



TEST REPORT

Applicant: Shenzhen 4U Tech-King Technology Co., Ltd
Address: Room 1106-2, Shangshuijing Complex Building, # 333 Jihua Rd, Buji Street, Longgang District, Shenzhen, China
Manufacturer: Shenzhen 4U Tech-King Technology Co., Ltd
Address: Room 1106-2, Shangshuijing Complex Building, # 333 Jihua Rd, Buji Street, Longgang District, Shenzhen, China
EUT: Plug in sensor Light
Trade Mark: N/A
Model Number: ZN02
Date of Receipt: Feb. 23, 2022
Test Date: Feb. 23, 2022 - Mar. 02, 2022
Date of Report: Mar. 02, 2022
Prepared By: Shenzhen DL Testing Technology Co., Ltd.
Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
Applicable Standards: EN IEC 55015:2019/A11:2020
EN IEC 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A1:2019
EN 61547:2009
EN 61000-4-2:2009, EN IEC 61000-4-3:2020, EN 61000-4-4:2012,
EN 61000-4-5:2014+A1:2017, EN 61000-4-6:2014/AC:2015,
EN 61000-4-8:2010, EN IEC 61000-4-11:2020
Test Result: Pass
Report Number: DL-20220302002E

Prepared (Engineer): Randy Xie

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.



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**1. VERSION**

| Version No. | Date | Description |
|-------------|---------------|-------------|
| 00 | Mar. 02, 2022 | Original |
| | | |
| | | |

2. TEST SUMMARY

| EMC Emission | | | | |
|------------------|--|-------------------------------|-------------------------|--------|
| Standard | Test Item | Limit | Result | Remark |
| EN 55015 | Disturbance voltages (CE) | ----- | PASS | |
| | Radiated disturbance in 9kHz-30MHz (ME) | ----- | PASS | |
| | Radiated disturbance in 30MHz-1000MHz (RE) | ----- | PASS | |
| EN 61000-3-2 | Harmonic Current Emission | Class A or D | N/A ^{NOTE (2)} | |
| EN 61000-3-3 | Voltage Fluctuations & Flicker | ----- | PASS | |
| EMC Immunity | | | | |
| Section EN 61547 | Test Item | Performance Criteria | Result | Remark |
| EN 61000-4-2 | Electrostatic Discharge | B | PASS | |
| EN 61000-4-3 | RF electromagnetic field | A | PASS | |
| EN 61000-4-4 | Fast transients | B | PASS | |
| EN 61000-4-5 | Surges | B | PASS | |
| EN 61000-4-6 | Injected Current | A | PASS | |
| EN 61000-4-8 | Power Frequency Magnetic Field | A | PASS | |
| EN 61000-4-11 | Volt. Interruptions Volt. Dips | B / C / C ^{NOTE (3)} | PASS | |

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

(2) The power consumption of EUT is less than 75W and no Limits apply.

(3) Voltage dip: 100% reduction – Performance Criteria B

Voltage dip: 30% reduction – Performance Criteria C

Voltage Interruption: 100% Interruption – Performance Criteria C

(4) Test Facility: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China



3. GENERAL INFORMATION

3.1 Description of Device (EUT)

| | |
|-------------------|----------------------|
| EUT: | Plug in sensor Light |
| Trade Mark: | N/A |
| Model Number: | ZN02 |
| Test Model: | ZN02 |
| Model difference: | N/A |
| Power Supply: | 220-240V~50Hz |
| Work Frequency: | Below 108MHz |

3.2 Tested System Details

None.

3.3 Block Diagram of Test Set-up



3.4 Test Mode Description

Mode1. On Mode

3.5 Test Auxiliary Equipment

None.

3.6 Test Uncertainty

Conducted Emission Uncertainty : $\pm 2.56\text{dB}$

Radiated Emission Uncertainty : $\pm 3.24\text{dB}$

**4. TEST INSTRUMENT USED****For Disturbance Voltages and ME Test (843 Shielded Room)**

| Equipment | Manufacturer | Model | Serial | Last Cal. | Next Cal. |
|-------------------|--------------|-----------|--------|---------------|---------------|
| 843 Shielded Room | ChengYu | 843 Room | 843 | Nov. 25, 2019 | Nov. 24, 2022 |
| EMI Receiver | R&S | ESR | 101421 | Nov. 06, 2021 | Nov. 05, 2022 |
| LISN | R&S | ENV216 | 102417 | Nov. 06, 2021 | Nov. 05, 2022 |
| Clamp | COM-POWER | CLA-050 | 431071 | Nov. 06, 2021 | Nov. 05, 2022 |
| 3-Loop Antenna | DAZE | ZN30401 | 13021 | Nov. 06, 2021 | Nov. 05, 2022 |
| ISN T8 | Schwarzbeck | NTFM 8158 | 101135 | Nov. 06, 2021 | Nov. 05, 2022 |
| ISN T5 | Schwarzbeck | NTFM 8158 | 101136 | Nov. 06, 2021 | Nov. 05, 2022 |
| 843 Cable 1# | ChengYu | CE Cable | 001 | Nov. 06, 2021 | Nov. 05, 2022 |
| 843 Cable 1# | ChengYu | CE Cable | 002 | Nov. 06, 2021 | Nov. 05, 2022 |

For Radiated Emission Test (966 chamber)

| Equipment | Manufacturer | Model | Serial | Last Cal. | Next Cal. |
|--------------------------|--------------|-----------|------------|---------------|---------------|
| 966 Chamber | ChengYu | 966 Room | 966 | Nov. 25, 2019 | Nov. 24, 2022 |
| Spectrum Analyzer | Agilent | E4408B | MY50140780 | Nov. 06, 2021 | Nov. 05, 2022 |
| EMI Receiver | R&S | ESRP7 | 101393 | Nov. 06, 2021 | Nov. 05, 2022 |
| Amplifier | Schwarzbeck | BBV9743B | 00153 | Nov. 06, 2021 | Nov. 05, 2022 |
| Amplifier | EMEC | EM01G8GA | 00270 | Nov. 06, 2021 | Nov. 05, 2022 |
| Broadband Trilog Antenna | Schwarzbeck | VULB9162 | 00306 | Nov. 06, 2021 | Nov. 05, 2023 |
| Horn Antenna | Schwarzbeck | BBHA9120D | 02139 | Nov. 06, 2021 | Nov. 05, 2023 |
| 966 Cable 1# | ChengYu | 966 | 004 | Nov. 06, 2021 | Nov. 05, 2022 |
| 966 Cable 2# | ChengYu | 966 | 003 | Nov. 06, 2021 | Nov. 05, 2022 |

For Harmonic & Flicker Test (EMS --- site)

| Equipment | Manufacturer | Model | Serial | Last Cal. | Next Cal. |
|-------------------------------------|---------------------|---------|--------|---------------|---------------|
| Harmonics, Flicker & power Analyser | LAPLACE INSTRUMENTS | AC2000A | 311370 | Nov. 06, 2021 | Nov. 05, 2022 |
| AC Power Supply | MToni | HPF5010 | 633659 | Nov. 06, 2021 | Nov. 05, 2022 |

For Electrostatic Discharge Immunity Test (EMS --- site)

| Equipment | Manufacturer | Model | Serial | Last Cal. | Next Cal. |
|------------|--------------|----------|--------|---------------|---------------|
| ESD Tester | SCHLODER | SESD 230 | 17352 | Nov. 06, 2021 | Nov. 05, 2022 |

**For RF Field Strength Susceptibility Test (Keyway --- site)**

| Equipment | Manufacturer | Model | Serial | Last Cal. | Next Cal. |
|-------------------------------|--------------|-------------|------------|---------------|---------------|
| Signal Generator | HP | 8648A | 3625U00573 | Nov. 06, 2021 | Nov. 05, 2022 |
| Amplifier | A&R | 500A100 | 17034 | Nov. 06, 2021 | Nov. 05, 2022 |
| Amplifier | A&R | 100W/1000M1 | 17028 | Nov. 06, 2021 | Nov. 05, 2022 |
| Audio Analyzer (20Hz~1GHz) | Panasonic | 2023B | 202301/428 | Nov. 06, 2021 | Nov. 05, 2022 |
| Isotropic Field Probe | A&R | FP2000 | 16755 | Nov. 06, 2021 | Nov. 05, 2022 |
| Antenna | EMCO | 3108 | 9507-2534 | Nov. 06, 2021 | Nov. 05, 2022 |
| Log-periodic Antenna | A&R | AT1080 | 16812 | Nov. 06, 2021 | Nov. 05, 2022 |

For EFT /B, Surge, Voltage Dips Interruptions Test (EMS --- site)

| Equipment | Manufacturer | Model | Serial | Last Cal. | Next Cal. |
|---|--------------|------------------------|---------------|---------------|---------------|
| Transient Comprehensive Immunity Test System | Graphtec | HVIP16T+HCO MPACT 5 | 192501+192202 | Nov. 06, 2021 | Nov. 05, 2022 |
| Coupling Clamp | HTEC | 001 | 0001 | Nov. 06, 2021 | Nov. 05, 2022 |

For Injected Currents Susceptibility Test (EMS --- site)

| Equipment | Manufacturer | Model | Serial | Last Cal. | Next Cal. |
|-----------------|--------------|-------------|---------------|---------------|---------------|
| C/S Test System | LIONCEL | RIS-6091-85 | 0191101 | Nov. 06, 2021 | Nov. 05, 2022 |
| CDN | LIONCEL | CDN-M2-16 | 0191001 | Nov. 06, 2021 | Nov. 05, 2022 |
| CDN | LIONCEL | CDN-M3-16 | 0191002 | Nov. 06, 2021 | Nov. 05, 2022 |
| Injection Clamp | Frankonia | EMCL-20 | 18101728-0108 | Nov. 06, 2021 | Nov. 05, 2022 |

For Magnetic Field Immunity Test (EMS --- site)

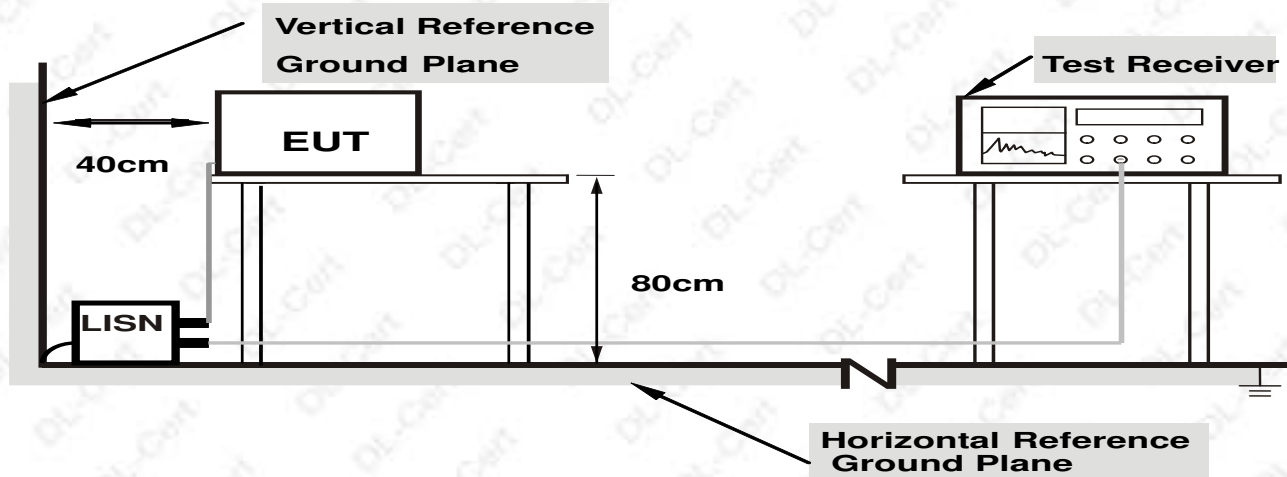
| Equipment | Manufacturer | Model | Serial | Last Cal. | Next Cal. |
|-------------------------------|--------------|---------------------------|--------|---------------|---------------|
| Magnetic field Test System | LIONCEL | PMF-801C-C/ PMF-801C-T | 190401 | Nov. 06, 2021 | Nov. 05, 2022 |

Other

| Name | Manufacturer | Model | Software version |
|------------------------------|--------------|---------|------------------|
| EMC Conduction Test System | FALA | EZ_EMG | EMC-CON 3A1.1 |
| EMC radiation test system | FALA | EZ_EMG | FA-03A2 |
| RF test system | MAIWEI | MTS8310 | 2.0.0.0 |
| RF communication test system | MAIWEI | MTS8200 | 2.0.0.0 |

5. DISTURBANCE VOLTAGES TEST

5.1 Block Diagram Of Test Setup



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

5.2 Test Standard and Limit

EN 55015

| Frequency MHz | Limits dB(μV) | |
|------------------|------------------|---------------|
| | Quasi-peak Level | Average Level |
| 0,009 to 0,05 | 110 | -- |
| 0.05 to 0.15 | 90 to 80* | -- |
| 0.15~0.50 | 66 ~ 56* | 55 ~ 46* |
| 0.50~5.00 | 56 | 46 |
| 5.00~30.00 | 60 | 50 |

- Notes:
1. *Decreasing linearly with logarithm of frequency.
 2. The lower limit shall apply at the transition frequencies.

5.3 EUT Configuration on Test

The following equipment's are installed on conducted emission test to meet EN 55015 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

5.4 Operating Condition of EUT

- 5.4.1 Setup the EUT and simulators as shown in Section 5.1.
- 5.4.2 Turn on the power of all equipment.
- 5.4.3 Let the EUT work in test modes and test it.

5.5 Test Procedure

The EUT is put on the table and connected to the AC mains through a Artificial Mains Network (AMN) or ISN. This provided a 50ohm coupling impedance for the tested equipment. Both sides of AC line are checked to find out the maximum conducted emission levels according to the **EN 55015** regulations during conducted emission test.



The bandwidth of the test receiver (R&S Test Receiver ESR) is set at 10KHz.
The frequency ranges from 150kHz to 30MHz is investigated.

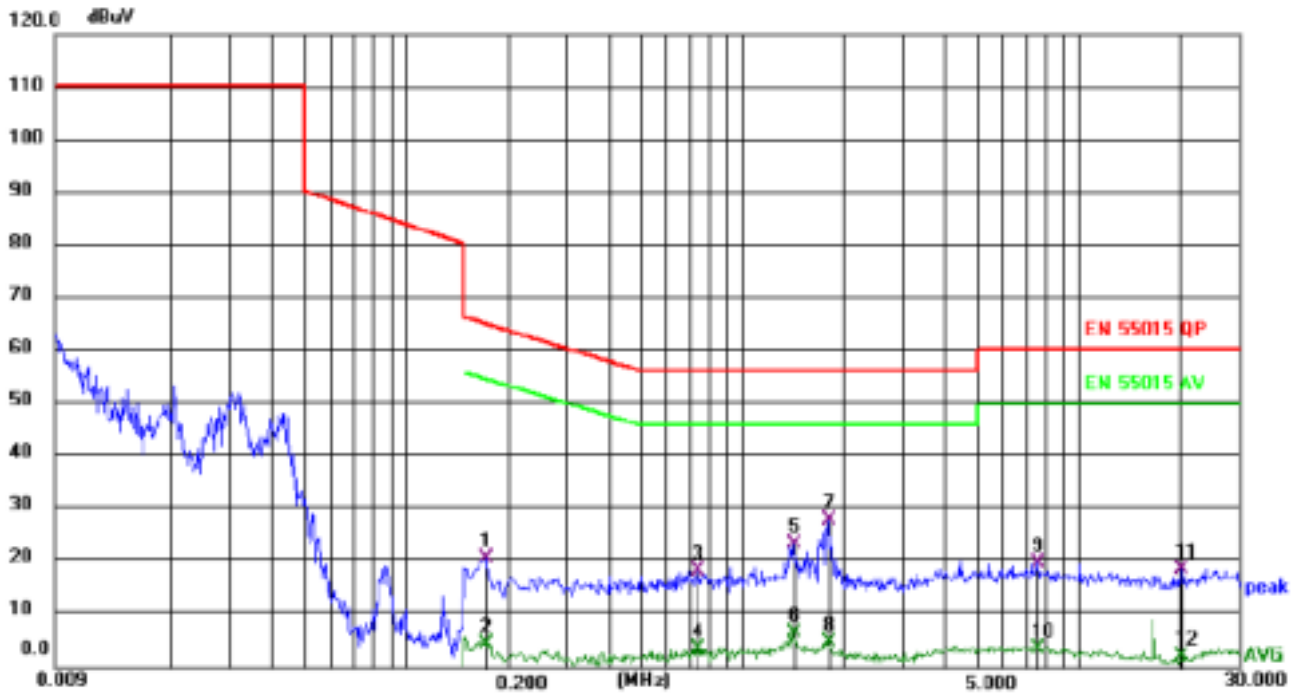
5.6 Test Result

PASS

Please refer to the following page.



| Disturbance Voltages Test Data | | | |
|--------------------------------|--------------|--------------------|--------|
| Temperature: | 24.5 °C | Relative Humidity: | 54% |
| Pressure: | 1009hPa | Phase: | Line |
| Test Voltage: | AC 230V/50Hz | Test Mode: | Mode 1 |



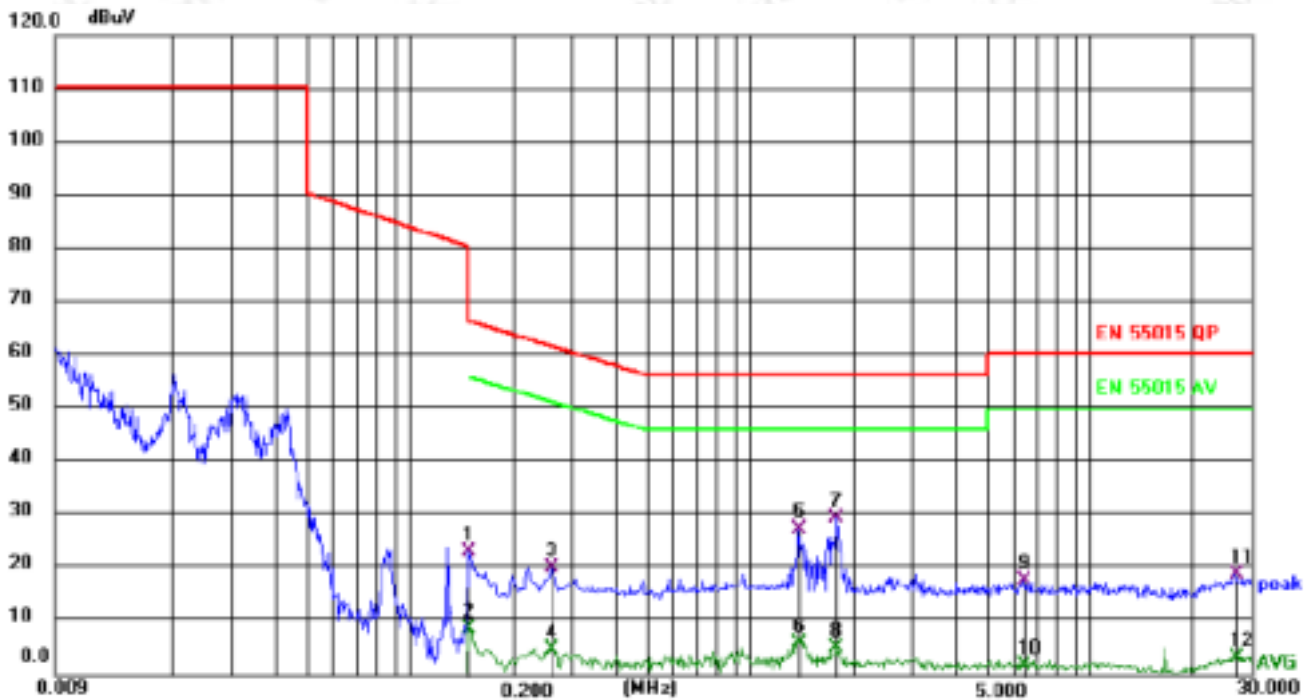
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1 | 0.1726 | 10.72 | 10.03 | 20.75 | 64.83 | 44.08 | QP | P | |
| 2 | 0.1726 | -5.47 | 10.03 | 4.56 | 54.83 | 50.27 | AVG | P | |
| 3 | 0.7351 | 9.18 | 9.38 | 18.56 | 56.00 | 37.44 | QP | P | |
| 4 | 0.7351 | -5.76 | 9.38 | 3.62 | 46.00 | 42.38 | AVG | P | |
| 5 | 1.4146 | 13.96 | 9.52 | 23.48 | 56.00 | 32.52 | QP | P | |
| 6 | 1.4146 | -2.89 | 9.52 | 6.83 | 46.00 | 39.17 | AVG | P | |
| 7 * | 1.8016 | 18.37 | 9.75 | 28.12 | 56.00 | 27.88 | QP | P | |
| 8 | 1.8016 | -4.73 | 9.75 | 5.02 | 46.00 | 40.98 | AVG | P | |
| 9 | 7.6156 | 10.21 | 9.78 | 19.99 | 60.00 | 40.01 | QP | P | |
| 10 | 7.6156 | -5.93 | 9.78 | 3.85 | 50.00 | 46.15 | AVG | P | |
| 11 | 20.2741 | 8.31 | 10.45 | 18.76 | 60.00 | 41.24 | QP | P | |
| 12 | 20.2741 | -8.21 | 10.45 | 2.24 | 50.00 | 47.76 | AVG | P | |

Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor



| Disturbance Voltages Test Data | | | |
|--------------------------------|--------------|--------------------|---------|
| Temperature: | 24.5 °C | Relative Humidity: | 54% |
| Pressure: | 1009hPa | Phase: | Neutral |
| Test Voltage: | AC 230V/50Hz | Test Mode: | Mode 1 |



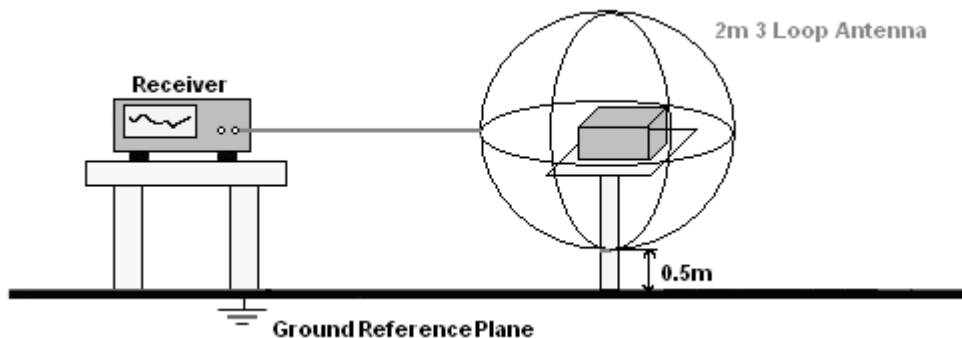
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1 | 0.1500 | 13.04 | 10.35 | 23.39 | 66.00 | 42.61 | QP | P | |
| 2 | 0.1500 | -1.39 | 10.35 | 8.96 | 56.00 | 47.04 | AVG | P | |
| 3 | 0.2625 | 11.41 | 8.98 | 20.39 | 61.35 | 40.96 | QP | P | |
| 4 | 0.2625 | -3.95 | 8.98 | 5.03 | 51.35 | 46.32 | AVG | P | |
| 5 | 1.3920 | 17.74 | 9.57 | 27.31 | 56.00 | 28.69 | QP | P | |
| 6 | 1.3920 | -3.30 | 9.57 | 6.27 | 46.00 | 39.73 | AVG | P | |
| 7 * | 1.8060 | 19.80 | 9.76 | 29.56 | 56.00 | 26.44 | QP | P | |
| 8 | 1.8060 | -4.57 | 9.76 | 5.19 | 46.00 | 40.81 | AVG | P | |
| 9 | 6.4231 | 8.09 | 9.84 | 17.93 | 60.00 | 42.07 | QP | P | |
| 10 | 6.4231 | -7.95 | 9.84 | 1.89 | 50.00 | 48.11 | AVG | P | |
| 11 | 26.8126 | 7.98 | 11.21 | 19.19 | 60.00 | 40.81 | QP | P | |
| 12 | 26.8126 | -7.69 | 11.21 | 3.52 | 50.00 | 46.48 | AVG | P | |

Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

6. RADIATED DISTURBANCE IN 9 KHZ TO 30 MHZTEST

6.1 Block Diagram of Test Setup



6.2 Test Standard and Limit

EN 55015

| Frequency MHz | Limits dB(μ A) 2m Loop Diameter |
|------------------|--------------------------------------|
| | Quasi-peak Level |
| 0,009 to 0,07 | 88 |
| 0.07 to 0.15 | 88 ~ 58* |
| 0.15~3.00 | 58 ~ 22* |
| 3.00~30.00 | 22 |

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

6.3 EUT Configuration on Test

The following equipment's are installed on conducted emission test to meet EN 55015 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

6.4 Operating Condition of EUT

6.4.1 Setup the EUT and simulators as shown in Section 6.1.

6.4.2 Turn on the power of all equipment.

6.4.3 Let the EUT work in test modes and test it.

6.5 Test Procedure

The EUT is put on the table and connected to the AC mains through a Artificial Mains Network (AMN) or ISN. This provided a 50ohm coupling impedance for the tested equipment. Both sides of AC line are checked to find out the maximum conducted emission levels according to the **EN 55015** regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESR) is set at 10KHz.

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

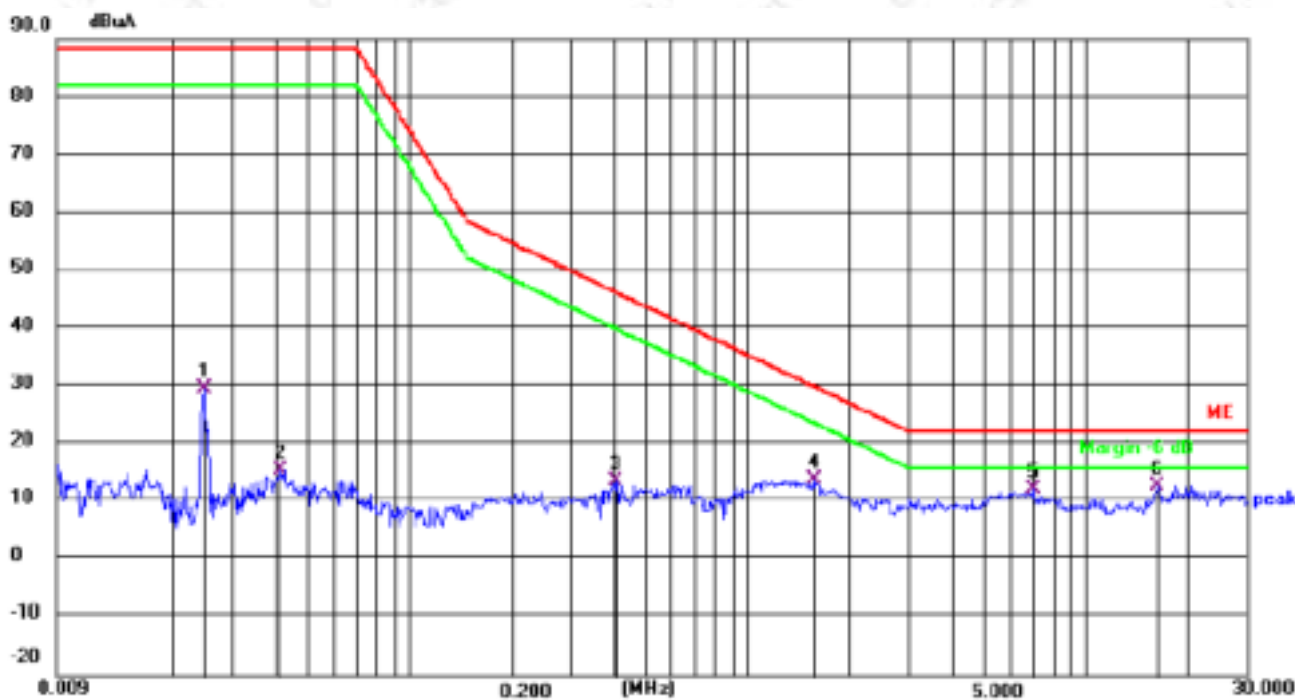
6.6 Test Result

PASS

Please refer to the following page.



| Radiated disturbance (9KHz-30MHz) Test Data | | | |
|---|--------------|--------------------|--------|
| Temperature: | 24.5 °C | Relative Humidity: | 54% |
| Pressure: | 1009hPa | Polarization: | X |
| Test Voltage: | AC 230V/50Hz | Test Mode: | Mode 1 |



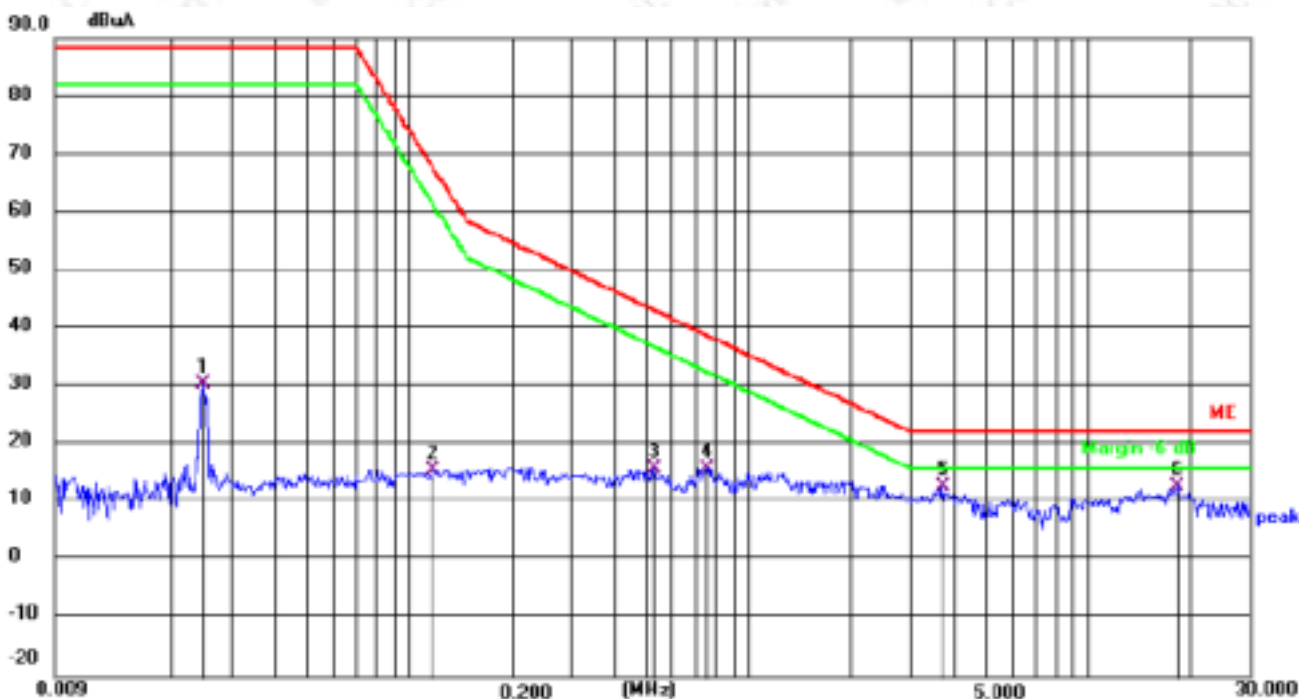
| No. | Frequency (MHz) | Reading (dBuA) | Factor (dB) | Level (dBuA) | Limit (dBuA) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1 | 0.0246 | -29.06 | 58.59 | 29.53 | 88.00 | 58.47 | QP | P | |
| 2 | 0.0415 | -40.65 | 56.14 | 15.49 | 88.00 | 72.51 | QP | P | |
| 3 | 0.4072 | -16.20 | 30.00 | 13.80 | 46.00 | 32.20 | QP | P | |
| 4 | 1.5665 | -16.16 | 30.00 | 13.84 | 29.81 | 15.97 | QP | P | |
| 5 | 7.0216 | -17.73 | 30.00 | 12.27 | 22.00 | 9.73 | QP | P | |
| 6 * | 16.4581 | -17.13 | 30.00 | 12.87 | 22.00 | 9.13 | QP | P | |

Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor



| Radiated disturbance (9KHz-30MHz) Test Data | | | |
|---|--------------|--------------------|--------|
| Temperature: | 24.5 °C | Relative Humidity: | 54% |
| Pressure: | 1009hPa | Polarization: | Y |
| Test Voltage: | AC 230V/50Hz | Test Mode: | Mode 1 |



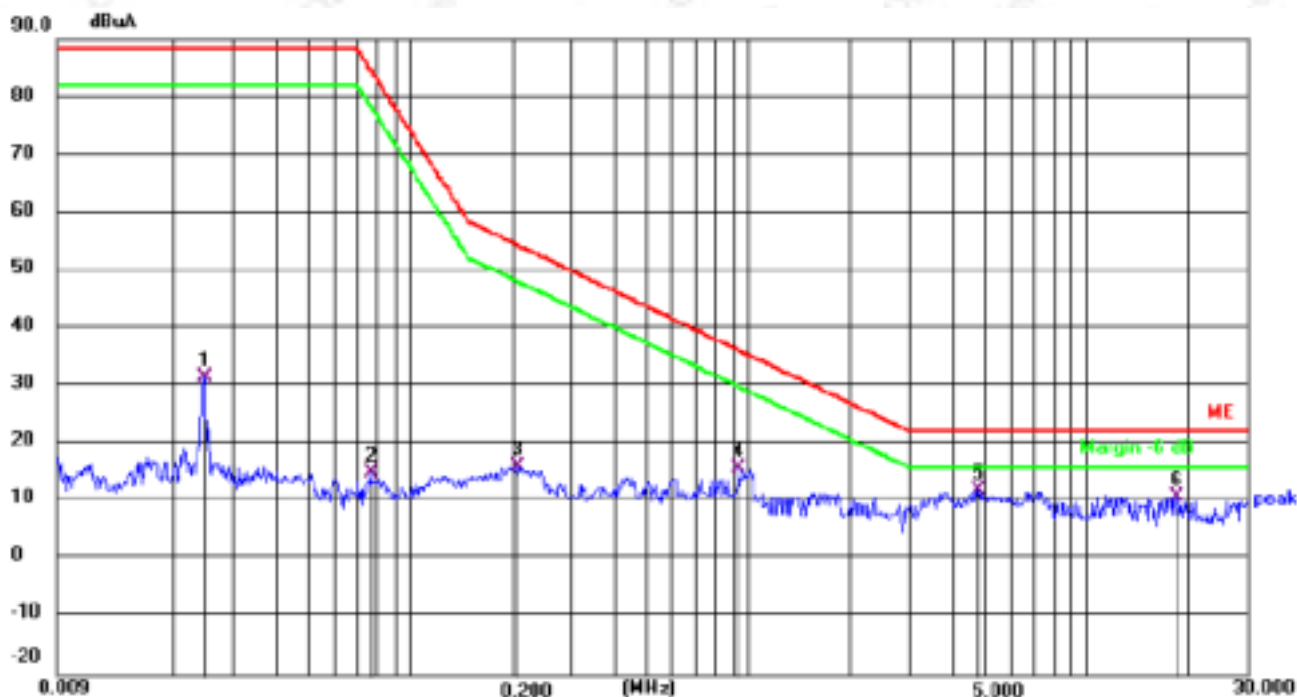
| No. | Frequency (MHz) | Reading (dBuA) | Factor (dB) | Level (dBuA) | Limit (dBuA) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1 | 0.0246 | -28.13 | 58.59 | 30.46 | 88.00 | 57.54 | QP | P | |
| 2 | 0.1184 | -44.08 | 59.76 | 15.68 | 67.31 | 51.63 | QP | P | |
| 3 | 0.5281 | -14.23 | 30.00 | 15.77 | 42.87 | 27.10 | QP | P | |
| 4 | 0.7570 | -14.15 | 30.00 | 15.85 | 38.55 | 22.70 | QP | P | |
| 5 * | 3.7456 | -17.21 | 30.00 | 12.79 | 22.00 | 9.21 | QP | P | |
| 6 | 18.3031 | -17.22 | 30.00 | 12.78 | 22.00 | 9.22 | QP | P | |

Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor



| Radiated disturbance (9KHz-30MHz) Test Data | | | |
|---|--------------|--------------------|--------|
| Temperature: | 24.5 °C | Relative Humidity: | 54% |
| Pressure: | 1009hPa | Polarization: | Z |
| Test Voltage: | AC 230V/50Hz | Test Mode: | Mode 1 |



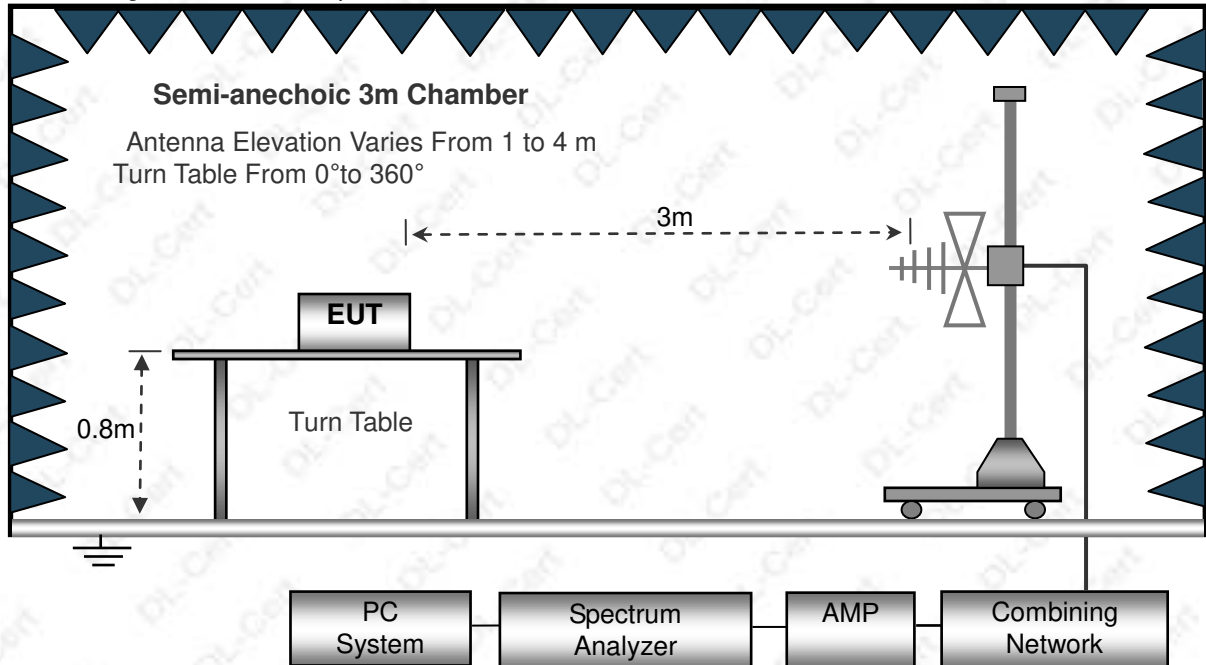
| No. | Frequency (MHz) | Reading (dBuA) | Factor (dB) | Level (dBuA) | Limit (dBuA) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1 | 0.0246 | -27.06 | 58.59 | 31.53 | 88.00 | 56.47 | QP | P | |
| 2 | 0.0767 | -38.01 | 53.07 | 15.06 | 84.40 | 69.34 | QP | P | |
| 3 | 0.2084 | -13.93 | 30.00 | 16.07 | 54.05 | 37.98 | QP | P | |
| 4 | 0.9415 | -13.98 | 30.00 | 16.02 | 35.93 | 19.91 | QP | P | |
| 5 * | 4.7986 | -18.06 | 30.00 | 11.94 | 22.00 | 10.06 | QP | P | |
| 6 | 18.6585 | -19.03 | 30.00 | 10.97 | 22.00 | 11.03 | QP | P | |

Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

7. RADIATED DISTURBANCE IN 30MHZ TO 1000 MHZTEST

7.1 Block Diagram of Test Setup



7.2 Test Standard and Limit

EN 55015

| Frequency (MHz) | Quasi-peak limits at 3m dB(μ V/m) |
|-----------------|---|
| 30-230 | 40 |
| 230-1000 | 47 |

Remark:

- (1) The smaller limit shall apply at the cross 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 device or system.

7.3 EUT Configuration on Test

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

The configuration of EUT is the same as used in conducted emission test.

Please refer to Section 5.3.

7.4 Operating Condition of EUT

Same as conducted emission test, which is listed in Section 5.4 except the test set up replaced as Section 6.2.

7.5 Test Procedure

- 1) The radiated emissions test was conducted in a semi-anechoic chamber.



2) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

3) Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.

4) The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

5) The bandwidth setting on the field strength meter (R&S Test Receiver ESCI) is set at 120KHz.

6) The frequency range from 30MHz to 1000MHz is checked.

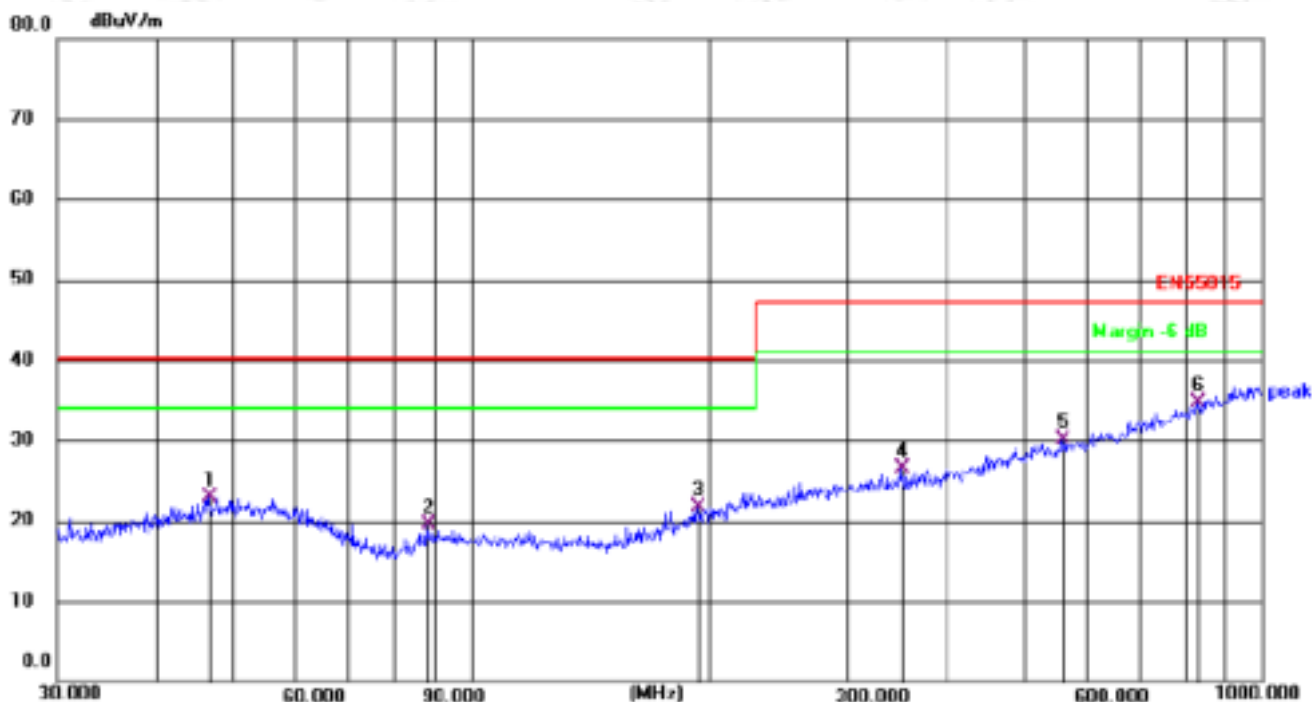
7.6 Test Result

PASS

Please refer to the following page.



| Radiated Disturbance (30MHz-1000MHz) Test Data | | | |
|--|--------------|--------------------|------------|
| Temperature: | 24.5 °C | Relative Humidity: | 54% |
| Pressure: | 1009hPa | Polarization: | Horizontal |
| Test Voltage: | AC 230V/50Hz | Test Mode: | Mode 1 |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dB/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|---------------|------------|----------|
| 1 | | 46.6664 | 34.66 | -11.70 | 22.96 | 40.00 | 17.04 | QP |
| 2 | | 88.0329 | 35.29 | -15.79 | 19.50 | 40.00 | 20.50 | QP |
| 3 | | 193.0945 | 35.44 | -13.73 | 21.71 | 40.00 | 18.29 | QP |
| 4 | | 350.4768 | 36.48 | -9.99 | 26.49 | 47.00 | 20.51 | QP |
| 5 | | 558.7302 | 36.14 | -6.13 | 30.01 | 47.00 | 16.99 | QP |
| 6 | * | 827.4934 | 36.58 | -1.91 | 34.67 | 47.00 | 12.33 | QP |

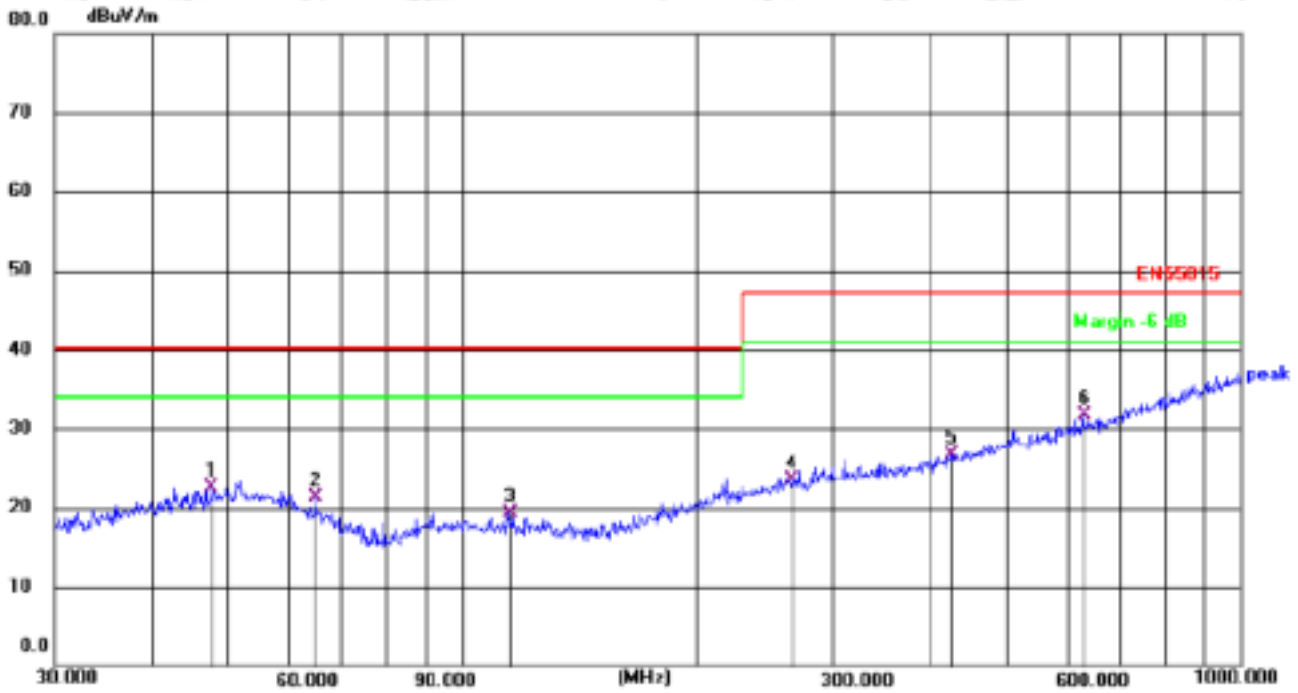
Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;



| Radiated Disturbance (30MHz-1000MHz) Test Data | | | |
|--|--------------|--------------------|----------|
| Temperature: | 24.5 °C | Relative Humidity: | 54% |
| Pressure: | 1009hPa | Polarization: | Vertical |
| Test Voltage: | AC 230V/50Hz | Test Mode: | Mode 1 |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dB/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|---------------|------------|----------|
| 1 | | 47.8260 | 33.96 | -11.42 | 22.54 | 40.00 | 17.46 | QP |
| 2 | | 64.8865 | 34.82 | -13.45 | 21.37 | 40.00 | 18.63 | QP |
| 3 | | 114.9169 | 34.88 | -15.49 | 19.39 | 40.00 | 20.61 | QP |
| 4 | | 265.6757 | 34.11 | -10.52 | 23.59 | 47.00 | 23.41 | QP |
| 5 | | 426.5210 | 34.36 | -7.65 | 26.71 | 47.00 | 20.29 | QP |
| 6 | * | 629.4772 | 35.83 | -4.08 | 31.75 | 47.00 | 15.25 | QP |

Remark:

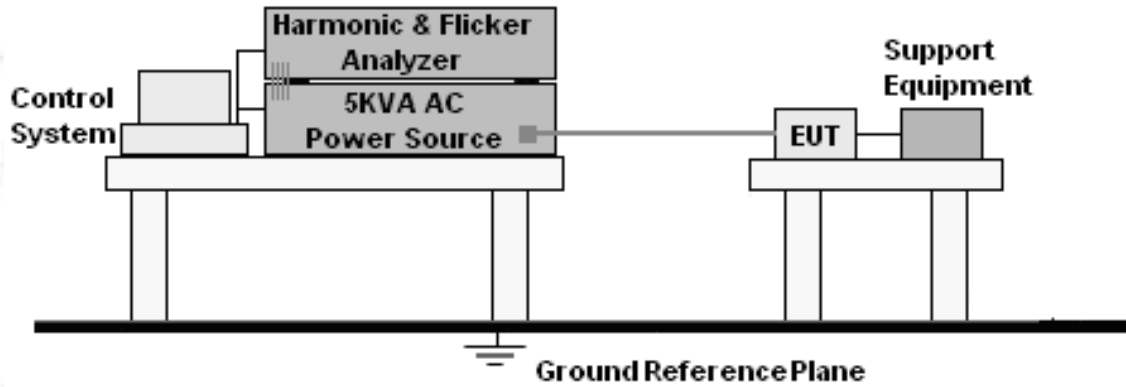
Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;



8. HARMONIC CURRENT EMISSION TEST

8.1 Block Diagram of Test Setup



8.2 Test Standard

EN 61000-3-2

8.3 Operating Condition of EUT

Setup the EUT as shown in Section 8.1.

Turn on the power of all equipment.

Let the EUT work in test mode and test it.

8.4 Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

8.5 Test Results

PASS

Please refer to the following page.

There is no need for Harmonic current test to be performed on this product (rated power is less than 75 W) in accordance with EN 61000-3-2.

For further details, please refer to Clause 7 of EN 61000-3-2 which states:

“For the following categories of equipment, limits are not specified in this standard:

- equipment with a rated power of 75 W or less, other than lighting equipment.”

**9. VOLTAGE FLUCTUATIONS & FLICKER TEST**

9.1 Block Diagram of Test Setup

Same as Section 8.1.

9.2 Test Standard

EN 61000-3-3

9.3 Operating Condition of EUT

Same as Section 8.3. The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

Flicker Test Limit

| Test items | Limits |
|------------|---------------------------|
| Pst | 1.0 |
| dc | 3.3% |
| Tmax | 4.0% |
| dt | Not exceed 3.3% for 500ms |

9.4 Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

9.5 Test Results

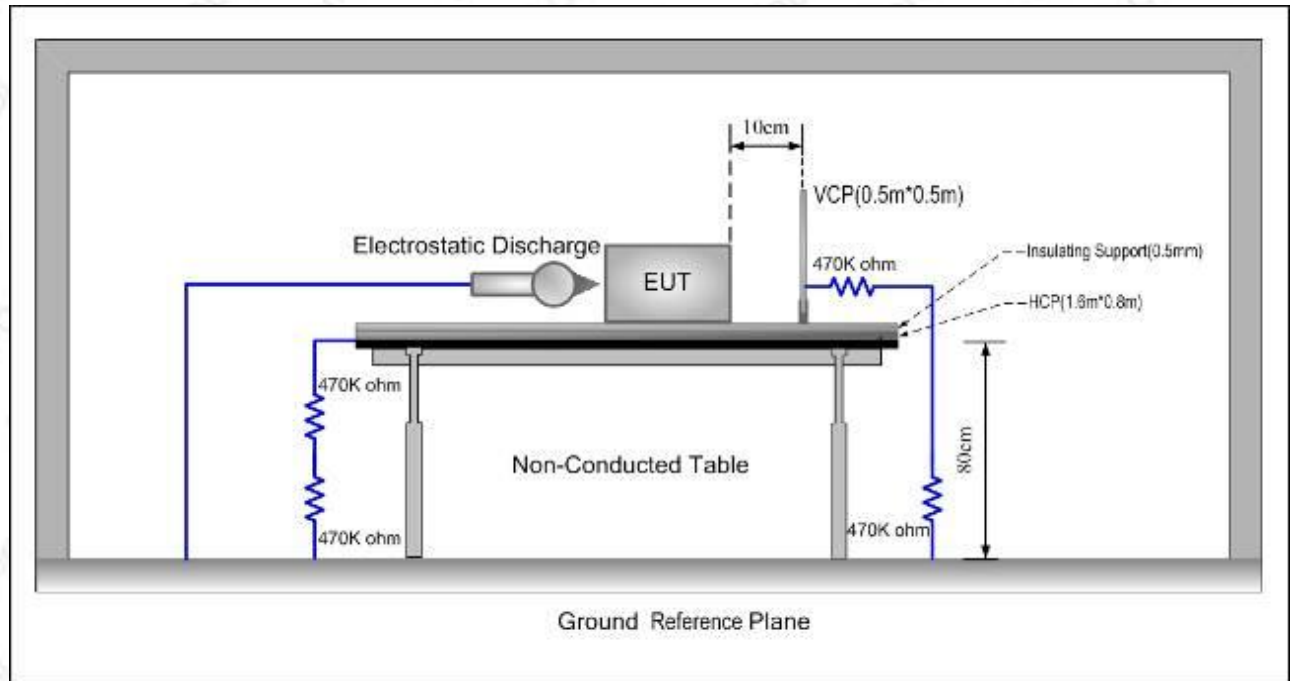
| Flicker Test Data | | | |
|--|--------------|--------------------|--------|
| Temperature: | 24.5°C | Relative Humidity: | 54% |
| Test Voltage: | AC 230V/50Hz | Test Mode: | Mode 1 |
| Voltage Fluctuation | | Limit | Value |
| Relative Voltage Change Characteristic Tmax (dc > 3%) | | 500ms | 0ms |
| Maximum Relative Voltage Change dmax | | 4% | 0.00 |
| | | 6% | / |
| | | 7% | / |
| Relative Steady-state Voltage Change dc | | 3.3% | 0.00 |
| Flicker | | Limit | Value |
| Short-term Flicker Indicator Pst | | 1.0 | 0.063 |
| Long-term Flicker Indicator Plt | | 0.65 | / |

**10. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA**

| Product Standard | EN 61547 |
|-------------------------|---|
| 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. |
| 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. |
| 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. |

11. ELECTROSTATIC DISCHARGE IMMUNITY TEST

11.1 Block Diagram of Test Setup



11.2 Test Standard

EN 61547, EN 61000-4-2

11.3 Severity Levels and Performance Criterion

Severity Level: 3 / Air Discharge: $\pm 8\text{KV}$

Level: 2 / Contact Discharge: $\pm 4\text{KV}$

Performance criterion: B

11.4 Test Procedure

- Electrostatic discharges were applied only to those points and surfaces of the Product that are accessible to users during normal operation.
- The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- The time interval between two successive single discharges was at least 1 second.
- The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the Product.
- Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- Air discharges were applied with the round discharge tip of the discharge electrode approaching the Product as fast as possible (without causing mechanical damage) to touch the Product. After each discharge, the ESD generator was removed from the Product and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the Product. The ESD generator was positioned vertically at a distance of 0.1 meters from the Product with the discharge electrode touching the HCP.



h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the Product were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the Product.

11.5 Test Results

PASS

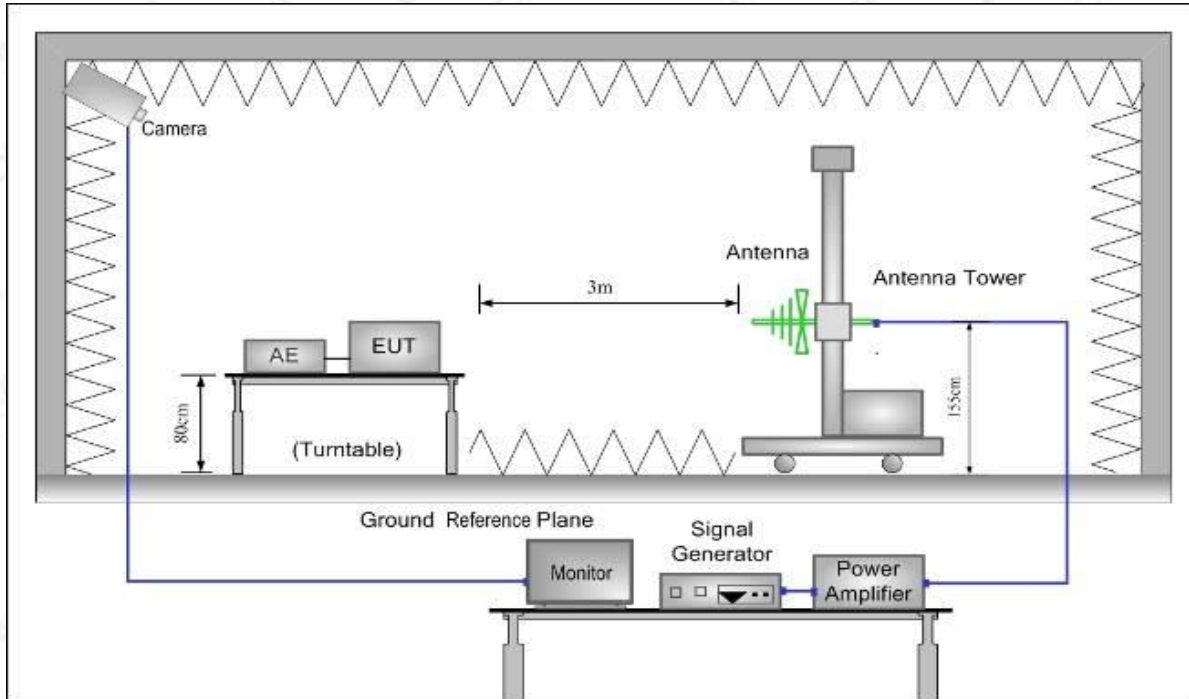
Please refer to the following page.

| Electrostatic Discharge Test Data | | | | | | | |
|-----------------------------------|---|---------------|---|----------------|--------|--------|--|
| Temperature: | | 25.1 °C | | Humidity: | | 55% | |
| Power Supply : | | AC 230V/50Hz | | Test Mode: | | Mode 1 | |
| Discharge Method | Discharge Position | Voltage (±kV) | Min. No. of Discharge per polarity (Each Point) | Required Level | Result | | |
| Contact Discharge | Conductive Surfaces | 2, 4 | 10 | B | Pass | | |
| | Indirect Discharge HCP | 2, 4 | 10 | B | Pass | | |
| | Indirect Discharge VCP | 2, 4 | 10 | B | Pass | | |
| Air Discharge | Slots, Apertures, and Insulating Surfaces | 2, 4, 8 | 10 | B | Pass | | |

Note: N/A

12. RF FIELD STRENGTH SUSCEPTIBILITY TEST

12.1 Block Diagram of Test Setup



12.2 Test Standard

EN 61547, EN 61000-4-3

12.3 Severity Levels and Performance Criterion

Severity Level 2, 3V / m

Performance criterion: A

12.4 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.

All the scanning conditions are as follows:

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



12.5 Test Results

PASS

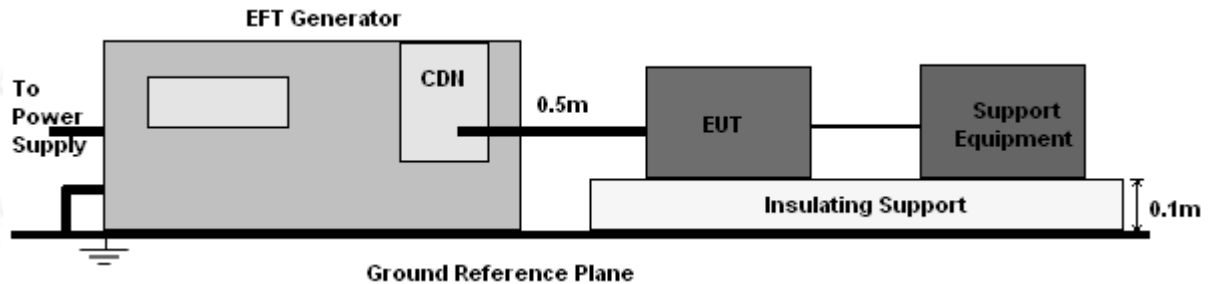
Please refer to the following page.

| R/S Test Data | | | | |
|-----------------|-----------------------------|----------------------|----------------|--------|
| Temperature: | 25.1°C | Humidity: | 55% | |
| Power Supply: | AC 230V/50Hz | Test Mode: | Mode 1 | |
| Criterion: | A | Steps | 1 % | |
| Frequency (MHz) | Position | Field Strength (V/m) | Required Level | Result |
| 80 – 1000 | Front, Right, Back, Left | 3 | A | Pass |
| Note: N/A | | | | |

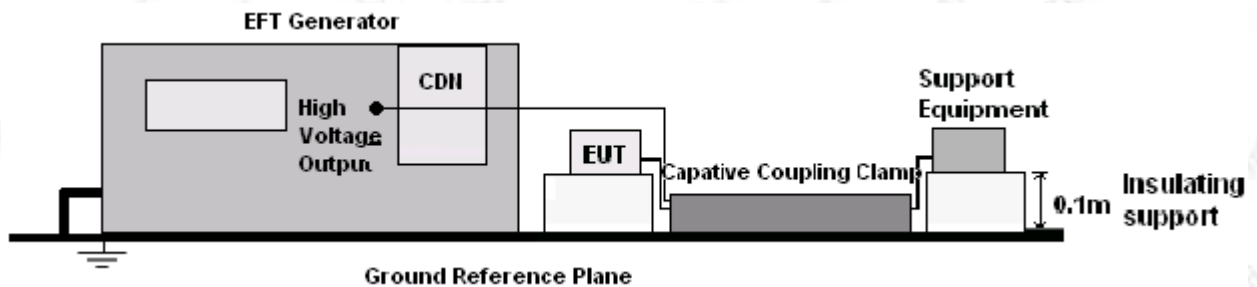
13. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

13.1 Block Diagram of EUT Test Setup

For input a.c. / d.c. power port:



For signal lines and control lines:



13.2 Test Standard

EN 61547, EN 61000-4-4

13.3 Severity Levels and Performance Criterion

Severity Level 2 at 1KV, Pulse Rise time & Duration: 5 nS / 50 nS

Performance criterion: B

13.4 Test Procedure

EUT shall be placed 0.8m high above the ground reference plane which is a min.1m*1m metallic sheet with 0.65mm minimum thickness. 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

For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.



13.5 Test Results

PASS

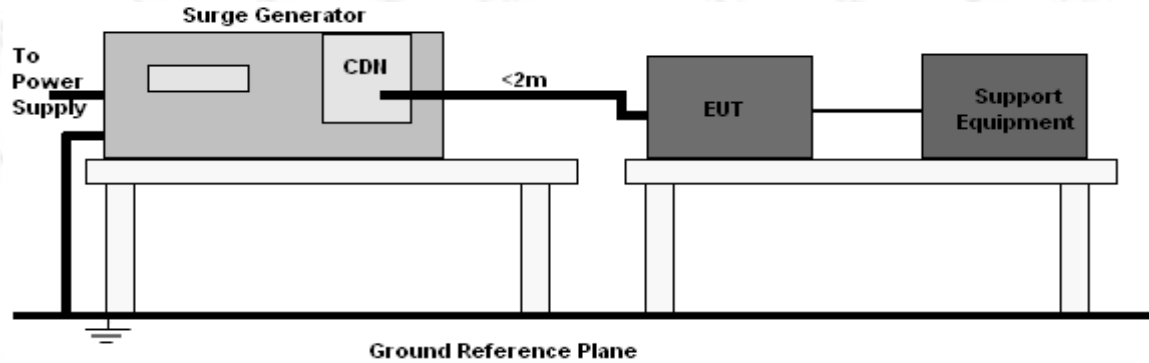
Please refer to the following page.

| EFT Test Data | | | |
|----------------|-------------------|-----------------------|--------|
| Temperature: | 24.5°C | Humidity: | 53% |
| Power Supply : | AC 230V/50Hz | Test Mode: | Mode 1 |
| Coupling Line | Test Voltage (kV) | Performance Criterion | Result |
| L | ±0.5, 1 | B | PASS |
| N | ±0.5, 1 | B | PASS |
| L-N | ±0.5, 1 | B | PASS |



14. SURGE TEST

14.1 Block Diagram of EUT Test Setup



14.2 Test Standard

EN 61547, EN 61000-4-5

14.3 Severity Levels and Performance Criterion

Severity Level: Line to Line, Level 2 at 1KV;

Severity Level: Line to Earth, Level 3 at 2KV.

Performance criterion: B

14.4 Test Procedure

- 1) Set up the EUT and test generator as shown on section 14.1
- 2) For line-to-line coupling mode, provide a 1KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
- 3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 4) Different phase angles are done individually.
- 5) Repeat procedure 2) to 4) except the open-circuit test voltage change from 1KV to 2KV for line to earth coupling mode test.
- 6) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

14.5 Test Result

PASS

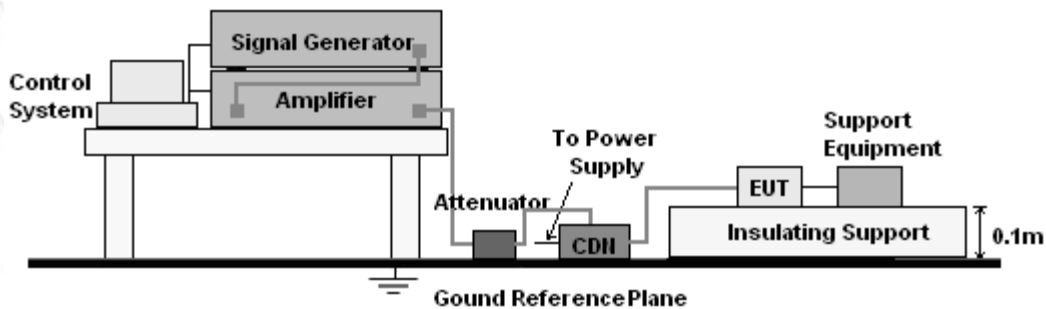
Please refer to the following page.

| Surge Test Data | | | | | | |
|-----------------|----------|--------------|-------------|--------------------|-----------------------|--------|
| Temperature: | | 24.5°C | | Humidity: | | 53% |
| Power Supply : | | AC 230V/50Hz | | Test Mode: | | Mode 1 |
| Location | Polarity | Phase Angle | No of Pulse | Pulse Voltage (KV) | Performance Criterion | Result |
| L-N | + | 90 | 5 | 0.5,1 | B | Pass |
| L-N | - | 270 | 5 | 0.5,1 | B | Pass |
| Note: N/A | | | | | | |

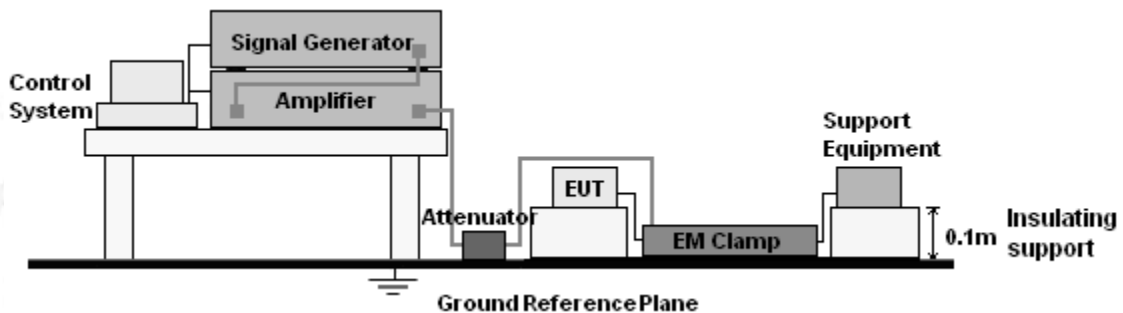
15. INJECTED CURRENTS SUSCEPTIBILITY TEST

15.1 Block Diagram of EUT Test Setup

For input a.c. / d.c. power port:



For signal lines and control lines:



15.2 Test Standard

EN 61547, EN 61000-4-6

15.3 Severity Levels and Performance Criterion

Severity Level 2: 3V(rms), 150KHz ~ 80MHz/230MHz

Performance criterion: A

15.4 Test Procedure

- 1) Set up the EUT, CDN and test generator as shown on section 15.1
- 2) Let EUT work in test mode and measure.
- 3) The EUT and supporting equipments are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane at above 0.1-0.3m 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).
- 4) The disturbance signal described below is injected to EUT through CDN.
- 5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 6) 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
- 7) 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.

8) Recording the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

15.5 Test Result

PASS

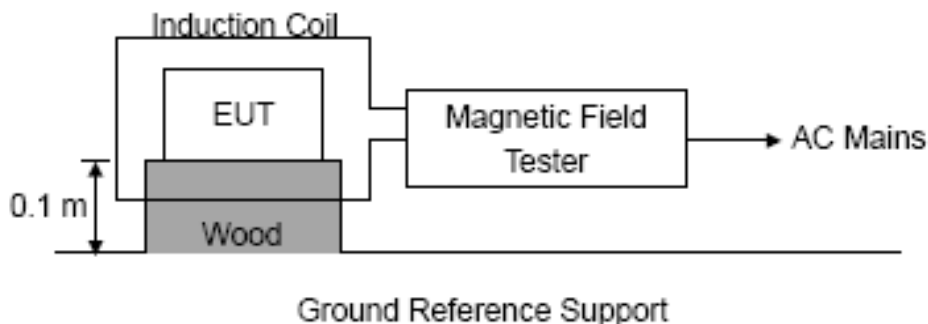
Please refer to the following page.

| CS Test Data | | | | | | |
|-----------------------|-------------------------|-------------------------|---------------------------|------------|-----------------------|--------|
| Temperature: | | 24.5℃ | | Humidity: | | 53% |
| Power Supply : | | AC 230V/50Hz | | Test Mode: | | Mode 1 |
| Frequency Range (MHz) | Injected Position | Strength | Modulation Signal | Freq. Step | Performance Criterion | Result |
| 0.15 ~ 80 | AC Line | 3V(rms), Unmodulated | AM 80%, 1kHz sine wave | 1% | A | Pass |
| 0.15 ~ 80 | DC Line, Signal Line | 3V(rms), Unmodulated | AM 80%, 1kHz sine wave | 1% | / | / |

Note: N/A

16. MAGNETIC FIELD IMMUNITY TEST

16.1 Block Diagram of EUT Test Setup



16.2 Test Standard

EN 61547, EN 61000-4-8

16.3 Severity Levels and Performance Criterion

Severity Level 2: 3A/m

Performance criterion: A

16.4 Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 16.1. The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

16.5 Test Result

PASS

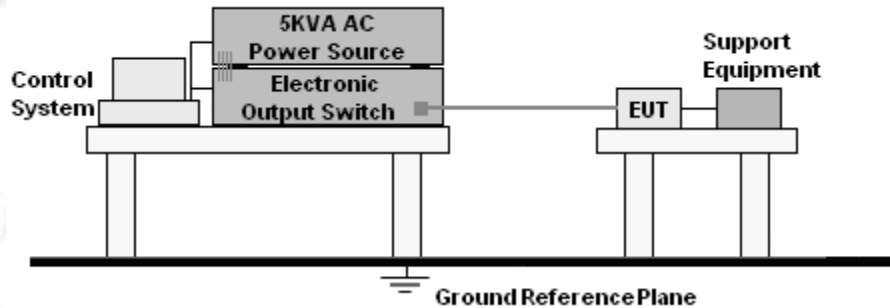
Please refer to the following page.

| MS Test Data | | | | | |
|--------------------|--------------|----------|------------------|-----------------------|--------|
| Temperature: | 24.5°C | | Humidity: | 53% | |
| Power Supply : | AC 230V/50Hz | | Test Mode: | Mode 1 | |
| Test specification | Units | Duration | Coil Orientation | Performance Criterion | Result |
| 3 | A/m | 5 Min | X | A | PASS |
| | | | Y | A | PASS |
| | | | Z | A | PASS |
| Note: N/A | | | | | |



17. VOLTAGE DIPS AND INTERRUPTIONS TEST

17.1 Block Diagram of EUT Test Setup



17.2 Test Standard

EN 61547, EN 61000-4-11

17.3 Severity Levels and Performance Criterion

Input and Output AC Power Ports.

- Voltage Dips.
- Voltage Interruptions.

| Environmental Phenomena | Test Specification | Units | Phase Angle | Performance Criterion |
|-------------------------|--------------------|-----------------------|-------------|-----------------------|
| Voltage Dips | 70 10 | % Reduction period | 0°, 180° | C |
| Voltage Interruptions | 0 0.5 | % Reduction period | 0°, 180° | B |

17.4 Test Procedure

- 1) Set up the EUT and test generator as shown on section 17.1
- 2) The interruption is introduced at selected phase angles with specified duration. There is a 3mins minimum interval between each test event.
- 3) After each test a full functional check is performed before the next test.
- 4) Repeat procedures 2 & 3 for voltage dips, only the level and duration is changed.
- 5) Record any degradation of performance.



17.5 Test Result

PASS

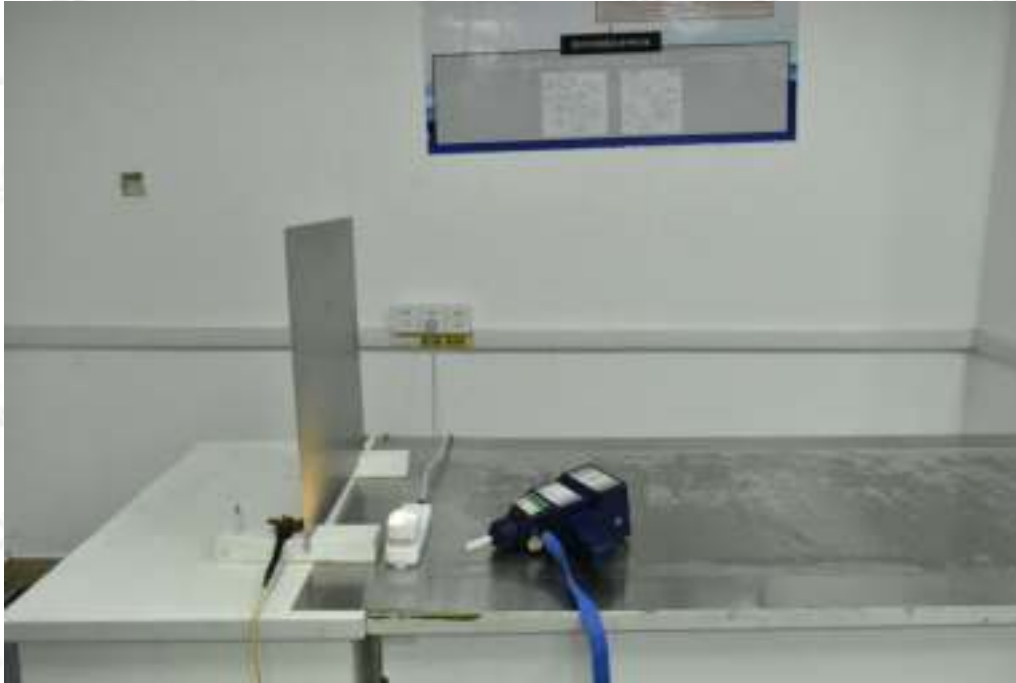
Please refer to the following page.

| DIPS Test Data | | | | |
|-------------------------|--------------------|--------------------|-----------------------|--------|
| Temperature: | 24.5°C | Humidity: | 53% | |
| Power Supply : | AC 230V/50Hz | Test Mode: | Mode 1 | |
| Environmental Phenomena | Test Specification | Units | Performance Criterion | Result |
| Voltage Dips | 70 10 | % Reduction period | C | Pass |
| Voltage Interruptions | 0 0.5 | % Reduction period | B | Pass |



18. SETUP PHOTOGRAPHS



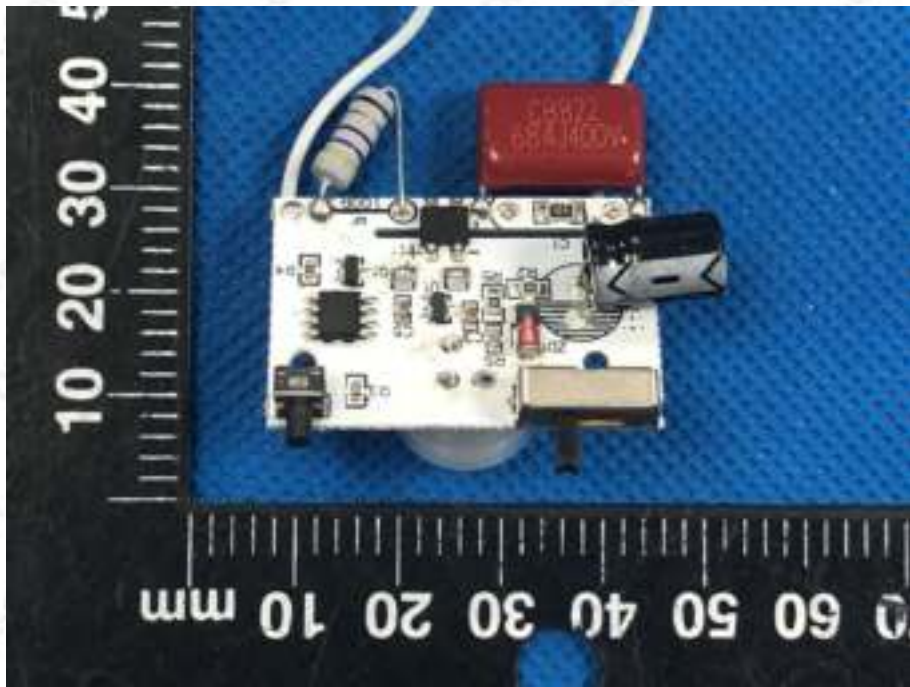
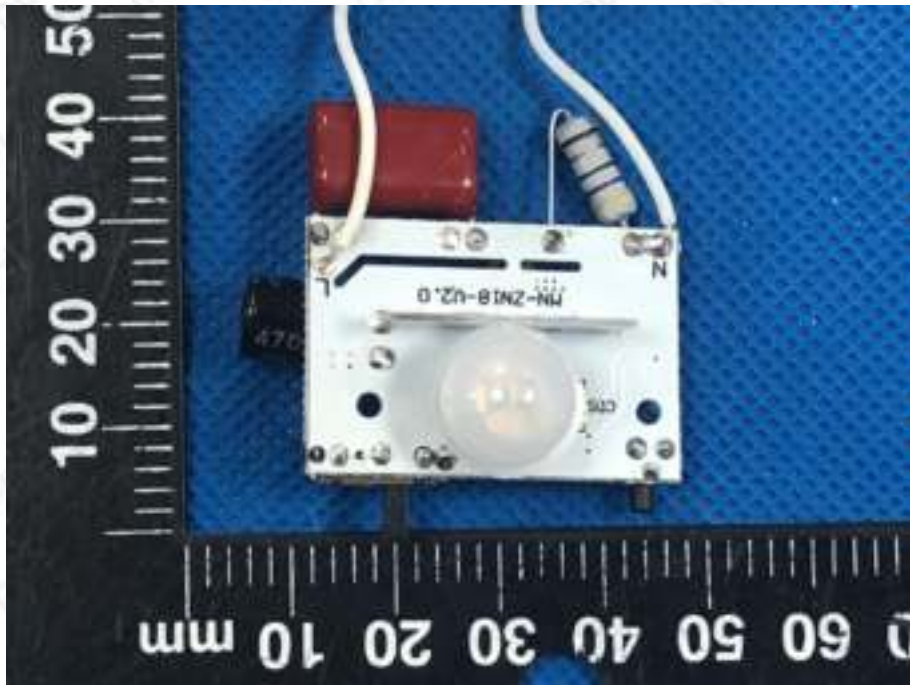




19. EUT PHOTOGRAPHS







***** END OF REPORT *****