# EMC TEST REPORT

For

Aurora (Shanghai) Technology Co., Ltd

LED Point Light

Test Model: PP0003-LED1.8M-RGBW-85D

Additional Models : please refer to Model list

| | | |
|---|---|---|
| Prepared for | : | Aurora (Shanghai) Technology Co., Ltd |
| Address | : | Room 221, 2F, Building 6, No.7001, Zhongchun Road, Minhang District, Shanghai |
| 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 |
| Tel | : | (+86)755-29871520 |
| Fax | : | (+86)755-29871521 |
| Web | : | www.LCS-cert.com |
| Mail | : | webmaster@LCS-cert.com |
| Date of receipt of test sample | : | May 16, 2022 |
| Number of tested samples | : | 1 |
| Serial number | : | Prototype |
| Date of Test | : | May 16, 2022 - June 24, 2022 |
| Date of Report | : | June 24, 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.....** | **LCSB051622071E** |
| Date of Issue..... | June 24, 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 ☒<br>Partial application of Harmonised standards ☐<br>Other standard testing method ☐ |
| **Applicant's Name.....** | **Aurora (Shanghai) Technology Co., Ltd** |
| Address..... | Room 221, 2F, Building 6, No.7001, Zhongchun Road, Minhang District, Shanghai |
| **Test Specification:** | |
| Standard..... | EN IEC 55015:2019+A11:2020<br>EN IEC 61000-3-2:2019+A1:2021<br>EN 61000-3-3:2013+A1:2019+A2:2021<br>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.....** | **LED Point Light** |
| Trademark..... | N/A |
| Test Model/Type..... | PP0003-LED1.8M-RGBW-85D |
| Rating..... | DC24V, 1.8W |
| **Results .....** | **PASS** |

| **Compiled by:** | **Supervised by:** | **Approved by:** |
|---|---|---|
| Amy Liu / Engineer | Aimee Yang / Technique Director | Dm Gu / Manager |

# EMC - TEST REPORT

| | |
|---|---|
| **Test Report No.....:** | **LCSB051622071E** |

| | |
|---|---|
| **Applicant.....:** | **Aurora (Shanghai) Technology Co., Ltd** |
| Address.....: | Room 221, 2F, Building 6, No.7001, Zhongchun Road, Minhang District, Shanghai |
| Telephone.....: | / |
| Fax.....: | / |
| **Manufacturer.....:** | **Aurora (Shanghai) Technology Co., Ltd** |
| Address.....: | Room 221, 2F, Building 6, No.7001, Zhongchun Road, Minhang District, Shanghai |
| Telephone.....: | / |
| Fax.....: | / |
| **Factory.....:** | **Aurora (Shanghai) Technology Co., Ltd** |
| Address.....: | Room 221, 2F, Building 6, No.7001, Zhongchun Road, Minhang District, Shanghai |
| 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 | June 24, 2022 | Initial Issue | - |
| | | | |
| | | | |

Remark:
000) : “---”

# TABLE OF CONTENTS

# 1. GENERAL INFORMATION

## 1.1. GENERAL DESCRIPTION OF THE ITEM(S)

| | |
|---|---|
| Equipment Under Test | LED Point Light |
| Test Model/Type | PP0003-LED1.8M-RGBW-85D |
| Additional Models/Type | See Model list |
| Description of Model difference | - |
| Rating | DC24V, 1.8W |
| Mounting position | ☐ Table top equipment<br>☒ Wall /Ceiling mounted equipment<br>☐ Floor standing equipment<br>☐ Hand-held equipment<br>☐ Other |
| Non-restricted ELV lamps | ☐ Yes<br>☒ 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.for more information refer to client's DoC letter. |

| **Model** | **Rating** |
|---|---|
| PP0003-LED1.8M-RGBW-85D | DC24V, 1.8W |
| PP0003-LEDXXM-RGBW-85D | DC24V, max.1.8W |
| Remark: "XX" is the customer code, which can be 01 to 99. | |

## 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.<br>101-201, No.39 Building,Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China.<br>CNAS Registration Number is L10160. |
| Test Location 2 | Shenzhen LCS Compliance Testing Laboratory Ltd.<br>101, 201 Building A and 301 Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, Guangdong, China.<br>NVLAP Accreditation Code is 600167-0.<br>CNAS Registration Number is L4595. |
| Date of receipt of test item | May 16, 2022 |
| Date(s) of performance of test | May 16, 2022 - June 24, 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 | 2022-05-05 | 2023-05-04 |
| 2 | 10dB Attenuator | SCHWARZBECK | VTSD9561-F | 9561-F159 | 2022-05-05 | 2023-05-04 |
| 3 | Artificial Mains Network | SCHWARZBECK | NSLK8127 | 8127716 | 2022-05-05 | 2023-05-04 |
| 4 | EMI Test Software | EZ | EZ_EMC | N/A | / | / |
| 5 | Asymmetric Artificial Network | SCHWARZBECK | NTFM 8158 | NTFM8158#120 | 2022-05-05 | 2023-05-04 |
| 6 | Voltage Probe | SCHWARZBECK | KT 9420 | 9420401 | 2022-05-05 | 2023-05-04 |
| 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 | 2022-05-05 | 2023-05-04 |
| 2 | Triple-loop Antenna | EVERFINE | LLA-2 | 9161 | 2022-05-05 | 2023-05-04 |
| 3 | EMI Test Software | EZ | EZ_EMC | N/A | / | / |
| 4 | No. 2 shielded Room | CHENGYU | 843 | / | 2020-06-16 | 2023-06-16 |

| RADIATED DISTURBANCE (above 30MHz) | | | | | | |
|---|---|---|---|---|---|---|
| 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 | 2022-05-05 | 2023-05-04 |
| 3 | Spectrum Analyzer | Agilent | N9020A | MY49100699 | 2022-05-05 | 2023-05-04 |
| 4 | Log-periodic Antenna | SCHWARZBECK | VULB9163 | 5094 | 2022-05-20 | 2025-05-19 |
| 5 | Horn Antenna | ETS-LINDGREN | 3115 | 00034771 | 2022-05-20 | 2025-05-19 |
| 6 | EMI Test Software | EZ | EZ_EMC | N/A | / | / |
| 7 | Controller | KGS | M4U450 | / | / | / |

| HARMONIC CURRENT & FLICKER | | | | | | |
|---|---|---|---|---|---|---|
| Item | Test equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
| 1 | Harmonic Current And Flicker Test System | HTEC | AC2000A | / | 2022-05-05 | 2023-05-04 |
| 2 | Linear Variable Frequency Power Supply | HTEC | HHF-5010 | / | 2022-05-05 | 2023-05-04 |

| 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 | 2022-05-05 | 2023-05-04 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | Coupling Clamp | HTEC | H3C | 163701 | 2022-05-05 | 2023-05-04 |

| SURGE | | | | | | |
|---|---|---|---|---|---|---|
| Item | Test equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
| 1 | Surge Generator | 3CTEST | SG5006G | EC5581070 | 2022-05-05 | 2023-05-04 |
| 2 | Coupling / decoupling Network | 3CTEST | SGN-5010G | EC5591033 | 2022-05-05 | 2023-05-04 |

| 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 | 2022-05-05 | 2023-05-04 |
| 2 | Coupling Network | HTEC | CDN-M2+M3 | A22/0382/2016 | 2022-05-05 | 2023-05-04 |
| 3 | Attenuator 6dB | HTEC | ATT6 | HA1601 | 2022-05-05 | 2023-05-04 |
| 4 | Electromagnetic clamp | LUTHI | EM101 | 35535 | 2022-05-05 | 2023-05-04 |

| 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 | 2022-05-05 | 2023-05-04 |

| VOLTAGEDIPS AND SHORT INTERRUPTIONS | | | | | | |
|---|---|---|---|---|---|---|
| Item | Test equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
| 1 | Voltage Dips and up Generator | HTEC | HPFS161P | 162202 | 2022-05-05 | 2023-05-04 |

| RADIO-FREQUENCY ELECTROMAGNETIC FIELDS | | | | | | |
|---|---|---|---|---|---|---|
| Item | Test equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
| 1 | ESG Vector Signal Generator | Agilent | E4438C | MY42081396 | 2022-06-06 | 2023-06-05 |
| 2 | RF POWER AMPLIFIER | OPHIR | 5225R | 1052 | NCR | NCR |
| 3 | RF POWER AMPLIFIER | OPHIR | 5273F | 1019 | NCR | NCR |
| 4 | Stacked Broadband Log Periodic Antenna | SCHWARZBECK | STLP 9128 | 9128ES-145 | NCR | NCR |
| 5 | Stacked Mikrowellen Log.-Per Antenna | SCHWARZBECK | STLP 9149 | 9149-484 | NCR | NCR |
| 6 | Electric field probe | Narda S.TS./PMM | EP601 | 611WX80208 | 2022-06-06 | 2023-06-05 |

# 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 |

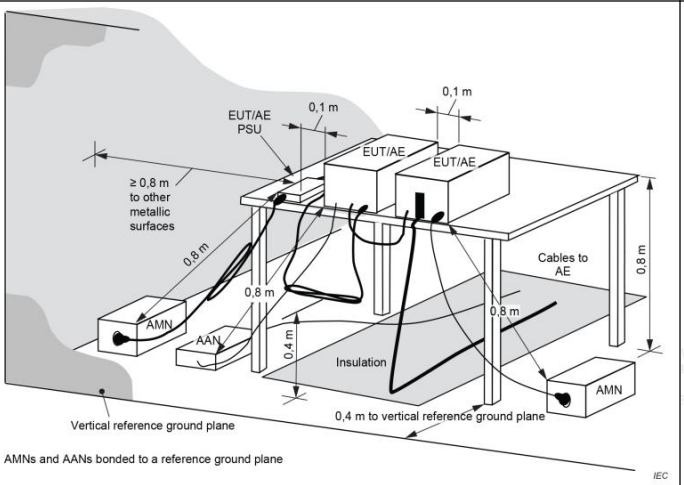
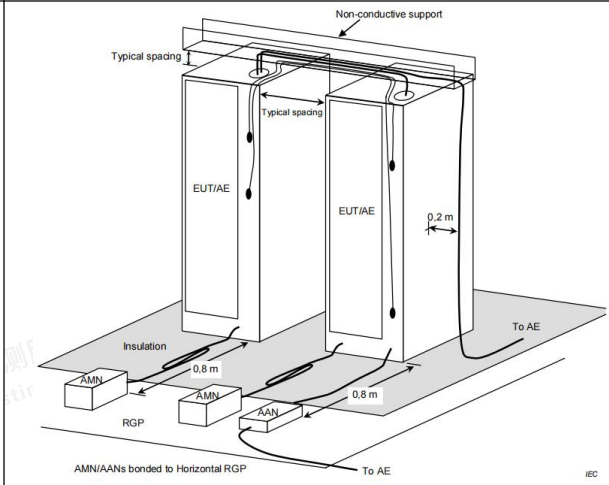
1) The limits decrease linearly with the logarithm of the frequency in the range 0.15MHz to 0.5 MHz.

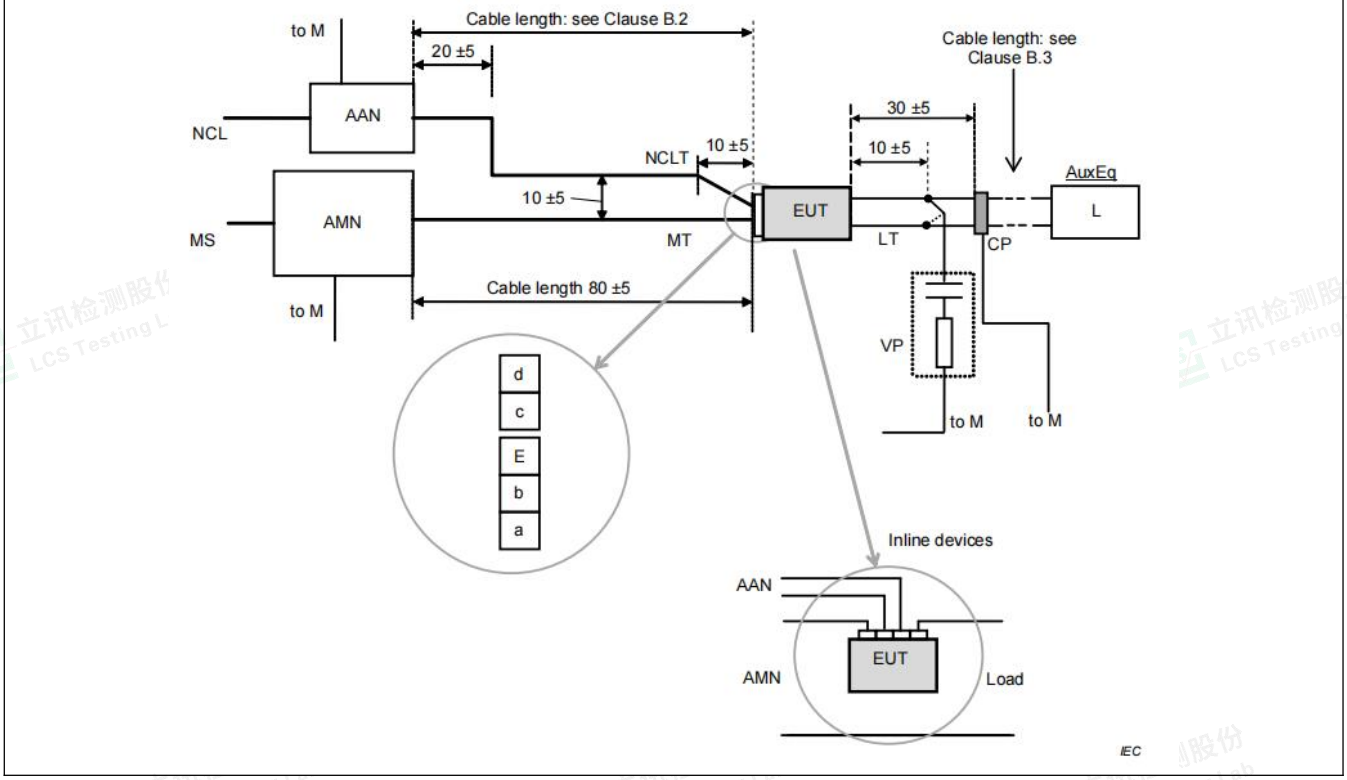
**Disturbance voltage limits at local wired ports: local wired ports other than electrical power supply interface of ELV lamp**

| 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)

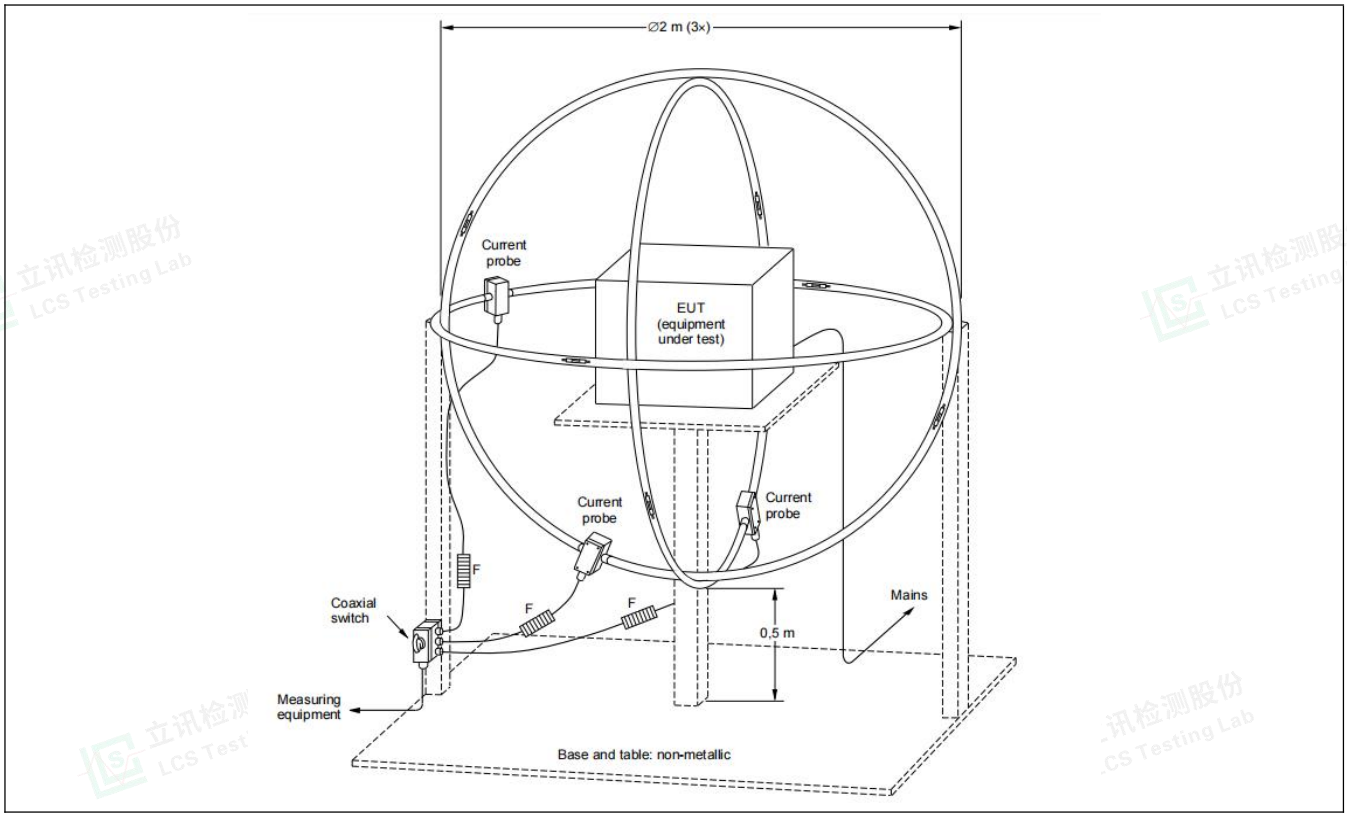
| | |
|---|---|
| Standard | EN IEC 55015:2019+A11:2020 |
| Basic Standard(s) | EN 55016-2-3 |
| Test method | Large Loop Antenna (LLA) |

**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

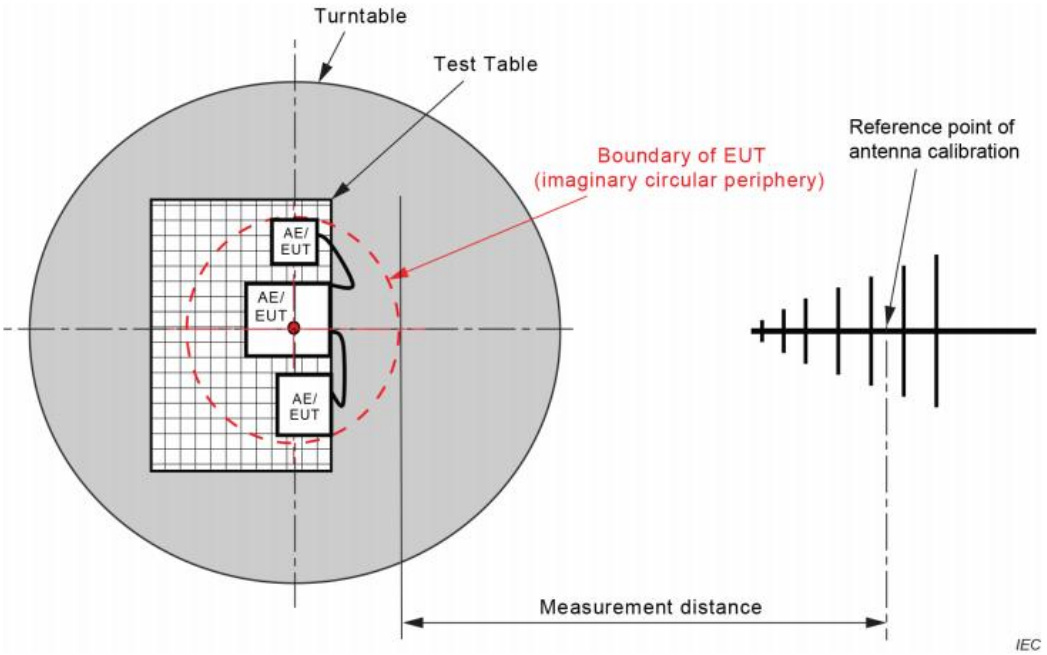
## 5.3. RADIATED DISTURBANCE (30MHz - 1GHz)

| | |
|---|---|
| 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.<br>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.

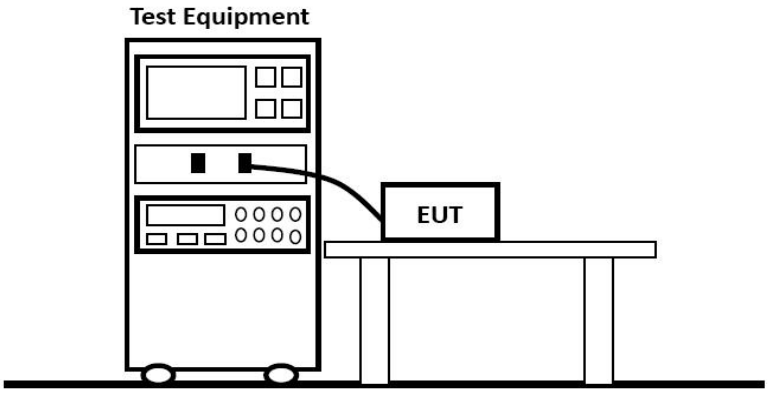
**Test Results** refer to Annex A.3

## 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**



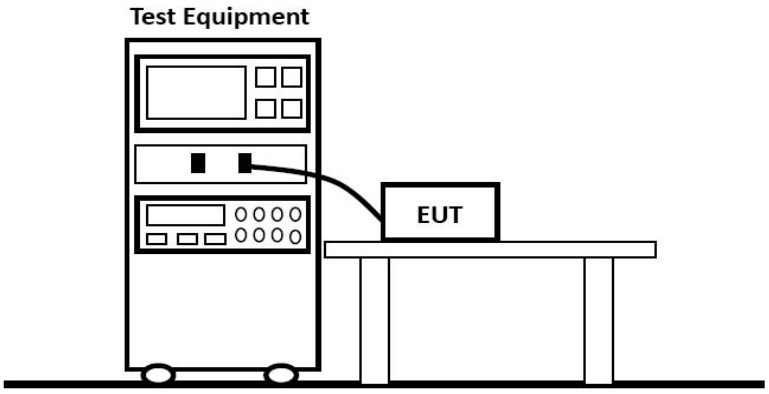
## 5.5. VOLTAGE FLUCTUATIONS & FLICKER

| | |
|---|---|
| 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.

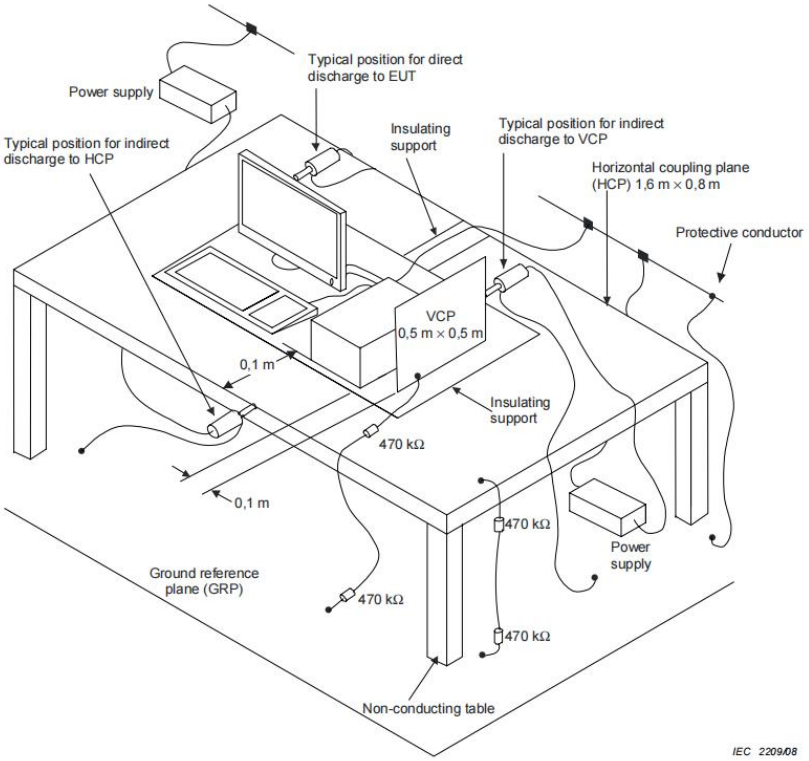
## 6.2. ELECTROSTATIC DISCHARGE

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.

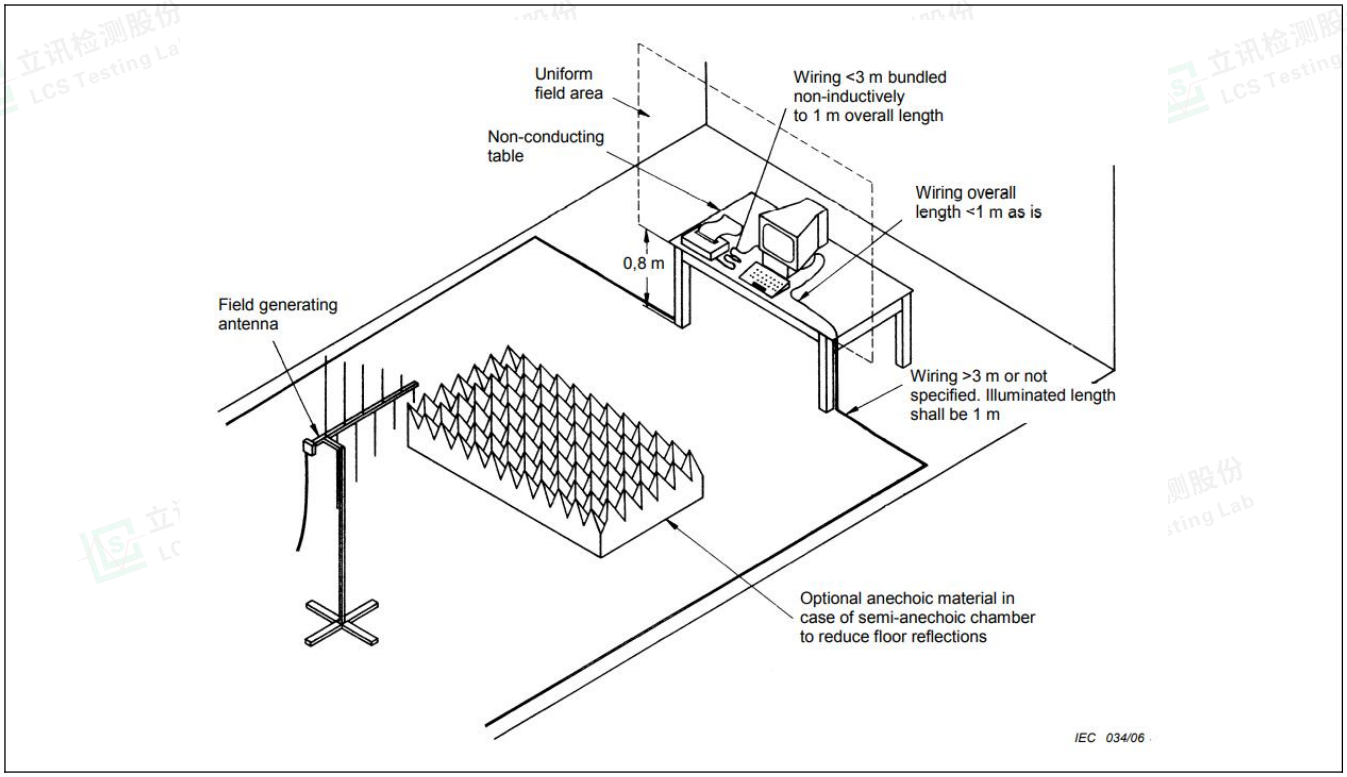
The test was carried out in a half-wave anechoic chamber with absorbent material attached to a reflective ground plate, Before the test, the test field strength needs to be calibrated. during the calibration, the corresponding relationship between the target field strength and the forward power applied 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.

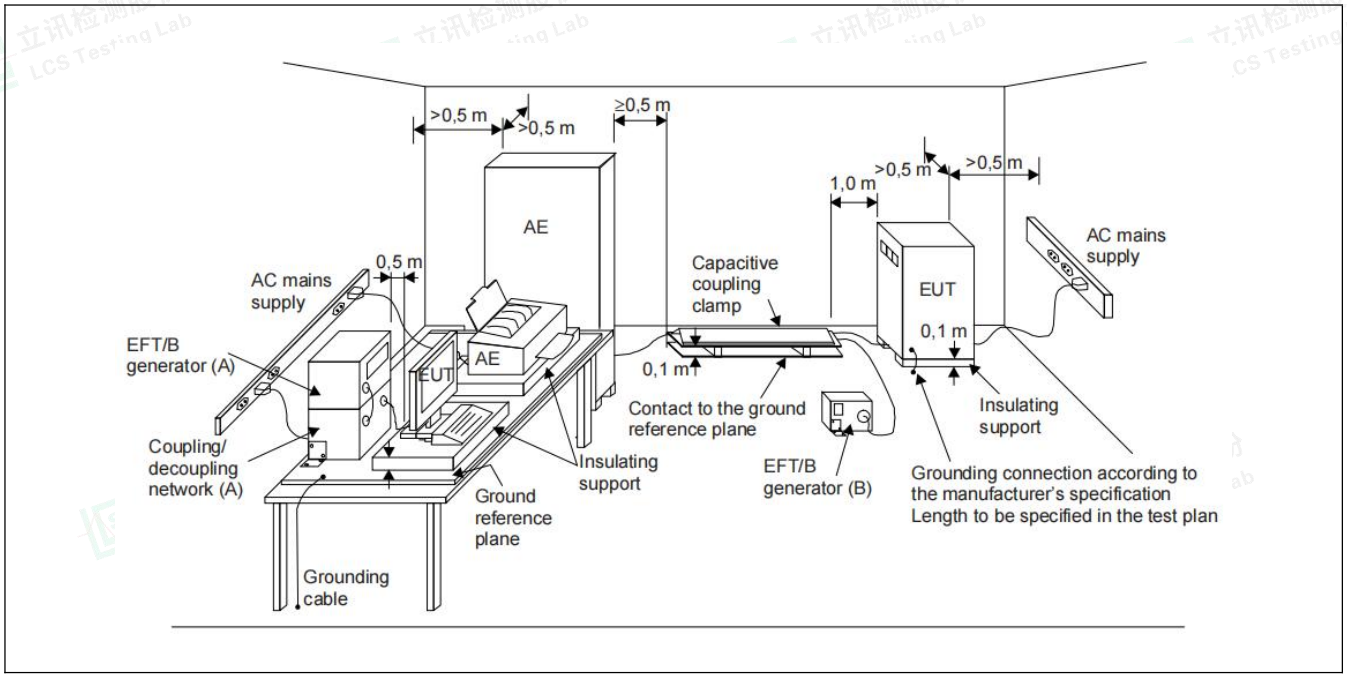
The EUT is put on the Insulating support which is 0.1 meter high above the ground reference plane. the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5 m. both polarities of the test voltage should be applied during test, 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 .

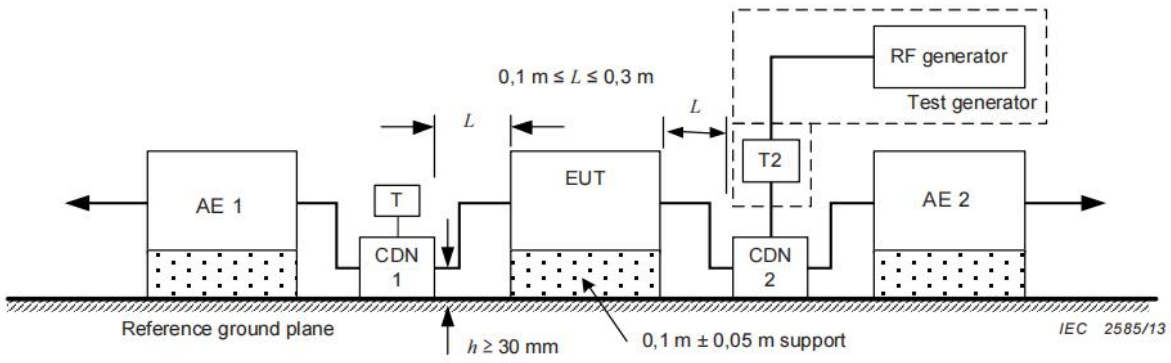
The equipment to be tested is placed on an insulating support of 0,1 m ± 0,05 m height above a reference ground plane. a non conductive roller / caster in the range of 0,1 m ± 0,05 m above the reference ground plane can be used as an alternative to an insulating support. all cables exiting the EUT shall 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**

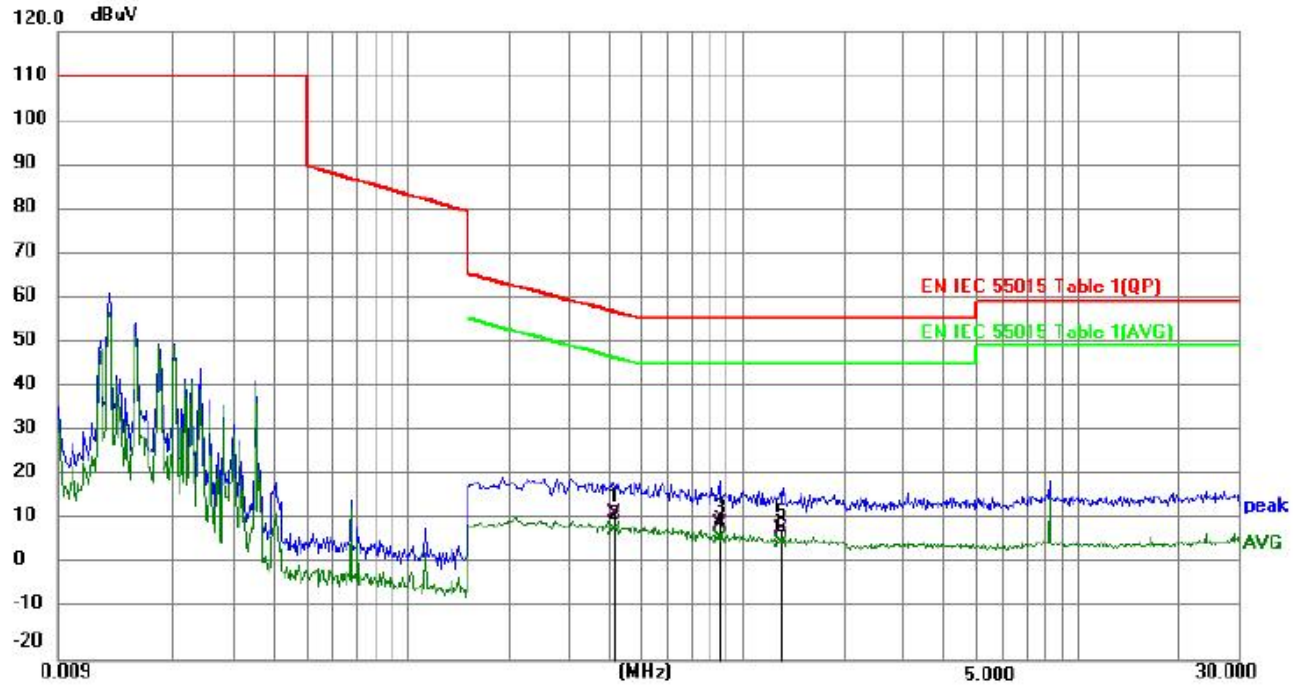



**Test Results** refer to Annex A.4

# ANNEX A - TEST RESULTS

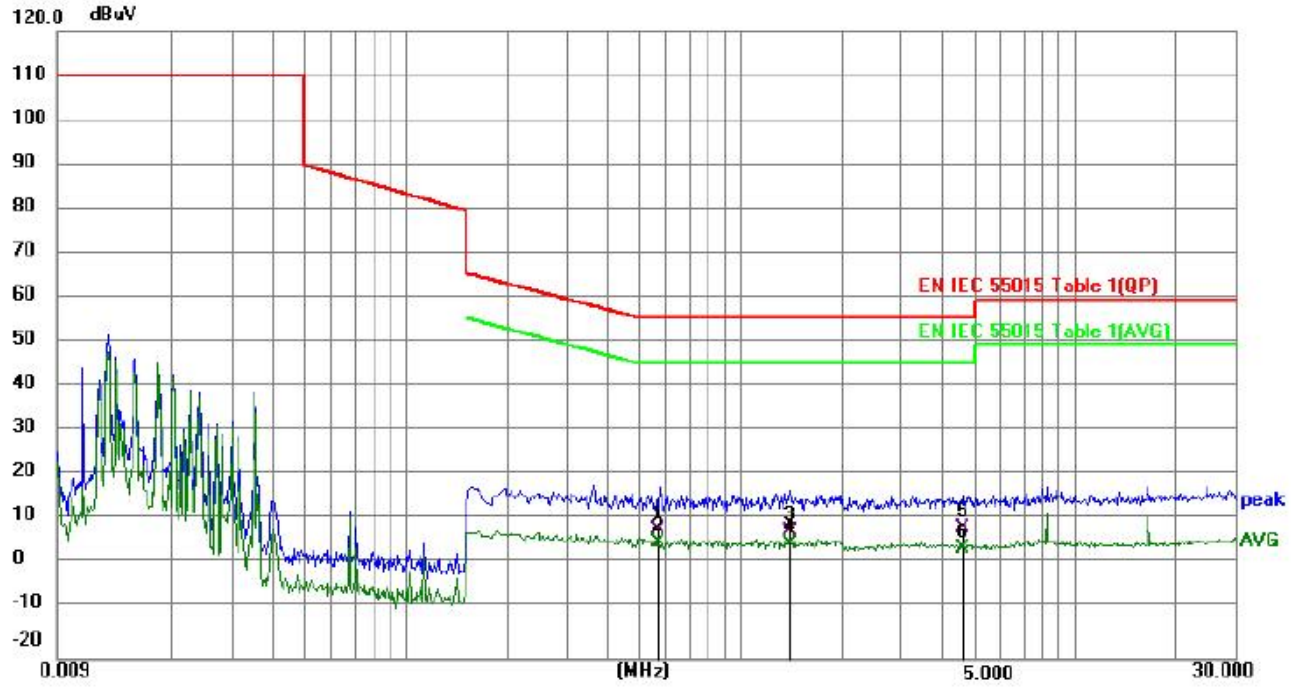
## A.1. CONDUCTED DISTURBANCE TEST RESULTS

| | |
|---|---|
| Environmental Conditions | 23.3℃, 52% RH |
| Model | PP0003-LED1.8M-RGBW-85D |
| Operating mode | Mode 1 (worst case) |
| Test voltage | DC 24V |
| Test engineer | Sam Chen |
| Pol | Line |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.4136 | 2.61 | 10.20 | 12.81 | 57.58 | -44.77 | QP | |
| 2 | * | 0.4136 | -1.15 | 10.20 | 9.05 | 47.58 | -38.53 | AVG | |
| 3 | | 0.8556 | 0.24 | 10.20 | 10.44 | 56.00 | -45.56 | QP | |
| 4 | | 0.8556 | -3.07 | 10.20 | 7.13 | 46.00 | -38.87 | AVG | |
| 5 | | 1.3034 | -0.83 | 10.20 | 9.37 | 56.00 | -46.63 | QP | |
| 6 | | 1.3034 | -4.09 | 10.20 | 6.11 | 46.00 | -39.89 | AVG | |

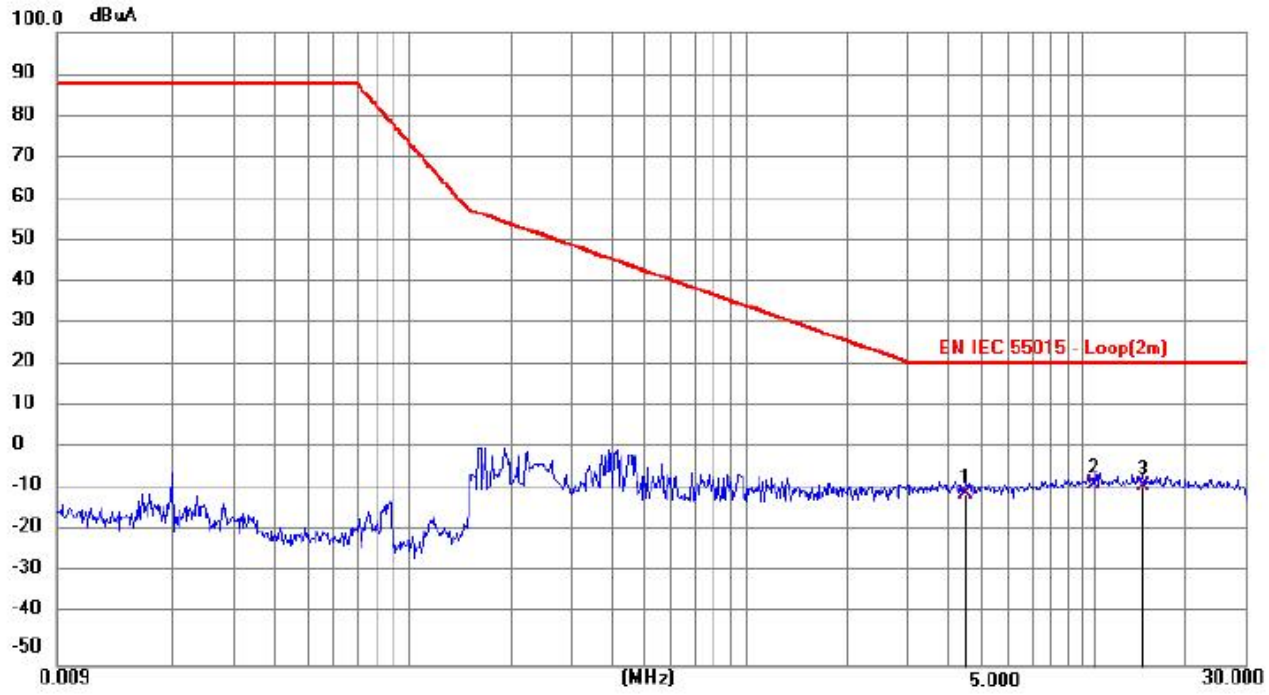
| | |
|---|---|
| Environmental Conditions | 23.3℃, 52% RH |
| Model | PP0003-LED1.8M-RGBW-85D |
| Operating mode | Mode 1 (worst case) |
| Test voltage | DC 24V |
| Test engineer | Sam Chen |
| Pol | Neutral |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.5675 | -1.24 | 10.20 | 8.96 | 56.00 | -47.04 | QP | |
| 2 | * | 0.5675 | -4.26 | 10.20 | 5.94 | 46.00 | -40.06 | AVG | |
| 3 | | 1.4107 | -1.77 | 10.20 | 8.43 | 56.00 | -47.57 | QP | |
| 4 | | 1.4107 | -4.63 | 10.20 | 5.57 | 46.00 | -40.43 | AVG | |
| 5 | | 4.6217 | -0.96 | 10.20 | 9.24 | 56.00 | -46.76 | QP | |
| 6 | | 4.6217 | -5.51 | 10.20 | 4.69 | 46.00 | -41.31 | AVG | |

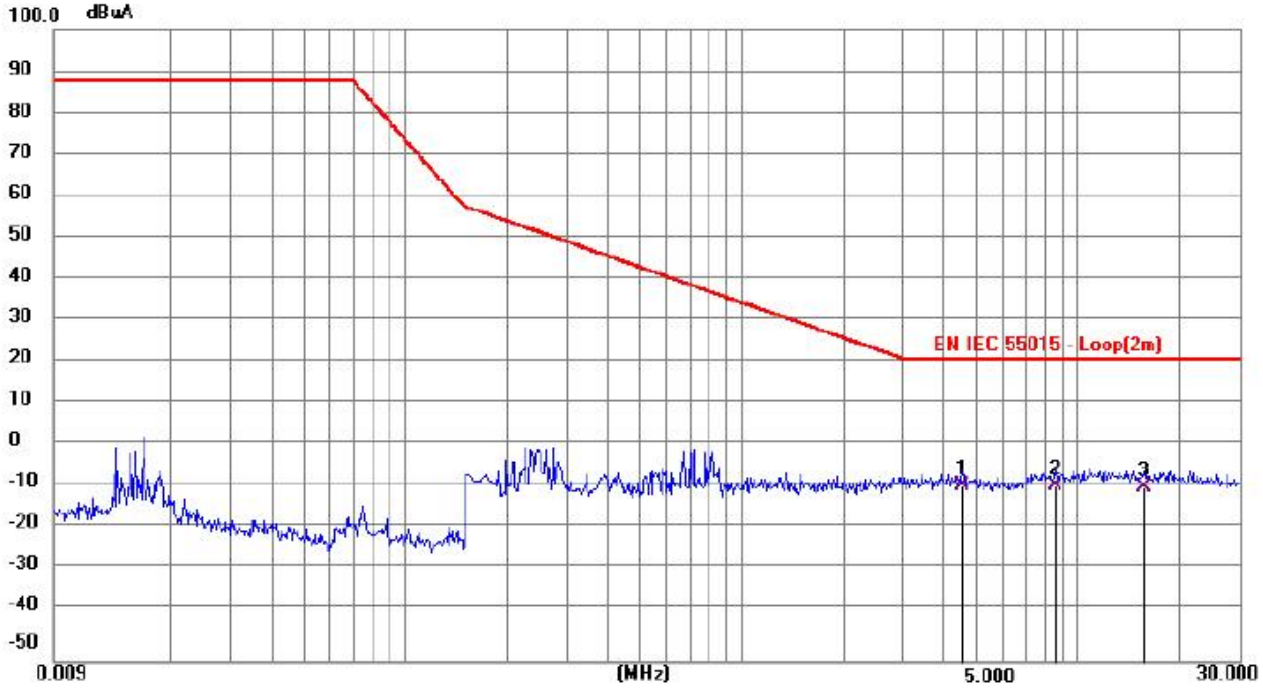
## A.2. RADIATED DISTURBANCE TEST RESULTS (9kHz - 30MHz)

| | |
|---|---|
| Environmental Conditions | 23.3℃, 52% RH |
| Model | PP0003-LED1.8M-RGBW-85D |
| Operating mode | Mode 1 (worst case) |
| Test voltage | DC 24V |
| Test engineer | Sam Chen |
| Pol | X |



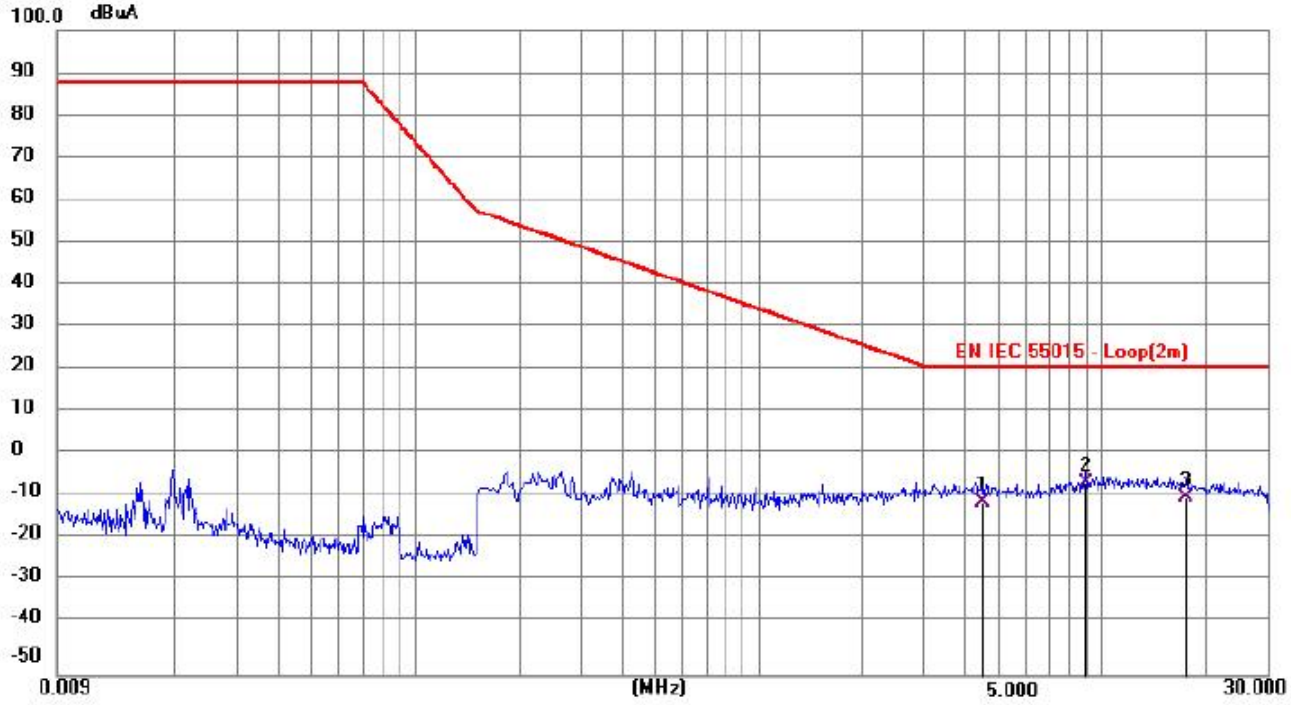

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuA | dBuA | dB | Detector | Comment |
| 1 | | 4.4340 | -34.41 | 25.16 | -9.25 | 22.00 | -31.25 | QP | |
| 2 | * | 10.6303 | -33.14 | 26.14 | -7.00 | 22.00 | -29.00 | QP | |
| 3 | | 14.9685 | -33.25 | 25.70 | -7.55 | 22.00 | -29.55 | QP | |

| | |
|---|---|
| Environmental Conditions | 23.3℃, 52% RH |
| Model | PP0003-LED1.8M-RGBW-85D |
| Operating mode | Mode 1 (worst case) |
| Test voltage | DC 24V |
| Test engineer | Sam Chen |
| Pol | Y |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuA | dBuA | dB | Detector | Comment |
| 1 | * | 4.5015 | -34.01 | 25.85 | -8.16 | 22.00 | -30.16 | QP | |
| 2 | | 8.5065 | -34.41 | 26.18 | -8.23 | 22.00 | -30.23 | QP | |
| 3 | | 15.5760 | -34.44 | 25.95 | -8.49 | 22.00 | -30.49 | QP | |

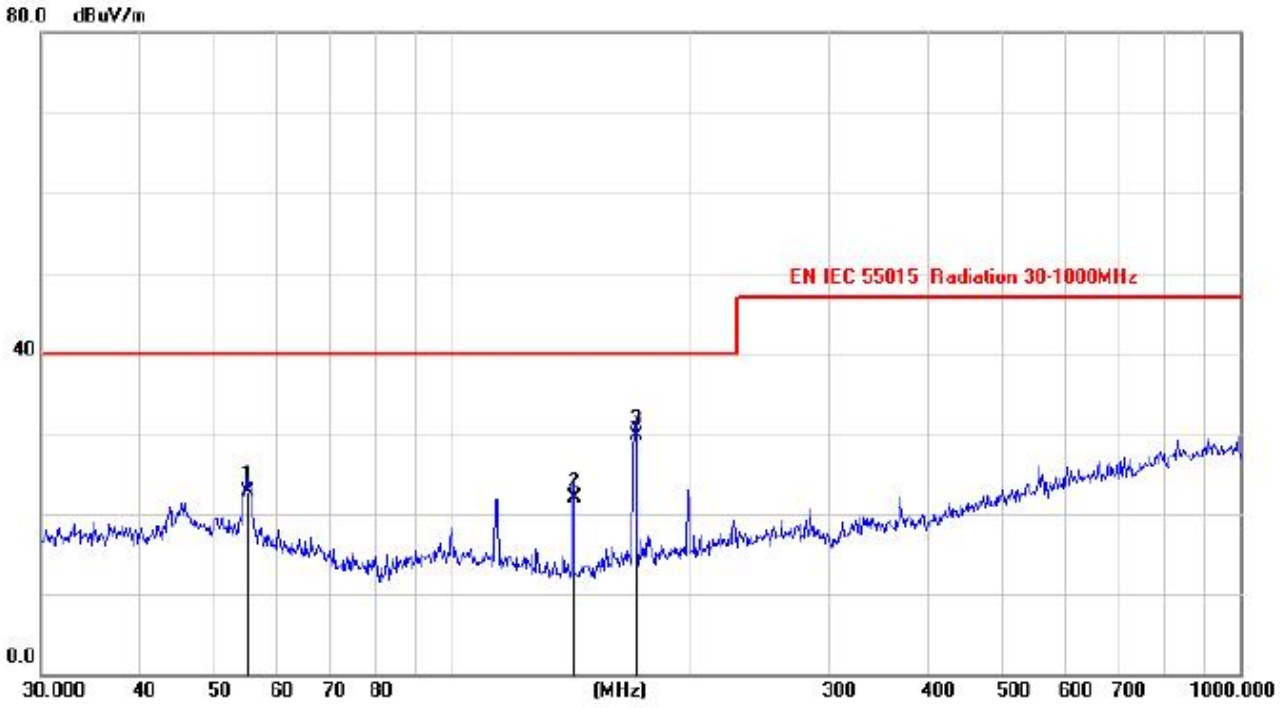
| | |
|---|---|
| Environmental Conditions | 23.3℃, 52% RH |
| Model | PP0003-LED1.8M-RGBW-85D |
| Operating mode | Mode 1 (worst case) |
| Test voltage | DC 24V |
| Test engineer | Sam Chen |
| Pol | Z |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuA | dBuA | dB | Detector | Comment |
| 1 | | 4.4385 | -36.04 | 26.30 | -9.74 | 22.00 | -31.74 | QP | |
| 2 | * | 8.9205 | -31.78 | 26.57 | -5.21 | 22.00 | -27.21 | QP | |
| 3 | | 17.5335 | -34.52 | 26.10 | -8.42 | 22.00 | -30.42 | QP | |

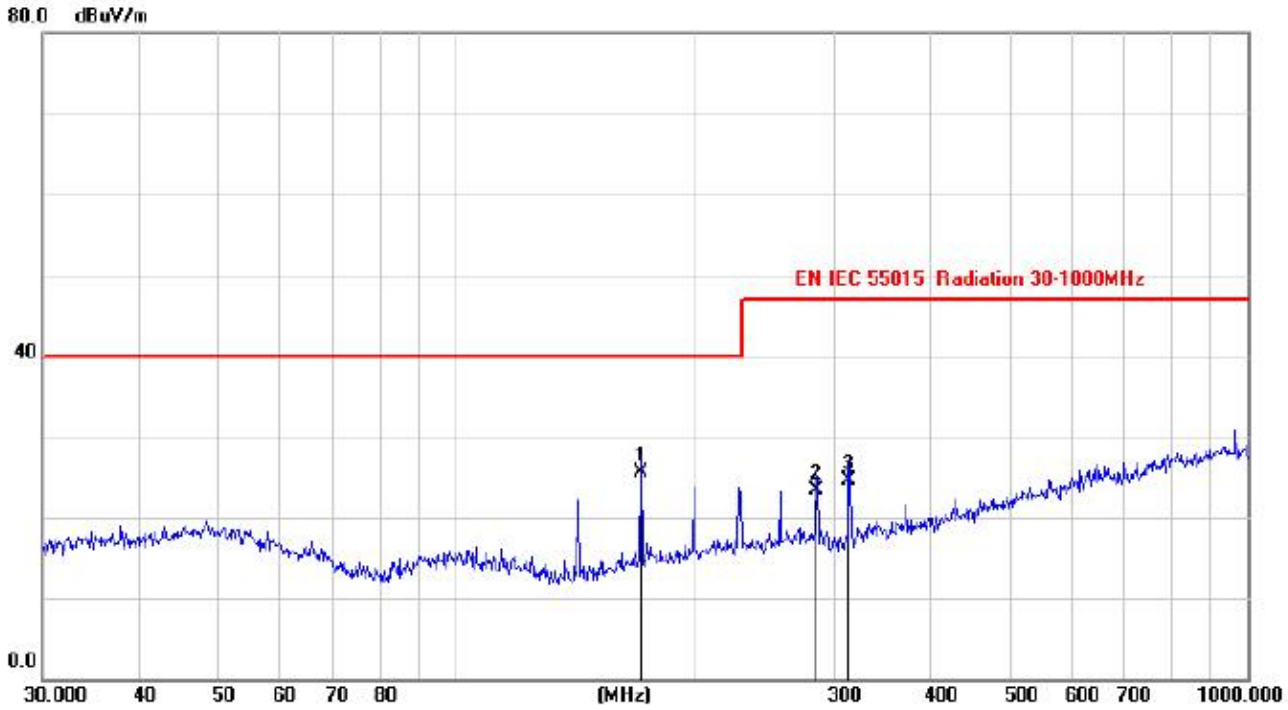
## A.3. RADIATED DISTURBANCE TEST RESULTS (30MHz - 1GHz)

| | |
|---|---|
| Environmental Conditions | 22.6℃, 51% RH |
| Model | PP0003-LED1.8M-RGBW-85D |
| Operating mode | Mode 1 (worst case) |
| Test voltage | DC 24V |
| Test engineer | Sam Chen |
| 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 | | 55.0757 | 10.14 | 12.56 | 22.70 | 40.00 | -17.30 | QP | | | |
| 2 | | 142.5117 | 10.34 | 11.56 | 21.90 | 40.00 | -18.10 | QP | | | |
| 3 | * | 170.9424 | 18.30 | 11.50 | 29.80 | 40.00 | -10.20 | QP | | | |

| | |
|---|---|
| Environmental Conditions | 22.6℃, 51% RH |
| Model | PP0003-LED1.8M-RGBW-85D |
| Operating mode | Mode 1 (worst case) |
| Test voltage | DC 24V |
| Test engineer | Sam Chen |
| 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 | * | 171.4677 | 15.13 | 10.47 | 25.60 | 40.00 | -14.40 | QP | | | |
| 2 | | 285.9778 | 10.28 | 13.12 | 23.40 | 47.00 | -23.60 | QP | | | |
| 3 | | 314.3765 | 10.72 | 13.88 | 24.60 | 47.00 | -22.40 | QP | | | |

## A.4. IMMUNITY TEST RESULTS

| ELECTROSTATIC DISCHARGE IMMUNITY TEST RESULTS | | | | | |
|---|---|---|---|---|---|
| Standard | ☒ EN 61547:2009 | | ☒ EN 61000-4-2 | | |
| EUT | LED Point Light | | Temperature | 23.7℃ | |
| M/N | PP0003-LED1.8M-RGBW-85D | | Humidity | 51％ | |
| Test Mode | Mode 1 | | Pressure | 1008mbar | |
| Input voltage | DC 24V | | Test Results | Pass | |
| Test engineer | Sam Chen | | | | |
| Discharge Mode | Test Points | Test Valtage (kV) & polarity | Number of discharges/polarity | Discharge interval (s) | Performance Criteria |
| Contact Discharge | Conductive surfaces | ± 2&4 | 10 | 1 | B |
| Air Discharge | Insulating surfaces | ± 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 | LED Point Light | | Temperature | 23℃ |
| M/N | PP0003-LED1.8M-RGBW-85D | | Humidity | 53% |
| 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 :

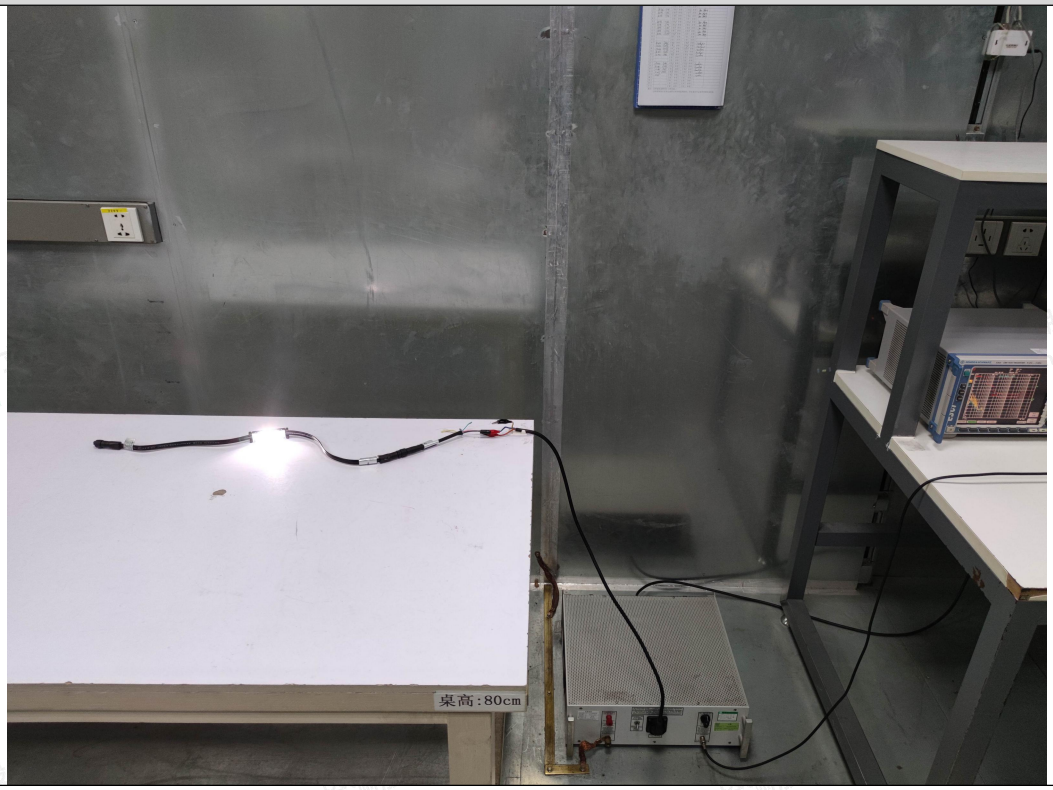
| ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST RESULTS | | | | |
|---|---|---|---|---|
| Standard | ☒ EN 61547:2009 | | ☒ EN 61000-4-4 | |
| EUT | LED Point Light | | Temperature | 23.7℃ |
| M/N | PP0003-LED1.8M-RGBW-85D | | Humidity | 53% |
| Test Mode | Mode 1 | | Pressure | 1008mbar |
| Input voltage | DC 24V | | Test Results | Pass |
| Test engineer | Sam Chen | | | |
| 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 | LED Point Light | | Temperature | 23.7℃ |
| M/N | PP0003-LED1.8M-RGBW-85D | | Humidity | 53% |
| Test Mode | Mode 1 | | Pressure | 1008mbar |
| Input voltage | DC 24V | | Test Results | Pass |
| Frequency range | 0,15 - 80 MHz | | Test engineer | Sam Chen |
| 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 | | | | |

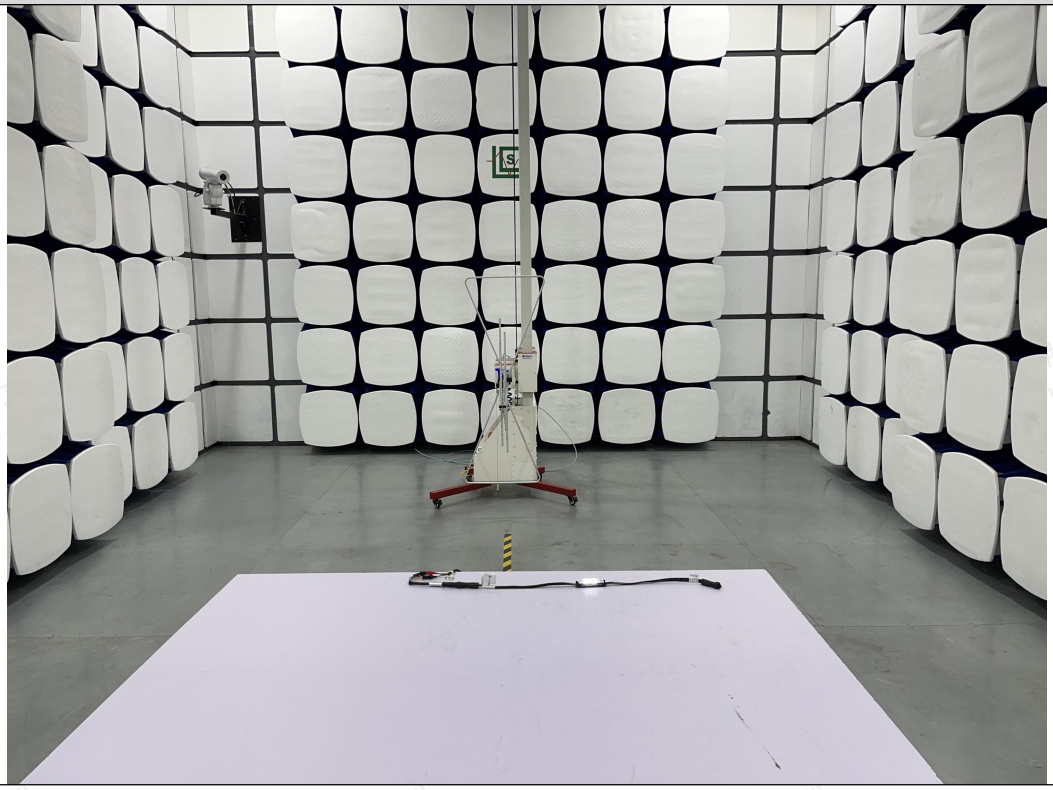
# ANNEX B - TEST PHOTOS

## B.1. Conducted Disturbance at electric power supply



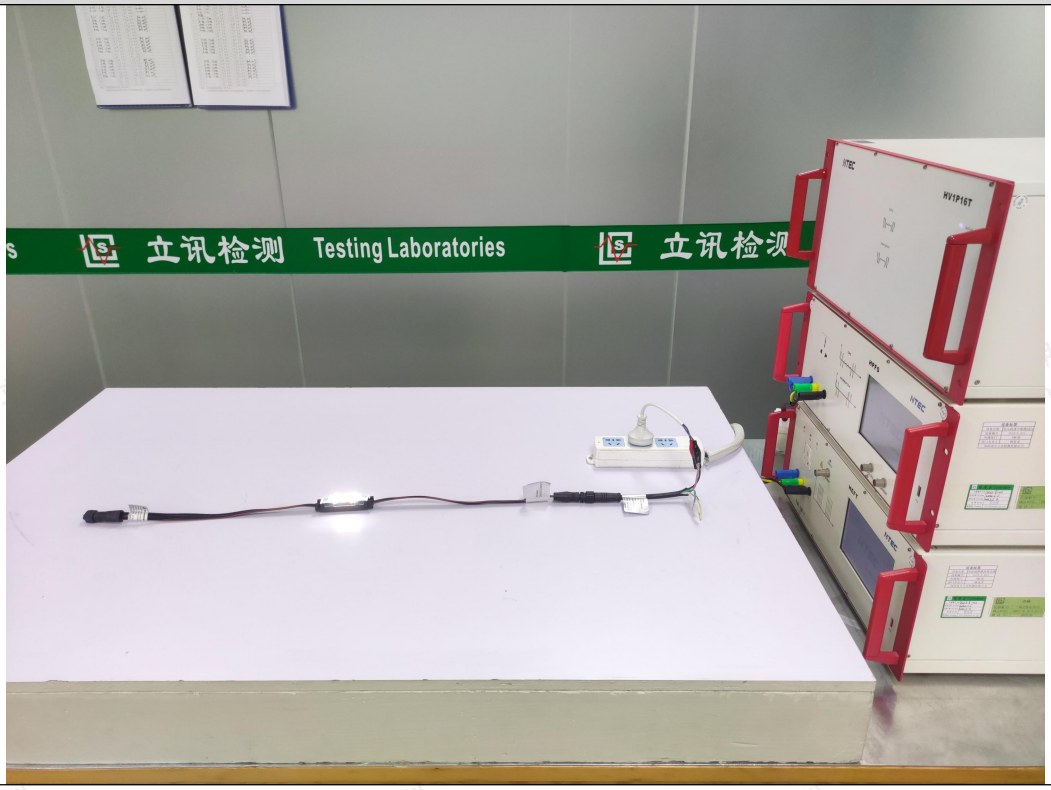

## B.2. Radiated Disturbance (9kHz - 30MHz)

## 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.

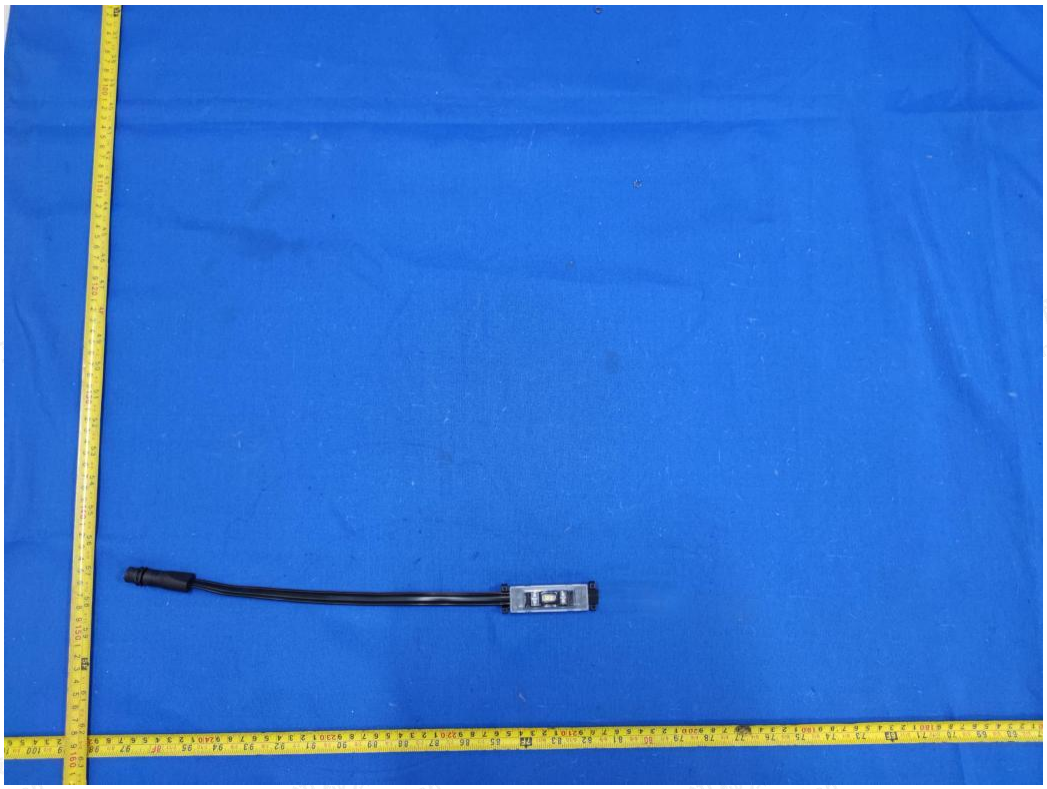


Figure. 1（PP0003-LED1.8M-RGBW-85D ）

Figure. 2（PP0003-LED1.8M-RGBW-85D ）


Figure. 3


Figure. 4

---------- END ----------