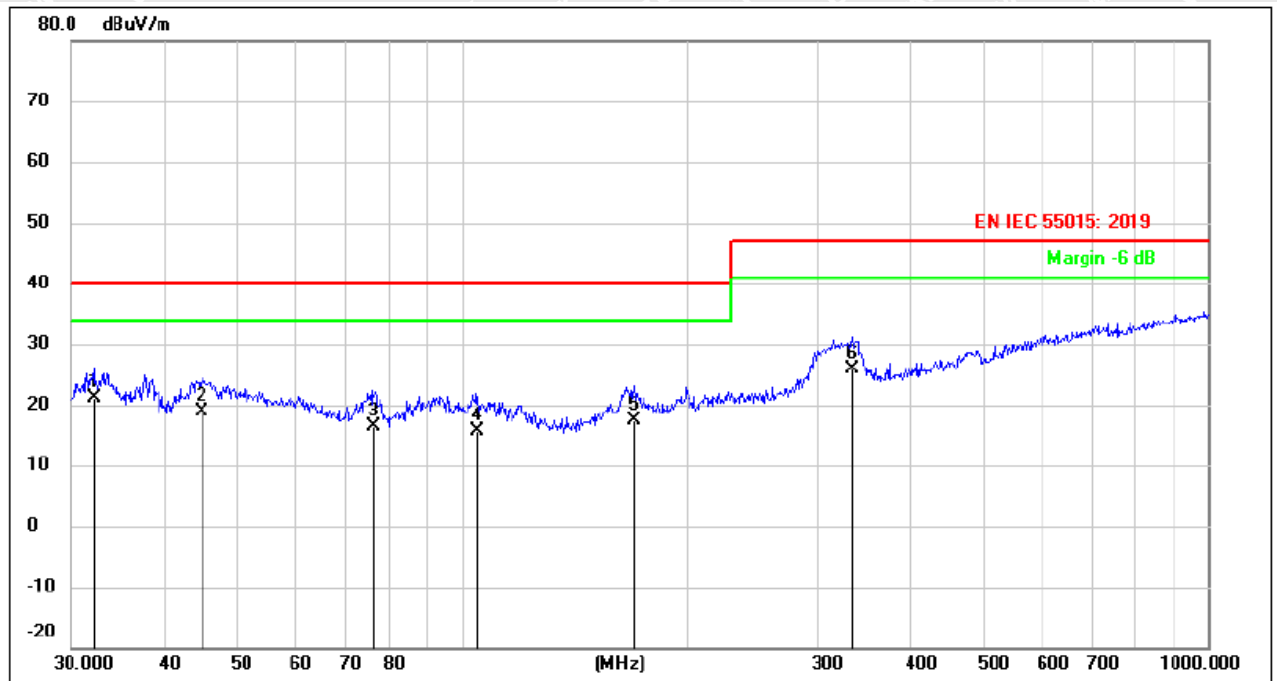
The maximised peak emissions from the EUT was scanned and measured for Horizontal & Vertical polarisation. Quasi-peak measurements were performed if peak emissions were within 6dB of the limit line. According to the data in section 5.3.4, the EUT complied with the EN IEC 55015 standards.





### 5.3.4 Radiated Emission test data,30MHz to 1GHz

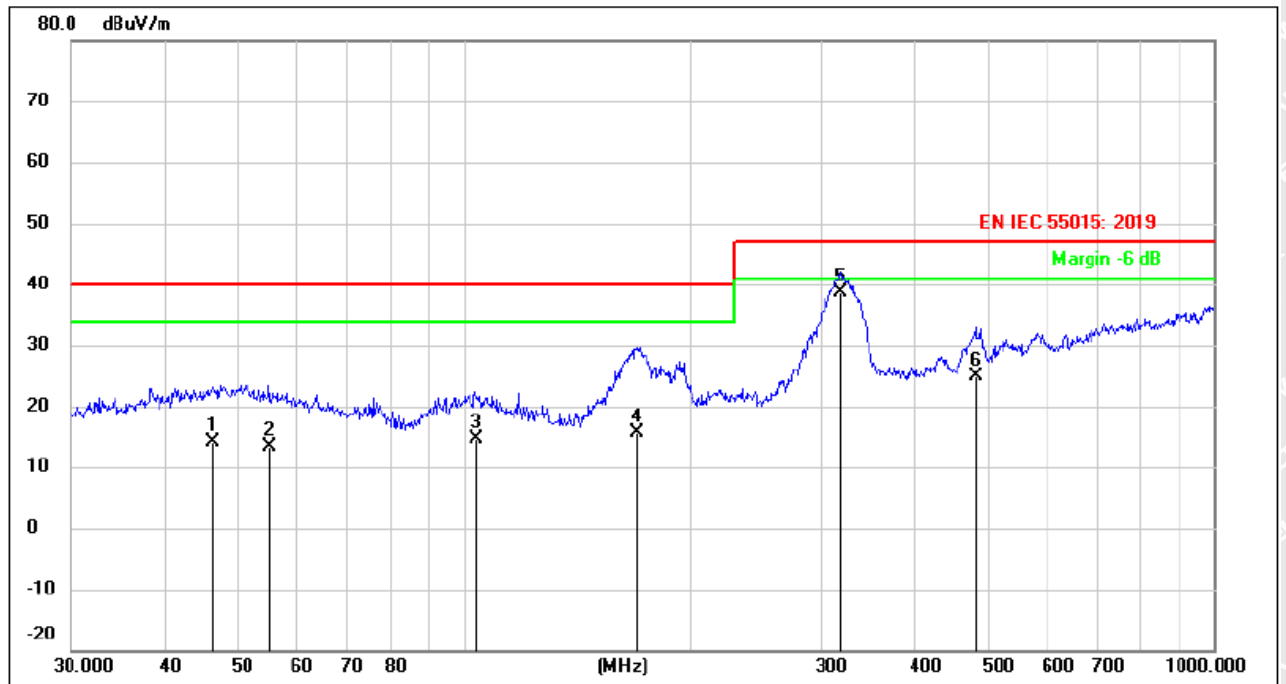
Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	32.1795	10.27	10.93	21.20	40.00	-18.80	QP
2	44.9006	5.36	13.60	18.96	40.00	-21.04	QP
3	75.9773	7.99	8.38	16.37	40.00	-23.63	QP
4	104.9033	3.93	11.59	15.52	40.00	-24.48	QP
5	170.1948	8.69	8.79	17.48	40.00	-22.52	QP
6	333.6867	11.23	14.73	25.96	47.00	-21.04	QP



Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	46.5030	-0.21	14.39	14.18	40.00	-25.82	QP
2	55.0274	-0.57	13.93	13.36	40.00	-26.64	QP
3	103.8054	2.13	12.59	14.72	40.00	-25.28	QP
4	170.1947	6.91	8.75	15.66	40.00	-24.34	QP
5	318.8170	23.36	15.37	38.73	47.00	-8.27	QP
6	482.2155	6.24	18.75	24.99	47.00	-22.01	QP



## 5.4 Harmonics Current Emission

Test Requirement..... : EN IEC 61000-3-2

Test Method..... : EN IEC 61000-3-2

Test Result..... : Pass

Class/Severity..... : Class C

### 5.4.1 E.U.T. Operation

#### Operating Environment:

Temperature ..... : 23.8°C

Humidity..... : 43.6%RH

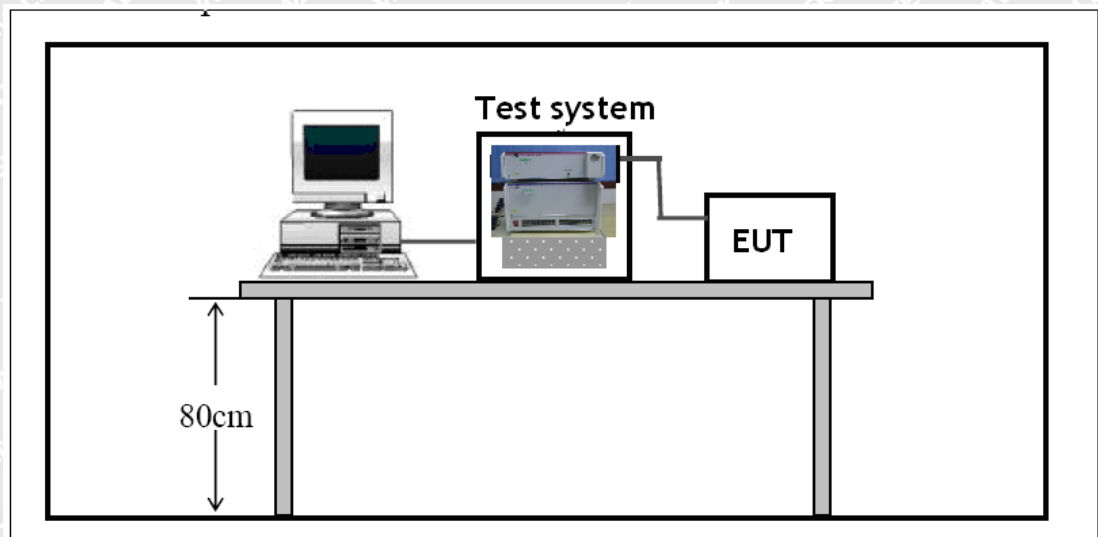
#### EUT Operation:

Input Voltage ..... : 230V~, 50Hz

Operating Mode..... : On mode

### 5.4.2 Block Diagram of Setup

The Harmonics Current emission test was performed in accordance with the EN IEC 61000-3-2.







### 5.4.3 Harmonic Current Emission Test Data

Final Test Result	<b>Pass</b>	Tobs	Quasi-Stationary
Voltage	230.00 V	THC	0.2672 A
Current	2.8897 A	POHC/Limit	0.0101 A / 0.2729 A *3
Power	655.80 W	Nominal	230 V / 50 Hz
Power Factor	0.9867	Fundamental Current	2.8771 A
Apparent Power	664.7 VA	Measuring Period	150 s
THD (max)	9.29 %	Margin	100 %

Order	Limit1(A rms)	Limit2(A rms)	Ave(A rms)	Max(A rms)	Judge
1	----	----	2.8763	2.8771	N/A
2	0.0575	0.0863	0.0009	0.0011	N/A
3	0.8516	1.2774	0.2391	0.2394	Pass
4	----	----	0.0009	0.0011	N/A
5	0.2877	0.4316	0.0851	0.0852	Pass
6	----	----	0.0009	0.0010	N/A
7	0.2014	0.3021	0.0552	0.0557	Pass
8	----	----	0.0011	0.0013	N/A
9	0.1439	0.2158	0.0418	0.0421	Pass
10	----	----	0.0012	0.0015	N/A
11	0.0863	0.1295	0.0306	0.0309	Pass
12	----	----	0.0013	0.0015	N/A
13	0.0863	0.1295	0.0230	0.0234	Pass
14	----	----	0.0012	0.0015	N/A
15	0.0863	0.1295	0.0172	0.0175	Pass
16	----	----	0.0011	0.0013	N/A
17	0.0863	0.1295	0.0114	0.0117	N/A
18	----	----	0.0011	0.0013	N/A
19	0.0863	0.1295	0.0089	0.0091	N/A
20	----	----	0.0012	0.0014	N/A
21	0.1295	0.1295	0.0052	0.0055	N/A
22	----	----	0.0012	0.0013	N/A
23	0.1295	0.1295	0.0025	0.0031	N/A
24	----	----	0.0010	0.0011	N/A
25	0.1295	0.1295	0.0024	0.0027	N/A
26	----	----	0.0009	0.0010	N/A
27	0.1295	0.1295	0.0014	0.0020	N/A
28	----	----	0.0008	0.0010	N/A
29	0.1295	0.1295	0.0021	0.0022	N/A
30	----	----	0.0011	0.0012	N/A
31	0.1295	0.1295	0.0020	0.0023	N/A
32	----	----	0.0012	0.0014	N/A
33	0.1295	0.1295	0.0029	0.0033	N/A
34	----	----	0.0010	0.0012	N/A
35	0.1295	0.1295	0.0036	0.0038	N/A
36	----	----	0.0007	0.0009	N/A
37	0.1295	0.1295	0.0034	0.0036	N/A
38	----	----	0.0009	0.0010	N/A
39	0.1295	0.1295	0.0026	0.0029	N/A
40	----	----	0.0012	0.0014	N/A

N/A : Not Apply



## 5.5 Voltage Fluctuation and Flicker

Test Requirement ..... : EN 61000-3-3  
 Test Method ..... : EN 61000-3-3  
 Test Result ..... : Pass

### 5.5.1 E.U.T. Operation

#### Operating Environment:

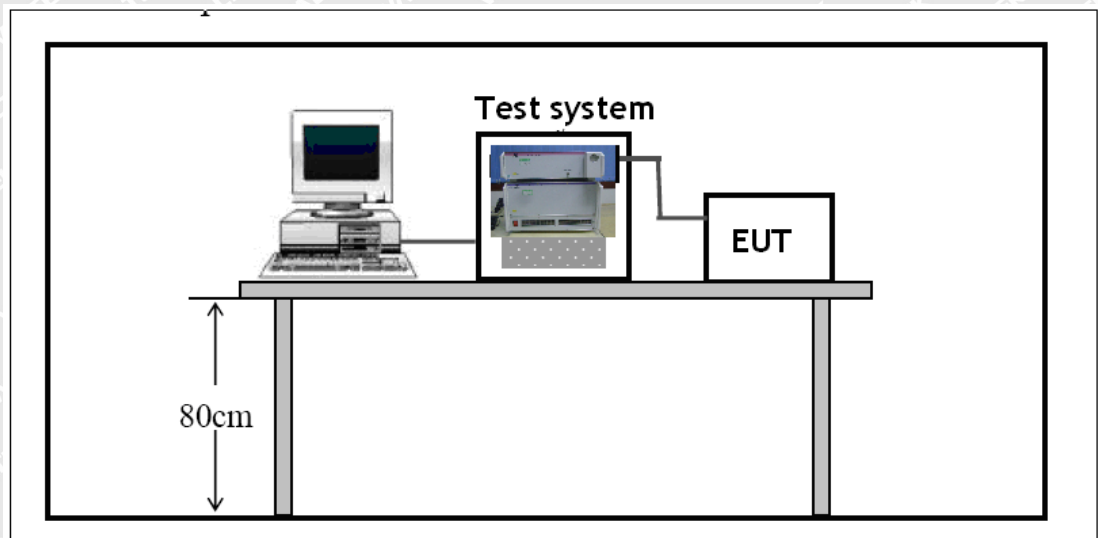
Temperature ..... : 23.8°C  
 Humidity ..... : 43.6%RH

#### EUT Operation:

Input Voltage ..... : 230V~, 50Hz  
 Operating Mode ..... : On mode

### 5.5.2 Block Diagram of Setup

The Harmonics test was performed in accordance with the EN 61000-3-3.



### 5.5.3 Voltage Fluctuation and Flicker Test Data

	$d_c$ (%)	$d_{max}$ (%)	$T_{max}$ (ms)	$P_{st}$	$P_{lt}$
<b>Limits</b>	3.3	4	500ms	N/A	N/A
<b>Result</b>	0.000	0.035	0	N/A	N/A



## 6 Immunity Test Results

### 6.1 Performance Criteria

**Performance criterion A:** During the test, no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

**Performance criterion B:** During the test, the luminous intensity may change to any value. After the test, the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test, the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

**Performance criterion C:** During and after the test, any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal, if necessary by temporary interruption of the mains supply and/or operating the regulating control.

### 6.2 Electrostatic Discharge (ESD)

<b>Test Requirement</b> .....	:	EN 61547
<b>Test Method</b> .....	:	IEC 61000-4-2
<b>Test Result</b> .....	:	Pass
<b>Discharge Impedance</b> .....	:	330Ω / 150pF
<b>Discharge Voltage</b> .....	:	Air Discharge: ±8kV Contact Discharge: ±4kV HCP & VCP: ±4kV
<b>Polarity</b> .....	:	Positive & Negative
<b>Number of Discharge</b> .....	:	Minimum 10 times at each test point
<b>Discharge Mode</b> .....	:	Single Discharge
<b>Discharge Period</b> .....	:	1 second minimum

#### 6.2.1 E.U.T. Operation

##### Operating Environment:

<b>Temperature</b> .....	:	22.6°C
<b>Humidity</b> .....	:	51.8%RH
<b>Barometric Pressure</b> .....	:	100.3kPa

##### EUT Operation:

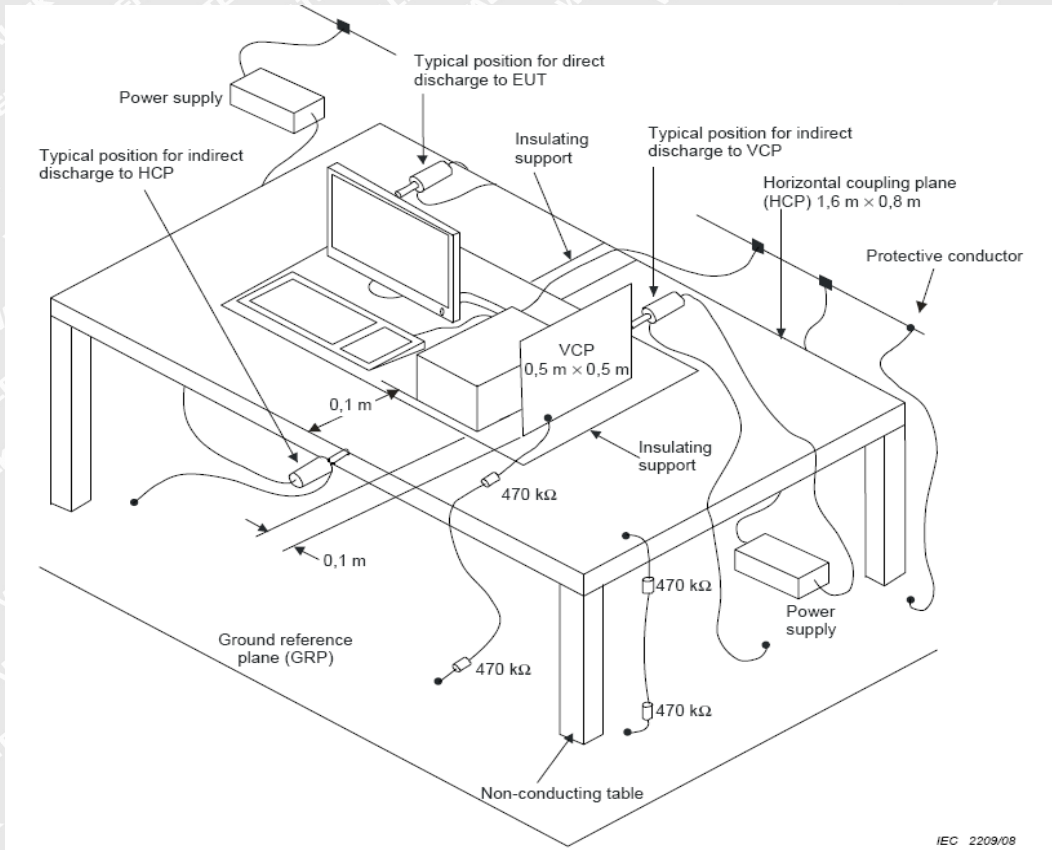
<b>Input Voltage</b> .....	:	230V~, 50Hz
<b>Operating Mode</b> .....	:	On mode





### 6.2.2 Block Diagram of Setup

The ESD test was performed in accordance with the IEC 61000-4-2.



### 6.2.3 Direct Discharge Test Results

Observations:      Test points:      1. All Exposed Surface & Seams;  
 2. All metallic part

Direct Discharge			Test Results		
Applied Voltage (kV)	Performance Criterion	Test Point	Contact Discharge	Air Discharge	Actual performance
±8	B	1	N/A	Pass*	A
±4	B	2	Pass*	N/A	A

Remark:

\* During the test no deviation was detected to the selected operation mode(s)



## 6.2.4 Indirect Discharge Test Results

Observations: Test points: 1. All sides.

Indirect Discharge			Test Results		
Applied Voltage (kV)	Performance Criterion	Test Point	Horizontal Coupling	Vertical Coupling	Actual performance
±4	B	1	Pass*	Pass*	A

Remark:

\* During the test no deviation was detected to the selected operation mode(s)

## 6.3 Radio-frequency electromagnetic fields, 80MHz to 1GHz

Test Requirement ..... : EN 61547  
 Test Method ..... : IEC 61000-4-3  
 Test Result ..... : Pass  
 Frequency Range ..... : 80MHz to 1GHz  
 Test level ..... : 3V/m  
 Modulation ..... : 80%, 1kHz Amplitude Modulation.  
 Face of EUT ..... : Front, Back, Left, Right  
 Antenna polarisation ..... : Horizontal& Vertical

### 6.3.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 21.6°C

Humidity ..... : 52.2%RH

EUT Operation:

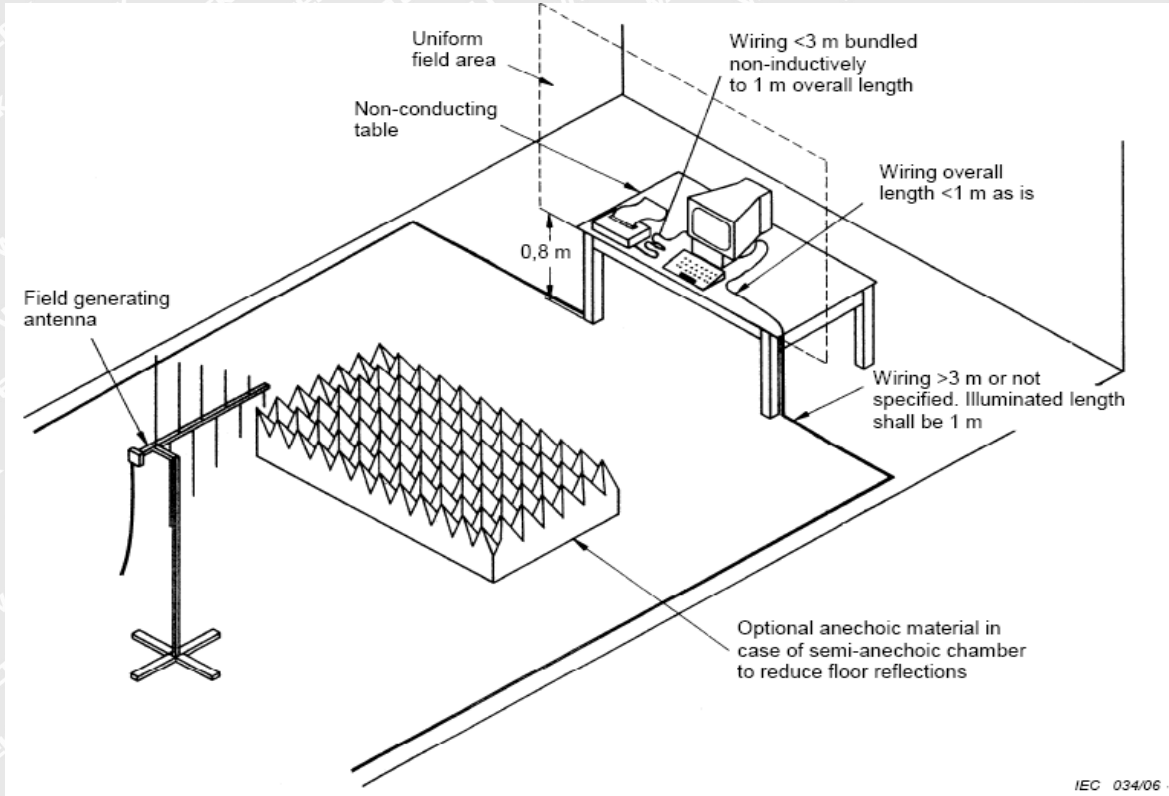
Input Voltage ..... : 230V~, 50Hz

Operating Mode ..... : On mode



### 6.3.2 Block Diagram of Setup

The Radio-frequency electromagnetic fields Immunity test was performed in accordance with the IEC 61000-4-3.



### 6.3.3 Test Results

Frequency	Face of EUT	Antenna polarisation	Test Level	Step Size	Dwell Time	Performance Criterion	Result	Actual performance
80 to 1000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	3s	A	Pass*	A
80 to 1000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	3s	A	Pass*	A

Remark:

- \* During the test no deviation was detected to the selected operation mode(s)





## 6.4 Electrical Fast Transients (EFT)

Test Requirement .....	:	EN 61547
Test Method .....	:	IEC 61000-4-4
Test Result .....	:	Pass
Test Level .....	:	1.0kV on AC Mains
Polarity .....	:	Positive & Negative
Repetition Frequency....	:	5kHz
Burst Duration .....	:	300ms
Test Duration .....	:	2 minutes per level & polarity

### 6.4.1 E.U.T. Operation

#### Operating Environment:

Temperature .....	:	22.6°C
Humidity .....	:	51.8%RH

#### EUT Operation:

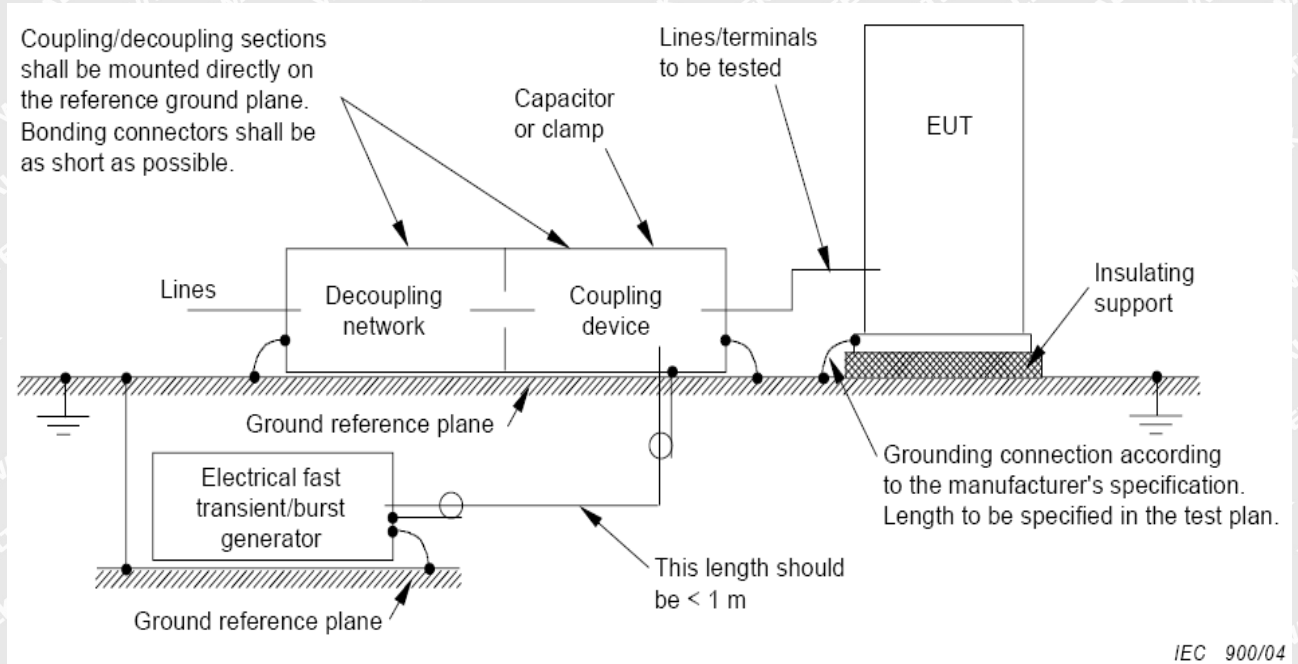
Input Voltage .....	:	230V~, 50Hz
Operating Mode .....	:	On mode

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### 6.4.2 Block Diagram of Setup

The Electrical Fast Transients Immunity test was performed in accordance with the IEC 61000-4-4.



### 6.4.3 Test Results

Test Port	Test Level(kV)	Performance Criterion	Result	Actual performance
Line-Neutral-PE	±1.0	B	Pass*	A

Remark:

\* During the test no deviation was detected to the selected operation mode(s)



### 6.5 Surge

**Test Requirement**..... : EN 61547  
**Test Method**..... : IEC 61000-4-5  
**Test Result**..... : Pass  
**Test level**..... : Table 10 of EN 61547  
**Interval** ..... : 60s between each surge  
**No. of surges** ..... : 5 positive at 90°, 5 negative at 270°.

#### 6.5.1 E.U.T. Operation

**Operating Environment:**

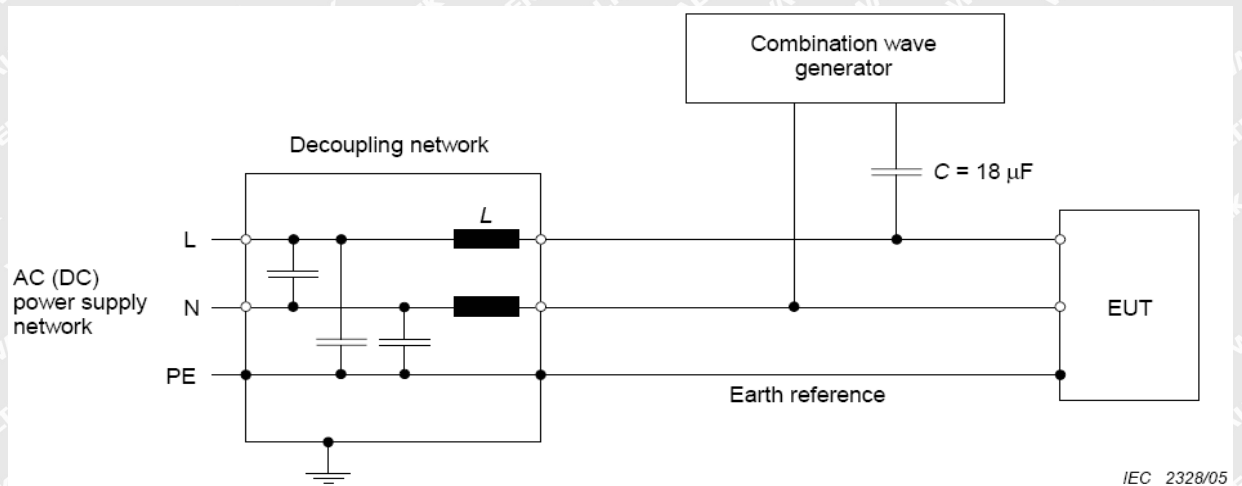
**Temperature** ..... : 22.6°C  
**Humidity**..... : 51.8%RH

**EUT Operation:**

**Input Voltage** ..... : 230V~, 50Hz  
**Operating Mode**..... : On mode

#### 6.5.2 Block Diagram of Setup

The Surge Immunity test was performed in accordance with the IEC 61000-4-5.



IEC 2328/05

#### 6.5.3 Test Results

Test Port	Applied Voltage (kV)	Performance criterion	Result	Actual performance
Between Live And Neutral	错误!未找到引用源。1	C	Pass*	A
Between Live And Earth	错误!未找到引用源。2	C	Pass*	B
Between Neutral And Earth	错误!未找到引用源。2	C	Pass*	B

Remark:

\* During the test no deviation was detected to the selected operation mode(s)





### 6.6 Injected Currents Immunity 0.15MHz to 80MHz

**Test Requirement** ..... : EN 61547  
**Test Method** ..... : IEC 61000-4-6  
**Test Result** ..... : Pass  
**Frequency Range** ..... : 0.15MHz to 80MHz  
**Test level** ..... : 3V r.m.s. (unmodulated emf into 150 Ω)  
**Modulation** ..... : 80%, 1kHz Amplitude Modulation.

#### 6.6.1 E.U.T. Operation

**Operating Environment:**

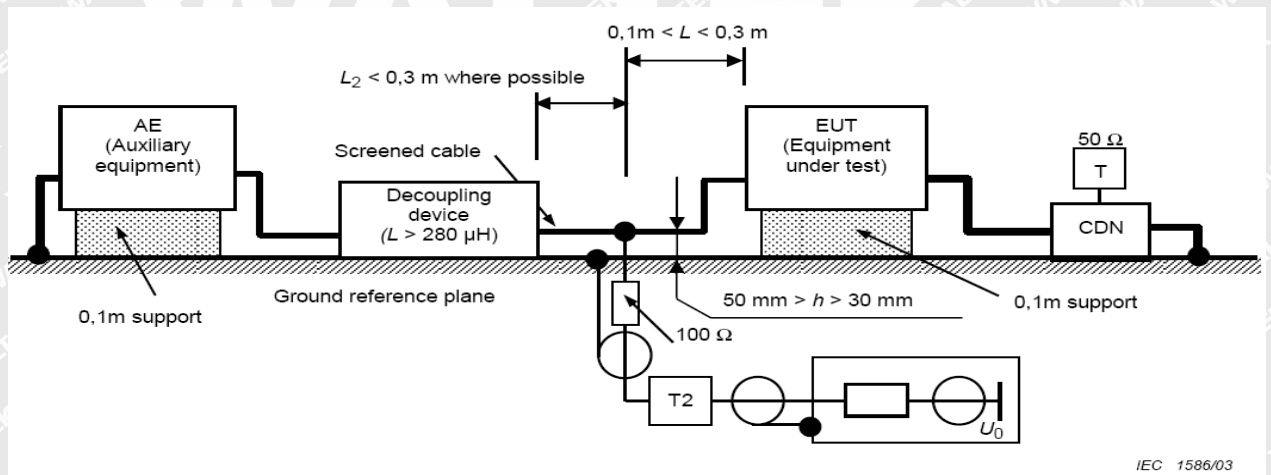
**Temperature** ..... : 22.7°C  
**Humidity** ..... : 50.2%RH

**EUT Operation:**

**Input Voltage** ..... : 230V~, 50Hz  
**Operating Mode** ..... : On mode

#### 6.6.2 Block Diagram of Setup

The Injected Currents Immunity test was performed in accordance with the IEC 61000-4-6.



#### 6.6.3 Test Results

Frequency	Line	Test Level	Modulation	Step Size	Dwell Time	Performance Criterion	Result	Actual performance
0.15MHz to 80MHz	3 Wire AC Supply Cables	3Vr.m.s.	80%, 1kHz Amp. Mod.	1%	3s	A	Pass*	A

Remark:

\* During the test no deviation was detected to the selected operation mode(s)

Waltek Testing Group (Suzhou) Co., Ltd.  
<http://www.waltek.com.cn>



## 6.7 Voltage Dips and Interruptions

Test Requirement.....	EN 61547
Test Method.....	IEC 61000-4-11
Test Result.....	Pass
Test Level(Voltage reduction)	0%&70 % of $U_T$ (Supply Voltage)
No. of Dips / Interruptions.....	1 per Level at 20ms intervals

### 6.7.1 E.U.T. Operation

#### Operating Environment:

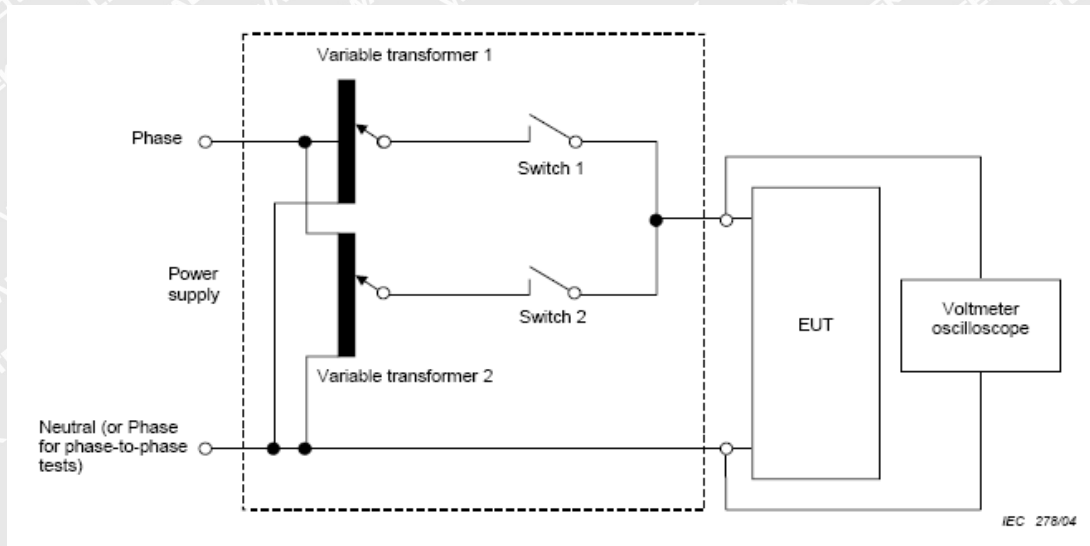
Temperature .....	22.6°C
Humidity.....	51.8%RH

#### EUT Operation:

Input Voltage .....	230V~, 50Hz
Operating Mode.....	On mode

### 6.7.2 Block Diagram of Setup

The Voltage Dips and Interruptions Immunity test was performed in accordance with the IEC 61000-4-11.



### 6.7.3 Test Results

Test Level in % $U_T$	Phase	Performance criterion	Duration	Result	Actual performance
0	0° & 180°	B	0.5	Pass*	B
70	0° & 180°	C	10	Pass*	B

Remark:

\* During the test no deviation was detected to the selected operation mode(s)





## 7 Photographs – Test Setup

### 7.1 Photograph – Mains Terminal Disturbance Voltage Test Setup



### 7.2 Photograph – Radiated electromagnetic disturbance Test Setup, 9kHz to 30MHz







### 7.3 Photograph – Radiated Emission Test Setup, 30MHz to 1GHz

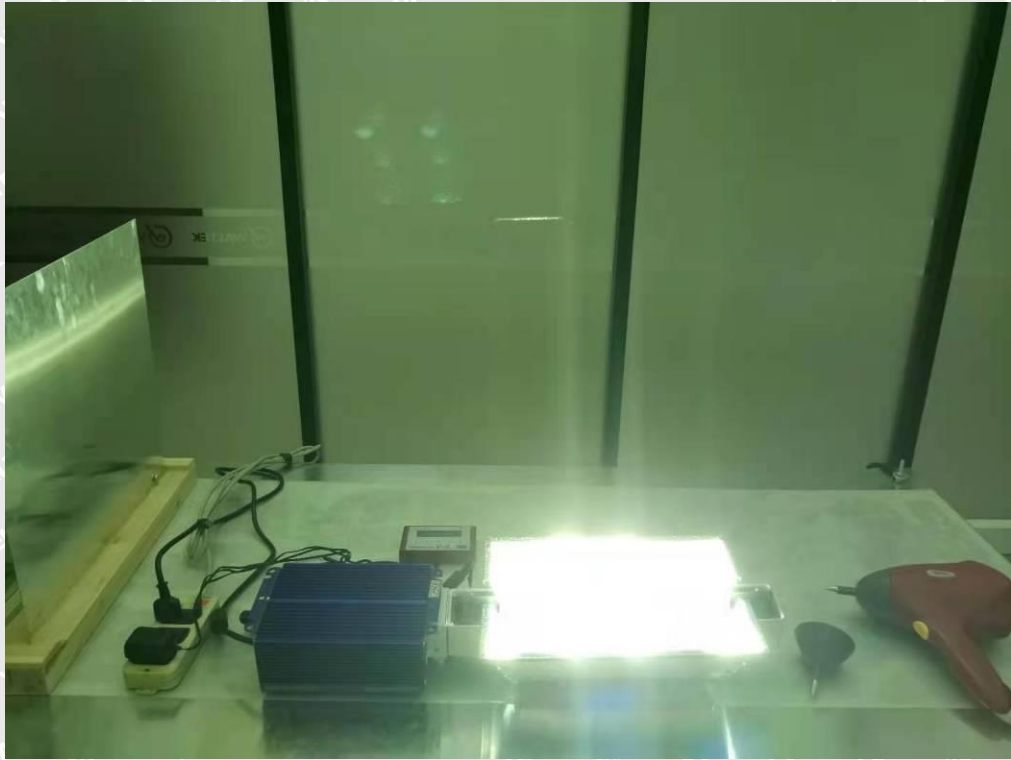


### 7.4 Photograph – Harmonic Current and Flicker





### 7.5 Photograph – ESD Immunity Test Setup



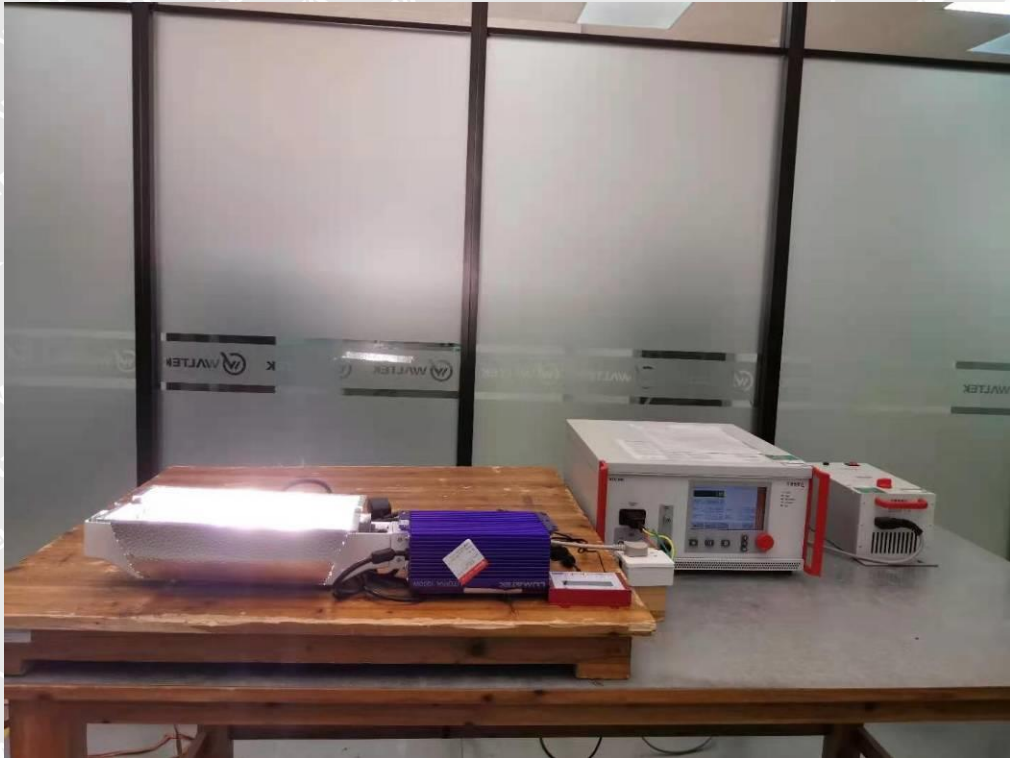
### 7.6 Photograph – Radio-frequency electromagnetic fields Immunity Test Setup







### 7.7 Photograph – EFT & Voltage Dips and Interruptions Immunity Test Setup



### 7.8 Photograph – Surge Immunity Test Setup







## 7.9 Photograph – Injected Currents Immunity Test Setup



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## 8 Photographs – Constructional Details

### 8.1 EUT – Front View



### 8.2 EUT – Back View



=====End of Report=====