

EMC TEST REPORT

For

SHENZHEN LEDYI LIGHTING CO., LTD.

LED Strip

Test Model: LY120-S2835WW-W24

Additional Models : Please Refer To Page 9 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
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Date of receipt of test sample : October 18, 2021
Number of tested samples : 1
Serial number : Prototype
Date of Test : October 18, 2021 ~ October 26, 2021
Date of Report : October 26, 2021

EMC TEST REPORT**BS EN IEC 55015:2019+A11:2020**

Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

BS EN 61547: 2009

Equipment for general lighting purposes - EMC immunity requirements

Report Reference No..... : LCS211018001BE

Date Of Issue: October 26, 2021

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 Location/ 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: BS EN IEC 55015:2019+A11:2020
BS EN IEC 61000-3-2:2019
BS EN 61000-3-3:2013+A1:2019
BS EN 61547: 2009

Test Report Form No.: SLCSEMC-2.2

TRF Originator: Shenzhen Southern LCS Compliance Testing Laboratory Ltd.

Master TRF: Dated 2016-08

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Test Item Description..... : LED Strip

Trade Mark: LEDYi

Test Model: LY120-S2835WW-W24

Power Supply: DC24V, 1000mA, 24W

Results : PASS**Compiled by:***Aimee Yang***Supervised by:***Dm Gu***Approved by:***Cherry Chen*

Aimee Yang/ File administrators

Dm Gu/ Technique principal

Cherry Chen / Manager

EMC - TEST REPORT**Test Report No. : LCS211018001BE**October 26, 2021
Date of issue

Applicant: **SHENZHEN LEDYI LIGHTING CO., LTD.**
Address

7th Floor, Skyworth Digital Building, Songbai Road, Shiyan,
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Telephone /

Fax /

Manufacturer: **SHENZHEN LEDYI LIGHTING CO., LTD.**
Address

7th Floor, Skyworth Digital Building, Songbai Road, Shiyan,
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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 /

Test Result according to the standards on page 6: **PASS**

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.

Revision History

| Revision | Issue Date | Revisions | Revised By |
|----------|------------------|---------------|-------------|
| 00 | October 26, 2021 | Initial Issue | Cherry Chen |
| | | | |
| | | | |

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1. REPORT INFORMATION DESCRIPTION

1.1 Summary of Standards and Results

1.1.1 Description of Standards and Results

| EMISSION (BS EN IEC 55015:2019+A11:2020) | | | |
|---|-------------------------------|------------------|---------|
| Description of Test Item | Test Standard | Limits | Results |
| Conducted Disturbance at the electric power supply interface | BS EN IEC 55015:2019+A11:2020 | / | PASS |
| Conducted Disturbance at wired network interfaces | BS EN IEC 55015:2019+A11:2020 | / | N/A |
| Radiated Disturbance (9kHz to 30MHz) | BS EN IEC 55015:2019+A11:2020 | 2m | PASS |
| Radiated Disturbance (30MHz to 1000MHz) | BS EN IEC 55015:2019+A11:2020 | / | PASS |
| Harmonic Current Emissions* | BS EN IEC 61000-3-2:2019 | Class C | N/A |
| Voltage Fluctuations & Flicker* | BS EN 61000-3-3:2013+A1:2019 | / | N/A |
| IMMUNITY (BS EN 61547: 2009) | | | |
| Description of Test Item | Test Standard | Basic Standard | Results |
| Electrostatic Discharge Immunity Test (ESD) | BS EN 61547: 2009 | BS EN 61000-4-2 | PASS |
| Radiated, Radio-Frequency, Electromagnetic Field Immunity Test (RS) | BS EN 61547: 2009 | BS EN 61000-4-3 | PASS |
| Power Frequency Magnetic Field Immunity Test | BS EN 61547: 2009 | BS EN 61000-4-8 | N/A |
| Electrical Fast Transient/Burst Immunity Test (EFT) | BS EN 61547: 2009 | BS EN 61000-4-4 | PASS |
| Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields (CS) | BS EN 61547: 2009 | BS EN 61000-4-6 | PASS |
| Surge Immunity Test (a.c. Power Ports) | BS EN 61547: 2009 | BS EN 61000-4-5 | N/A |
| Voltage Dips, Short Interruptions and Voltage Variations Immunity Test | BS EN 61547: 2009 | BS EN 61000-4-11 | N/A |
| Note 1: N/A is an abbreviation for not applicable. | | | |
| Note 2: systems with nominal voltages less than but not equal to 220 V (line-to-neutral), the harmonic and flicker limits have not yet been considered. | | | |

1.1.2 Performance Criteria

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.

Additional requirement for lighting equipment incorporating a starting device: After the test, the lighting equipment is switched off. After half an hour, it is switched on again. The lighting equipment shall start and operate as intended.

1.2 Product Information

1.2.1 EUT introduce

EUT : LED Strip
Test Model : LY120-S2835WW-W24
Additional Models : See page 9 model list
EUT Clock Frequency : /

1.2.2 Test Modes

Mode 1 : EUT was test with power on, to get the status 'Lighting'
Mode 2 : EUT was test with power on and keep charging, to get the status 'Charging'
Mode 3 : EUT was test with keep discharging, to get the status 'Discharging'
Mode 4 : EUT was test with max power, to get the status 'Full load'
Mode 5 : EUT was test with half power, to get the status 'Half load'

1.2.3 Test Auxiliary Equipment

| Configuration | Model | Rating | Manufacturer |
|---------------|-------|--------|--------------|
| | | | |

1.2.4 General Product Information

The EUTs are general luminaires for illumination purpose. detailed differences shown in below.

Model list:

| Model | Rating |
|--|--------------------|
| LY120-S2835WW-W24 | DC24V, 1000mA, 24W |
| LYX1-SX2X3-X4 | |
| X1 denote LED Qty of 1 meter, can be 30, 48, 60, 72, 84, 96, 98, 112, 120, 140, 144, 240, 360, 420, 480, 560, 700, 720 | |
| X2 denote LED chip, can be 3528, 5050, 2835, 3014, 5630, 3838, 2216, 2110, 2010, 1808 | |
| X3 denote source color, can be WW, W, TW, R, G, B, Y, O, P, IB, RGB, RGBW, RGBTW | |
| X4 denote voltage, can be W5, W12, W24, W36, W48 | |

1.3 Description of Test Facility

EMC Lab. : TUV RH Registration Number. is UA 50418075 0001.
UL Registration Number. is 100571-492.
NVLAP Registration Code is 600112-0.

Test Facilities : Shenzhen Southern LCS Compliance Testing Laboratory Ltd.
101-201, No.39 Building, Xialang Industrial Zone, Heshuikou
Community, Matian Street, Guangming District, Shenzhen, China.

RF Field Strength : Shenzhen LCS Compliance Testing Laboratory Ltd.
Susceptibility 101, 201 Building A and 301 Building C, Juji Industrial Park,
Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, Guangdong,
China.

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.

| Test | Parameters | Expanded uncertainty (U_{lab}) | Expanded uncertainty (U_{cispr}) |
|--|---|---------------------------------------|---|
| Conducted Disturbance | Level accuracy (9kHz to 150kHz) (150kHz to 30MHz) | ± 1.40 dB ± 2.80 dB | ± 4.0 dB ± 3.6 dB |
| Electromagnetic Radiated Emission (3-loop) | Level accuracy (9kHz to 30MHz) | ± 3.46 dB | N/A |
| Radiated Disturbance | Level accuracy (9kHz to 30MHz) | ± 3.12 dB | N/A |
| Radiated Disturbance | Level accuracy (30MHz to 200MHz) | ± 4.66 dB | ± 5.2 dB |
| Radiated Disturbance | Level accuracy (200MHz to 1000MHz) | ± 4.64 dB | ± 5.0 dB |
| Harmonic Current | Voltage | $\pm 0.640\%$ | N/A |
| Voltage Fluctuations & Flicker | Voltage | $\pm 0.530\%$ | N/A |

(1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

(2) 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. | Due Date. |
|------|-------------------------------|--------------|------------|---------------|------------|
| 1 | EMI Test Receiver | R&S | ESCI | 101142 | 2022-06-08 |
| 2 | 10dB Attenuator | SCHWARZBECK | VTSD9561-F | 9561-F159 | 2022-06-08 |
| 3 | Artificial Mains Network | SCHWARZBECK | NSLK8127 | 8127716 | 2022-06-08 |
| 4 | EMI Test Software | EZ | EZ EMC | N/A | / |
| 5 | Asymmetric Artificial Network | SCHWARZBECK | NTFM 8158 | NTFM 8158#120 | 2022-06-08 |
| 6 | Voltage Probe | SCHWARZBECK | KT 9420 | 9420401 | 2022-06-08 |
| 7 | No. 2 shielded room | CHENGYU | 843 | / | 2023-06-16 |

Radiated Disturbance

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|---------------------|--------------|-----------|------------|------------|
| 1 | EMI Test Receiver | R&S | ESCI | 101142 | 2022-06-08 |
| 2 | Triple-loop Antenna | EVERFINE | LLA-2 | 9161 | 2022-06-08 |
| 3 | EMI Test Software | EZ | EZ EMC | N/A | / |
| 4 | No. 2 shielded room | CHENGYU | 843 | / | 2023-06-16 |

Radiated Disturbance

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|--------------------------|-------------------|--------------|---------------|------------|
| 1 | 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH03-HY | 2024-06-15 |
| 2 | EMI Test Receiver | R&S | ESCI3 | 101010 | 2022-06-08 |
| 3 | Spectrum analyzer | Agilent | N9020A | MY49100699 | 2022-06-08 |
| 4 | Log per Antenna | SCHWARZBECK | VULB9163 | 5094 | 2022-06-23 |
| 5 | Horn antenna | ETS-LINDGREN | 3115 | 00034771 | 2022-06-23 |
| 6 | EMI Test Software | EZ | EZ EMC | N/A | / |
| 7 | Positioning Controller | MF | BK8807-4A-2T | 2016-0808-008 | / |

Harmonic Current&Voltage Fluctuation and Flicker

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|--|--------------|-----------|------------|------------|
| 1 | Harmonic Current and Flicker Test System | HTEC | AC2000A | / | 2022-06-08 |
| 2 | Linear variable frequency power supply | HTEC | HHF-5010 | / | 2022-06-08 |

Electrostatic Discharge Immunity Test (ESD)

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|----------------|--------------|-----------|------------|------------|
| 1 | ESD Simulator | TESEQ | NSG 437 | 1615 | 2022-03-24 |
| | | | | | |

Electrical Fast Transient/Burst Immunity Test (EFT)

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|---|--------------|-----------|------------|------------|
| 1 | Electrical fast transient(EFT)generator | HTEC | HEFT51 | 162201 | 2022-06-10 |
| 2 | Coupling Clamp | HTEC | H3C | 163701 | 2022-05-13 |

Surge Immunity Test

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|-----------------------------|--------------|-----------|------------|------------|
| 1 | Surge Generator | 3CTEST | SG5006G | EC5581070 | 2022-05-13 |
| 2 | Coupling/decoupling Network | 3CTEST | SGN-5010G | EC5591033 | 2022-05-13 |

Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|------------------------------------|--------------|-----------|---------------|------------|
| 1 | Conducted Susceptibility Generator | HTEC | CDG6000 | 126A140012016 | 2022-06-08 |
| 2 | Coupling network | HTEC | CDN-M2+M3 | A22/0382/2016 | 2022-06-08 |
| 3 | Attenuator 6dB | HTEC | ATT6 | HA1601 | 2022-06-08 |
| 4 | Electromagnetic clamp | LUTHI | EM101 | 35535 | 2022-06-08 |

Power Frequency Magnetic Field Immunity Test

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|--|--------------|-----------|------------|------------|
| 1 | Power frequency mag-field generator System | HTEC | HPFMF100 | 100-2400 | 2022-06-08 |

Voltage Dips, Short Interruptions and Voltage Variations Immunity Test

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|-------------------------------|--------------|-----------|------------|------------|
| 1 | Voltage dips and up generator | HTEC | HPFS161P | 162202 | 2022-06-10 |

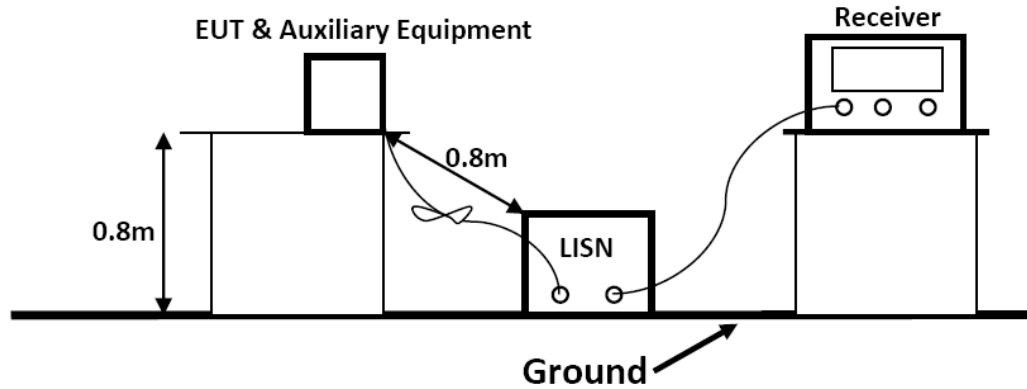
Radiated, Radio-Frequency, Electromagnetic Field Immunity Test

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Due Date. |
|------|--|-------------------|-----------|------------|------------|
| 1 | RS Test Software | Tonscend | / | / | N/A |
| 2 | ESG Vector Signal Generator | Agilent | E4438C | MY42081396 | 2021-11-14 |
| 3 | 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH03-HY | 2023-06-11 |
| 4 | RF POWER AMPLIFIER | OPHIR | 5225R | 1052 | 2021-11-21 |
| 5 | RF POWER AMPLIFIER | OPHIR | 5273F | 1019 | 2021-11-21 |
| 6 | Stacked Broadband Log Periodic Antenna | SCHWARZBECK | STLP 9128 | 9128ES-145 | 2021-11-21 |
| 7 | Stacked Mikrowellen Log.-Per Antenna | SCHWARZBECK | STLP 9149 | 9149-484 | 2021-11-21 |
| 8 | RS Test Software | Tonscend | / | / | 2022-03-24 |

4. TEST DETAILS

4.1 Conducted Disturbance

4.1.1 Block Diagram of Test Setup



4.1.2 Test Standard

BS EN IEC 55015:2019+A11:2020

4.1.3 Limits

| Disturbance voltage limits at the electric power supply interface | | |
|---|----------------------|----------|
| Frequency range | Limits (dB μ V)* | |
| | Quasi-peak | Average |
| 9kHz to 50kHz | 110 | -- |
| 50kHz to 150kHz | 90 ~ 80* | -- |
| 150kHz to 0.5MHz | 66 ~ 56* | 56 ~ 46* |
| 0.5MHz to 5.0MHz | 56 | 46* |
| 5.0MHz to 30MHz | 60 | 50 |

NOTE 1: at the transition frequency, the lower limit applies.

NOTE 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.

| Disturbance voltage limits at wired network interfaces other than power supply | | |
|--|----------------------|----------|
| Frequency range | Limits (dB μ V)* | |
| | Quasi-peak | Average |
| 0.15MHz to 5.0MHz | 84 to 74 | 74 to 64 |
| 5.0MHz to 30MHz | 74 | 64 |

NOTE: 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 voltage limits of local wired ports: electrical power supply interface of non-restricted ELV lamps | | |
|---|----------------------|----------|
| Frequency range | Limits (dB μ V)* | |
| | Quasi-peak | Average |
| 9kHz to 50kHz | 136 | -- |
| 50kHz to 150kHz | 116 ~ 106* | -- |
| 150kHz to 0.5MHz | 92 ~ 82* | 82 ~ 72* |
| 0.5MHz to 5.0MHz | 82 | 72* |
| 5.0MHz to 30MHz | 86 | 76 |

NOTE: The limits in this table apply if no 26 dB attenuator is applied.

| Disturbance voltage limits at local wired ports: local wired ports other than electrical power supply interface of ELV lamp | | |
|--|----------------------|---------|
| Frequency range | Limits (dB μ V)* | |
| | Quasi-peak | Average |
| 0.15MHz to 5.0MHz | 80 | 70 |
| 5.0MHz to 30MHz | 74 | 64 |

4.1.4 Test Procedure Description

The EUT is put on the table which is 0.8 meter high above the ground, and connected to the AC mains through a Line Impedance Stabilization Network (LISN). EUT is powered by V-type artificial power network, and the distance from LISN/ISN is 0.8m. The part of the EUT power cord exceeding 0.8m folds in parallel to form a 0.3-0.4 m eight harness.

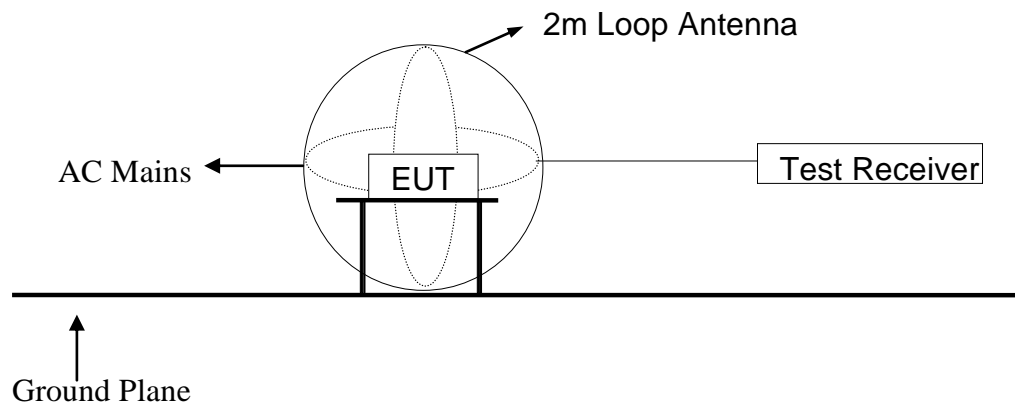
The bandwidth of the test receiver is set at 200Hz in 9k~150kHz range and 9kHz in 150k~30MHz range.

4.1.5 Test Results

Refer to Annex A.1

4.2 Radiated Disturbance (9kHz to 30MHz)

4.2.1 Block Diagram of Test Setup



4.2.2 Test Standard

BS EN IEC 55015:2019+A11:2020

4.2.3 Limits

| LLAS radiated disturbance limits in the frequency range 9 kHz to 30 MHz | |
|--|---------------------------------------|
| Frequency range | Limits for loop diameter (dB μ A) |
| | 2m |
| 9kHz to 70kHz | 88 |
| 70kHz to 150kHz | 88 to 58* |
| 150kHz to 3.0MHz | 58 to 22* |
| 3.0MHz to 30MHz | 22 |

NOTE1: At the transition frequency the lower limit applies.

NOTE2: Decreasing linearly with logarithm of the frequency.

4.2.4 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.

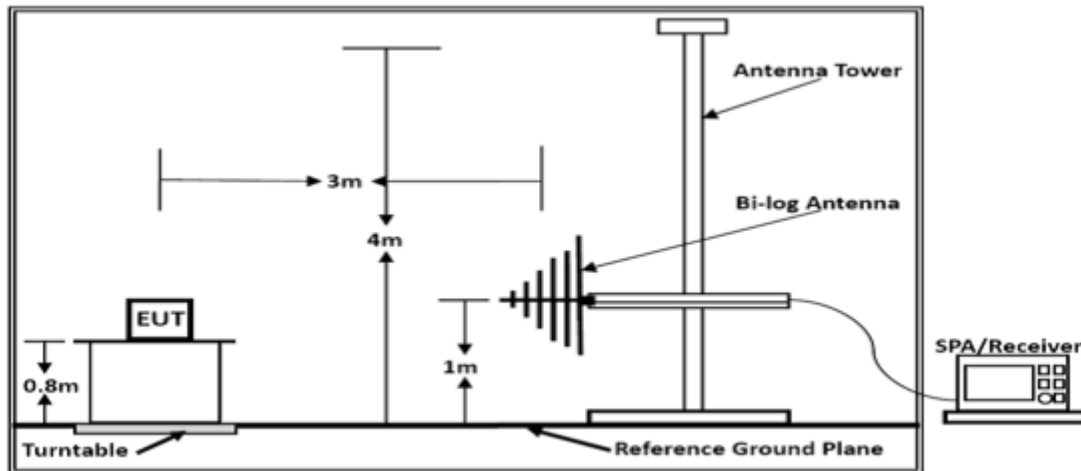
The frequency range from 9kHz to 30MHz is investigated. The receiver is measured with the quasi-peak detector. For frequency band 9kHz to 150kHz, the bandwidth of the field strength meter is set at 200Hz. For frequency band 150kHz to 30MHz, the bandwidth is set at 9kHz.

4.2.5 Test Results

Refer to Annex A.2

4.3 Radiated Disturbance (30MHz to 1000MHz)

4.3.1 Block Diagram of Test Setup



4.3.2 Test Standard

BS EN IEC 55015:2019+A11:2020

4.3.3 Limits

| SAC Radiated disturbance limits and associated measurement methods in the frequency range 30 MHz to 1 GHz (at 3 m distance) | |
|---|---------------------------------|
| Frequency range (MHz) | Quasi-Peak Limits(dB μ V/m) |
| 30 ~ 230 | 40 |
| 230 ~ 1000 | 47 |

NOTE1: at the transition frequency, the lower limit applies.

NOTE2: Distance refers to the distance in meters between the measuring instrument antenna geometric center and the closed point of any part of the EUT.

NOTE3: Testing method which the Semi Anechoic Chamber

4.3.4 Test Procedure Description

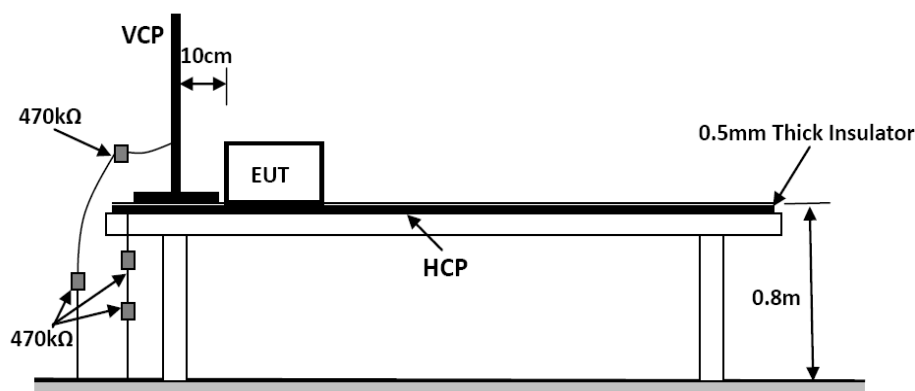
The Radiated Disturbance test was conducted in a 3M Semi Anechoic Chamber and conforming to CISPR 16. The EUT is placed on a turntable, which is 0.8 meter high above the ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away 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. By-log antenna (calibrated by Dipole Antenna) is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. The bandwidth of the Receiver is set at 120kHz; The frequency range from 30MHz to 1000MHz is investigated.

4.3.5 Test Results

Refer to Annex A.3

4.4 Electrostatic Discharge Immunity Test

4.4.1 Block Diagram of Test Setup



4.4.2 Test Standard

BS EN 61547: 2009

4.4.3 Limits

| Electrostatic discharges — Test levels | | | | |
|--|----------------------|---------|-----------------------------------|----------------------|
| Discharge Type | Discharge Level (KV) | | Number of discharges (Each point) | Performance Criteria |
| | + | - | | |
| Air Discharge-Direct | 2, 4, 8 | 2, 4, 8 | 20 | B |
| Contact Discharge-Direct | 2, 4 | 2, 4 | 20 | |
| Contact Discharge- Indirect | 2, 4 | 2, 4 | 20 | |

4.4.4 Test Procedure

a) Air Discharge

This test is done on a non-conductive surfaces. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

b) Contact Discharge

This test is done on a conductive surfaces. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

c) Indirect Discharge For Horizontal Coupling Plane and Vertical Coupling Plane

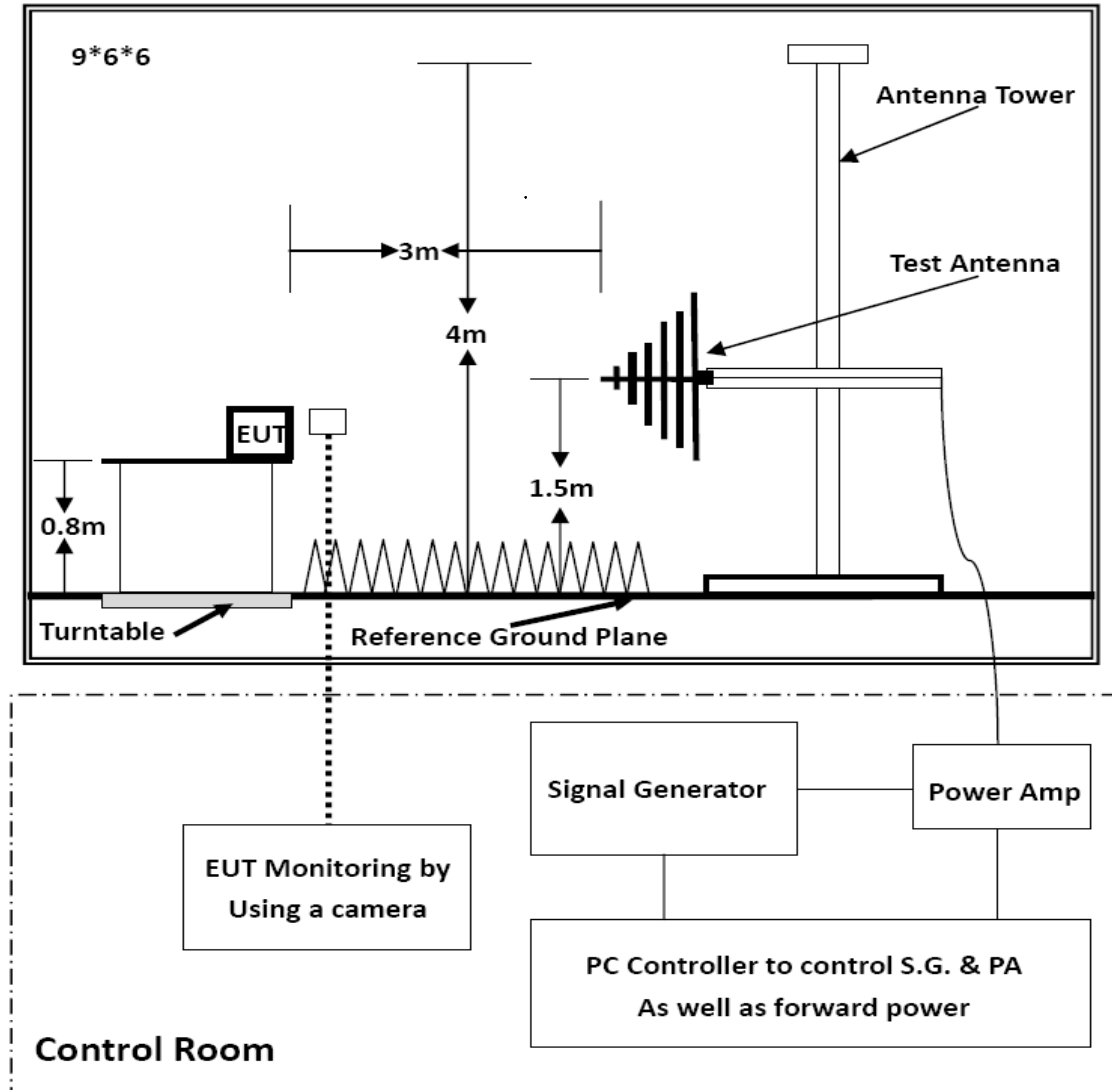
At least 20(+/- 10 times at each pole) single discharges shall be applied to the coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane. with a time interval of at least 1 second between each discharge.

4.4.5 Test Results

Refer to Annex A.4

4.5 Radiated, Radio-Frequency, Electromagnetic Field Immunity Test

4.5.1 Block Diagram of Test Setup



4.5.2 Test Standard

BS EN 61547: 2009

4.5.3 Limits

| Radio-frequency electromagnetic fields – Test levels | | |
|--|---------------------------|----------------------|
| Characteristics | Test levels | Performance Criteria |
| Frequency range | 80 MHz to 1 000 MHz | A |
| Test level | 3 V/m (unmodulated) | |
| Modulation | 1 kHz, 80 % AM, sine wave | |

4.5.4 Test Procedure

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.

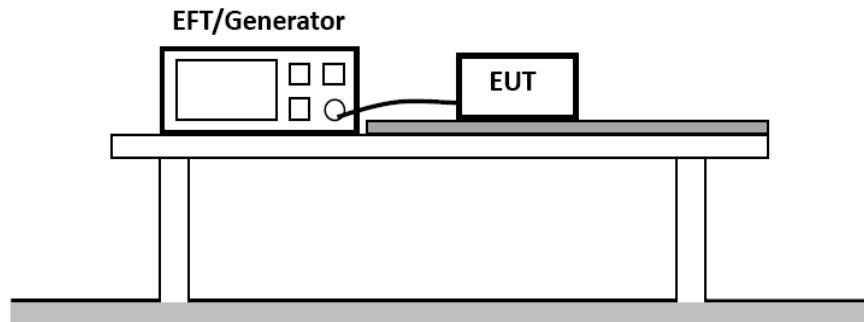
The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

4.5.5 Test Results

Refer to Annex A.4

4.6 Electrical Fast Transient/Burst Immunity Test

4.6.1 Block Diagram of Test Setup



4.6.2 Test Standard

BS EN 61547: 2009

4.6.3 Limits

| Fast transients - Test levels at input and output a.c. power ports | | | | | | |
|--|----------------------|----------------|--------------|--------------------|-----------------|----------------------|
| Test Levels | Repetition Frequency | Burst Duration | Burst Period | Test Duration | Coupling Method | Performance Criteria |
| ±1 kV | 5 kHz | 15ms | 300ms | 2 min per polarity | Direct | B |

| Fast transients - Test levels at input and output d.c. power ports | | | | | | |
|--|----------------------|----------------|--------------|--------------------|-----------------|----------------------|
| Test Levels | Repetition Frequency | Burst Duration | Burst Period | Test Duration | Coupling Method | Performance Criteria |
| ±0.5kV | 5 kHz | 15ms | 300ms | 2 min per polarity | Direct | B |

Note: Not applicable to equipment not connected to the mains while in use.

4.6.4 Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

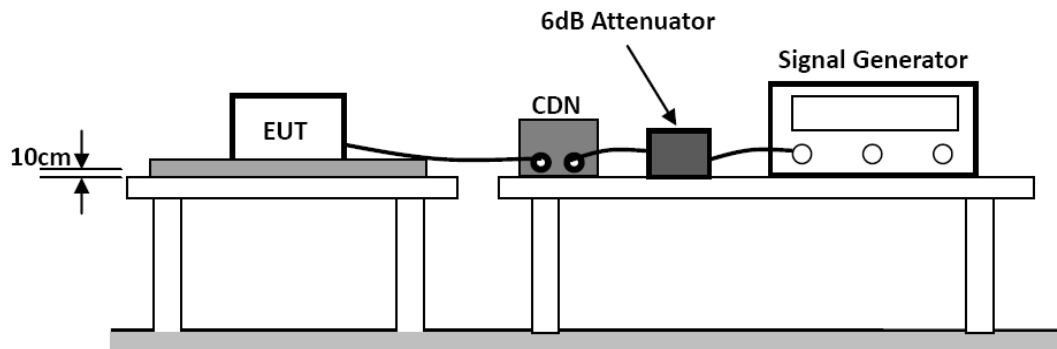
The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC or DC power lines. Both polarities of the test voltage should be applied during compliance test, Fast transients are carried out with a minimum duration of 2 min with a positive polarity and a minimum of 2 min with a negative polarity

4.6.5 Test Results

Refer to Annex A.4

4.7 Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields

4.7.1 Block Diagram of Test Setup



4.7.2 Test Standard

BS EN 61547: 2009

4.7.3 Limits

| Radio-frequency common mode – Test levels at input and output a.c. power ports | | | | | |
|---|------------------|--------------------------|-----------------|-------|----------------------|
| Frequency range (MHz) | Test Level (V/m) | Modulation Signal | Coupling Method | Steps | Performance Criteria |
| 0.15 to 80 | 3 | 1kHz, 80%, AM, Sine wave | CDN | 1% | A |

Note: Only applicable to ports interfacing with cables whose total length, according to the manufacturer's specification, may exceed 3 m.

| Radio-frequency common mode – Test levels at input and output d.c. power ports | | | | | |
|---|------------------|--------------------------|-----------------|-------|----------------------|
| Frequency range (MHz) | Test Level (V/m) | Modulation Signal | Coupling Method | Steps | Performance Criteria |
| 0.15 to 80 | 3 | 1kHz, 80%, AM, Sine wave | CDN | 1% | A |

Note: Only applicable to equipment that is connected to the mains while in use.

4.7.4 Test Procedure

a) The EUT are placed on an insulated wooden table 0.8m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

b) The test signal is sent to the coupling device through the 6dB attenuator, and then injected into the EUT test port by the common mode of the coupling device. The power port is injected use CDN. The signal line and control line are injected use Electromagnetic Injection Clamp

c) The frequency range is swept from 150kHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

4.7.5 Test Results

Refer to Annex A.4

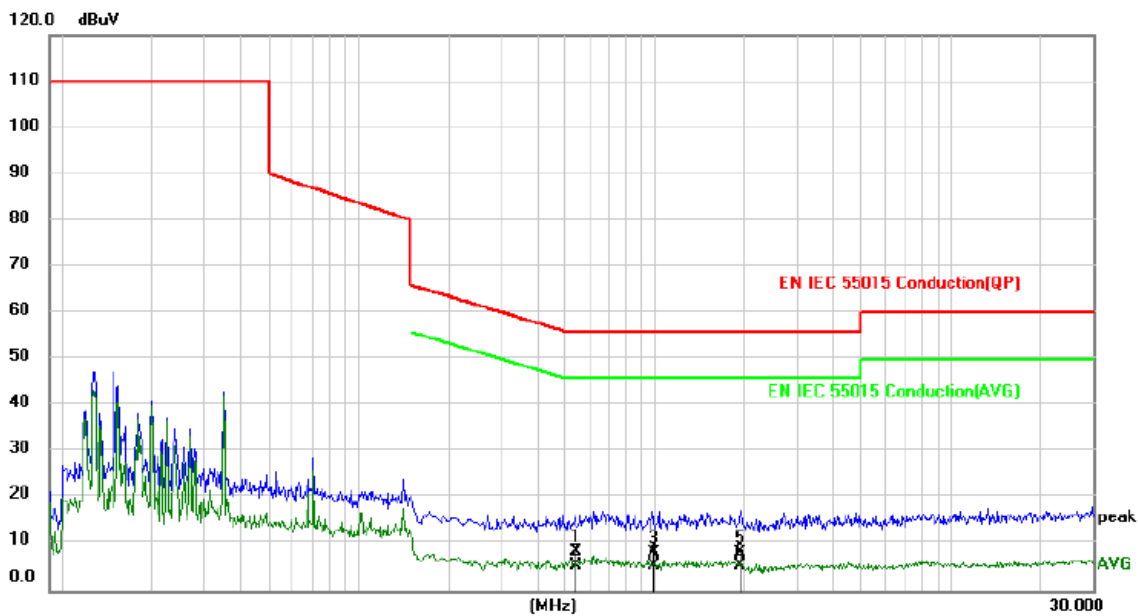
ANNEX A

(Emission and Immunity test results)

A.1 Conducted Disturbance Test Results

| | |
|---------------------------|-------------------|
| Environmental Conditions: | 23.9°C, 53% RH |
| Test Voltage: | DC 24V |
| Test Model: | LY120-S2835WW-W24 |
| Test Mode: | Mode 1 |
| Test Engineer: | Peng Dong |
| Pol: | Line |

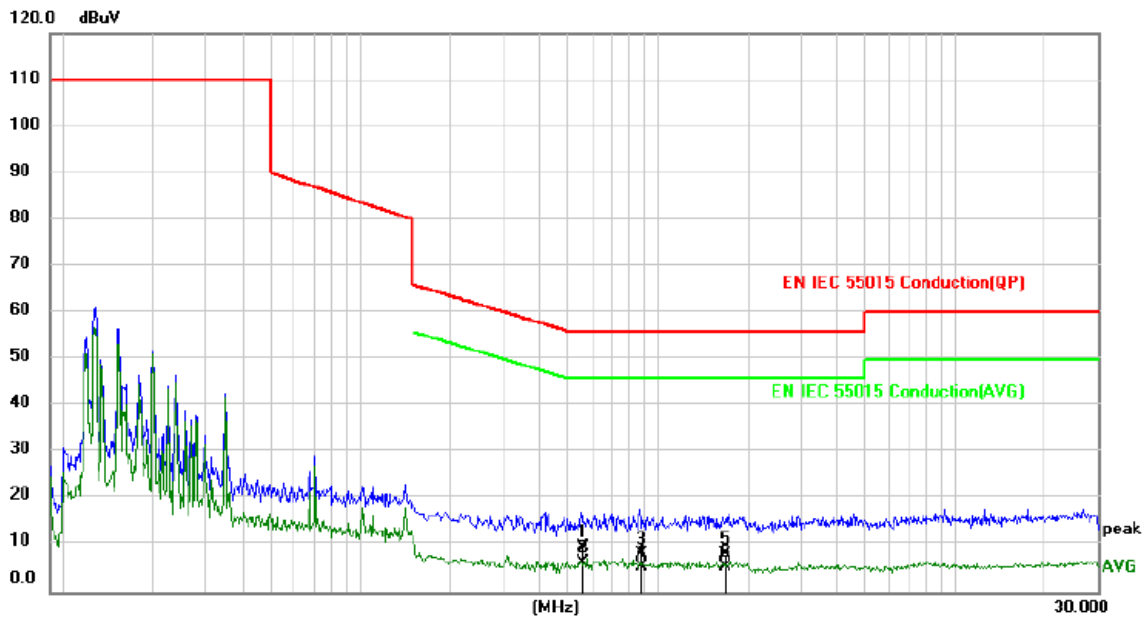
Detailed results are shown below



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | Detector | Comment |
|-----|-----|--------|---------------|----------------|-------------|-------|--------|----------|---------|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | | 0.5429 | -1.68 | 10.20 | 8.52 | 56.00 | -47.48 | QP | |
| 2 | * | 0.5429 | -4.58 | 10.20 | 5.62 | 46.00 | -40.38 | AVG | |
| 3 | | 0.9946 | -1.86 | 10.20 | 8.34 | 56.00 | -47.66 | QP | |
| 4 | | 0.9946 | -4.76 | 10.20 | 5.44 | 46.00 | -40.56 | AVG | |
| 5 | | 1.9523 | -1.86 | 10.20 | 8.34 | 56.00 | -47.66 | QP | |
| 6 | | 1.9523 | -4.68 | 10.20 | 5.52 | 46.00 | -40.48 | AVG | |

| | |
|---------------------------|-------------------|
| Environmental Conditions: | 23.9°C, 53% RH |
| Test Voltage: | DC 24V |
| Test Model: | LY120-S2835WW-W24 |
| Test Mode: | Mode 1 |
| Test Engineer: | Peng Dong |
| Pol: | Neutral |

Detailed results are shown below

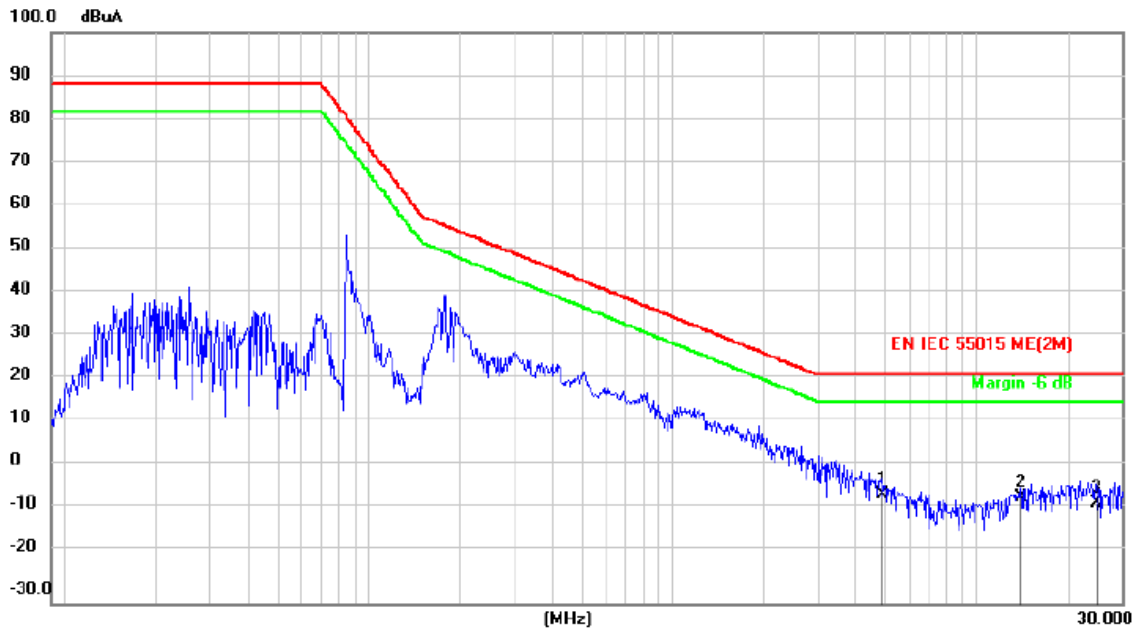


| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1 | | 0.5646 | -0.35 | 10.20 | 9.85 | 56.00 | -46.15 | QP | |
| 2 | * | 0.5646 | -3.80 | 10.20 | 6.40 | 46.00 | -39.60 | AVG | |
| 3 | | 0.8779 | -1.86 | 10.20 | 8.34 | 56.00 | -47.66 | QP | |
| 4 | | 0.8779 | -4.65 | 10.20 | 5.55 | 46.00 | -40.45 | AVG | |
| 5 | | 1.6777 | -1.86 | 10.20 | 8.34 | 56.00 | -47.66 | QP | |
| 6 | | 1.6777 | -4.67 | 10.20 | 5.53 | 46.00 | -40.47 | AVG | |

A.2 Radiated Disturbance Test Results (9kHz to 30MHz)

| | |
|---------------------------|-------------------|
| Environmental Conditions: | 23.9°C, 53% RH |
| Test Voltage: | DC 24V |
| Test Model: | LY120-S2835WW-W24 |
| Test Mode: | Mode 1 |
| Test Engineer: | Peng Dong |
| Pol: | X |

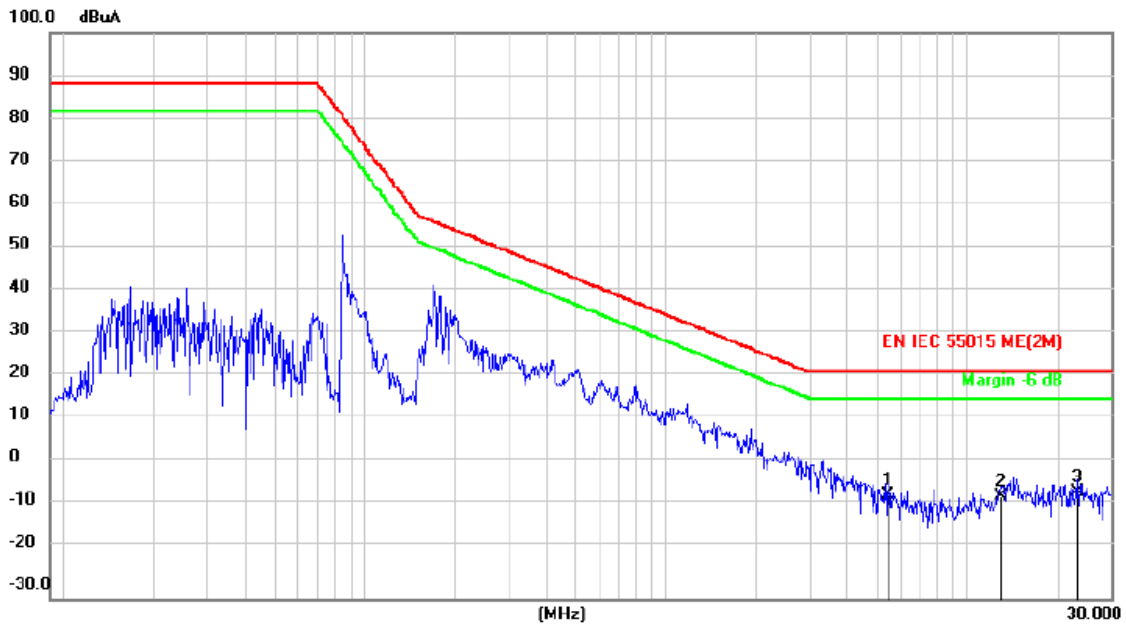
Detailed results are shown below



| No. | Mk. | Freq. MHz | Reading Level dBuA | Correct Factor dB | Measure- ment dBuA | Limit dBuA | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1 | * | 4.8752 | 7.16 | -12.26 | -5.10 | 22.00 | -27.10 | QP | |
| 2 | | 13.9946 | 17.00 | -22.70 | -5.70 | 22.00 | -27.70 | QP | |
| 3 | | 24.8931 | 27.23 | -34.17 | -6.94 | 22.00 | -28.94 | QP | |

| | |
|---------------------------|-------------------|
| Environmental Conditions: | 23.9°C, 53% RH |
| Test Voltage: | DC 24V |
| Test Model: | LY120-S2835WW-W24 |
| Test Mode: | Mode 1 |
| Test Engineer: | Peng Dong |
| Pol: | Y |

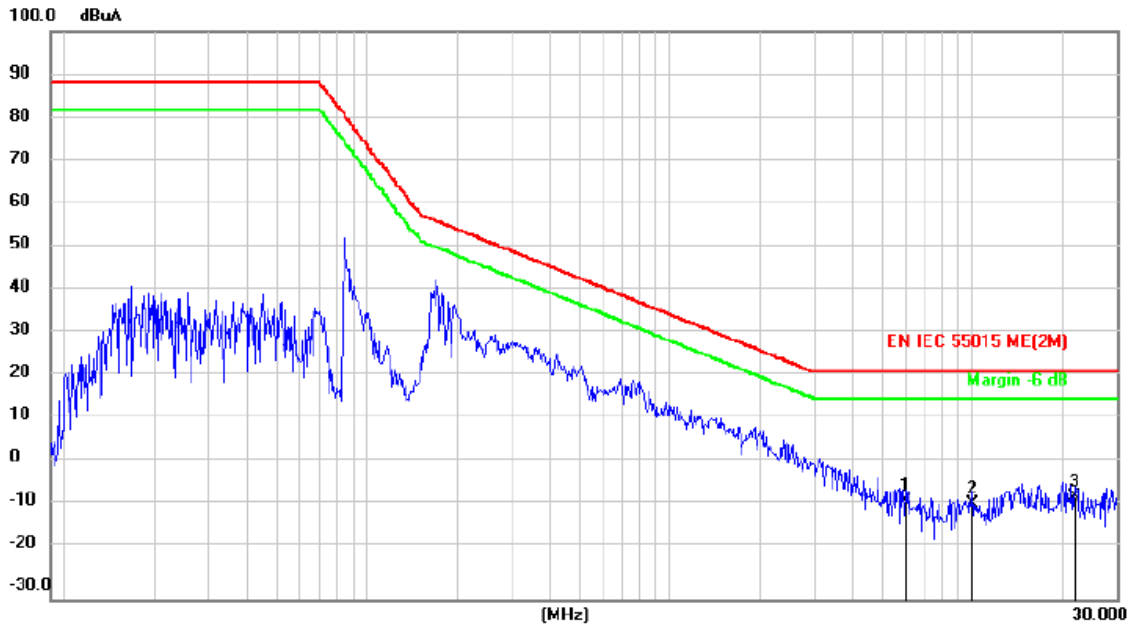
Detailed results are shown below



| No. | Mk. | Freq. MHz | Reading Level dBuA | Correct Factor dB | Measure- ment dBuA | Limit dBuA | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1 | | 5.4615 | 7.41 | -13.63 | -6.22 | 22.00 | -28.22 | QP | |
| 2 | | 13.0096 | 15.41 | -21.86 | -6.45 | 22.00 | -28.45 | QP | |
| 3 | * | 23.1414 | 27.73 | -33.24 | -5.51 | 22.00 | -27.51 | QP | |

| | |
|---------------------------|-------------------|
| Environmental Conditions: | 23.9°C, 53% RH |
| Test Voltage: | DC 24V |
| Test Model: | LY120-S2835WW-W24 |
| Test Mode: | Mode 1 |
| Test Engineer: | Peng Dong |
| Pol: | Z |

Detailed results are shown below

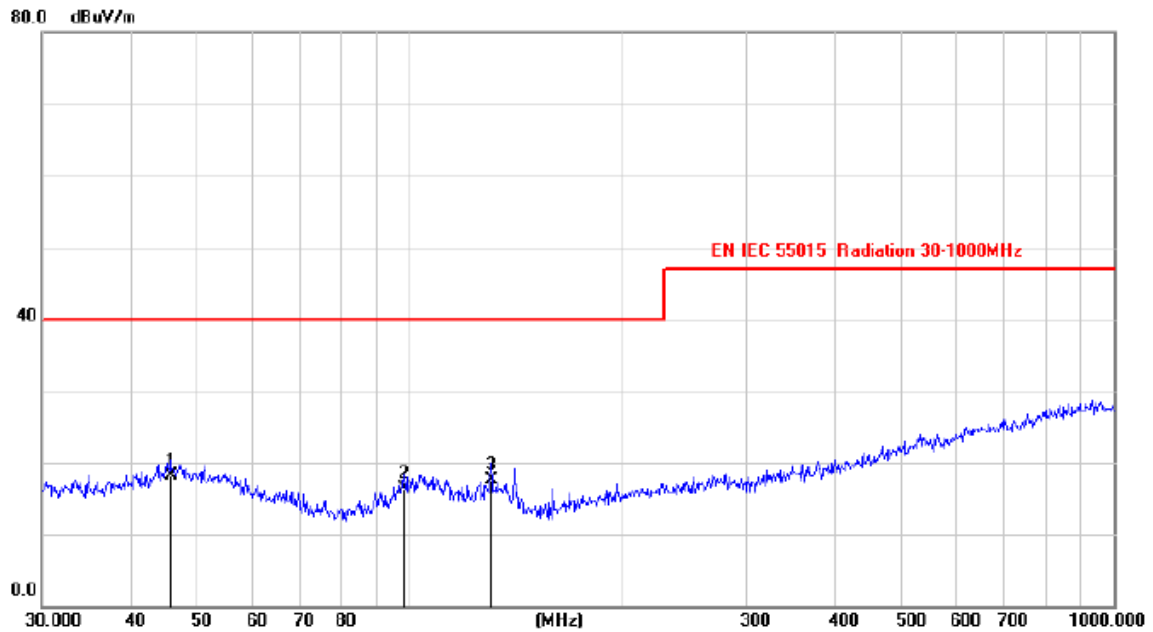


| No. | Mk. | Freq. MHz | Reading Level dBuA | Correct Factor dB | Measure- ment dBuA | Limit dBuA | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1 | | 6.0198 | 7.63 | -14.93 | -7.30 | 22.00 | -29.30 | QP | |
| 2 | | 10.0350 | 12.31 | -20.41 | -8.10 | 22.00 | -30.10 | QP | |
| 3 | * | 21.8640 | 25.89 | -32.46 | -6.57 | 22.00 | -28.57 | QP | |

A.3 Radiated Disturbance Test Results (30MHz to 1000MHz)

| | |
|---------------------------|-------------------|
| Environmental Conditions: | 23.8°C, 55% RH |
| Test Voltage: | DC 24V |
| Test Model: | LY120-S2835WW-W24 |
| Test Mode: | Mode 1 |
| Test Engineer: | Peng Dong |
| Pol: | Vertical |

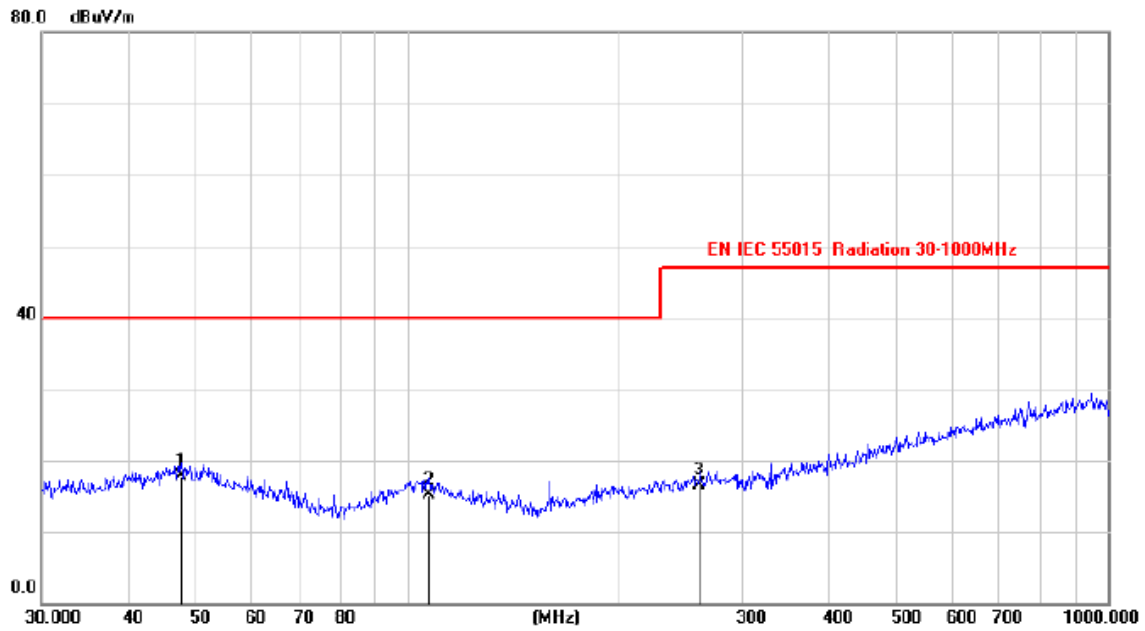
Detailed results are shown below



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB/m | Measure- ment dBuV/m | Limit dBuV/m | Margin dB | Detector | Antenna Height cm | Table Degree degree | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|--------------|----------|-------------------------|---------------------------|---------|
| 1 | * | 45.8151 | 4.91 | 13.11 | 18.02 | 40.00 | -21.98 | QP | | | |
| 2 | | 98.2279 | 5.80 | 10.50 | 16.30 | 40.00 | -23.70 | QP | | | |
| 3 | | 130.5505 | 4.61 | 12.87 | 17.48 | 40.00 | -22.52 | QP | | | |

| | |
|---------------------------|-------------------|
| Environmental Conditions: | 23.8°C, 55% RH |
| Test Voltage: | DC 24V |
| Test Model: | LY120-S2835WW-W24 |
| Test Mode: | Mode 1 |
| Test Engineer: | Peng Dong |
| Pol: | Horizontal |

Detailed results are shown below



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB/m | Measure- ment dBuV/m | Limit dBuV/m | Margin dB | Detector | Antenna Height cm | Table Degree degree | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|--------------|----------|-------------------------|---------------------------|---------|
| 1 | * | 47.5126 | 3.05 | 14.56 | 17.61 | 40.00 | -22.39 | QP | | | |
| 2 | | 107.5101 | 2.10 | 12.94 | 15.04 | 40.00 | -24.96 | QP | | | |
| 3 | | 261.1727 | 3.41 | 13.03 | 16.44 | 47.00 | -30.56 | QP | | | |

A.4 Immunity Test Results

| Electrostatic Discharge Immunity Test Results | | | | | | | | |
|--|---|--------------|--|-----|---|-----|---|----------------------|
| Standard | <input checked="" type="checkbox"/> BS EN 61547: 2009 | | <input checked="" type="checkbox"/> BS EN 61000-4-2 : 2009 | | | | | |
| Applicant | SHENZHEN LEDYI LIGHTING CO., LTD. | | | | | | | |
| EUT | LED Strip | Temperature | 23.9°C | | | | | |
| M/N | LY120-S2835WW-W24 | Humidity | 51% | | | | | |
| Test Mode | Mode 1 | Pressure | 1008mbar | | | | | |
| Input Voltage | DC 24V | Test Results | Pass | | | | | |
| Test Engineer | Peng Dong | | | | | | | |
| Discharge mode | Test points | Results | | | | | | Performance Criteria |
| | | 2kv | | 4kv | | 8kv | | |
| | | + | - | + | - | + | - | |
| Direct-Contact Discharge | Front | P | P | P | P | / | / | B |
| | Back | P | P | P | P | / | / | B |
| | Left | P | P | P | P | / | / | B |
| | Right | P | P | P | P | / | / | B |
| | Top | P | P | P | P | / | / | B |
| | Bottom | P | P | P | P | / | / | B |
| Direct-Air Discharge | Front | P | P | P | P | P | P | B |
| | Back | P | P | P | P | P | P | B |
| | Left | P | P | P | P | P | P | B |
| | Right | P | P | P | P | P | P | B |
| | Top | P | P | P | P | P | P | B |
| | Bottom | P | P | P | P | P | P | B |
| Indirect-Contact Discharge(VCP) | / | P | P | P | P | / | / | B |
| Indirect-Contact Discharge(HCP) | / | P | P | P | P | / | / | B |
| Note: "P" = Pass. | | | | | | | | |

Radiated, Radio-Frequency, Electromagnetic Field Immunity Test Results

| Standard | <input checked="" type="checkbox"/> BS EN 61547: 2009 | | <input checked="" type="checkbox"/> BS EN IEC 61000-4-3:2020 | |
|---------------|---|-----------------------|--|----------------------|
| Applicant | SHENZHEN LEDYI LIGHTING CO., LTD. | | | |
| EUT | LED Strip | Temperature | 23.5°C | |
| M/N | LY120-S2835WW-W24 | Humidity | 53% | |
| Test Mode | Mode 1 | Pressure | 1008mbar | |
| Input Voltage | DC 24V | Test Engineer | Baron wen | |
| Modulation | 80% AM 1KHz | Test Results | Pass | |
| Steps | 1% | | | |
| Angle of EUT | Antenna polarization | Frequency Range (MHz) | Test Level (V/m) | Performance Criteria |
| 0° | Vertical, Horizontal | 80 to 1000 | 3 | A |
| 90° | Vertical, Horizontal | 80 to 1000 | 3 | A |
| 180° | Vertical, Horizontal | 80 to 1000 | 3 | A |
| 270° | Vertical, Horizontal | 80 to 1000 | 3 | A |

Note:

| Electrical Fast Transient/Burst Immunity Test Results | | | | | |
|--|---|----------------------|---|------|----------------------|
| Standard | <input checked="" type="checkbox"/> BS EN 61547: 2009 | | <input checked="" type="checkbox"/> BS EN 61000-4-4: 2012 | | |
| Applicant | SHENZHEN LEDYI LIGHTING CO., LTD. | | | | |
| EUT | LED Strip | Temperature | 24.1 °C | | |
| M/N | LY120-S2835WW-W24 | Humidity | 54% | | |
| Test Mode | Mode 1 | Pressure | 1008mbar | | |
| Input Voltage | DC 24V | Test Results | Pass | | |
| Test Engineer | Peng Dong | | | | |
| | | | | | |
| Test Port Type | Test Level | Repetition Frequency | Test Duration | | Performance Criteria |
| | | | + | - | |
| AC Power ports | | | | | |
| DC Input /Output Power ports | ±0.5kV | 5kHz | 2min | 2min | B |
| Note: | | | | | |

| Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields Test Results | | | | |
|--|---|------------------|---|----------------------|
| Standard | <input checked="" type="checkbox"/> BS EN 61547: 2009 | | <input checked="" type="checkbox"/> BS EN 61000-4-6: 2014 | |
| Applicant | SHENZHEN LEDYI LIGHTING CO., LTD. | | | |
| EUT | LED Strip | Temperature | 24.1°C | |
| M/N | LY120-S2835WW-W24 | Humidity | 54% | |
| Test Mode | Mode 1 | Pressure | 1008mbar | |
| Input Voltage | DC 24V | Test Results | Pass | |
| Test Engineer | Peng Dong | | | |
| | | | | |
| Test Port Type | Frequency range (MHz) | Test Level (V/m) | Coupling method | Performance Criteria |
| AC Power ports | | | | |
| DC Input /Output Power ports | 0.15 to 80 | 3 | CDN | A |
| Remark: 1.Modulation Signal:1kHz, 80%, AM, Sine wave. 2.Measurement Equipment: Simulator : CIT-10 (FRANKONIA) CDN : <input checked="" type="checkbox"/> CDN-M2 (FRANKONIA) <input type="checkbox"/> CDN-M3 (FRANKONIA) | | | | |
| | | | | |

ANNEX B (Test photograph)

B.1 Photo of Conducted Disturbance



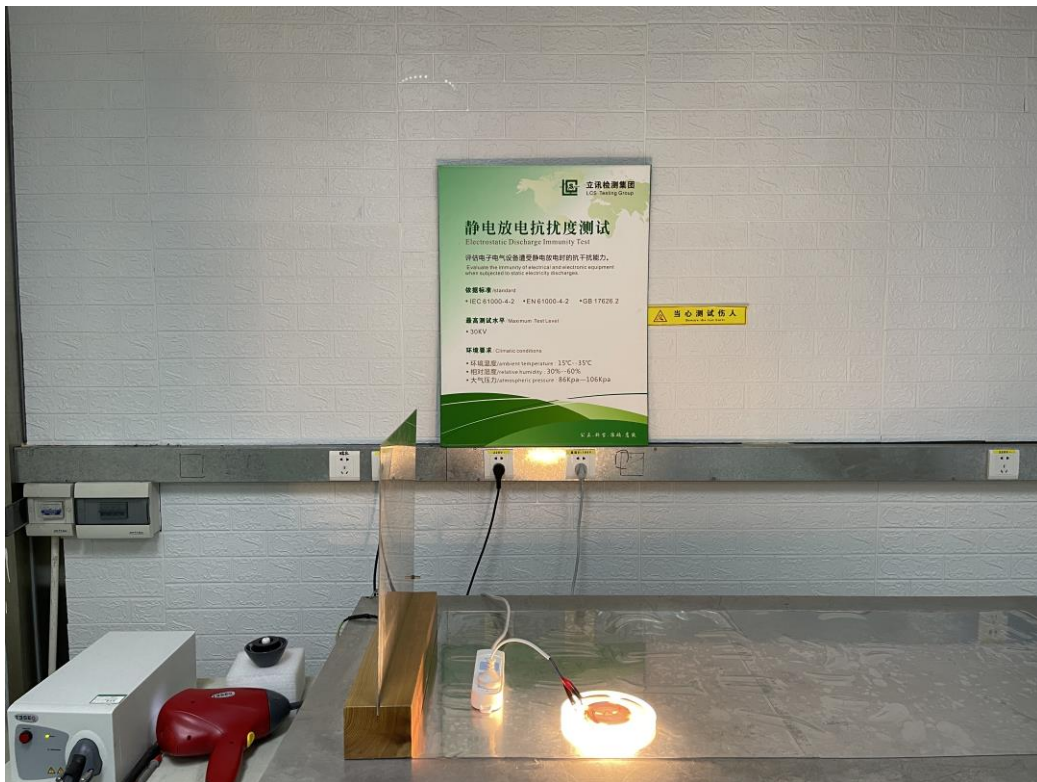
B.2 Photo of Radiated Disturbance(9kHz to 30MHz)



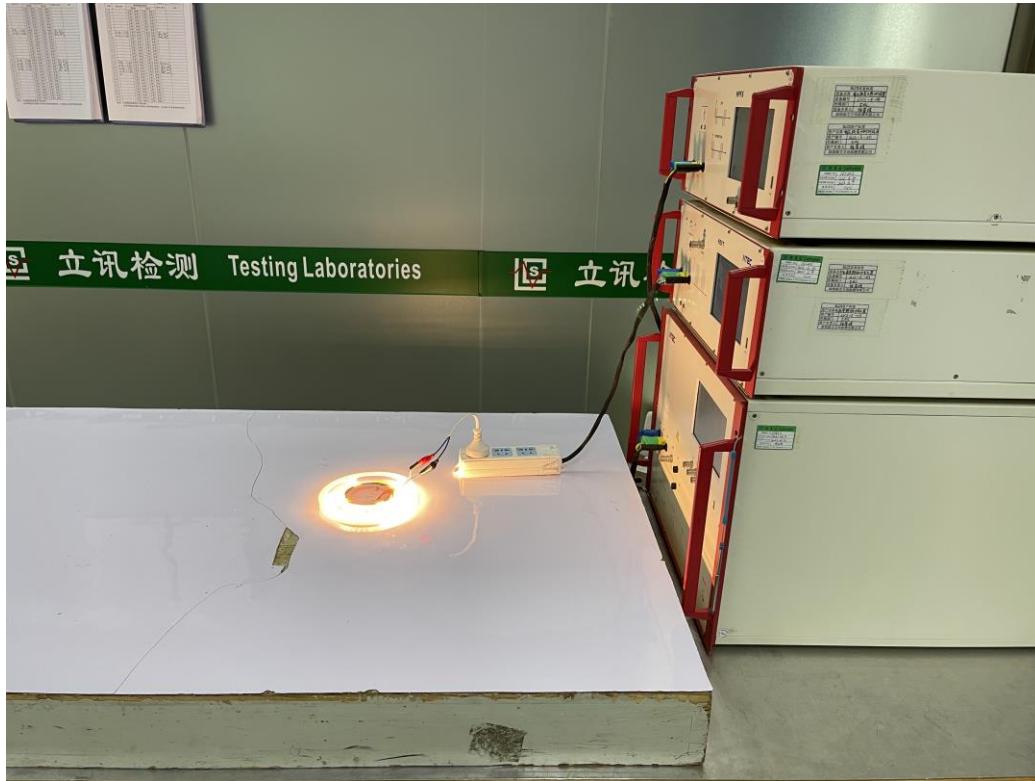
B.3 Photo of Radiated Disturbance(30MHz to 1000MHz)



B.4 Photo of Electrostatic Discharge Immunity Test



B.5 Photo of Electrical Fast Transient/Burst Immunity Test



B.6 Photo of Immunity To Conducted Disturbances, Induced by Radio-Frequency Fields



ANNEX C

(External and internal photos of the EUT)

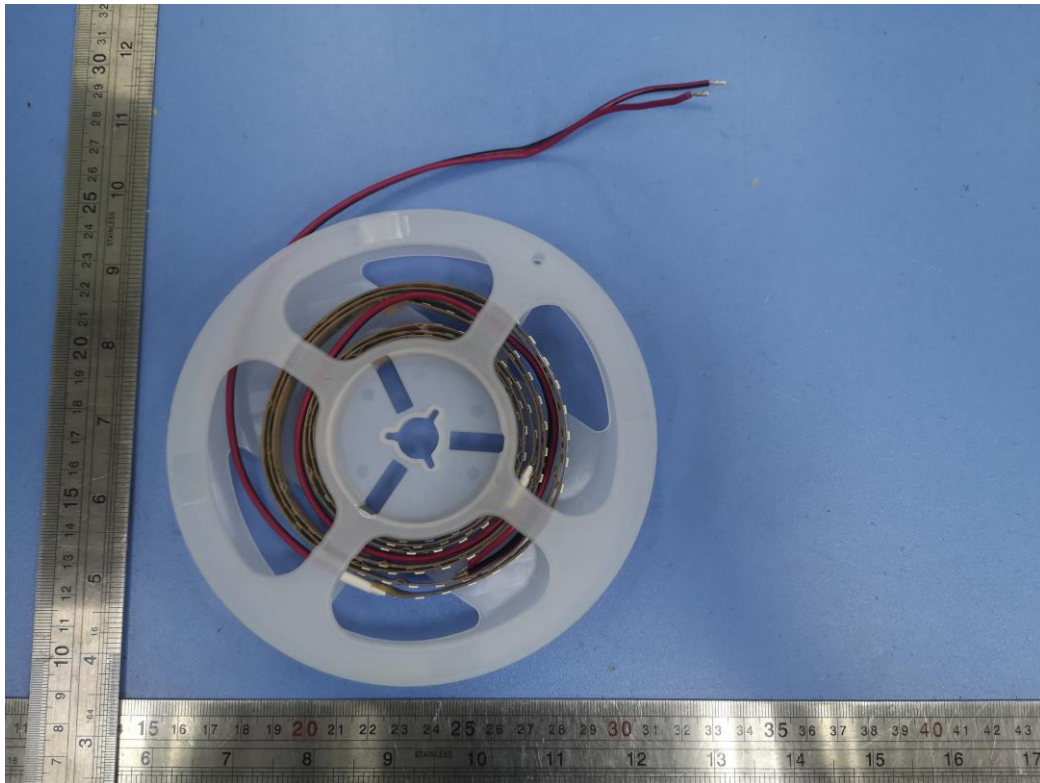


Figure. 1

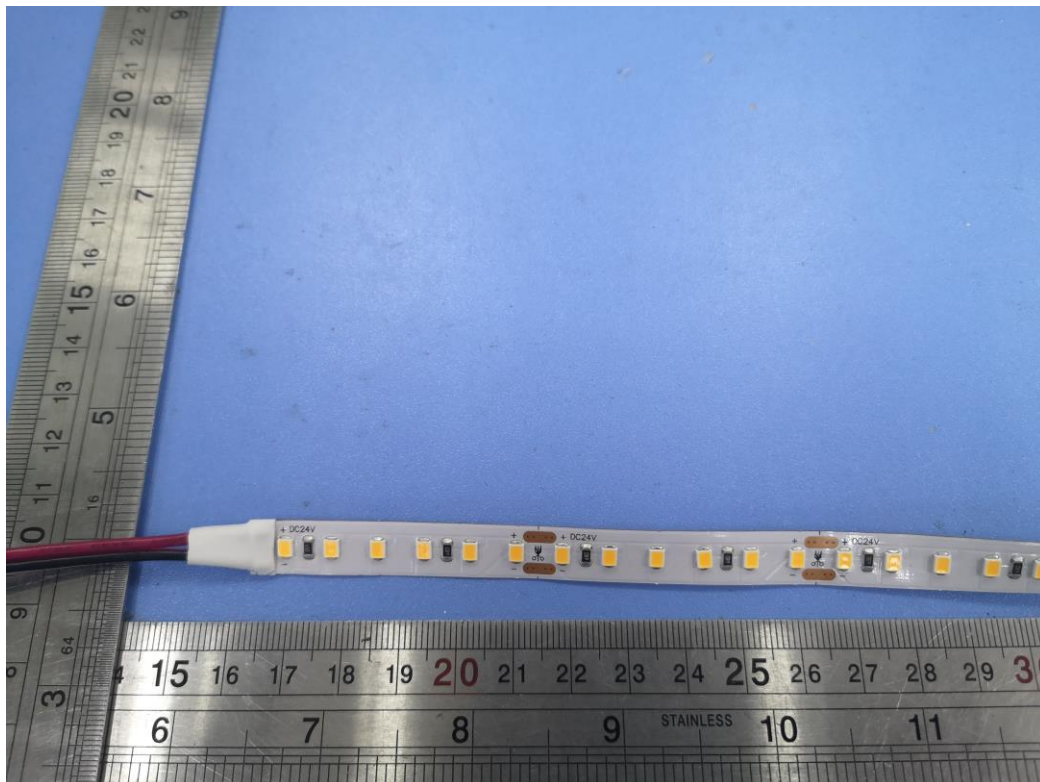


Figure. 2

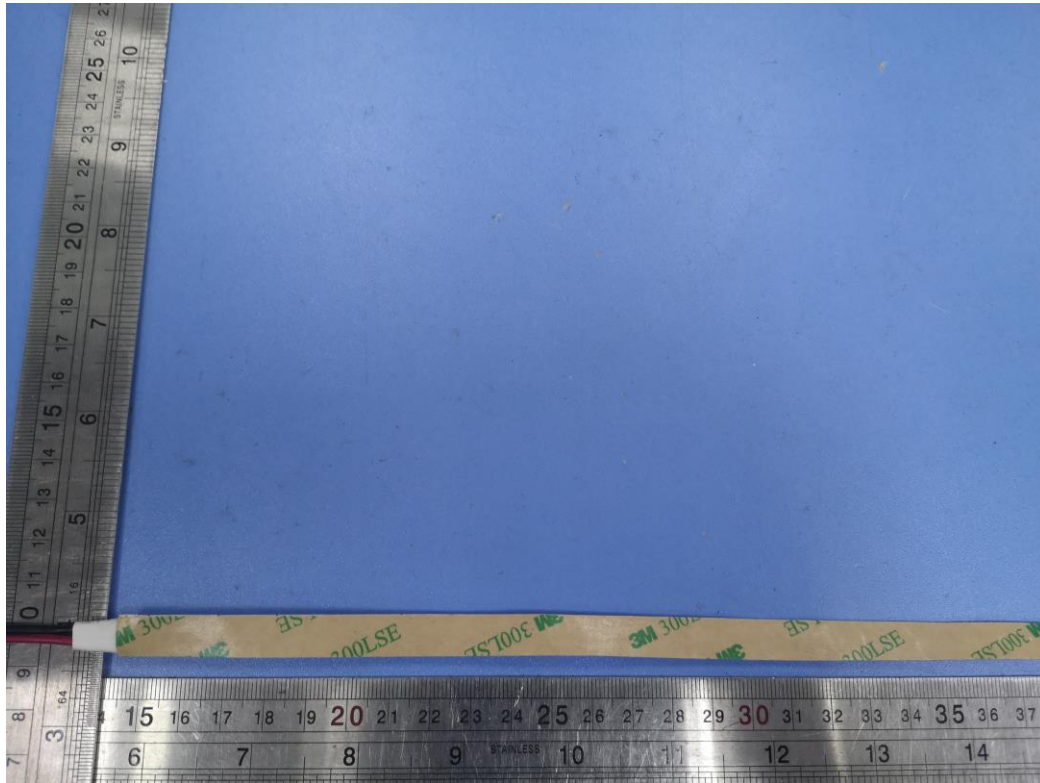


Figure. 3

-----THE END OF TEST REPORT-----