EMC TEST REPORT

For

SHENZHEN LEDYI LIGHTING CO., LTD.

Flexible LED Wall Washer

Test Model: LY48-FW2835W-24-IP67

Additional Models : please refer to Model list

Prepared for	:	SHENZHEN LEDYI LIGHTING CO., LTD.
Address	:	7th Floor, Skyworth Digital Building, Songbai Road, Shiyan, Bao'an District, Shenzhen, China, 518108
Prepared by	:	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.
Address	:	101-201, No.39 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China
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Date of receipt of test sample	:	March 29, 2022
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	March 29, 2022 - April 15, 2022
Date of Report	:	April 15, 2022

EMC TEST REPORT

EN IEC 55015:2019+A11:2020

Emission - Electrical lighting and similar equipment

EN 61547:2009

Equipment for general lighting purposes - EMC immunity requirements

Report Reference No	**LCS220329009BE**
Date of Issue	April 15, 2022
Testing Laboratory Name	**Shenzhen Southern LCS Compliance Testing Laboratory Ltd.**
Address	101-201, No.39 Building,Xialang Industrial Zone, Heshuikou Community, Matian Street,Guangming District, Shenzhen, China.
Testing Procedure	Full application of Harmonised standards ☒ Partial application of Harmonised standards ☐ Other standard testing method ☐
Applicant's Name	**SHENZHEN LEDYI LIGHTING CO., LTD.**
Address	7th Floor, Skyworth Digital Building, Songbai Road, Shiyan, Bao'an District, Shenzhen, China, 518108
Test Specification:	
Standard	EN IEC 55015:2019+A11:2020 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A1:2019+A2:2021 EN 61547:2009
Test Report Form No.	SLCSEMC-2.3
TRF Originator	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.
Master TRF	Dated 2016-08

Equipment Under Test.	**Flexible LED Wall Washer**
Trademark	LEDYi
Test Model/Type	LY48-FW2835W-24-IP67
Rating	DC 24V, 18W/M
Results	**PASS**

Compiled by:	**Supervised by:**	**Approved by:**
Aimee Yang	Cherry Chen	
Aimee Yang / Engineer	Cherry Chen / Technique Director	Dm Gu / Manager

EMC - TEST REPORT

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Applicant.....:	**SHENZHEN LEDYI LIGHTING CO., LTD.**
Address.....:	7th Floor, Skyworth Digital Building, Songbai Road, Shiyan, Bao'an District, Shenzhen, China, 518108
Telephone.....:	/
Fax.....:	/
Manufacturer .....:	**SHENZHEN LEDYI LIGHTING CO., LTD.**
Address.....:	7th Floor, Skyworth Digital Building, Songbai Road, Shiyan, Bao'an District, Shenzhen, China, 518108
Telephone.....:	/
Fax.....:	/
Factory.....:	**SHENZHEN LEDYI LIGHTING CO., LTD.**
Address.....:	7th Floor, Skyworth Digital Building, Songbai Road, Shiyan, Bao'an District, Shenzhen, China, 518108
Telephone.....:	/
Fax.....:	/

The applicant and manufacturer information, product name, model, trademark and other information in this report are all provided by the applicant, and this laboratory is not responsible for verifying its authenticity.

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the test are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. the climatic conditions during the test were in the following Limits:

Ambient temperature	15℃ - 30℃
Relative Humidity air	30% - 60%
Atmospheric pressure	86 kPa - 106 kPa

Climate values will be recorded and recorded separately if specifically required in the base standard or application product/product series standard.

POSSIBLE TEST CASE VERDICTS

Test cases does not apply to test object	N/A
Test object does meet requirement	P(Pass) / PASS
Test object does not meet requirement	F(Fail) / FAIL
Not measured	N/M

DEFINITION OF SYMBOLS USED IN THIS TEST REPORT

☒ Indicate that the conditions, standards or equipment listed is applicable to this report / test / EUT.
☐ Indicate that the conditions, standards or equipment listed is not applicable to this report / test / EUT.

REVISION HISTORY

Revision	Issue Date	Revision Content	Revised by
000	April 15, 2022	Initial Issue	-

Remark:
000) : “---”

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1. GENERAL INFORMATION

1.1. GENERAL DESCRIPTION OF THE ITEM(S)

Equipment Under Test	Flexible LED Wall Washer
Test Model/Type	LY48-FW2835W-24-IP67
Additional Models/Type	See Model list
Description of Model difference	-
Rating	DC 24V, 18W/M
Mounting position	☐ Table top equipment ☐ Wall /Ceiling mounted equipment ☐ Floor standing equipment ☐ Hand-held equipment ☒ Other
Non-restricted ELV lamps	☐ Yes ☒ No

Information of the Equipment Under Test(EUT)
The EUT is general luminaires which intended for residential use. the product contains electronic control circuits,and no component susceptible to magnetic fields.

Model	Rating
LY48-FW2835W-24-IP67	DC24V, 18W/M
LY48-FW2835R-24-IP67	DC24V, 18W/M
LY48-FW2835G-24-IP67	DC24V, 18W/M
LY48-FW2835B-24-IP67	DC24V, 18W/M
LY48-FW2835Y-24-IP67	DC24V, 18W/M
LY42-FW3535RGB-24-IP67	DC24V, 18W/M
LY42-FW3535RGBW-24-IP67	DC24V, 18W/M
LY36-FW3535RGB-DMX512-24-IP67	DC24V, 18W/M

for more information refer to client's DoC letter.

1.2. OPERATING MODE(S) USED OF TESTS

During the tests, the following operating mode(s) has(have) been used.

Operating Mode	Operating Mode description	Used for testing	
		Emission	Immunity
1	Lighting on mode	☒	☒
2	Maximum light	☐	☐
3	Minimum light	☐	☐
4	Full load	☐	☐

1.3. SUPPORT / AUXILIARY EQUIPMENT FOR THE EUT

EUT has been tested using the following auxiliary equipment :

Auxeq	Model/Type	Manufacturer	Supplied by
-			

1.4. DESCRIPTION OF TEST FACILITY

Test Location 1	Shenzhen Southern LCS Compliance Testing Laboratory Ltd. 101-201, No.39 Building,Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China. CNAS Registration Number is L10160.
Test Location 2	Shenzhen LCS Compliance Testing Laboratory Ltd. 101, 201 Building A and 301 Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, Guangdong, China. NVLAP Accreditation Code is 600167-0. CNAS Registration Number is L4595.
Date of receipt of test item	March 29, 2022
Date(s) of performance of test	March 29, 2022 - April 15, 2022

Note: Radio-Frequency Electromagnetic Field (RS) Test Subcontract to Shenzhen LCS Compliance Testing Laboratory Ltd for Testing.

2. STATEMENT OF THE MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. the reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. the measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods - Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. the manufacturer has the sole responsibility of continued compliance of the device.

Measurement	Uncertainty (U_{lab})	Uncertainty (U_{cispr})
Conducted disturbance (9kHz - 150kHz)	± 1.40 dB	± 4.0 dB
Conducted disturbance (150kHz - 30MHz)	± 2.80 dB	± 3.6 dB
Magnetic field disturbance (9kHz - 150kHz)	± 3.46 dB	-
Magnetic field disturbance (150kHz - 30MHz)		
Radiated disturbance (9kHz - 30MHz)	± 3.12 dB	N/A
Radiated disturbance (30MHz - 200MHz)	± 4.66 dB	± 5.2 dB
Radiated disturbance (200MHz - 1GHz)	± 4.64 dB	± 5.0 dB
Harmonic current	± 0.64%	-
Voltage fluctuations & Flicker	± 0.53%	-

Supplementary information:

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

3. MEASURING DEVICES AND TEST EQUIPMENT

CONDUCTED DISTURBANCE						
Item	Test equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Receiver	R&S	ESCI	101142	2021-06-08	2022-06-08
2	10dB Attenuator	SCHWARZBECK	VTSD9561-F	9561-F159	2021-06-08	2022-06-08
3	Artificial Mains Network	SCHWARZBECK	NSLK8127	8127716	2021-06-08	2022-06-08
4	EMI Test Software	EZ	EZ_EMC	N/A	/	/
5	Asymmetric Artificial Network	SCHWARZBECK	NTFM 8158	NTFM8158#120	2021-06-08	2022-06-08
6	Voltage Probe	SCHWARZBECK	KT 9420	9420401	2021-06-08	2022-06-08
7	No. 2 shielded Room	CHENGYU	843	/	2020-06-16	2023-06-16

RADIATED DISTURBANCE (9KHz - 30MHz)						
Item	Test equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Receiver	R&S	ESCI	101142	2021-06-08	2022-06-08
2	Triple-loop Antenna	EVERFINE	LLA-2	9161	2021-06-08	2022-06-08
3	EMI Test Software	EZ	EZ_EMC	N/A	/	/
4	No. 2 shielded Room	CHENGYU	843	/	2020-06-16	2023-06-16

RADIATED DISTURBANCE (30MHz - 1GHz)						
Item	Test equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2021-06-15	2024-06-15
2	EMI Test Receiver	R&S	ESCI3	101010	2021-06-08	2022-06-08
3	Spectrum Analyzer	Agilent	N9020A	MY49100699	2021-06-08	2022-06-08
4	Log-periodic Antenna	SCHWARZBECK	VULB9163	5094	2019-06-23	2022-06-23
5	Horn Antenna	ETS-LINDGREN	3115	00034771	2019-06-23	2022-06-23
6	EMI Test Software	EZ	EZ_EMC	N/A	/	/
7	Positioning Controller	MF	BK8807-4A-2T	2016-0808-008	/	/

HARMONIC CURRENT & FLICKER						
Item	Test equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Harmonic Current And Flicker Test System	HTEC	AC2000A	/	2021-06-08	2022-06-08
2	Linear Variable Frequency Power Supply	HTEC	HHF-5010	/	2021-06-08	2022-06-08

ELECTROSTATIC DISCHARGE						
Item	Test equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	ESD Simulator	TESEQ	NSG 437	1615	2022-03-21	2023-03-21

ELECTRICAL FAST TRANSIENT / BURST						
Item	Test equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Electrical Fast Transient Generator	HTEC	HEFT51	162201	2021-06-10	2022-06-10

2	Coupling Clamp	HTEC	H3C	163701	2021-05-13	2022-05-13

INJECTED CURRENTS (RADIO-FREQUENCY COMMON MODE)						
Item	Test equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Conducted Susceptibility Generator	HTEC	CDG6000	126A140012016	2021-06-08	2022-06-08
2	Coupling Network	HTEC	CDN-M2+M3	A22/0382/2016	2021-06-08	2022-06-08
3	Attenuator 6dB	HTEC	ATT6	HA1601	2021-06-08	2022-06-08
4	Electromagnetic clamp	LUTHI	EM101	35535	2021-06-08	2022-06-08

POWER FREQUENCY MAGNETIC FIELD						
Item	Test equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Power Frequency Mag-Field Generator System	HTEC	HPFMF100	100-2400	2021-06-08	2022-06-08

RADIO-FREQUENCY ELECTROMAGNETIC FIELDS						
Item	Test equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	RS Test Software	Tonscend	/	/	N/A	N/A
2	ESG Vector Signal Generator	Agilent	E4438C	MY42081396	2021-11-14	2022-11-14
3	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2020-06-11	2023-06-11
4	RF Power Amplifier	OPHIR	5225R	1052	2021-11-21	2022-11-21
5	RF Power Amplifier	OPHIR	5273F	1019	2021-11-21	2022-11-21
6	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	2021-11-21	2022-11-21
7	Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-484	2021-11-21	2022-11-21

4. VERDICT SUMMARY SECTION

This chapter present an overview of the standards and results. Refer the next chapter for details of measured test results and applied test levels.

4.1. STANDARD(S)

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+A1:2021 - Electromagnetic compatibility (EMC) Part 3-2: Limits for harmonic current emissions (equipment input current ≤16 A per phase).

EN 61000-3-3:2013+A1:2019+A2:2021 - Electromagnetic compatibility (EMC)Part 3-3: Limits for 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.

4.2. OVERVIEW OF RESULTS

EMISSION TESTS - EN IEC 55015, EN IEC 61000-3-2, EN 61000-3-3		
Requirement - Test case	**Limit**	**Verdict**
Conducted Disturbance - electric power supply	Table 1, Table 4	PASS
Conducted Disturbance - wired network ports at other than power supply	Table 2, Table 3	N/A
Conducted Disturbance - local wired ports at other than electrical power supply interface of ELV lamp	Table 5, Table 6	N/A
Assessment of the enclosure port	---	---
Radiated Disturbance in the frequency range 9 kHz to 30 MHz	Table 8, Table 9	PASS
Radiated Disturbance in the frequency range 30 MHz to 1 GHz	Table 10	PASS
Harmonic Current	Clause 7	N/A
Voltage Fluctuations and Flicker [2]	Clause 5	N/A
IMMUNITY TESTS - EN 61547		
Requirement - Test case	**Basic Standard(s)**	**Verdict**
Electrostatic Discharge	IEC/EN 61000-4-2	PASS
Radio-Frequency Electromagnetic Fields	IEC/EN 61000-4-3	PASS
Electrical Fast Transient / Burst	IEC/EN 61000-4-4	PASS
Surge	IEC/EN 61000-4-5	N/A
Injected Currents (Radio-Frequency Common Mode)	IEC/EN 61000-4-6	PASS
Power Frequency Magnetic Field [1]	IEC/EN 61000-4-8	N/A
Voltage Dips and Short Interruptions	IEC/EN 61000-4-11	N/A

Supplementary information:

1) Only need to be applied to equipment containing components susceptible to magnetic fields.

2) According to EN 61000-3-3:2013+A1:2019+A2:2021 Clause A.2, Incandescent lamp luminaires with ratings less than or equal to 1000W and discharge and LED lamp luminaires with ratings less than or equal to 600W, are deemed to comply with the standard and are not required to be tested.

5. EMISSION TESTS

5.1. CONDUCTED DISTURBANCE

Standard	EN IEC 55015:2019+A11:2020
Basic Standard(s)	EN 55016-2-1

Disturbance voltage limits at the electric power supply interface

Frequency range [MHz]	Limit: Quasi-peak [dB(μV)]	Limit: Average[dB(μV)]	IF BW
0,009 - 0,05	110	N/A	200 Hz
0,05 - 0,15	90 - 80	N/A	200 Hz
0,15 - 0,5	66 - 56	56 - 46	9 kHz
0,5 - 5,0	56	46	9 kHz
5,0 - 30	60	50	9 kHz

1) At the transition frequency, the lower limit applies.
2) The limit decreases linearly with the logarithm of the frequency in the ranges 50 kHz to 150 kHz and 150 kHz to 0,5 MHz.
3) If the EUT is non-restricted ELV lamps, the limits add 26dB.

Disturbance voltage limits at wired network interfaces other than power supply

Frequency range [MHz]	Limit: Quasi-peak [dB(μV)]	Limit: Average[dB(μV)]	IF BW
0,15 - 5,0	84 - 74	74 - 64	9 kHz
5,0 - 30	74	64	9 kHz

1) The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.
2) The disturbance voltage limits are derived for use with an artificial asymmetrical network (AAN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the measured interface.

Disturbance current limits at wired network interfaces other than power supply

Frequency range [MHz]	Limit: Quasi-peak [dB(μA)]	Limit: Average[dB(μA)]	IF BW
0,15 - 5,0	40 - 30	30 - 20	9 kHz
5,0 - 30	30	20	9 kHz

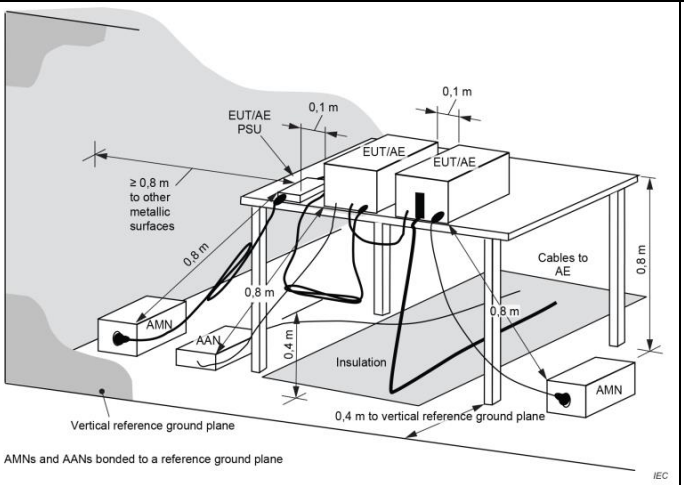
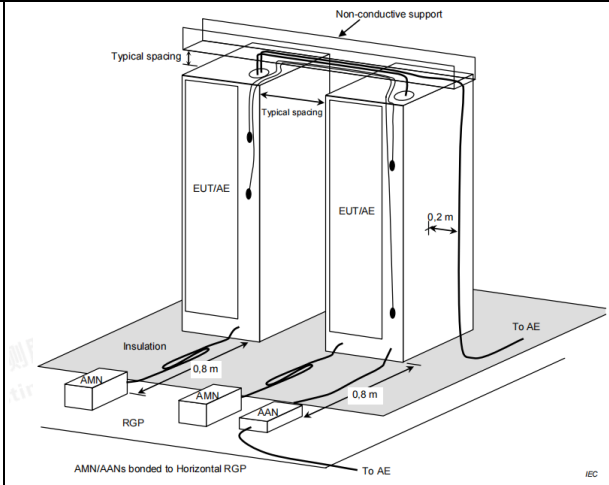
1) The limits decrease linearly with the logarithm of the frequency in the range 0.15MHz to 0.5 MHz.

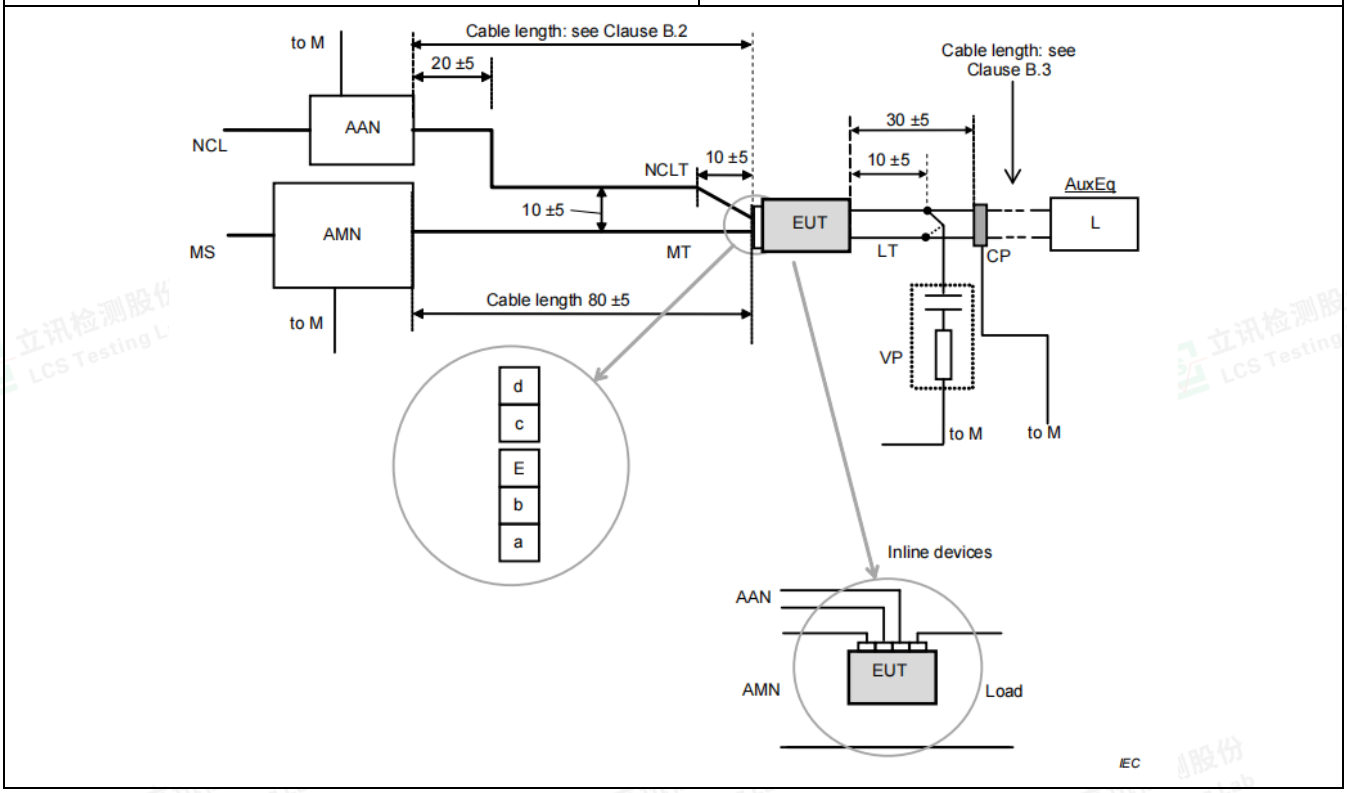
Disturbance voltage limits at local wired ports: local wired ports other than electrical power supply interface of ELV lamp

Frequency range [MHz]	Limit: Quasi-peak [dB(μV)]	Limit: Average[dB(μV)]	IF BW
0,15 - 5,0	80	70	9 kHz
5,0 - 30	74	64	9 kHz

1) At the transition frequency, the lower limit applies.

Test configuration

Test Setup for table-top	Test Setup for Floor standing
	



Test Procedure Description

For Table-top, EUT shall be placed at (0,8 ± 0,05) m above the reference plane of the test site selected for measurement. for Floor standing, EUT shall be placed at (0,12 ± 0,04) m above the reference plane of the test site selected for measurement.
and connected to the AC mains through artificial mains network (LISN). EUT is powered by V-type artificial power network,and the distance from LISN or ANN is 0,8m. the part of the EUT power cord exceeding 0,8m folds in parallel to form a 0,3-0,4 m eights harness.

Test Results refer to Annex A.1

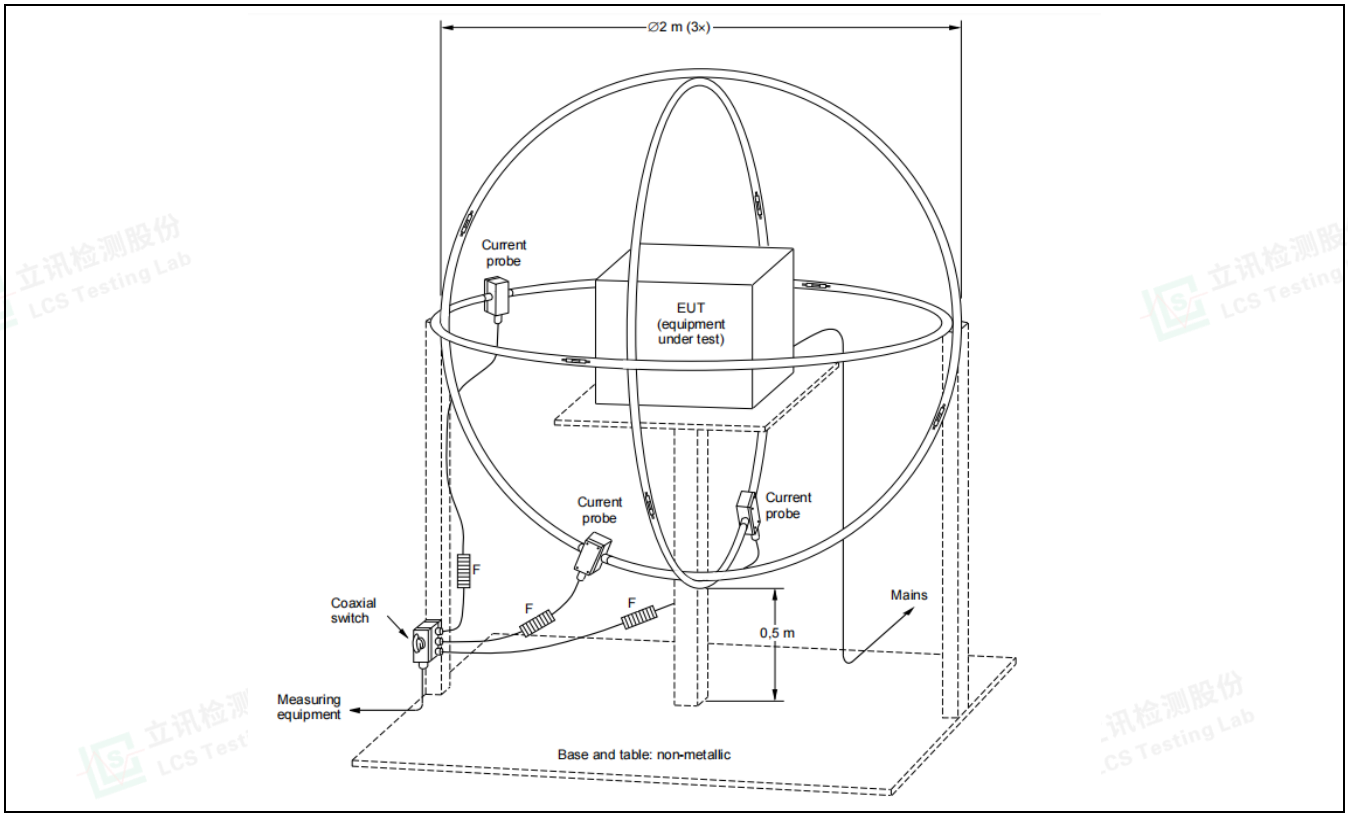
5.2. RADIATED DISTURBANCE (9KHz - 30MHz)

Standard	EN IEC 55015:2019+A11:2020
Basic Standard(s)	EN 55016-2-3
Test method	Large Loop Antenna (LLA)

LLAS Radiated disturbance limits (2m)

Frequency range [MHz]	Limit: Quasi-peak [dB(µA)]	IF BW
0,009 - 0,07	88	200 Hz
0,07 - 0,15	88 - 58	200 Hz
0,15 - 3,0	58 - 22	9 kHz
3,0 - 30	22	9 kHz
1) At the transition frequency the lower limit applies. 2) Decreasing linearly with logarithm of the frequency.		

Test configuration



Test Procedure Description

The EUT is placed on a wood table in the center of a loop antenna. the induced current in the loop antenna is measured by means of a current probe and the test receiver. Three field components are checked by means of a coaxial switch.

Test Results refer to Annex A.2

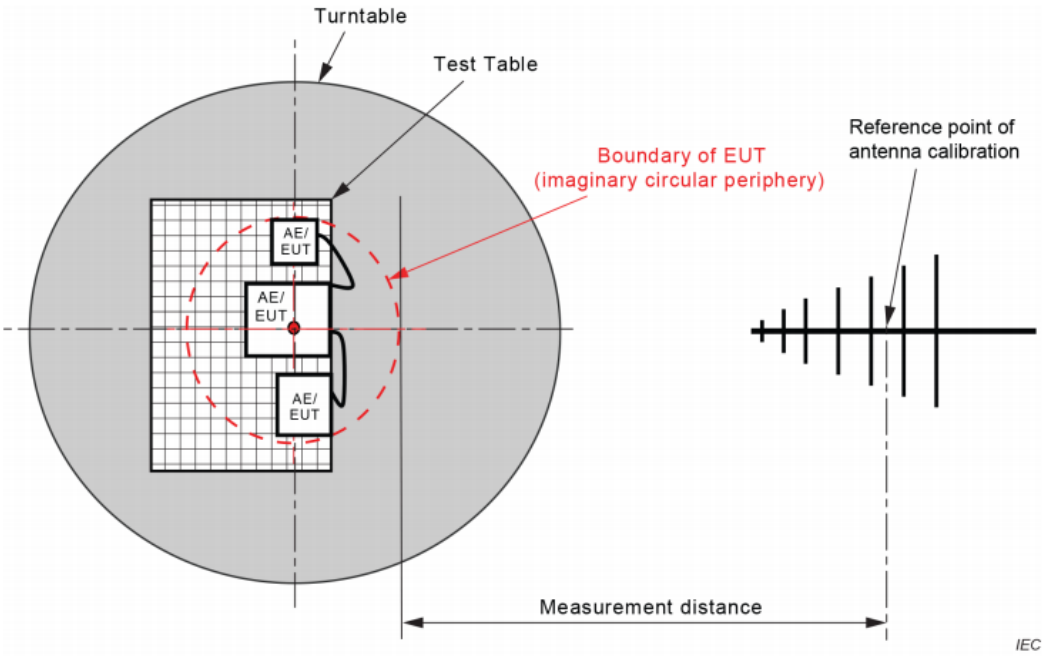
5.3. RADIATED DISTURBANCE (30MHz - 1GHz)

Standard	EN IEC 55015:2019+A11:2020
Basic Standard(s)	EN 55016-2-3
Test method	Semi Anechoic Chamber (SAC)

SAC Radiated disturbance limit

Frequency range [MHz]	Limit: Quasi-peak [dB(μV/m)]		IF BW
	3 m distance	10 m distance	
30 - 230	40	30	120 KHz
230 - 1000	47	37	120 KHz
1) At the transition frequency, the lower limit applies. 2) Distance refers to the distance in meters between the measuring instrument antenna geometric center and the closed point of any part of the EUT.			

Test configuration



Test Procedure Description

The radiated disturbance test was conducted in a 3m Semi Anechoic Chamber and conforming to CISPR 16-2-3. the EUT is placed on a turntable, which is 0.8 meter high above the ground. the turntable can rotate 360 degrees to determine the position of the maximum emission level. the EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. the antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Log-periodic Antenna (calibrated by Dipole antenna) is used as a receiving antenna. both horizontal and vertical polarization of the antenna is set on test.

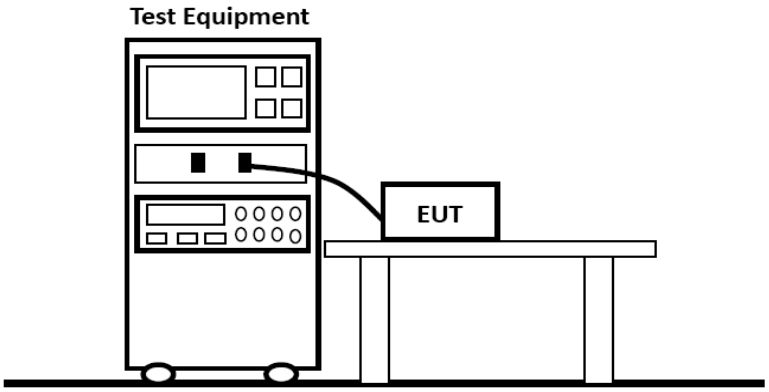
Test Results refer to Annex A.3

5.4. HARMONIC CURRENT

Standard		EN IEC 61000-3-2:2019+A1:2021
Exlusions (For these categories of equipment, limits are not specified in the EN IEC 61000-3-2)	☒	Systems with nominal voltages less than 220VAC (line-to-neutral)
	☐	Lighting equipment with rated power < 5 W
	☐	Equipment with rated power of ≤ 75 W (other than lighting equipment)
	☐	Professional equipment with a total rated power >1kW
	☐	Symmetrically controlled heating elements with rated power ≤ 200 W
	☐	Independent dimmers for incandescent lamps with rated power ≤ 1kW

Classification				
☐	Class A	All equipment not specified as belonging to Class B, C or D		
☐	Class B	Portable tools		
☐	Class C	☐	Lighting equipment with active input power > 25W	
		☐	Lighting equipment with active input power ≥ 5W and ≤ 25W	
			☐	Table 3, column 2 (Power-related limits)
			☐	3rd harmonic ≤ 86%, 5th harmonic ≤ 61% and waveform conditions
			☐	THD ≤ 70%, Harmonic:3rd ≤ 35%, 5th ≤ 25%, 7th ≤ 30%, 9th and 11th ≤ 20%, 2nd ≤ 5%
☐	Class D	Personal computers, television receivers,refrigerators and freezers having one or more variable-speed drives to control compressor		

Test configuration



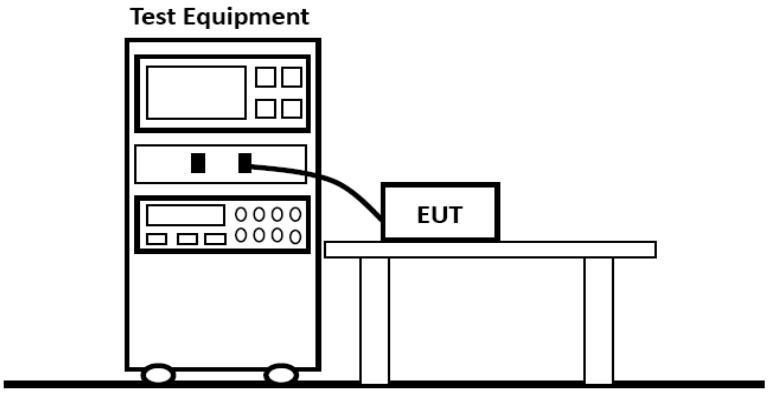
5.5. VOLTAGE FLUCTUATIONS & FLICKER

Standard	EN 61000-3-3:2013+A1:2019+A2:2021

Limit

P_{st} (Short term flicker)	☐	≤ 1	☒	Not applicable
P_{lt} (Long-term flicker)	☐	≤ 0,65	☒	Not applicable
T_{max} (Accumulated time)	☐	≤ 500 ms	☒	Not applicable
d_c (Relative voltage change)	☐	≤ 3.3%	☒	Not applicable
d_{max} (Max.voltage change)	☐	≤ 4%	☐	≤ 6%
	☐	≤ 7%	☒	Not applicable

Test configuration



6. IMMUNITY TESTS

6.1. PERFORMANCE CRITERIA

Standard	EN 61547:2009

The performance of lighting equipment shall be assessed by monitoring:

- the luminous intensity of the luminaire or of the lamp(s).
- the functioning of the control in the case of equipment which includes a regulating control or concerns the regulating control itself.
- the functioning of the starting device, if any.

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.

Electronic lighting equipment		Tests and performance criteria							
		5.2 (ESD)	5.3 (RS)	5.4 (PFMF)	5.5 (EFT)	5.6 (CS)	5.7 (Surge)	5.8 (Dips)	5.9 (Interruption)
☐	Self-ballasted lamps	B	A	B	B	A	C	C	B
☐	Independent auxiliaries	B	A	B	B	A	C	C	B[1]
☒	Luminaire including active electronic components	B	A	B	B	A	C	C	B[1]
☐	Luminaire for emergency lighting	B[2]	A	B	B[2]	A	B[2]	See[3]	See[3]

Supplementary information:

1) For ballasts where the lamp is not able to restart within 1 min, due to the physical constraints of the lamp, performance criterion C applies.

2) Luminaires for emergency lighting shall be tested in both the normal and emergency mode of operation.

3) These tests do not apply as they are covered by the test in IEC 60598-2-22.

4) For emergency luminaires designed to operate in high-risk task areas, after the test, the luminous intensity shall be restored to its initial value within 0,5 s.

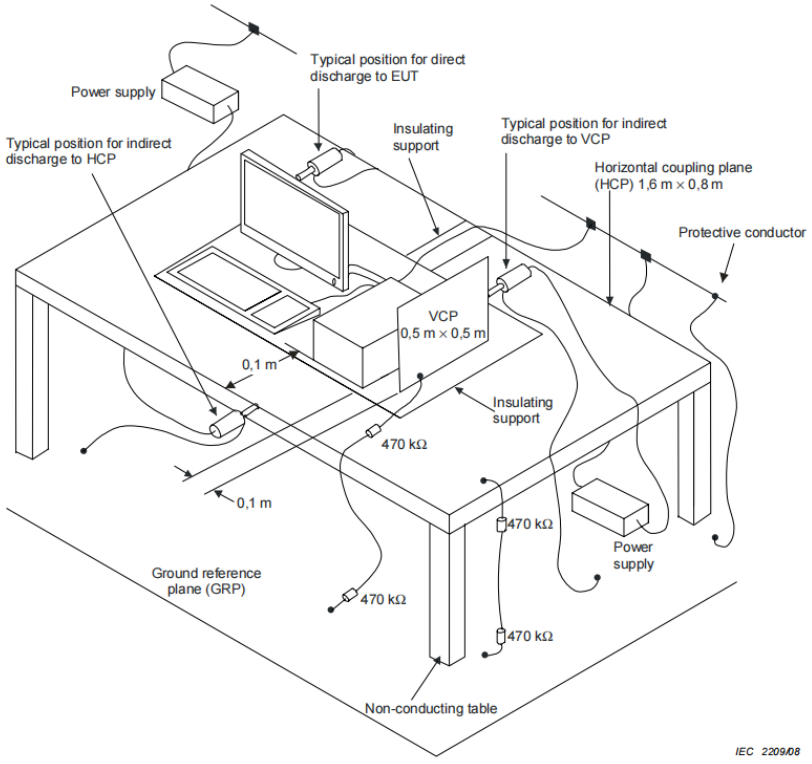
6.2. ELECTROSTATIC DISCHARGE

Electrostatic discharge (ESD) is the result of accumulated static electricity from a person or object, for example, walking on a synthetic carpet. ESD can indirectly affect the operation of equipment or damage its electronic components through direct discharge or coupling. both effects were simulated during the test. contact discharge is the preferred test method. twenty discharges (10 with positive and 10 with negative polarity) shall be applied on each accessible metallic part of the enclosure (terminals are excluded). air discharges shall be used where contact discharges cannot be applied. discharges shall be applied on the horizontal or vertical coupling planes.

Requirements

Standard	EN 61547:2009							
Basic standard	EN 61000-4-2							
Port under test	Enclosure							
Contact discharge	☒	± 2 kV	☒	± 4 kV	☐	±8 kV	☐	±15 kV
Air discharge	☒	± 2 kV	☒	± 4 kV	☒	±8 kV	☐	±15 kV
Number of discharges	≥ 10 per polarity with ≥ 1 sec interval							

Test configuration



Test Results refer to Annex A.4

6.3. RADIO-FREQUENCY ELECTROMAGNETIC FIELDS

During the test it is verified if the EUT has sufficient immunity against radiated electromagnetic fields.

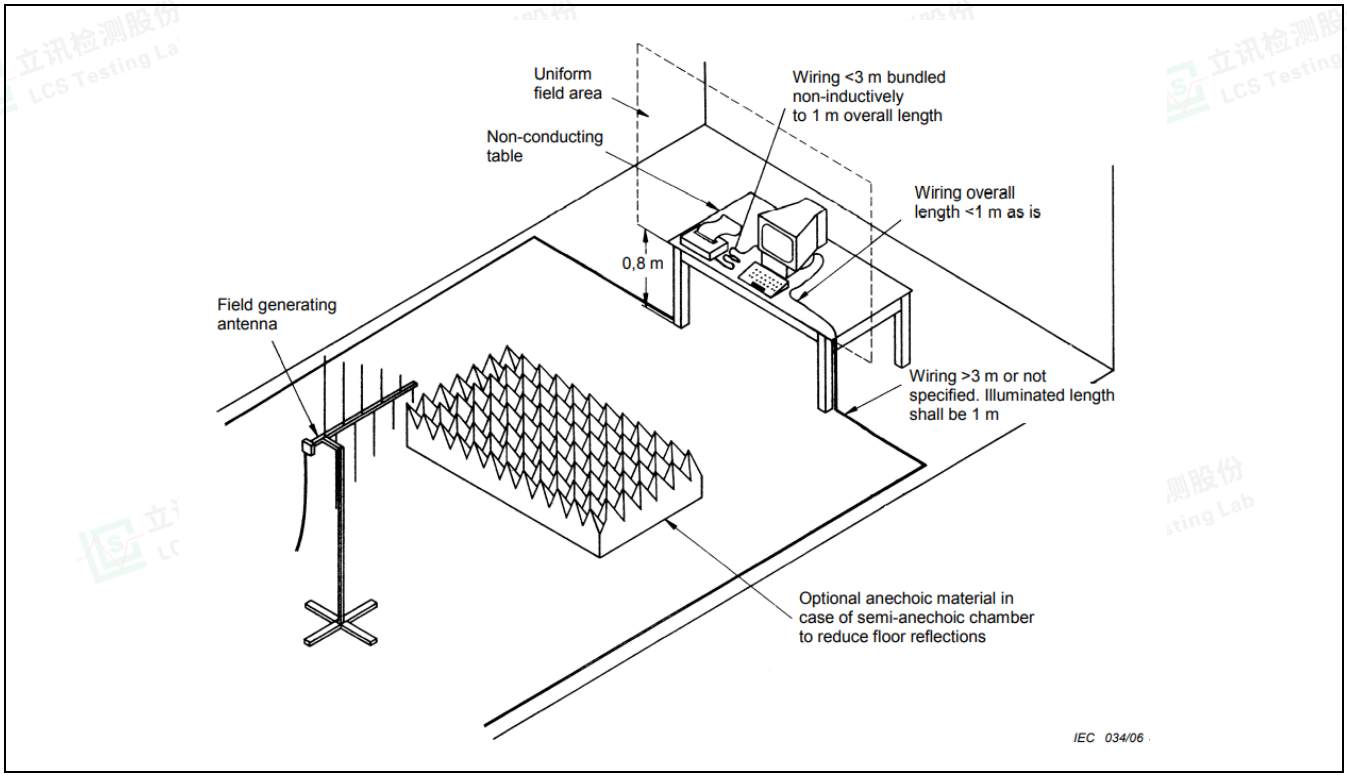
The test was carried out in a half-wave anechoic chamber with absorbent material attached to a reflective ground plate, Before the test, the test field strength needs to be calibrated. during the calibration, the corresponding relationship between the target field strength and the forward power applied to the transmitting antenna is established.during the test, except for EUT, the indoor layout is consistent with the calibration.

The EUT and its simulators are placed on a turn table which is 0,8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. both horizontal and vertical polarization of the antenna are set on test. each of the four sides of EUT must be faced this transmitting antenna and measured individually. in order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

Requirements

Standard	EN 61547:2009			
Basic standard	EN 61000-4-3			
Port under test	Enclosure			
Frequency range	Test level	Modulation	Dwell time	Step size
80 - 1000 MHz	3 V/m	1 kHz, 80 % AM	≥ 0,5 s	≤ 1%

Test configuration



Test Results refer to Annex A.4

6.4. ELECTRICAL FAST TRANSIENT / BURST

The EFT immunity test simulates the disturbances by caused of very short transient bursts.

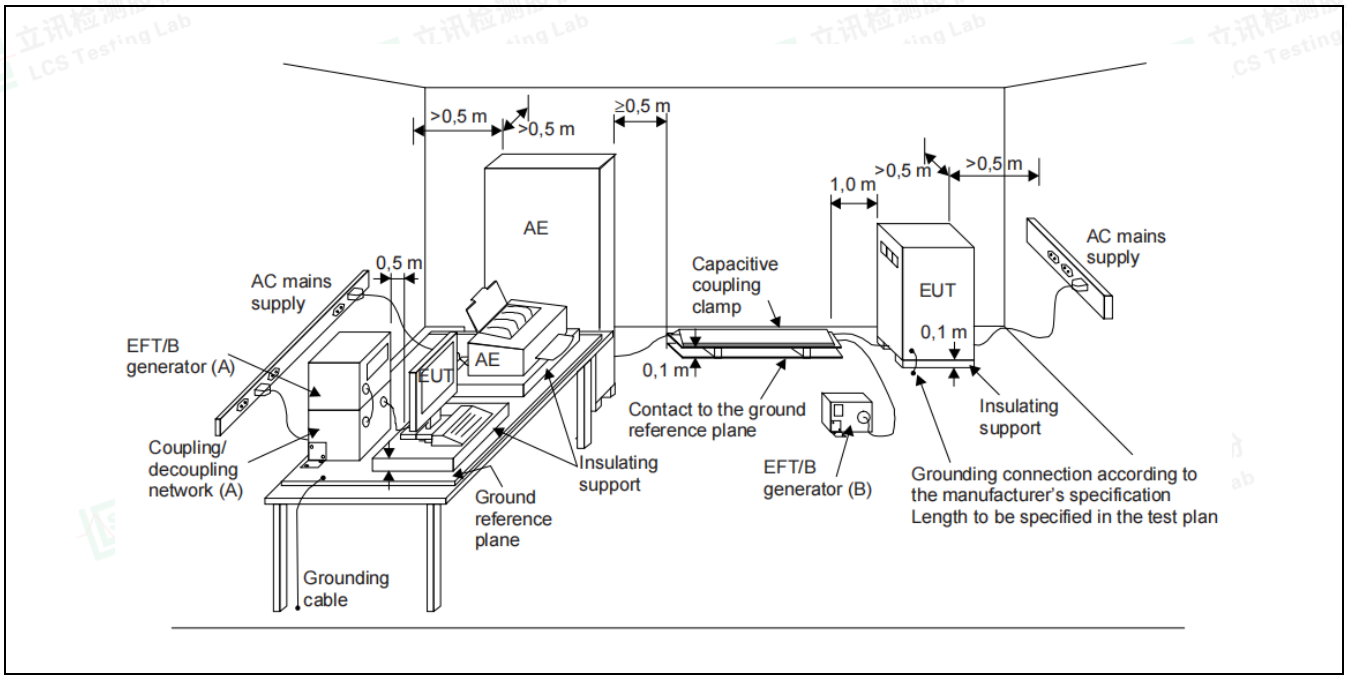
The EUT is put on the Insulating support which is 0.1 meter high above the ground reference plane. the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5 m. both polarities of the test voltage should be applied during test, fast transients are carried out with a minimum duration of 2 min with a positive polarity and a minimum of 2 min with a negative polarity.

Requirements

Standard		EN 61547:2009		
Basic standard		EN 61000-4-4		
Pulse characteristics		5/50 ns		
Port under test		Test level	Repetition frequency	Duration
☐	AC input / output power	± 1000 V	5 kHz	2 min / polarity
☒	DC input / output power [2]	± 500 V	5 kHz	2 min / polarity
☐	Signal / Control port [1 3]	± 500 V	5 kHz	2 min / polarity

1) Only applicable to ports interfacing with cables whose whose total length may exceed 3 m.
2) Not applicable to equipment not connected to the mains while in use.
3) Change of state commands are not applied during the test.

Test configuration



Test Results refer to Annex A.4

6.5. INJECTED CURRENTS (RADIO-FREQUENCY COMMON MODE)

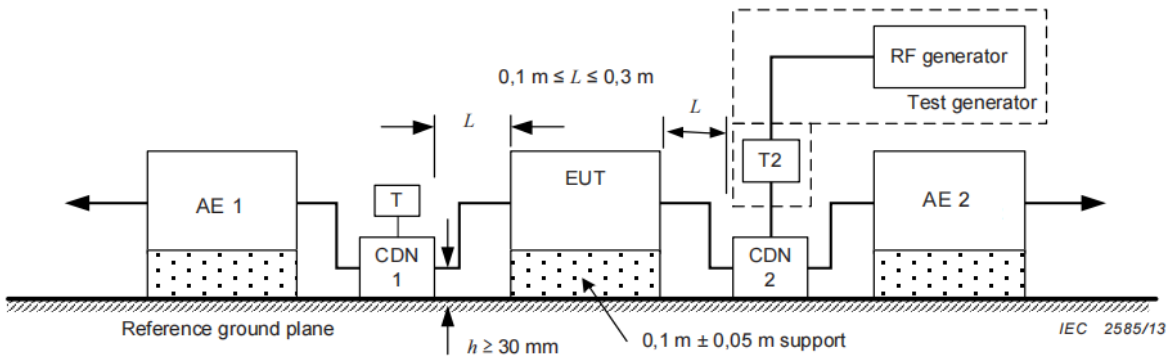
During the test the immunity of the EUT for conducted electromagnetic fields is checked .

The equipment to be tested is placed on an insulating support of 0,1 m ± 0,05 m height above a reference ground plane. a non conductive roller / caster in the range of 0,1 m ± 0,05 m above the reference ground plane can be used as an alternative to an insulating support. all cables exiting the EUT shall be supported at a height of at least 30 mm above the reference ground plane.The coupling and decoupling devices shall be placed on the reference ground plane, making direct contact with it at a distance of 0,1 m to 0,3 m from the EUT.

Requirements

Standard		EN 61547:2009			
Basic standard		EN 61000-4-6			
Frequency range		0,15 - 80 MHz			
Port under test		Test level	Modulation	Dwell time	Step size
☐	AC input / output power	3 V	1 kHz, 80 % AM	≥ 0,5 s	≤ 1%
☒	DC input / output power [1]	3 V	1 kHz, 80 % AM	≥ 0,5 s	≤ 1%
☐	Signal / Control port [2]	3 V	1 kHz, 80 % AM	≥ 0,5 s	≤ 1%
1) Not applicable to equipment not connected to the mains while in use. 2) Only applicable to ports interfacing with cables whose whose total length may exceed 3 m.					

Test configuration

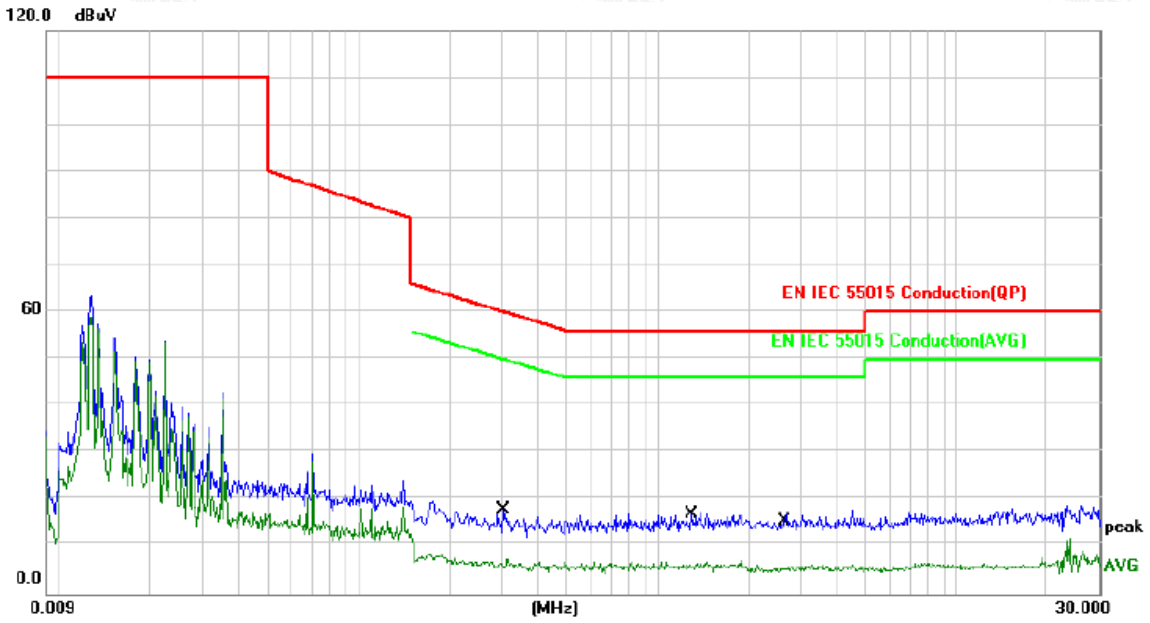


Test Results refer to Annex A.4

ANNEX A - TEST RESULTS

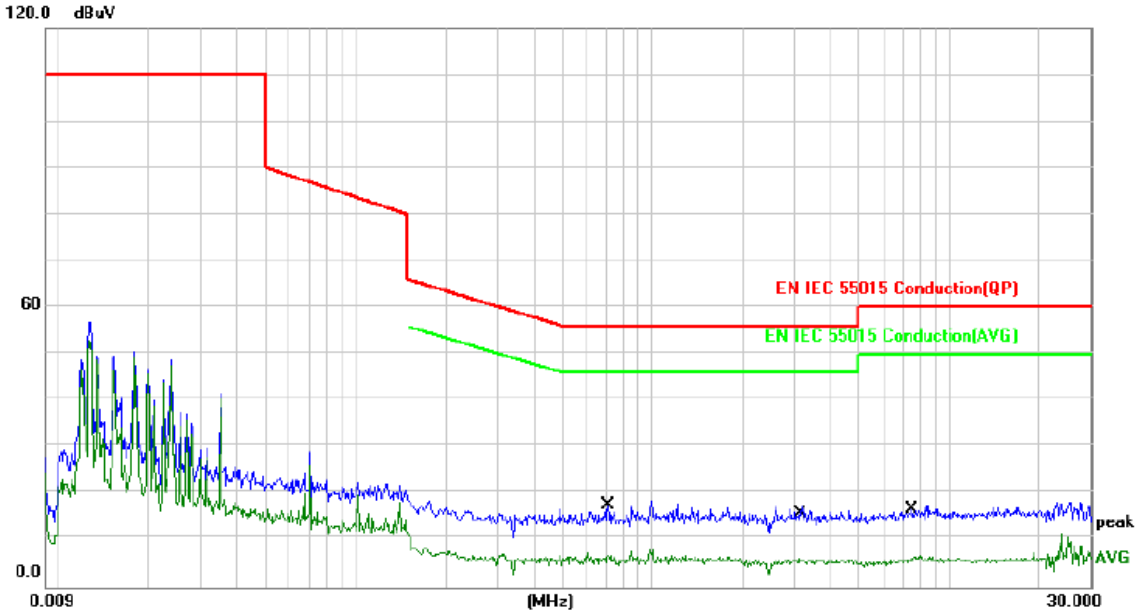
A.1. CONDUCTED DISTURBANCE TEST RESULTS

Environmental Conditions	23.9℃, 53% RH
Model	LY48-FW2835W-24-IP67
Operating mode	Mode 1 (worst case)
Test voltage	DC 24V
Test engineer	Peng Dong
Pol	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3050	-0.83	10.20	9.37	60.11	-50.74	QP	
2		0.3050	-3.92	10.20	6.28	50.11	-43.83	AVG	
3		1.2866	-2.04	10.20	8.16	56.00	-47.84	QP	
4	*	1.2866	-4.74	10.20	5.46	46.00	-40.54	AVG	
5		2.6294	-1.07	10.20	9.13	56.00	-46.87	QP	
6		2.6294	-5.64	10.20	4.56	46.00	-41.44	AVG	

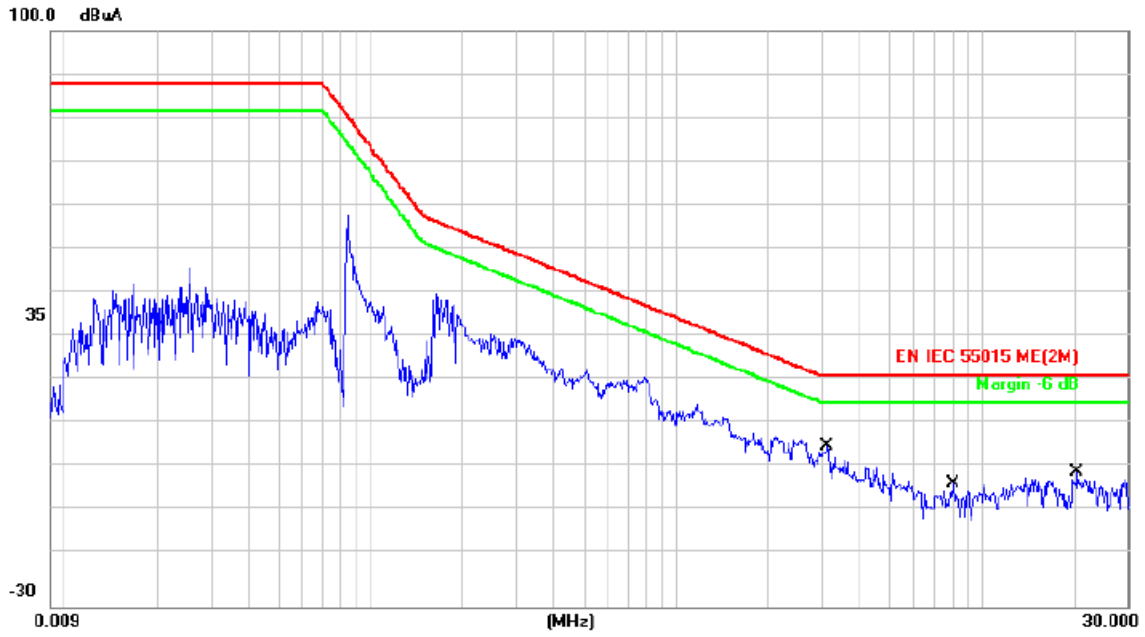
Environmental Conditions	23.9℃, 53% RH
Model	LY48-FW2835W-24-IP67
Operating mode	Mode 1 (worst case)
Test voltage	DC 24V
Test engineer	Peng Dong
Pol	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.7169	-1.33	10.20	8.87	56.00	-47.13	QP	
2	*	0.7169	-4.39	10.20	5.81	46.00	-40.19	AVG	
3		3.1135	-0.78	10.20	9.42	56.00	-46.58	QP	
4		3.1135	-5.39	10.20	4.81	46.00	-41.19	AVG	
5		7.5279	-0.48	10.20	9.72	60.00	-50.28	QP	
6		7.5279	-5.08	10.20	5.12	50.00	-44.88	AVG	

A.2. RADIATED DISTURBANCE TEST RESULTS (9kHz - 30MHz)

Environmental Conditions	23.9℃, 53% RH
Model	LY48-FW2835W-24-IP67
Operating mode	Mode 1 (worst case)
Test voltage	DC 24V
Test engineer	Peng Dong
Pol	X

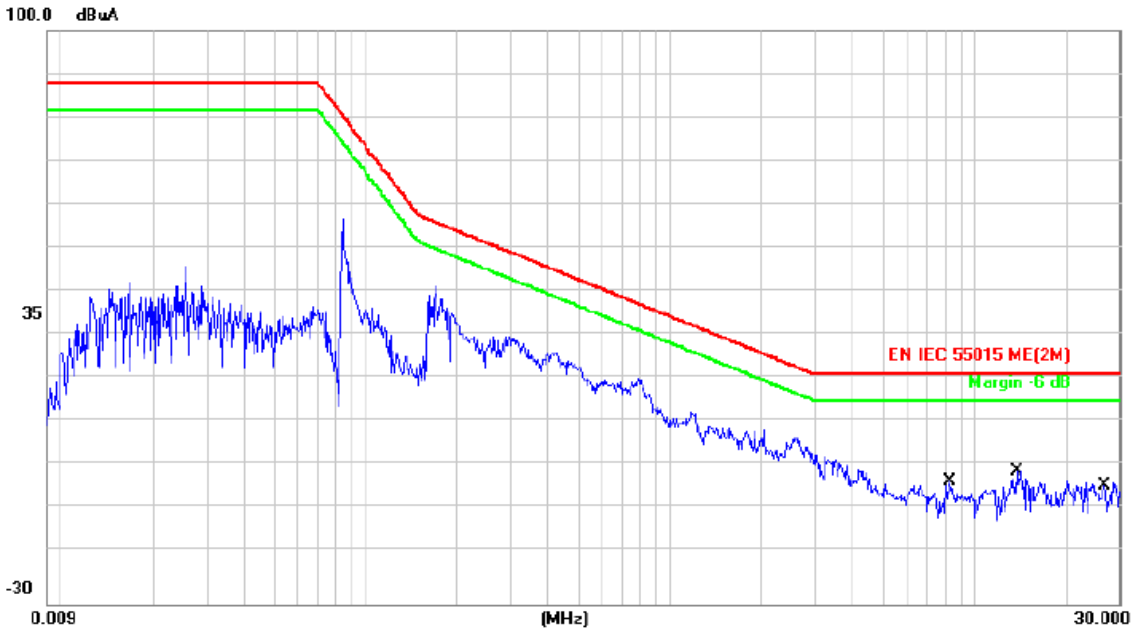


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuA	dB	dBuA	dBuA	dB	Detector	Comment
1	*	3.1206	11.21	-7.56	3.65	22.00	-18.35	QP	
2		8.0615	13.63	-18.17	-4.54	22.00	-26.54	QP	
3		20.4902	25.81	-27.99	-2.18	22.00	-24.18	QP	

Environmental Conditions	23.9℃, 53% RH
Model	LY48-FW2835W-24-IP67
Operating mode	Mode 1 (worst case)
Test voltage	DC 24V
Test engineer	Peng Dong
Pol	Y

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuA	dB	dBuA	dBuA	dB	Detector	Comment
1	*	4.5319	10.38	-11.45	-1.07	22.00	-23.07	QP	
2		7.6783	10.99	-17.59	-6.60	22.00	-28.60	QP	
3		21.8640	28.91	-32.46	-3.55	22.00	-25.55	QP	

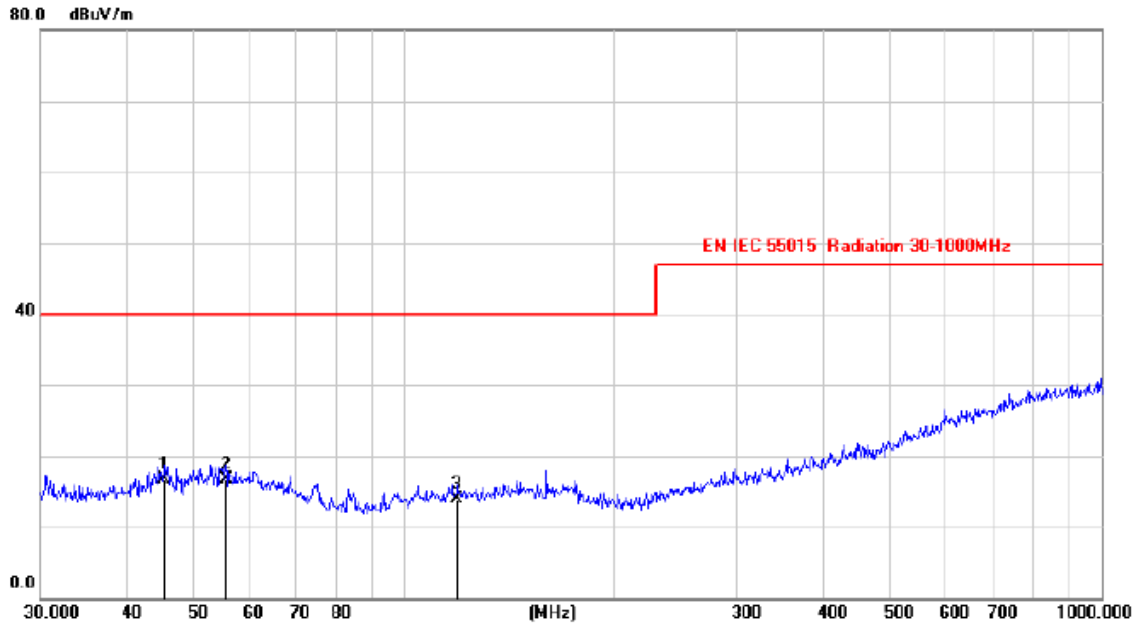
Environmental Conditions	23.9℃, 53% RH
Model	LY48-FW2835W-24-IP67
Operating mode	Mode 1 (worst case)
Test voltage	DC 24V
Test engineer	Peng Dong
Pol	Z



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuA	dB	dBuA	dBuA	dB	Detector	Comment
1		8.3268	12.74	-18.48	-5.74	22.00	-27.74	QP	
2	*	13.7697	19.58	-22.50	-2.92	22.00	-24.92	QP	
3		26.7789	30.21	-35.43	-5.22	22.00	-27.22	QP	

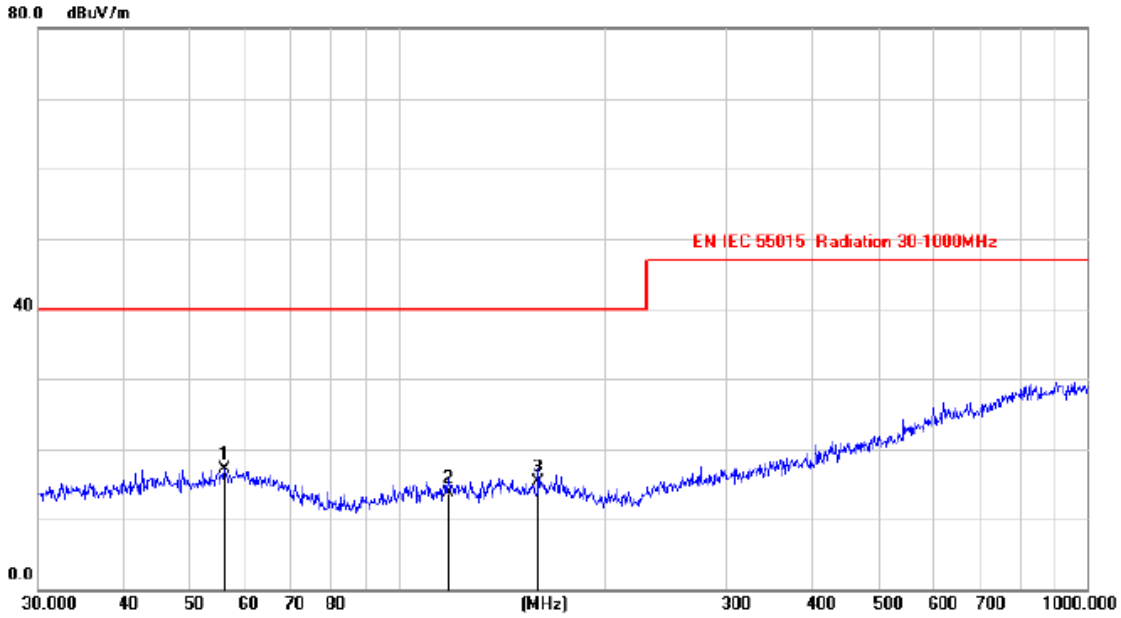
A.3. RADIATED DISTURBANCE TEST RESULTS (30MHz - 1GHz)

Environmental Conditions	23.9℃, 51% RH
Model	LY48-FW2835W-24-IP67
Operating mode	Mode 1 (worst case)
Test voltage	DC 24V
Test engineer	Peng Dong
Pol	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	45.2563	4.65	12.10	16.75	40.00	-23.25	QP			
2		55.4390	4.02	12.60	16.62	40.00	-23.38	QP			
3		119.0702	2.56	11.44	14.00	40.00	-26.00	QP			

Environmental Conditions	23.9℃, 51% RH
Model	LY48-FW2835W-24-IP67
Operating mode	Mode 1 (worst case)
Test voltage	DC 24V
Test engineer	Peng Dong
Pol	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	56.0498	3.99	13.11	17.10	40.00	-22.90	QP			
2		118.4975	3.09	10.53	13.62	40.00	-26.38	QP			
3		159.9947	5.38	9.88	15.26	40.00	-24.74	QP			

A.4. IMMUNITY TEST RESULTS

ELECTROSTATIC DISCHARGE IMMUNITY TEST RESULTS					
Standard	☒ EN 61547:2009		☒ EN 61000-4-2		
EUT	Flexible LED Wall Washer		Temperature	23.2℃	
M/N	LY48-FW2835W-24-IP67		Humidity	50%	
Test Mode	Mode 1		Pressure	1008mbar	
Input voltage	DC 24V		Test Results	Pass	
Test engineer	Peng Dong				
Discharge Mode	Test Points	Test Valtage (kV) & polarity	Number of discharges/polarity	Discharge interval (s)	Performance Criteria
Contact Discharge	-	± 2&4	10	1	B
Air Discharge	-	± 2&4&8	10	1	B
VCP	-	± 4	10	1	B
HCP	-	± 4	10	1	B

RADIO-FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST RESULTS				
Standard	☒ EN 61547:2009		☒ EN 61000-4-3	
EUT	Flexible LED Wall Washer		Temperature	24.1℃
M/N	LY48-FW2835W-24-IP67		Humidity	55%
Test Mode	Mode 1		Pressure	1008mbar
Input voltage	DC 24V		Test engineer	Baron.wen
Modulation	1 kHz, 80 % AM		Test Results	Pass
Steps	1%			
Angle of EUT	Antenna polarization	Frequency Range	Test Level	Performance Criteria
0°	Vertical Horizontal	80 - 1000 MHz	3 V/m	A
90°	Vertical Horizontal	80 - 1000 MHz	3 V/m	A
180°	Vertical Horizontal	80 - 1000 MHz	3 V/m	A
270°	Vertical Horizontal	80 - 1000 MHz	3 V/m	A

Note :

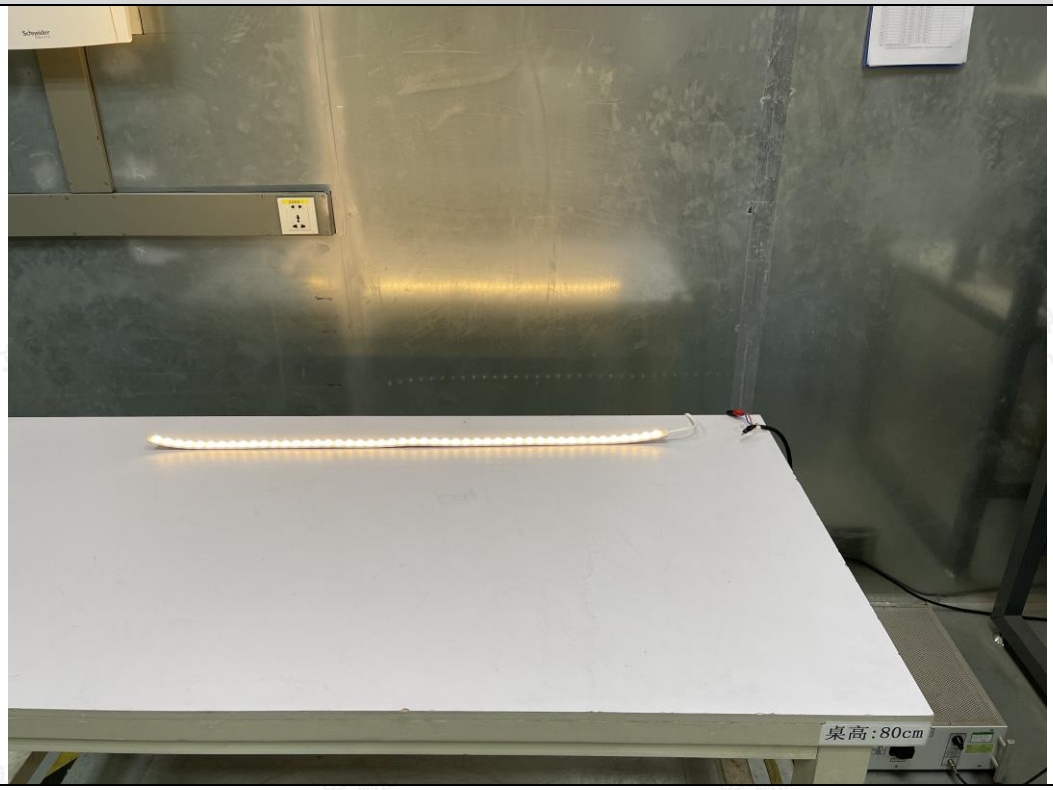
ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST RESULTS				
Standard	☒ EN 61547:2009		☒ EN 61000-4-4	
EUT	Flexible LED Wall Washer		Temperature	23.9℃
M/N	LY48-FW2835W-24-IP67		Humidity	52%
Test Mode	Mode 1		Pressure	1008mbar
Input voltage	DC 24V		Test Results	Pass
Test engineer	Peng Dong			
Port under test	Test Level & polarity	Repetition Frequency	Test duration / polarity	Performance Criteria
AC Input / Output Power				
DC Input / Output Power	± 0.5 kV	5 kHz	2min	B
Signal / Control Port				

Note:

INJECTED CURRENTS (RADIO-FREQUENCY COMMON MODE) TEST RESULTS				
Standard	☒ EN 61547:2009		☒ EN 61000-4-6	
EUT	Flexible LED Wall Washer		Temperature	24.1℃
M/N	LY48-FW2835W-24-IP67		Humidity	54%
Test Mode	Mode 1		Pressure	1008mbar
Input voltage	DC 24V		Test Results	Pass
Frequency range	0,15 - 80 MHz		Test engineer	Peng Dong
Port under test	Test Level	Coupling method	Dwell time	Performance Criteria
AC Input / Output Power				
DC Input / Output Power	3 V	CDN	3 seconds	A
Signal / Control Port				

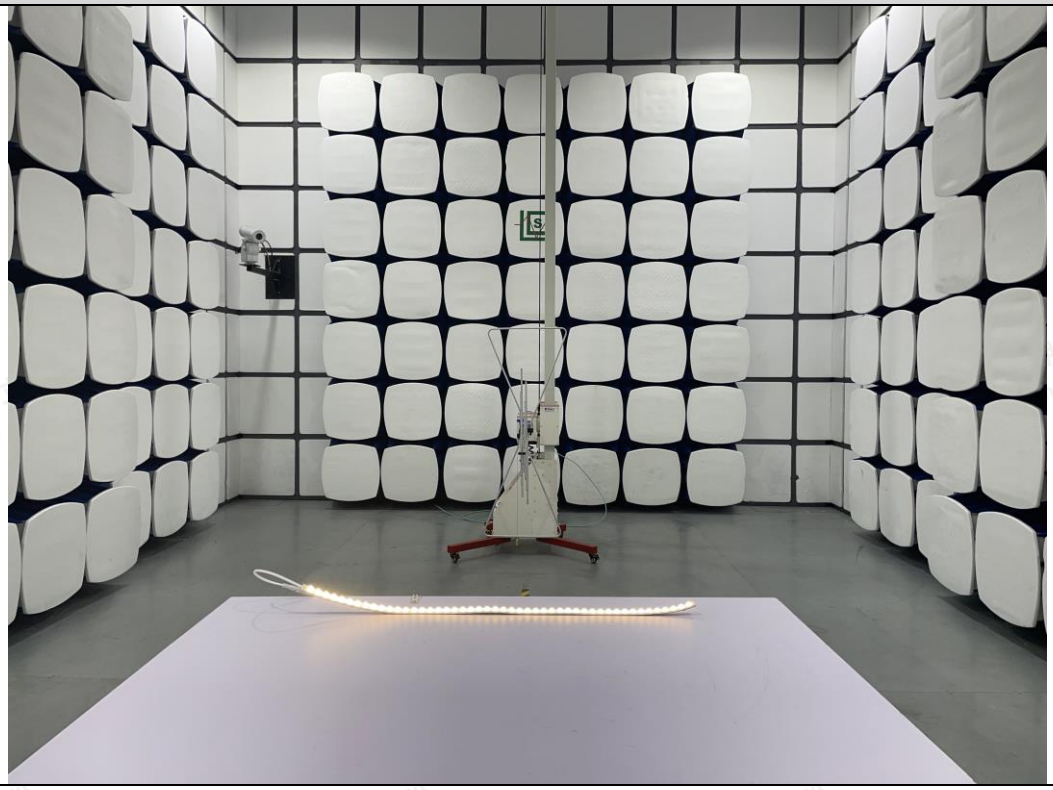
ANNEX B - TEST PHOTOS

B.1. Conducted Disturbance at electric power supply

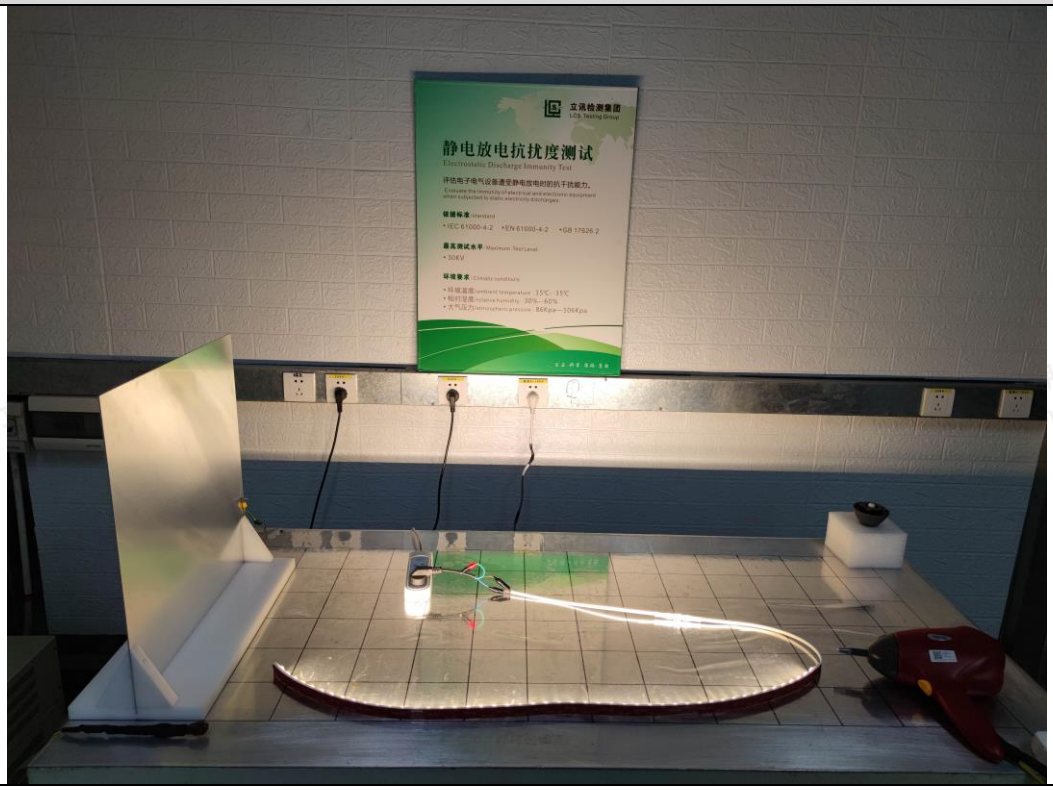


B.2. Radiated Disturbance (9kHz - 30MHz)

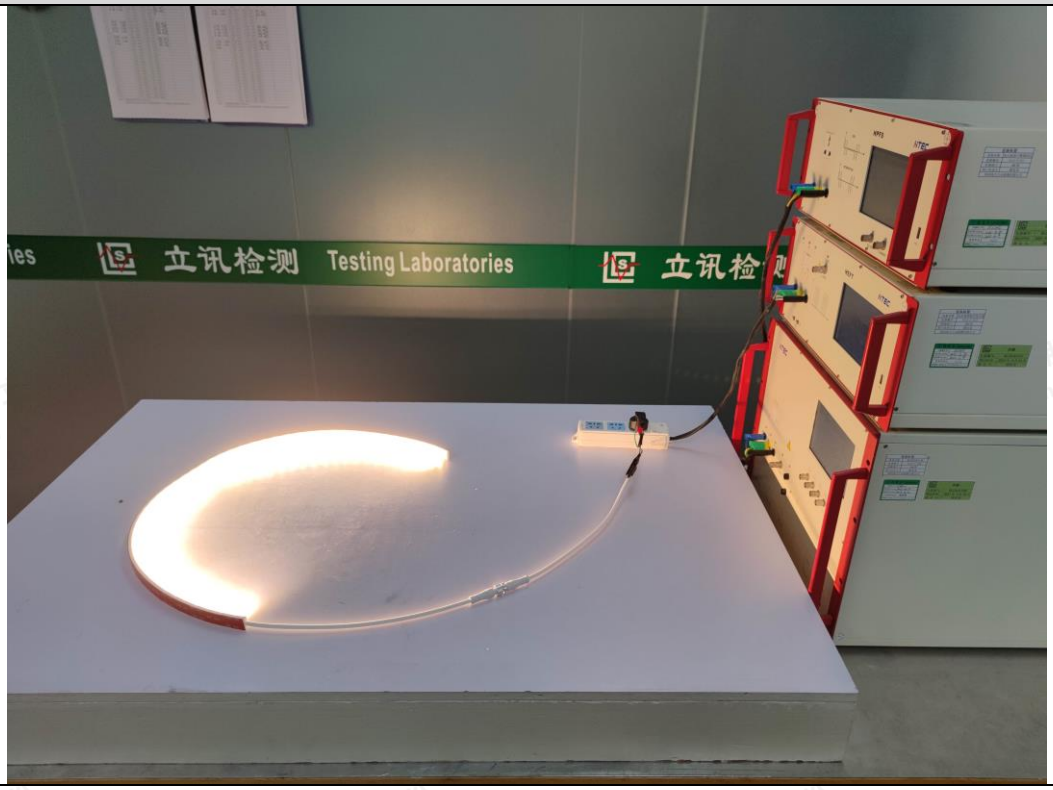
B.3. Radiated Disturbance (30MHz to 1GHz)



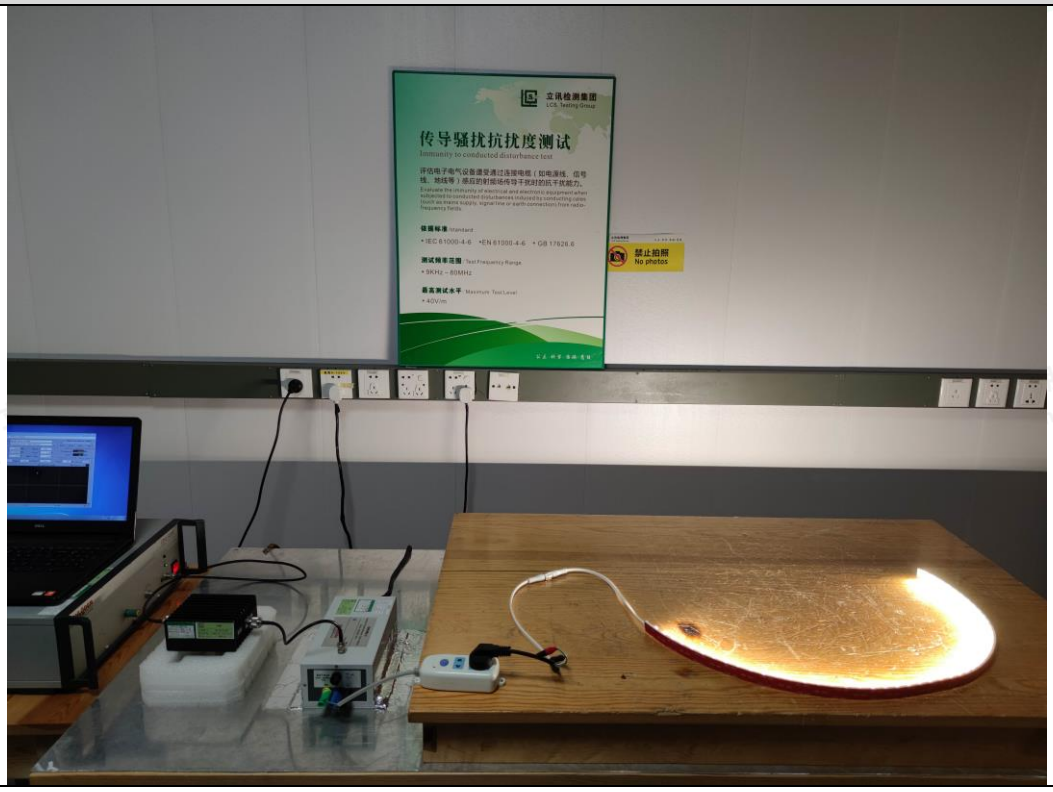
B.4. Electrostatic Discharge



B.5. Electrical Fast Transient / Burst



B.6. Injected Currents (Radio-Frequency Common Mode)



ANNEX C - EXTERNAL AND INTERNAL PHOTOS OF THE EUT

The photographs show the equipment under test.

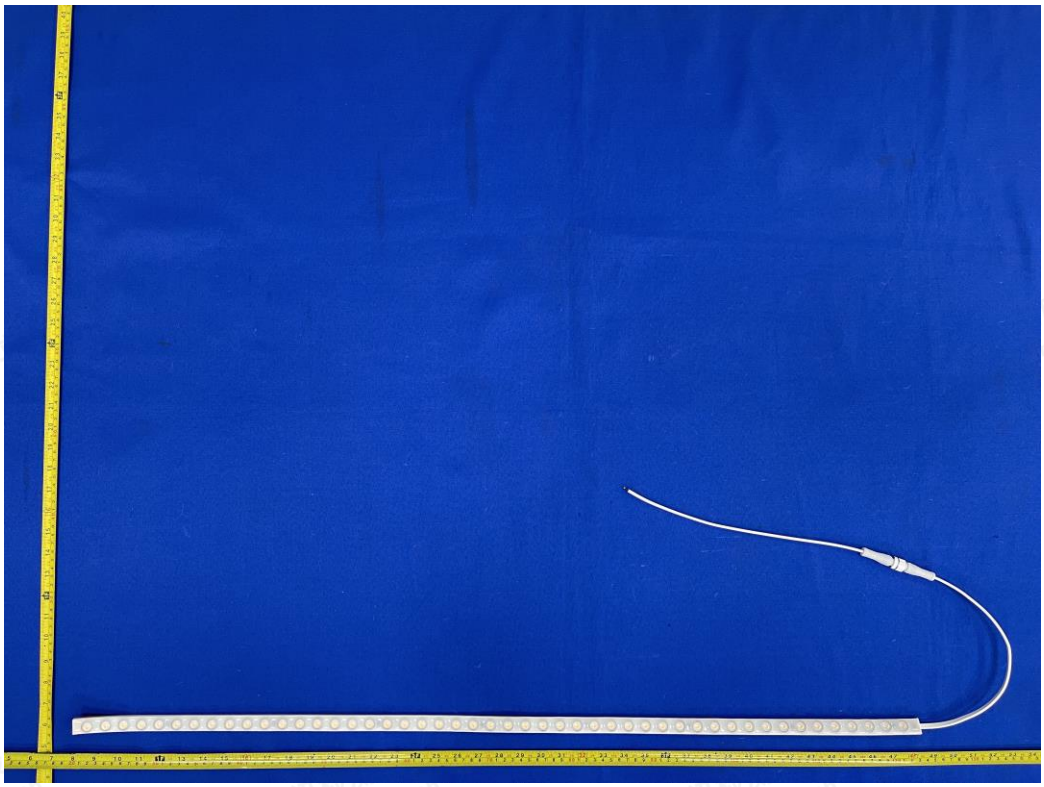


Figure. 1（LY48-FW2835W-24-IP67）

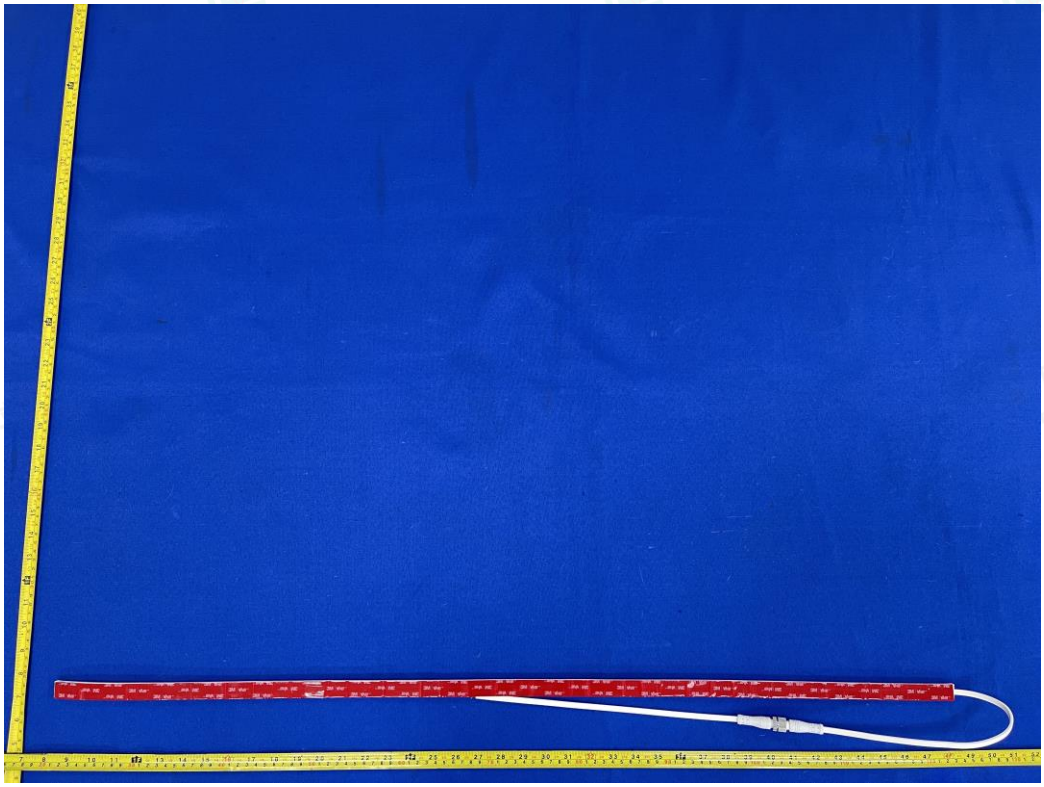


Figure. 2

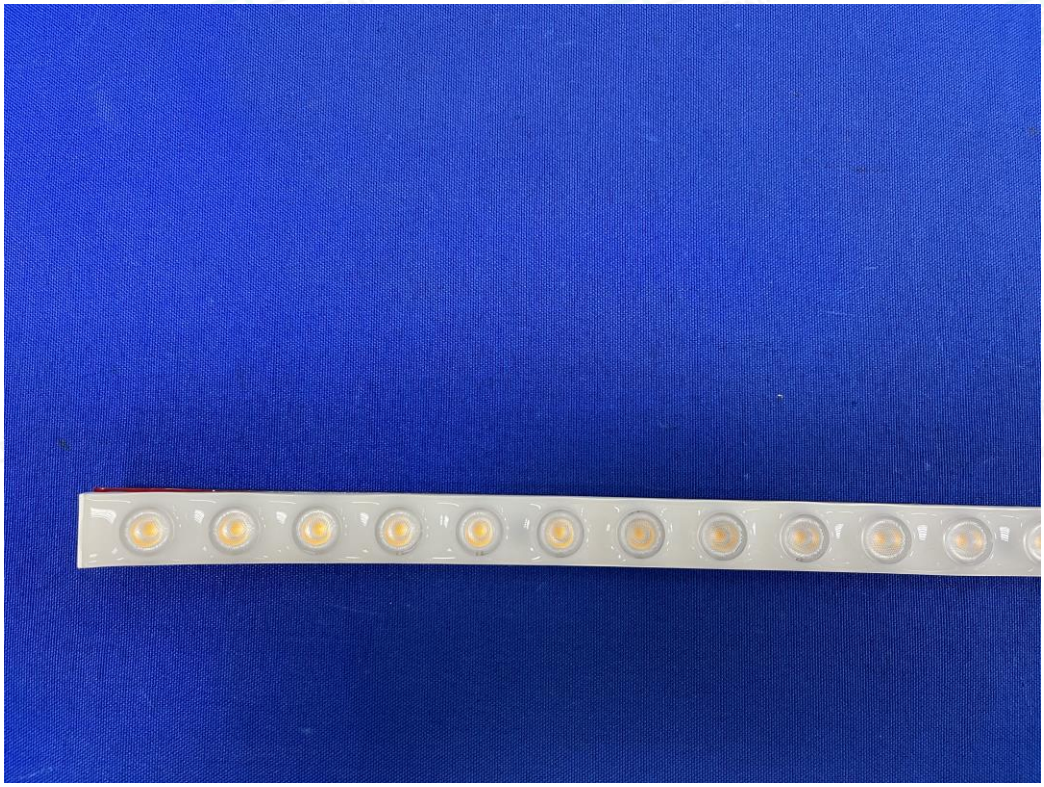


Figure. 3

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