# EMC TEST REPORT

For

ZENIT LED VE AYDINLATMA TEK.REKLAMCILIK SAN. VE TIC. A.S

LED MODULE

Model No.: MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W

Additional Model No.: Please Refer To Page 11

| | | |
|---|---|---|
| Prepared for | : | ZENIT LED VE AYDINLATMA TEK.REKLAMCILIK SAN. VE TIC. A.S |
| Address | : | Deri OSB Mh. Yan Sanayi Cad. 17 Deri Osb Sit. YA-11 No : 17/1/2 Tuzla / İSTANBUL, TURKEY Posta Kodu: 34940 |
| Prepared by | : | Shenzhen Southern LCS Compliance Testing Laboratory Ltd. |
| Address | : | B Area, 1-2F, Building B, Zhongyu Green High-tech Industrial Park, Wenge Road, Heshuikou, Gongming Street, Guangming New District, Shenzhen, Guangdong, China |
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| Web | : | www.LCS-cert.com |
| Mail | : | webmaster@LCS-cert.com |
| Date of receipt of test sample | : | August 01, 2017 |
| Number of tested samples | : | 1 |
| Serial number | : | Prototype |
| Date of Test | : | August 01, 2017 ~ August 07, 2017 |
| Date of Report | : | August 07, 2017 |



CE

**EMC TEST REPORT**

**EN 55015: 2013+A1: 2015**

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

| | |
|---|---|
| **Report Reference No. ..... :** | **LCS170801018BE** |
| Date Of Issue ..... : | August 07, 2017 |
| **Testing Laboratory Name..... :** | **Shenzhen Southern LCS Compliance Testing Laboratory Ltd.** |
| Address ..... : | B Area, 1-2F, Building B, Zhongyu Green High-tech Industrial Park, Wenge Road, Heshuikou, Gongming Street, Guangming New District, Shenzhen, Guangdong, China |
| Testing Location/ Procedure ... : | Full application of Harmonised standards ■<br>Partial application of Harmonised standards □<br>Other standard testing method □ |
| **Applicant's Name ..... :** | **ZENIT LED VE AYDINLATMA TEK.REKLAMCILIK SAN. VE TIC. A.S** |
| Address ..... : | Deri OSB Mh. Yan Sanayi Cad. 17 Deri Osb Sit. YA-11 No : 17/1/2 Tuzla / İSTANBUL, TURKEY Posta Kodu: 34940 |
| **Test Specification:** | |
| Standard ..... : | EN 55015: 2013+A1: 2015<br>EN 61547: 2009 |
| Test Report Form No. ..... : | LCSEMC-1.0 |
| TRF Originator ..... : | Shenzhen Southern LCS Compliance Testing Laboratory Ltd. |
| Master TRF ..... : | Dated 2011-03 |



| | |
|---|---|
| **Test Item Description. ..... :** | **LED MODULE** |
| Trade Mark ..... : | LEDRONICS |
| Model/ Type Reference ..... : | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W |
| Ratings ..... : | DC 12V, 1.2W |
| **Result ..... :** | **Positive** |

| **Compiled by:** | **Supervised by:** | **Approved by:** |
|---|---|---|
| Aimee Yang/ File administrators | Dm Gu/ Technique principal | Cherry Chen/ Manager |

# EMC -- TEST REPORT

| **Test Report No. : LCS170801018BE** | August 07, 2017<br>Date of issue |
|---|---|

| | |
|---|---|
| Type/Model.....: | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W |
| EUT.....: | LED MODULE |
| **Applicant.....:** | **ZENIT LED VE AYDINLATMA TEK.REKLAMCILIK SAN. VE TIC. A.S** |
| Address .....: | Deri OSB Mh. Yan Sanayi Cad. 17 Deri Osb Sit. YA-11 No : 17/1/2 Tuzla / İSTANBUL, TURKEY Posta Kodu: 34940 |
| Telephone.....: | / |
| Fax.....: | / |
| **Manufacturer .....:** | **ZENIT LED VE AYDINLATMA TEK.REKLAMCILIK SAN. VE TIC. A.S** |
| Address .....: | Deri OSB Mh. Yan Sanayi Cad. 17 Deri Osb Sit. YA-11 No : 17/1/2 Tuzla / İSTANBUL, TURKEY Posta Kodu: 34940 |
| Telephone.....: | / |
| Fax.....: | / |
| **Factory .....:** | **ZENIT LED VE AYDINLATMA TEK.REKLAMCILIK SAN. VE TIC. A.S** |
| Address .....: | Deri OSB Mh. Yan Sanayi Cad. 17 Deri Osb Sit. YA-11 No : 17/1/2 Tuzla / İSTANBUL, TURKEY Posta Kodu: 34940 |
| Telephone.....: | / |
| Fax.....: | / |

| | |
|---|---|
| **Test Result** according to the standards on page 7: | **Positive** |

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 | August 07, 2017 | Initial Issue | Gavin Liang |
| | | | |
| | | | |

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Test Report Description Page

# 1. SUMMARY OF STANDARDS AND RESULTS

## 1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

| EMISSION (EN 55015: 2013+A1: 2015) | | | |
|---|---|---|---|
| **Description of Test Item** | **Standard** | **Limits** | **Results** |
| Conducted disturbance at mains terminals | EN 55015: 2013+A1: 2015 | -------- | N/A |
| Magnetic field emission | EN 55015: 2013+A1: 2015 | -------- | PASS |
| Radiated disturbance | EN 55015: 2013+A1: 2015 | -------- | PASS |
| Harmonic current emissions | EN 61000-3-2: 2014 | Class C | N/A |
| Voltage fluctuations & flicker | EN 61000-3-3: 2013 | -------- | N/A |

| IMMUNITY (EN 61547: 2009) | | | |
|---|---|---|---|
| **Description of Test Item** | **Basic Standard** | **Performance Criteria** | **Results** |
| Electrostatic discharge (ESD) | EN 61000-4-2: 2009 | B | PASS |
| Electrical fast transient (EFT) | EN 61000-4-4: 2012 | B | N/A |
| Surge (Input a.c. power ports) | EN 61000-4-5: 2014 | B | N/A |
| Radio-frequency, Continuous conducted disturbance | EN 61000-4-6: 2014 | A | N/A |
| Power frequency magnetic field | EN 61000-4-8: 2010 | A | PASS |
| Voltage dips, 30% reduction | EN 61000-4-11: 2004 | C | N/A |
| Voltage interruptions | | B | N/A |
| N/A is an abbreviation for Not Applicable. | | | |

## 1.2.Description of Performance Criteria

**General Performance Criteria**

Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

— essential operational modes and states;

— tests of all peripheral access (hard disks, floppy disks, printers, keyboard, mouse, etc.);

— quality of software execution;

— quality of data display and transmission;

— quality of speech transmission.

### 1.2.1.Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacture when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deliver from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

### 1.2.2.Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacture, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operation state or stored data is allowed to persist after the test.

If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be deliver from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

### 1.2.3.Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacture's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be loss.

# 2. GENERAL INFORMATION

## 2.1.Description of Device (EUT)

| | | |
|---|---|---|
| EUT | : | LED MODULE |
| Trade Mark | : | LEDRONICS |
| Model Number | : | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W |
| Power Supply | : | DC 12V, 1.2W |

## 2.2.Description of Test Facility

Site Description

EMC Lab. : TUV RH Registration Number. is UA 50362241 0001.
CNAS Registration Number. is L4595.
UL Registration Number. is 100571-492.
NVLAP Registration Number. is 600112-0.

## 2.3.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.

## 2.4.Measurement Uncertainty

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

## 2.5.Model List

| |
|---|
| MINT-Samsung-MSM13UW-CEM1-LENS-6500K-1.08W |
| MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W |
| MINT-Samsung-MSM13UW-CEM1-LENS-4000K-1.08W |
| MINT-Samsung-MSM13UW-CEM1-LENS-5000K-1.08W |
| MINT-Samsung-MSM13UW-CEM1-LENS-3000K-1.08W |
| MINT-Samsung-MSM13UW-CEM1-LENS-6500K-0,72W |
| MINT-Samsung-MSM13UW-CEM1-LENS-10000K-0,72W |
| MINT-Samsung-MSM13UW-CEM1-LENS-4000K-0,72W |
| MINT-Samsung-MSM13UW-CEM1-LENS-5000K-0,72W |
| MINT-Samsung-MSM13UW-CEM1-LENS-3000K-0,72W |
| MINT-CHN-MSM13UW-CEM1-LENS-6500K-1.08W |
| MINT-CHN-MSM13UW-CEM1-LENS-10000K-1.08W |
| MINT-CHN-MSM13UW-CEM1-LENS-4000K-1.08W |
| MINT-CHN-MSM13UW-CEM1-LENS-5000K-1.08W |
| MINT-CHN-MSM13UW-CEM1-LENS-3000K-1.08W |
| MINT-CHN-MSM13UW-CEM1-LENS-6500K-0,72W |
| MINT-CHN-MSM13UW-CEM1-LENS-10000K-0,72W |
| MINT-CHN-MSM13UW-CEM1-LENS-4000K-0,72W |
| MINT-CHN-MSM13UW-CEM1-LENS-5000K-0,72W |
| MINT-CHN-MSM13UW-CEM1-LENS-3000K-0,72W |
| MINT-Osram-MSM13UW-CEM1-LENS-6500K-1.08W |
| MINT-Osram-MSM13UW-CEM1-LENS-4000K-1.08W |
| MINT-Osram-MSM13UW-CEM1-LENS-5000K-1.08W |
| MINT-Osram-MSM13UW-CEM1-LENS-3000K-1.08W |
| MINT-Osram-MSM13UW-CEM1-LENS-6500K-0,72W |
| MINT-Osram-MSM13UW-CEM1-LENS-4000K-0,72W |
| MINT-Osram-MSM13UW-CEM1-LENS-5000K-0,72 |
| MINT-Osram-MSM13UW-CEM1-LENS-3000K-0,72W |

# 3. MEASURING DEVICES AND TEST EQUIPMENT

## 3.1.Radiated Electromagnetic Disturbance

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
|---|---|---|---|---|---|
| 1 | EMI Test Receiver | ROHDE & SCHWARZ | ESR 7 | 101142 | 2017-06-18 |
| 2 | EMI Test Receiver | ROHDE & SCHWARZ | ESPI3 | 101840 | 2017-06-18 |
| 3 | Triple-loop Antenna | LAPLACE | MK II-A | 9161 | 2017-06-18 |
| 4 | 10dB Attenuator | LAPLACE | HAT-10 | 15542 | 2017-06-18 |
| 5 | EMI Test Software | AUDIX | E3 | N/A | N/A |

## 3.2.Radiated Disturbance (Electric Field)

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
|---|---|---|---|---|---|
| 1 | 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH03-HY | 2017-06-18 |
| 2 | EMI Test Receiver | ROHDE & SCHWARZ | ESR 7 | 101181 | 2017-06-18 |
| 3 | Log per Antenna | SCHWARZBECK | VULB9163 | 9163-470 | 2016-04-18 |
| 4 | EMI Test Software | AUDIX | E3 | N/A | 2017-06-18 |
| 5 | Positioning Controller | MF | MF-7082 | / | 2017-06-18 |

## 3.3.Electrostatic Discharge

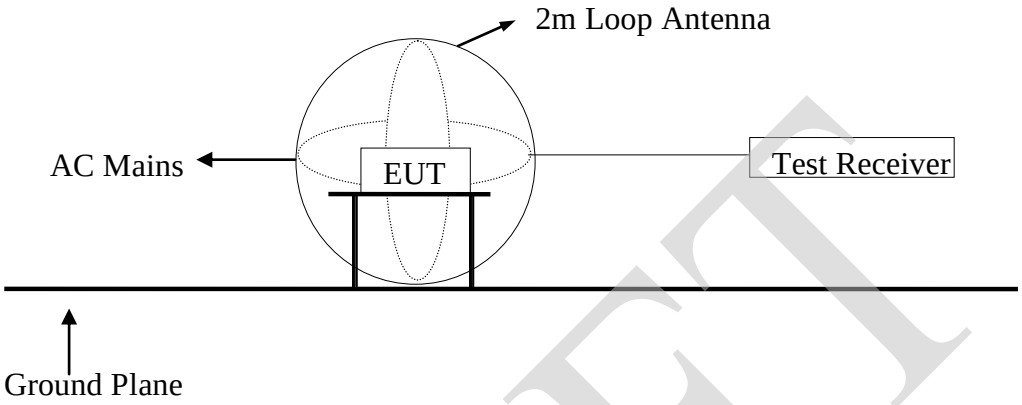
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
|---|---|---|---|---|---|
| 1 | ESD Simulator | SCHLODER | SESD 230 | 604035 | 2017-06-18 |

## 3.4.Power Frequency Magnetic Field Susceptibility

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
|---|---|---|---|---|---|
| 1 | Power frequency mag-field generator System | EVERFINE | EMS61000-8K | 906003 | 2017-06-18 |

# 4. MAGNETIC FIELD EMISSION MEASUREMENT

## 4.1.Block Diagram of Test Setup




## 4.2.Magnetic Field Emission Measurement Standard and Limits

### 4.2.1.Test Standard

EN 55015: 2013+A1: 2015

### 4.2.2.Test Limits

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

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

## 4.3.EUT Configuration on Test

The configuration of the EUT is same as Section 3.3.

## 4.4.Operating Condition of EUT

Same as conducted measurement which is listed in Section 4.4, except the test set up replaced by Section 4.1.

## 4.5.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 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.

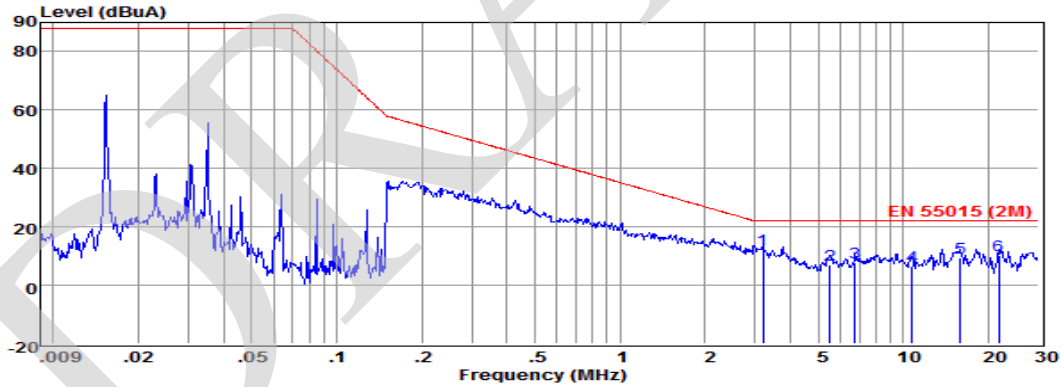
All the test results are listed in Section 4.6.

## 4.6.Test Results

**PASS.**

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

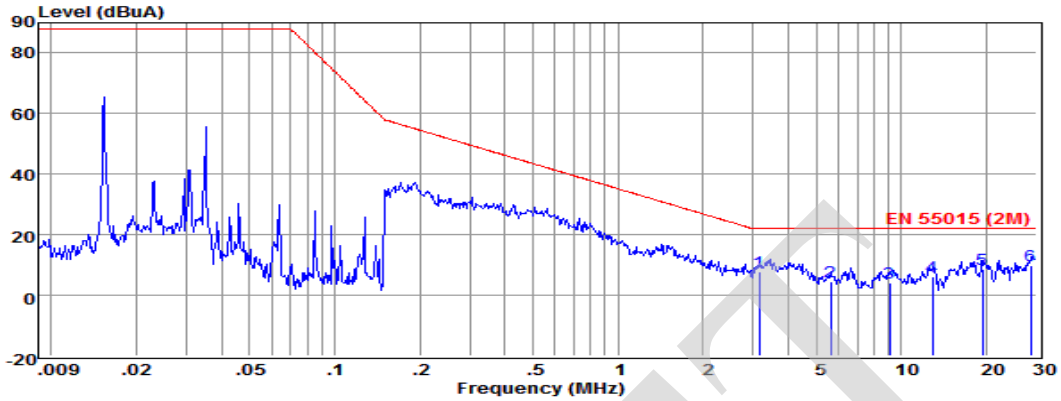
| **Model No.** | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W | **Test Mode** | ON |
|---|---|---|---|
| **Environmental Conditions** | 24℃, 56% RH | **Test Engineer** | EZREAL SU |
| **Pol** | X | | |




| | Freq | Reading | LISNFac | CabLos | Measured | Limit | Over | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuA | dB | dB | dBuA | dBuA | dB | |
| 1 | 3.20 | -44.07 | 55.79 | 0.70 | 12.42 | 22.00 | -9.58 | QP |
| 2 | 5.51 | -45.27 | 51.70 | 0.73 | 7.16 | 22.00 | -14.84 | QP |
| 3 | 6.74 | -43.01 | 49.93 | 0.76 | 7.68 | 22.00 | -14.32 | QP |
| 4 | 10.71 | -42.21 | 48.16 | 0.82 | 6.77 | 22.00 | -15.23 | QP |
| 5 | 15.93 | -38.66 | 47.31 | 0.85 | 9.50 | 22.00 | -12.50 | QP |
| 6 | 21.69 | -36.79 | 46.18 | 0.87 | 10.26 | 22.00 | -11.74 | QP |

Remarks: 1. Measured = Reading +Cable Loss.
2. The emission levels that are 20dB below the official limit are not reported.

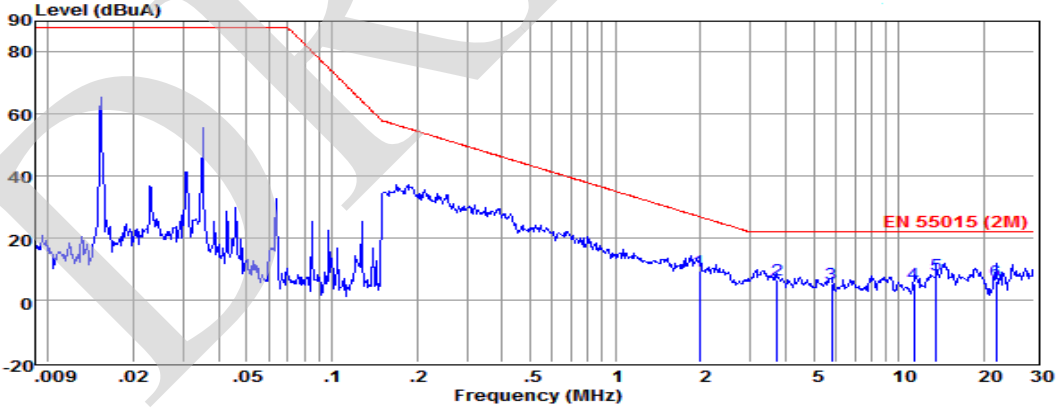
| **Model No.** | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W | **Test Mode** | ON |
|---|---|---|---|
| **Environmental Conditions** | 24℃, 56% RH | **Test Engineer** | EZREAL SU |
| **Pol** | Y | | |




| | Freq | Reading | LISNFac | CabLos | Measured | Limit | Over | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuA | dB | dB | dBuA | dBuA | dB | |
| 1 | 3.15 | -48.69 | 55.89 | 0.70 | 7.90 | 22.00 | -14.10 | QP |
| 2 | 5.64 | -47.51 | 51.49 | 0.74 | 4.72 | 22.00 | -17.28 | QP |
| 3 | 9.10 | -45.49 | 48.64 | 0.80 | 3.95 | 22.00 | -18.05 | QP |
| 4 | 12.90 | -42.29 | 47.80 | 0.83 | 6.34 | 22.00 | -15.66 | QP |
| 5 | 19.36 | -38.90 | 46.70 | 0.86 | 8.66 | 22.00 | -13.34 | QP |
| 6 | 28.57 | -35.92 | 44.75 | 0.90 | 9.73 | 22.00 | -12.27 | QP |

Remarks: 1. Measured = Reading +Cable Loss.
2. The emission levels that are 20dB below the official limit are not reported.

| **Model No.** | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W | **Test Mode** | ON |
|---|---|---|---|
| **Environmental Conditions** | 24℃, 56% RH | **Test Engineer** | EZREAL SU |
| **Pol** | Z | | |

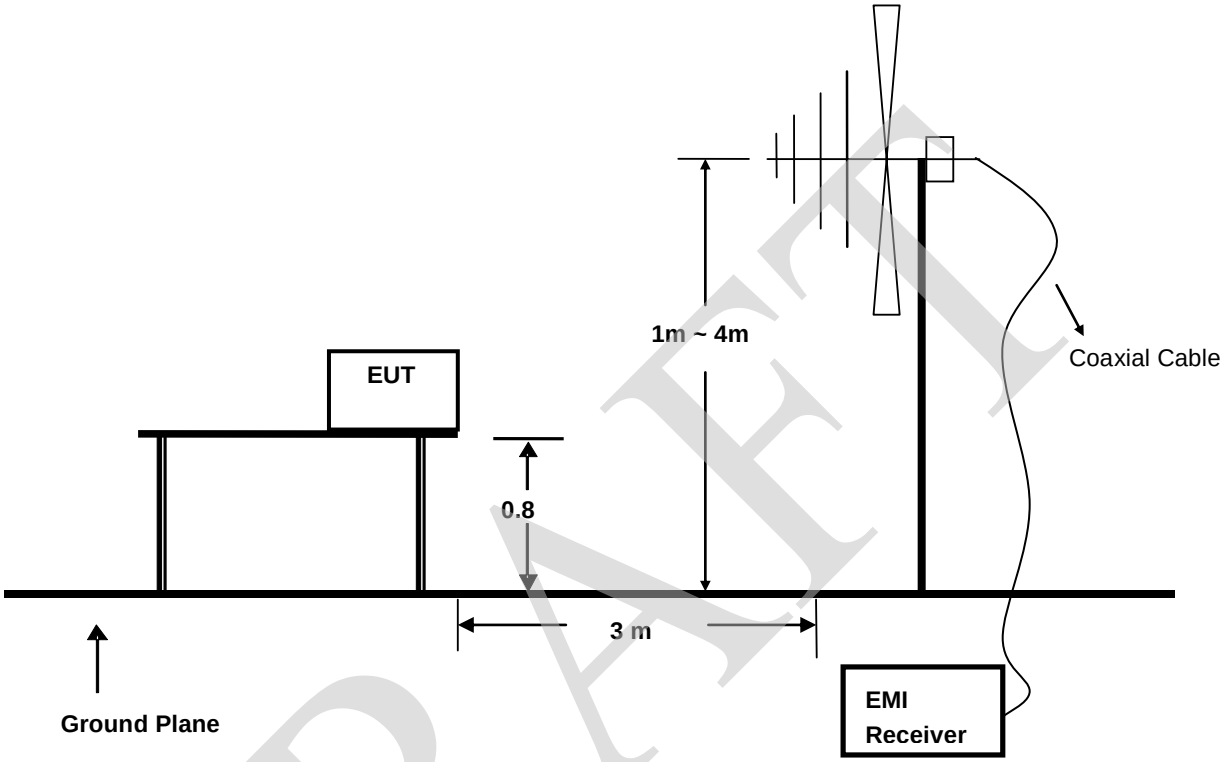



| | Freq | Reading | LISNFac | CabLos | Measured | Limit | Over | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuA | dB | dB | dBuA | dBuA | dB | |
| 1 | 1.98 | -49.64 | 58.51 | 0.68 | 9.55 | 26.99 | -17.44 | QP |
| 2 | 3.73 | -48.86 | 54.90 | 0.71 | 6.75 | 22.00 | -15.25 | QP |
| 3 | 5.78 | -46.64 | 51.28 | 0.74 | 5.38 | 22.00 | -16.62 | QP |
| 4 | 11.33 | -43.57 | 48.05 | 0.82 | 5.30 | 22.00 | -16.70 | QP |
| 5 | 13.55 | -40.43 | 47.70 | 0.83 | 8.10 | 22.00 | -13.90 | QP |
| 6 | 22.04 | -40.91 | 46.10 | 0.87 | 6.06 | 22.00 | -15.94 | QP |

Remarks: 1. Measured = Reading +Cable Loss.
2. The emission levels that are 20dB below the official limit are not reported.

# 5. RADIATED EMISSION MEASUREMENT

## 5.1.Block Diagram of Test Setup




## 5.2.Test Standard

EN 55015: 2013+A1: 2015

## 5.3.Radiated Emission Limits

All emanations from a class B device 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 LIMIT (dBμV/m) |
|---|---|---|
| 30 ~ 230 | 3 | 40 |
| 230 ~ 300 | 3 | 47 |

Note: (1) The smaller limit shall apply at the combination point 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.

## 5.4.EUT Configuration on Test

The EN 55015 regulations test method must be used to find the maximum emission during radiated emission measurement.

## 5.5.Operating Condition of EUT

5.5.1 Turn on the power.

5.5.2 After that, let the EUT work in test mode (ON) and measure it.

## 5.6.Test Procedure

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.

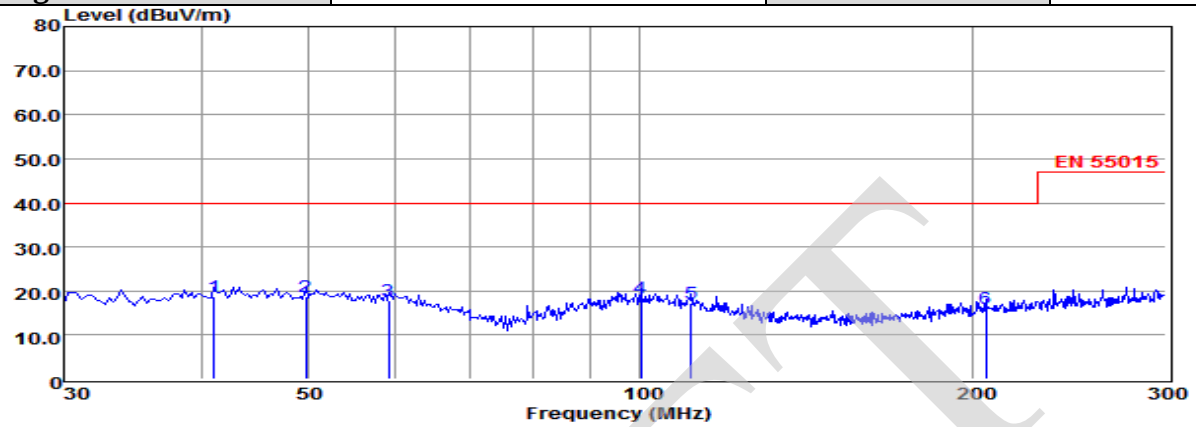
The frequency range from 30MHz to 300MHz is investigated.

## 5.7.Test Results

**PASS**.

The test result please refer to the next page.

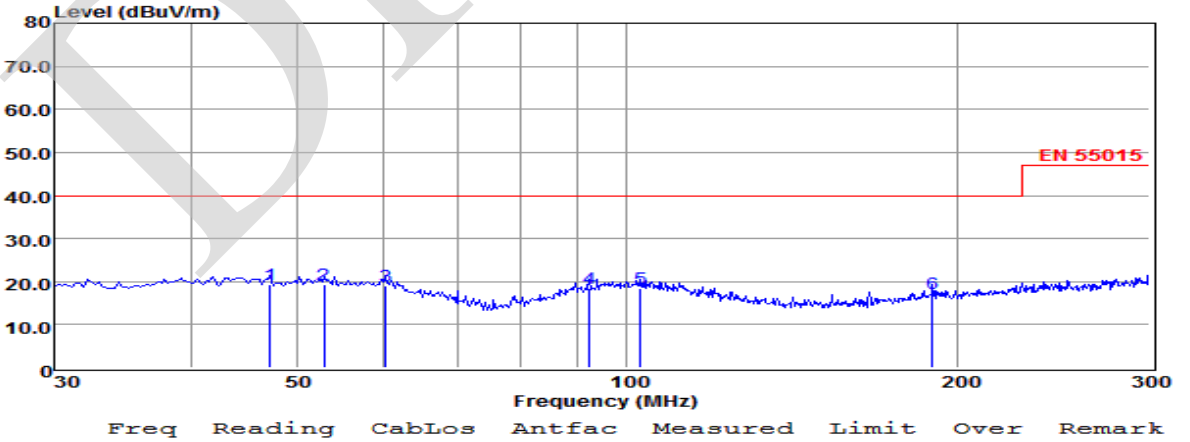
| **Model No.** | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W | **Test Mode** | ON |
|---|---|---|---|
| **Environmental Conditions** | 24℃, 56% RH | **Detector Function** | Quasi-peak |
| **Pol** | Vertical | **Distance** | 3m |
| **Test Engineer** | EZREAL SU | | |




| | Freq | Reading | CabLos | Antfac | Measured | Limit | Over | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 41.07 | 4.76 | 0.50 | 13.57 | 18.83 | 40.00 | -21.17 | QP |
| 2 | 49.71 | 4.95 | 0.54 | 13.27 | 18.76 | 40.00 | -21.24 | QP |
| 3 | 59.16 | 4.51 | 0.49 | 12.75 | 17.75 | 40.00 | -22.25 | QP |
| 4 | 100.20 | 4.73 | 0.60 | 13.14 | 18.47 | 40.00 | -21.53 | QP |
| 5 | 111.27 | 4.64 | 0.61 | 12.03 | 17.28 | 40.00 | -22.72 | QP |
| 6 | 206.04 | 4.35 | 0.99 | 10.76 | 16.10 | 40.00 | -23.90 | QP |

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

| **Model No.** | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W | **Test Mode** | ON |
|---|---|---|---|
| **Environmental Conditions** | 24℃, 56% RH | **Detector Function** | Quasi-peak |
| **Pol** | Horizontal | **Distance** | 3m |
| **Test Engineer** | EZREAL SU | | |

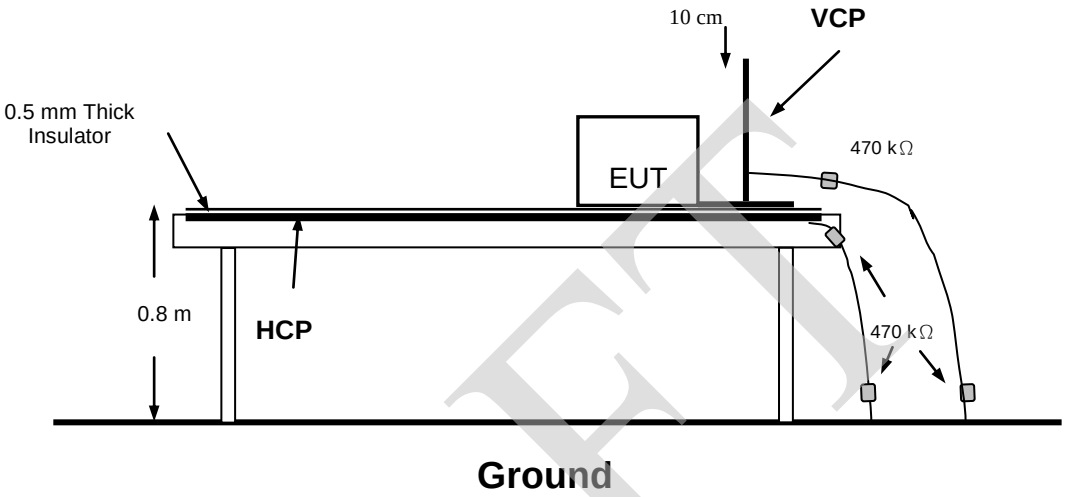



| | Freq | Reading | CabLos | Antfac | Measured | Limit | Over | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 47.28 | 5.52 | 0.35 | 13.41 | 19.28 | 40.00 | -20.72 | QP |
| 2 | 52.95 | 5.66 | 0.46 | 13.11 | 19.23 | 40.00 | -20.77 | QP |
| 3 | 60.24 | 5.93 | 0.49 | 12.59 | 19.01 | 40.00 | -20.99 | QP |
| 4 | 92.37 | 5.61 | 0.56 | 12.35 | 18.52 | 40.00 | -21.48 | QP |
| 5 | 102.90 | 5.03 | 0.61 | 12.90 | 18.54 | 40.00 | -21.46 | QP |
| 6 | 190.11 | 5.98 | 0.86 | 10.56 | 17.40 | 40.00 | -22.60 | QP |

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

# 6. ELECTROSTATIC DISCHARGE TEST

## 6.1.Block Diagram of Test Setup




## 6.2.Test Standard

EN 61547: 2009 (EN 61000-4-2: 2009, Severity Level: Air Discharge: Level 3, ±8KV Contact Discharge: Level 2, ±4KV)

## 6.3.Severity Levels 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 configuration of EUT is listed in Section 3.6

## 6.5.Operating Condition of EUT

6.5.1.Setup the EUT as shown in Section 6.1.

6.5.2.Turn on the power of all equipments.

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

## 6.6.Test Procedure

6.6.1.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.

Because the case of the EUT is metal surface, so it does not need to be tested.

6.6.2.Contact Discharge

All the procedure shall be same as Section 9.6.1. 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 discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 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

| | | | |
|---|---|---|---|
| **Standard** | ☐ IEC 61000-4-2 ☑ EN 61000-4-2 | | |
| **Applicant** | ZENIT LED VE AYDINLATMA TEK.REKLAMCILIK SAN. VE TIC. A.S | | |
| **EUT** | LED MODULE | **Temperature** | 23℃ |
| **M/N** | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W | **Humidity** | 56% |
| **Criterion** | B | **Pressure** | 1021mbar |
| **Test Mode** | ON | **Test Engineer** | EZREAL SU |

**Air Discharge**

| Test Points | Test Levels | | | Results | | |
|---|---|---|---|---|---|---|
| | ± 2KV | ± 4KV | ± 8KV | Pass | Fail | Performance Criterion |
| Front | ☒ | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Back | ☒ | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Left | ☒ | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Right | ☒ | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Top | ☒ | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Bottom | ☒ | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |

**Contact Discharge**

| Test Points | Test Levels | | Results | | |
|---|---|---|---|---|---|
| | ± 2 KV | ±4 KV | Pass | Fail | Performance Criterion |
| Front | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Back | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Left | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Right | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Top | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Bottom | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |

**Discharge To Horizontal Coupling Plane**

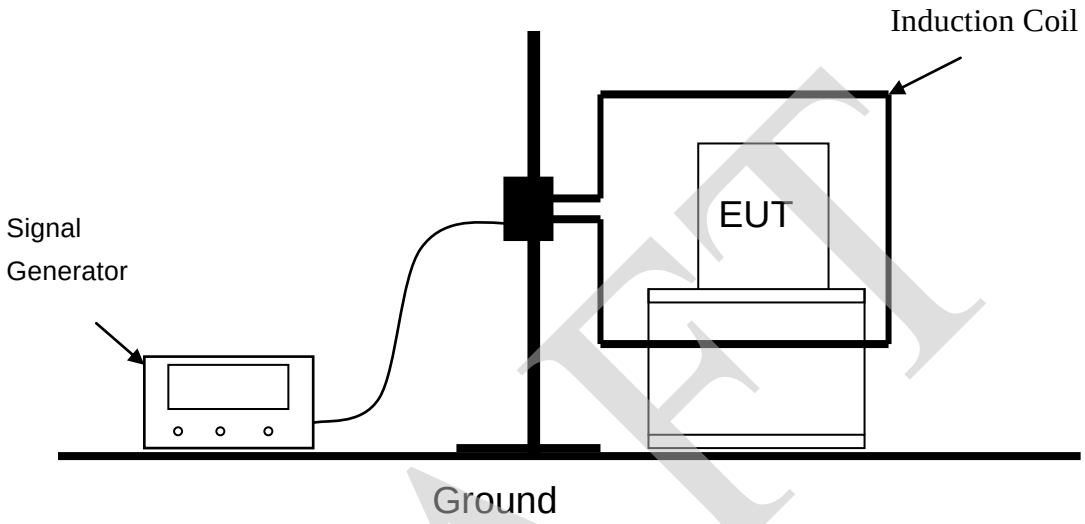
| Side of EUT | Test Levels | | Results | | |
|---|---|---|---|---|---|
| | ± 2 KV | ± 4 KV | Pass | Fail | Performance Criterion |
| Front | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Back | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Left | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Right | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |

**Discharge To Vertical Coupling Plane**

| Side of EUT | Test Levels | | Results | | |
|---|---|---|---|---|---|
| | ± 2 KV | ± 4 KV | Pass | Fail | Performance Criterion |
| Front | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Back | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Left | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |
| Right | ☒ | ☒ | ☒ | ☐ | ☐A ☒B |

# 7. MAGNETIC FIELD IMMUNITY TEST

## 7.1.Block Diagram of Test Setup




## 7.2.Test Standard

EN 61547: 2009 (EN 61000-4-8: 2010, Severity Level 2: 3A/m)

## 7.3.Severity Levels and Performance Criterion

### 7.3.1.Severity level

| Level | Magnetic Field Strength (A/m) |
|---|---|
| 1. | 1 |
| 2. | 3 |
| 3. | 10 |
| 4. | 30 |
| 5. | 100 |
| X | Special |

### 7.3.2.Performance criterion: **A**

## 7.4.EUT Configuration on Test

The configuration of EUT are listed in Section 3.10.

## 7.5.Operating Condition of EUT

7.5.1.Setup the EUT as shown in 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.

## 7.6.Test Procedure

7.6.1.Set up the EUT system as shown on Section 7.1.

7.6.2.The Induction coil is set up in horizontal or vertical.

7.6.3.Let the EUT work in test mode and measure it.

## 7.7.Test Results

**PASS.**

Please refer to the following page.

# Magnetic Field Immunity Test Result

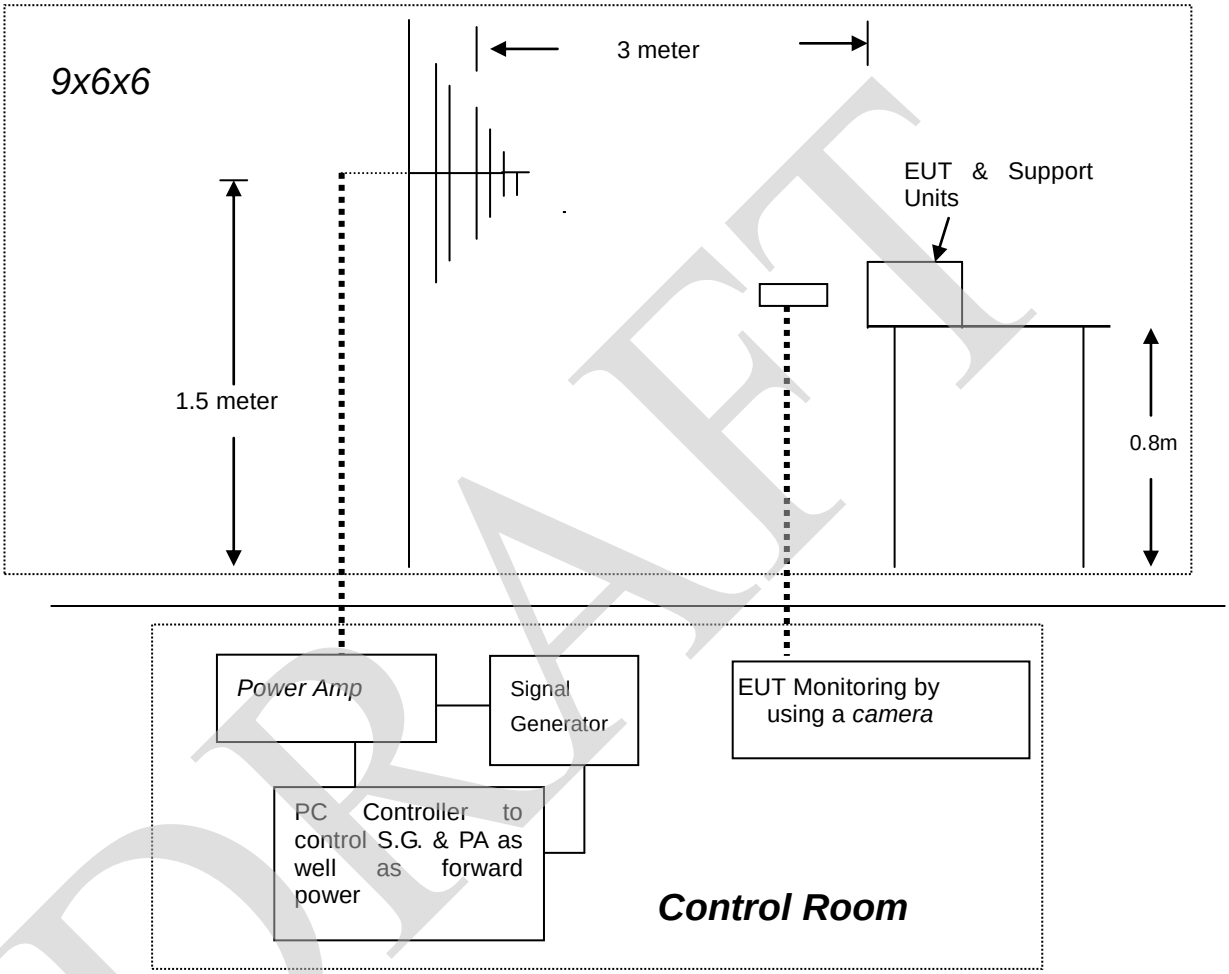
| | | | |
|---|---|---|---|
| **Standard** | ☐ IEC 61000-4-8 ☑ EN 61000-4-8 | | |
| **Applicant** | ZENIT LED VE AYDINLATMA TEK.REKLAMCILIK SAN. VE TIC. A.S | | |
| **EUT** | LED MODULE | **Temperature** | 23℃ |
| **M/N** | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W | **Humidity** | 56％ |
| **Test Mode** | ON | **Criterion** | A |
| **Test Engineer** | EZREAL SU | | |

| Test Level (A/M) | Testing Duration | Coil Orientation | Criterion | Result |
|---|---|---|---|---|
| 3 | 5 mins | X | A | PASS |
| 3 | 5 mins | Y | A | PASS |
| 3 | 5 mins | Z | A | PASS |

Note:

# 8. RF FIELD STRENGTH SUSCEPTIBILITY TEST

## 8.1.Block Diagram of Test Setup




## 8.2.Test Standard

EN 61547: 2009 (EN 61000-4-3: 2006+A2: 2010, Severity Level: 2, 3V / m)

## 8.3.Severity Levels and Performance Criterion

### 8.3.1.Severity level

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

### 8.3.2.Performance criterion: **A**

## 8.4.EUT Configuration on Test

The configuration of EUT are listed in Section 3.13.

## 8.5.Operating Condition of EUT

8.5.1.Setup the EUT as shown in Section 8.1.
8.5.2.Turn on the power of all equipments.
8.5.3.Let the EUT work in test mode (On) and measure it.

## 8.6.Test Procedure

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. All the scanning conditions are as follows:

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

## 8.7.Test Results

**PASS**.

Please refer to the following page.

# RF Field Strength Susceptibility Test Results

| | | | |
|---|---|---|---|
| **Standard** | ☐ IEC 61000-4-3 ☑ EN 61000-4-3 | | |
| **Applicant** | ZENIT LED VE AYDINLATMA TEK.REKLAMCILIK SAN. VE TIC. A.S | | |
| **EUT** | LED MODULE | **Temperature** | 26℃ |
| **M/N** | MINT-Samsung-MSM13UW-CEM1-LENS-10000K-1.08W | **Humidity** | 51％ |
| **Field Strength** | 3 V/m | **Criterion** | A |
| **Test Mode** | ON | **Test Engineer** | EZREAL SU |
| **Frequency Range** | 80 MHz to 1000 MHz | | |
| **Modulation** | ☐None ☐ Pulse ☑AM 1KHz 80% | | |
| **Steps** | 1% | | |

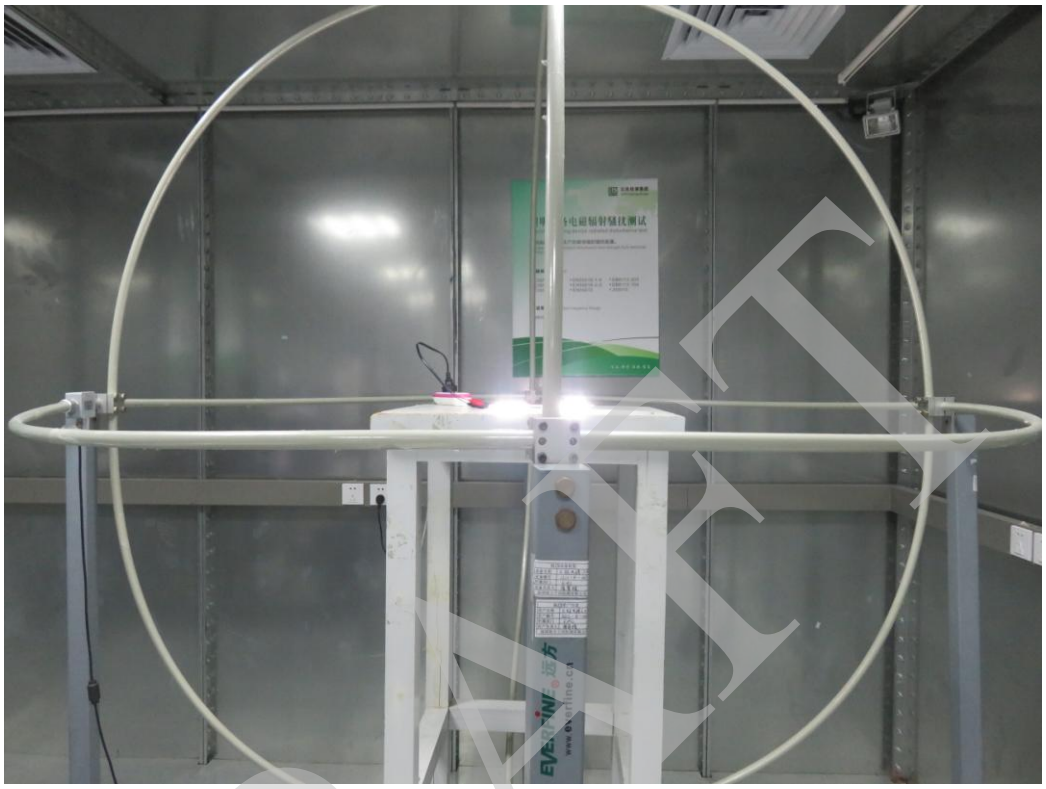
| | **Horizontal** | **Vertical** |
|---|---|---|
| **Front** | PASS | PASS |
| **Right** | PASS | PASS |
| **Rear** | PASS | PASS |
| **Left** | PASS | PASS |

Test Equipment:
1. Signal Generator: 2031 (MARCONI)
2. Power Amplifier: 500A100 & 100W/1000M1 (A&R)
3. Power Antenna: 3108 (EMCO) & AT1080 (A&R)
4. Field Monitor: FM2000 (A&R)

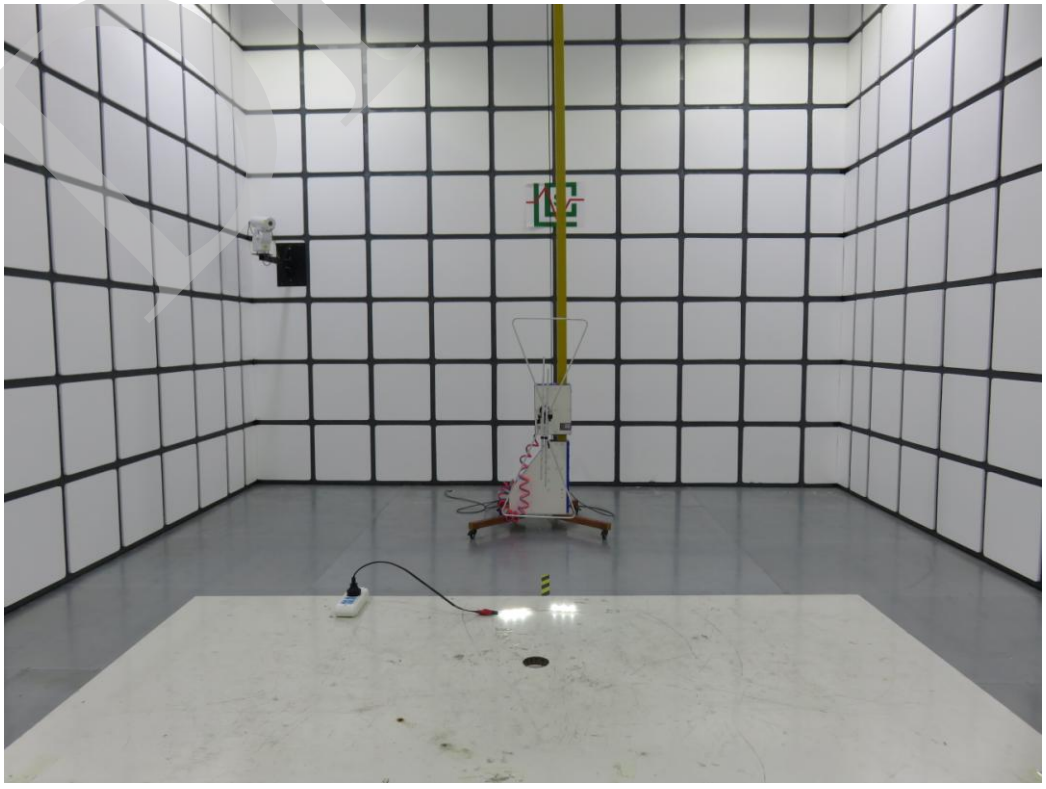
Note:

# 9. PHOTOGRAPH

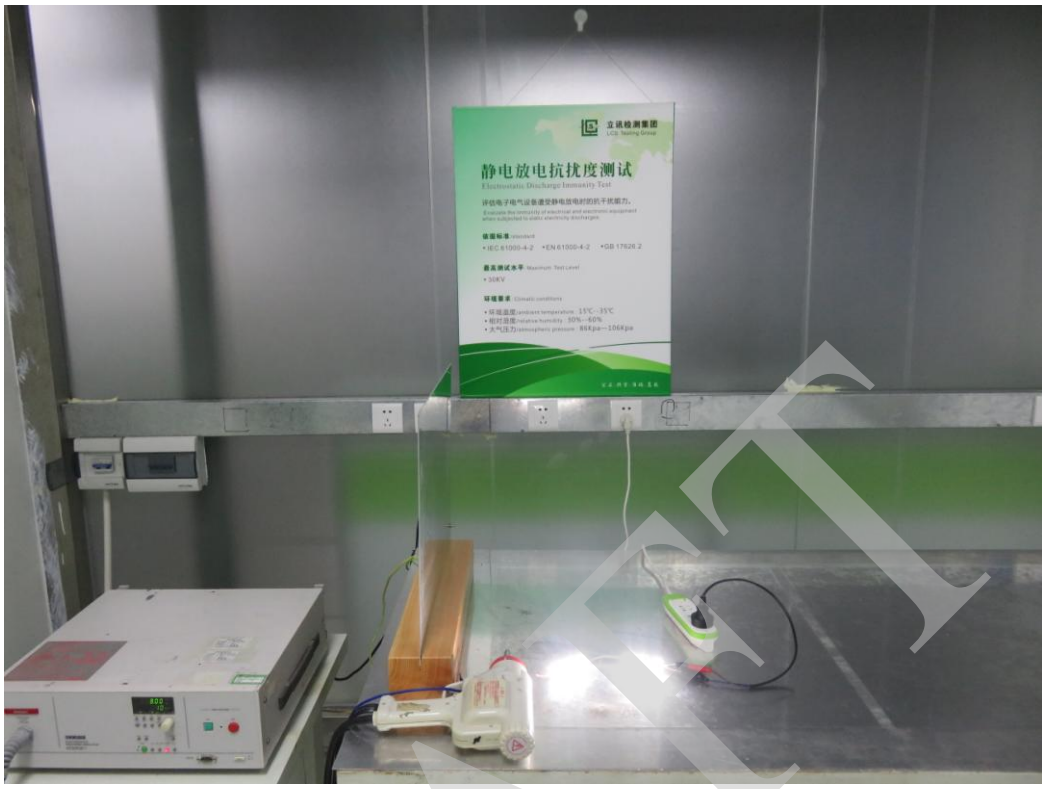
## 9.1. Photo of Radiated Electromagnetic Disturbance Measurement



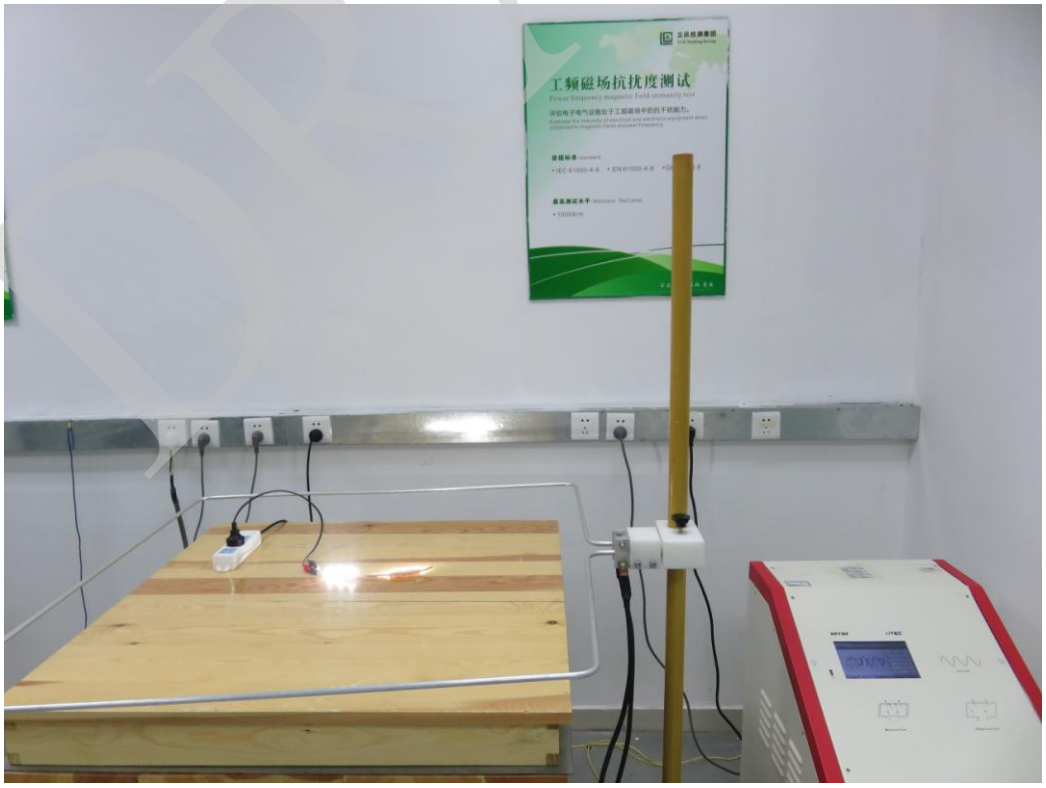
## 9.2. Photo of Radiated Measurement



## 9.3. Photo of Electrostatic Discharge Test




## 9.4. Photo of Magnetic Field Immunity Test



# 10. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

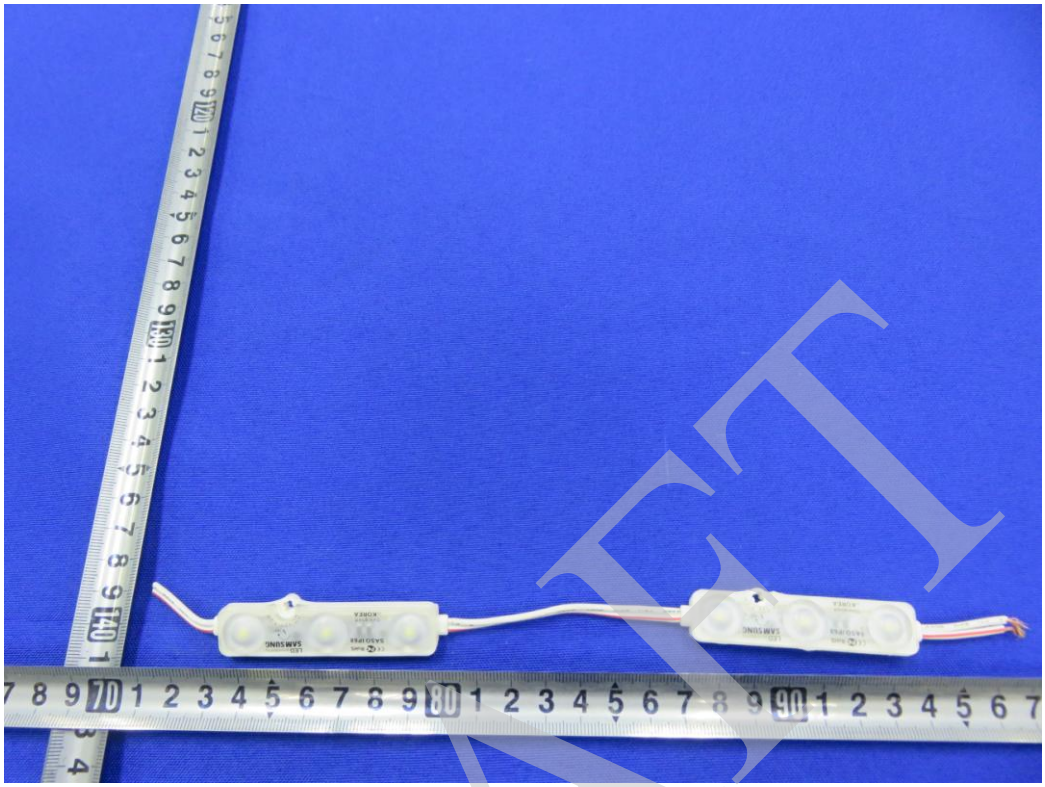


Fig. 1

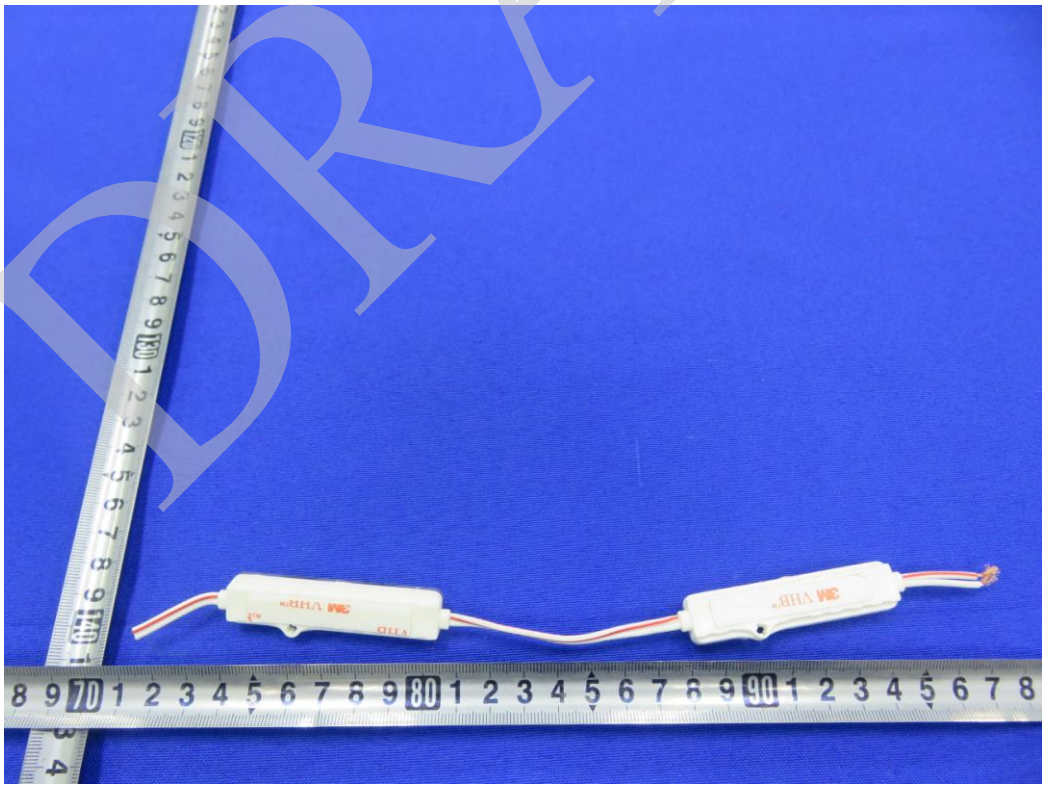


Fig. 2

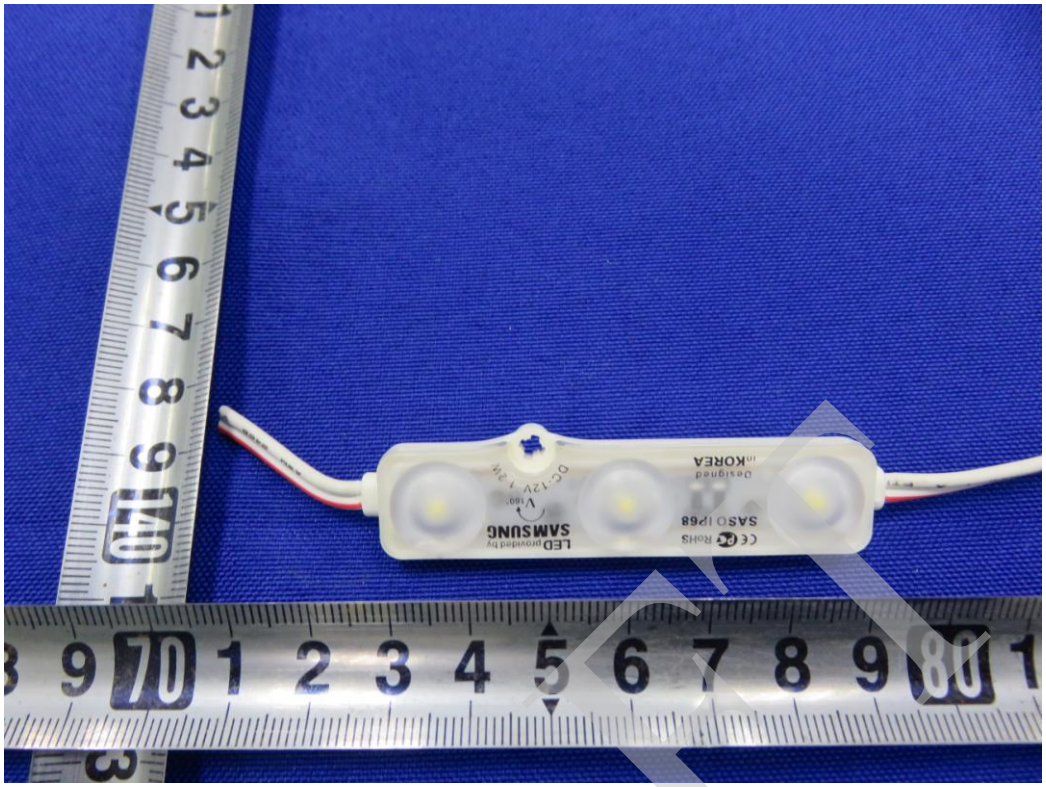



Fig.3

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