



TEST REPORT

Reference No...... : WTZ20F07049677X1E
Applicant..... : Zhongshan Songwei Lighting Electrical co;LTD
Address..... : No. 502, Dong'an North Road, Cao Er, Guzhen Town, Zhongshan, Guangdong
Manufacturer : The same as above
Address..... : The same as above
Product Name..... : LED Ceiling Light
Model No...... : Refer to section 3.2
Standards..... : EN 55015:2013+A1:2015
EN 61547:2009
EN 61000-3-2:2014
EN 61000-3-3:2013
Date of Receipt sample : 2020-08-14
Date of Test : 2020-08-14 to 2020-08-17
Date of Issue..... : 2020-08-31
Test Report Form No. : WEL-55015A-01A
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:

Waltek Testing Group (Foshan) Co., Ltd.

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

Tel:+86-757-23811398

Fax:+86-757-23811381

E-mail:info@waltek.com.cn

Compiled by:

Kyrie Yun / Project Engineer

Approved by:

Danny Zhou / Manager



1 Test Summary

EMISSION				
Test Item	Test Standard		Class / Severity	Result
Mains Terminal Disturbance Voltage, 9kHz to 30MHz	EN 55015:2013+A1:2015		Clause 4.3.1	Pass
Radiated Electromagnetic disturbance, 9kHz to 30MHz	EN 55015:2013+A1:2015		Clause 4.4.1	Pass
Radiated Emission, 30MHz to 300MHz	EN 55015:2013+A1:2015		Clause 4.4.2	Pass
Harmonic Current Emission	EN 61000-3-2:2014		Class C	Pass**
Voltage Fluctuation and Flicker	EN 61000-3-3:2013		Clause 5	Pass***
IMMUNITY (EN 61547:2009)				
Test Item	Test Method	Class / Severity	Performance Criteria	Result
Electrostatic Discharge(ESD)	IEC 61000-4-2:2008	±4 kV Contact ±8 kV Air	B	Pass
Radio-Frequency Electromagnetic Fields (80MHz to 1GHz)	IEC 61000-4-3:2010	3V/m, 80%, 1kHz, Amp. Mod.	A	Pass
Electrical Fast Transients (EFT)	IEC 61000-4-4:2012	AC ±1.0kV DC ±0.5kV	B	Pass
Surge	IEC 61000-4-5:2005	±0.5kV D.M.† ±1kV C.M.‡	C	Pass
Injected Currents, 0.15MHz to 80MHz	IEC 61000-4-6:2013	3Vr.m.s.(emf), 80%, 1kHz Amp. Mod.	A	Pass
Power-Frequency Magnetic Field	IEC 61000-4-8:2009	3A/m	A	N/A
Voltage Dips and Interruptions	IEC 61000-4-11:2004	0 % U _T * for 0.5per	B	Pass
		70 % U _T * for 10per	C	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

A.M

Amplitude Modulation

†

Differential Mode

‡

Common Mode

*

U_T is the nominal supply voltage

**

According to EN 61000-3-2, no limit apply to the non-discharge lighting equipment with rated power less than or equal to 25W. Therefore, this equipment is deemed to fulfil this standard without any testing.

According to EN 61000-3-3 which states:"Pst and Plt evaluations are required only for lighting equipment which is likely to produce flicker; for example: disco lighting and automatically regulated equipment." Incandescent lamp luminaires with ratings less than or equal to 1 000 W and discharge lamp luminaires with ratings less than or equal to 600 W and LED luminaires with ratings less than or equal to 200 W, are deemed to comply with the dmax limits in this standard and are not required to be tested.



2 Contents

	Page
COVER PAGE	1
1 TEST SUMMARY	2
2 CONTENTS	3
3 GENERAL INFORMATION	5
3.1 GENERAL DESCRIPTION OF E.U.T.	5
3.2 DETAILS OF E.U.T.	5
3.3 DESCRIPTION OF SUPPORT UNITS	5
3.4 STANDARDS APPLICABLE FOR TESTING	5
3.5 TEST FACILITY	6
3.6 SUBCONTRACTED	6
3.7 ABNORMALITIES FROM STANDARD CONDITIONS	6
3.8 OTHER	6
4 EQUIPMENT USED DURING TEST	7
4.1 SOFTWARE LIST	8
4.2 MEASUREMENT UNCERTAINTY	9
4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	9
4.4 DECISION RULE	9
5 EMISSION TEST RESULTS	10
5.1 MAINS TERMINALS DISTURBANCE VOLTAGE, 9KHz TO 30MHz	10
5.1.1 E.U.T. Operation	10
5.1.2 Block Diagram of Test Setup	10
5.1.3 Measurement Data	10
5.1.4 Corrected Amplitude & Margin Calculation	11
5.1.5 Mains Terminals Disturbance Voltage Test Data	11
5.2 RADIATED ELECTROMAGNETIC DISTURBANCE, 9KHz TO 30MHz	13
5.2.1 E.U.T. Operation	13
5.2.2 Block Diagram of Test Setup	13
5.2.3 Measurement Data	13
5.2.4 Radiated Electromagnetic Disturbance Test Data, 9KHz to 30MHz	14
5.3 RADIATED EMISSION, 30MHz TO 300MHz	17
5.3.1 E.U.T. Operation	17
5.3.2 Block Diagram of Test Setup	17
5.3.3 Measurement Data	17
5.3.4 Corrected Amplitude & Margin Calculation	18
5.3.5 Radiated Emission Test Data	18
6 IMMUNITY TEST RESULTS	20
6.1 PERFORMANCE CRITERIA	20
6.2 ELECTROSTATIC DISCHARGE (ESD)	21
6.2.1 E.U.T. Operation	21
6.2.2 Block Diagram of Setup	21
6.2.3 Direct Discharge Test Results	22
6.2.4 Indirect Discharge Test Results	22
6.3 RADIO-FREQUENCY ELECTROMAGNETIC FIELDS, 80MHz TO 1GHz	23
6.3.1 E.U.T. Operation	23
6.3.2 Block Diagram of Setup	24
6.3.3 Test Results	24
6.4 ELECTRICAL FAST TRANSIENTS (EFT)	25
6.4.1 E.U.T. Operation	25
6.4.2 Block Diagram of Setup	26



6.4.3	Test Results.....	26
6.5	SURGE.....	27
6.5.1	E.U.T. Operation	27
6.5.2	Block Diagram of Setup.....	27
6.5.3	Test Results.....	28
6.6	INJECTED CURRENTS IMMUNITY, 0.15MHZ TO 80MHZ	29
6.6.1	E.U.T. Operation	29
6.6.2	Block Diagram of Setup.....	30
6.6.3	Test Results.....	30
6.7	VOLTAGE DIPS AND INTERRUPTIONS	31
6.7.1	E.U.T. Operation	31
6.7.2	Block Diagram of Setup.....	31
6.7.3	Test Results.....	32
7	PHOTOGRAPHS – TEST SETUP	33
7.1	PHOTOGRAPH – MAINS TERMINAL DISTURBANCE VOLTAGE TEST SETUP.....	33
7.2	PHOTOGRAPH – RADIATED ELECTROMAGNETIC DISTURBANCE TEST SETUP.....	33
7.3	PHOTOGRAPH – RADIATED EMISSION TEST SETUP, 30MHZ TO 300MHZ.....	34
7.4	PHOTOGRAPH – ESD IMMUNITY TEST SETUP.....	34
7.5	PHOTOGRAPH – RADIO-FREQUENCY ELECTROMAGNETIC FIELDS IMMUNITY TEST SETUP.....	35
7.6	PHOTOGRAPH – EFT IMMUNITY TEST SETUP.....	35
7.7	PHOTOGRAPH – SURGE IMMUNITY TEST SETUP	36
7.8	PHOTOGRAPH – INJECTED CURRENTS IMMUNITY TEST SETUP	36
7.9	PHOTOGRAPH – VOLTAGE DIPS AND INTERRUPTIONS IMMUNITY TEST SETUP.....	37
8	PHOTOGRAPHS – CONSTRUCTIONAL DETAILS.....	38
8.1	EUT – FRONT VIEW.....	38
8.2	EUT – BACK VIEW.....	38
8.3	EUT – LED DRIVER VIEW.....	39

WALTEK



3 General Information

3.1 General Description of E.U.T.

Product Name : LED Ceiling Light

Model No. : Refer to section 3.2

Remark..... : All models have same electric circuit only their rated power is different. Model 191244005-1 is the biggest power model. Therefore it can represent other models to performed EMC tests.

3.2 Details of E.U.T.

Technical Data..... :

Item	Model	Rated Input	Rated Power
1	191244005-1	AC 220-240V, 50Hz	18W
2	191143001-1	AC 220-240V, 50Hz	12W
3	191144001-1	AC 220-240V, 50Hz	18W

3.3 Description of Support Units

The EUT has been tested as an independent unit. 191244005-1 is the test sample. The DV&RE tests were performed in the condition of AC 245V/50Hz input. The other tests were performed in the condition of AC 230V/50Hz input.

3.4 Standards Applicable for Testing

The tests were performed according to following standards:

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 up to and including 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.



3.5 Test Facility

The test facility has a test site registered with the following organizations:

- **ISED – Registration No.: 21895**

Waltek Testing Group (Foshan) Co., Ltd. has been registered and fully described in a report filed with the Innovation, Science and Economic Development Canada (ISED). The acceptance letter from the ISED is maintained in our files. Registration ISED number: 21895, March 12, 2019

- **FCC – Registration No.: 820106**

Waltek Testing Group (Foshan) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 820106, August 16, 2018

- **NVLAP – Lab Code: 600191-0**

Waltek Testing Group (Foshan) Co., Ltd. EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 600191-0.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

3.6 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: ---

Lab information: ---

3.7 Abnormalities from Standard Conditions

None.

3.8 Other

This report is based on report No. WTZ20F07049677E for updating model name. It does not affect the EMC test items. Original report NO. WTZ20F07049677E is no longer valid.



4 Equipment Used during Test

Mains Terminal Disturbance Voltage 1#(Conducted Emission)					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESR3	102423	Valid
2.	LISN	R&S	ENV216	101343	Valid
3.	Cable	HUBER+SUHNER	CBL2-NN-6M	223NN624	Valid
4.	Switch	CD	RSU-A4 18G	RSUA4008	Valid
Mains Terminal Disturbance Voltage 2#(Conducted Emission)					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESCI	101178	Valid
2.	LISN	R&S	ENV216	101215	Valid
3.	Cable	HUBER+SUHNER	CBL2-NN-6M	6102701	Valid
4.	Switch	ESE	RSU/M2	---	Valid
Radiated electromagnetic disturbance(9kHz to 30MHz)					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESCI	101178	Valid
2	Three Loops Antenna	SCHWARZBECK	HXYZ9170	213	Valid
Radiated Emission					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESR7	101566	Valid
2.	Active Loop Antenna	SCHWARZBECK	FMZB1519B	00004	Valid
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB 9162	9162-117	Valid
4.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	01561	Valid
5.	Preamplifier	Lunar E M	LNA1G18-40	20160501002	Valid
ESD					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	ESD Simulator	TESEQ	NSG437	521	Valid
EFT & Voltage Dips and Interruptions					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMS test system	TESEQ	NSG3040	0319	Valid
2.	Clamp	TESEQ	CDN8014	31405	Valid
Surge					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	Surge Simulator	TESEQ	NSG3060	1395	Valid



Injected Currents					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	Conducted Immunity test system	TESEQ	NSG4070	31469	Valid
2.	CDN	TESEQ	CDN M016	31586	Valid
3.	Clamp	TESEQ	KEMZ801	32362	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

4.1 Software List

Description	Manufacturer	Model	Version
EMI Test Software (Conducted Emission1#)	FARATRONIC	EZ-EMC	EMEC-3A1
EMI Test Software (Conducted Emission2#)	FARATRONIC	EZ-EMC	CON-03A1
EMI Test Software (LOOP)	FARATRONIC	EZ-EMC	CON-03A1
EMI Test Software (Radiated Emission)	FARATRONIC	EZ-EMC	RA-03A1-1
Radiated Immunity Test Software	TONSCEND	JS35-RS	V2.0.1.7



4.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Emission	150kHz~30MHz	$\pm 2.7\text{dB}$	(1)
Radiated Electromagnetic Disturbance	9kHz~30MHz	$\pm 3.0\text{dB}$	(1)
Radiated Emission	30MHz~1GHz	$\pm 4.1\text{dB}$	(1)

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

4.3 Special Accessories and Auxiliary Equipment

Item	Equipment	Technical Data	Manufacturer	Model No.	Serial No.
1.	/	/	/	/	/

4.4 Decision Rule

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} , 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} , then

- Compliance is deemed to occur if no measured disturbance level, increased by $(U_{\text{LAB}} - U_{\text{cispr}})$, exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{\text{LAB}} - U_{\text{cispr}})$, exceeds the disturbance limit.



5 Emission Test Results

5.1 Mains Terminals Disturbance Voltage, 9kHz to 30MHz

Test Requirement..... : EN 55015 Clause 4.3.1

Test Method..... : EN 55015 Clause 8

Test Result..... : Pass

Frequency Range..... : 9kHz to 30MHz

Class/Severity..... : Table 2a of EN 55015

5.1.1 E.U.T. Operation

Operating Environment:

Temperature : 25°C

Humidity..... : 60%RH

Atmospheric Pressure..... : 101.2kPa

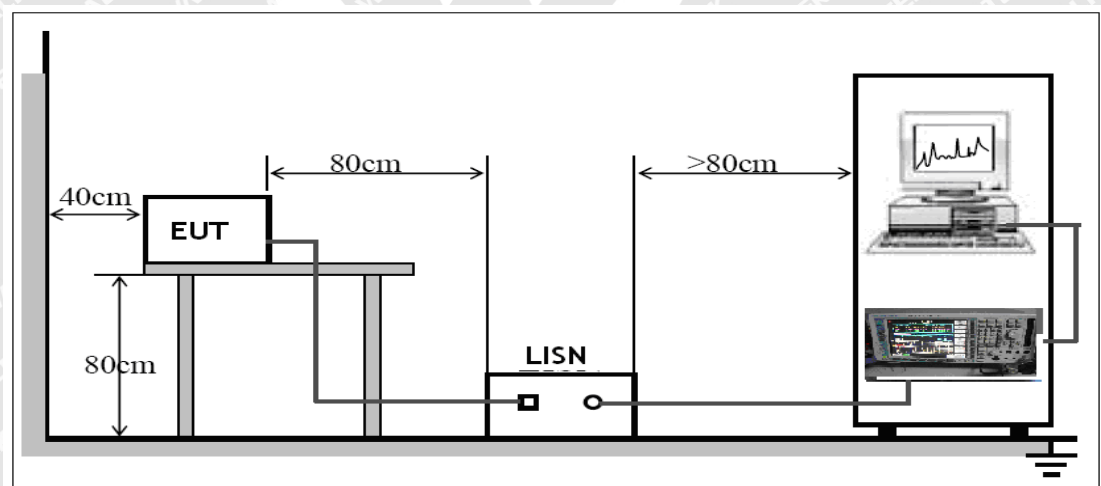
EUT Operation:

Input Voltage : AC 245V/50Hz

Operating Mode..... : Lighting Mode

5.1.2 Block Diagram of Test Setup

The Mains Terminals Disturbance Voltage tests were performed in accordance with the EN 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 Corrected Amplitude & Margin Calculation

The Corrected factor is calculated by adding LISN VDF(Voltage Division Facotr), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Measurement} = \text{Reading Level} + \text{Correct Factor}$$

$$\text{Correct Facotor} = \text{LISN VDF} + \text{Cable Loss}$$

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

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

5.1.5 Mains Terminals Disturbance Voltage Test Data

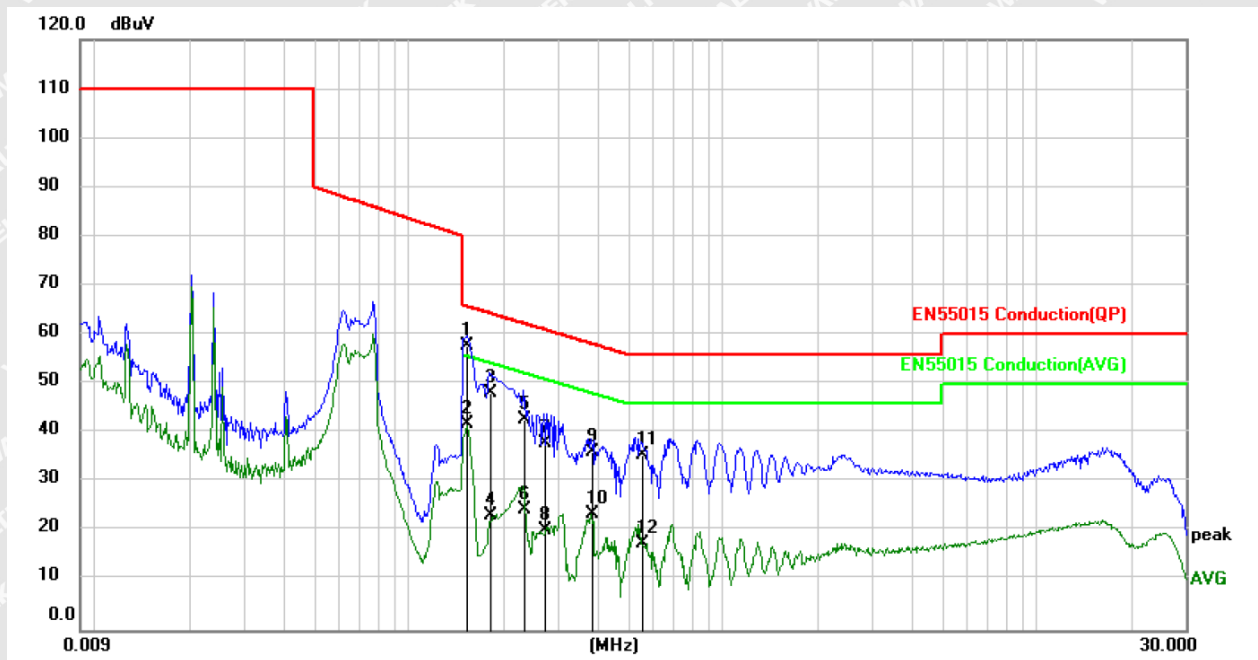
Live Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1539	50.45	9.64	60.09	65.79	-5.70	QP	
2		0.1539	33.36	9.64	43.00	55.79	-12.79	AVG	
3		0.2060	40.12	9.65	49.77	63.37	-13.60	QP	
4		0.2060	20.81	9.65	30.46	53.37	-22.91	AVG	
5		0.2660	30.72	9.65	40.37	61.24	-20.87	QP	
6		0.2660	13.32	9.65	22.97	51.24	-28.27	AVG	
7		0.3820	32.67	9.65	42.32	58.24	-15.92	QP	
8		0.3820	19.21	9.65	28.86	48.24	-19.38	AVG	
9		0.5299	30.48	9.66	40.14	56.00	-15.86	QP	
10		0.5299	15.12	9.66	24.78	46.00	-21.22	AVG	
11		0.6860	29.26	9.67	38.93	56.00	-17.07	QP	
12		0.6860	14.41	9.67	24.08	46.00	-21.92	AVG	



Neutral Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1539	48.18	9.61	57.79	65.79	-8.00	QP	
2		0.1539	32.21	9.61	41.82	55.79	-13.97	AVG	
3		0.1819	38.64	9.61	48.25	64.40	-16.15	QP	
4		0.1819	13.54	9.61	23.15	54.40	-31.25	AVG	
5		0.2340	33.04	9.62	42.66	62.31	-19.65	QP	
6		0.2340	14.96	9.62	24.58	52.31	-27.73	AVG	
7		0.2700	28.19	9.62	37.81	61.12	-23.31	QP	
8		0.2700	10.65	9.62	20.27	51.12	-30.85	AVG	
9		0.3820	26.52	9.62	36.14	58.24	-22.10	QP	
10		0.3820	13.88	9.62	23.50	48.24	-24.74	AVG	
11		0.5500	25.97	9.64	35.61	56.00	-20.39	QP	
12		0.5500	7.88	9.64	17.52	46.00	-28.48	AVG	



5.2 Radiated Electromagnetic Disturbance, 9kHz to 30MHz

Test Requirement..... : EN 55015 Clause 4.4.1

Test Method..... : EN 55015 Clause 9.1

Test Result..... : Pass

Frequency Range..... : 9kHz to 30MHz

Class/Severity..... : Table 3a of EN 55015

5.2.1 E.U.T. Operation

Operating Environment:

Temperature : 24.8°C

Humidity..... : 49.3%RH

Barometric Pressure..... : 101.2kPa

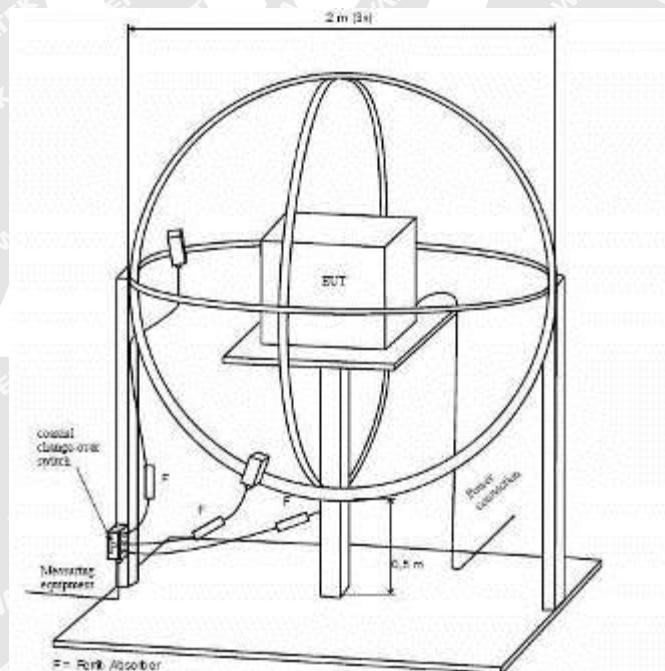
EUT Operation:

Input Voltage : AC 245V/50Hz

Operating Mode..... : Lighting mode

5.2.2 Block Diagram of Test Setup

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



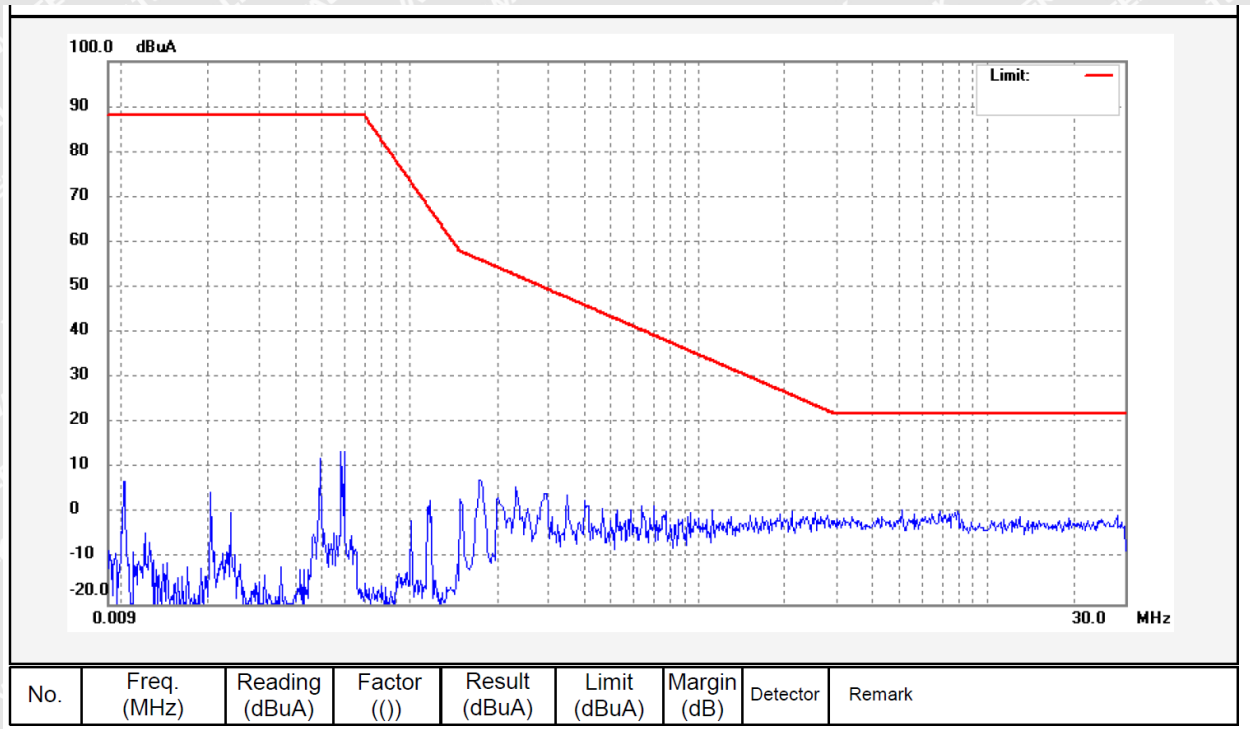
5.2.3 Measurement Data

According to the data in section 5.2.4, the EUT complied with the EN 55015 standards. The maximised peak emissions from the EUT was scanned and measured for three loops. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.



5.2.4 Radiated Electromagnetic Disturbance Test Data, 9kHz to 30MHz

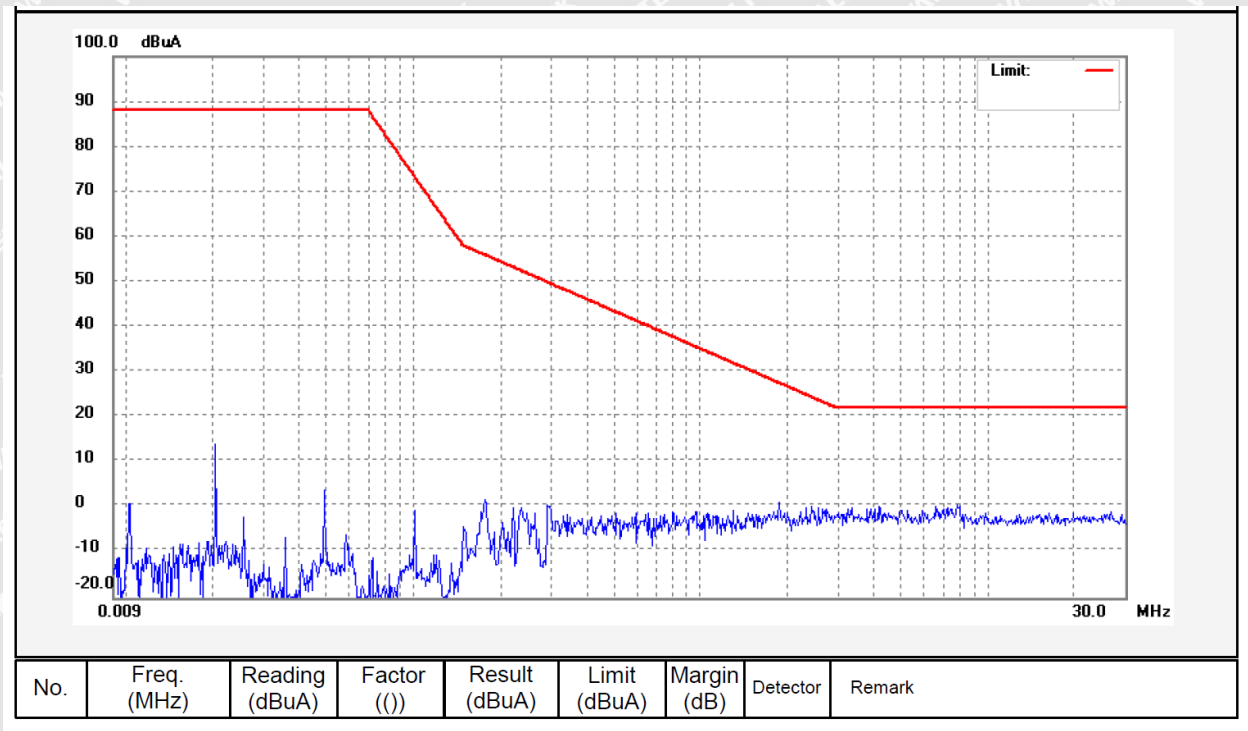
Loop X



WALTEK



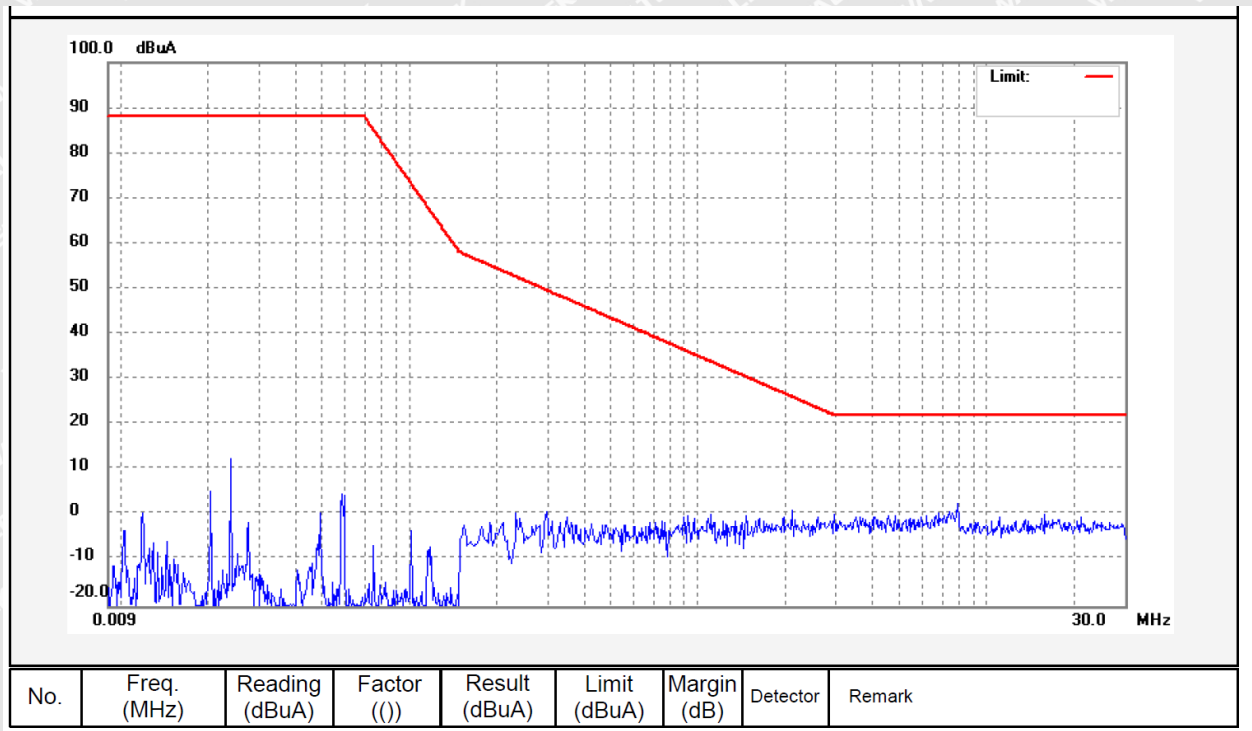
Loop Y



WALTEK



Loop Z



WALTEK



5.3 Radiated Emission, 30MHz to 300MHz

Test Requirement.....	: EN 55015
Test Method.....	: EN 55015
Test Result.....	: Pass
Frequency Range.....	: 30MHz to 300MHz
Class/Severity.....	: Table 3b of EN 55015

5.3.1 E.U.T. Operation

Operating Environment:

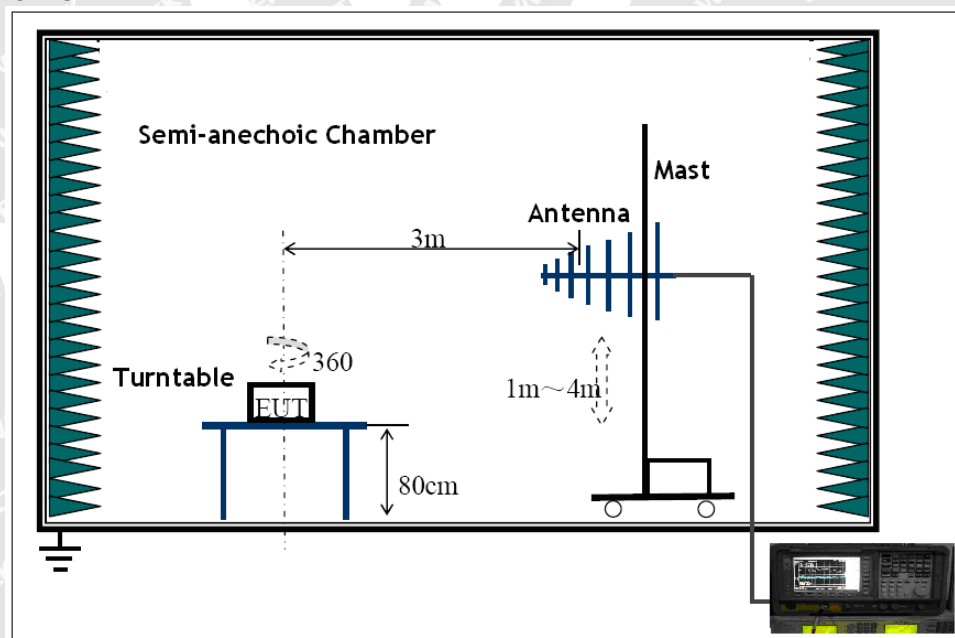
Temperature	: 24.5°C
Humidity.....	: 50.5%RH
Atmospheric Pressure	: 101.2kPa

EUT Operation:

Input Voltage	: AC 245V/50Hz
Operating Mode.....	: Lighting mode

5.3.2 Block Diagram of Test Setup

The Radiated Emission test was performed in the 3m Semi- Anechoic Chamber test site and accordance with CISPR16-2-3.



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.



5.3.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Corr. Factor}$$

$$\text{Corr. Factor} = \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

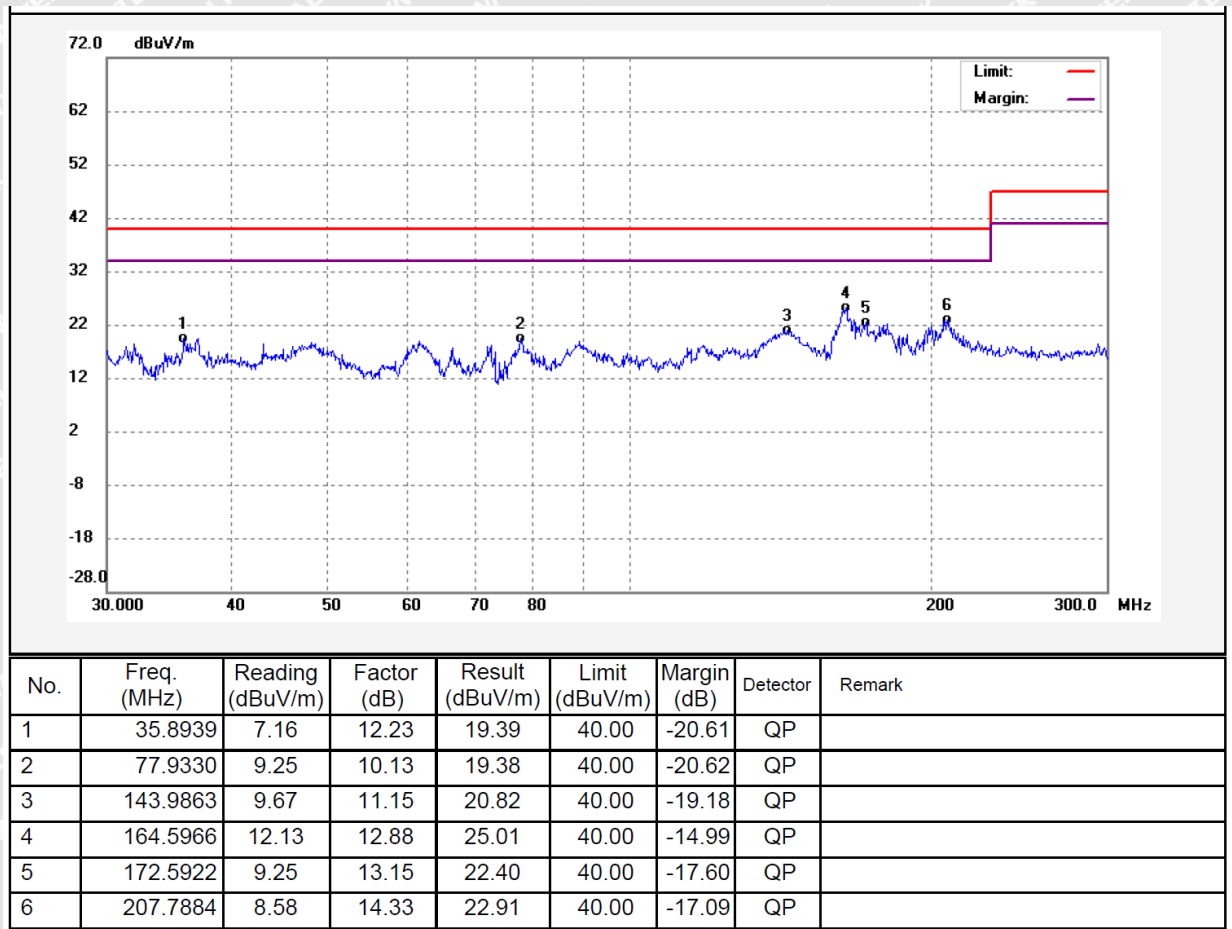
The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit.

The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

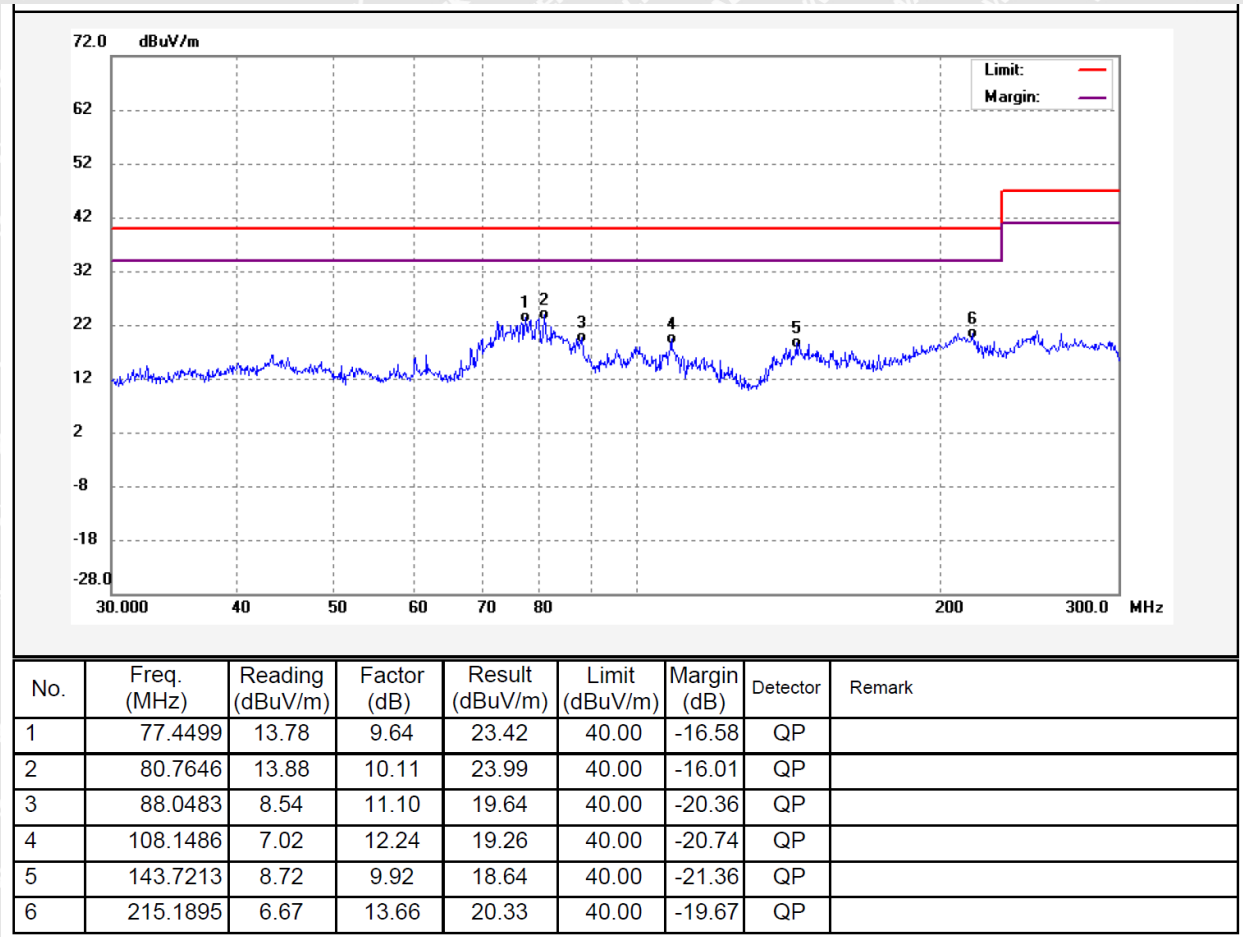
5.3.5 Radiated Emission Test Data

Vertical Polarization





Horizontal Polarization



WALTEK



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.



WALTEK



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:

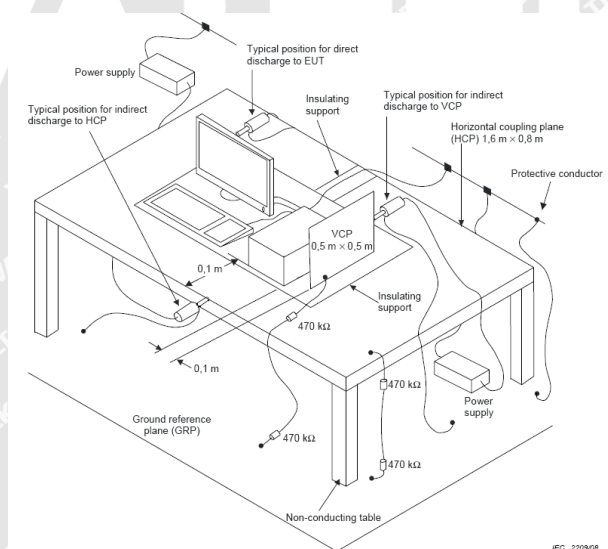
Temperature	: 23.1°C
Humidity	: 45.2%RH
Barometric Pressure	: 100.1kPa

EUT Operation:

Input Voltage.....	: AC 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
±8	B	1	N/A	Pass*
±4	B	2	Pass*	N/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
±4	B	1	Pass*	Pass*

Remark:

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

WALTEK



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
Test Distance	:	3m

6.3.1E.U.T. Operation

Operating Environment:

Temperature	:	25.1°C
Humidity.....	:	49.9%RH
Barometric Pressure.....	:	101.8kPa

EUT Operation:

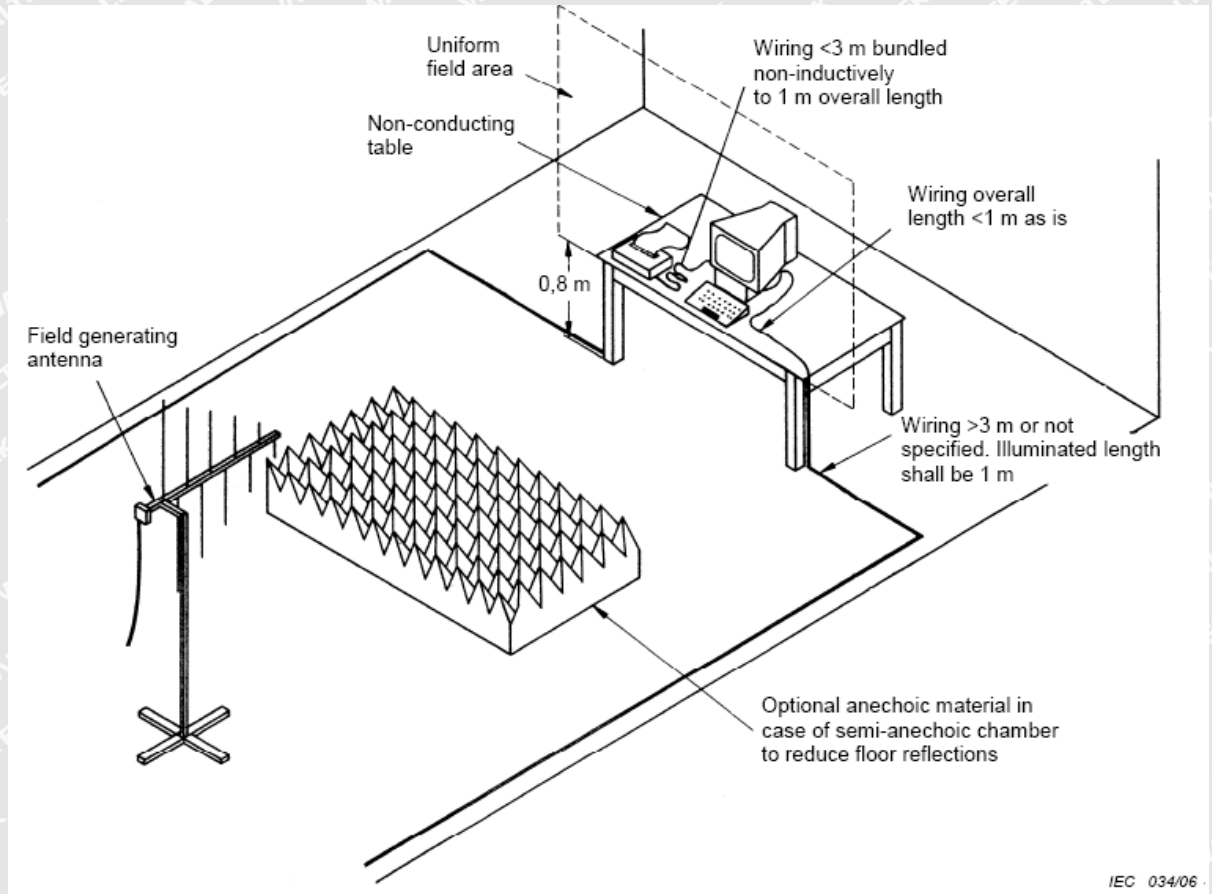
Input Voltage	:	AC 230V/50Hz
Operating Mode.....	:	On mode

WALTEK



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
80 to 1000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
80 to 1000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*

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

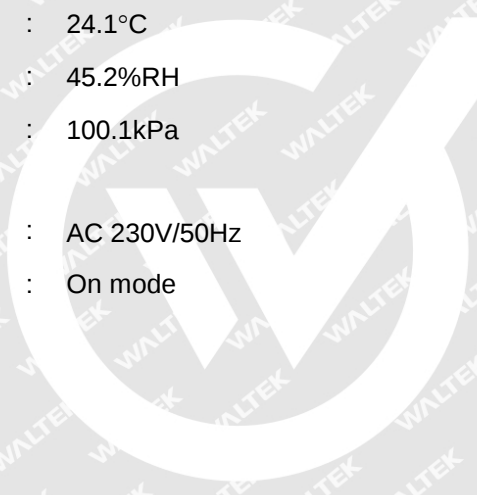
6.4.1E.U.T. Operation

Operating Environment:

Temperature	: 24.1°C
Humidity.....	: 45.2%RH
Barometric Pressure.....	: 100.1kPa

EUT Operation:

Input Voltage	: AC 230V/50Hz
Operating Mode.....	: On mode

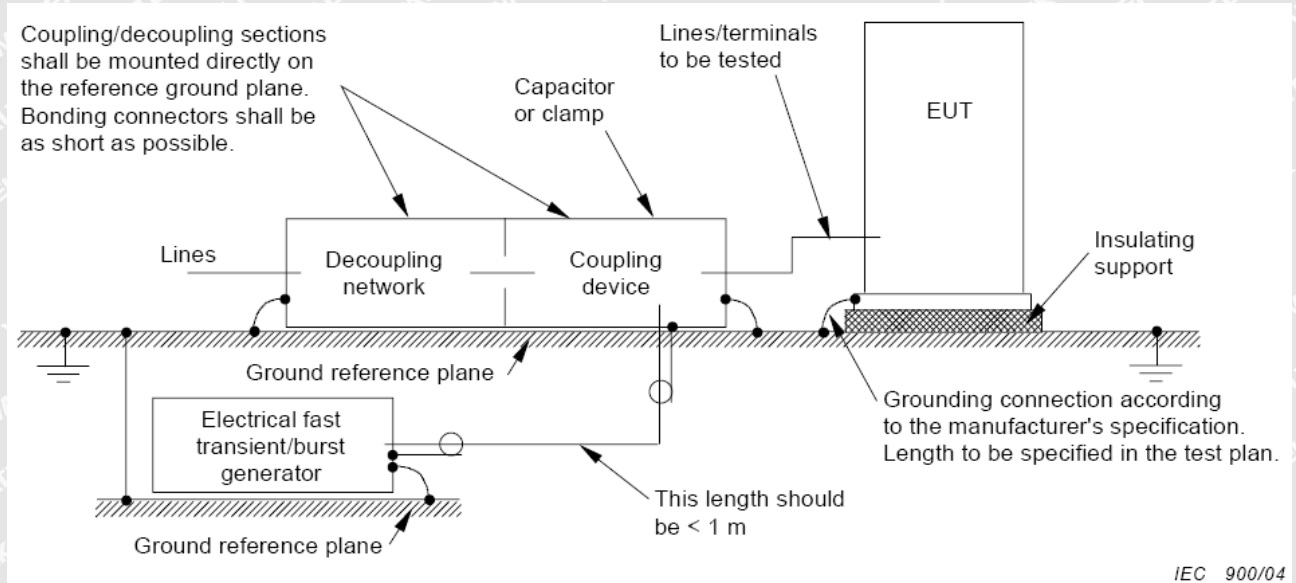


WALTEK



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
Line-Neutral-PE	± 1.0	B	Pass*

Remark:

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

WALTEK



6.5 Surge

Test Requirement.....	: EN 61547
Test Method.....	: IEC 61000-4-5
Test Result.....	: Pass
Test level.....	: Table 10 of EN61547
Interval	: 60s between each surge
No. of surges	: 5 positive at 90°, 5 negative at 270°.

6.5.1E.U.T. Operation

Operating Environment:

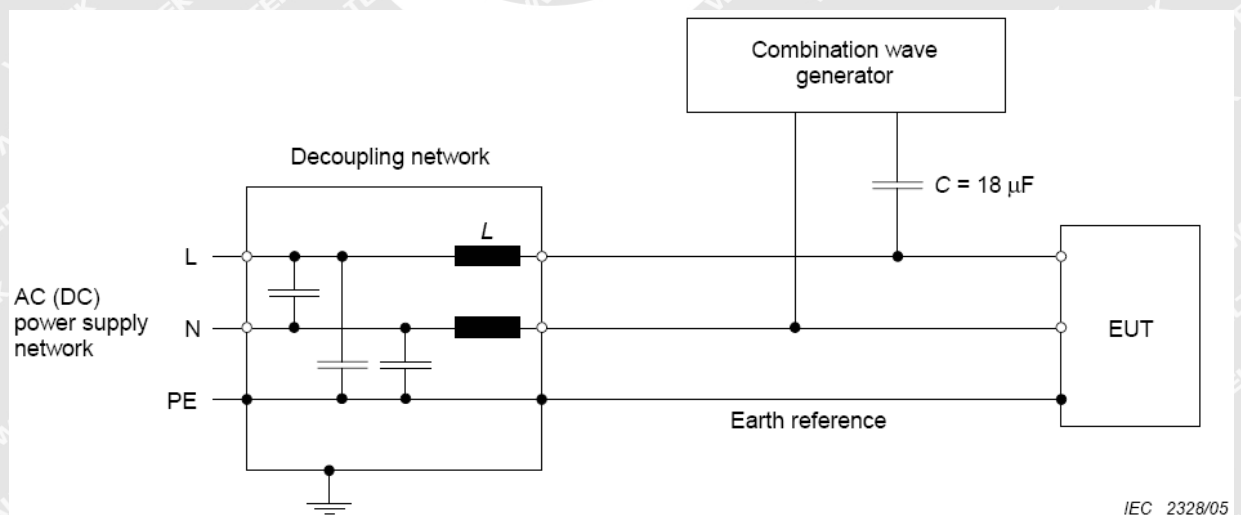
Temperature	: 23.6°C
Humidity.....	: 46.3%RH
Barometric Pressure.....	: 101.2kPa

EUT Operation:

Input Voltage	: AC 230V/50Hz
Operating Mode.....	: On mode

6.5.2Block 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
Between Phase And Phase	± 1	C	N/A
Between Live And Neutral	± 0.5	C	Pass*
Between Live And Earth	± 1	C	Pass*
Between Neutral And Earth	± 1	C	Pass*

Remark:

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



WALTEK



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.

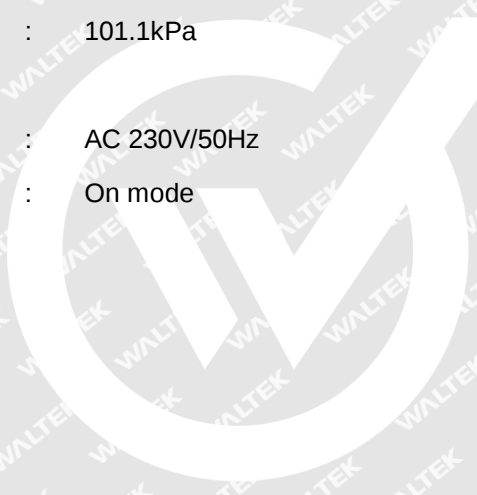
6.6.1E.U.T. Operation

Operating Environment:

Temperature	:	23.1°C
Humidity.....	:	45.7%RH
Barometric Pressure.....	:	101.1kPa

EUT Operation:

Input Voltage	:	AC 230V/50Hz
Operating Mode.....	:	On mode

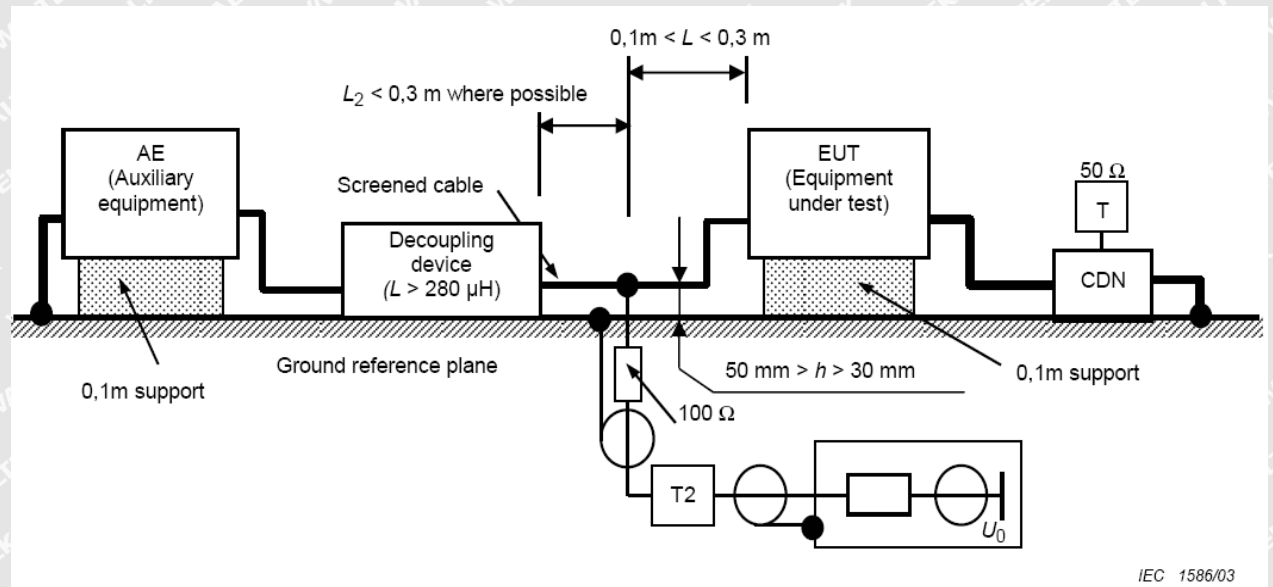


WALTEK



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
0.15MHz to 80MHz	3 Wire AC Supply Cables	3Vr.m.s.	80%, 1kHz Amp. Mod.	1%	1s	A	Pass*

Remark:

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



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

6.7.1E.U.T. Operation

Operating Environment:

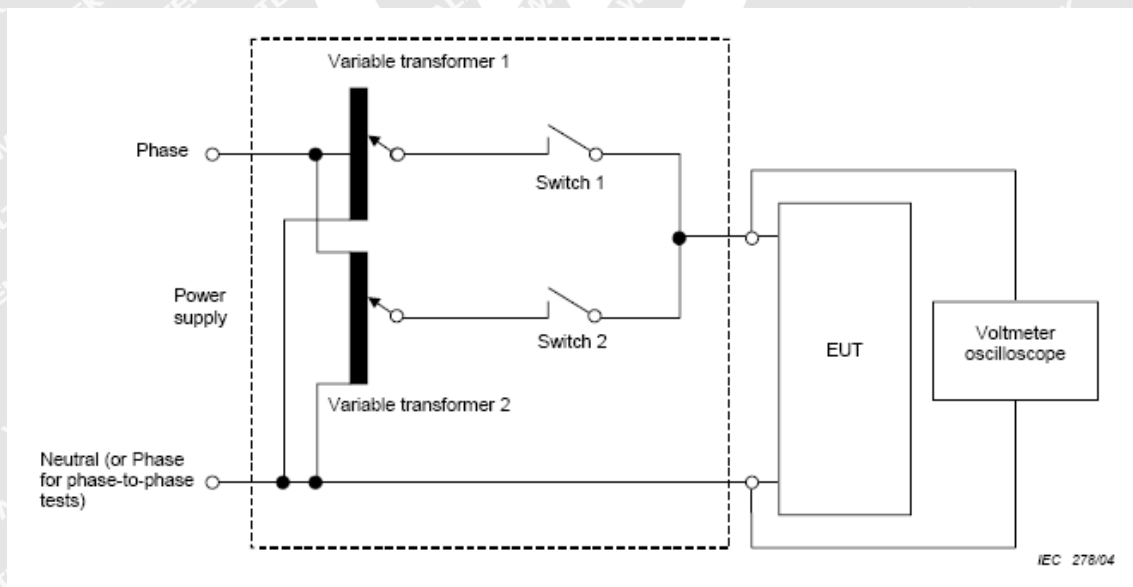
Temperature	: 23.8°C
Humidity.....	: 44.6%RH
Barometric Pressure.....	: 101.1kPa

EUT Operation:

Input Voltage	: AC 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
0	0°	B	0.5	Pass*
	180°			Pass*
70	0°	C	10	Pass*
	180°			Pass*

Remark:

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



WALTEK



7 Photographs – Test Setup

7.1 Photograph – Mains Terminal Disturbance Voltage Test Setup



7.2 Photograph – Radiated Electromagnetic Disturbance Test Setup





7.3 Photograph – Radiated Emission Test Setup, 30MHz to 300MHz

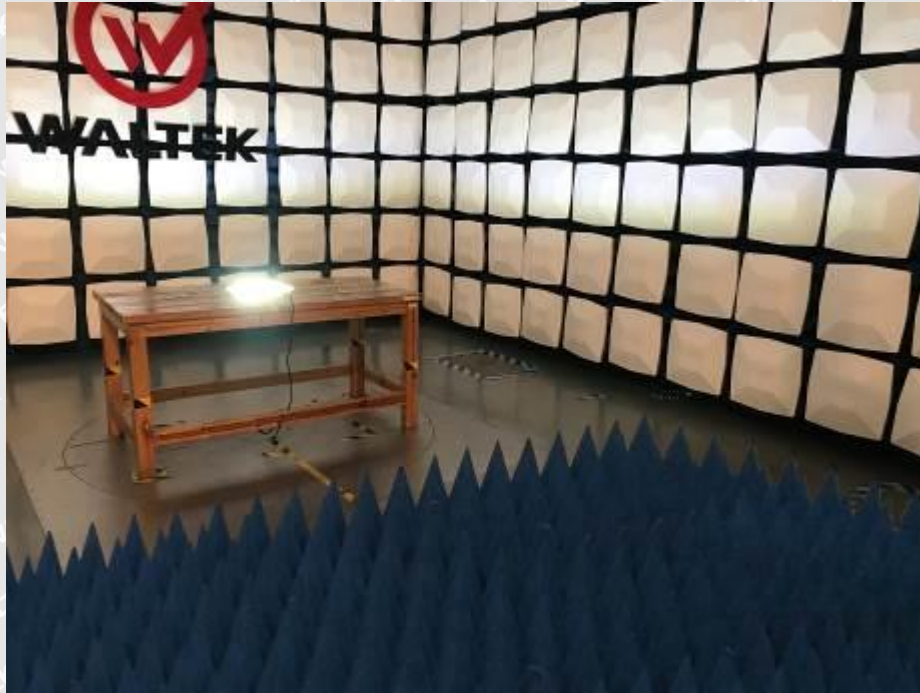


7.4 Photograph – ESD Immunity Test Setup





7.5 Photograph – Radio-Frequency Electromagnetic Fields Immunity Test Setup



7.6 Photograph – EFT Immunity Test Setup





7.7 Photograph – Surge Immunity Test Setup



7.8 Photograph – Injected Currents Immunity Test Setup





7.9 Photograph – Voltage Dips and Interruptions Immunity Test Setup



WALTEK

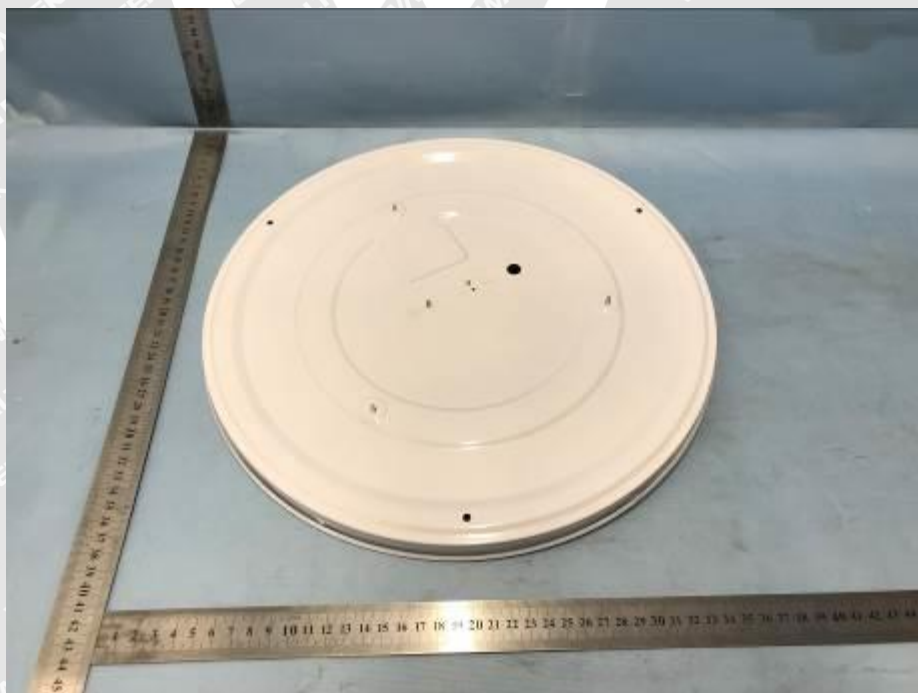


8 Photographs – Constructional Details

8.1 EUT – Front View



8.2 EUT – Back View





8.3 EUT – LED Driver View



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

WALTEK