

EMC TEST REPORT

Electrical lighting and similar equipment

Test Report No.:	TCT240612E074	
Date of issue	Jul. 08, 2024	
Testing laboratory.....:	Shenzhen TCT Testing Technology Co., Ltd.	
Testing location/ address.....:	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Applicant's name	BRAYTRON S.R.L	
Address.....:	B.DUL IULIU MANIU, NR.616, CORP B, ETAJ 1 SECTOR 6, 061129, BUCHAREST, ROMANIA	
Manufacturer's name	DEMGRUP INTERNATIONAL LIGHTING LIMITED	
Address.....:	UNIT D 16/F, ONE CAPITAL PLACE, 18 LUARD ROAD, WAN CHAI, HONG KONG	
Standard(s).....:	EN IEC 55015:2019+A11:2020 EN IEC 61547:2023 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A1:2019+A2:2021	
Test item description.....:	LED LIGHTING FIXTURE	
Trade Mark.....:	BRAYTRON	
Model/Type reference	Refer to model(s) list of page 3~5	
Rating(s)	Input: AC 220-240 V, 50/60 Hz	
Date of receipt of test item.....:	Jun. 12, 2024	
Date (s) of performance of test:	Jun. 12, 2024 ~ Jul. 08, 2024	
Tested by (+signature).....:	Kyle ZHOU	
Check by (+signature)	Howie LYU	
Approved by (+signature)	Tomsin	



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1. General Product Information

1.1.EUT description

Test item description..... :	LED LIGHTING FIXTURE
Model/Type reference..... :	BH17-04691
Rating(s)..... :	Input: AC 220-240 V, 50/60 Hz
AC Line..... :	<input type="checkbox"/> Shielded <input type="checkbox"/> Unshielded, <input type="checkbox"/> Detachable <input type="checkbox"/> Un-detachable <input checked="" type="checkbox"/> No applicable <input type="checkbox"/> Length:
DC Line..... :	<input type="checkbox"/> Shielded <input type="checkbox"/> Unshielded, <input type="checkbox"/> Detachable <input type="checkbox"/> Un-detachable <input checked="" type="checkbox"/> No applicable <input type="checkbox"/> Length:

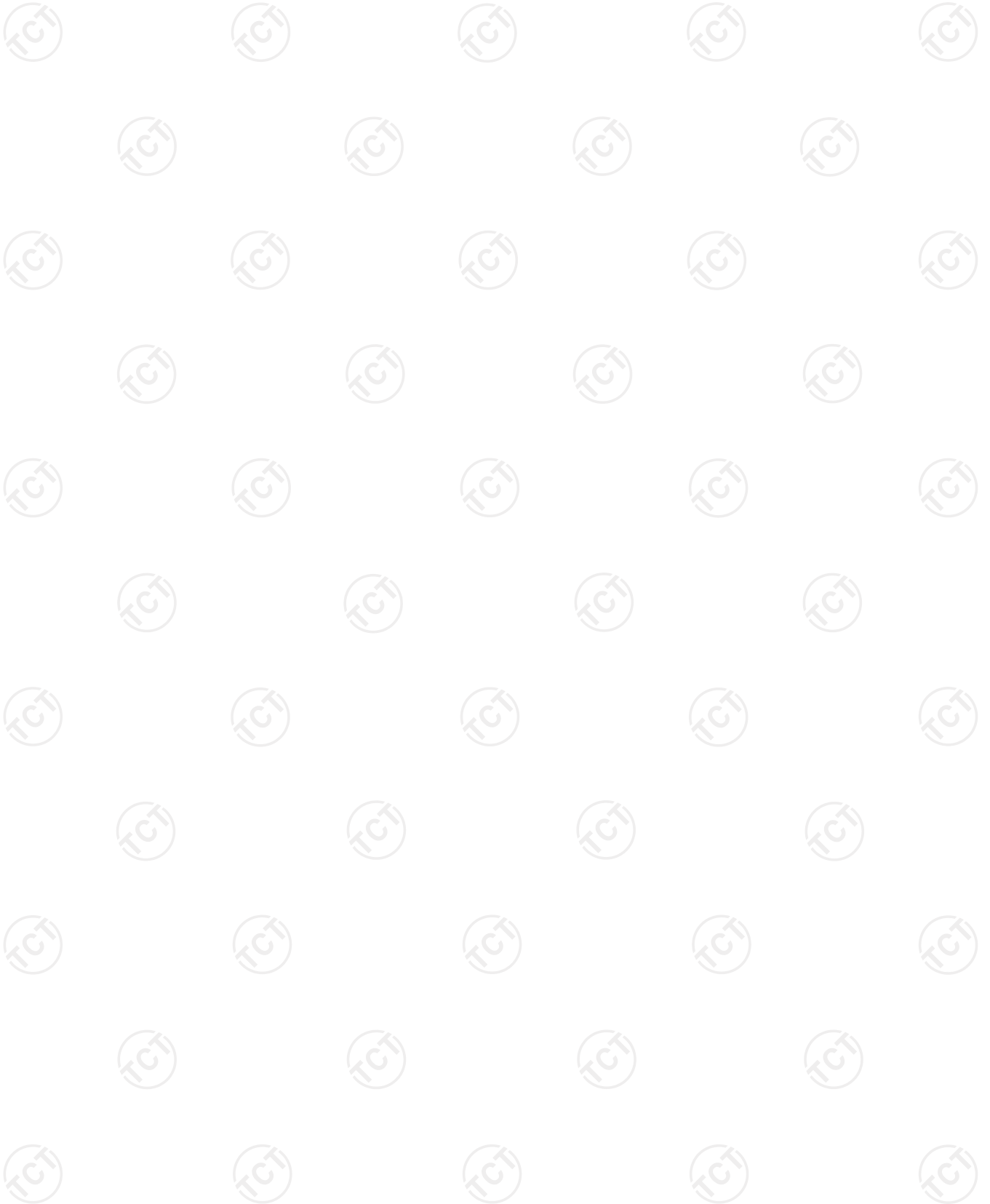
1.2.Model(s) list

No.	Model No.	Tested with
1	BH17-04691	<input checked="" type="checkbox"/>
Other models	BH17-X01XX, BH17-X02XX, BH17-X03XX, BH17-X04XX, BH17-X05XX, BH17-X06XX, BH17-X07XX, BH17-X08XX, BH17-X09XX, BH17-X10XX, BH17-X11XX, BH17-X12XX, BH17-X13XX, BH17-X14XX, BH17-X15XX, BH17-X16XX, BH17-X17XX, BH17-X18XX, BH17-X19XX, BH17-X20XX, BH17-X21XX, BH17-X22XX, BH17-X23XX, BH17-X24XX, BH17-X25XX, BH17-X26XX, BH17-X27XX, BH17-X28XX, BH17-X29XX, BH17-X30XX, BH17-X31XX, BH17-X32XX, BH17-X33XX, BH17-X34XX, BH17-X35XX, BH17-X36XX, BH17-X37XX, BH17-X38XX, BH17-X39XX, BH17-X40XX, BH17-X41XX, BH17-X42XX, BH17-X43XX, BH17-X44XX, BH17-X45XX, BH17-X46XX, BH17-X47XX, BH17-X48XX, BH17-X49XX, BH17-X50XX, BH17-X51XX, BH17-X52XX, BH17-X53XX, BH17-X54XX, BH17-X55XX, BH17-X56XX, BH17-X57XX, BH17-X58XX, BH17-X59XX, BH17-X60XX, BH17-X61XX, BH17-X62XX, BH17-X63XX, BH17-X64XX, BH17-X65XX, BH17-X66XX, BH17-X67XX, BH17-X68XX, BH17-X69XX, BH17-X70XX, BH17-X71XX, BH17-X72XX, BH17-X73XX, BH17-X74XX, BH17-X75XX, BH17-X76XX, BH17-X77XX, BH17-X78XX, BH17-X79XX, BH17-X80XX, BH17-X81XX, BH17-X82XX, BH17-X83XX, BH17-X84XX, BH17-X85XX, BH17-X86XX, BH17-X87XX, BH17-X88XX, BH17-X89XX, BH17-X90XX, BH17-X91XX, BH17-X92XX, BH17-X93XX, BH17-X94XX, BH17-X95XX, BH17-X96XX, BH17-X97XX, BH17-X98XX, BH18-X01XX, BH18-X02XX, BH18-X03XX, BH18-X04XX, BH18-X05XX, BH18-X06XX, BH18-X07XX, BH18-X08XX, BH18-X09XX, BH18-X10XX, BH18-X11XX, BH18-X12XX, BH18-X13XX, BH18-X14XX, BH18-X15XX, BH18-X16XX, BH18-X17XX, BH18-X18XX, BH18-X19XX, BH18-X20XX, BH18-X21XX, BH18-X22XX, BH18-X23XX, BH18-X24XX, BH18-X25XX, BH18-X26XX, BH18-X27XX, BH18-X28XX, BH18-X29XX, BH18-X30XX, BH18-X31XX, BH18-X32XX, BH18-X33XX, BH18-X34XX, BH18-X35XX, BH18-X36XX, BH18-X37XX, BH18-X38XX, BH18-X39XX, BH18-X40XX, BH18-X41XX, BH18-X42XX, BH18-X43XX, BH18-X44XX, BH18-X45XX, BH18-X46XX, BH18-X47XX, BH18-X48XX, BH18-X49XX, BH18-X50XX, BH18-X51XX, BH18-X52XX, BH18-X53XX, BH18-X54XX, BH18-X55XX, BH18-X56XX, BH18-X57XX, BH18-X58XX, BH18-X59XX, BH18-X60XX, BH18-X61XX, BH18-X62XX, BH18-X63XX, BH18-X64XX, BH18-X65XX, BH18-X66XX, BH18-X67XX, BH18-X68XX, BH18-X69XX, BH18-X70XX, BH18-X71XX, BH18-X72XX, BH18-X73XX, BH18-X74XX, BH18-X75XX, BH18-X76XX, BH18-X77XX, BH18-X78XX, BH18-X79XX, BH18-X80XX, BH18-X81XX, BH18-X82XX, BH18-X83XX, BH18-X84XX, BH18-X85XX, BH18-X86XX, BH18-X87XX, BH18-X88XX, BH18-X89XX, BH18-X90XX, BH18-X91XX, BH18-X92XX, BH18-X93XX, BH18-X94XX, BH18-X96XX, BH18-X97XX, BH18-X98XX,	

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BH15-X94XX, BH15-X95XX, BH15-X96XX, BH15-X97XX, BH15-X98XX

(X=0,1,2,3,4,5,6,7,8,9)

Note: BH17-04691 is tested model, other models are derivative models. The models are identical in circuit and PCB layout, only different on the model names. So the test data of BH17-04691 can represent the remaining models.



2. Test Information

2.1.EUT operation mode(s)

Mode #	Operating mode description	Test voltage
1	Lighting(Max)	AC 230 V/ 50 Hz
2	Lighting(Min)	AC 230 V/ 50 Hz
3	Lighting(Mid)	AC 230 V/ 50 Hz

Test worst operating mode	
Disturbance voltage at mains terminals	Mode 1
Radiated electromagnetic disturbances	Mode 2
Remark: The worst measurement data and graphical presentation show in this report.	

2.2.Special accessories and auxiliary equipment

Product Type	Manufacturer	Model No.	Serial No.
/	/	/	/

Auxiliary cable description

Port name	Specified length(m)	Shielded	Unshielded
/	/	/	/

2.3.Configuration of system under test



(EUT: LED LIGHTING FIXTURE)

2.4. General test conditions

Environmental reference conditions

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.

The climatic conditions during the tests were within the following limits:

Temperature	Humidity	Atmospheric pressure
15 °C – 30 °C	30 % - 60 %	86 kPa – 106 kPa

If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.

Measurement uncertainties

Test Item	Uncertainty
Uncertainty for Disturbance voltage at the mains terminals	3.32 dB
Uncertainty for Radiated emission (9kHz to 30 MHz)	2.92dB
Uncertainty for Radiated emission (30 MHz to 1 GHz)	4.86 dB

The overall measurement uncertainty of a measurement is defined as the range of which can be supposed that it contains the true value with a specified probability.

This probability is 95 % for the generally specified measurement uncertainty (so-called expanded measurement uncertainty).

The limits for emission measurements and the Test levels for immunity tests in the applied standards were defined taking into consideration the accuracy limits for measurement and testing equipment required by the Basic standards.

All measurement and test results of the EMC laboratory of Shenzhen TCT Testing Technology Co., Ltd. fulfil the requirements for measurement uncertainties according to the standards applied.

Decision rule for statement(s) of conformity is based on simple acceptance specified in Clause 4.3.3 in IEC Guide 115:2023.

3. Test Result Summary

EN IEC 55015:2019+A11:2020	
Requirement – Test case	Verdict
Disturbance voltage	Pass
Radiated electromagnetic disturbances (9 kHz to 30 MHz)	N/A
Radiated electromagnetic disturbances (30 MHz to 1 GHz)	Pass
EN IEC 61000-3-2:2019+A1:2021	
Requirement – Test case	Verdict
Harmonic current emissions	Pass
EN 61000-3-3:2013+A1:2019+A2:2021	
Requirement – Test case	Verdict
Voltage changes, voltage fluctuations and flicker	N/A
EN IEC 61547:2023	
Requirement – Test case	Verdict
Electrostatic discharge immunity (ESD)	Pass
Radiated, radio-frequency, electromagnetic field immunity (RS)	Pass
Electrical fast transient/burst immunity (EFT/B)	Pass
Surge immunity	Pass
Immunity to conducted disturbances, induced by radio-frequency fields (CS)	Pass
Power frequency magnetic field immunity (PFMF)	N/A
Voltage dips, short interruptions and voltage variations immunity (DIPS)	Pass
Remark: ---	

Test case verdicts	
- Test case does not apply to the test object	N/A
- Test object does meet the requirement	P (Pass)
- Test object does not meet the requirement	F (Fail)

4. List of Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Due
Disturbance voltage				
EMI Test Receiver	R&S	ESCI3	100898	2025/06/26
Line Impedance Stabilisation Network(LISN)	Schwarzbeck	NSLK 8126	8126453	2025/01/31
Attenuator	N/A	10dB	164080	2025/06/26
844 Shielded room	SKET	8m*4m*4m	CR4	2027/06/26
Test software	EZ EMC	EMEC-3A1	1.1.4.2	/
Radiated electromagnetic disturbances (9 kHz to 30 MHz)				
Loop antenna	Schwarzbeck	FMZB1519B	00191	2025/06/28
EMI Test Receiver	R&S	ESCI7	100783	2025/01/31
#2 3m Anechoic Chamber	SKET	9m*6m*6m	SA02	2027/02/21
Test software	EZ EMC	FA-03A2 RE+	1.1.4.2	/
Radiated electromagnetic disturbances (30 MHz to 1 GHz)				
Broadband Antenna	Schwarzbeck	VULB 9168	01197	2025/02/02
EMI Test Receiver	R&S	ESCI7	100529	2025/01/31
Pre-amplifier	HP	8447D	2727A05017	2025/06/26
3m Anechoic Chamber	SKET	9m*6m*6m	SA01	2027/06/12
Test software	EZ EMC	FA-03A2 RE+	1.1.4.2	/
Harmonic current emissions & Voltage Fluctuations and Flicker				
AC Power Supply	KIKUSUI	PCR4000M	UC002552	2025/01/31
Harmonic/Flicker Analyzer	KIKUSUI	KHA1000	UD002324	2025/06/26
Line Impedance Network	KIKUSUI	LIN1020JF	UC001738	2025/06/26
Test software	KIKUSUI	HarmoCapture	V3.9.1.00	/
Electrostatic discharge immunity (ESD)				
Electrostatic Discharge Generator	3ctest	EDS 30T	ES031000122077	2025/07/02
Radiated, radio-frequency, electromagnetic field immunity (RS)				
Antenna	SKET	STLP 9129_Plus	/	/
Signal Generator	Agilent	N5181A	MY50141997	2025/01/31

Amplifier	SKET	HAP_80M01G-250 W	202105183	2025/06/26
Amplifier	SKET	HAP_01G06G-80W	202305501	2025/06/26
Field Probe	Narda	EP-601	811ZX01057	2025/06/28
USB Power Sensor	Agilent	U2000A	MY53410013	2025/01/31
USB Power Sensor	Agilent	U2001A	MZ54330012	2025/01/31
743 Anechoic Chamber	SKET	7m*4m*3m	SA04	2025/03/02
Test software	SKET	EMC-S	3.1.3.2	/

Electrical fast transient/burst immunity (EFT/B)

Fast Transient Burst Simulator	Prima	EFT61004BG	PR12074375	2025/06/26
Capacitive Coupling folder	Prima	EFT-CLAMP	N/A	2025/06/26

Surge immunity

Lightning Surge Generator	Prima	SUG61005BG	PR12125534	2025/06/26
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Immunity to conducted disturbances, induced by radio-frequency fields (CS)

Conducted Immunity Test System	Schloder	CDG-6000-75	126B1290/2014	2025/06/26
CDN	Schloder	CDN M2+M3-16	A2210281/2014	2025/06/26
CDN	Prima	CRF-CDN-TRJ45	PR230681112	2025/06/26
EM-Clamp	Schloder	EMCL-20	132A1194/2014	2025/06/26
RF Attenuator	PE	75W 6dB	N/A	2025/06/26
Test software	HUBERT	IEC/EN61000-4-6	V 1.5	/

Power frequency magnetic field immunity (PFMF)

Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	G121941CS1341114	2025/06/26
Adjustable Magnetic Field Coil	EVERFINE	MFC-4	G1242BBS1341114	2025/06/26

Voltage dips, short interruptions and voltage variations immunity (DIPS)

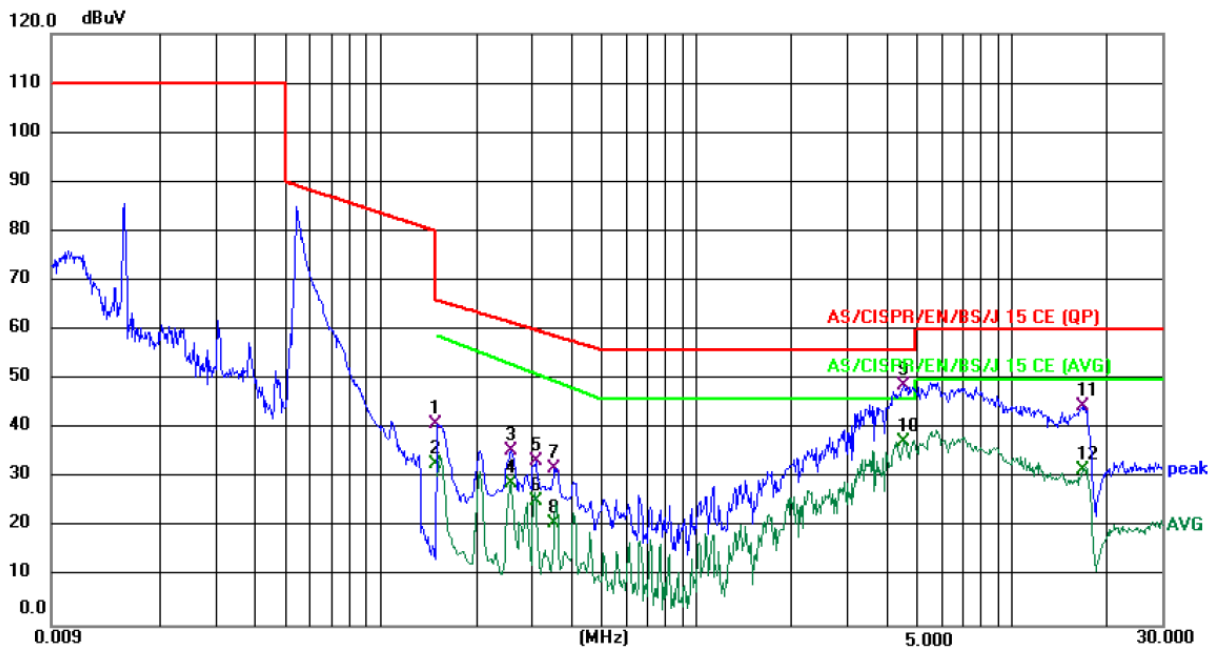
Cycle Sag Simulator	Prima	DRP61011AG	PR12106201	2025/06/26
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5. Test Conditions and Results (Emission)

5.1. Disturbance voltage

Test requirement	EN IEC 55015:2019+A11:2020				
Test frequency range...	9/150 kHz to 30 MHz				
Limits	Electric power supply interface				
	Frequency (MHz)	Quasi-peak(dBμV)		Average(dBμV)	
	0.009 to 0.05	110		N/A	
	0.05 to 0.15	90 to 80		N/A	
	0.15 to 0.5	66 to 56		56 to 46	
	0.5 to 5	56		46	
	5 to 30	60		50	
	Wired network interfaces other than power supply				
	Frequency	Voltage Limits(dBμV)		Current Limits(dBμA)	
	MHz	Quasi-peak	Average	Quasi-peak	Average
	0.15 to 0.5	84 to 74	74 to 64	40 to 30	30 to 20
	0.5 to 30	74	64	30	20
	Local wired ports- Electrical power supply interface of non-restricted ELV lamps				
	Frequency (MHz)	Quasi-peak(dBμV)		Average(dBμV)	
	0.009 to 0.05	136		N/A	
	0.05 to 0.15	116 to 106		N/A	
	0.15 to 0.5	92 to 82		82 to 72	
0.5 to 5	82		72		
5 to 30	86		76		
Local wired ports- Other than electrical power supply interface of ELV lamp					
Frequency	Voltage Limits(dBμV)		Current Limits(dBμA)		
MHz	Quasi-peak	Average	Quasi-peak	Average	
0.15 to 0.5	80	70	40 to 30	30 to 20	
0.5 to 30	74	64	30	20	
Test method	The AMN placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.				
Ambient temperature...	22.8 °C				
Relative humidity	49 %				
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China				
Test model(s)	BH17-04691				
EUT operation mode....	Mode 1				
Test results	Pass				
Remark.....	/				

Measurement data and Graphical presentation of the result



Site 844 Shielding Room

Phase: **L1**

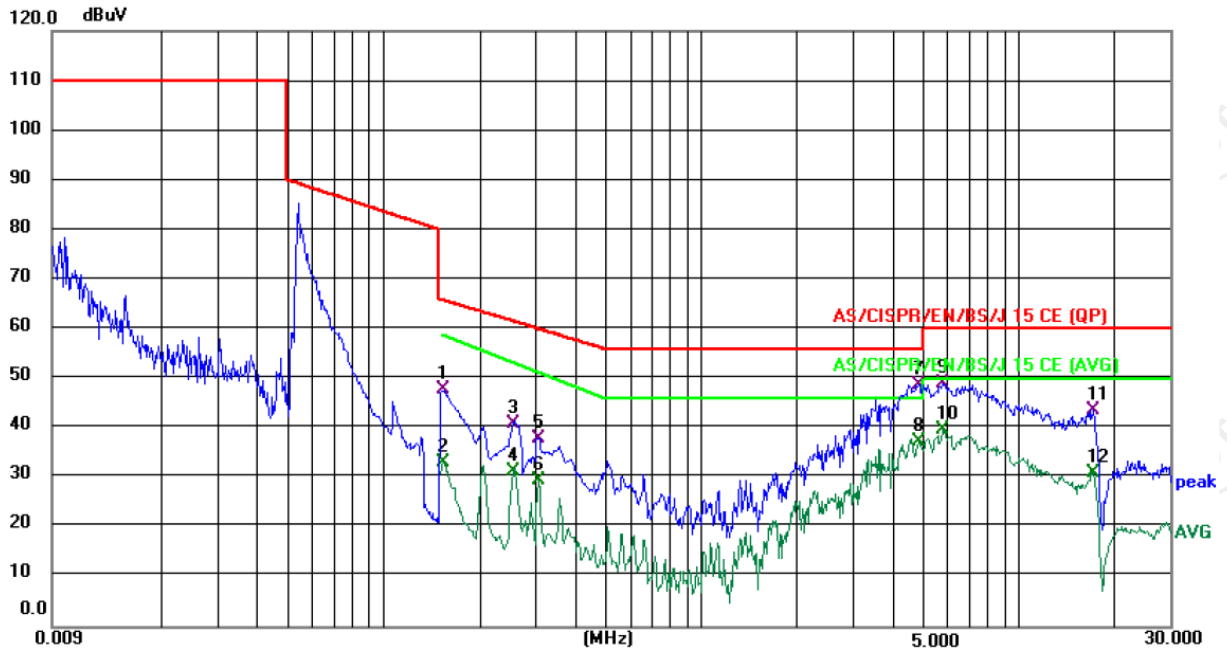
Temperature: 22.8 (°C)

Humidity: 49 %

Limit: AS/CISPR/FN/BS/J 15 CE (QP)

Power: AC 230 V/50 Hz

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	30.86	10.02	40.88	66.00	-25.12	QP	
2		0.1500	22.87	10.02	32.89	59.00	-26.11	AVG	
3		0.2580	25.82	9.85	35.67	61.50	-25.83	QP	
4		0.2580	19.08	9.85	28.93	53.14	-24.21	AVG	
5		0.3100	23.56	9.84	33.40	59.97	-26.57	QP	
6		0.3100	15.66	9.84	25.50	51.16	-25.66	AVG	
7		0.3537	22.50	9.48	31.98	58.88	-26.90	QP	
8		0.3537	11.49	9.48	20.97	49.74	-28.77	AVG	
9	*	4.5579	38.36	10.37	48.73	56.00	-7.27	QP	
10		4.5579	26.89	10.37	37.26	46.00	-8.74	AVG	
11		16.9980	33.87	10.61	44.48	60.00	-15.52	QP	
12		16.9980	21.14	10.61	31.75	50.00	-18.25	AVG	



Site 844 Shielding Room

Phase: **N**

Temperature: 22.8 (°C)

Humidity: 49 %

Limit: AS/CISPR/EN/BS/J 15 CE (QP)

Power: AC 230 V/50 Hz

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1539	37.68	10.02	47.70	65.79	-18.09	QP	
2		0.1539	23.15	10.02	33.17	58.72	-25.55	AVG	
3		0.2540	31.23	9.85	41.08	61.63	-20.55	QP	
4		0.2540	21.64	9.85	31.49	53.31	-21.82	AVG	
5		0.3059	28.23	9.84	38.07	60.08	-22.01	QP	
6		0.3059	19.61	9.84	29.45	51.31	-21.86	AVG	
7	*	4.8700	38.49	10.41	48.90	56.00	-7.10	QP	
8		4.8700	26.98	10.41	37.39	46.00	-8.61	AVG	
9		5.7938	38.66	10.45	49.11	60.00	-10.89	QP	
10		5.7938	29.44	10.45	39.89	50.00	-10.11	AVG	
11		17.2377	33.09	10.60	43.69	60.00	-16.31	QP	
12		17.2377	20.58	10.60	31.18	50.00	-18.82	AVG	

5.2. Radiated electromagnetic disturbances (9 kHz to 30 MHz)

Test requirement	EN IEC 55015:2019+A11:2020	
Test frequency range...	9 kHz to 30 MHz	
Limits	<input checked="" type="checkbox"/> LLAS radiated disturbance limits	
	Frequency (MHz)	Quasi-peak(dBμA)
	0.009 to 0.07	88
	0.07 to 0.15	88 to 58
	0.15 to 3	58 to 22
	3 to 30	22
	<input type="checkbox"/> Loop antenna radiated disturbance limits	
	Frequency (MHz)	Quasi-peak(dBμA/m)
	0.009 to 0.07	69
	0.07 to 0.15	69 to 39
0.15 to 4	39 to 3	
4 to 30	3	
Test method	<p>The EUT and support equipment are positioned in the centre of loop antenna system (LAS). The LAS consists of three circular, mutually perpendicular large-loop antennas (LLAs), having a diameter of 2 m, supported by a non-metallic base. A 50 Ω coaxial cable between the current probe of an LLA and the coaxial switch, and between this switch and the measuring equipment, shall have a surface transfer impedance smaller than 10 mΩ/m at 100 kHz and 1 mΩ/m at 10 MHz. The distance between the outer diameter of the loop antenna system and nearby objects, such as floor and walls, shall be at least 0.5 m as per CISPR 15.</p> <p>The induced current in the loop antenna is measured by means of a current probe (1 V/A) and the CISPR measuring receiver. By means of a coaxial switch, the three field directions (X, Y, Z) can be measured in sequence.</p> <p>The receiver scanned from 9 kHz to 30 MHz for emissions in each of the test modes. and recorded at least the six highest emission. Each value shall comply with the requirement given.</p> <p>The test data of the worst-case condition(s) was recorded.</p>	
Ambient temperature...	/	
Relative humidity	/	
Test location	/	
Test model(s)	/	
EUT operation mode....	/	
Test results	N/A	
Remark.....	This EUT is expected to incapable of generating large magnetic dipole moments, according to the standard clause 5.3.4; the requirements are fulfilled without further testing.	

5.3. Radiated electromagnetic disturbances (30 MHz to 1 GHz)

Test requirement	EN IEC 55015:2019+A11:2020		
Test frequency range.:	30 MHz to 1 GHz		
Limits	<input checked="" type="checkbox"/> Limits –OATS or SAC		
	Frequency (MHz)	10 m measurement distance	3 m measurement distance
		dB μ V/m	
	30 to 230	30 Quasi-peak	40 Quasi-peak
	230 to 1000	37 Quasi-peak	47 Quasi-peak
	<input type="checkbox"/> Limits –CDNE method		
	Frequency (MHz)		Quasi-peak(dB μ V)
	30 to 100		64 to 54
	100 to 200		54
	200 to 300		54 to 51
Test method	Measurements were made in a 3/10-meter semi-anechoic chamber that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3/10 meters with the receive antenna located at 1 to 4-meter height in both horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.		
Ambient temperature.:	24.5 °C		
Relative humidity	53 %		
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China		
Test model(s)	BH17-04691		
EUT operation mode.:	Mode 2		
Test results	Pass		
Remark.....	/		

Measurement data and Graphical presentation of the result



Site: 3m Anechoic Chamber1

Polarization: **Horizontal**

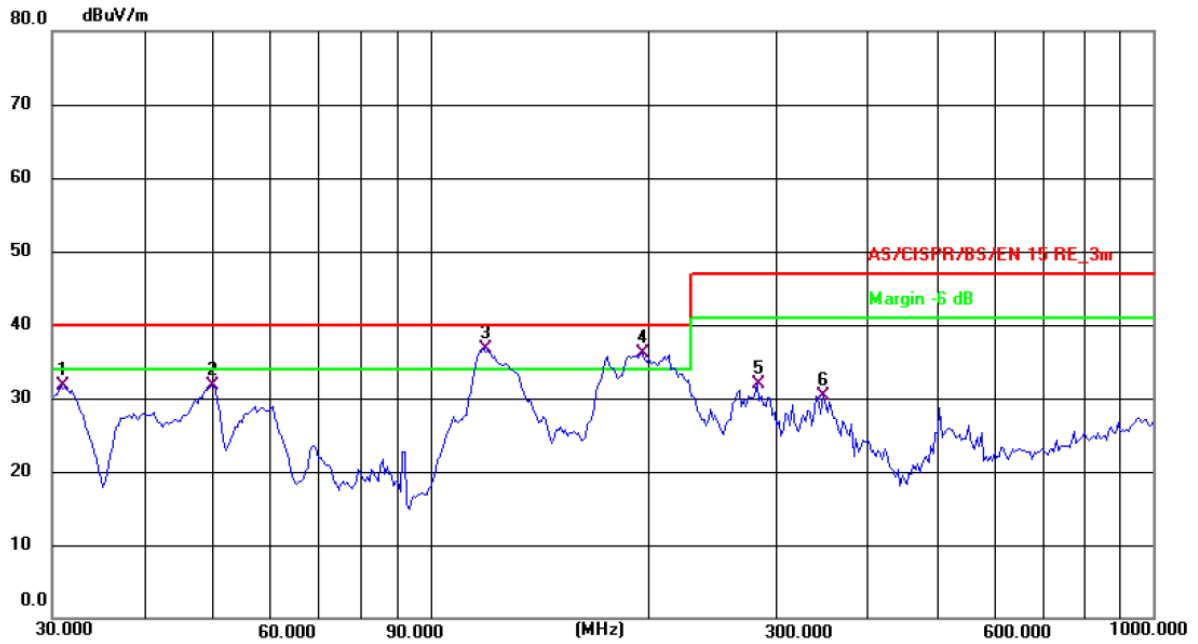
Temperature: 24.5(C)

Humidity: 53 %

Limit: AS/CISPR/BS/EN 15 RE_3m

Power: AC 230 V/50 Hz

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	49.0145	31.09	-12.66	18.43	40.00	-21.57	QP	P	
2	59.2325	32.03	-13.02	19.01	40.00	-20.99	QP	P	
3 *	115.3205	49.07	-13.96	35.11	40.00	-4.89	QP	P	
4 !	174.4241	46.24	-11.98	34.26	40.00	-5.74	QP	P	
5	212.2695	47.98	-14.57	33.41	40.00	-6.59	QP	P	
6	349.2500	44.26	-9.23	35.03	47.00	-11.97	QP	P	



Site: 3m Anechoic Chamber1

Polarization: **Vertical**

Temperature: 24.5(C) Humidity: 53 %

Limit: AS/CISPR/BS/EN 15 RE_3m

Power: AC 230 V/50 Hz

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	30.8535	45.24	-13.54	31.70	40.00	-8.30	QP	P	
2	49.7068	44.36	-12.64	31.72	40.00	-8.28	QP	P	
3 *	118.6014	50.23	-13.47	36.76	40.00	-3.24	QP	P	
4 !	196.5098	50.25	-14.18	36.07	40.00	-3.93	QP	P	
5	282.9852	42.80	-10.93	31.87	47.00	-15.13	QP	P	
6	349.2500	39.63	-9.23	30.40	47.00	-16.60	QP	P	

5.4. Harmonic current emissions

Test requirement	EN IEC 61000-3-2:2019+A1:2021	
Limit classification in accordance with the standard	Limits - Class C with rated power > 25 W	
	Harmonic order (n)	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
	2	2
	3	27
	5	10
	7	7
	9	5
	11 ≤ n ≤ 39 (odd harmonics only)	3
	Limits - Class C with rated power ≥ 5 W and ≤ 25 W	
	1: First requirement, Table 3 column 2 2: 3 rd harmonic ≤ 86 %, 5 th harmonic ≤ 61 % and waveform conditions 3: THD ≤ 70 %, Harmonics: 3 rd ≤ 35 %, 5 th ≤ 25 %, 7 th ≤ 30 %, 9 th and 11 th ≤ 20 %, 2 nd ≤ 5 %	
Test method	This test consists on the measurement of harmonics components of the input current which may be produced by equipment having an input current up to and including 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.	
Ambient temperature.....	23.6 °C	
Relative humidity	52 %	
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Test model(s)	BH17-04691	
EUT operation mode.....	Mode 1	
Test results	Pass	
Remark.....	/	

Measurement data of the result

Test Data of Harmonics Current

Final Test Result	Pass	Tobs	Quasi-Stationary
Voltage	230.24 V	THC	0.0138 A
Current	0.3403 A	POHC/Limit	0.0031 A / 0.0322 A *3
Power	77.30 W	Nominal	230 V / 50 Hz
Power Factor	0.9866	Fundamental Current	0.3400 A
Apparent Power	78.4 VA	Measuring Period	150 s
THD (max)	4.07 %	Margin	100 %

Order	Limit1(A rms)	Limit2(A rms)	Ave(A rms)	Max(A rms)	Judge
1	----	----	0.3394	0.3400	N/A
2	0.0068	0.0102	0.0005	0.0006	N/A
3	0.1006	0.1510	0.0102	0.0103	Pass
4	----	----	0.0001	0.0002	N/A
5	0.0340	0.0510	0.0036	0.0037	N/A
6	----	----	0.0001	0.0002	N/A
7	0.0238	0.0357	0.0042	0.0043	N/A
8	----	----	0.0001	0.0002	N/A
9	0.0170	0.0255	0.0036	0.0037	N/A
10	----	----	0.0001	0.0001	N/A
11	0.0102	0.0153	0.0032	0.0033	N/A
12	----	----	0.0000	0.0001	N/A
13	0.0102	0.0153	0.0028	0.0028	N/A
14	----	----	0.0000	0.0001	N/A
15	0.0102	0.0153	0.0023	0.0024	N/A
16	----	----	0.0000	0.0001	N/A
17	0.0102	0.0153	0.0020	0.0020	N/A
18	----	----	0.0000	0.0001	N/A
19	0.0102	0.0153	0.0017	0.0018	N/A
20	----	----	0.0000	0.0001	N/A
21	0.0153	0.0153	0.0016	0.0016	N/A
22	----	----	0.0000	0.0001	N/A
23	0.0153	0.0153	0.0015	0.0016	N/A
24	----	----	0.0000	0.0001	N/A
25	0.0153	0.0153	0.0013	0.0013	N/A
26	----	----	0.0000	0.0001	N/A
27	0.0153	0.0153	0.0010	0.0010	N/A
28	----	----	0.0000	0.0001	N/A
29	0.0153	0.0153	0.0008	0.0009	N/A
30	----	----	0.0000	0.0001	N/A
31	0.0153	0.0153	0.0007	0.0008	N/A
32	----	----	0.0000	0.0001	N/A
33	0.0153	0.0153	0.0006	0.0007	N/A
34	----	----	0.0000	0.0001	N/A
35	0.0153	0.0153	0.0005	0.0005	N/A
36	----	----	0.0000	0.0001	N/A
37	0.0153	0.0153	0.0004	0.0005	N/A
38	----	----	0.0000	0.0001	N/A
39	0.0153	0.0153	0.0005	0.0005	N/A
40	----	----	0.0000	0.0001	N/A

N/A : Not Apply

5.5.Voltage changes, voltage fluctuations and flicker

Test requirement	EN 61000-3-3:2013+A1:2019+A2:2021
Applied limit	<p>The value of P_{st} shall be not greater than 1.0</p> <p>The value of P_{it} shall be not greater than 0.65</p> <p>The value of $d(t)$ during a voltage change shall not exceed 3.3 % for more than 500 ms</p> <p>The relative steady-state voltage change, d_c shall not exceed 3.3 %</p> <p>The maximum relative voltage change d_{max} shall not exceed:</p> <p>a) 4 % without additional conditions</p> <p>b) 6 % for equipment which is:</p> <ul style="list-style-type: none"> - 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 <p>c) 7 % for equipment which is</p> <ul style="list-style-type: none"> - attended whilst in use (for example : hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as 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.
Test method	This test consists on the measurement of voltage changes, voltage fluctuations and flicker which may be produced by equipment having an input current ≤ 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.
Observation time	10 Minutes
	120 Minutes
	24 times switching according to Annex B
Ambient temperature	/
Relative humidity	/
Test location	/
Test model(s)	/
EUT operation mode	/
Test results	N/A
Remark	LED lamp luminaires with ratings less than or equal to 600 W, are deemed to comply with the d_c , d_{max} and T_{max} limits in this standard and are not required to be tested.

6. Test Conditions and Results (Immunity)

6.1. General information


Performance criteria as defined by the standard	
Criterion	Description from standard
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.
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 (30 min for high pressure gas discharge lamps). 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.
C	During and after the test, any change of the luminous intensity is allowed and the light source(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.
Other:	The following additional requirement applies to lighting equipment incorporating a starting device: after the test, the lighting equipment is switched off for 30 min and back on again. The lighting equipment shall start and operate as intended.

6.2. Electrostatic discharge immunity

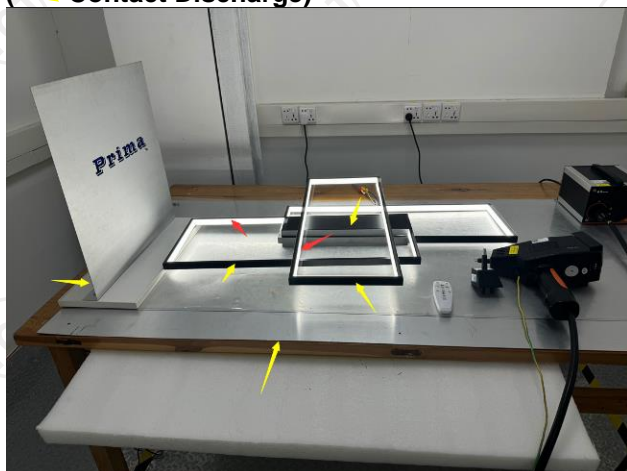
Test requirement	EN IEC 61547:2023	
Basic standard	EN 61000-4-2:2009	
Test level	Discharge type	Discharge voltage
	Contact discharge voltage	±4 kV
	Air discharge voltage	±8 kV
	Supplementary information: Road and street lighting equipment shall be tested for air discharge at ±15 kV and for contact discharge at ±8 kV.	
Storage capacitor	150 pF	
Discharge resistor	330 Ω	
Horizontal coupling plate	1.6 x 0.8 m	
Vertical coupling plate	0.5 x 0.5 m	
Number of discharges	Min. 10 per discharge location	
Discharge interval	1 second	
Performance criteria	B	
Test method	The table-top equipment under test is placed on a wooden table, 0.8 m high, standing on the ground reference plane. A horizontal coupling plane (HCP), 1.6 x 0.8 m, is placed on the table. The EUT and the cables are isolated from the coupling plane by an insulating support 0.5 mm thick. The floor standing equipment is isolated from the ground reference plane by an insulating support about 0.1 m thick. The vertical coupling plane (VCP) of dimensions 0.5 m x 0.5 m is placed parallel to, and positioned at a distance of 0.1 m from, the EUT.	
Ambient temperature	24.3 °C	
Relative humidity	52 %	
Air pressure	100.4 kPa	
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Test model(s)	BH17-04691	
EUT operation mode	Mode 3	
Test results	Pass	
Remark	/	

6.2.1. Test results for electrostatic discharges

Photos of selected test points:

( Air Discharge)

( Contact Discharge)



Contact discharges			
Test point	Positive polarity	Negative polarity	Observations
	4 kV	4 kV	
VCP- Four Sides	Pass	Pass	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3
HCP- Four Sides	Pass	Pass	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3
Points on conductive surface as indicated in the picture above	Pass	Pass	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3

Air discharges			
Test point	Positive polarity	Negative polarity	Observations
	8 kV	8 kV	
Points on non-conductive surface as indicated in the picture above	Pass	Pass	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3

6.2.2. Test results of observations description

/ - Not performed or not required.
1 –There was no change compared with initial operation during the test.
2 –During the test the luminous intensity change, and after the test the luminous intensity can be restored to its initial value within 1 min.
3 –During the test the luminous intensity change, and after the test the luminous intensity can return to normal within 30 min.

6.3. Radiated, radio-frequency, electromagnetic field immunity

Test requirement	EN IEC 61547:2023		
Basic standard	EN IEC 61000-4-3:2020		
Test level	Frequency (MHz)	Field strength	Modulation
	80 to 1000	3 V/m (r.m.s.) (unmodulated)	80% AM (1 kHz)
Dwell time	1 second		
Step size	1 %		
Distance antenna to EUT	3 m		
Performance criteria	A		
Test method	Measurements were made in a fully anechoic chamber and the indicated field strength was pre-calibrated prior to placement of the system under test. Tests were performed in both the horizontal and vertical polarities, where applicable. The antenna was placed 3 meters from the product under test. All sides of the EUT were investigated for anomalies.		
Ambient temperature	24.1 °C		
Relative humidity	52 %		
Air pressure	100.4 kPa		
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China		
Test model(s)	BH17-04691		
EUT operation mode	Mode 3		
Test results	Pass		
Remark	/		

6.3.1. Test results for radio-frequency electromagnetic field

Frequency	EUT side	Antenna polarity	Field strength	Observation	Results
80 MHz to 1 GHz	Front	Horizontal	3 V/m	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
	Left Side	Horizontal	3 V/m	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
	Right Side	Horizontal	3 V/m	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
	Rear	Horizontal	3 V/m	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
	Front	Vertical	3 V/m	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
	Left Side	Vertical	3 V/m	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
	Right Side	Vertical	3 V/m	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
	Rear	Vertical	3 V/m	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.3.2. Test results of observations description

/ - Not performed or not required.

1 - There was no change compared with initial operation during the test.

2 - During the test the luminous intensity change, and after the test the luminous intensity can be restored to its initial value within 1 min.

3 - During the test the luminous intensity change, and after the test the luminous intensity can return to normal within 30 min.

6.4. Electrical fast transient/burst immunity

Test requirement	EN IEC 61547:2023	
Basic standard	EN 61000-4-4:2012	
Test level	Measurement port	Voltage
	Input and output a.c. power ports	±1 kV
	Input and output d.c. power ports	±0.5 kV
	Signal and control lines	±0.5 kV
Burst duration	15 ms	
Burst period	300 ms	
Repetition frequency	5 kHz	
Test time	2 minutes per level & polarity	
Performance criteria	B	
Test method	Measurements were made on a ground plane that extends 0.5-meter minimum beyond all sides of the system under test. Mains power tests were conducted with the product connected to a Coupling/Decoupling Network (CDN). One of each unique interface was tested for a period of 2 minute per polarity. The bursts are applied on the mains supply port by using a coupling decoupling network and on signal and control lines ports by using a capacitive clamp.	
Ambient temperature	24.3 °C	
Relative humidity	54 %	
Air pressure	100.4 kPa	
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Test model(s)	BH17-04691	
EUT operation mode	Mode 3	
Test results	Pass	
Remark	/	

6.4.1. Test results for electrical fast transient/burst

Measurement port	Level	Polarity	Observation	Results
AC power port	1 kV	Positive & Negative	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.4.2. Test results of observations description

/ - Not performed or not required.

1 –There was no change compared with initial operation during the test.

2 –During the test the luminous intensity change, and after the test the luminous intensity can be restored to its initial value within 1 min.

3 –During the test the luminous intensity change, and after the test the luminous intensity can return to normal within 30 min.

6.5. Surge immunity

Test requirement	EN IEC 61547:2023			
Basic standard	EN 61000-4-5:2014+A1:2017			
Test level	Characteristics	Device		
		Self-ballasted lamps ≤ 25 W	Lighting equipment (except self- ballasted lamps ≤ 25 W)	
	Wave-shape data	1.2/50 μs	1.2/50 μs	1.2/50 μs
	line to line	±0.5 kV	±1 kV	
	line to ground	N/A	±2 kV	
Supplementary information: Road and street lighting equipment shall comply with ±2 kV line to line and ±4 kV line to ground voltages.				
Repetition rate	1/min			
Phase angles	Positive pulses are applied 90° and negative pulses are applied 270°			
Number of pulses for each coupling	5			
Performance criteria	B (for lighting equipment for emergency lighting) / C			
Test method	Mains power tests were conducted with the product connected to a Coupling/Decoupling Network (CDN). The test voltage was increased from the lowest indicated level up to the maximum level. Five positive polarity pulses at the 90° phase angle, five negative polarity pulses at the 270° phase angle. Each surge was applied 60 seconds after the previous surge. Signal and Telecommunications ports were subject to five (5) positive and five (negative) surges applied through the appropriate Coupling/Decoupling Network (CDN).			
Ambient temperature	24.3 °C			
Relative humidity	54 %			
Air pressure	100.4 kPa			
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China			
Test model(s)	BH17-04691			
EUT operation mode	Mode 3			
Test results	Pass			
Remark	/			

6.5.1. Test results for surge

Measurement port		Level	Polarity	Observation	Results
AC power port	L-N	1 kV	Positive	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
			Negative	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
	L-PE	2 kV	Positive	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
			Negative	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
	N-PE	2 kV	Positive	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass
			Negative	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.5.2. Test results of observations description

/ - Not performed or not required.
1 -There was no change compared with initial operation during the test.
2 -During the test the luminous intensity change, and after the test the luminous intensity can be restored to its initial value within 1 min.
3 -During the test the luminous intensity change, and after the test the luminous intensity can return to normal within 30 min.

6.6. Immunity to conducted disturbances, induced by radio-frequency fields

Test requirement	EN IEC 61547:2023	
Basic standard	EN IEC 61000-4-6:2023	
Frequency range	150 kHz to 80 MHz	
Test level	Measurement port	Voltage
	Input and output a.c. power ports	3 V (r.m.s.) (unmodulated)
	Input and output d.c. power ports	3 V (r.m.s.) (unmodulated)
	Signal and control lines	3 V (r.m.s.) (unmodulated)
Dwell time	1 second	
Step size	1 %	
Modulation	80% AM (1kHz)	
Performance criteria	A	
Test method	The test allows estimating of the conducted immunity of electrical and electronic equipment to electromagnetic disturbances coming from intended radio-frequency (RF) transmitters in the frequency range 150 kHz to 80 MHz. The interference is applied on mains supply, signal line and earth connection ports by using coupling decoupling networks or a clamp.	
Ambient temperature	24.3 °C	
Relative humidity	54 %	
Air pressure	100.4 kPa	
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Test model(s)	BH17-04691	
EUT operation mode	Mode 3	
Test results	Pass	
Remark	/	

6.6.1. Test results for Immunity to injected currents

Measurement port	Frequency	Coupling type	Level	Observation	Results
AC power port	0.15 MHz to 80 MHz	CDN	3 V	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.6.2. Test results of observations description

/ - Not performed or not required.

1 –There was no change compared with initial operation during the test.

2 –During the test the luminous intensity change, and after the test the luminous intensity can be restored to its initial value within 1 min.

3 –During the test the luminous intensity change, and after the test the luminous intensity can return to normal within 30 min.

6.7. Power frequency magnetic field immunity (PFMF)

Test requirement	EN IEC 61547:2023	
Basic standard	EN 61000-4-8:2010	
Test level	Frequency	A/m
	50/60 Hz	3
Performance criteria	A	
Test method	Measurements were made on a ground plane that extends 1-meter minimum beyond all sides of the system under test. The EUT was located 80cm above the reference ground plane and the indicated field was pre-calibrated prior to placement of the system under test.	
Ambient temperature	/	
Relative humidity	/	
Air pressure	/	
Test location	/	
Test model(s)	/	
EUT operation mode	/	
Test results	N/A	
Remark	The EUT does not contain components susceptible to magnetic fields, therefore this test is not applicable for this EUT.	

6.8.Voltage dips, short interruptions and voltage variations immunity

Test requirement	EN IEC 61547:2023		
Basic standard	EN IEC 61000-4-11:2020		
Test level	Voltage Dips		
	Frequency	Test level in % U_T	Duration
	50 Hz	70	10 cycles
	Voltage interruptions		
	Frequency	Test level in % U_T	Duration
	50 Hz	0	0.5 cycle
	U _T is the rated voltage of the equipment under test.		
Repetition rate	10 seconds		
Number of dips or interruptions	3		
Performance criteria	B & C		
Test method	The test allows estimating of the conducted immunity of electrical and electronic equipment connected to low-voltage power supply networks for voltage dips and short interruptions. The interference is applied on mains supply port by using a testing generator.		
Ambient temperature	24.4 °C		
Relative humidity	54 %		
Air pressure	100.4 kPa		
Test location	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China		
Test model(s)	BH17-04691		
EUT operation mode	Mode 3		
Test results	Pass		
Remark	/		

6.8.1. Test results for Voltage dips

% of U_T	Frequency	Duration in cycles	Sync Angle	Observation	Results
70	50 Hz	10	0°	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.8.2. Test results for Voltage interruptions

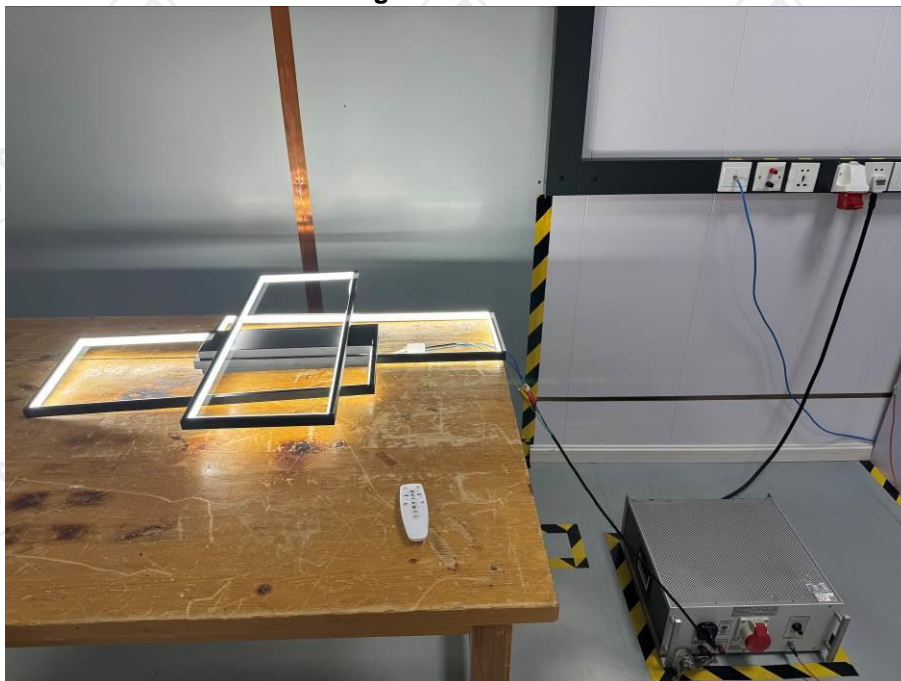
% of U_T	Frequency	Duration in cycles	Sync Angle	Observation	Results
0	50 Hz	0.5	0°	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	Pass

6.8.3. Test results of observations description

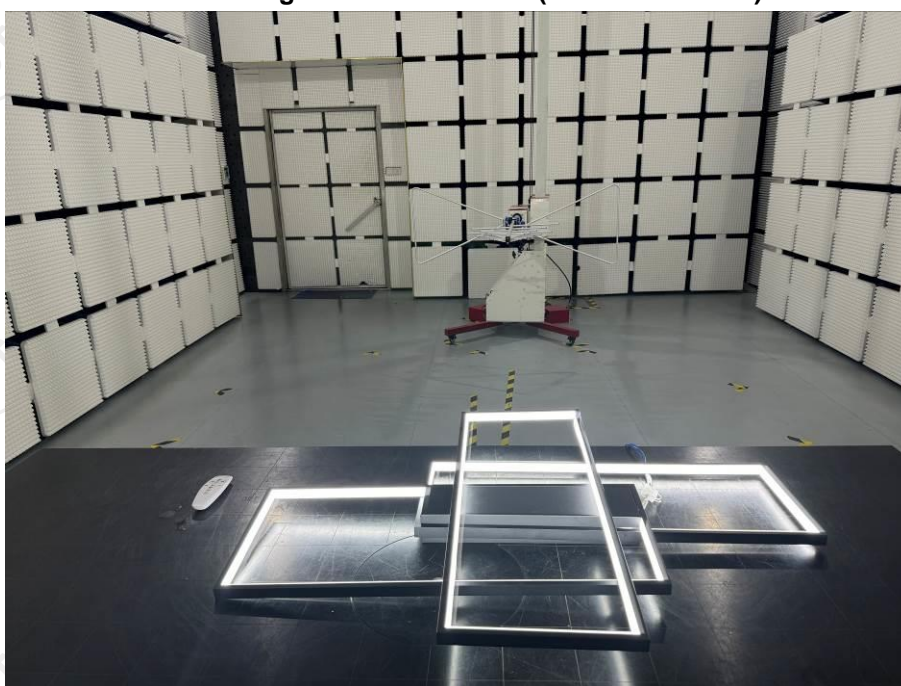
/ - Not performed or not required.
1 –There was no change compared with initial operation during the test.
2 –During the test the luminous intensity change, and after the test the luminous intensity can be restored to its initial value within 1 min.
3 –During the test the luminous intensity change, and after the test the luminous intensity can return to normal within 30 min.

7. Test set-up photo

Disturbance voltage at mains terminals test view



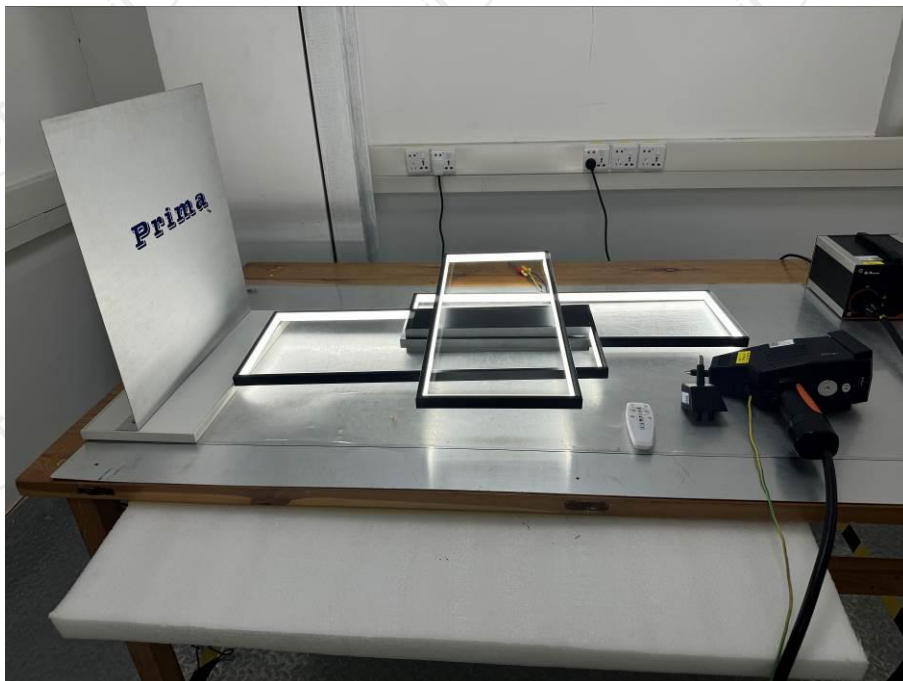
Radiated electromagnetic disturbances (30 MHz to 1 GHz) test view



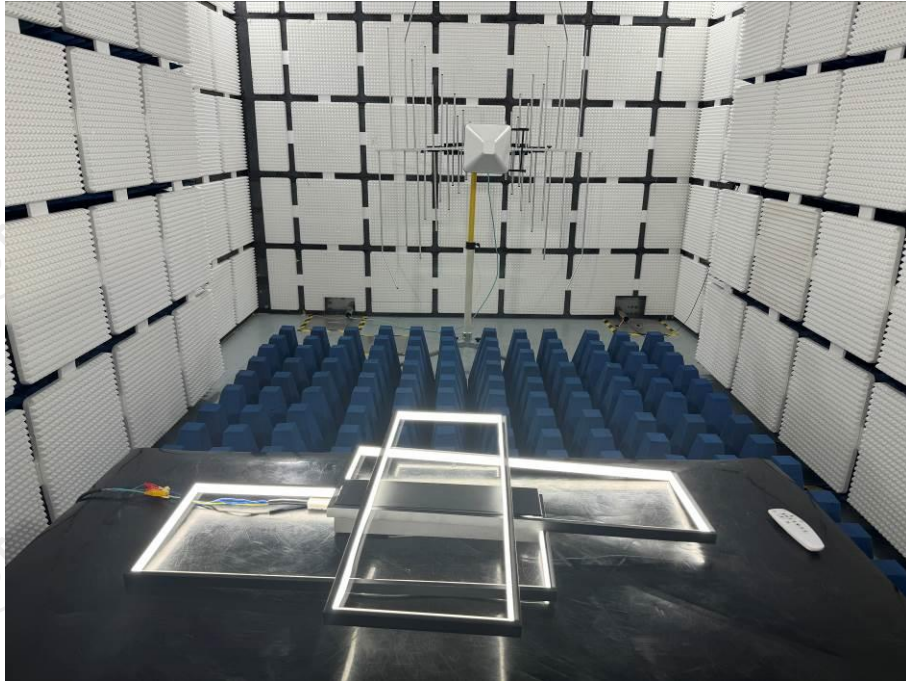
Harmonic current emissions test view



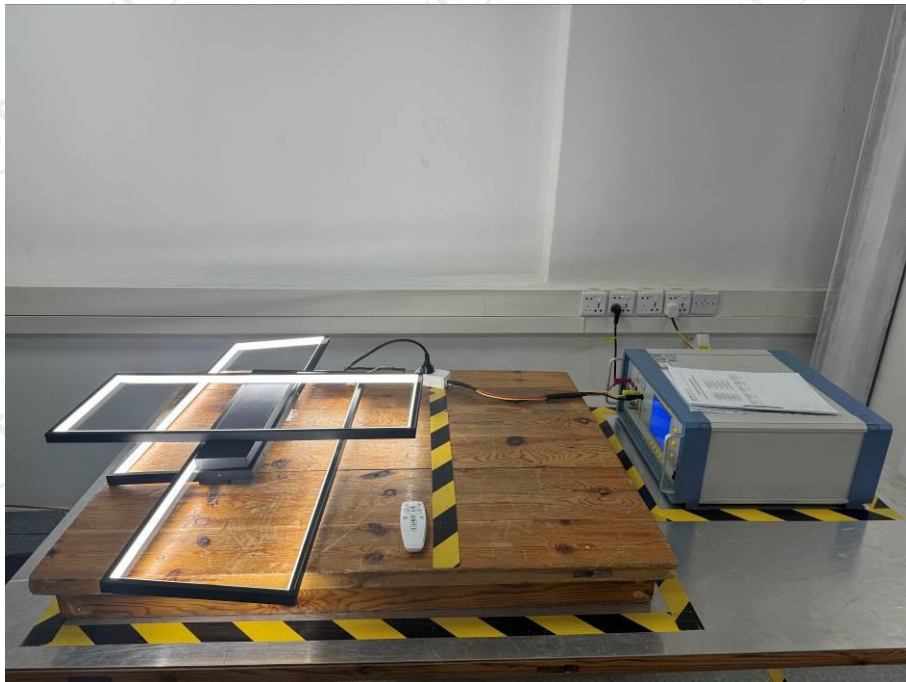
Electrostatic discharge immunity (ESD) test view



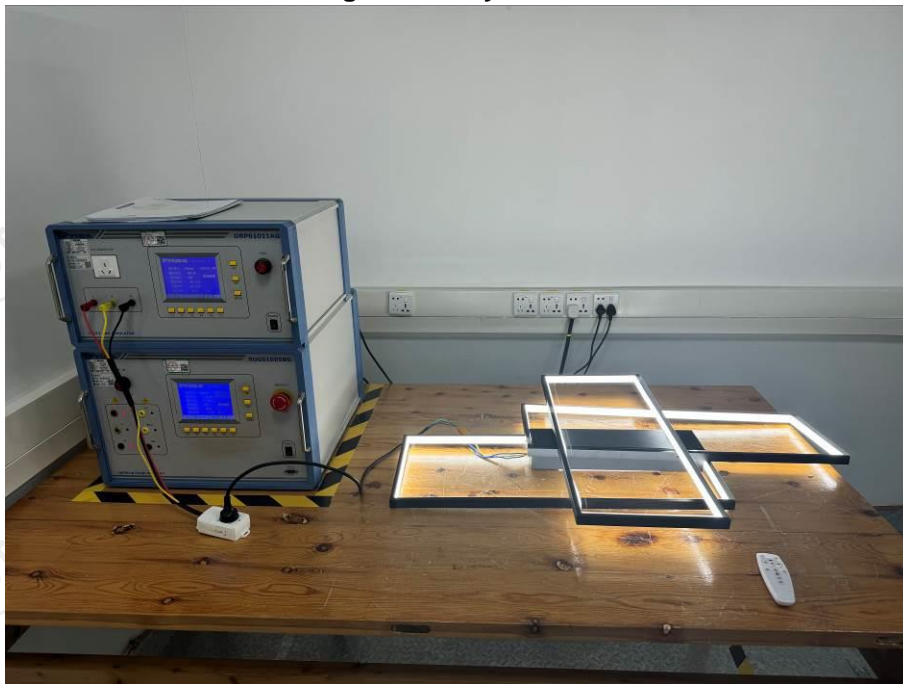
Radiated, radio-frequency, electromagnetic field immunity (RS) test view



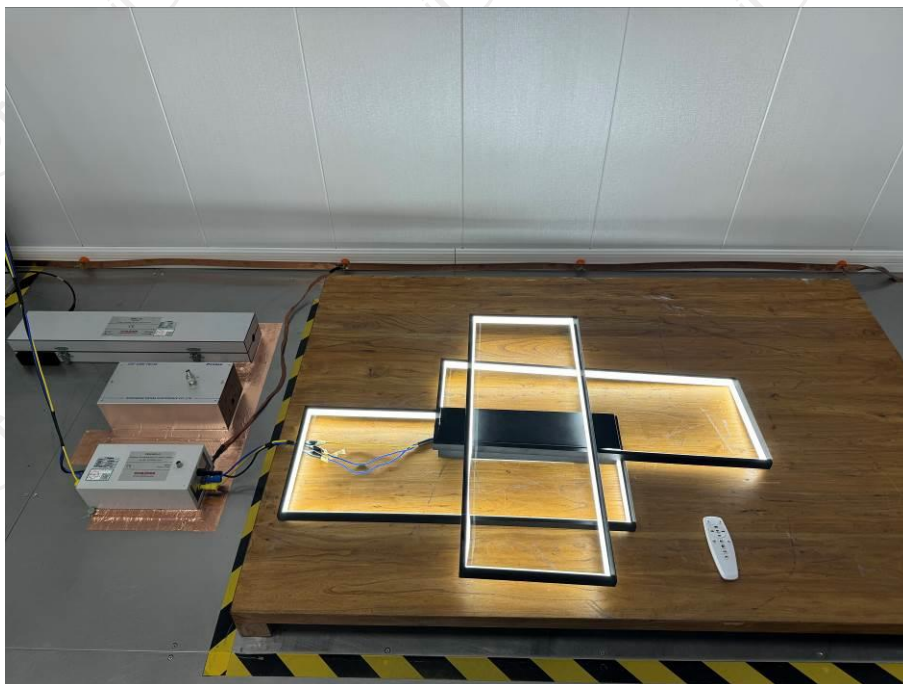
Electrical fast transient/burst immunity (EFT/B) test view



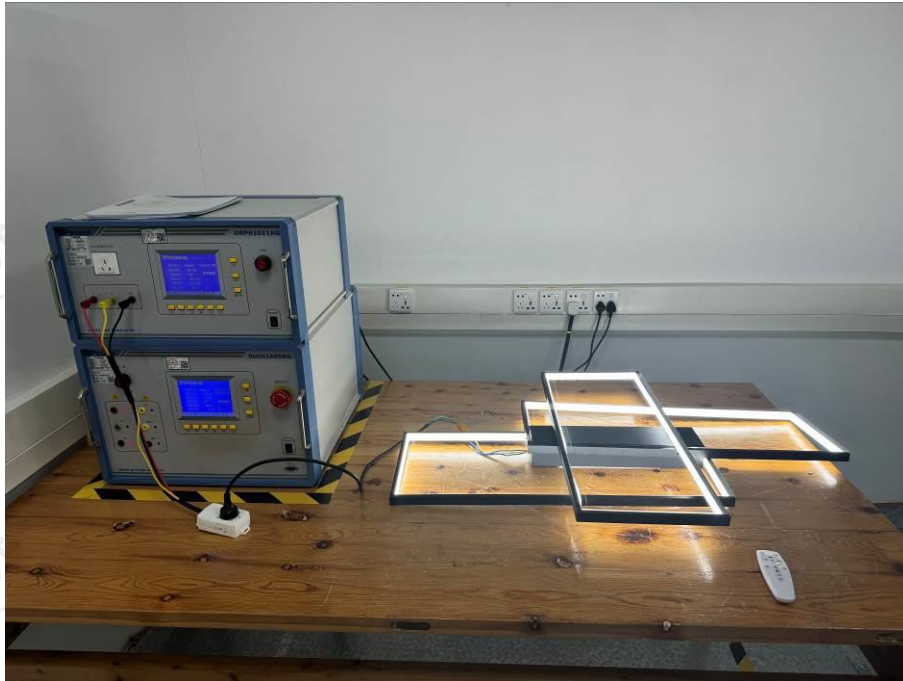
Surge immunity test view



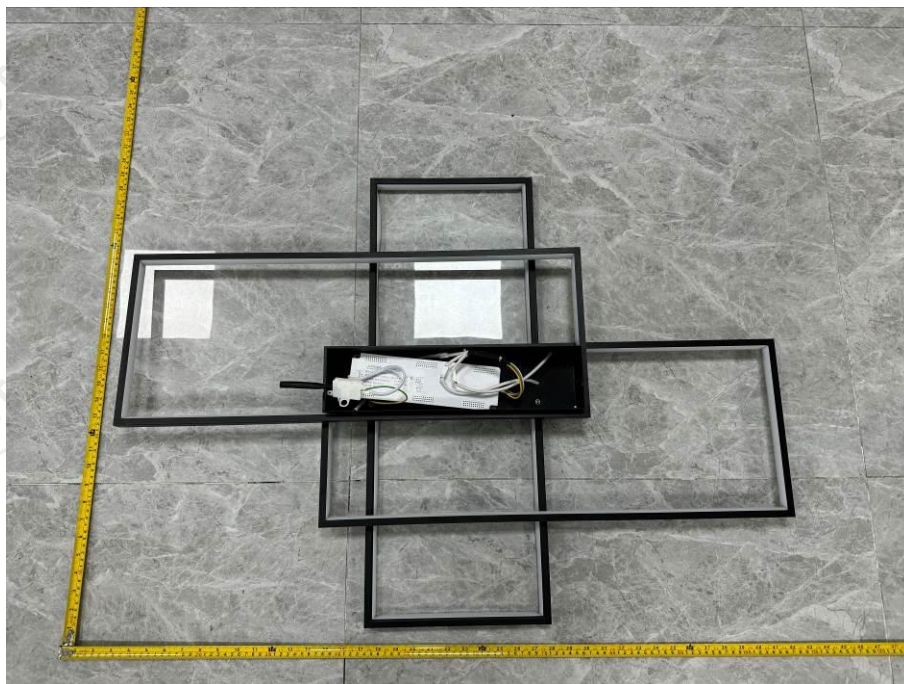
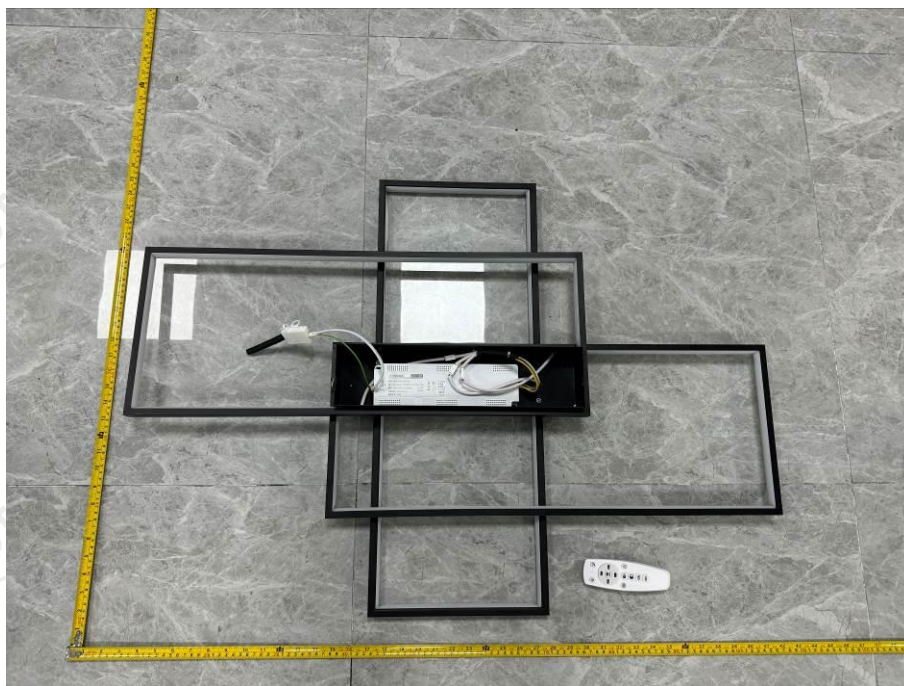
Immunity to conducted disturbances, induced by radio-frequency fields (CS) test view

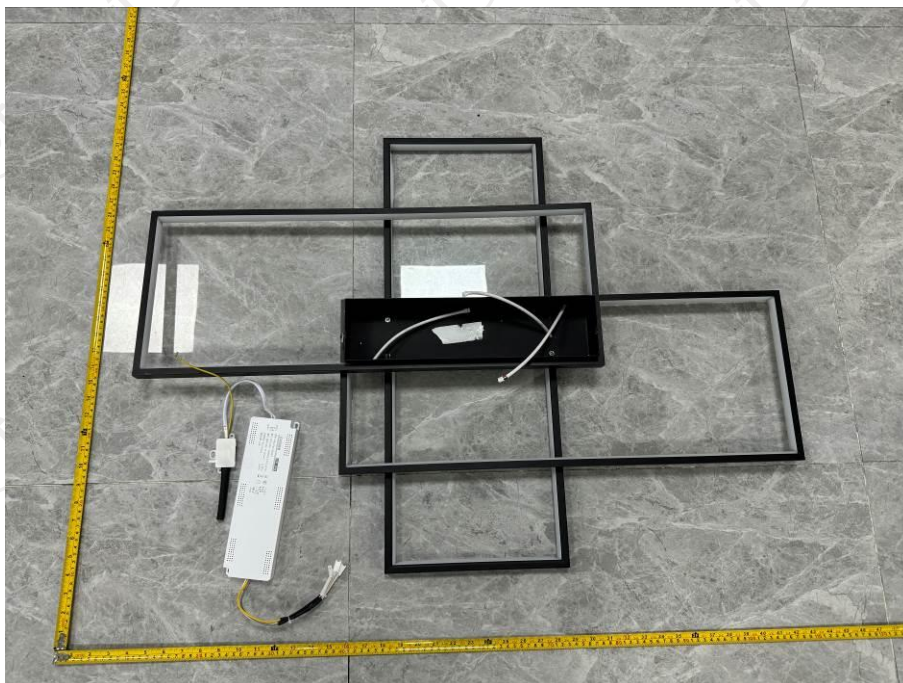
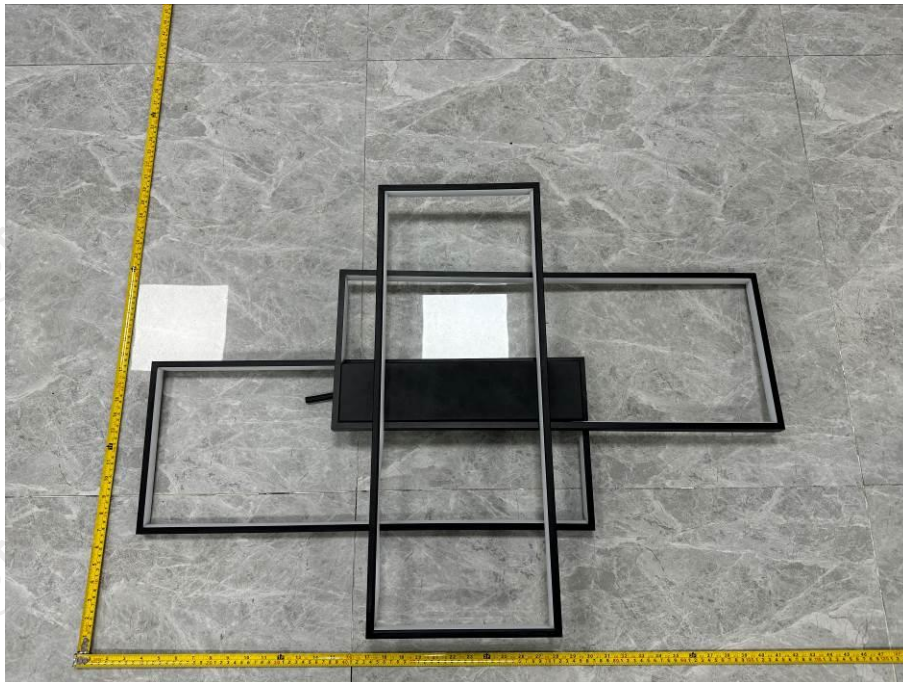


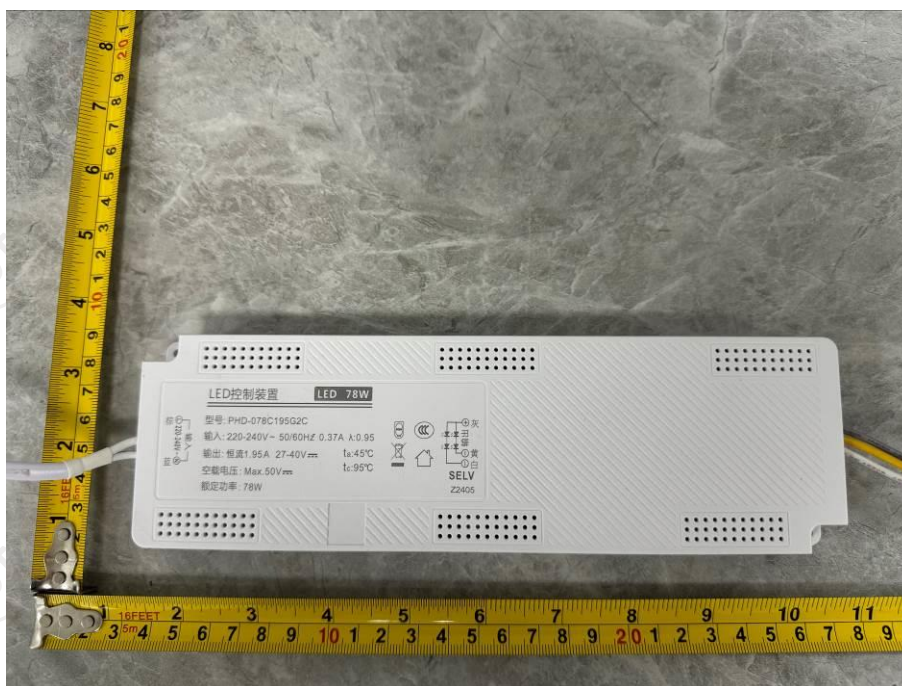
Voltage dips, short interruptions and voltage variations immunity (DIPS) test view

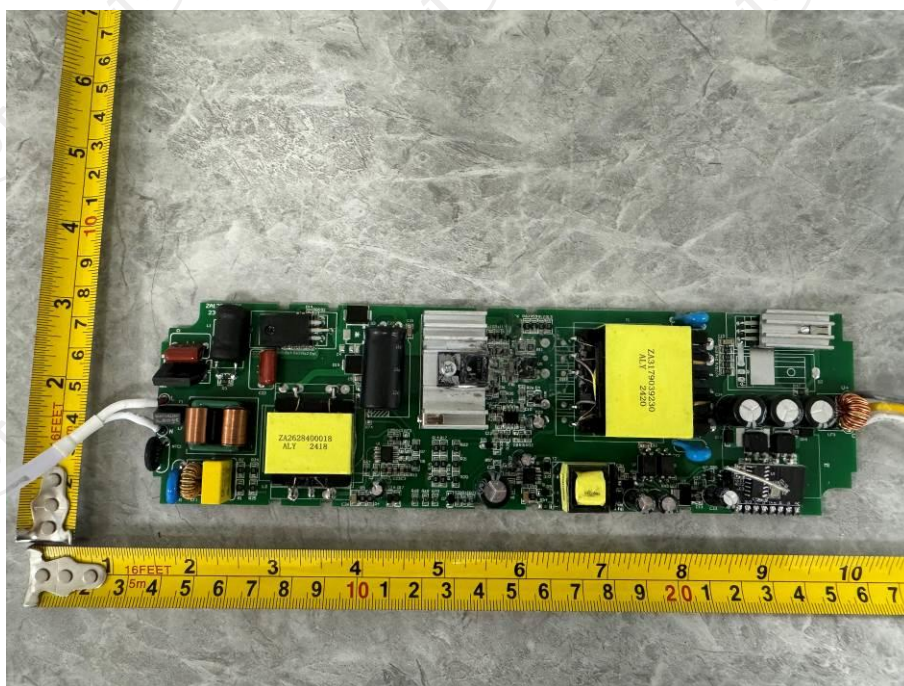


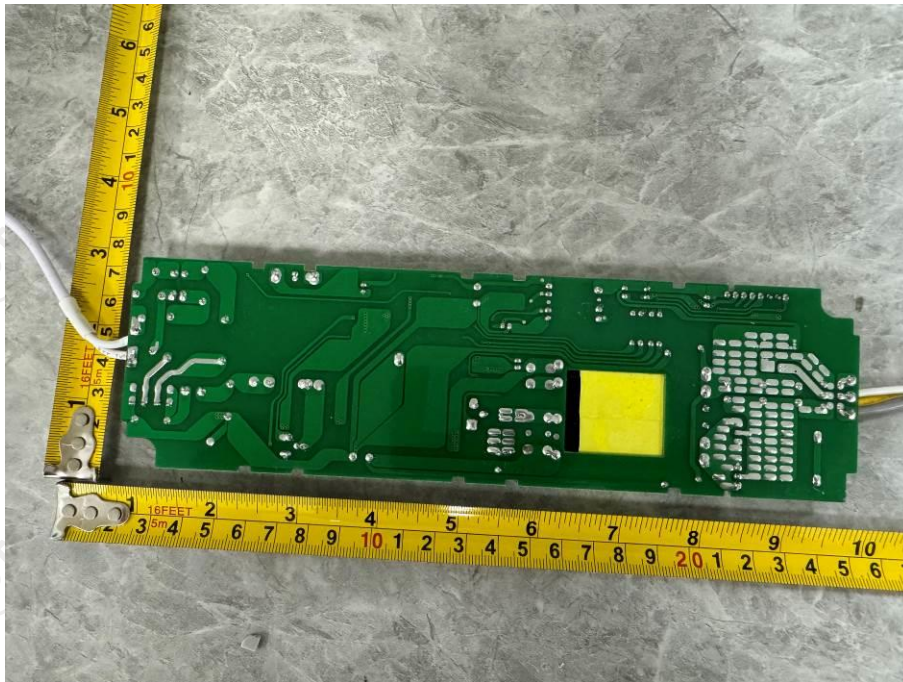
8. Photo of the EUT











*******End of report*******