



TEST REPORT

Reference No. : WTU21N09102493E
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 : LED Luminaires
Model No. : ZEUS 600W PRO 2.9, ZEUS 600W 2.6
Standards : EN IEC 55015:2019+A11:2020
EN 61547:2009
EN IEC 61000-3-2:2019
EN 61000-3-3:2013+A1:2019
Date of Receipt sample : 2021-08-06
Date of Test : 2021-08-13
Date of Issue : 2021-10-18
Test Report Form No. : WEL-55015A-03B
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.

Prepared By:

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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+A11:2020	Clause 4.3.1	Pass
Radiated electromagnetic disturbance, 9kHz to 30MHz	EN IEC 55015:2019+A11:2020	Clause 4.5.2	Pass
Radiated Emission, 30MHz to 1GHz	EN IEC 55015:2019+A11:2020	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.

- Product Name** : LED Luminaires
- Model No.** : ZEUS 600W PRO 2.9, ZEUS 600W 2.6
- Protection Class** : Class I
- Remark** :
1. The EUT (equipment under test) is an ordinary LED Luminaires for Lighting and similar use. For the further information, refer to the user's manual.
 2. In electrical characteristics, all models are similar circuit principle and PCB layout, except for model name and appearance. For detailed information, refer to section 3.2.
 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.

3.2 Details of E.U.T.

Technical Data..... :

No.	Model	Rated Input	Input Power	Note
1.	ZEUS 600W PRO 2.9	220-240V~, 50/60Hz	600W	/
2.	ZEUS 600W 2.6	220-240V~, 50/60Hz	600W	/

3.3 Description of Support Units

The EUT has been tested as an independent unit. ZEUS 600W PRO 2.9 is the tested sample. All tests were performed in the condition of 230V~, 50Hz input.

3.4 Standards Applicable for Testing

The tests were performed according to following standards:

- | | |
|----------------------------|---|
| EN IEC 55015:2019+A11:2020 | 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 ≤ 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 ≤ 16 A per phase and not subject to conditional connection. |



3.5 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 Testing Group (Foshan) Co., Ltd.

Address: No.13-19, 2/F., 2nd Building, Sunlink International Machinery City,
Chencun, Shunde District, Foshan, Guangdong, China

3.6 Abnormalities from Standard Conditions

None.

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4 Equipment Used during Test

Mains Terminal Disturbance Voltage (Conducted Emission)					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	EMI Test Receiver	R&S	ESCI	101406	Valid
2	TWO-LINE V-NETWORK	R&S	ENV216	101208	Valid
Radiated electromagnetic disturbance(9kHz to 30MHz)					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	EMI Test Receiver	R&S	ESCI	101406	Valid
2	3-dimensional large loop antenna	SCHWARZBECK	HXYZ9170	256	Valid
3m Semi-anechoic Chamber for Radiated Emission					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
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
Harmonics Measuring System					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
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
ESD					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	electrostatic discharge generator	TESEQ	NSG437	699	Valid
Radio-frequency electromagnetic fields					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
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

EFT & Voltage Dips and Interruptions

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

Surge

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

Injected Currents

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	$\pm 2.66\text{dB}$	(1)
Radiated electromagnetic disturbance	9kHz ~30MHz	$\pm 3.00\text{dB}$	(1)
Radiated Emission	30MHz~1GHz	$\pm 5.03\text{dB}$	(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:

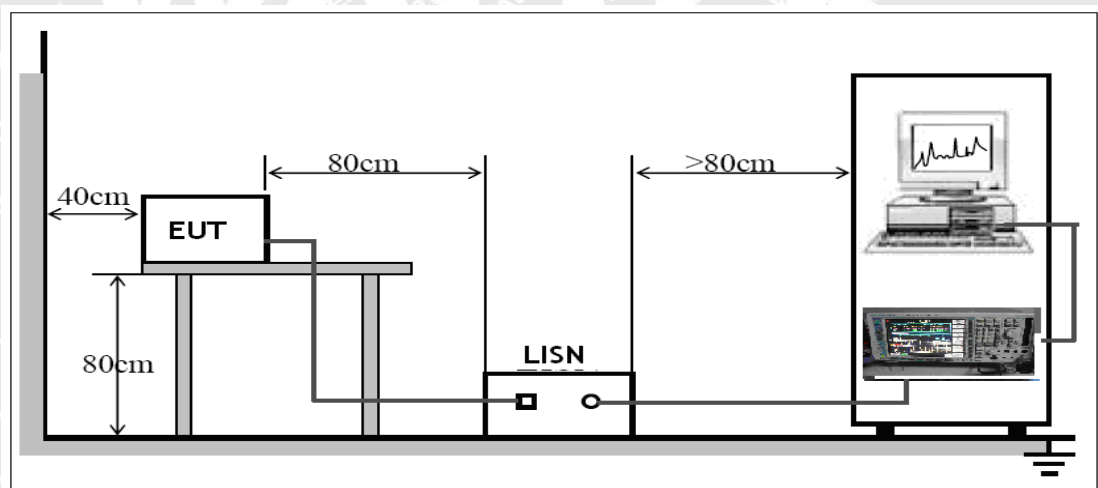
Temperature	: 21.5°C
Humidity.....	: 54%RH

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.



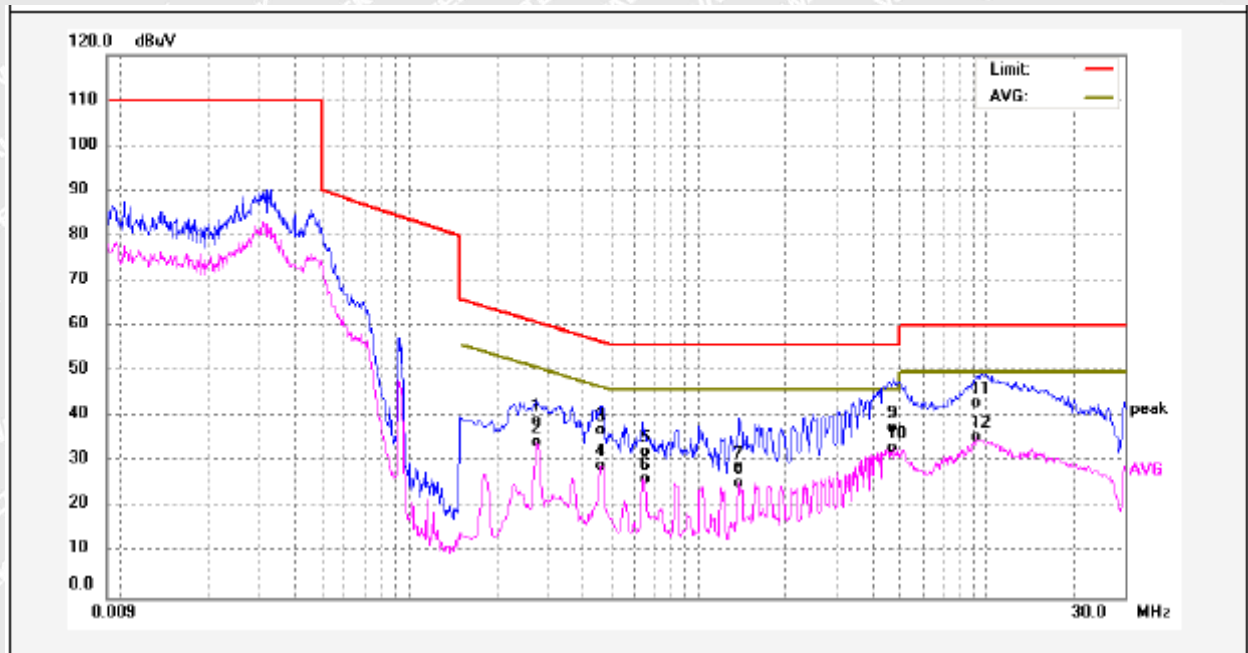
5.1.3 Measurement Data

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

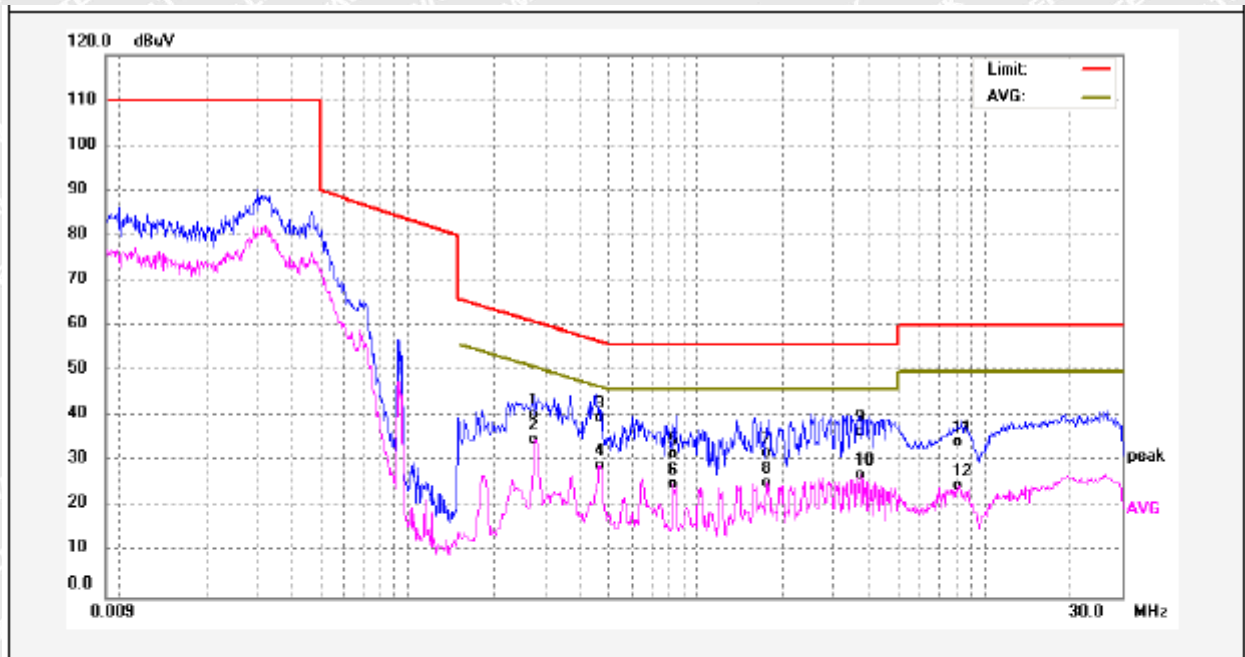
Live Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2781	29.57	9.67	39.24	60.87	-21.63	QP	
2	0.2781	24.61	9.67	34.28	50.87	-16.59	AVG	
3	0.4581	27.50	9.67	37.17	56.73	-19.56	QP	
4	0.4581	19.64	9.67	29.31	46.73	-17.42	AVG	
5	0.6580	22.73	9.67	32.40	56.00	-23.60	QP	
6	0.6580	16.59	9.67	26.26	46.00	-19.74	AVG	
7	1.3821	18.94	9.71	28.65	56.00	-27.35	QP	
8	1.3821	15.54	9.71	25.25	46.00	-20.75	AVG	
9	4.7101	27.69	9.83	37.52	56.00	-18.48	QP	
10	4.7101	23.36	9.83	33.19	46.00	-12.81	AVG	
11	9.2461	33.18	9.95	43.13	60.00	-16.87	QP	
12	9.2461	25.62	9.95	35.57	50.00	-14.43	AVG	



Neutral Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2781	30.74	9.67	40.41	60.87	-20.46	QP	
2	0.2781	25.24	9.67	34.91	50.87	-15.96	AVG	
3	0.4661	30.04	9.67	39.71	56.58	-16.87	QP	
4	0.4661	19.68	9.67	29.35	46.58	-17.23	AVG	
5	0.8341	21.83	9.68	31.51	56.00	-24.49	QP	
6	0.8341	15.27	9.68	24.95	46.00	-21.05	AVG	
7	1.7621	22.18	9.73	31.91	56.00	-24.09	QP	
8	1.7621	15.52	9.73	25.25	46.00	-20.75	AVG	
9	3.7101	26.81	9.79	36.60	56.00	-19.40	QP	
10	3.7101	17.38	9.79	27.17	46.00	-18.83	AVG	
11	8.1701	24.28	9.92	34.20	60.00	-25.80	QP	
12	8.1701	14.78	9.92	24.70	50.00	-25.30	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 : 21.5°C

Humidity..... : 54%RH

EUT Operation:

Input Voltage : 230V~, 50Hz

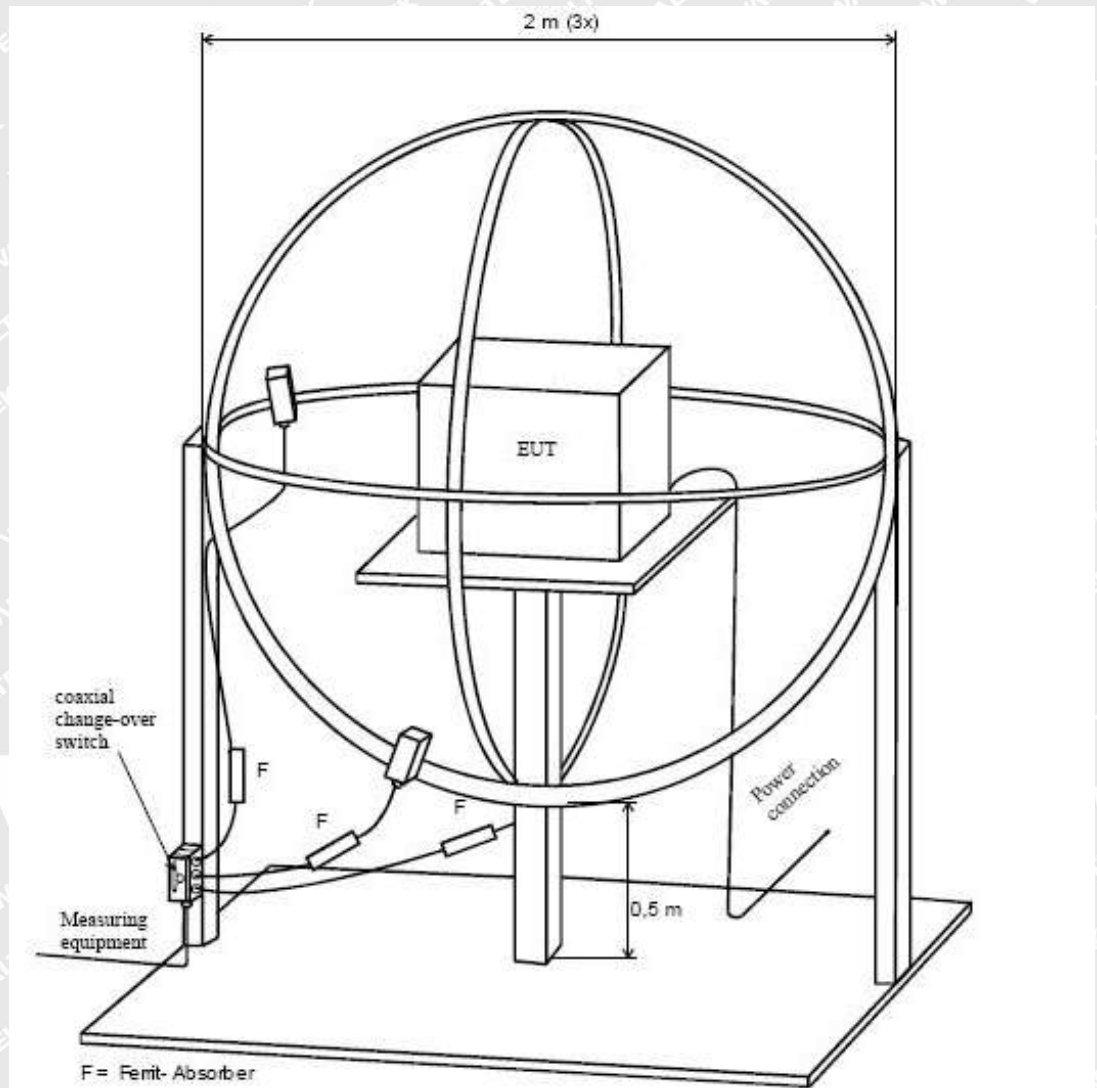
Operating Mode..... : On mode

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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.



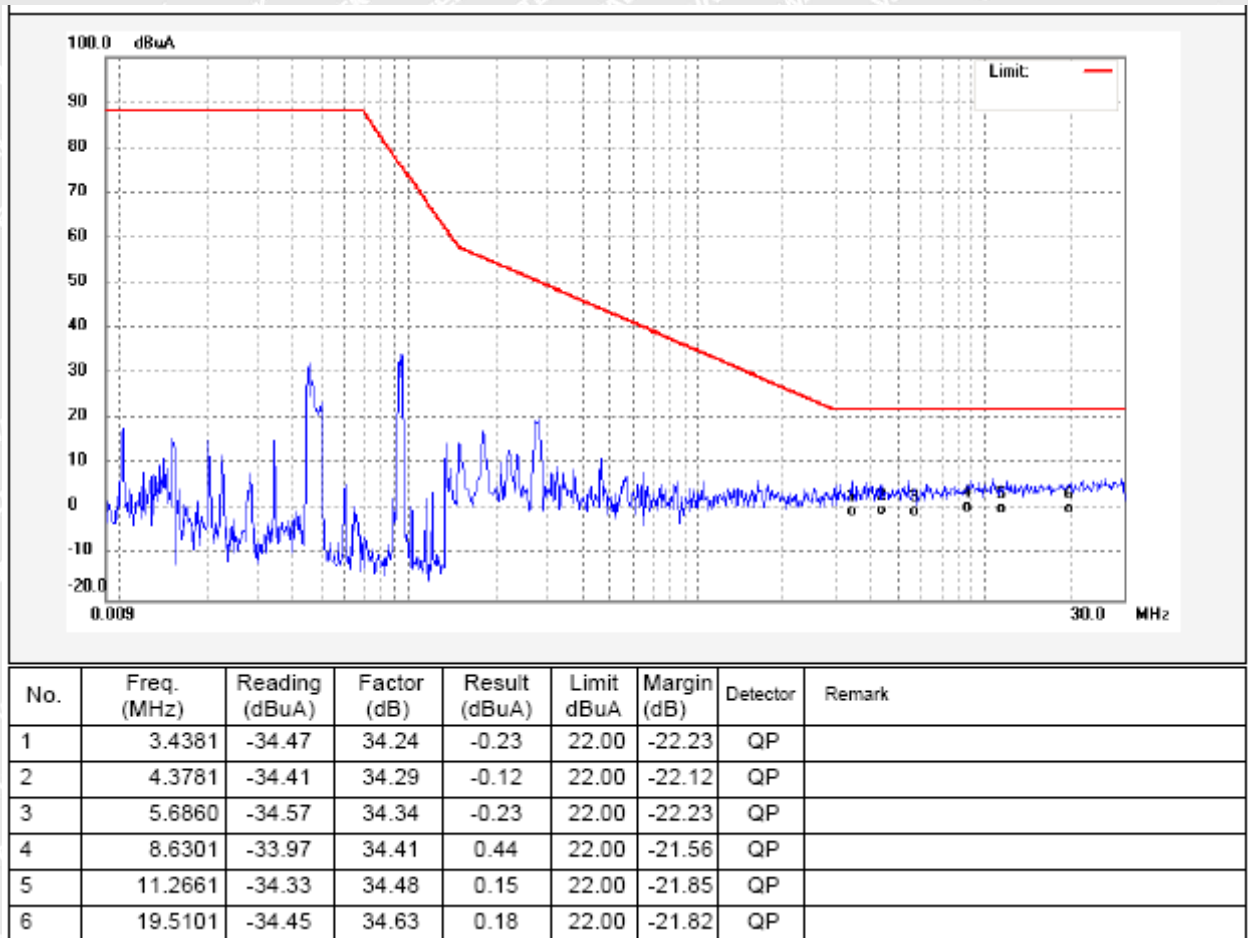
5.2.3 Measurement Data

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



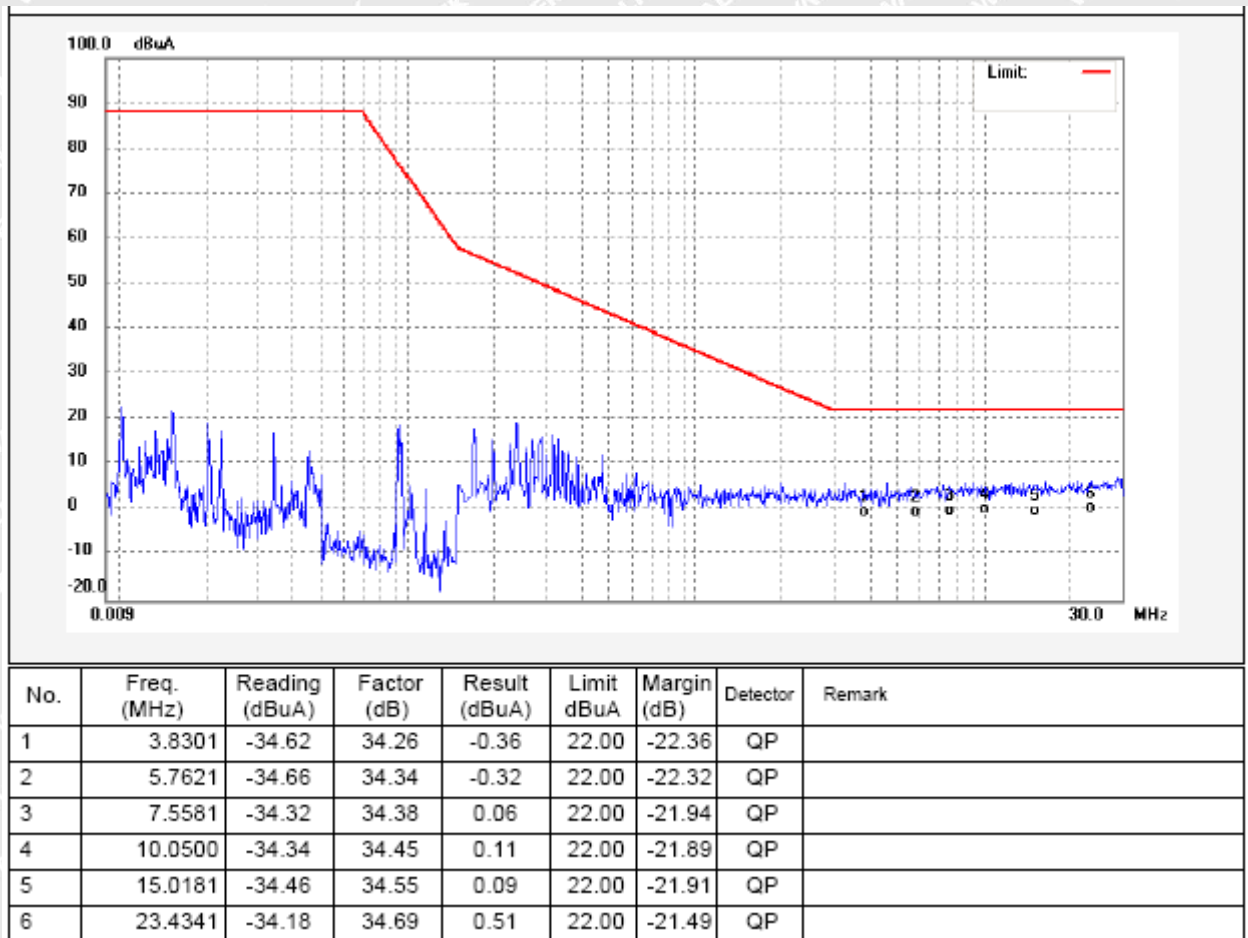
5.2.4 Radiated Electromagnetic Disturbance test data, 9kHz to 30MHz

Loop X



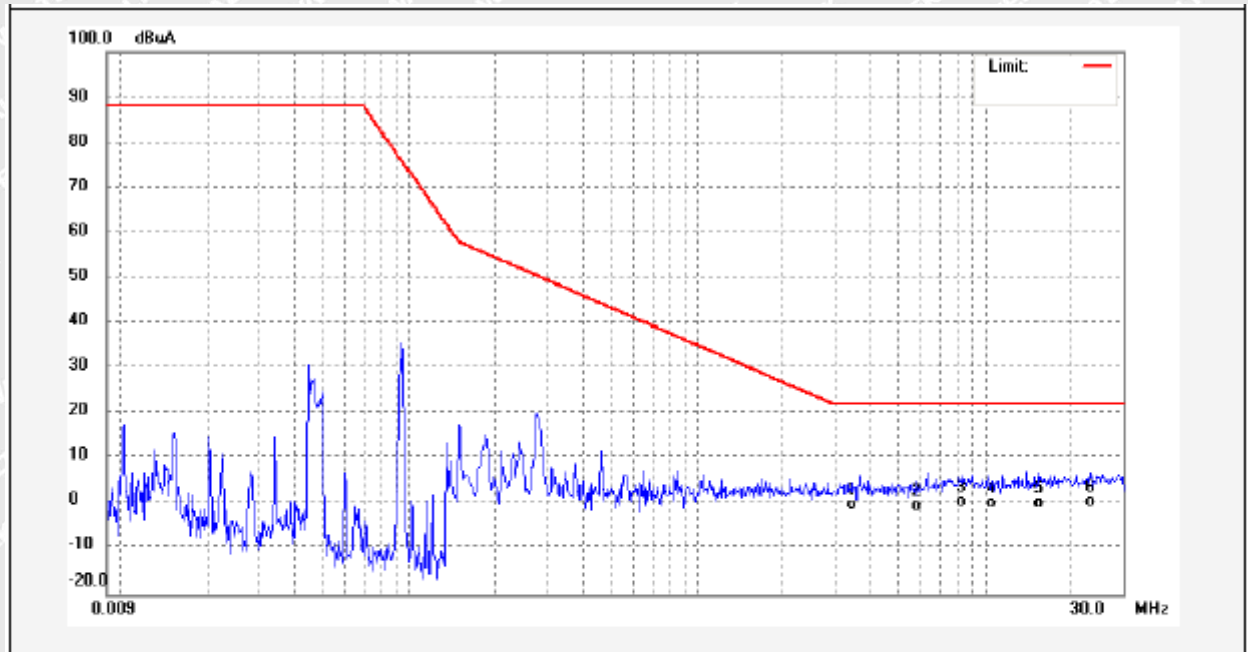


Loop Y





Loop Z



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.4621	-34.36	34.24	-0.12	22.00	-22.12	QP	
2	5.7781	-34.67	34.34	-0.33	22.00	-22.33	QP	
3	8.2861	-33.76	34.40	0.64	22.00	-21.36	QP	
4	10.5141	-34.33	34.46	0.13	22.00	-21.87	QP	
5	15.2141	-34.38	34.55	0.17	22.00	-21.83	QP	
6	23.0621	-34.26	34.68	0.42	22.00	-21.58	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:

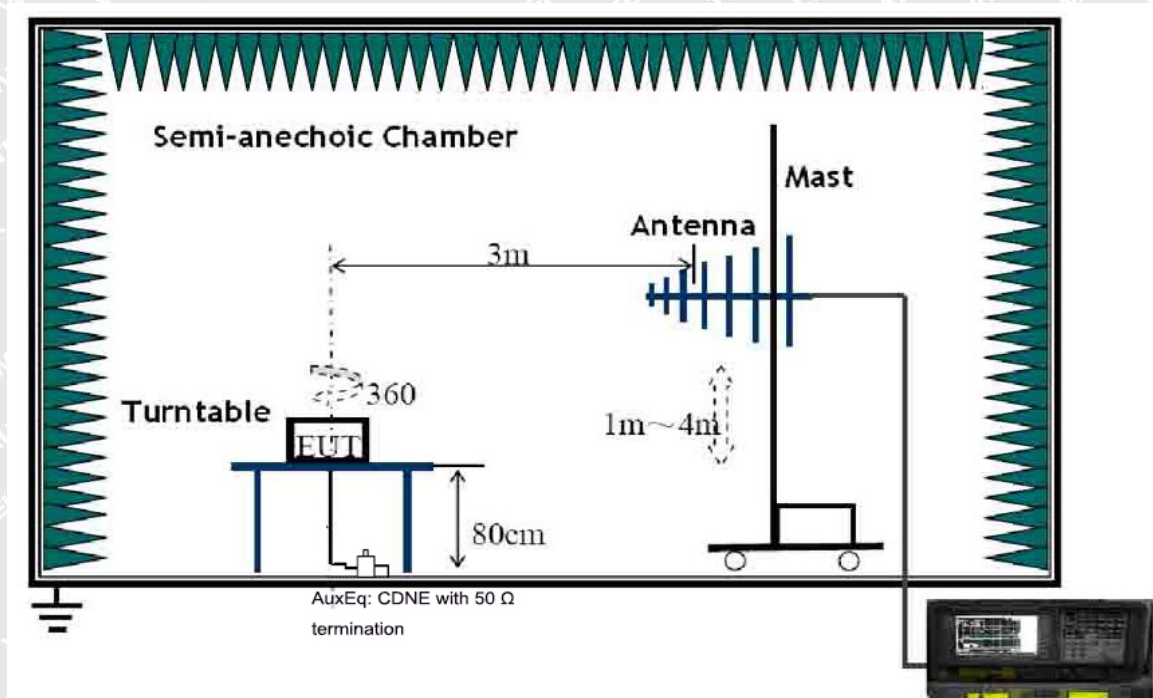
Temperature..... : 22.7°C
Humidity..... : 48%RH

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

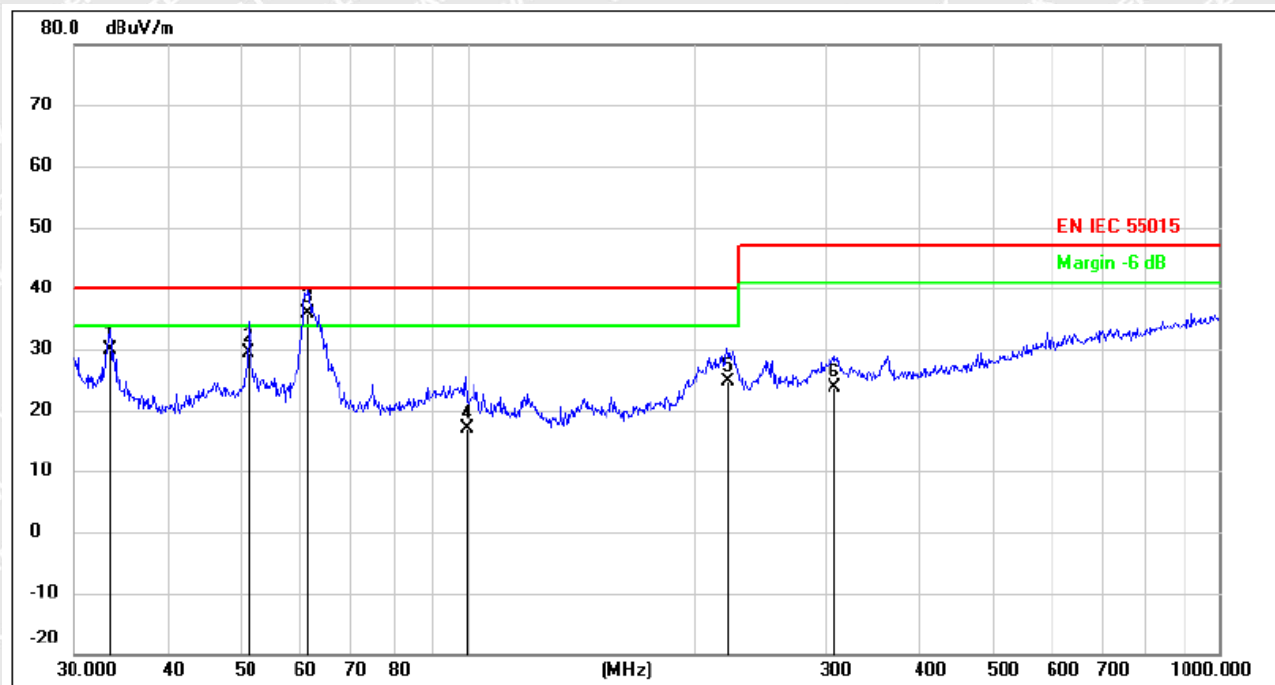
The maximised peak emissions from the EUT was scanned and measured for Horizontal & Vertical polarisation. Quasi-peak measurements were performed if peak emissions were within 6dB of the limit line. According to the data in section 5.3.4, the EUT complied with the EN IEC 55015 standards.

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5.3.4 Radiated Emission test data, 30MHz to 1GHz

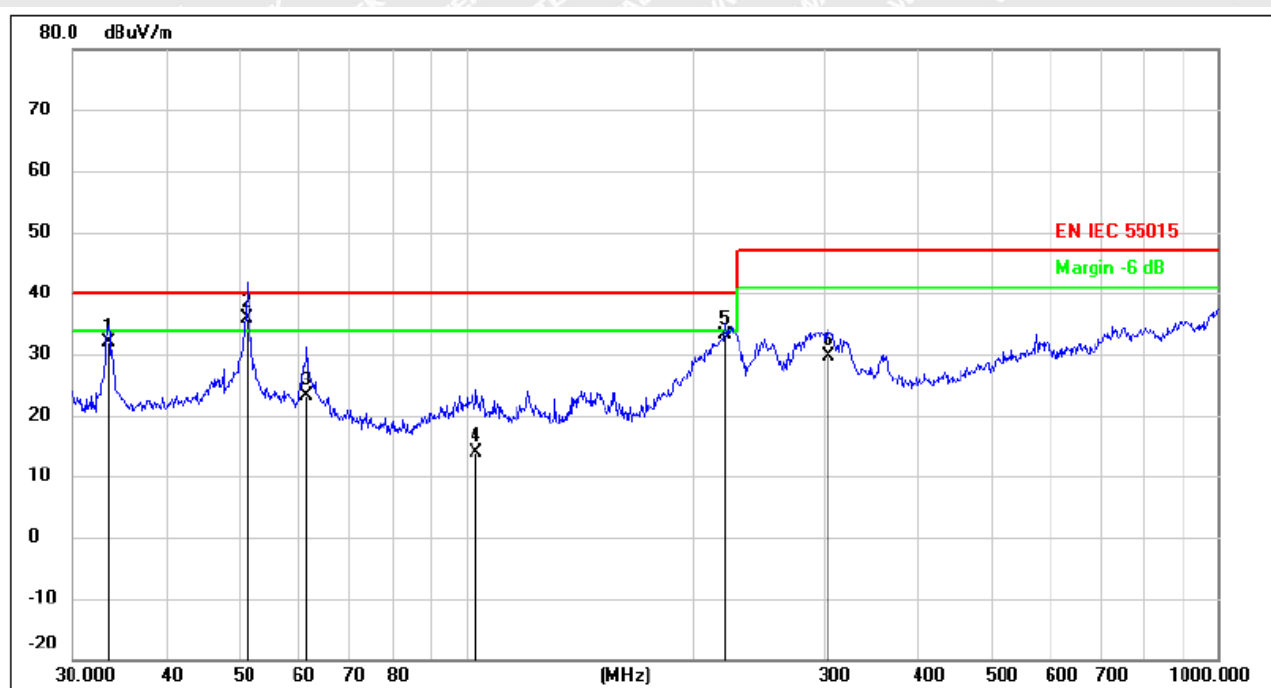
Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	33.4449	18.83	10.99	29.82	40.00	-10.18	QP
2	51.3005	15.84	13.46	29.30	40.00	-10.70	QP
3	61.5618	24.11	11.69	35.80	40.00	-4.20	QP
4	99.5281	5.22	11.57	16.79	40.00	-23.21	QP
5	221.3921	12.92	11.76	24.68	40.00	-15.32	QP
6	307.8313	9.53	14.05	23.58	47.00	-23.42	QP



Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	33.4448	20.61	11.38	31.99	40.00	-8.01	QP
2	51.3004	21.08	14.90	35.98	40.00	-4.02	QP
3	61.5617	10.73	12.51	23.24	40.00	-16.76	QP
4	103.4419	1.26	12.65	13.91	40.00	-26.09	QP
5	221.3920	21.67	11.42	33.09	40.00	-6.91	QP
6	304.6099	15.37	14.24	29.61	47.00	-17.39	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 : 22.2°C

Humidity..... : 53.0%RH

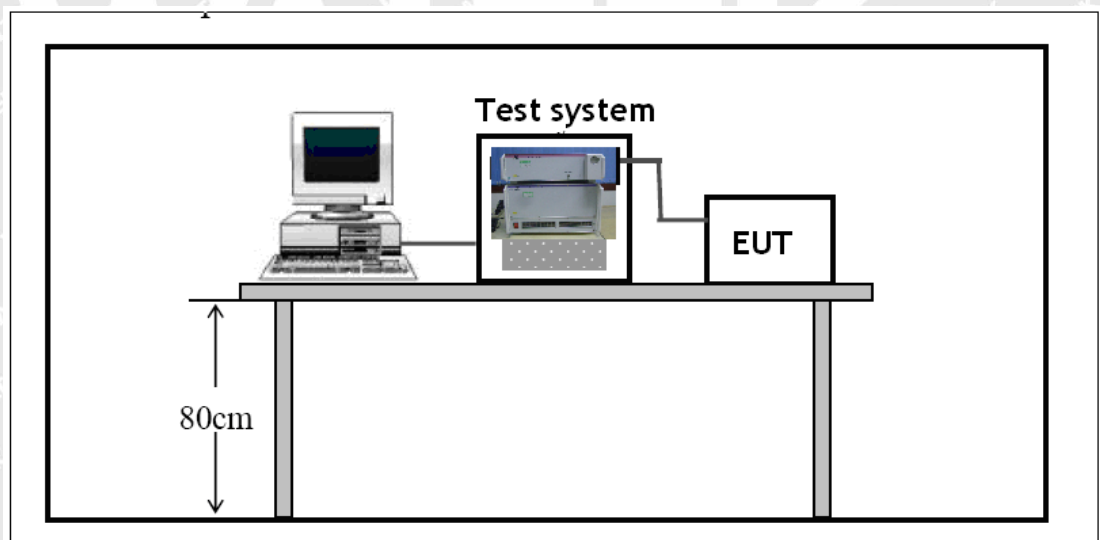
EUT Operation:

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	Pass	Tobs	Quasi-Stationary
Voltage	230.00 V	THC	0.3817 A
Current	2.8879 A	POHC/Limit	0.0561 A / 0.2716 A *3
Power	628.56 W	Nominal	230 V / 50 Hz
Power Factor	0.9463	Fundamental Current	2.8621 A
Apparent Power	664.2 VA	Measuring Period	150 s
THD (max)	13.36 %	Margin	100 %

Order	Limit1(A rms)	Limit2(A rms)	Ave(A rms)	Max(A rms)	Judge
1	----	----	2.8569	2.8621	N/A
2	0.0572	0.0859	0.0026	0.0031	N/A
3	0.8125	1.2188	0.3592	0.3598	Pass
4	----	----	0.0036	0.0042	N/A
5	0.2862	0.4293	0.0794	0.0809	Pass
6	----	----	0.0036	0.0040	N/A
7	0.2003	0.3005	0.0509	0.0514	Pass
8	----	----	0.0036	0.0041	N/A
9	0.1431	0.2147	0.0173	0.0182	Pass
10	----	----	0.0036	0.0040	N/A
11	0.0859	0.1288	0.0237	0.0247	Pass
12	----	----	0.0036	0.0041	N/A
13	0.0859	0.1288	0.0268	0.0275	Pass
14	----	----	0.0036	0.0041	N/A
15	0.0859	0.1288	0.0298	0.0306	Pass
16	----	----	0.0036	0.0040	N/A
17	0.0859	0.1288	0.0273	0.0280	Pass
18	----	----	0.0036	0.0040	N/A
19	0.0859	0.1288	0.0284	0.0292	Pass
20	----	----	0.0036	0.0041	N/A
21	0.1288	0.1288	0.0261	0.0268	Pass
22	----	----	0.0036	0.0041	N/A
23	0.1288	0.1288	0.0217	0.0225	Pass
24	----	----	0.0036	0.0040	N/A
25	0.1288	0.1288	0.0242	0.0251	Pass
26	----	----	0.0036	0.0041	N/A
27	0.1288	0.1288	0.0142	0.0149	N/A
28	----	----	0.0036	0.0041	N/A
29	0.1288	0.1288	0.0218	0.0226	Pass
30	----	----	0.0037	0.0041	N/A
31	0.1288	0.1288	0.0134	0.0140	N/A
32	----	----	0.0037	0.0041	N/A
33	0.1288	0.1288	0.0068	0.0074	N/A
34	----	----	0.0037	0.0041	N/A
35	0.1288	0.1288	0.0149	0.0157	N/A
36	----	----	0.0037	0.0042	N/A
37	0.1288	0.1288	0.0107	0.0115	N/A
38	----	----	0.0037	0.0040	N/A
39	0.1288	0.1288	0.0107	0.0113	N/A
40	----	----	0.0037	0.0042	N/A

N/A : Not Apply



5.5 Voltage Changes, Voltage Fluctuation and Flicker

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

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

Test Result..... : Pass

According to EN 61000-3-3 which states: " Incandescent lamp luminaires with ratings less than or equal to 1000 W and discharge and LED lamp luminaires with ratings less than or equal to 600 W, are deemed to comply with the dc, dmax and Tmax limits in this standard and are not required to be tested. And LED luminaires with ratings less than or equal to 600 W, are deemed to comply with the dc, dmax and Tmax limits in this standard and are not required to be tested."

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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)

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

6.2.1 E.U.T. Operation

Operating Environment:

Temperature.....	:	21.4℃
Humidity.....	:	51.4%RH
Barometric Pressure.....	:	102.4kPa

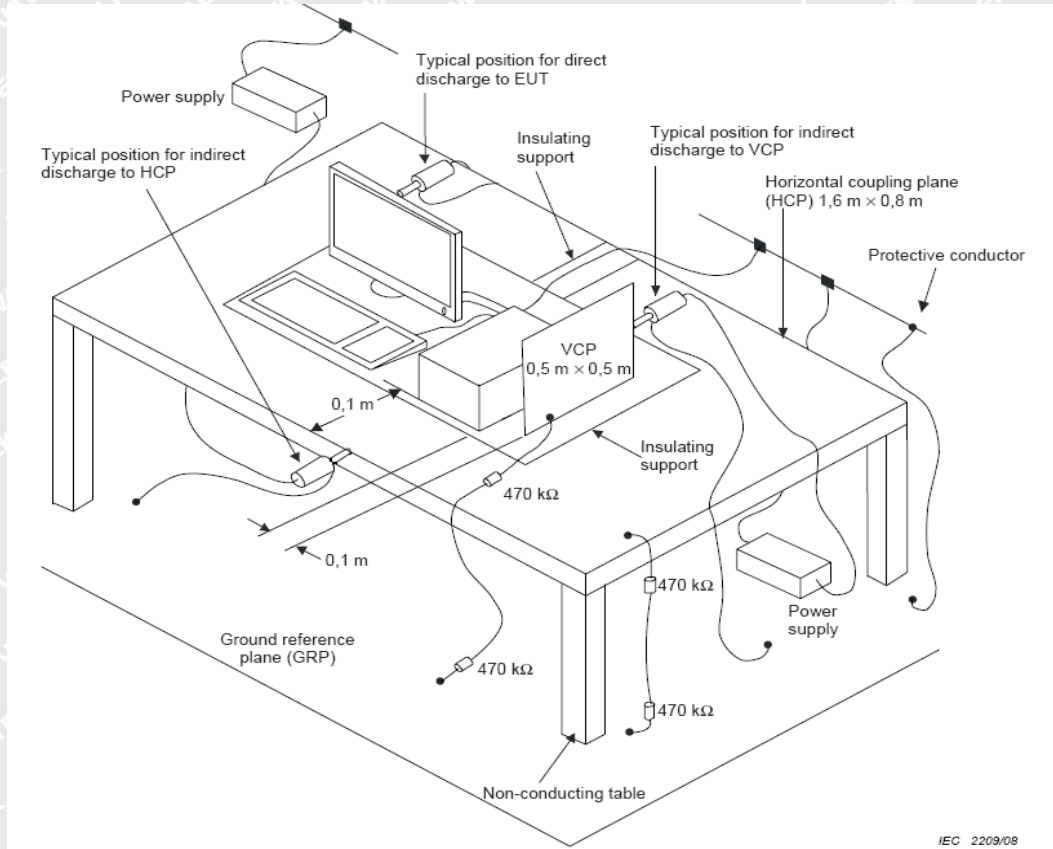
EUT Operation:

Input Voltage.....	:	230V~, 50Hz
Operating Mode.....	:	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
±2, ±4, ±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..... : 22.7°C

Humidity..... : 54.1%RH

EUT Operation:

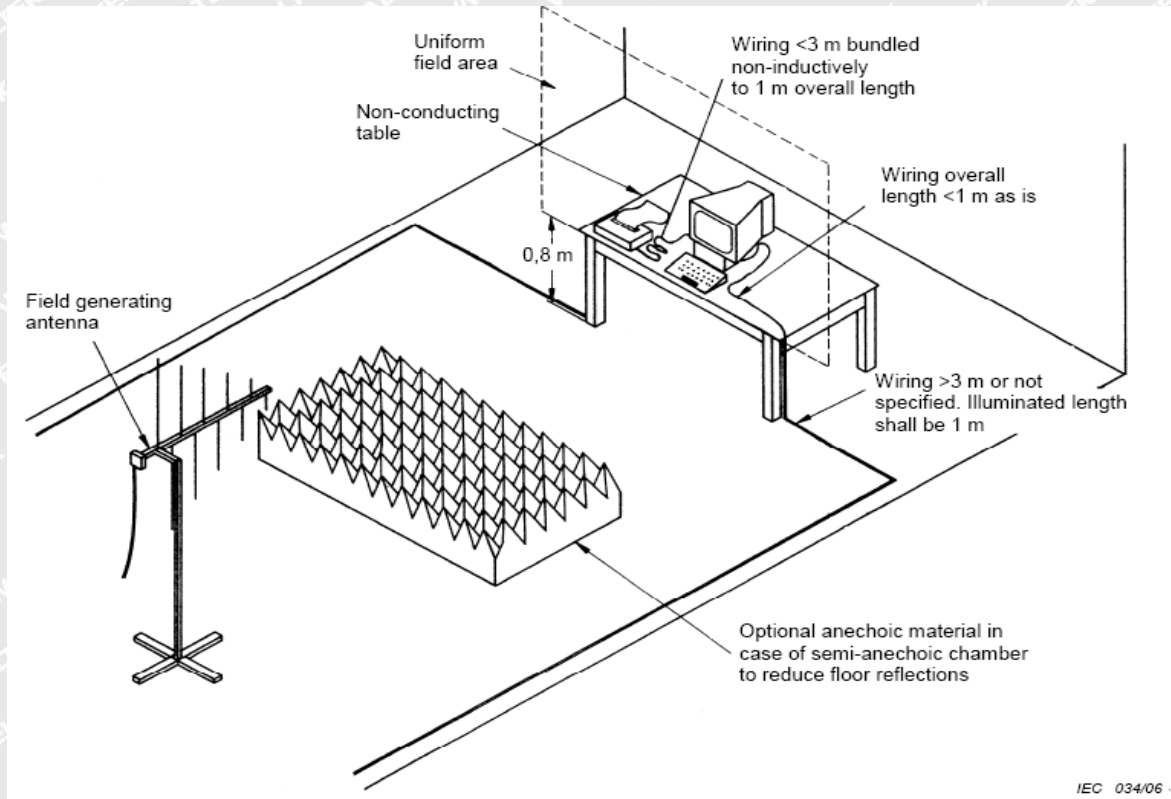
Input Voltage..... : 230V~, 50Hz

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.....	: 21.4°C
Humidity.....	: 51.4%RH

EUT Operation:

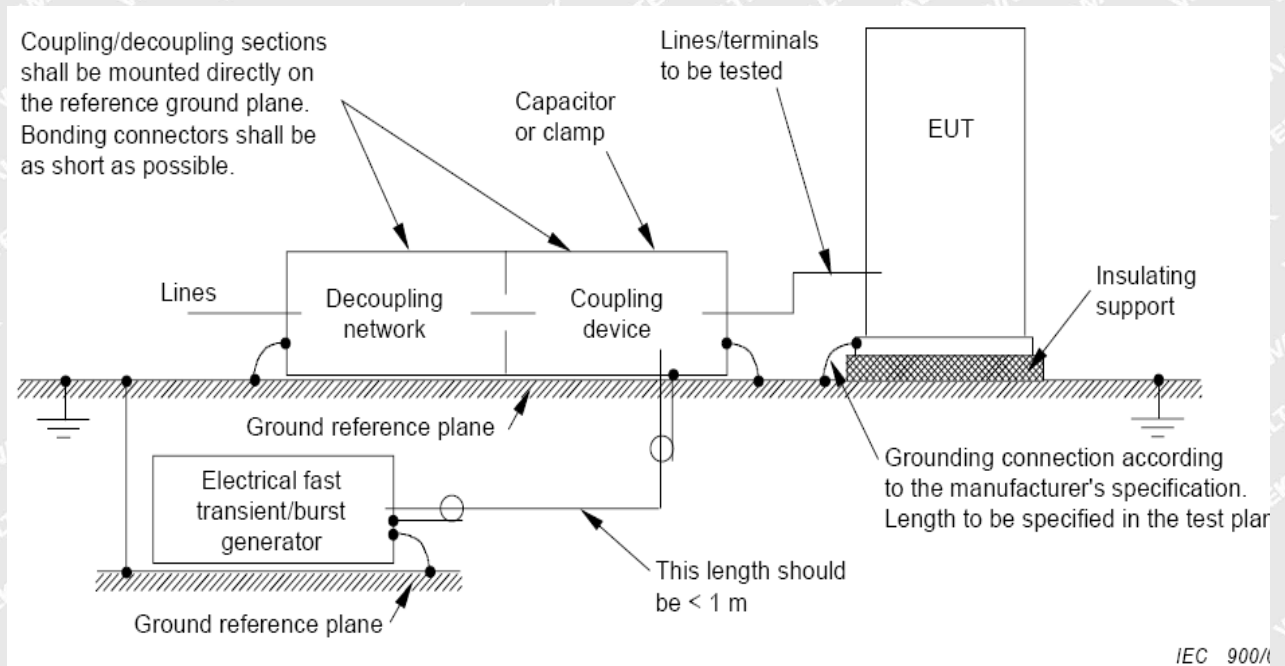
Input Voltage.....	: 230V~, 50Hz
Operating Mode.....	: On mode

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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:

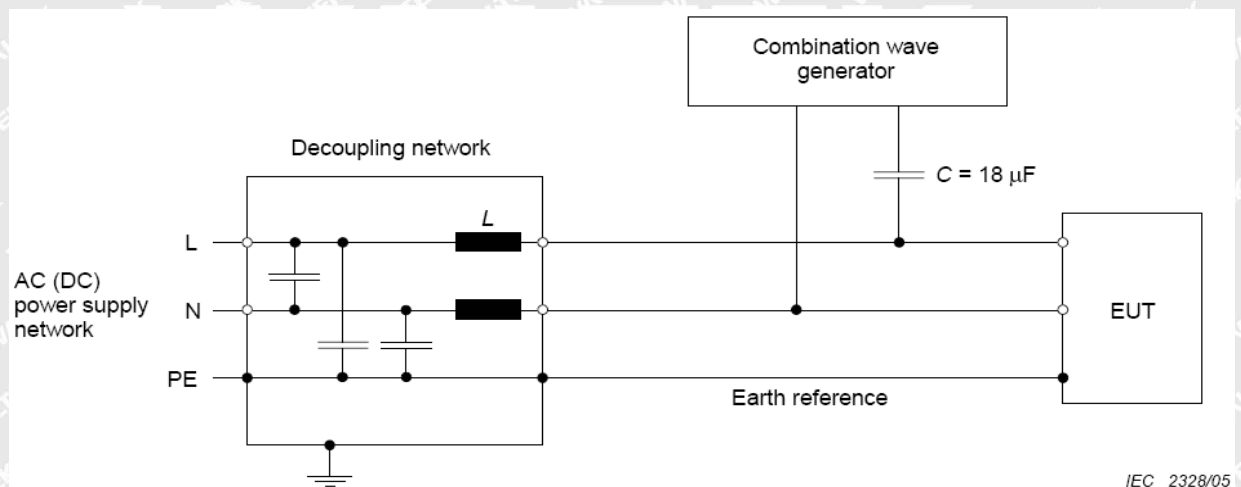
Temperature	: 21.4°C
Humidity.....	: 51.4%RH

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.



6.5.3 Test Results

Test Port	Applied Voltage (kV)	Performance criterion	Result	Actual performance
Between Live And Neutral	$\pm 0.5/1$	C	Pass*	B
Between Live And Earth	$\pm 0.5/1/2$	C	Pass*	B
Between Neutral And Earth	$\pm 0.5/1/2$	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:

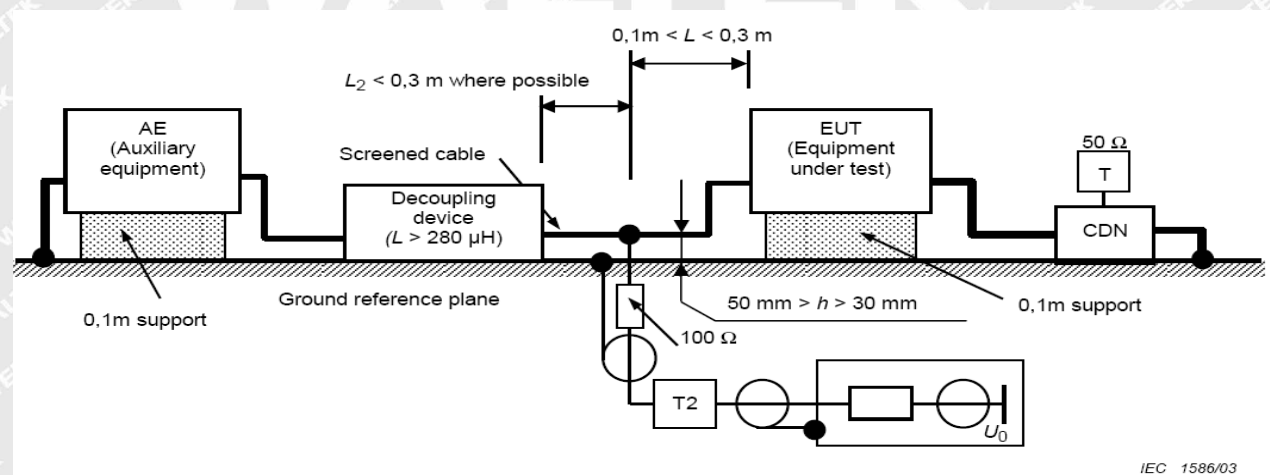
Temperature : 21.4°C
Humidity : 51.4%RH

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)

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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:

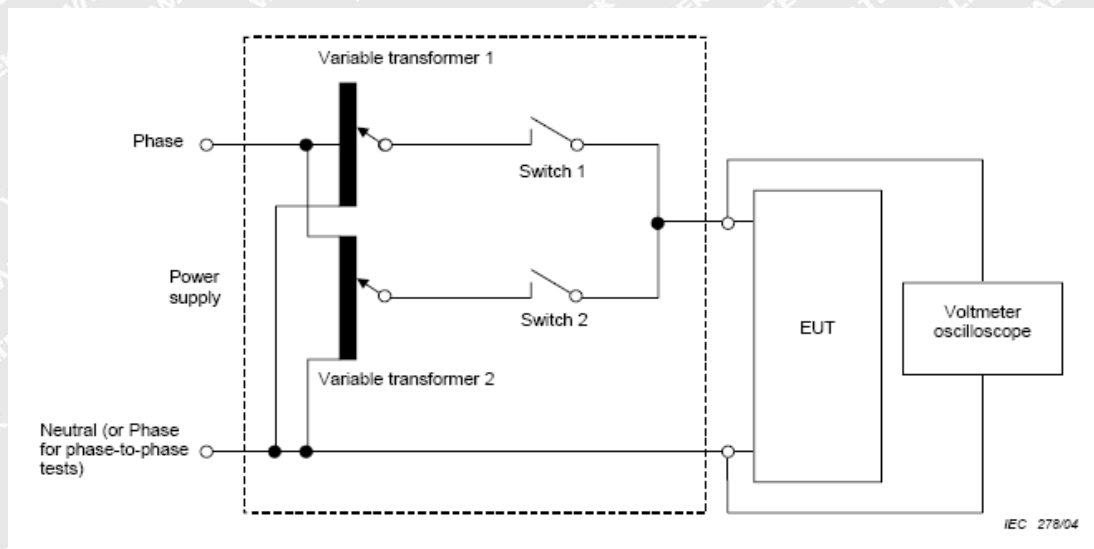
Temperature	21.4°C
Humidity	51.4%RH

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

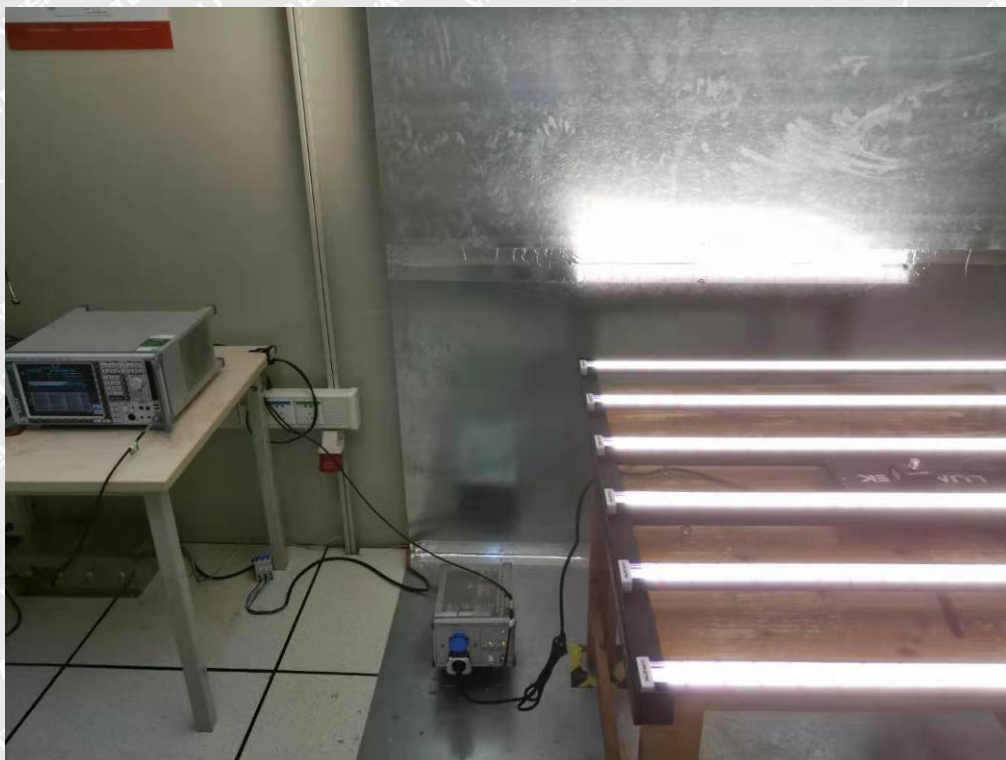
Remark:

* 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

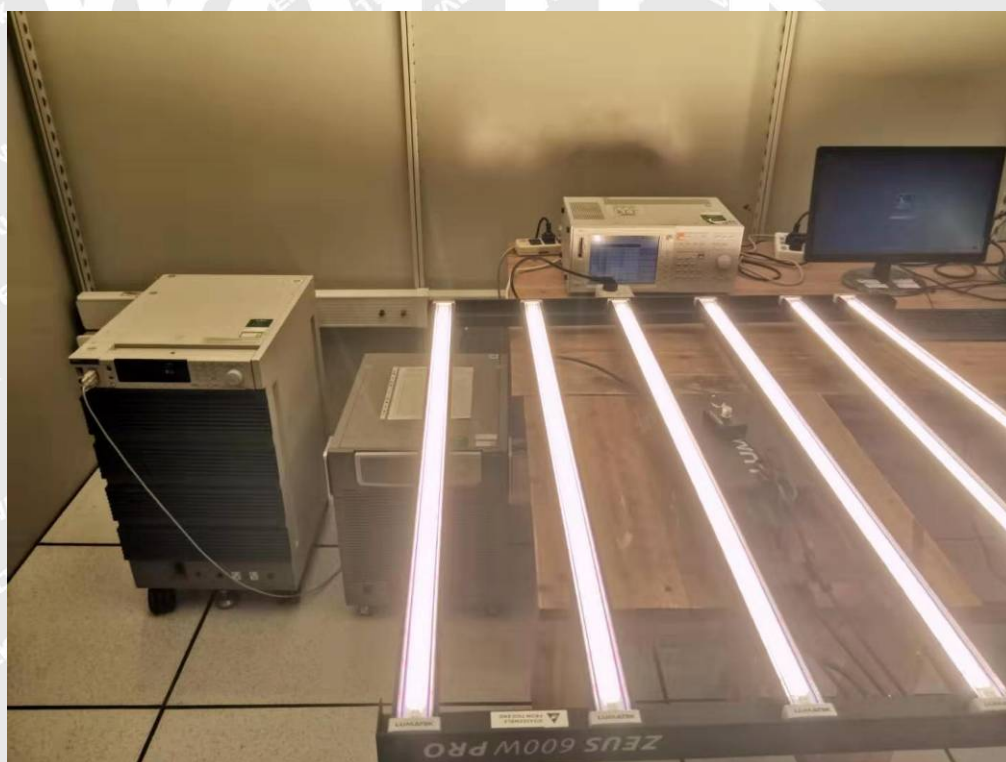




7.3 Photograph – Radiated Emission Test Setup, 30MHz to 1GHz

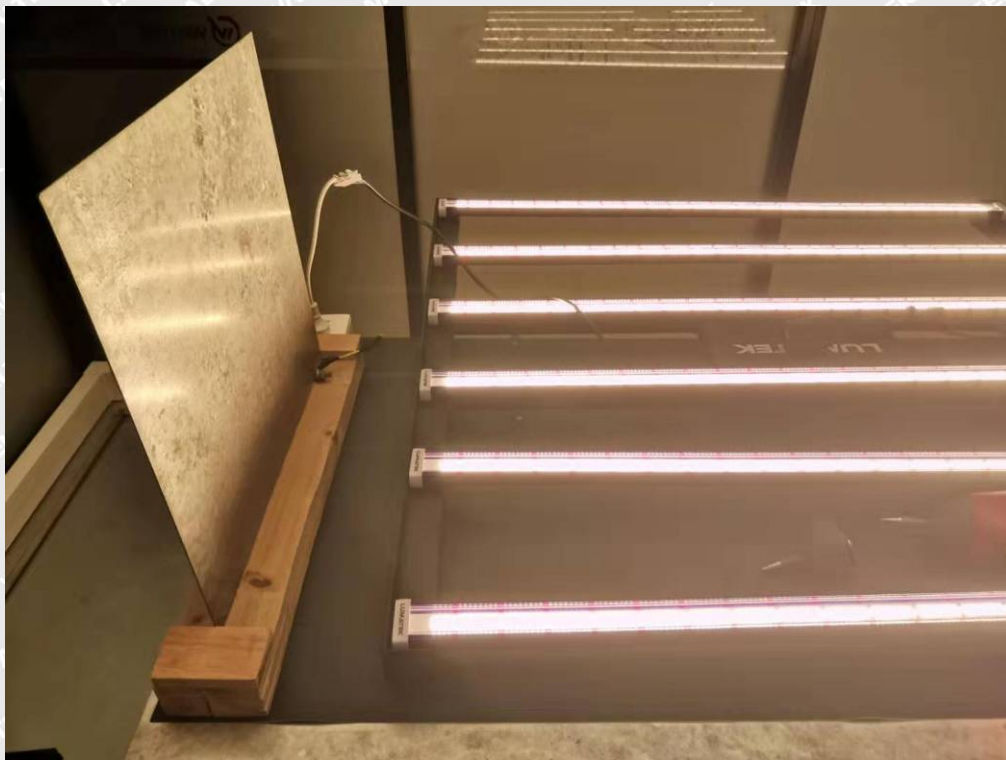


7.4 Photograph – Harmonic Current Test Setup





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





8 Photographs – Constructional Details

8.1 EUT – Appearance View



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