



航天检测技术（深圳）有限公司
Aerospace Testing Technology (Shenzhen) Co., Ltd.

EMC TEST REPORT

Report No : AST2209303001A-1

Product Name : Wi-fi Smart Socket

Product Model : NTL-SWxx-yy

Applied Standard : EN 55032:2015+
AC:2016-07+A1:2020+A11:2020
EN 55035:2017+A11:2020
EN IEC 61000-3-2:2019+A1:2021
EN 61000-3-3:2013+A1:2019+A2:2021

Test Result : PASS

Issue Date : Sep. 24, 2022

Aerospace Testing Technology (Shenzhen) Co., Ltd.

101, Block A4, No. 5, 8th Road, Shapu Yangyong Industrial Park,
Songgang Street, Bao'an District, Shenzhen, Guangdong, China

Tel.: .086-0755-27781492

Fax.: 086-0755-27781492

Web.:www.ast-test.com

E-mail: ast@hangtianjc.com

| | |
|--------------------------|---|
| Product Name | : Wi-fi Smart Socket |
| Tested Model | : NTL-SWxx-yy |
| Series Model Description | : x are variables, x can be "0-9", "A-Z", "a-z" or blank, the differences of the basic function, y are variables, y can be "0-9", "A-Z", "a-z" or blank, the differences of the interface number and Interface properties. z are variables, z can be "0-9", "A-Z", "a-z" or blank, the differences of the Regional. The differences no impact safety related constructions and EMC. |
| Trademark | : NEUTRON |
| Applicant | : NEUTRON DIGITAL TECHNOLOGY CO., LIMITED |
| Address | : 1008 FLAT, 10-FLOOR, WING TUCK COMMERCIAL CENTRE 177-183 WING LOK STREET SHEUNG WAN/HONGKONG |
| Manufacturer | : NEUTRON DIGITAL TECHNOLOGY CO., LIMITED |
| Address | : 1008 FLAT, 10-FLOOR, WING TUCK COMMERCIAL CENTRE 177-183 WING LOK STREET SHEUNG WAN/HONGKONG |
| Factory | : NEUTRON DIGITAL TECHNOLOGY CO., LIMITED |
| Address | : 1008 FLAT, 10-FLOOR, WING TUCK COMMERCIAL CENTRE 177-183 WING LOK STREET SHEUNG WAN/HONGKONG |
| Test date | : Sep. 10, 2022 to Sep. 24, 2022 |
| Remark: | <i>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 Aerospace Testing Technology (Shenzhen) Co., Ltd.</i> |

Prepared by



Mason

Sep. 24, 2022

Reviewed by



Lucas

Sep. 24, 2022

Approved by



Nero

Sep. 24, 2022



Table of Contents

| | |
|---|-----------|
| 1. SUMMARY OF TEST RESULTS | 5 |
| 2. GENERAL INFORMATION | 6 |
| 2.1. Test Laboratory | 6 |
| 2.2. List Of Test Equipments | 7 |
| 3. ENTPOWER LINE CONDUCTED EMISSION MEASUREMENT | 8 |
| 3.1. Block Diagram of Test Setup | 8 |
| 3.2. Measuring Standard | 8 |
| 3.3. EUT Configuration on Measurement..... | 8 |
| 3.4. Test Procedure | 8 |
| 3.5. Test Ruslts | 9 |
| 4. RADIATED EMISSION MEASUREMENT | 11 |
| 4.1. Block diagram of test setup (In chamber)..... | 11 |
| 4.2. Measuring Standard | 11 |
| 4.3. EUT Configuration on Test..... | 11 |
| 4.5. Test Results | 12 |
| 5. HARMONIC CURRENT EMISSION MEASUREMENT | 15 |
| 5.1. Block Diagram of Test Setup | 15 |
| 5.2. Measuring Standard | 15 |
| 5.3. Description of test Equipment..... | 15 |
| 5.4. Test Results | 15 |
| 6. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT | 15 |
| 6.1. Block Diagram of Test Setup | 15 |
| 6.2. Measuring Standard | 15 |
| 6.3. Test Results | 15 |
| 7. ELECTROSTATIC DISCHARGE IMMUNITY TEST | 16 |
| 7.1. Block Diagram Of Test | 16 |
| 7.2. Test Standard | 16 |
| 7.3. Severity Levels and Performance Criterion | 16 |
| 7.4. Severity Levels..... | 16 |
| 7.5. Test Procedure | 17 |
| 7.6. Test Results | 17 |
| 8. RF FIELD STRENGTH SUSCEPTIBILITY TEST | 19 |
| 8.1. Block Diagram Of Test | 19 |
| 8.2. Test Standard | 19 |
| 8.3. Test Procedure | 20 |
| 8.4. Test Results | 20 |
| 9. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST | 22 |
| 9.1. Block Diagram of Test Setup | 22 |
| 9.2. Test Standard | 22 |
| 9.3. Severity Levels and Performance Criterion | 22 |
| 9.4. Test Procedure | 23 |
| 9.5. Test Results: | 23 |
| 10. SURGE IMMUNITY TEST..... | 24 |
| 10.1. Block Diagram of Test Setup | 24 |

| | |
|--|-----------|
| 10.2. Test Standard | 24 |
| 10.3. Severity Levels and Performance Criterion | 24 |
| 10.4. Test Procedure | 25 |
| 10.5. Test Results | 25 |
| 11. INJECTED CURRENTS SUSCEPTIBILITY TEST | 26 |
| 11.1. Block Diagram of Test Setup | 26 |
| 11.2. Test Standard | 26 |
| 11.3. Severity Levels and Performance Criterion | 26 |
| 11.4. Test Procedure | 27 |
| 11.5. Test Results | 27 |
| 12. MAGNETIC FIELD SUSCEPTIBILITY TEST | 28 |
| 12.1. Block Diagram of Test | 28 |
| 12.2. Test Standard | 28 |
| 12.3. Severity Levels and Performance Criterion | 28 |
| 12.4. Test Procedure | 28 |
| 12.5. Test Result | 29 |
| 13. VOLTAGE DIPS AND INTERRUPTIONS TEST | 29 |
| 13.1. Block Diagram of Test Setup | 30 |
| 13.2. Test Standard | 30 |
| 13.3. Severity Levels and Performance Criterion | 30 |
| 13.4. Test Procedure | 30 |
| 13.5. Test Result | 31 |
| Photographs of the Test Set-Up | 32 |

1. SUMMARY OF TEST RESULTS

| EMISSION | | |
|--|---|---------|
| Test Item | Standard | Results |
| Power Line Conducted Emission Test | EN 55032:2015+AC:2016-07+A1:2020+A11:2020 | PASS |
| Radiated Emission | EN 55032:2015+AC:2016-07+A1:2020+A11:2020 | PASS |
| Harmonic Current | EN IEC 61000-3-2:2019+A2:2021 | PASS |
| Voltage Fluctuation And Flicker | EN 61000-3-3:2019+A2:2021 | PASS |
| IMMUNITY (EN 55035:2017+A11:2020) | | |
| Test Item | Basic Standard | Results |
| Electrostatic Discharge Immunity | EN 61000-4-2:2009 | PASS |
| Radiated Electromagnetic Fields Immunity | EN IEC 61000-4-3:2020 | PASS |
| Electric Fast Transient Burst Immunity | EN 61000-4-4:2012 | PASS |
| Surge Immunity | EN 61000-4-5:2014+A1:2017 | PASS |
| Injected Currents Susceptibility Test | EN 61000-4-6:2019 | PASS |
| Power Frequency Magnetic Field Immunity(50/60Hz) | EN 61000-4-8:2010 | PASS |
| Voltage Dips And Interruptions Immunity | EN IEC 61000-4-11:2020 | PASS |
| N/A is an abbreviation for Not Applicable. | | |

2. GENERAL INFORMATION

2.1. Test Laboratory

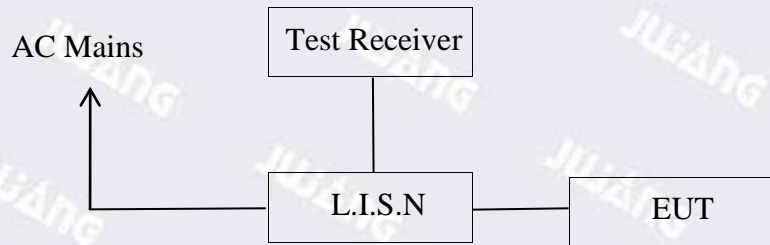
| | |
|---------------------------------------|--|
| Test Site1 | |
| Name | : Aerospace Testing Technology (Shenzhen) Co., Ltd. |
| Address | : 101, Block A4, No. 5, 8th Road, Shapu Yangyong Industrial Park, Songgang Street, Bao'an District, Shenzhen, Guangdong, China |
| Phone | : + 086 0755-27781492 |
| E-mail | : ast@hangtianjc.com |
| Test Site2 | |
| Name | : / |
| Address | : / |
| Phone | : / |
| E-mail | : / |
| Test Site3 | |
| Name | : / |
| Address | : / |
| Phone | : / |
| E-mail | : / |
| Test Report Form : EN55035_32J No. | |
| TRF Originator | : ATS |
| Master TRF | : Jul. 25, 2021 |

2.2. List Of Test Equipments

| Item | Kind of Equipment | Manufacturer | Type No. | Calibrated until |
|------|---------------------|------------------------|------------------|------------------|
| 1 | EMI Test Receiver | R&S | ESU8 | Aug. 24, 2022 |
| 2 | Bilog Antenna | SCHWARZBECK | VULB 9163 | Aug. 24, 2022 |
| 3 | Horn Antenna | SCHWARZBECK | BBHA9120D | Aug. 24, 2022 |
| 4 | Amplifier | Tonscend | TAP-9E6343 | Aug. 24, 2022 |
| 5 | Amplifier | Tonscend | TAP-051841 | Aug. 24, 2022 |
| 6 | Triple-Loop Antenna | Daze | ZN30401 | Aug. 24, 2022 |
| 7 | EMI Test Receiver | R&S | ESRP3 | Aug. 24, 2022 |
| 8 | LISN | Schwarzbeck | NNLK 8121 | Aug. 24, 2022 |
| 9 | Amplitude limiter | Schwarzbeck | VTSD 9561 F | Aug. 24, 2022 |
| 10 | ESD TEST GENERATOR | 3CTest | EDS 30V | Aug. 24, 2022 |
| 11 | Signal Generator | Keysight | N5181A | Aug. 24, 2022 |
| 12 | Power Amplifier | Mic-top | MPA-80-1000-1000 | Aug. 24, 2022 |
| 13 | Power meter | Keysight | E4419A | Aug. 24, 2022 |
| 14 | Power probe | Keysight | E9304A | Aug. 24, 2022 |
| 15 | Power Amplifier | AR | 25S1G4A | Aug. 24, 2022 |
| 16 | Antenna | Schwarzbeck | STLP9149 | Aug. 24, 2022 |
| 17 | Control | Positioning Controller | Model MF-7802 | 04/26/2022 |
| 18 | Immunity test | 3CTest | CCS 600 | Aug. 24, 2022 |
| 19 | Coupling clamp | 3CTest | CCC100 | Aug. 24, 2022 |
| 20 | CDN | 3CTest | SEPN3832T | Aug. 24, 2022 |
| 21 | Voltage regulator | 3CTest | VVT2216 | Aug. 24, 2022 |

3. ENTPOWER LINE CONDUCTED EMISSION MEASUREMENT

3.1. Block Diagram of Test Setup



3.2. Measuring Standard

Power Line Conducted Emission Limits (Class B)

| Frequency (MHz) | Limit (dB μ V) | |
|-----------------|--------------------|---------------|
| | Quasi-Peak Level | Average Level |
| 0.15 ~ 0.50 | 66.0 ~ 56.0 * | 56.0 ~ 46.0 * |
| 0.50 ~ 5.00 | 56.0 | 46.0 |
| 5.00 ~ 30.00 | 60.0 | 50.0 |

NOTE1-The lower limit shall apply at the transition frequencies.
NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.3. EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet EN 61000-6-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.4. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N).

This provided a 50ohm coupling impedance for the tested equipments.

Both sides of AC line are investigated to find out the maximum conducted emission according to the EN 61000-6-1 regulations during conducted emission measurement.

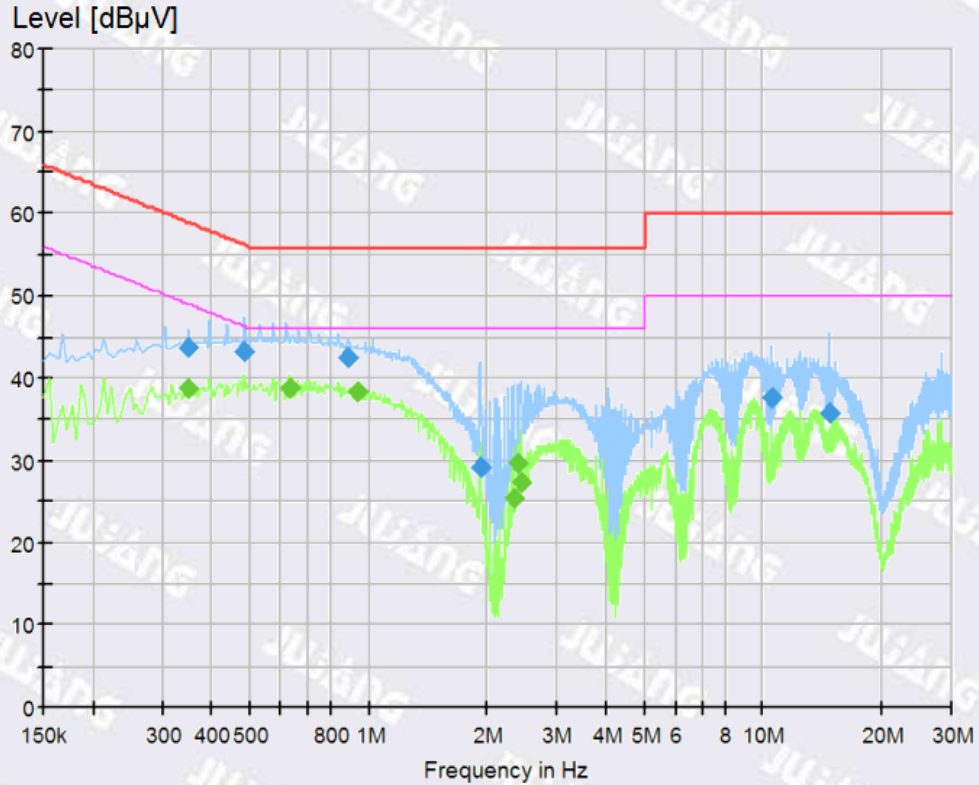
The bandwidth of the field strength meter (R&S Test Receiver ESCS30) is set at 9KHz in 150KHz~30MHz and 200Hz in 9KHz~150KHz.

The frequency range from 150kHz to 30MHz is investigated.

Conduction Uncertainty: $U_c = \pm 2.72$ dB

3.5. Test Results

Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, L

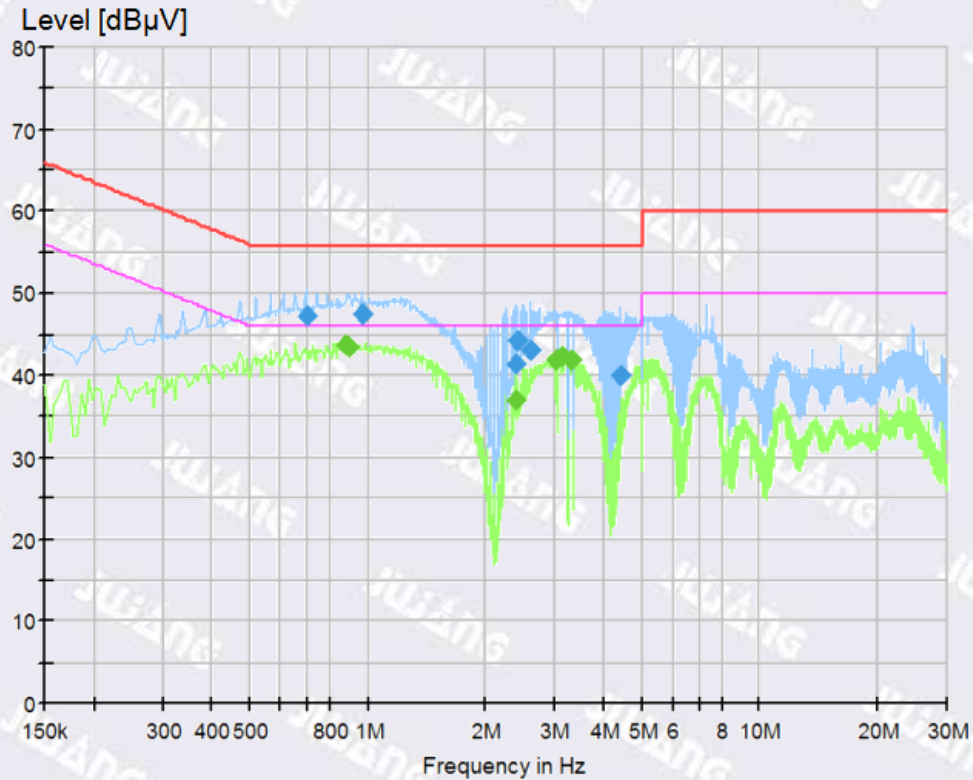


Final quasi-peak measurement results:

| Frequency (MHz) | QuasiPeak (dB V) | Limit (dB V) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.348000 | 43.82 | 59.01 | 15.19 | 1000.0 | 9.000 | L1 | 10.4 |
| 0.483000 | 43.33 | 56.29 | 12.96 | 1000.0 | 9.000 | L1 | 10.4 |
| 0.888000 | 42.50 | 56.00 | 13.50 | 1000.0 | 9.000 | L1 | 10.5 |
| 1.918500 | 29.15 | 56.00 | 26.85 | 1000.0 | 9.000 | L1 | 10.5 |
| 10.558500 | 37.73 | 60.00 | 22.27 | 1000.0 | 9.000 | L1 | 11.0 |
| 14.761500 | 35.73 | 60.00 | 24.27 | 1000.0 | 9.000 | L1 | 11.2 |

Final average measurement results:

| Frequency (MHz) | CAverage (dB V) | Limit (dB V) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.348000 | 38.86 | 49.01 | 10.15 | 1000.0 | 9.000 | L1 | 10.4 |
| 0.631500 | 38.80 | 46.00 | 7.20 | 1000.0 | 9.000 | L1 | 10.4 |
| 0.937500 | 38.35 | 46.00 | 7.65 | 1000.0 | 9.000 | L1 | 10.5 |
| 2.328000 | 25.54 | 46.00 | 20.46 | 1000.0 | 9.000 | L1 | 10.5 |
| 2.391000 | 29.66 | 46.00 | 16.34 | 1000.0 | 9.000 | L1 | 10.5 |
| 2.449500 | 27.47 | 46.00 | 18.53 | 1000.0 | 9.000 | L1 | 10.5 |

Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, N

Final quasi-peak measurement results:

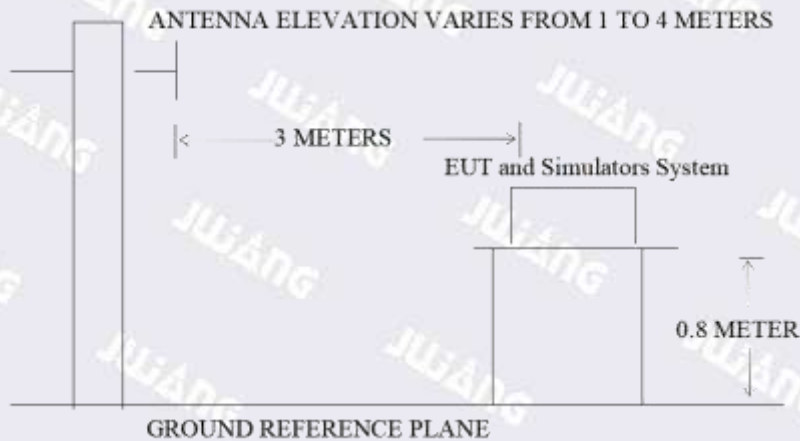
| Frequency (MHz) | QuasiPeak (dB V) | Limit (dB V) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.699000 | 47.19 | 56.00 | 8.81 | 1000.0 | 9.000 | N | 10.5 |
| 0.969000 | 47.39 | 56.00 | 8.61 | 1000.0 | 9.000 | N | 10.5 |
| 2.395500 | 41.32 | 56.00 | 14.68 | 1000.0 | 9.000 | N | 10.5 |
| 2.418000 | 44.17 | 56.00 | 11.83 | 1000.0 | 9.000 | N | 10.5 |
| 2.598000 | 43.12 | 56.00 | 12.88 | 1000.0 | 9.000 | N | 10.5 |
| 4.447500 | 40.02 | 56.00 | 15.98 | 1000.0 | 9.000 | N | 10.6 |

Final average measurement results:

| Frequency (MHz) | CAverage (dB V) | Limit (dB V) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.874500 | 43.65 | 46.00 | 2.35 | 1000.0 | 9.000 | N | 10.5 |
| 0.897000 | 43.43 | 46.00 | 2.57 | 1000.0 | 9.000 | N | 10.5 |
| 2.377500 | 36.93 | 46.00 | 9.07 | 1000.0 | 9.000 | N | 10.5 |
| 3.034500 | 41.91 | 46.00 | 4.09 | 1000.0 | 9.000 | N | 10.6 |
| 3.120000 | 42.28 | 46.00 | 3.72 | 1000.0 | 9.000 | N | 10.6 |
| 3.295500 | 41.94 | 46.00 | 4.06 | 1000.0 | 9.000 | N | 10.6 |

4. RADIATED EMISSION MEASUREMENT

4.1. Block diagram of test setup (In chamber)



4.2. Measuring

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 (dB V/m) |
|--------------------|----------------------|-----------------------------------|
| 30 ~ 230 | 3 | 40 |
| 230 ~ 1000 | 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.

4.3. EUT Configuration on Test

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

4.4. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table 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 a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna (calibrated by Dipole Antenna) is used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver (ESCS30) is set at 120kHz.
The frequency range from 30MHz to 1000MHz is investigated.

Radiation Uncertainty: $U_r = \pm 3.84$ dB

4.5. Test Results

its test data was showed as the follow:

Radiated Emission Measurement

Time: 9:23:29



Site LAB

Limit: EN55032 3m Class B Radiation (QP)

Polarization: **Horizontal**

Power: AC 230V/50Hz

Distance: 3m RBW: 120 KHz

VBW: 300 KHz

Temperature: 23(C)

Humidity: 54 %

Sweep Time: 165 ms

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dB/m | Over dB | Antenna Height cm | Table Degree degree | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|---------------|------------|-------------------------|---------------------------|----------|---------|
| 1 | | 39.7146 | 27.53 | -5.34 | 22.19 | 40.00 | -17.81 | | | peak | |
| 2 | | 54.4516 | 27.42 | -5.88 | 21.54 | 40.00 | -18.46 | | | peak | |
| 3 | | 96.2672 | 28.58 | -9.05 | 19.53 | 40.00 | -20.47 | | | peak | |
| 4 | | 149.2239 | 27.18 | -5.50 | 21.68 | 40.00 | -18.32 | | | peak | |
| 5 | | 317.1445 | 27.26 | -4.61 | 22.65 | 47.00 | -24.35 | | | peak | |
| 6 | * | 570.6100 | 28.08 | 2.02 | 30.10 | 47.00 | -16.90 | | | peak | |

*:Maximum data x:Over limit !:over margin

(Reference Only)

Radiated Emission Measurement

Time: 9:24:22



Site: LAB
 Limit: EN55032 3m Class B Radiation (QP)
 Polarization: **Vertical**
 Power: AC 230V/50Hz
 Distance: 3m
 RBW: 120 KHz
 VBW: 300 KHz
 Temperature: 23(C)
 Humidity: 54 %
 Sweep Time: 165 ms

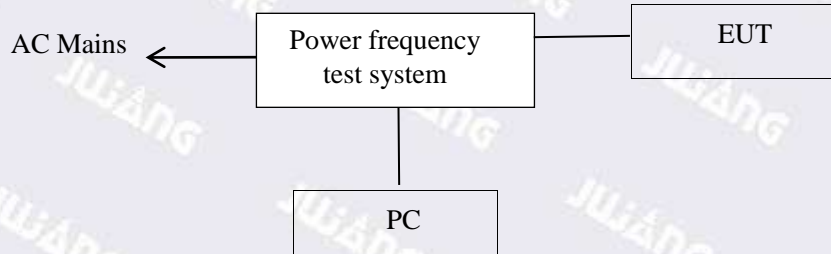
| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dB/m | Over dB | Antenna Height cm | Table Degree degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|---------------|------------|-------------------------|---------------------------|---------|
| 1 | | 39.7146 | 29.57 | -5.34 | 24.23 | 40.00 | -15.77 | peak | | |
| 2 | * | 57.8977 | 32.27 | -6.06 | 26.21 | 40.00 | -13.79 | peak | | |
| 3 | | 96.2672 | 33.96 | -9.05 | 24.91 | 40.00 | -15.09 | peak | | |
| 4 | | 167.2368 | 28.21 | -5.99 | 22.22 | 40.00 | -17.78 | peak | | |
| 5 | | 483.0618 | 27.78 | 0.31 | 28.09 | 47.00 | -18.91 | peak | | |

*:Maximum data x:Over limit !:over margin

(Reference Only)

5. HARMONIC CURRENT EMISSION MEASUREMENT

5.1. Block Diagram of Test Setup



5.2. Measuring

EN IEC 61000-3-2:2019+A2:2021

5.3. Description of test Equipment

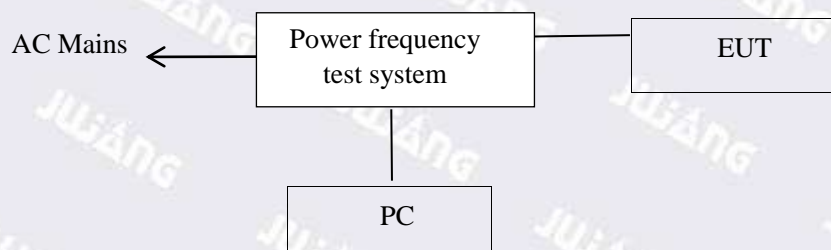
Note: Equipment is less than 75W, no corresponding harmonic current limit.

5.4. Test Results

PASS

6. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Measuring Standard

EN 61000-3-3:2019+A2:2021

6.3. Test Results

PASS.

7. ELECTROSTATIC DISCHARGE IMMUNITY TEST

7.1. Block Diagram Of Test



7.2. Test Standard

EN 55035:2017+A11:2020
 Severity Level: 3 / Air Discharge: $\pm 8\text{KV}$
 Level: 2 / Contact Discharge: $\pm 4\text{KV}$

7.3. Severity Levels and Performance Criterion

7.4. Severity Levels

| 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 |

7.3.1. Performance Criterion:B

7.5. Test Procedure

7.4.1. Air Discharge:

This test is done on a non-conductive surface. 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.

7.4.2. Contact Discharge:

All the procedure shall be same as Section 4.2.3.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.4.3. Indirect discharge for horizontal coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

7.4.4. Indirect discharge for vertical coupling plane

At least 10 single discharge (in the most sensitive polarity) 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.

7.6. Test Results

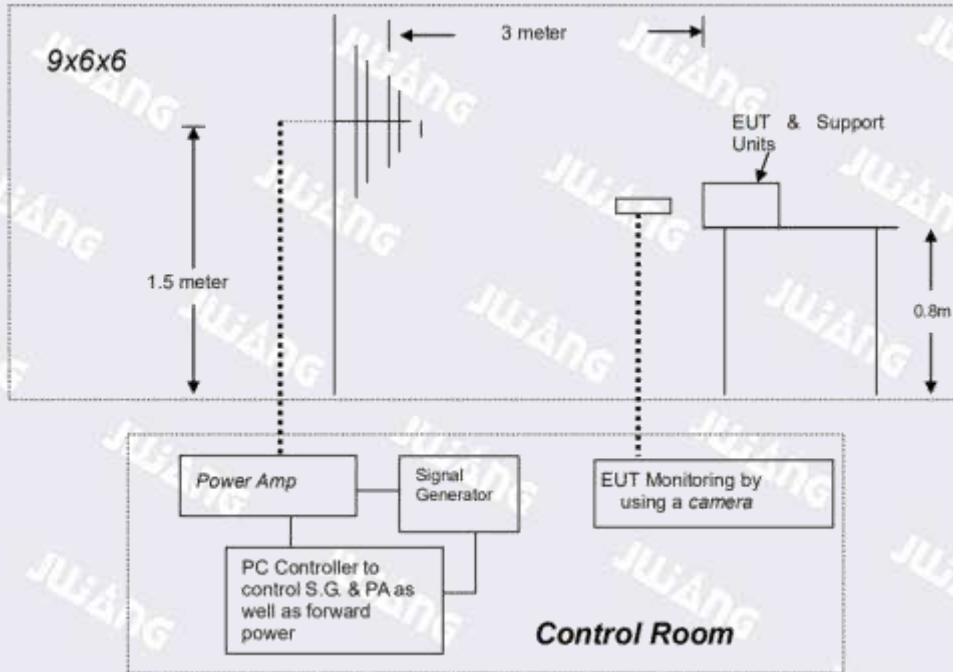
PASS.

Please refer to the following pages.

| Electrostatic Discharger Test Results | | | | | | |
|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--|--|
| Standard | EN 61000-4-2 | | | | | |
| Temperature | 25.4°C | | | Humidity | 56.8% | |
| Criterion | B | | | Pressure | 996mbar | |
| Test Mode | Normal | | | Test Date | 2022-06-24 | |
| Air Discharge | | | | | | |
| Test Points | Test Levels | | | Results | | |
| | 2KV | 4KV | 8KV | Passed | Fail | Performance Criterion |
| Front | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B |
| Back | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B |
| Left | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B |
| Right | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B |
| Top | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B |
| Bottom | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B |
| Contact Discharge | | | | | | |
| Test Points | Test Levels | | Results | | | |
| | 2KV | 4KV | Passed | Fail | Performance Criterion | |
| Front | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Back | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Left | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Right | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Top | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Bottom | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Discharge To Horizontal Coupling Plane | | | | | | |
| Side of EUT | Test Levels | | Results | | | |
| | 2KV | 4KV | Passed | Fail | Performance Criterion | |
| Front | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Back | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Left | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Right | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Discharge To Vertical Coupling Plane | | | | | | |
| Side of EUT | Test Levels | | Results | | | |
| | 2KV | 4KV | Passed | Fail | Performance Criterion | |
| Front | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Back | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Left | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |
| Right | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> A <input checked="" type="checkbox"/> B | |

8. RF FIELD STRENGTH SUSCEPTIBILITY TEST

8.1. Block Diagram Of Test



8.2. Test Standard

EN 61000-4-3: 2006+A1: 2008+A2: 2010

8.2.1. Severity Levels

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

8.2.2. Performance Criterion: A

8.3. Test Procedure

The EUT are placed on a table which is 0.8 meter high 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 are set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor its screen. All the scanning conditions are as following:

| Condition of Test | Remark |
|------------------------------|--|
| 1. Fielded Strength | 3 V/m (Severity Level 2) |
| 2. Radiated Signal | Modulated |
| 3. Scanning Frequency | 80 - 1000 MHz 1800MHz 2600MHz 3500MHz 5000MHz |
| 4. Sweeping time of radiated | 0.0015 decade/s |
| 5. Dwell Time | 1 Sec. |

8.4. Test Results

PASS.

Please refer to the following pages.

| RF Field Strength Susceptibility Test Results | | | |
|---|--|-----------------------|------------|
| Standard | EN 61000-4-3 | | |
| Temperature | 24.8°C | Humidity | 57.5% |
| Criterion | A | Field Strength | 3V/m |
| Test Mode | Normal | Test Date | 2022-06-22 |
| Frequency Range | 80MHz to 1000 MHz | | |
| Modulation | <input type="checkbox"/> None <input type="checkbox"/> Pulse <input checked="" type="checkbox"/> AM 1KHz 80% | | |
| Steps | 1% | | |
| | Horizontal | Vertical | |
| Front | PASS | PASS | |
| Right | PASS | PASS | |
| Rear | PASS | PASS | |
| Left | PASS | PASS | |

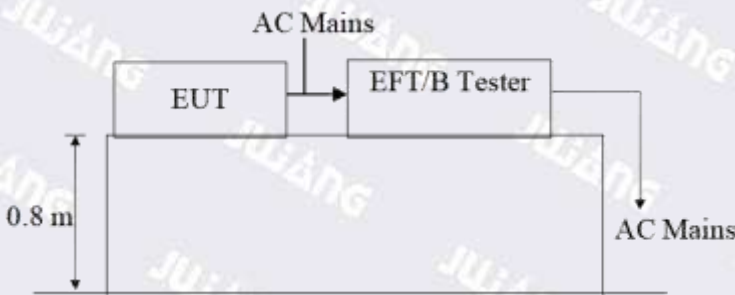
9. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

9.1. Block Diagram of Test Setup

9.1.1. Block Diagram of the EUT



9.1.2. EFT Test Setup



9.2. Test Standard

EN 61000-4-4:2012
Severity Level 2 at 1KV

9.3. Severity Levels and Performance Criterion

9.3.1. Severity level

| Open Circuit Output Test Voltage $\pm 10\%$ | | |
|---|-----------------------|---|
| Level | On Power Supply Lines | On I/O (Input/Output) Signal data and control lines |
| 1. | 0.5 KV | 0.25 KV |
| 2. | 1 KV | 0.5 KV |
| 3. | 2 KV | 1 KV |
| 4. | 4 KV | 2 KV |
| X | Special | Special |

9.3.2. Performance criterion : B

9.4. Test Procedure

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

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 mins.

9.5. Test Results

| Test Point | Polarity | Test Level (kV) | Performance Criterion | Observation | Result |
|------------|----------|-----------------|-----------------------|---|--------|
| L 1 | +/- | 1 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |
| L 2 | +/- | 1 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |
| L 1-L 2 | +/- | 1 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |
| PE | +/- | 1 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |
| L - PE | +/- | 1 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |
| N - PE | +/- | 1 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |
| L - N - PE | +/- | 1 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |

NOTE: 1. There was no change compared with initial operation during the test.

2. The loss of function of the EUT during the test and it was recovered by itself operation after the test.

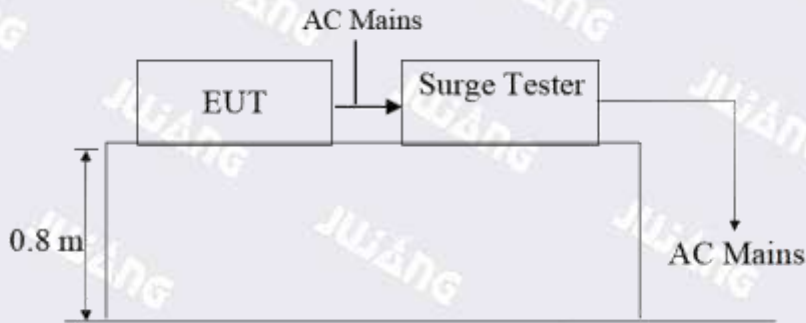
10. SURGE IMMUNITY TEST

10.1. Block Diagram of Test Setup

10.1.1. Block Diagram of the EUT



10.1.2. Surge Test Setup



Polarity : Positive / Negative
 Pulse number : 5 pulses for each polarity
 Coupling phase: 0°, 90°, 180°, 270°
 Repetition rate: 1 pulse/min
 Input voltage : AC 230 V, 50 Hz
 Operation mode: Power on with incandescent bulb and operated Wi-Fi function

10.2. Test Standard

EN 55035:2017+A11:2020

Severity Level: Line to Line: Level 2, 1.0KV)

10.3. Severity Levels and Performance Criterion

10.3.1. Severity level

| Severity Level | Open-Circuit Test Voltage KV |
|----------------|---------------------------------|
| 1 | 0.5 |
| 2 | 1.0 |
| 3 | 2.0 |
| 4 | 4.0 |
| * | Special |

10.3.2. Performance criterion : B

10.4. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 10.1.2.
- 2) For line to line coupling mode, provide a 1.0 KV 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) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

10.5. Test Results

| Test Point | Polarity | Test Level (kV) | Performance Criterion | Observation | Result |
|------------|----------|-----------------|-----------------------|---|--------|
| L 1 - L 2 | +/- | 1 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |
| L1 - PE | +/- | 2 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |
| L2 - PE | +/- | 2 | B | Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 | PASS |
| R - Ground | -- | -- | -- | Note <input type="checkbox"/> 1 <input type="checkbox"/> 2 | N/A |
| T - Ground | -- | -- | -- | Note <input type="checkbox"/> 1 <input type="checkbox"/> 2 | N/A |

NOTE: 1. There was no change compared with initial operation during the test.
 2. The loss of function of the EUT during the test and it was recovered by itself operation after the test.

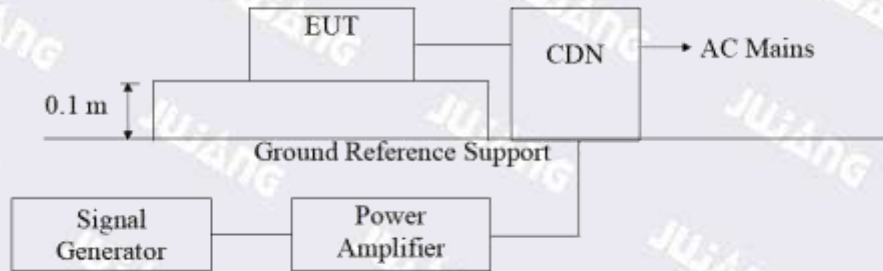
11. INJECTED CURRENTS SUSCEPTIBILITY TEST

11.1. Block Diagram of Test Setup

11.1.1. Block Diagram of the EUT



11.1.2. Block Diagram of Test Setup



11.2. Test Standard

EN 55035:2017+A11:2020

Severity Level 2 at 3V (rms), 0.15MHz ~ 10MHz
 Severity Level 2 and Level 1 at 3 V to 1V (rms),
 10MHz ~ 30MHz Severity Level 1 at 1V (rms), 30 MHz ~ 80MHz

11.3. Severity Levels and Performance Criterion

11.3.1. Severity level

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

11.3.2. Performance criterion: A

11.4. Test Procedure

- 1) Set up the EUT, CDN and test generators as shown on Section 11.1.2.
- 2) Let the EUT work in test mode and measure it.
- 3) The EUT 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 about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 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 testing and decide the EUT immunity criterion.

11.5. Test Results

AC mains power input port

Frequency range: 150kHz to 80MHz
 Modulated: Amplitude 80%, 1kHz sine wave
 Severity Level: 3 _____ V Unmodulated , r.m.s

| Level | Voltage Level (e.m.f.) U ₀ | Pass | Fail |
|-------|--|------|------|
| 1 | 1 | / | / |
| 2 | 3 | A | / |
| 3 | 10 | / | / |
| X | Special | / | / |

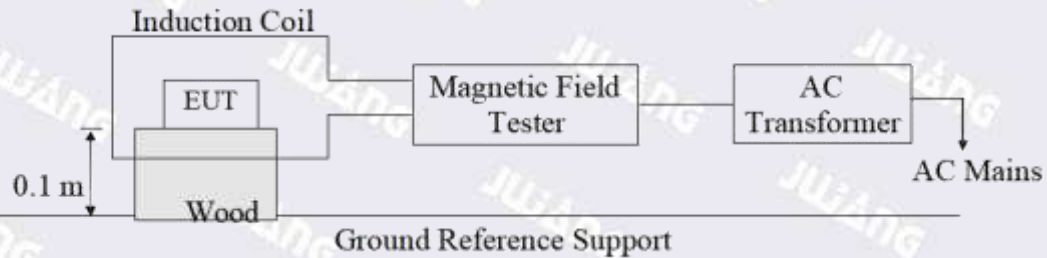
12. MAGNETIC FIELD SUSCEPTIBILITY TEST

12.1. Block Diagram of Test

12.1.1. Block diagram of test setup



12.1.2. Magnetic field test setup



12.2. Test Standard

(Severity Level: Level 1, 1A / m)

EN 55035:2017+A11:2020

12.3. Severity Levels and Performance Criterion

12.3.1. Severity Levels

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

12.3.2. Performance Criterion : A

12.4. Test Procedure

The EUT is placed in the middle of a induction coil (1*1m), under which is a 1*1*0.1m (high) table, this small table is also placed on a larger table,0.8 m above the ground. Both horizontal and vertical polarization of the induction coil are set on test, so that each side of the EUT is affected by the magnetic field. Also can reach the same aim by change the position of the EUT.

12.5. Test Result

| Magnetic Field Immunity Test Result | | | |
|---|------------------|------------------|------------|
| Temperature | 25.2°C | Humidity | 56.8% |
| Test Mode | Normal | Test Date | 2022-06-26 |
| Test Level (A/M) | Testing Duration | Coil Orientation | Result |
| 1 | 5 mins | X | Pass |
| 1 | 5 mins | Y | Pass |
| 1 | 5 mins | Z | Pass |
| A: Normal performance within the specification limits; B: Temporary degradation or loss of function or performance which is self-recoverable; C: Temporary degradation or loss of function or performance which requires operator intervention or system reset; | | | |

13. VOLTAGE DIPS AND INTERRUPTIONS TEST

Aerospace Testing Technology (Shenzhen) Co., Ltd.

101, Block A4, No. 5, 8th Road, Shapu Yangyong Industrial Park,
Songgang Street, Bao'an District, Shenzhen, Guangdong, China

Tel.: .086-0755-27781492

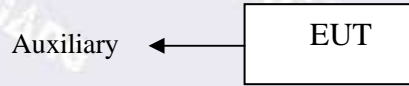
Fax.: 086-0755-27781492

Web.: www.ast-test.com

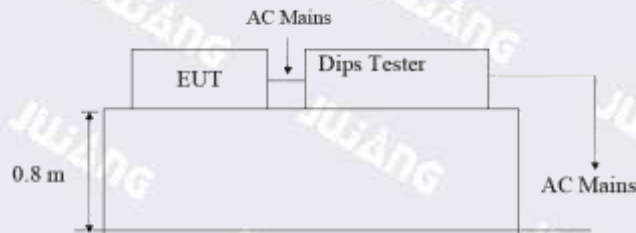
E-mail: ast@hangtianjc.com

13.1. Block Diagram of Test Setup

13.1.1. Block Diagram of the EUT



13.1.2. Dips Test Setup



13.2. Test Standard

EN 55035:2017+A11:2020

13.3. Severity Levels and Performance Criterion

13.3.1. Severity level

| Test Level %UT | Voltage dip and short interruptions %UT | Duration (in period) |
|-------------------|---|-------------------------|
| 0 | 100 | 0.5 |
| | | 1 |
| 40 | 60 | 5 |
| | | 10 |
| | | 25 |
| 70 | 30 | 50 |
| | | * |

13.3.2. Performance criterion : B&C&C

13.4. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 13.1.2.
- 2) The interruptions is introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

13.5. Test Result

| Environmental Phenomena | Test level (in % U_T) | Duration (in period of the rated frequency) | Remarks |
|-------------------------|--------------------------|---|---|
| Dips | 0 | 0.5 T (10 ms) | During the test, the load lamp flickered. After the disturbance ceased, it could be restored automatically. |
| Dips | 0 | 1 T (20 ms) | |
| Dips | 70 | 25 T (500 ms) | |
| Interruptions | 0 | 250 T (5 s) | |

NOTE: 1. There was no change compared with initial operation during and after the test.

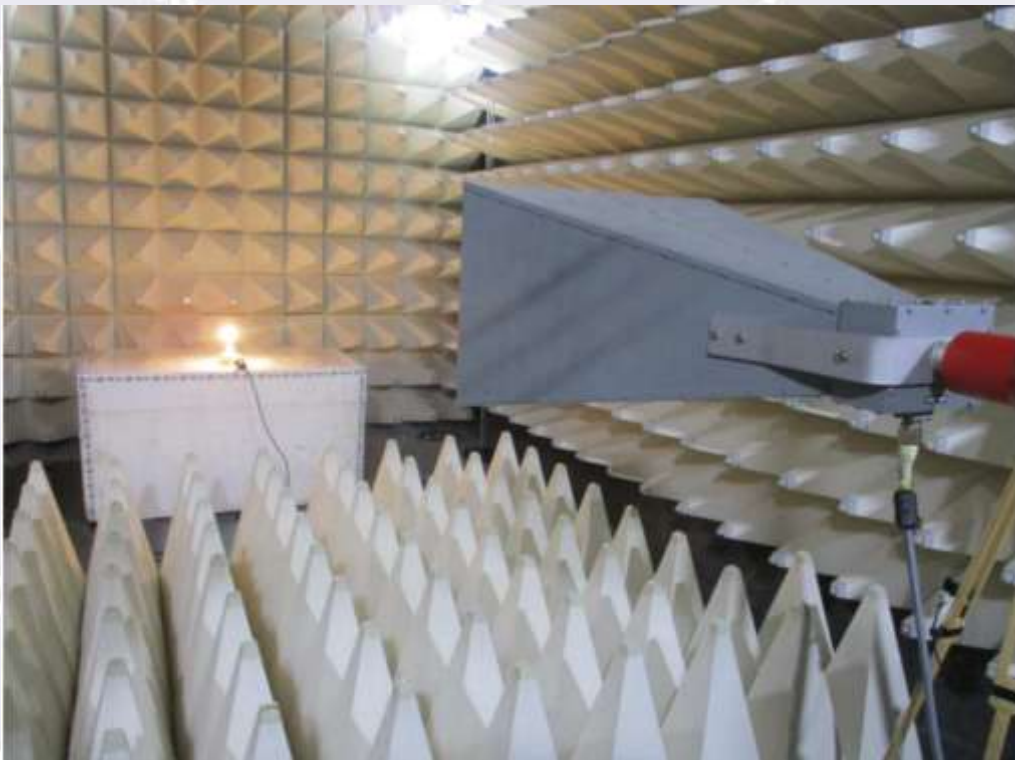
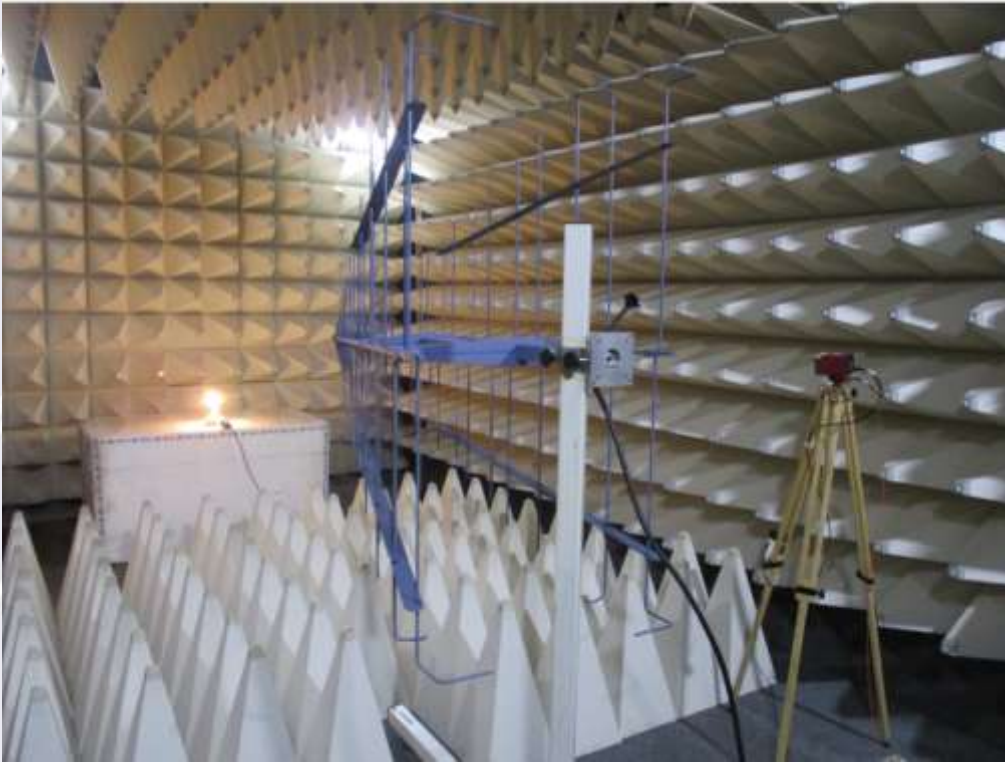
No unintentional response was found during the test.

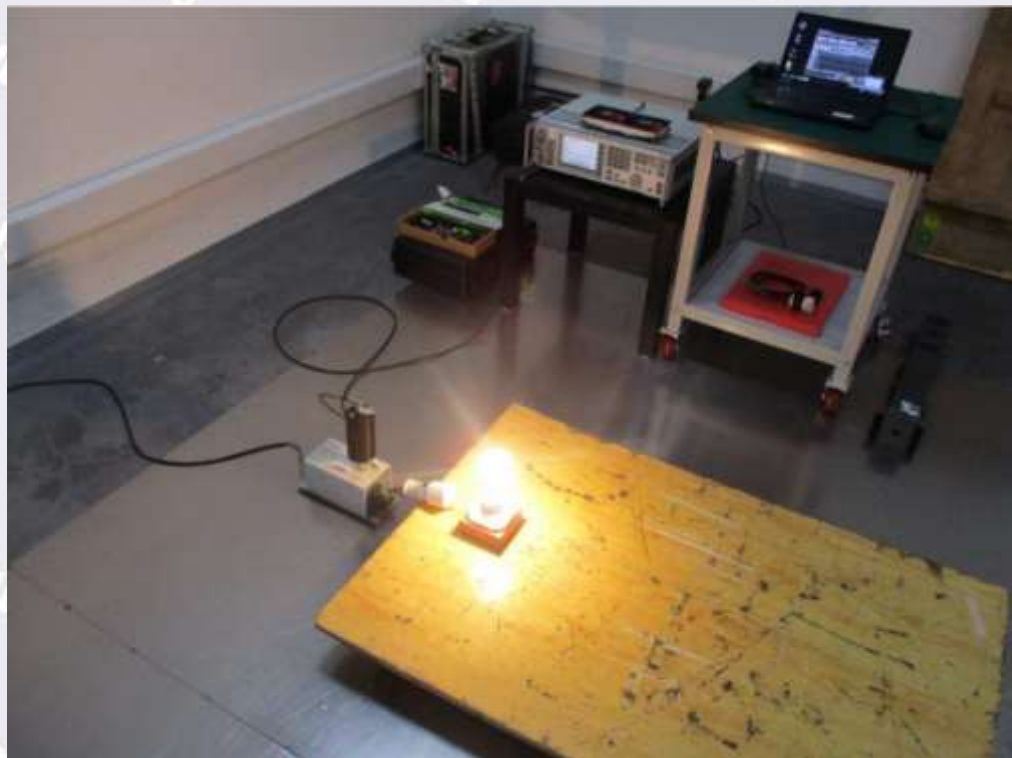
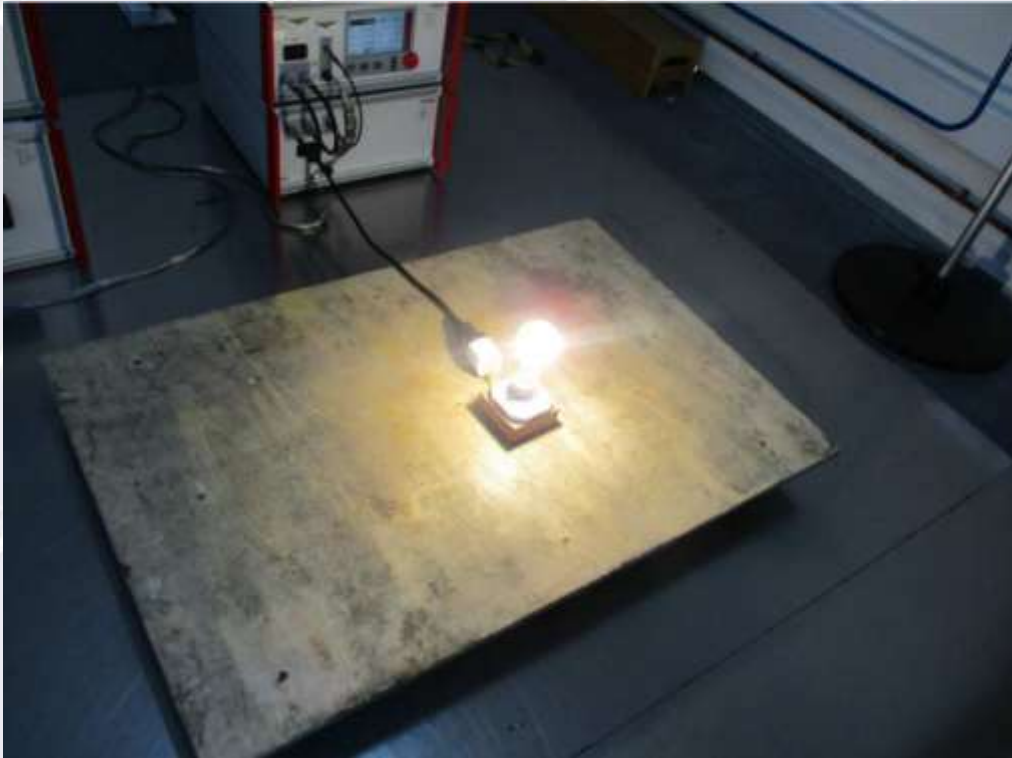
2. The function stopped during the test, but can be recoverable by itself operation after the test.

3. The function stopped during the test, but can be recoverable manually after the test.

Photographs of the Test Set-Up









EUT PHOTOS

Photo1

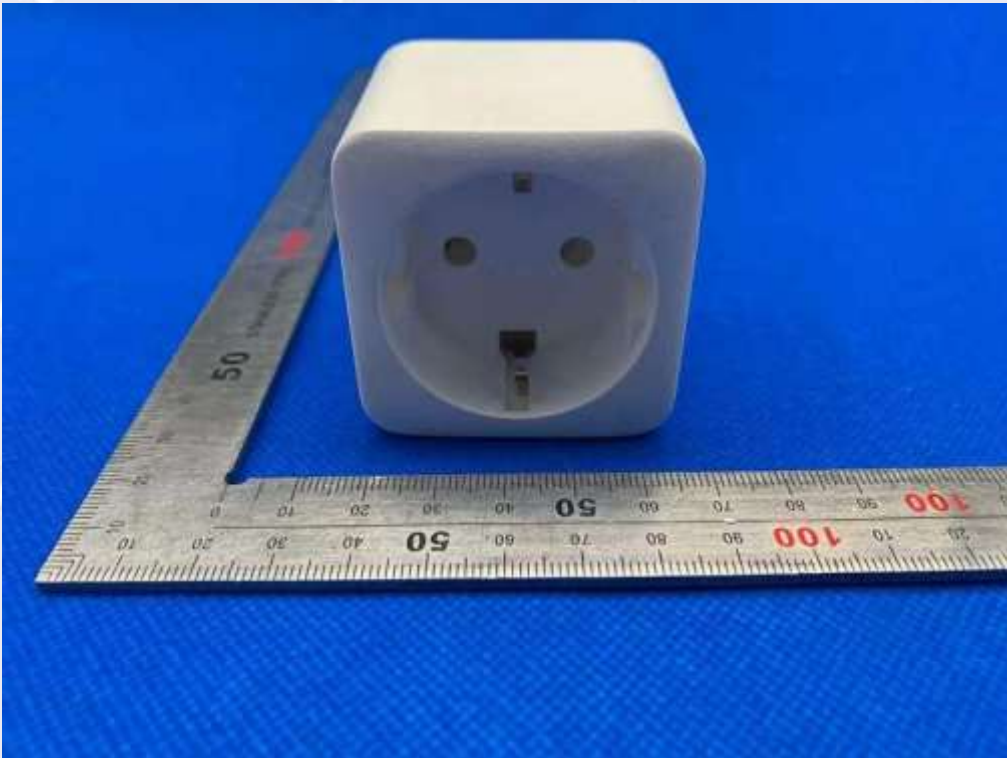


Photo2

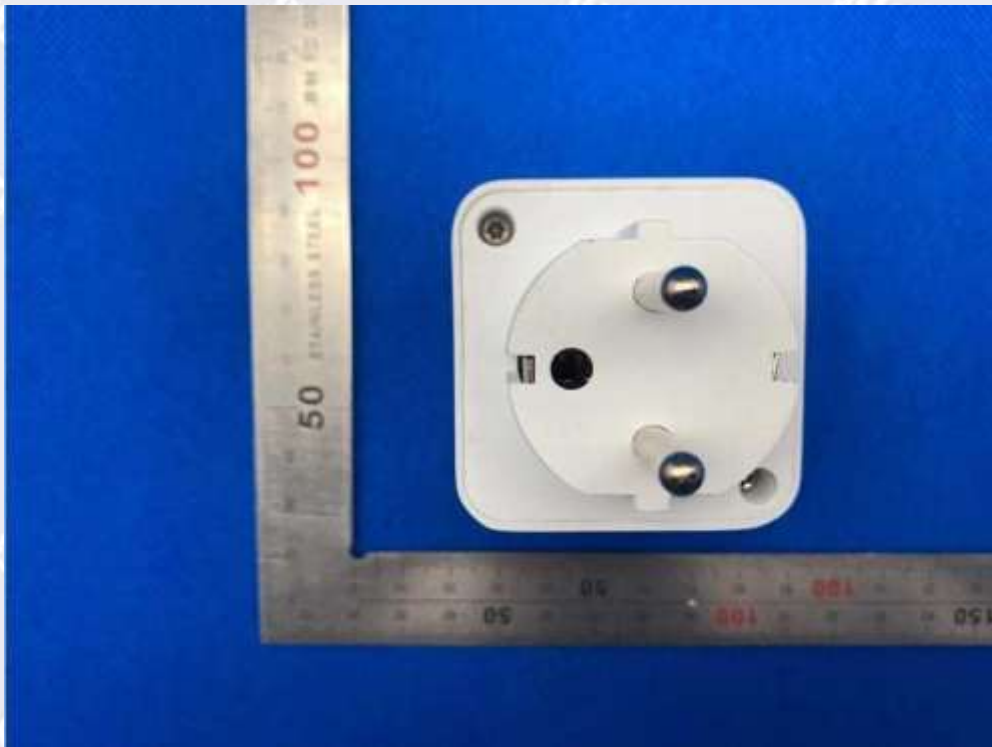


Photo3



Photo4



Photo5

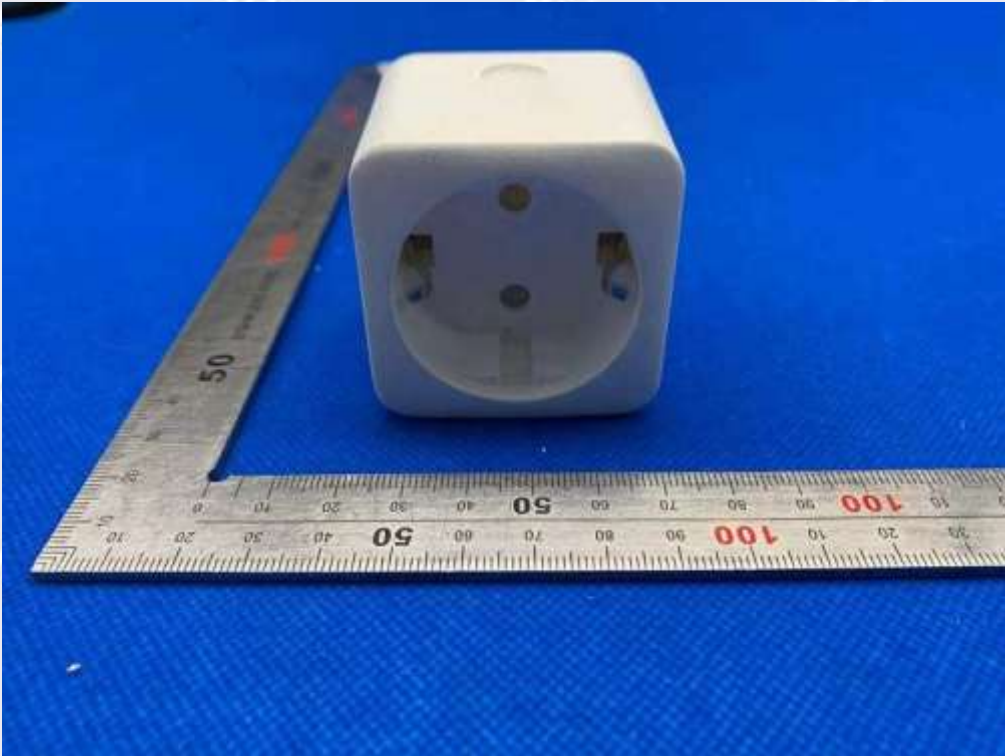


Photo6



Photo7



Photo8



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