# EMC TEST REPORT

**FOR**

**Ningbo Meike Lighting CO., LTD.**

**Camping Light**

**MODEL NO. : MK-5621, MK-5622, MK-5623, MK-6021, MK-6022, MK-6026, MK-6027, MK-7022, MK-7211, MK-7253, MK-7312, MK-7605, MK-7607, MK-7609, MK-8505, MK-8506**

**Prepared For :** **Ningbo Meike Lighting CO., LTD.**

**North 2102, Yinzhou Chamber Of Commerce, No. 1299 Yinxian Avenue, Ningbo, China, 315199**

**Prepared By :** **Beide (Shenzhen) Product Service Limited**

**China: 6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, Bao'an Dist, Shenzhen, China**

| | |
|---|---|
| **Report Number:** | **B-E240417196** |
| **Date of Test:** | **Apr. 18-24, 2024** |
| **Date of Report:** | **Apr. 24, 2024** |

Beide
Compliance Laboratory

# TABLE OF CONTENTS

Description Page

# TEST REPORT DECLARATION

| | | |
|---|---|---|
| Applicant | : | Ningbo Meike Lighting CO., LTD. |
| Address | : | North 2102, Yinzhou Chamber Of Commerce, No. 1299 Yinxian Avenue, Ningbo, China, 315199 |
| Client No. | : | 05746336 |
| Manufacturer | : | Ningbo Meike Lighting CO., LTD. |
| Address | : | North 2102, Yinzhou Chamber Of Commerce, No. 1299 Yinxian Avenue, Ningbo, China, 315199 |
| EUT Description | : | Camping Light |
| Model No. | : | MK-5621, MK-5622, MK-5623, MK-6021, MK-6022, MK-6026, MK-6027, MK-7022, MK-7211, MK-7253, MK-7312, MK-7605, MK-7607, MK-7609, MK-8505, MK-8506 |
| Power Supply | : | Input:DC5V,1A<br>Battery: Four gear,1 620mA, 2 370mA, 3 190mA, 4 60mA |
| Remark | : | Use MK-6022 do all the tests |

Test Procedure Used:
EN 55015:2019+A11:2020
EN 61547:2023 (EN 61000-3-2:2019+A1:2021
EN 61000-3-3:2013+A1:2019+A2:2021)

The device described above is tested by Beide (Shenzhen) Product Service Limited to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and EUT's performance criterion. The test results are contained in this test report. Beide (Shenzhen) Product Service Limited is assumed of full responsibility for the accuracy and completeness of these tests.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Beide (Shenzhen) Product Service Limited.

Date of Test : Apr. 18-24, 2024

Prepared by : (Jack)

Checked by : ( Vivian)

Approved by : (Johnson)

BEIDE (SHENZHEN) PRODUCT SERVICE LIMITED Beide Compliance Laboratory CERTIFICATION

# 1.TEST RESULTS SUMMARY

**Test Results Summary**

| | Test Items | Test Results |
|---|---|---|
| 1 | Radiation Emission Test | PASS |
| 2 | Magnetic Test | PASS |
| 3 | Electrostatic Discharge Test | PASS |
| 4 | Radio Frequency Electromagnetic Fields | PASS |

# 2.GENERAL INFORMATION

## 2.1.Report Information

2.1.1. This report is not a certificate of quality, it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BEIDE approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BEIDE in any way guarantees the later performance of the product/equipment.

2.1.2. The sample/s mentioned in this report is/are supplied by applicant, BEIDE therefore assumes no responsibility for the accuracy of information on the brand names, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the applicant at an additional fee. No third part can obtain a copy of this report through BEIDE, unless the applicant has authorized BEIDE in writing to do so.

## 2.2.Description of Device (EUT)

| | | |
|---|---|---|
| Description | : | Camping Light |
| Model Number | : | MK-5621, MK-5622, MK-5623, MK-6021, MK-6022, MK-6026, MK-6027, MK-7022, MK-7211, MK-7253, MK-7312, MK-7605, MK-7607, MK-7609, MK-8505, MK-8506 |
| Applicant | : | Ningbo Meike Lighting CO., LTD. |
| Address | : | North 2102, Yinzhou Chamber Of Commerce, No. 1299 Yinxian Avenue, Ningbo, China, 315199 |
| Manufacturer | : | Ningbo Meike Lighting CO., LTD. |
| Address | : | North 2102, Yinzhou Chamber Of Commerce, No. 1299 Yinxian Avenue, Ningbo, China, 315199 |

## 2.3.Test Facility

Site Description

| | | |
|---|---|---|
| Tested by | : | Beide (Shenzhen) Product Service Limited |
| Site Location | : | 6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, Bao'an Dist, Shenzhen, China |

## 2.4.Test Condition

Test Mode: ON

## 2.5.Test Conditions

Temperature: 22℃-28℃
Relative Humidity: 45%-68%

## 2.6.Performance Criterion

Performance criterion **A**:

The equipment shall continue to operate as intended during the test.
No change of actual operating state (for example change of channel) is allowed as a result of the application of the test.
Multifunction equipment shall for each function meet the relevant requirements.
Evaluation is carried out for audio and video functions.

Performance criterion **B**:

The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended. But failures which are recovered automatically but which cause temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the application of the test. During the test, degradation of performance is allowed.

# 3.TEST INSTRUMENT USED

## 3.1.For Radiation Emission Test

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | Spectrum Analyzer | Rohde&schwarz | FSEA20 | DE25181 | 2023.08.18 | 1 Year |
| 2. | Positioning Controller | C&C | CC-C-1F | N/A | 2023.08.18 | 1 Year |
| 3. | Trilog Broadband Antenna | Schwarzbeck | VULB9163 | 9163-333 | 2023.08.18 | 1 Year |
| 4. | Horn Antenna | Schwarzbeck | BBHX9120 | 9120-426 | 2023.08.18 | 1 Year |
| 5. | RF Switch | EM | EMSW18 | SW060023 | 2023.08.18 | 1 Year |
| 6. | Amplifier | Agilent | 8447F | 3113A06717 | 2023.08.18 | 1 Year |
| 7. | Coaxial Cable | Schwarzbeck | AK9513 | 9513-10 | 2023.08.18 | 1 Year |
| 8. | EMI Test Receiver | Rohde&schwarz | ESPI | 101206 | 2023.08.18 | 1 Year |

## 3.2.For Magnetic Test (In Shielding Room)

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | EMI Test Receiver | ROHDE&SCHWARZ | ESPI | 101206 | 2023.08.18 | 1 Year |
| 2. | Loop Antenna | Laplace Instrument Ltd | RF300 | 8006 | 2023.08.18 | 1 Year |
| 3. | Pulse Limiter | ROHDE&SCHWARZ | ESH3-Z2 | 100305 | 2023.08.18 | 1Year |
| 4. | 50Ω Coaxial Switch | ANRITSU CORP | MP59B | 6200283933 | 2023.08.18 | 1 Year |

## 3.3.For Electrostatic Discharge Immunity Test

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | ESD Tester | HAEFELY | PESD 1600 | H708159 | 2023.08.18 | 1 Year |

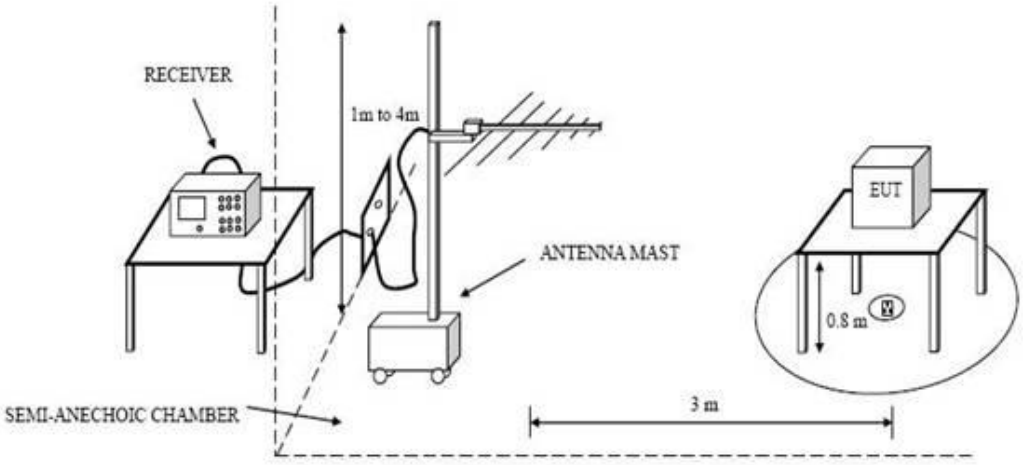
## 3.4.For Radio Frequency Electromagnetic Fields Test

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | RF Power Meter Dual Channel | BOONTON | 4232A | 10539 | 2023.08.18 | 1 Year |
| 2. | 50ohm Diode Power Sensor | BOONTON | 51011EMC | 34236/34238 | 2023.08.18 | 1 Year |
| 3. | Broad-band horn Antenna | SCHWARZBECK | BBHA9120L3F | 332 | 2023.08.18 | 1 Year |
| 4. | Power Amplifier | PRANA | N/A | N/A | 2023.08.18 | 1 Year |
| 5. | Power Amplifier | MILMEGA | AS0102-55 | N/A | 2023.08.18 | 1 Year |
| 6. | Signal Generator | AEROFLEX | 20238 | N/A | 2023.08.18 | 1 Year |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. | Field Strength Meter | HOLADAY | HI-6005 | N/A | 2023.08.18 | 1 Year |
| 8. | RS232 Fiber optic modem | HOLADAY | HI-4413P | N/A | 2023.08.18 | 1 Year |
| 9. | Log.-per. Antenna | SCHWARZ BECK | VULP9118E | N/A | 2023.08.18 | 1 Year |

# 4.RADIATION EMISSION TEST

## 4.1.Block Diagram of Test Setup




## 4.2.Test Standard

EN 55015:2019+A11:2020

## 4.3.Radiation Emission Limit

All emanations from a Class B computing devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

| FREQUENCY (MHz) | DISTANCE (Meters) | FIELD STRENGTHS LIMITS (dBμV/m) |
|---|---|---|
| 30 ~ 230 | 3 | 40 |
| 230 ~ 300 | 3 | 47 |

Notes: 1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

## 4.4.EUT Configuration on Test

The test Class B regulations test method must be used to find the maximum emission during radiated emission test.
The configuration of EUT is same as used in the test.

## 4.5.Operating Condition of EUT

4.5.1. Setup the EUT as shown on Section 4.1.
4.5.2. Turn on the power of all equipments.
4.5.3. Let the EUT work in test mode (On) and measure it and test it.

### 4.6.Test Procedure

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 10 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband 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 setting on the test receiver (R&S TEST RECEIVER ESPI) is 120kHz. The EUT is tested in Anechoic Chamber.

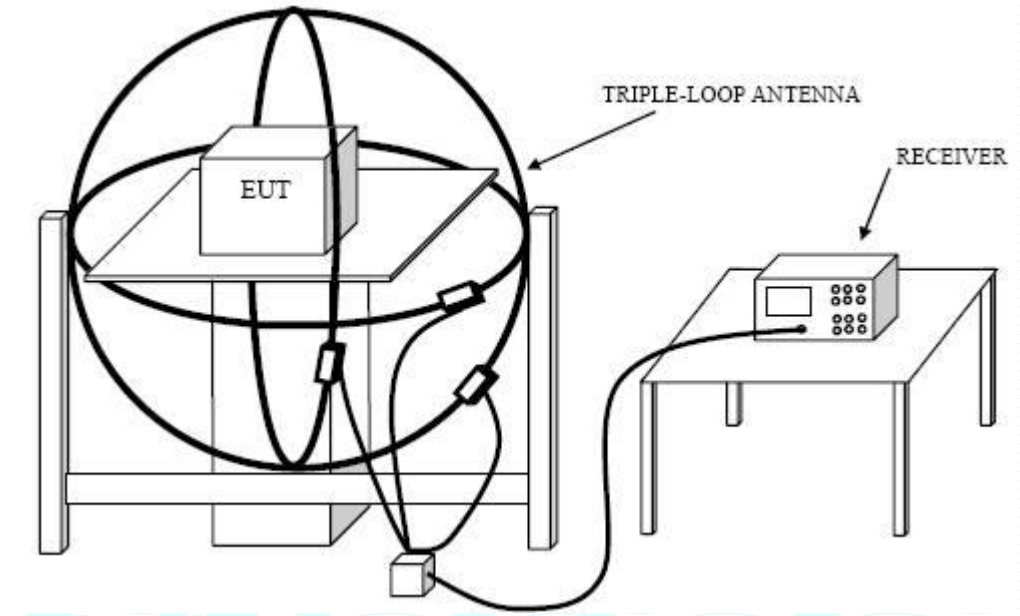
The frequency range from 30 MHz to 300MHz is checked. The scanning waveform is put in APPENDIX I.

### 4.7.Radiation Emission Test Results

PASS

# 5.MAGNETIC TEST

## 5.1.Block Diagram of Test Setup




## 5.2.Test Standard

EN 55015:2019+A11:2020

## 5.3.Magnetic Field Emission Limits

| Frequency | Limits for loop diameter (dBμA) |
|---|---|
| | 2m |
| 9kHz ~ 70kHz | 88 |
| 70kHz ~ 150kHz | 88 ~ 58* |
| 150kHz ~ 2.2MHz | 58 ~ 26* |
| 2.2MHz ~ 3.0MHz | 58 |
| 3.0MHz ~ 30MHz | 22 |

1. At the transition frequency the lower limit applies.
2. * decreasing linearly with logarithm of the frequency.

## 5.4.EUT Configuration on Test

The EN 55015 Class A regulations test method must be used to find the maximum Magnetic during the test.
The configuration of EUT is same as used in the test.

## 5.5.Operating Condition of EUT

5.5.1. Setup the EUT and simulators as shown in Section 5.1.

5.5.2. Turn on the power of all equipments.

5.5.3. Let the EUT work in test mode (ON) and test it.

## 5.6.Test Procedure

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 coax switch.

The frequency range from 9 kHz to 30MHz is investigated. The receiver is measured with the quasi-peak detector. For frequency band 9 kHz to 150 kHz, the bandwidth of the field strength meter (R&S test receiver ESPI) is set at 200Hz. For frequency band 150 kHz to 30MHz, the bandwidth is set at 10 kHz.

The frequency range from 9 kHz to 30MHz is investigated.

As the peak value is too low against the limit, so the Quasi-peak value has been omitted.

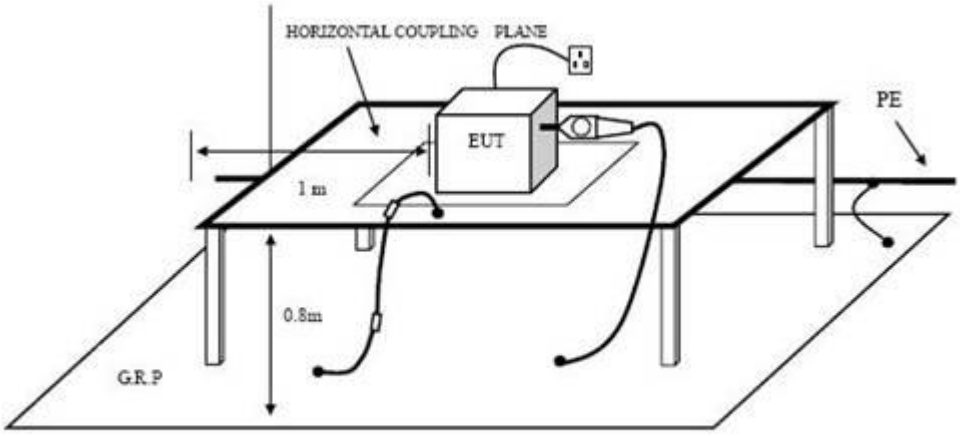
## 5.7.Magnetic Field Immunity Test Results

PASS

# 6.ELECTROSTATIC DISCHARGE TEST

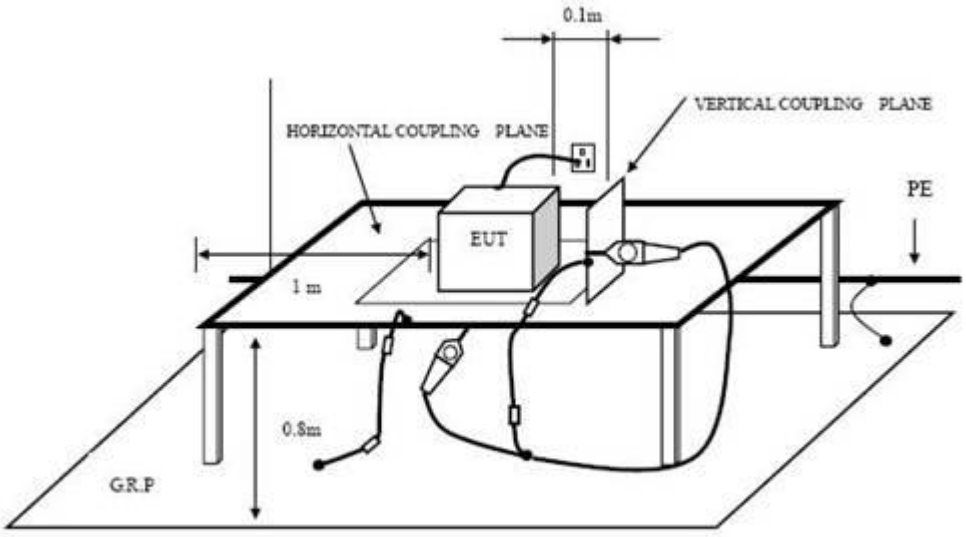
## 6.1.Block Diagram of Test Setup

6.1.1. Block Diagram of ESD Test Setup (Direct Discharge)




DIRECT DISCHARGE SETUP

6.1.2. Block Diagram of ESD Test Setup (Indirect Discharge)




INDIRECT DISCHARGE SETUP

## 6.2.Test Standard

EN 61547:2023 (EN 61000-3-2:2019+A1:2021
Severity Level 3 for Air Discharge at 8kV
Severity Level 2 for Contact Discharge at 4kV)

## 6.3.Severity level and Performance criterion

6.3.1.Severity level

| Level | Test Voltage Contact Discharge (kV) | Test Voltage Air Discharge (kV) |
|---|---|---|
| 1. | 2 | 2 |
| 2. | 4 | 4 |
| 3. | 6 | 8 |
| 4. | 8 | 15 |
| X. | Special | Special |

6.3.2. Performance criterion : **B**

## 6.4.EUT Configuration on Test

The test must be used to find the contact discharge and air discharge the difference voltage ratio during electrostatic discharge test.
The configuration of EUT is same as used in electrostatic discharge test.

## 6.5.Operating Condition of EUT

6.5.1. Setup the EUT and simulators as shown in Section 6.1.1 and 6.1.2.

6.5.2. Turn on the power of all equipments.

6.5.3. Let the EUT work in test mode (ON) and test it.

## 6.6.Test Procedure

6.6.1. Air Discharge:

This test is done on 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.

6.6.2. Contact Discharge

All the procedure shall be same as Section 6.6.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

6.6.3. Indirect discharge for horizontal coupling plane**:**
At least 20 single discharges shall be applied to the horizontal 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.

6.6.4. Indirect discharge for vertical coupling plane**:**
At least 20 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m ×0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

## 6.7.Test Results

PASS
Please refer to the following page.

# Electrostatic Discharge Test Results

Beide (Shenzhen) Product Service Limited

Date: Apr. 20, 2024

| | | | |
|---|---|---|---|
| Applicant | : Ningbo Meike Lighting CO., LTD. | Test Date | : Apr. 20, 2024 |
| EUT | : Camping Light | Temperature | : 24℃ |
| M/N | : MK-6022 | Humidity | : 47% |
| Power Supply | : DC 5V | Test Mode | : On |
| Test Engineer | : Jack | | |

Air Discharge: ±8kV For each point positive 10 times and negative 10 times discharge.

Contact Discharge: ±4kV

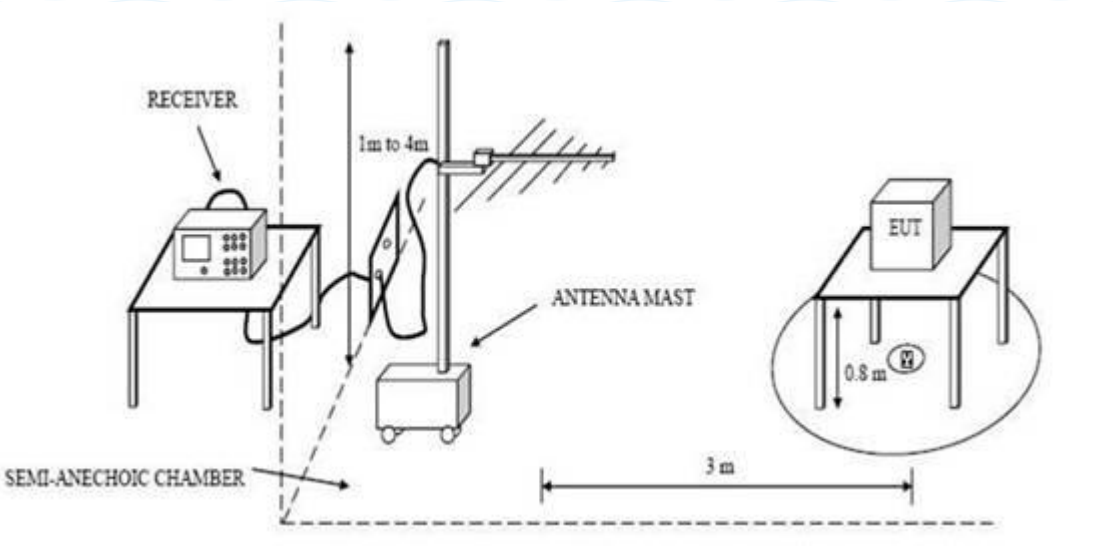
| **Location** | | **Kind**<br>A-Air Discharge<br>C-Contact Discharge | **Result** |
|---|---|---|---|
| Surface | 20 points | A | PASS |
| Slots | 20 points | A | PASS |
| HCP | 5 points | C | PASS |
| VCP | 5 points | C | PASS |

Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

Reviewer: Vivian

# 7.RF FIELD STRENGTH SUSCEPTIBILITY TEST

## 7.1.Block Diagram of Test Setup




## 7.2.Test Standard

EN 61547:2023 (EN 61000-3-3:2013+A1:2019+A2:2021, Severity Level: 2, 3V/m)

## 7.3.Severity level and Performance criterion

7.3.1. Severity level

| Level | Field Strength V/m |
|---|---|
| 1. | 1 |
| 2. | 3 |
| 3. | 10 |
| X. | Special |

7.3.2. Performance criterion : **A**

## 7.4.EUT Configuration on Test

The test must be used to find severity level in different phrase performance criterion during RF field strength susceptibility test.
The configuration of EUT is same as used in RF field strength susceptibility test.

## 7.5.Operating Condition of EUT

7.5.1. Setup the EUT as shown on Section 7.1.
7.5.2. Turn on the power of all equipments.
7.5.3. Let the EUT work in test mode (ON) and measure it and test it.

## 7.6.Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna is 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 the EUT.
All the scanning conditions are as follows **:**

| Condition of Test | Remarks |
|---|---|
| 1. Fielded Strength | 3 V/m (Severity Level 2) |
| 2. Radiated Signal | Modulated |
| 3. Scanning Frequency | 80 - 1000 MHz |
| 4. Sweeping time of radiated | 0.0015 decade/s |
| 5. Dwell Time | 1 Sec. |

## 7.7.Test Results

PASS
Please refer to the following page.

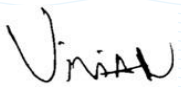
# RF Field Strength Susceptibility Test Results

Beide (Shenzhen) Product Service Limited

Date: Apr. 20, 2024

| | | | |
|---|---|---|---|
| Applicant | : Ningbo Meike Lighting CO., LTD. | Test Date | : Apr. 20, 2024 |
| EUT | : Camping Light | Temperature | : 24℃ |
| M/N | : MK-6022 | Humidity | : 49% |
| Power Supply | : DC 5V | Test Mode | : On |
| Test Engineer | : Jack | Frequency Range | : 80-1000MHz |

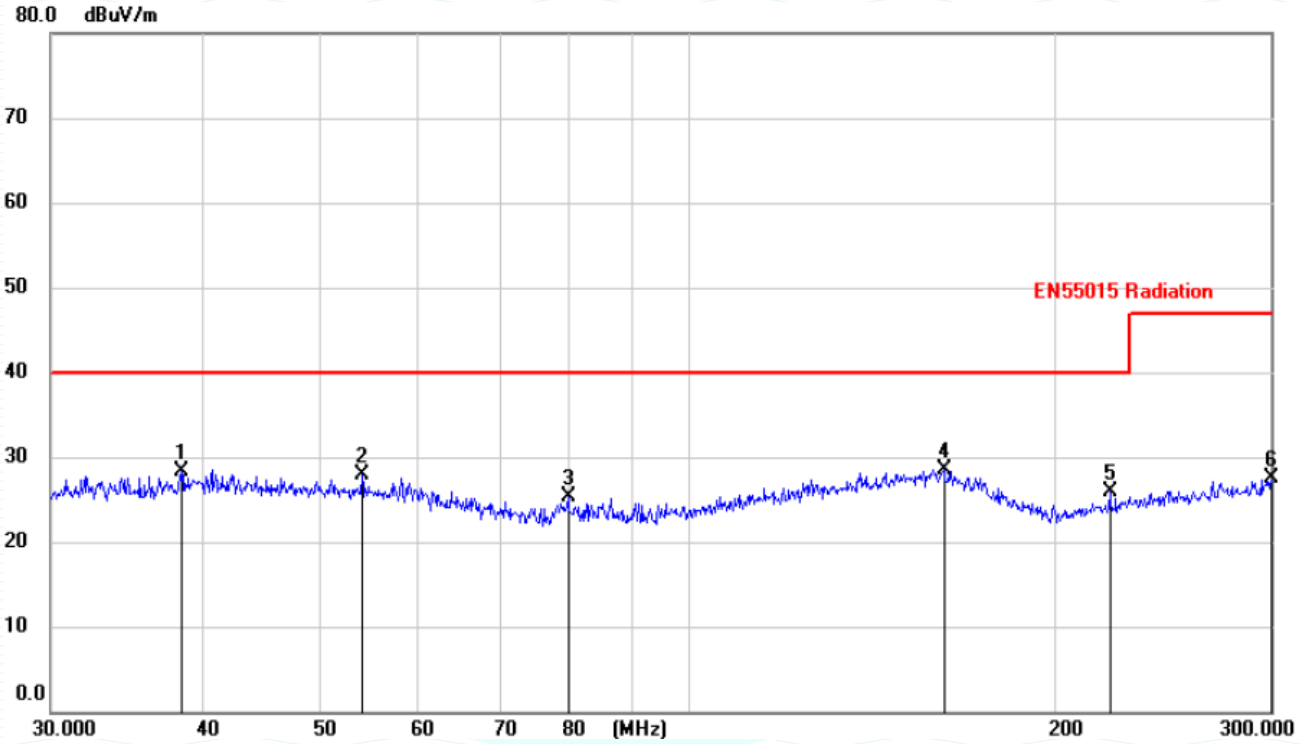
| | | |
|---|---|---|
| Modulation: | ☑ AM ☐ Pulse ☐none 1 kHz 80% | |
| Criterion : A | | |
| | Frequency Range: 80-1000MHz | |
| Steps | 1% | 1% |
| | Horizontal | Vertical |
| Front | Pass | Pass |
| Right | Pass | Pass |
| Rear | Pass | Pass |
| Left | Pass | Pass |

Reviewer : 

# APPENDIX I
# (TEST DATA)

| | | | |
|---|---|---|---|
| **Job No.:** | | **Polarization:** | **Horizontal** |
| **Standard:** | **EN 55015** | **Power Source:** | **DC 5V** |
| **Test item:** | **Radiation Test** | **Date:** | **2024/04/23** |
| **Temp.(℃)/Hum.(%RH):** | **25℃/47%RH** | **Time:** | |
| **EUT:** | **Camping Light** | **Test By:** | |
| **Model:** | **MK-6022** | **Distance:** | **3m** |

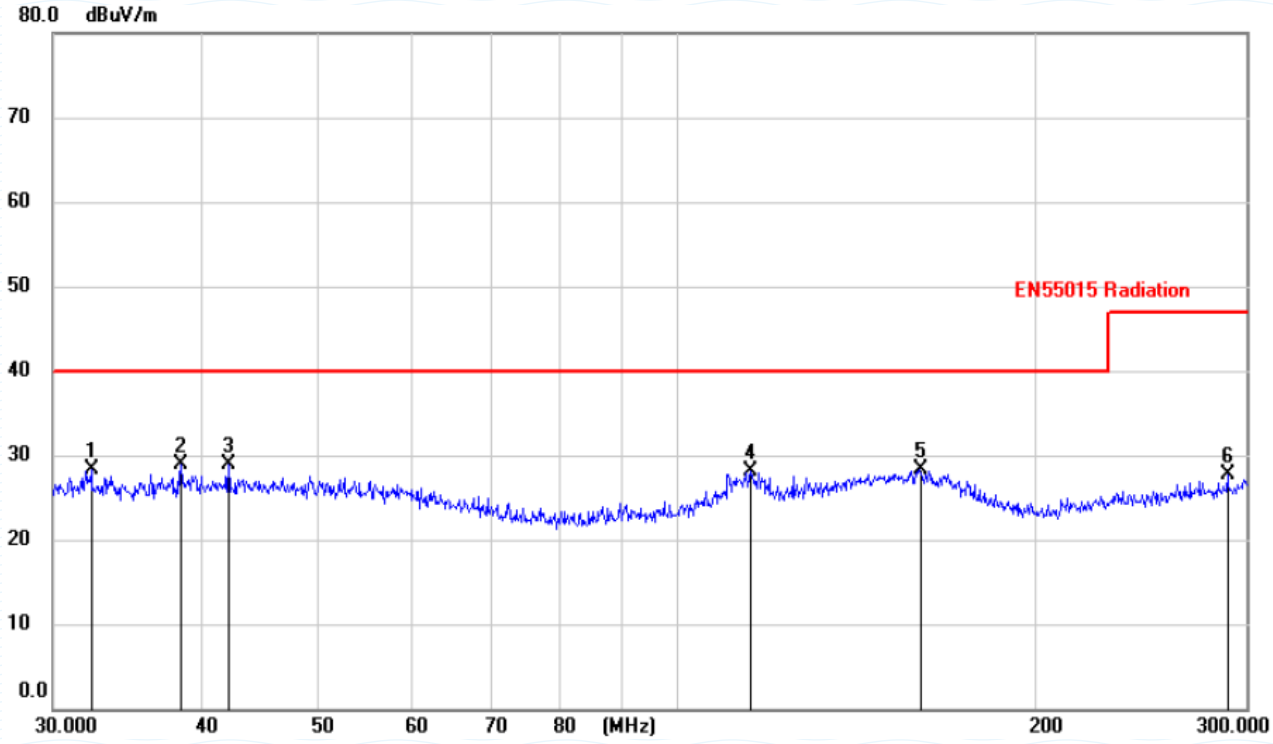
**Note:**




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 38.3814 | 14.31 | 13.96 | 28.27 | 40.00 | -11.73 | peak | | | |
| 2 | | 53.9661 | 14.39 | 13.43 | 27.82 | 40.00 | -12.18 | peak | | | |
| 3 | | 79.8218 | 15.76 | 9.45 | 25.21 | 40.00 | -14.79 | peak | | | |
| 4 | * | 162.2263 | 14.15 | 14.40 | 28.55 | 40.00 | -11.45 | peak | | | |
| 5 | | 221.8816 | 14.57 | 11.40 | 25.97 | 40.00 | -14.03 | peak | | | |
| 6 | | 300.0000 | 13.99 | 13.49 | 27.48 | 47.00 | -19.52 | peak | | | |

| | | | |
|---|---|---|---|
| **Job No.:** | | **Polarization:** | **Vertical** |
| **Standard:** | **EN 55015** | **Power Source:** | **DC 5V** |
| **Test item:** | **Radiation Test** | **Date:** | **2024/04/23** |
| **Temp.(℃)/Hum.(%RH):** | **25℃/47%RH** | **Time:** | |
| **EUT:** | **Camping Light** | **Test By:** | |
| **Model:** | **MK-6022** | **Distance:** | **3m** |

**Note:**




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 32.2940 | 14.96 | 13.40 | 28.36 | 40.00 | -11.64 | peak | | | |
| 2 | * | 38.3814 | 14.96 | 13.96 | 28.92 | 40.00 | -11.08 | peak | | | |
| 3 | | 42.0844 | 14.71 | 14.11 | 28.82 | 40.00 | -11.18 | peak | | | |
| 4 | | 115.1122 | 16.04 | 12.07 | 28.11 | 40.00 | -11.89 | peak | | | |
| 5 | | 160.0005 | 13.63 | 14.58 | 28.21 | 40.00 | -11.79 | peak | | | |
| 6 | | 289.1487 | 14.55 | 13.11 | 27.66 | 47.00 | -19.34 | peak | | | |

# APPENDIX II
# (EUT PHOTO)

**Figure 1**
**RADIATION EMISSION TEST**

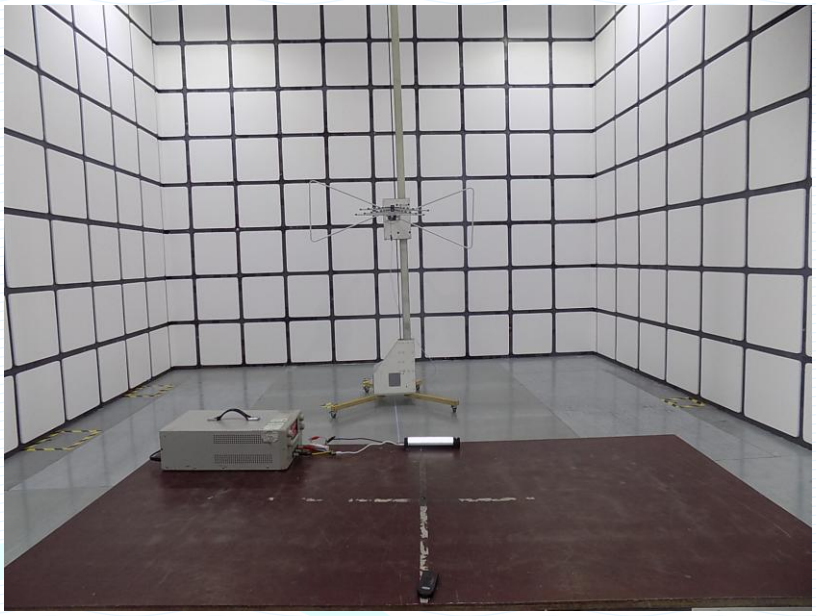


**Figure 2**
**APPEARANCE OF EUT**

**Figure 3**
**APPEARANCE OF EUT**

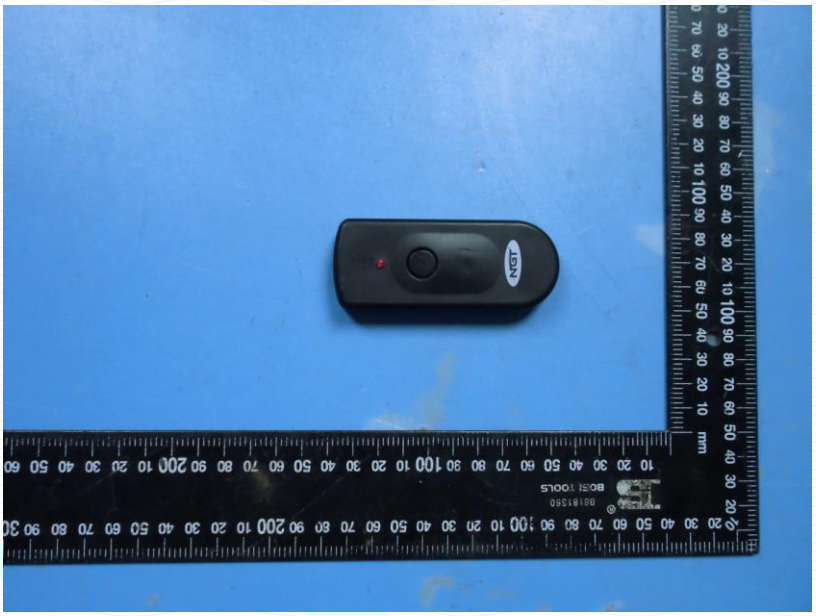


**Figure 4**
**APPEARANCE OF EUT**