# EMC Test Report

Report No.: AGC01110230937EE02

| | | |
|---|---|---|
| **PRODUCT DESIGNATION** | : | Wake-up Light |
| **BRAND NAME** | : | N/A |
| **MODEL NAME** | : | ACA-002, ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **APPLICANT** | : | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **DATE OF ISSUE** | : | Oct. 08, 2023 |
| **STANDARD(S)** | : | EN IEC 55015:2019+A11:2020<br>EN 61000-3-3:2013+A2:2021<br>EN IEC 61000-3-2:2019+A1:2021<br>EN 61547:2009 |
| **REPORT VERSION** | : | V1.0 |

Attestation of Global Compliance (Shenzhen) Co., Ltd

***A**ttestation of **G**lobal **C**ompliance (Shenzhen) Co., Ltd*

## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Oct. 08, 2023 | Valid | Initial release |

## Table of contents

## 1. General information

| | |
|---|---|
| Applicant | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Manufacturer | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Factory | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Product Designation | Wake-up Light |
| Brand Name | N/A |
| Test Model | ACA-002 |
| Series Model(s) | ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| Difference Description | All the same except for the model name and appearance color. |
| Deviation from Standard | No any deviation from the test method |
| Date of receipt of test item | Sep. 19, 2023 |
| Date of Test | Sep. 19, 2023 to Oct. 08, 2023 |
| Test Result | Pass |
| Test Report Form No | AGCER-EMC-GEN-V1 |
| Note: The test results of this report relate only to the tested sample identified in this report. | |

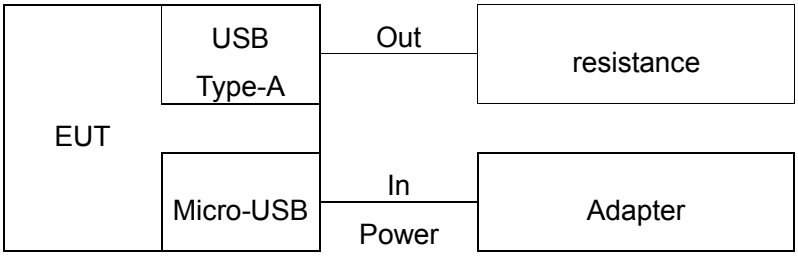
| | | |
|---|---|---|
| Prepared By | Cool Cheng<br>(Project Engineer) | Oct. 08, 2023 |
| Reviewed By | Calvin Liu<br>(Reviewer) | Oct. 08, 2023 |
| Approved By | Max Zhang<br>(Authorized Officer) | Oct. 08, 2023 |

# 2. Description of Test Configuration

## 2.1. Technical Description of Product

| | |
|---|---|
| Test arrangements of EUT | Table-top |
| Hardware Version | V2.0 |
| Software Version | V2.0 |
| Highest Internal Frequency | More than 108MHz |
| EUT Input Rating | DC 5V by adapter |
| Adapter Information | Model: YC-R02052000VU<br>Input: AC 100-240V, 50/60HZ, 0.2A<br>Output: DC 5.0V, 2.0A,10.0W<br>Manufacturer: SHENZHEN YOUMINGXING ELECTRONICS CO., LTD |

**Connection Diagram of Host System**




**I/O Port Information (☒Applicable ☐Not Applicable)**

| Port Type | Input/Output | Number | Cable Description |
|---|---|---|---|
| USB Type-A | Out | 1 | 1.16m unshielded |
| Micro-USB | In | 1 | 1.16m unshielded |

## 2.2. Description of Support Equipment

| Device Type | Manufacturer | Model Name | Specifications | Data Cable | Power Cable |
|---|---|---|---|---|---|
| Xiaomi phone | Xiaomi | Mi 10 | -- | -- | 1m,unshielded |
| Cement resistance | -- | -- | 5Ω | -- | 0.8m unshielded |

## 2.3. Description of Test Modes

| No. | Test Mode Description | Worst |
|---|---|---|
| 1 | Light on mode-maximum brightness（with adapter） | -- |
| 2 | Light on mode-medium brightness（with adapter） | -- |
| 3 | Light on mode-minimum brightness（with adapter） | -- |

Note: 1. All modes have been tested and only the worst mode test data recorded in the test report.

# 3. Summary of Measurement Results and Uncertainty

## 3.1. Test Specifications

| | |
|---|---|
| EN IEC 55015:2019+A11:2020 | 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 |

## 3.2. Description of Measurement Results

| Test items | Test Standard(s) | Verdict |
|---|---|---|
| Conducted emissions from the AC mains power ports | EN IEC 55015 | Pass |
| Radiated emissions at frequencies up to 1 GHz | EN IEC 55015 | Pass |
| Magnetic field induced current | EN IEC 55015 | Pass |
| Harmonic current emissions | EN IEC 61000-3-2 | Pass |
| Voltage fluctuations and flicker | EN 61000-3-3 | Pass |
| Electrostatic discharge | IEC 61000-4-2 [a] | Pass |
| Radio-frequency electromagnetic field | IEC 61000-4-3 [a] | Pass |
| Fast transients | IEC 61000-4-4 [a] | Pass |
| Surges | IEC 61000-4-5 [a] | Pass |
| Radio-frequency common mode (Injected currents) | IEC 61000-4-6 [a] | Pass |
| Power-frequency magnetic field | IEC 61000-4-8 [a] | Pass |
| Voltage dips and interruptions | IEC 61000-4-11 [a] | Pass |

Note:
a. The applicable versions of the basic standards are defined in the standard which listed in the test specification.

Performance table

| Performance Criteria for Immunity | |
|---|---|
| Performance criterion A | During the test, no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended. |
| Performance criterion B | During the test, the luminous intensity may change to any value. After the test, the luminous intensity shall be restored to its initial value within 1 min (30 min for high pressure gas discharge lamps). Regulating controls need not function during the test, but after the test, the mode of the control shall be the same as before the test, provided that during the test no mode changing commands were given. |
| Performance criterion C | During and after the test, any change of the luminous intensity is allowed and the light source(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. |
| The following additional requirement applies to lighting equipment incorporating a starting device: after the test, the lighting equipment is switched off for 30 min and back on again. The lighting equipment shall start and operate as intended. | |

### 3.3. Description of Measurement Uncertainty

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

| Item | Measurement Uncertainty |
|---|---|
| Conducted emissions from the AC mains power ports | Uc = ±2.9 dB |
| Radiated emissions at frequencies up to 1 GHz | Uc = ±3.9 dB |
| Radiated emissions at frequencies above 1 GHz | Uc = ±4.9 dB |

## 4. Test Facility

Laboratory name: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Laboratory Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified, or accredited by the following organizations:

**CNAS-Lab Code: L5488**

Attestation of Global Compliance (Shenzhen) Co., Ltd. is accredited in accordance with the recognized Interna tional Standard ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laborat ories (CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories).

**A2LA-Lab Cert. No.: 5054.02**

Attestation of Global Compliance (Shenzhen) Co., Ltd. is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This laboratory also meets the requirements of any additional program requirements in the Electrical field.

**FCC-Registration No.: 975832**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

**IC-Registration No.: 24842**

**CAB identifier: CN0063**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

**VCCI Membership No.: 4112**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered in accordance with VCCI Council Rules.

VCCI Registration No. C-20098 for conducted emissions at AC main power ports

VCCI Registration No. T-20102 for conducted emissions at telecommunication ports

VCCI Registration No. R-20136 for radiated emissions below 1GHz

VCCI Registration No. G-20132 for radiated emissions above 1GHz

# 5. Measurement of Conducted Emissions from the AC Mains Power Ports

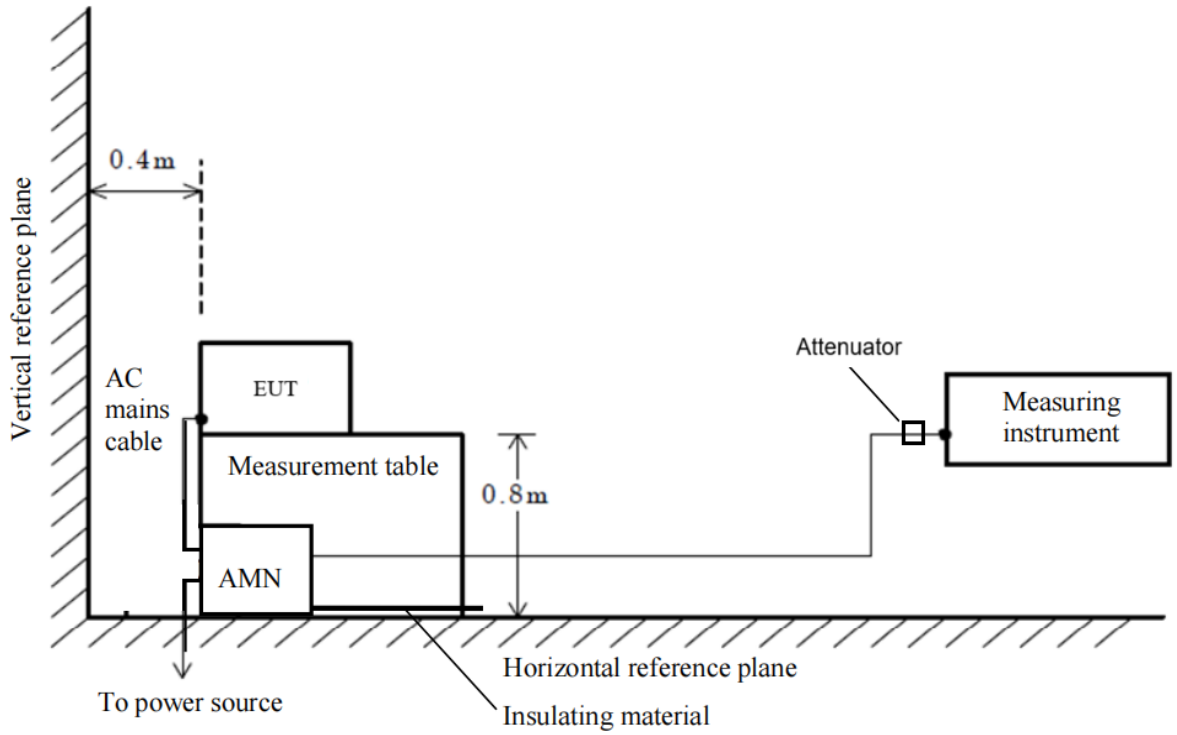
## 5.1. Requirements

Requirements for conducted emissions, low voltage AC mains port

| Network device | Detector type/ bandwidth | Frequency Range (MHz) | Limits dB(μV) | Measurement specifications |
|---|---|---|---|---|
| AMN | Quasi-peak/ 9kHz | 0.009 to 0.05 | 110 | Instrumentation: CISPR 16-1-1, Clauses 4, 5 and 7<br>Networks: CISPR 16-1-2, Clause 4<br>Method: CISPR 16-2-1, Clause 7<br>Set-up: CISPR 16-2-1, Clause 7 |
| | | 0.05 to 0.15 | 90 to 80 | |
| | | 0.15 to 0.5 | 66 to 56 | |
| | | 0.5 to 5 | 56 | |
| | | 5 to 30 | 60 | |
| | Average/ 9kHz | 0.15 to 0.5 | 56 to 46 | |
| | | 0.5 to 5 | 46 | |
| | | 5 to 30 | 50 | |

**Note:**
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the ranges 50kHz to 150kHz and 150kHz to 0.5MHz.
3. For lighting equipment incorporating exclusively electrodeless lamps, the limit in the frequency range of 2.2MHz to 3.0 MHz is 73 dB(μV) quasi-peak and 63 dB(μV) average.

## 5.2. Block Diagram of Test Setup



## 5.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESPI | 101206 | Jun. 03, 2023 | Jun. 02, 2024 |
| Artificial Mains Network | R&S | ESH2-Z5 | 100086 | Jun. 03, 2023 | Jun. 02, 2024 |
| Attenuator | East sheep | LM-XX-6-5W | N/A | Jun. 09, 2023 | Jun. 08, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| ES-K1 | R&S | For EMC Measurement, Version 1.71 |

## 5.4. Configuration of the EUT and method of measurement

a. The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane, and was positioned at a distance of 0.4 m away from the vertical reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.

b. Support equipment, if needed, was placed as per CISPR 16-2-1.

c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-1.

d. The EMI receiver measured the emission levels emanating from the EUT into the AC Mains through an Artificial Mains Network (AMN) and an attenuator used on the front end of the EMI receiver. Testing included measurements on all live and neutral lines.

e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.

f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.

g. A conducted emission is calculated by the following equation:

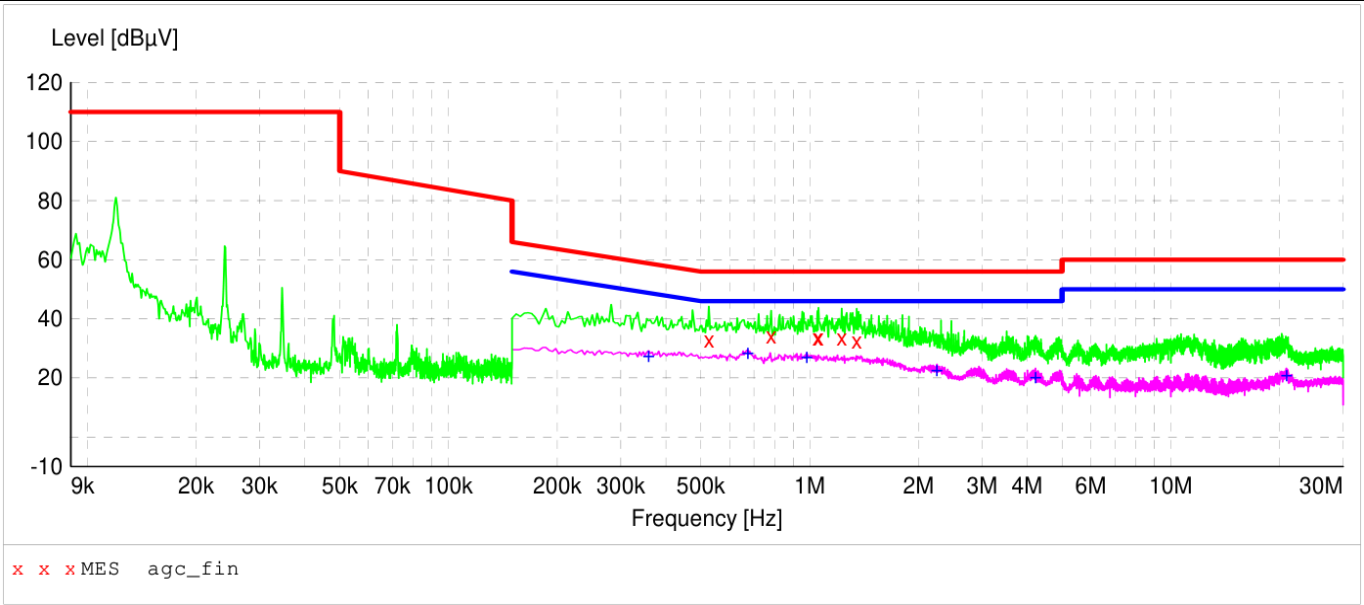
- Measurement Level (dBμV) = Receiver reading (dBμV) + Tansd (dB)
- Transd(dB)= AMN Factor(dB)+Cable Loss(dB)+Attenuation(dB)
- Margin= Limit-Level

### 5.5. Test Summary

| Test Engineer | Jimu | Temperature | 22.2 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 51.4 % |
| Verdict | Pass | | |

Test graph and data for Conducted Emission at line L1

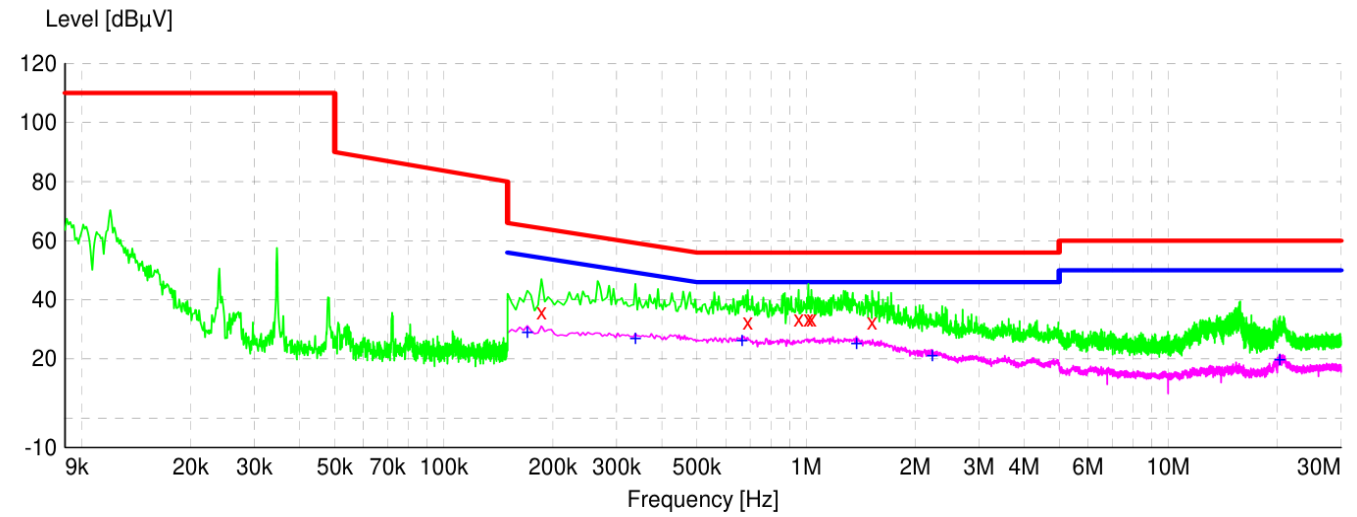
Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV] | Factor[dB] | Limit[dBµV] | Margin[dB] | Detector | Line |
|---|---|---|---|---|---|---|
| 0.526000 | 32.9 | 6.2 | 56.0 | 23.1 | QP | L1 |
| 0.782000 | 34.3 | 6.2 | 56.0 | 21.7 | QP | L1 |
| 1.050000 | 33.6 | 6.2 | 56.0 | 22.4 | QP | L1 |
| 1.058000 | 33.6 | 6.2 | 56.0 | 22.4 | QP | L1 |
| 1.226000 | 33.6 | 6.2 | 56.0 | 22.4 | QP | L1 |
| 1.350000 | 32.7 | 6.2 | 56.0 | 23.3 | QP | L1 |
| 0.358000 | 28.1 | 6.1 | 48.8 | 20.7 | AV | L1 |
| 0.674000 | 29.2 | 6.2 | 46.0 | 16.8 | AV | L1 |
| 0.982000 | 27.6 | 6.2 | 46.0 | 18.4 | AV | L1 |
| 2.250000 | 23.1 | 6.3 | 46.0 | 22.9 | AV | L1 |
| 4.222000 | 21.0 | 6.3 | 46.0 | 25.0 | AV | L1 |
| 20.898000 | 21.5 | 7.3 | 50.0 | 28.5 | AV | L1 |

Test graph and data for Conducted Emission at line N

Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV] | Factor[dB] | Limit[dBµV] | Margin[dB] | Detector | Line |
|---|---|---|---|---|---|---|
| 0.186000 | 36.1 | 6.1 | 64.2 | 28.1 | QP | N |
| 0.690000 | 32.7 | 6.2 | 56.0 | 23.3 | QP | N |
| 0.954000 | 33.5 | 6.2 | 56.0 | 22.5 | QP | N |
| 1.014000 | 33.4 | 6.2 | 56.0 | 22.6 | QP | N |
| 1.034000 | 33.5 | 6.2 | 56.0 | 22.5 | QP | N |
| 1.522000 | 32.5 | 6.2 | 56.0 | 23.5 | QP | N |
| 0.170000 | 29.7 | 6.1 | 55.0 | 25.3 | AV | N |
| 0.338000 | 27.7 | 6.1 | 49.3 | 21.6 | AV | N |
| 0.666000 | 27.2 | 6.2 | 46.0 | 18.8 | AV | N |
| 1.378000 | 25.9 | 6.2 | 46.0 | 20.1 | AV | N |
| 2.230000 | 22.1 | 6.3 | 46.0 | 23.9 | AV | N |
| 20.330000 | 20.4 | 7.1 | 50.0 | 29.6 | AV | N |

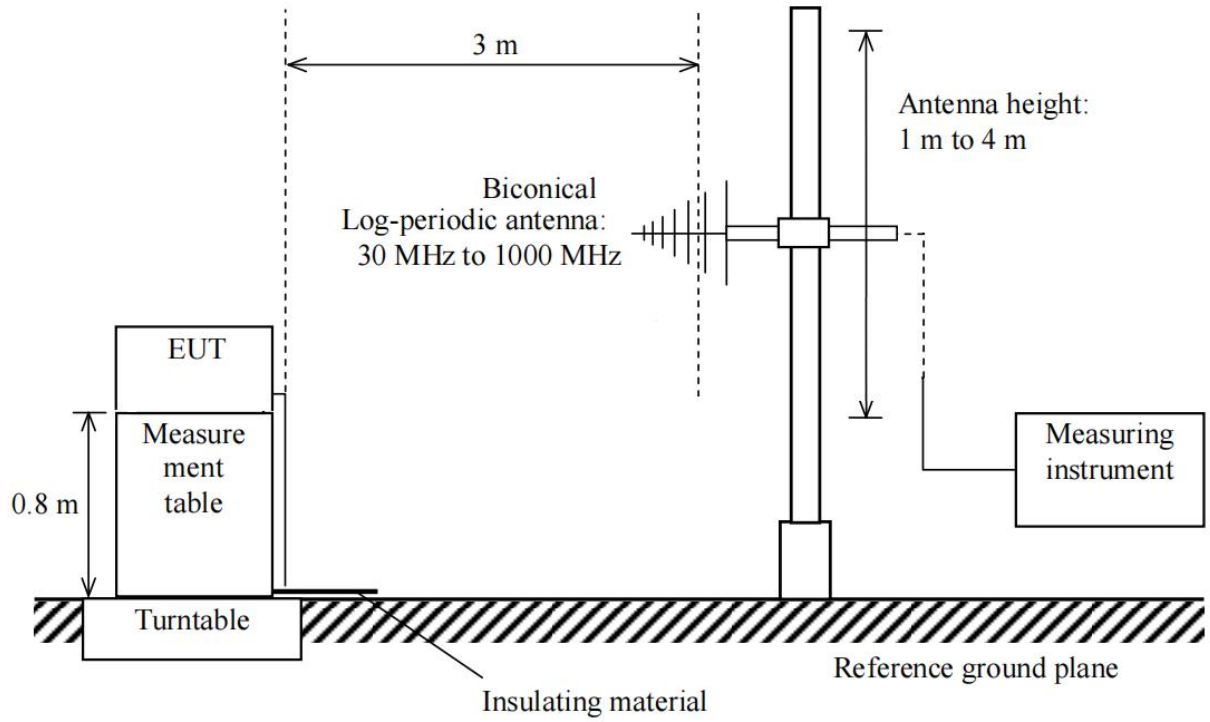
# 6. Measurement of Radiated Emissions at Frequencies up to 1 GHz

## 6.1. Requirements

Requirements for radiated emissions at frequencies up to 1 GHz at 3m distance

| Test facility | Detector type/ bandwidth | Frequency Range (MHz) | Limits dB(μV/m) | Measurement specifications |
|---|---|---|---|---|
| SAC | Quasi-peak/ 120kHz | 30 to 230 | 40 | Instrumentation: CISPR 16-1-1, Clauses 4, 5<br>Antennas: CISPR 16-1-4, Clause 4.5<br>Test Site: CISPR 16-1-4, Clause 6<br>Method: CISPR 16-2-3, Clause 7.6 |
| | | 230 to 1000 | 47 | |
| **Note:**<br>1. The lower limit shall apply at the transition frequency. | | | | |

## 6.2. Block Diagram of Test Setup



## 6.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESCI | 10096 | Feb. 18, 2023 | Feb. 17, 2024 |
| Antenna | SCHWARZBECK | VULB9168 | D69250 | May 11, 2023 | May 10, 2025 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| EZ-EMC | FARA | For EMC Measurement, Version RA-03A |

## 6.4. Configuration of the EUT and method of measurement

a. The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.

b. Support equipment, if needed, was placed as per CISPR 16-2-3.

c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-3.

d. The maximum receiving level of radiated emissions from the EUT was measured while the turntable was rotated from 0° to 360° and the antenna height was scanned between 1 m and 4 m. The cables were laid out to attain the maximum level of radiated emissions.

e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.

f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.

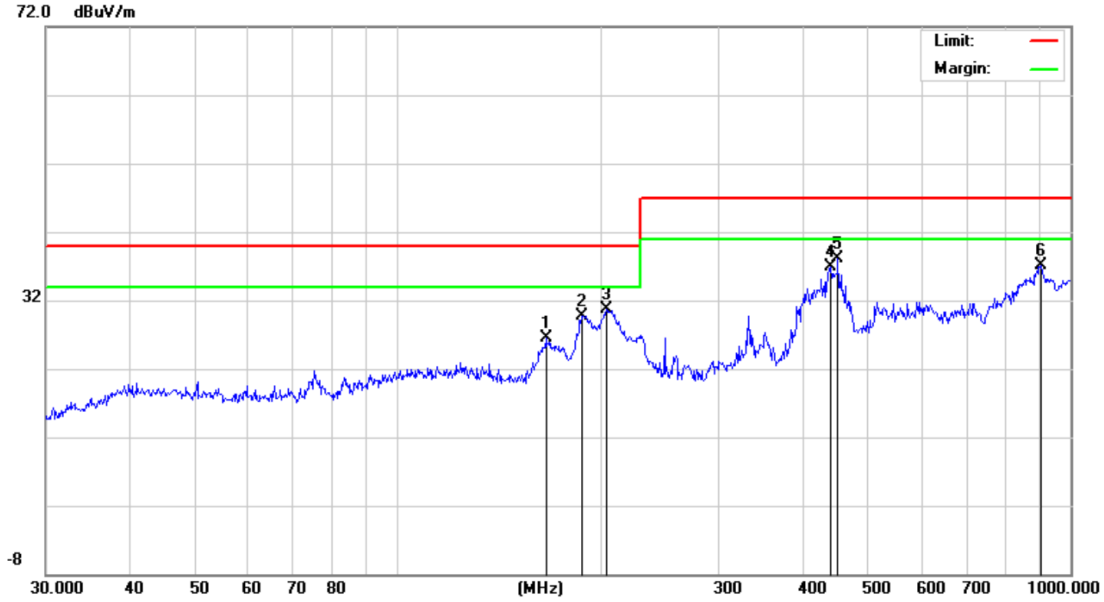
g. A radiated emission is calculated by the following equation:
   - Measurement Level dB(μV/m) = Receiver reading dB(μV) + Factor(dB/m)
   - Factor(dB/m) = Antenna Factor(dB/m) + Cable Loss(dB)
   - Margin= Limit-Level

## 6.5. Test Summary

| Test Engineer | Alex | Temperature | 23.7 ℃ |
|---|---|---|---|
| Test Date | Sep. 26, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 61.2 % |
| Verdict | Pass | | |

Test graph and data for Radiated Emission at Horizontal

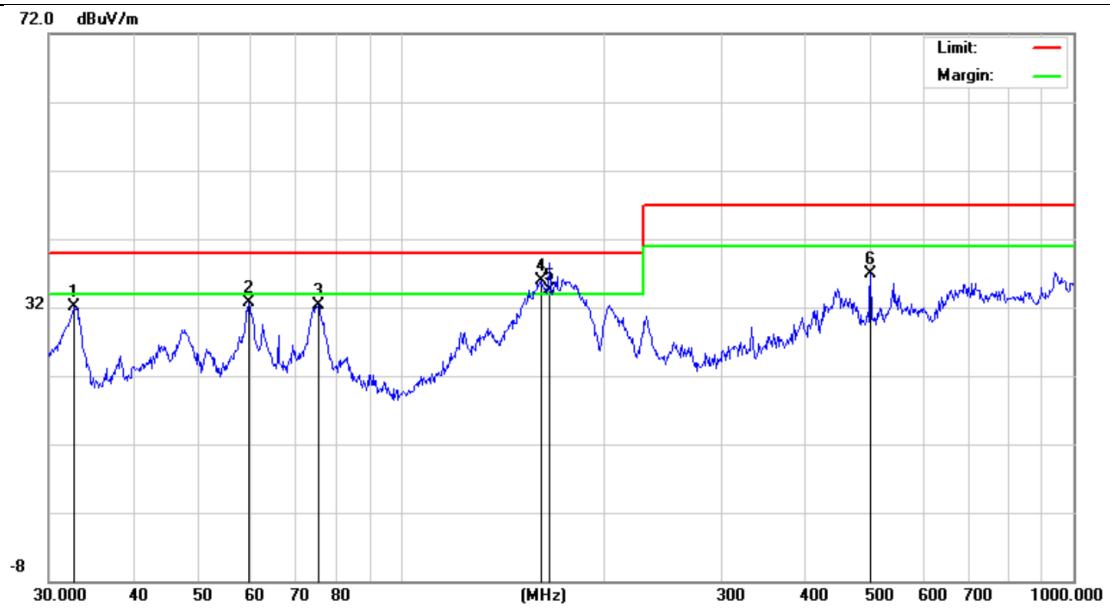
Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV/m] | Factor[dB] | Limit[dBµV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 166.0680 | 26.55 | 12.20 | 40.00 | 13.45 | peak | Horizontal |
| 187.7530 | 29.73 | 13.09 | 40.00 | 10.27 | peak | Horizontal |
| 204.2377 | 30.62 | 14.48 | 40.00 | 9.38 | peak | Horizontal |
| 440.1963 | 36.87 | 25.09 | 47.00 | 10.13 | peak | Horizontal |
| 451.1350 | 38.11 | 24.71 | 47.00 | 8.89 | peak | Horizontal |
| 903.3094 | 37.01 | 31.34 | 47.00 | 9.99 | peak | Horizontal |

Test graph and data for Radiated Emission at Vertical

Test Mode: Mode 1




| Frequency[MHz] | Level[dBμV/m] | Factor[dB] | Limit[dBμV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 32.7486 | 32.14 | 14.51 | 40.00 | 7.86 | peak | Vertical |
| 59.4405 | 32.65 | 17.09 | 40.00 | 7.35 | peak | Vertical |
| 75.4464 | 32.23 | 16.95 | 40.00 | 7.77 | peak | Vertical |
| 161.4742 | 35.93 | 18.22 | 40.00 | 4.07 | peak | Vertical |
| 166.0680 | 34.60 | 18.29 | 40.00 | 5.4 | QP | Vertical |
| 499.4247 | 36.92 | 24.09 | 47.00 | 10.08 | peak | Vertical |

# 7. Measurement of LLAS Radiated Disturbance

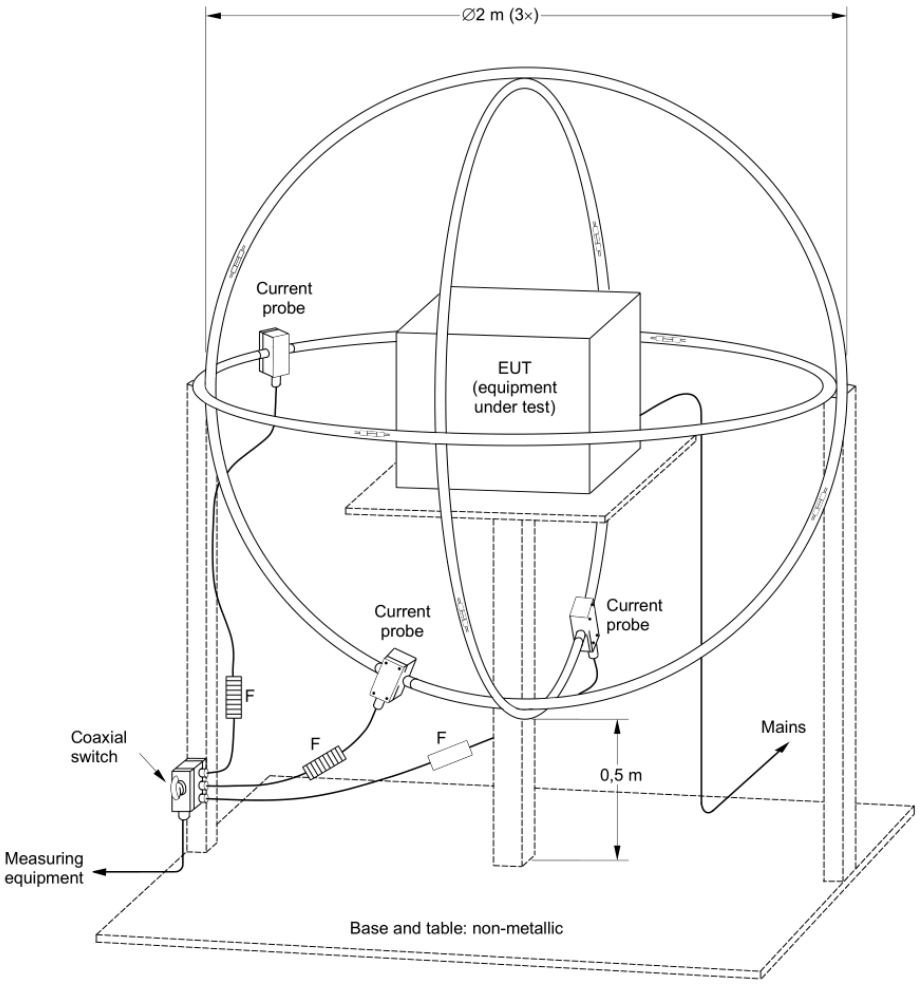
## 7.1. Requirements

LLAS radiated disturbance limits in the frequency range 9 kHz to 30 MHz

| Loop antenna diameter | Detector type/ bandwidth | Frequency Range (kHz) | Limits dB(μA) | Measurement specifications |
|---|---|---|---|---|
| 2 m | Quasi-peak/ 200Hz | 9 to 70 | 88 | Instrumentation: CISPR 16-1-4, Clauses 4<br>Method: CISPR 16-2-3, Clause 7<br>Set-up: CISPR 16-2-3, Clause 7 |
| | | 70 to 150 | 88 to 58 [a] | |
| | Quasi-peak/ 9kHz | 150 to 3.0 | 58 to 22 [a b] | |
| | | 3.0 to 30 | 22 | |

Note:
a. Decreasing linearly with the logarithm of the frequency.
b. For lighting equipment incorporating exclusively electrodeless lamps, the limit in the frequency range of 2.2 MHz to 3.0 MHz is 58 dB(μA).

## 7.2. Block Diagram of Test Setup



### 7.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Triple Loop Antenna | LAPLACE | RF300 | 9070 | Jun. 03, 2023 | Jun. 02, 2024 |
| Attenuator | East sheep | LM-XX-6-5W | N/A | Jun. 09, 2023 | Jun. 08, 2024 |
| Test Receiver | R&S | ESCI | 10096 | Jun. 03, 2023 | Jun. 02, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| ES-K1 | R&S | For EMC Measurement, Version 1.71 |

### 7.4. Configuration of the EUT and method of measurement

a. The EUT is placed in the center of the LLAS. The current induced by the magnetic field strength from the EUT into each of the three large loop antennas of the LLAS is measured by connecting the current probe of the large loop antenna to a measuring receiver (or equivalent). During the measurements, the EUT remains in a fixed position.

b. The currents in the three large loop antennas, originating from the three mutually orthogonal magnetic field strength components, are measured in sequence. Each current level measured shall comply with the emission limit, expressed in dB(μA), as specified in the product standard. The emission limit shall apply for an LLAS having large loop antennas with the standardized diameter of 2 m.

c. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.

d. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.

e. A conducted emission is calculated by the following equation:

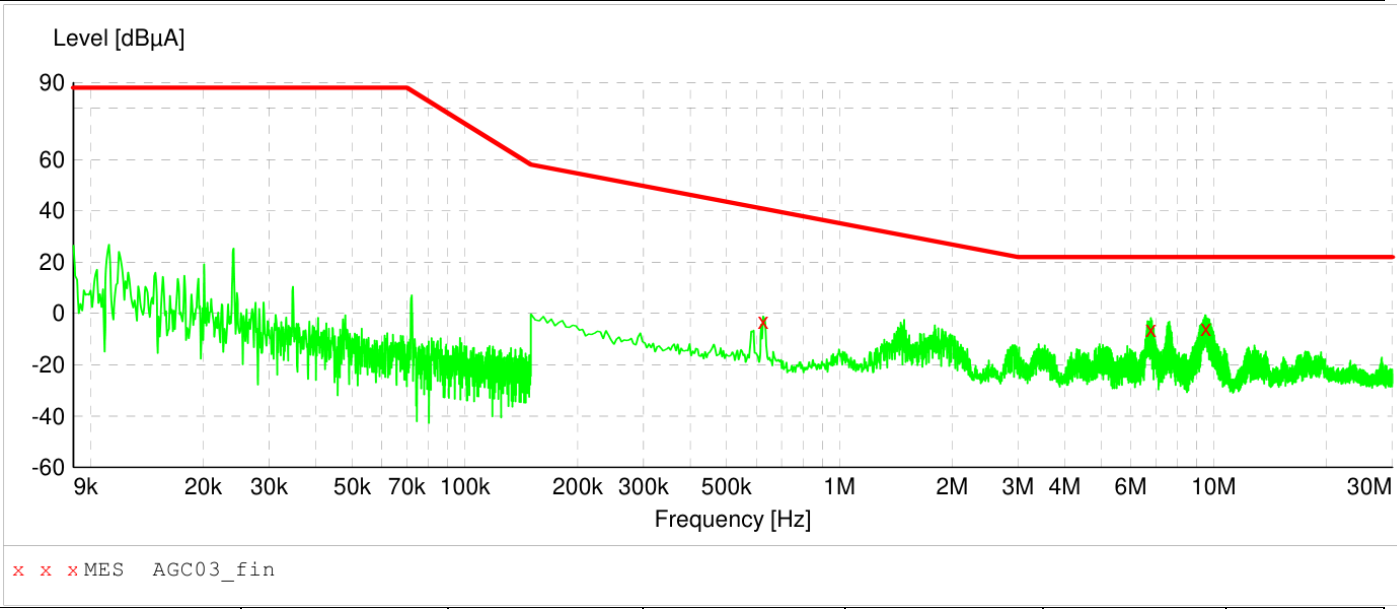
- Measurement Level (dBμV) = Receiver reading (dBμV) + Tansd (dB)
- Transd(dB)= Antenna Factor(dB)+Cable Loss(dB)+Attenuation(dB)
- Margin= Limit-Level

### 7.5. Test Summary

| Test Engineer | Jimu | Temperature | 22.2 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 2 | Relative Humidity | 51.4 % |
| Verdict | Pass | | |

Test graph and data for LLAS radiated disturbance at loop X

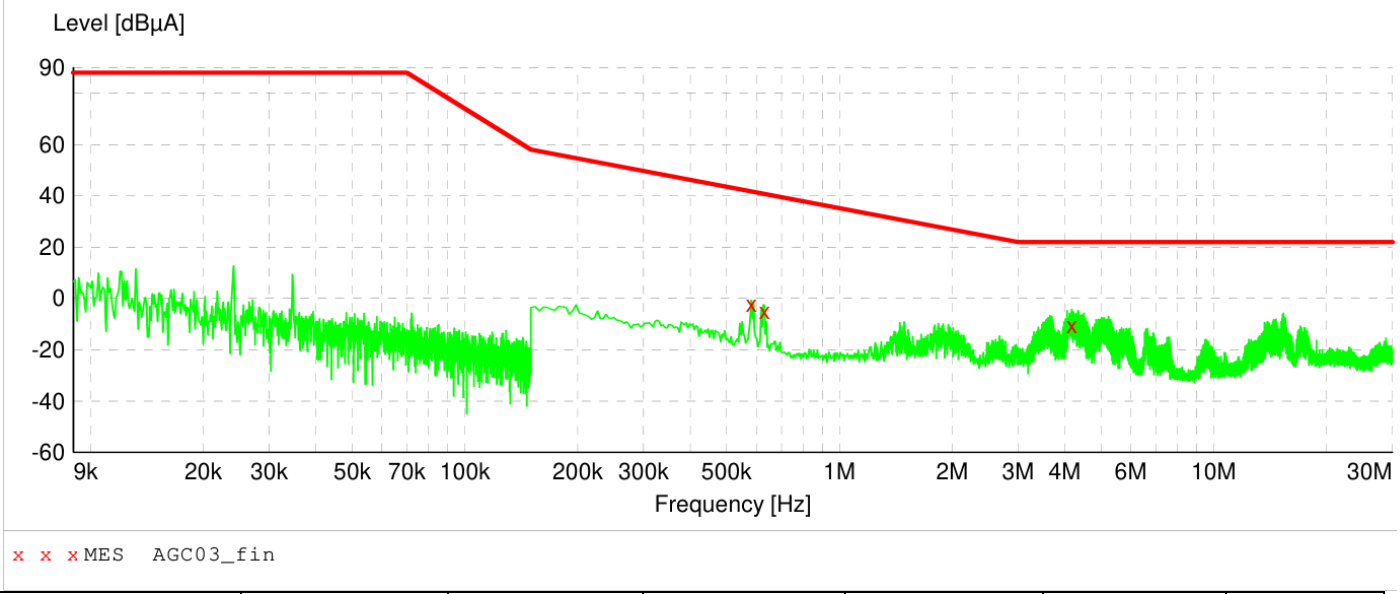
Test Mode: Mode 2




| Frequency[MHz] | Level[dBµV] | Factor[dB] | Limit[dBµV] | Margin[dB] | Detector | Loop |
|---|---|---|---|---|---|---|
| 0.626000 | -3.0 | -22.5 | 40.8 | 43.8 | QP | X |
| 6.790000 | -6.2 | -24.9 | 22.0 | 28.2 | QP | X |
| 9.522000 | -5.6 | -24.8 | 22.0 | 27.6 | QP | X |

Test graph and data for LLAS radiated disturbance at loop Y

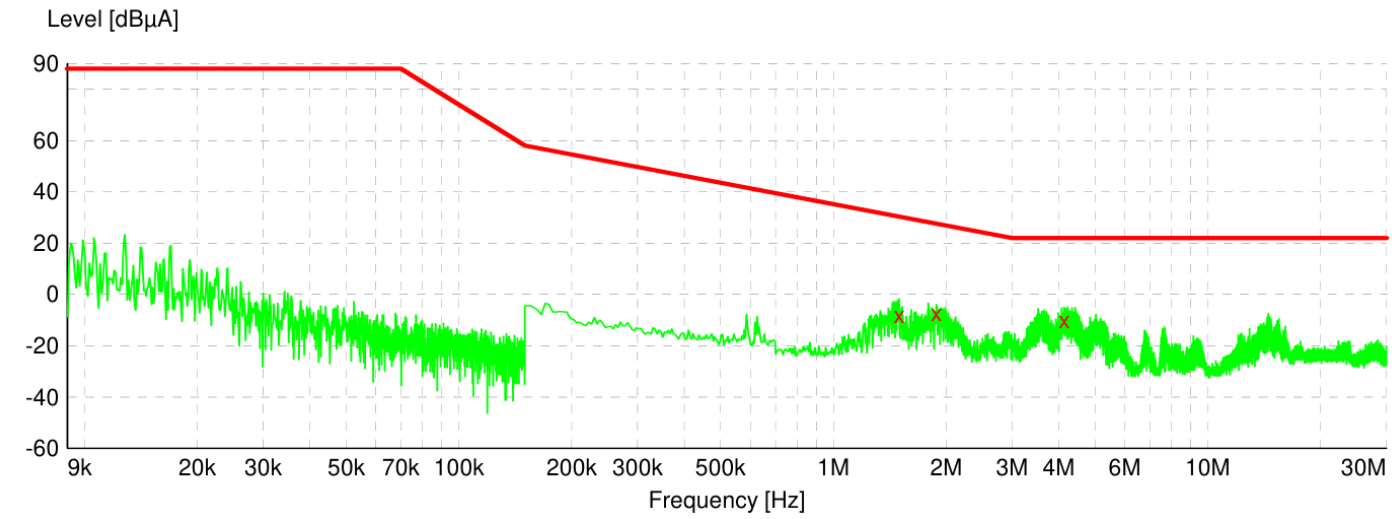
Test Mode: Mode 2




| Frequency[MHz] | Level[dBµV] | Factor[dB] | Limit[dBµV] | Margin[dB] | Detector | Loop |
|---|---|---|---|---|---|---|
| 0.582000 | -2.2 | -22.1 | 41.7 | 43.9 | QP | Y |
| 0.630000 | -4.9 | -22.5 | 40.8 | 45.7 | QP | Y |
| 4.174000 | -10.4 | -25.1 | 22.0 | 32.4 | QP | Y |

Test graph and data for LLAS radiated disturbance at loop Z

Test Mode: Mode 2




| Frequency[MHz] | Level[dBµV] | Factor[dB] | Limit[dBµV] | Margin[dB] | Detector | Loop |
|---|---|---|---|---|---|---|
| 1.498000 | -8.2 | -24.4 | 30.3 | 38.5 | QP | Z |
| 1.882000 | -7.5 | -24.6 | 27.6 | 35.1 | QP | Z |
| 4.138000 | -10.0 | -25.1 | 22.0 | 32.0 | QP | Z |

# 8. Measurement of Harmonic Current Emissions

## 8.1. Requirements

Applicable test standard(s): EN IEC 61000-3-2:2019+A1:2021

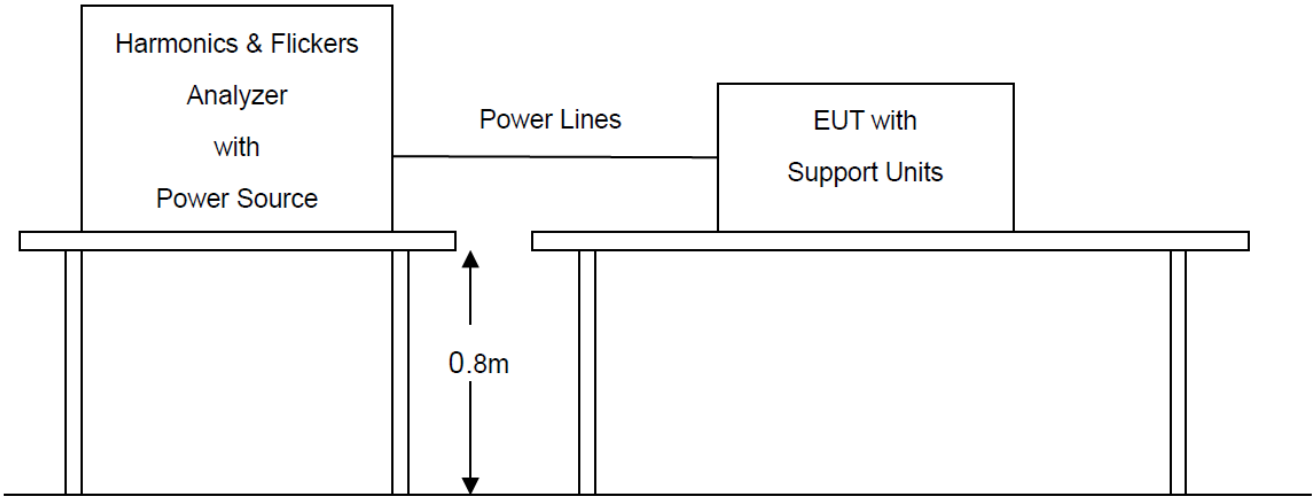
Limits of Harmonic Current Emissions

| Harmonic order *h* | Limits | | | | |
|---|---|---|---|---|---|
| | Class A | Class B | Class C[a] | Class D | |
| | Maximum permissible harmonic current (A) | | Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency (%) | Maximum permissible harmonic current per watt (mA/W) | Maximum permissible harmonic current (A) |
| 3 | 2.30 | 3.45 | 27[b] | 3.4 | 2.30 |
| 5 | 1.14 | 1.71 | 10 | 1.9 | 1.14 |
| 7 | 0.77 | 1.155 | 7 | 1.0 | 0.77 |
| 9 | 0.40 | 0.6 | 5 | 0.5 | 0.40 |
| 11 | 0.33 | 0.495 | 3 | 0.35 | 0.33 |
| 13 | 0.21 | 0.315 | 3 | 3.85/13 | 0.21 |
| 15≤*h*≤39(odd harmonics only) | 2.25/*h* | 3.375/*h* | 3 | 3.85/*h* | 2.25/*h* |
| 2 | 1.08 | 1.62 | 2 | Not applicable | Not applicable |
| 4 | 0.43 | 0.645 | Not applicable | | |
| 6 | 0.30 | 0.45 | | | |
| 8≤*h*≤40(even harmonics only) | 1.84/*h* | 2.76/*h* | | | |

Note:
(a) For some Class C products, other emission limits apply.
(b) The limit is determined based on the assumption of modern lighting technologies having power factors of 0.90 or higher.

The application of limits had been as defined in the applicable test standard.

## 8.2. Block Diagram of Test Setup




## 8.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Conditioning Unit | Schaffner | CCN1000-1 | 72431 | Jun. 02, 2023 | Jun. 01, 2024 |
| AC Source | Schaffner | NSG 1007 | 56825 | Jun. 02, 2023 | Jun. 01, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| CTS 4 | AMETEK | For harmonics and flickers measurement, version 4.29.0 |

## 8.4. Configuration of the EUT and method of measurement

a. The test shall be conducted according to the general requirements given in the applicable test standard. The test duration had been as defined in the applicable test standard.

b. The measurement of harmonic currents shall be performed as follows:

- for each harmonic order, measure the 1.5 s smoothed RMS harmonic current in each discrete Fourier transform (DFT) time window;
- calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period.

c. The value of the active input power to be used for the calculation of limits shall be determined as follows:

- measure the 1.5 s smoothed active input power in each DFT time window;
- determine the maximum of the measured values of active power from the DFT time windows over the entire duration of the test.

d. The harmonic currents and the active input power shall be measured under the same test conditions but need not be measured simultaneously.

### 8.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Jimu | Temperature | 22.6 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 53.2 % |
| Verdict | Pass | | |

| Harm# | Harms(avg) | 100%Limit | %of Limit | Status |
|---|---|---|---|---|
| 3 | 7.63 | 26.96 | 28.3 | Pass |
| 5 | 5.56 | 19.13 | 29.1 | Pass |

# 9. Measurement of Voltage Fluctuations and Flicker

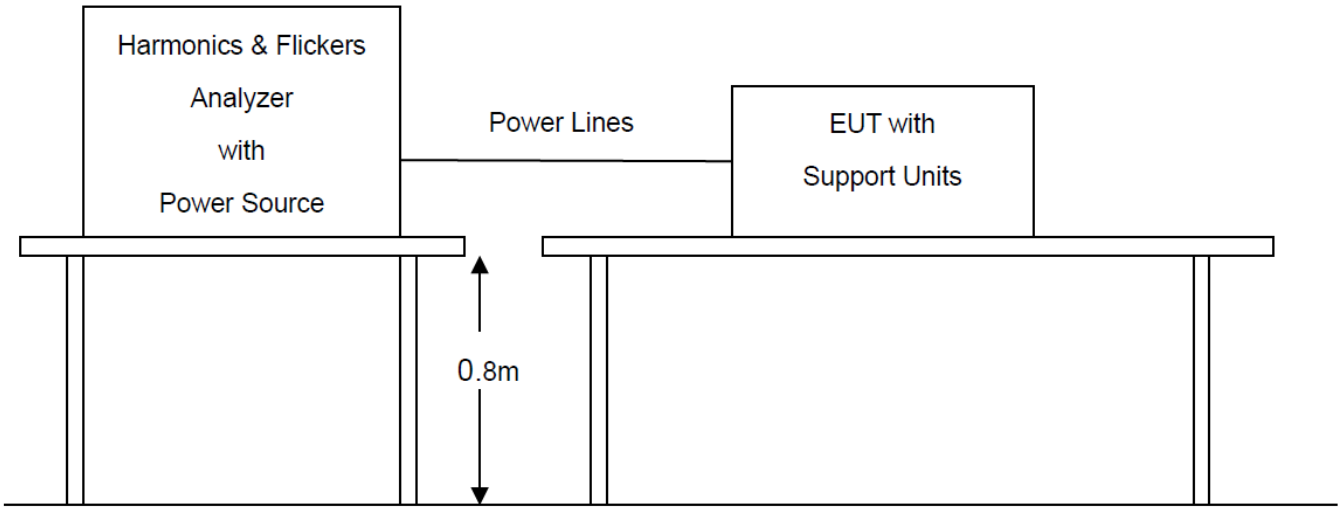
## 9.1. Requirements

Applicable test standard(s): EN 61000-3-3:2013+A2:2021

Limits of Voltage Fluctuations and Flicker

| Parameters | Definitions | Limits |
|---|---|---|
| $T_{max}$ | the accumulated time value of *d(t)* with a deviation exceeding 3.3 % during a single voltage change at the EUT terminals | ⩽500 ms |
| $d_c$ | the maximum relative steady-state voltage change | ⩽3.3% |
| $d_{max}$ | the maximum relative voltage change | ☒⩽4%<br>☐⩽6%<br>☐⩽7% |
| ☒$P_{st}$ | short-term flicker severity | ⩽0.65 |
| ☐$P_{lt}$ | long-term flicker severity | ⩽1.0 |

## 9.2. Block Diagram of Test Setup




## 9.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Conditioning Unit | Schaffner | CCN1000-1 | 72431 | Jun. 02, 2023 | Jun. 01, 2024 |
| AC Source | Schaffner | NSG 1007 | 56825 | Jun. 02, 2023 | Jun. 01, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| CTS 4 | AMETEK | For harmonics and flickers measurement, version 4.29.0 |

### 9.4. Configuration of the EUT and method of measurement

a. The test shall be conducted according to the general requirements given in the applicable test standard. The test duration and test condition had been as defined in the applicable test standard.

b. All types of voltage fluctuations would been assessed by direct measurement using a flicker meter which complies with the specification given in IEC 61000-4-15:2010.

### 9.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Jimu | Temperature | 22.6 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 53.2 % |
| Verdict | Pass | | |

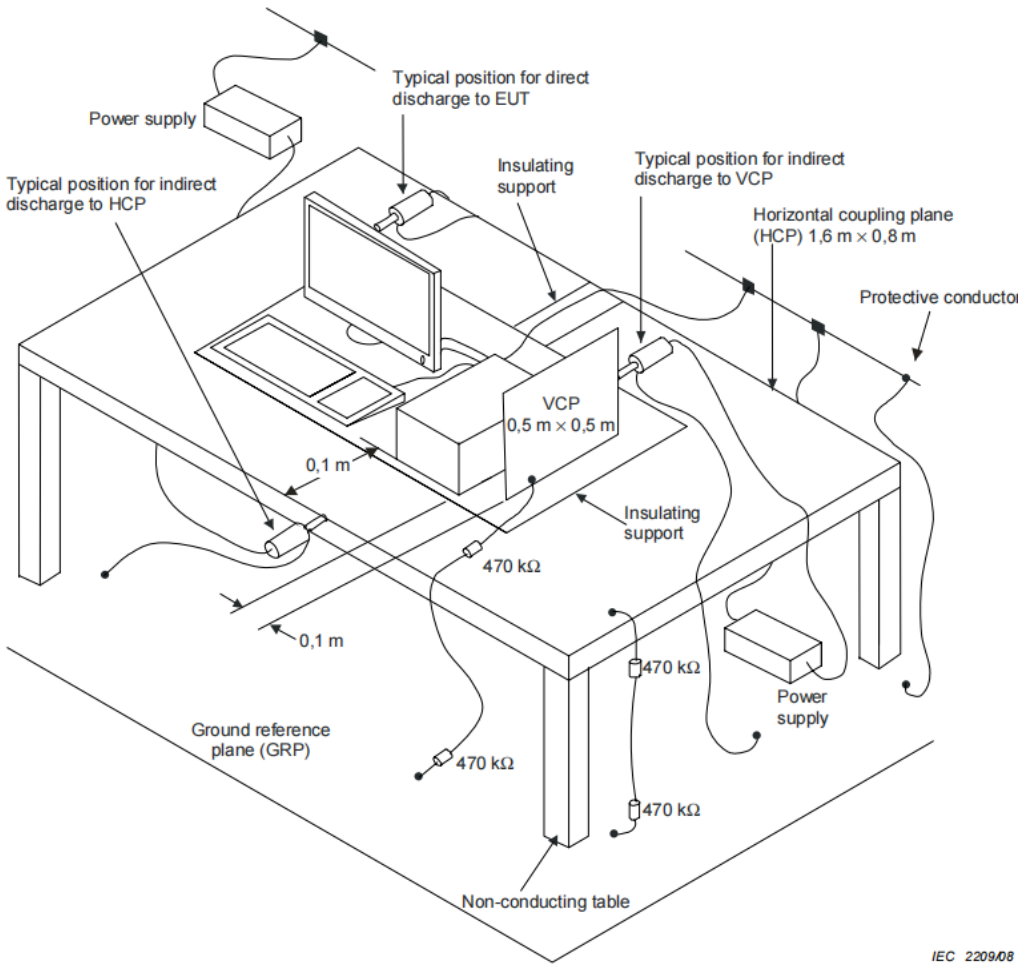
| Parameters | Measurement Value | Limits |
|---|---|---|
| $T_{max}$ | 0 | ⩽500 ms |
| $d_c$ | 0.00 | ⩽3.3% |
| $d_{max}$ | 0.00 | ⩽4% |
| $P_{st}$ | 0.108 | ⩽0.65 |

# 10. Measurement of Electrostatic discharge

## 10.1. Requirements

| | |
|---|---|
| Port | Enclosure |
| Basic Standard | IEC 61000-4-2 |
| Test Level | ±8.0 kV (Air Discharge)<br>±4.0 kV (Contact Discharge)<br>±4.0 kV (Indirect Discharge) |
| Required Performance Criterion | B |
| Time Between Each Discharge: | 1 second |
| Number of Discharge for Each Applied Voltage | 10 |

## 10.2. Block Diagram of Test Setup



### 10.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| ESD Simulator | Schaffner | NSG 438 | 782 | Dec. 30, 2022 | Dec. 29, 2023 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| -- | -- | -- |

### 10.4. Configuration of the EUT and method of measurement

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
c. The time interval between two successive single discharges was at least 1 second.
d. 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 EUT.
e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were completed.
g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT 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 EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed vertically to and 0.1 meters from the EUT.
i. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 10.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Sam | Temperature | 23 ℃ |
| Test Date | Oct. 07, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2/3 | Relative Humidity | 47 % |
| Verdict | Pass | | |

| Voltage | Coupling | Observation | Performance |
|---|---|---|---|
| ±4kV | Contact Discharge | No degradation of performance | A |
| ±2KV, ±4kV, ±8kV | Air Discharge | No degradation of performance | A |
| ±4kV | Indirect Discharge HCP | No degradation of performance | A |
| ±4kV | Indirect Discharge VCP | No degradation of performance | A |

Red line: Contact discharge

Blue line: Air discharge

# 11. Measurement of Radio-Frequency Electromagnetic Field

## 11.1. Requirements

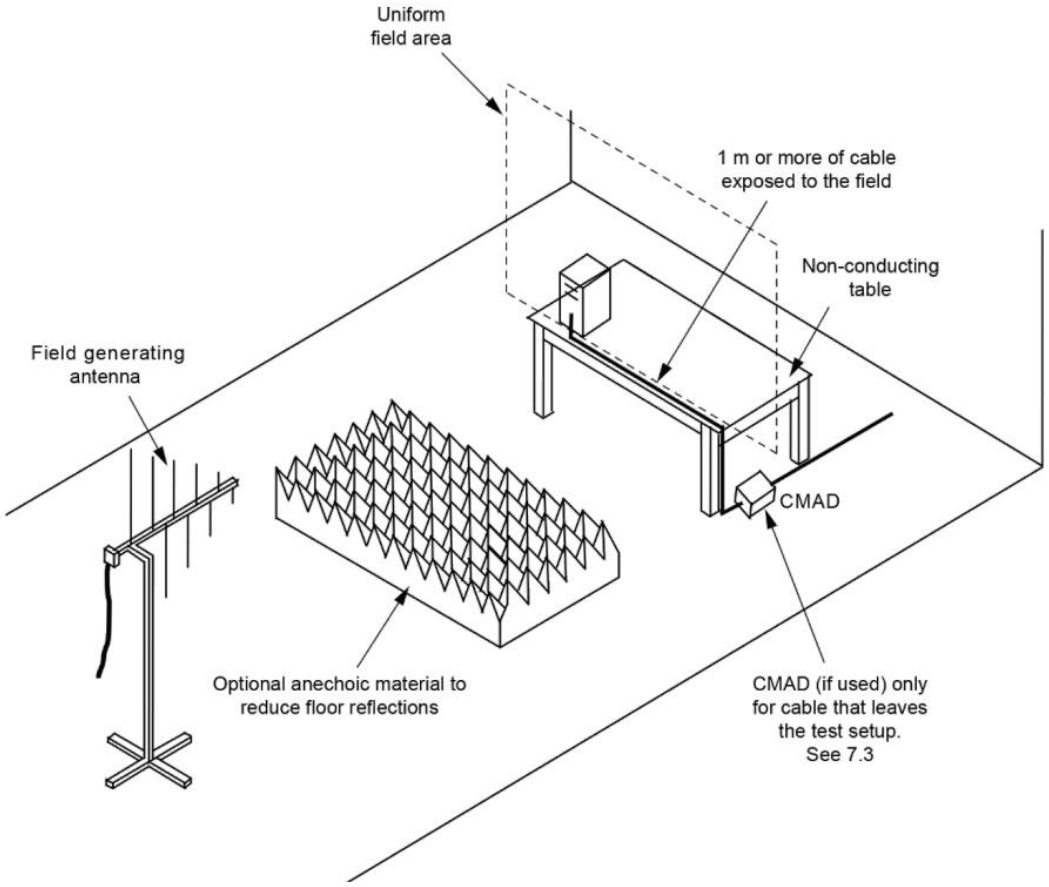
| | |
|---|---|
| Port | Enclosure |
| Basic Standard | IEC 61000-4-3 |
| Required Performance Criterion | A |
| Test Level | 3V/m with 80% AM. 1kHz Modulation at 80 to 1000MHz |
| Antenna polarization | Vertical and Horizontal |
| Step size increment [a] | 1% |
| Dwell time [b] | ≤5 seconds |
| Test Distance | 3m |
| EUT position facing antenna | Front side, back side, left side and right side |

Notes:

a. Recognizing that a 1% step size is preferred, the frequency range can be swept incrementally with a step size not exceeding 4% of the previous frequency with a test level of twice the value of the specified test level in order to reduce the testing time for equipment requiring testing in multiple configurations and/or long cycle times.

b. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time shall not exceed 5 seconds at each of the frequencies during the scan. The time to exercise the EUT is not interpreted as a total time of a program or a cycle but related to the reaction time in case of failure of the EUT.

## 11.2. Block Diagram of Test Setup



### 11.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Generator | Aglient | E4421B | MY43351603 | Feb. 17, 2023 | Feb. 16, 2024 |
| Power Probe | R&S | URV5-Z4 | 100124 | Mar. 24, 2023 | Mar. 23, 2025 |
| Power Meter | R&S | NRVD | 8323781027 | Mar. 24, 2023 | Mar. 23, 2025 |
| Power Amplifier | KALMUS | 7100LC | 04-02/17-06-001 | Apr. 25, 2023 | Apr. 24, 2024 |
| Biconilog Antenna | ETS | 3142C | 00060447 | N/A | N/A |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| TS+[JS35-RS] | Tonscend | For EMC measurement, version 2.0.1.8 |

### 11.4. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT) was positioned within the Uniform Field Area (UFA) on a supporting table, ensuring a 3-meter separation from the transmitting antenna. This setup aligns with the calibrated square area, guaranteeing field uniformity during testing. The supporting units were strategically located outside the UFA to avoid any potential interference. Nonetheless, the cables connected to the EUT were intentionally exposed to the precisely calibrated field within the UFA.

b. Before testing, it will verify the proper operation of the test equipment/system. This verification will involve measuring the field strength at one point within the Uniform Field Area (UFA) at various frequencies.

c. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

d. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 11.5. Test Summary

| Test Engineer | Alex | Temperature | 23.7 ℃ |
|---|---|---|---|
| Test Date | Sep. 26, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2/3 | Relative Humidity | 61.2 % |
| Verdict | Pass | | |

| Frequency | Exposed Side | Field Strength (V/m) | Observation | Performance |
|---|---|---|---|---|
| 80MHz to 1GHz | Front | 3V/m (rms) | No degradation of performance | A |
| | Left | | No degradation of performance | A |
| | Rear | | No degradation of performance | A |
| | Right | | No degradation of performance | A |

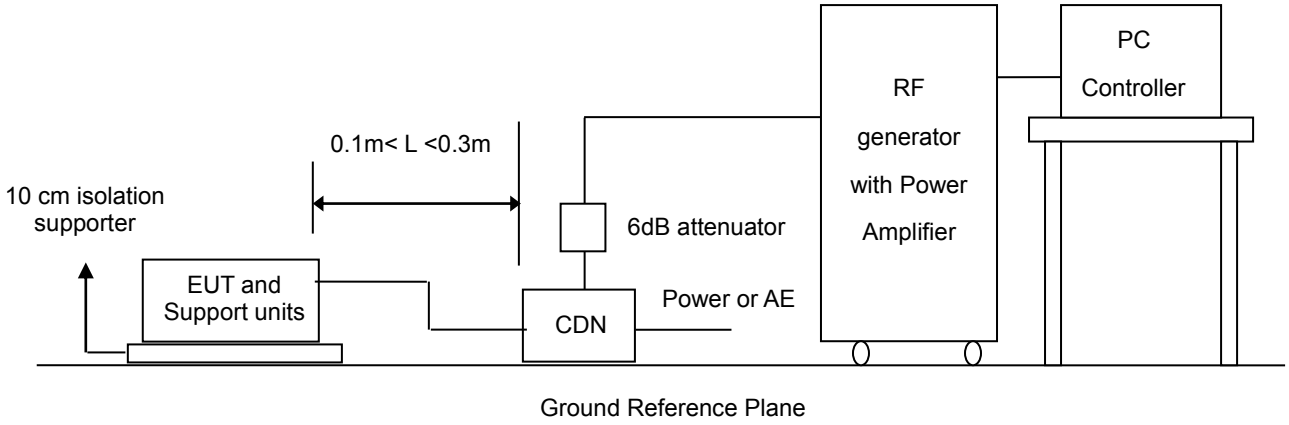
## 12. Measurement of Radio-frequency common mode

### 12.1. Requirements

| Port | ☒AC mains power ports | ☐signal, wired network and control ports [a] | ☐DC power ports [a] |
|---|---|---|---|
| Basic Standard | IEC 61000-4-6 | | |
| Required Performance Criterion | A | | |
| Test Level | 0.15 to 80 MHz, 3 V RMS (unmodulated), 80 % AM (1 kHz) | | |
| Step size increment [b] | 1% | | |
| Dwell time [c] | ⩽5 seconds | | |

Notes:
a. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.
b. Recognizing that a 1% step size is preferred, the frequency range can be swept incrementally with a step size not exceeding 4% of the previous frequency with a test level of twice the value of the specified test level in order to reduce the testing time for equipment requiring testing in multiple configurations and/or long cycle times.
c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time shall not exceed 5 seconds at each of the frequencies during the scan. The time to exercise the EUT is not interpreted as a total time of a program or a cycle but related to the reaction time in case of failure of the EUT.

### 12.2. Block Diagram of Test Setup



### 12.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Power Amplifier | AR | 75A250 | 18464 | N/A | N/A |
| CDN | ZHINAN | ZN3751 | 15004 | Aug. 03, 2022 | Sep. 02, 2024 |
| 6dB attenuator | ZHINAN | E-002 | N/A | Aug. 04, 2022 | Aug. 03, 2024 |
| Power Probe | R&S | URV5-Z4 | 100124 | Mar. 24, 2023 | Mar. 23, 2025 |
| Electromagnetic Injection Clamp | Luthi | EM101 | 35773 | Aug. 12, 2022 | Aug. 11, 2024 |
| Power Meter | R&S | NRVD | 8323781027 | Mar. 24, 2023 | Mar. 23, 2025 |
| Signal Generator | Keysight | E4421B | MY43351603 | Feb. 17, 2023 | Feb. 16, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| TS+[JS35-CS] | Tonscend | For EMC measurement, version 2.0.1.7 |

### 12.4. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT) shall be tested within its intended operating and climatic conditions.

b. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane. The test shall be performed with the test generator connected to each of the coupling devices (CDN, EM clamp, current clamp) in turn. All other cables not under test shall either be disconnected (when functionally allowed) or provided with decoupling networks or unterminated CDNs only.

c. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

d. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 12.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Sam | Temperature | 23 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2/3 | Relative Humidity | 47 % |
| Verdict | Pass | | |

| Test port | Test Level | Coupling method | Observation | Performance |
|---|---|---|---|---|
| AC Mains Input | 3 V | CDN | No degradation of performance | A |

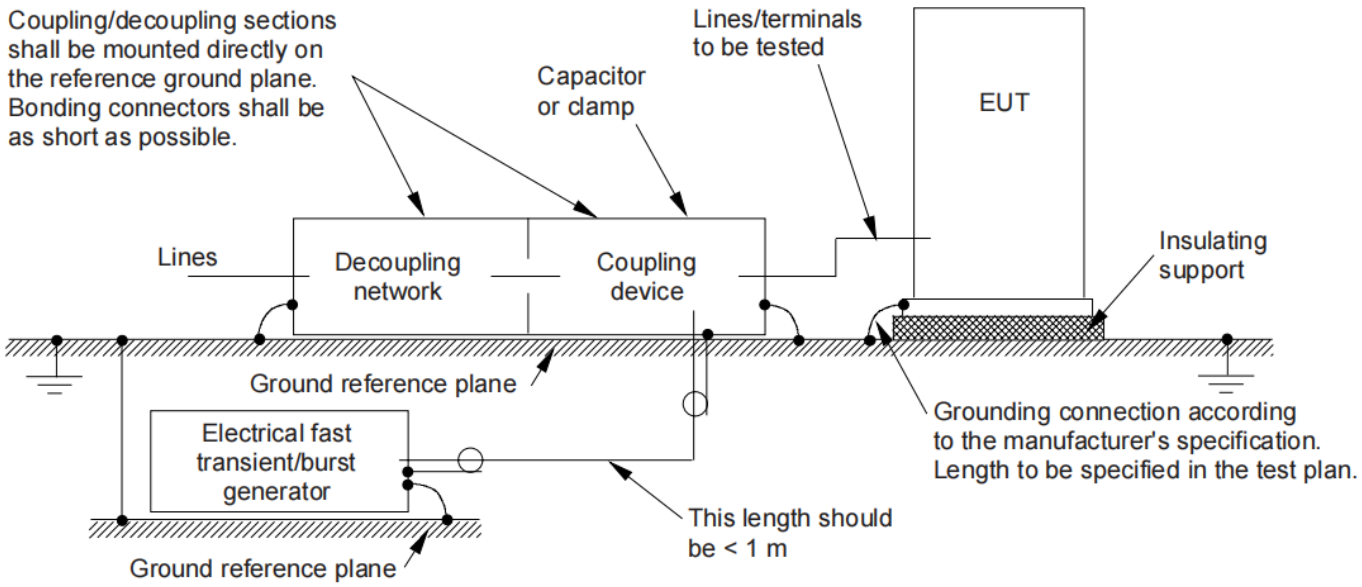
# 13. Measurement of Fast Transients

## 13.1. Requirements

| | | | |
|---|---|---|---|
| Port | ☒AC mains power ports | ☐signal, wired network and control ports [a] | ☐DC power ports [a] |
| Basic Standard | IEC 61000-4-4 | | |
| Required Performance Criterion | B | | |
| Test Level | 1 kV (peak) | 0.5 kV (peak) | 0.5 kV (peak) |
| Polarity | Positive/Negative | | |
| Impulse Frequency | 5kHz | | |
| Impulse wave shape | 5/50ns | | |
| Burst Duration | 15ms | | |
| Burst Period | 300ms | | |

Notes:
a. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.

## 13.2. Block Diagram of Test Setup



### 13.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| EFT/Surge/DIPS Generator | Schaffner | Modula 6150 | 34437 | Jun. 08, 2023 | Jun. 07, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| WinModula | Schaffner | For EFT/Surge/Dips measurement, version 2.31 c |

### 13.4. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT), whether stationary floor-mounted or table top, and equipment designed to be mounted in other configurations, shall be placed on a ground reference plane and shall be insulated from it by an insulating support 0,1 m ± 0,01 m thick.
b. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane.
c. The EUT shall be arranged and connected to satisfy its functional requirements, according to the equipment installation specifications. The minimum distance between the EUT and all other conductive structures (e.g. the walls of a shielded room), except the ground reference plane shall be more than 0,5 m. All cables to the EUT shall be placed on the insulation support 0,1 m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.
d. The test voltages shall be coupled to all of the EUT ports including those between two units of equipment involved in the test, unless the length of the interconnecting cable makes it impossible to test.
e. Either a direct coupling network or a capacitive clamp shall be used for the application of the test voltages.
f. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 13.5. Test Summary

| Test Engineer | Sam | Temperature | 23 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2/3 | Relative Humidity | 49 % |
| Verdict | Pass | | |

| Inject Line | Voltage(kV) | Inject Method | Observation | Performance |
|---|---|---|---|---|
| AC Lines | 0.5, 1 | Direct | No degradation of performance | A |

# 14. Measurement of Surges

## 14.1. Requirements

| | | |
|---|---|---|
| Port | AC mains power ports [a] | |
| Basic Standard | IEC 61000-4-5 | |
| Required Performance Criterion | B | |
| Test Level | Self-ballasted lamps ≤ 25 W: | Line to line: 0.5 kV |
| | Lighting equipment (except self-ballasted lamps ≤ 25 W): | Line to line: 1 kV; Line to ground: 2 kV |
| | Road and street lighting equipment: | Line to line: 2 kV; Line to ground: 4 kV |
| Tr/Th | 1.2/50 (8/20) μs | |
| Number of impulses | Five positive and five negative impulses | |
| Time between successive impulses | 1 min | |

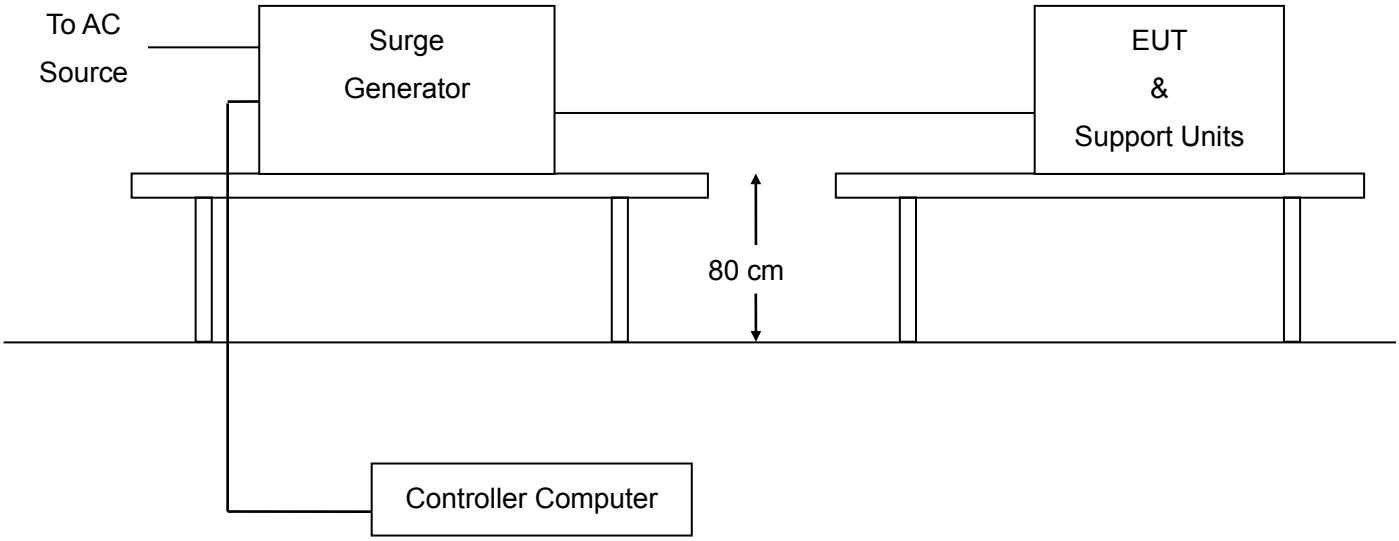
Notes:

a. The number of pulses applied shall be as follows:
- Five positive pulses line-to-neutral at 90° phase.
- Five negative pulses line-to-neutral at 270° phase.

The following additional pulses are required only if the EUT has an earth connection or if the EUT is earthed via any AE:
- Five positive pulses line-to-earth at 90° phase.
- Five negative pulses line-to-earth at 270° phase.
- Five negative pulses neutral-to-earth at 90° phase.
- Five positive pulses neutral-to-earth at 270° phase.

b. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.

### 14.2. Block Diagram of Test Setup




### 14.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| EFT/Surge/DIPS Generator | Schaffner | Modula 6150 | 34437 | Jun. 08, 2023 | Jun. 07, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| WinModula | Schaffner | For EFT/Surge/Dips measurement, version 2.31 c |

### 14.4. Configuration of the EUT and method of measurement

a. Verification shall be performed. It is preferable to perform the verification prior to the test.

b. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

c. When testing line-to-ground, the lines are tested individually in sequence, if there is no other specification.

d. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore, all lower test levels including the selected test level shall be tested.

e. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 14.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Sam | Temperature | 23 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2/3 | Relative Humidity | 49 % |
| Verdict | Pass | | |

| Test port | Coupling | Voltage(kV) | Observation | Performance |
|---|---|---|---|---|
| AC Mains Input | line-to-neutral | 0.5, 1 | No degradation of performance | A |

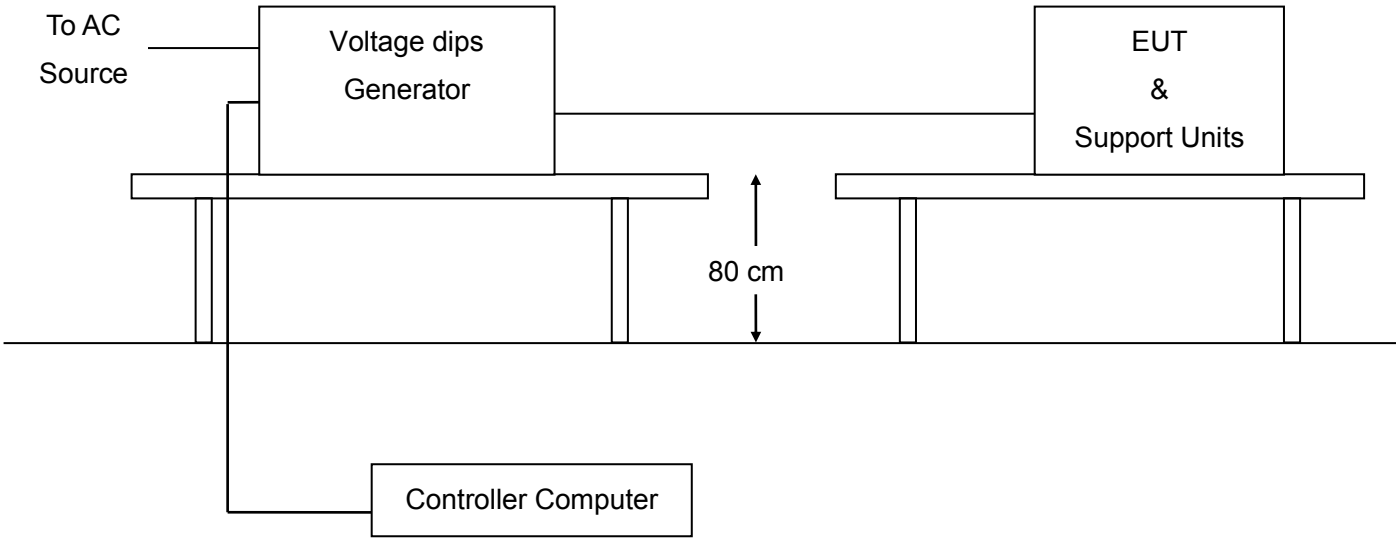
# 15. Measurement of Voltage dips and interruptions

## 15.1. Requirements

| | | |
|---|---|---|
| Port | AC mains power ports | |
| Basic Standard | IEC 61000-4-11 | |
| Required Performance Criterion | B | B |
| Residual voltage [a] | 0 % | 70 % |
| Number of cycles [b] | 0.5 | 10 |
| Variation/dip repetition | Sequence of three dips/interruptions with an interval of 10 seconds between each test | |

Notes:
a. Changes to occur at 0 degree crossover point of the voltage waveform. If the EUT does not demonstrate compliance when tested with 0 degree switching, the test shall be repeated with the switching occurring at both 90 degrees and 270 degrees. If the EUT satisfies these alternative requirements, then it fulfils the requirements.
b. Apply at only one supply frequency of the EUT.

## 15.2. Block Diagram of Test Setup



### 15.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| EFT/Surge/DIPS Generator | Schaffner | Modula 6150 | 34437 | Jun. 08, 2023 | Jun. 07, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| WinModula | Schaffner | For EFT/Surge/Dips measurement, version 2.31 c |

### 15.4. Configuration of the EUT and method of measurement

a. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

b. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 15.5. Test Summary

| Test Engineer | Sam | Temperature | 23 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2/3 | Relative Humidity | 49 % |
| Verdict | Pass | | |

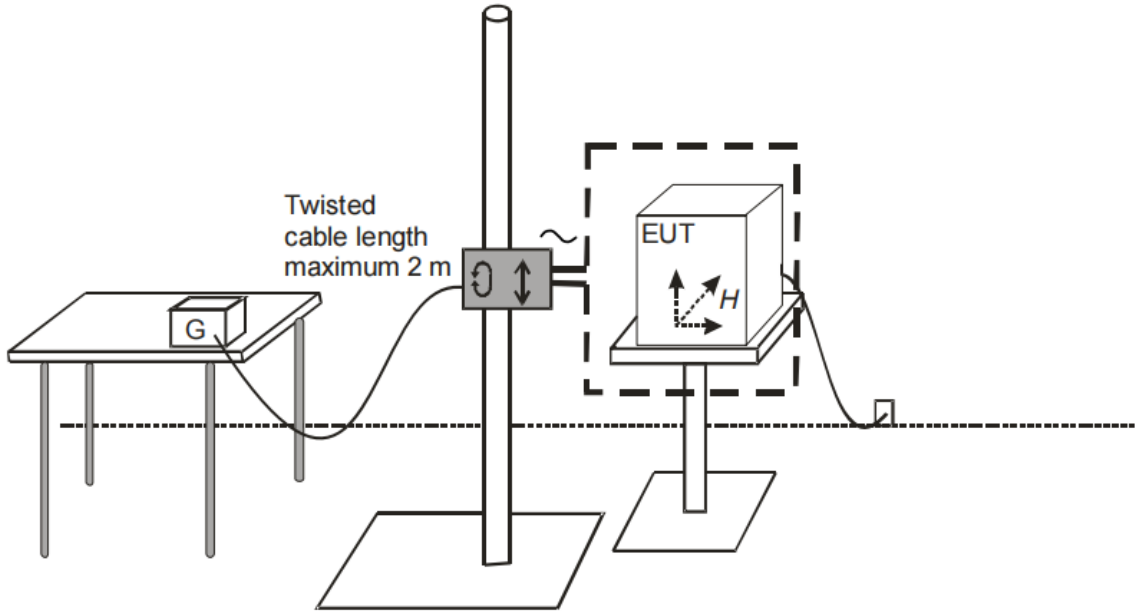
| Test port | Residual voltage (%) | Cycles | Observation | Performance |
|---|---|---|---|---|
| AC Mains Input | 0 | 0.5 | No degradation of performance | A |
| | 70 | 10 | No degradation of performance | A |

# 16. Measurement of Power-frequency magnetic field

## 16.1. Requirements

| | |
|---|---|
| Port | Enclosure |
| Basic Standard | IEC 61000-4-8 |
| Test Level | 3 A/m |
| Frequency | 50 or 60 Hz |
| Required Performance Criterion | A |
| Application of the magnetic field | Continuous |

## 16.2. Block Diagram of Test Setup



### 16.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Power frequency field immunity device with coil | HTEC | HPFMF | 161701 | Jun. 01, 2023 | May 31, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| -- | -- | -- |

Auxiliary Apparatus

| Device Type | Manufacturer | Model Name | Serial No. | Data Cable | Power Cable |
|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- |

### 16.4. Configuration of the EUT and method of measurement

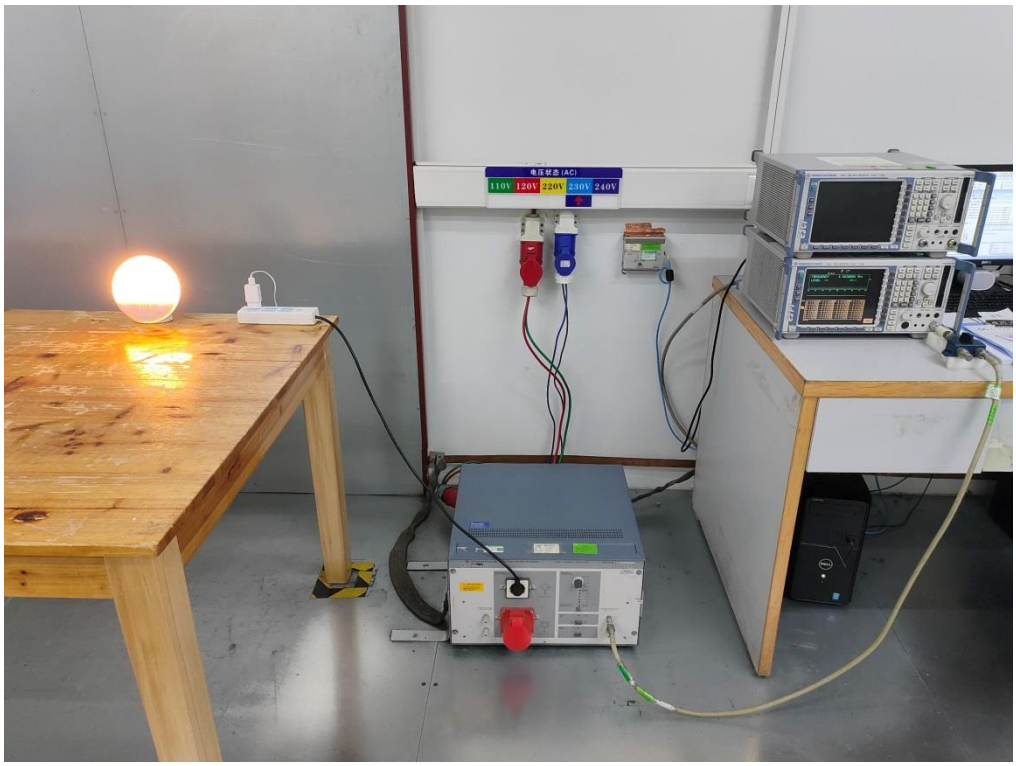
a. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.
b. The power supply, signal and other functional electrical quantities shall be applied within their rated range.
c. If the actual operating signals are not available, they may be simulated.
d. Preliminary verification of equipment performances shall be carried out prior to applying the test magnetic field.
e. The plane of the inductive coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations and the same procedure.
f. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 16.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Sam | Temperature | 23 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2/3 | Relative Humidity | 49 % |
| Verdict | Pass | | |

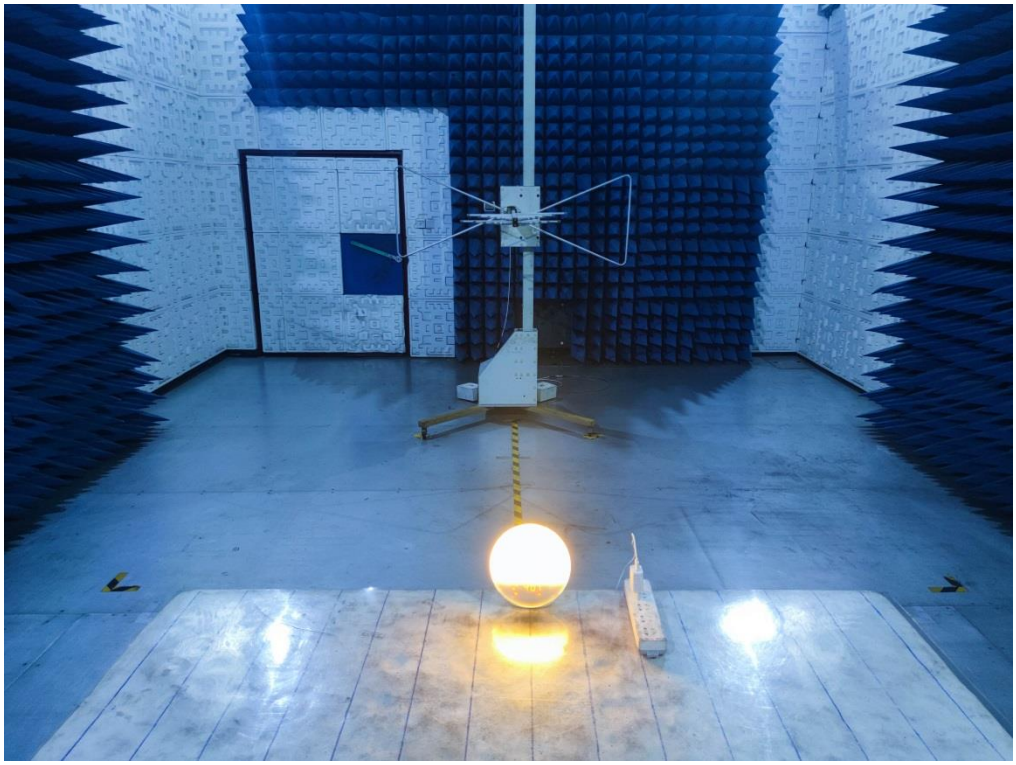
| Frequency | Test Level | Observation | Performance |
|---|---|---|---|
| 50Hz | 3A/m | No degradation of performance | A |
| 60Hz | 3A/m | No degradation of performance | A |

## 17. Photographs of Test Setup

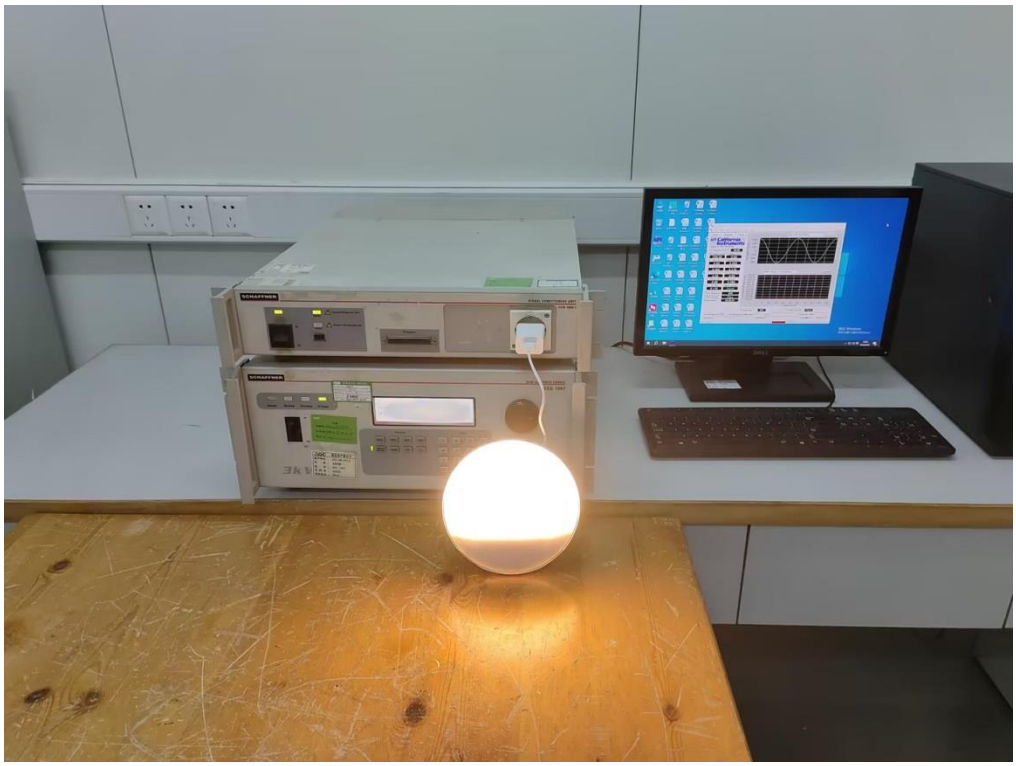



Conducted emissions from the AC mains power ports

Magnetic field induced current

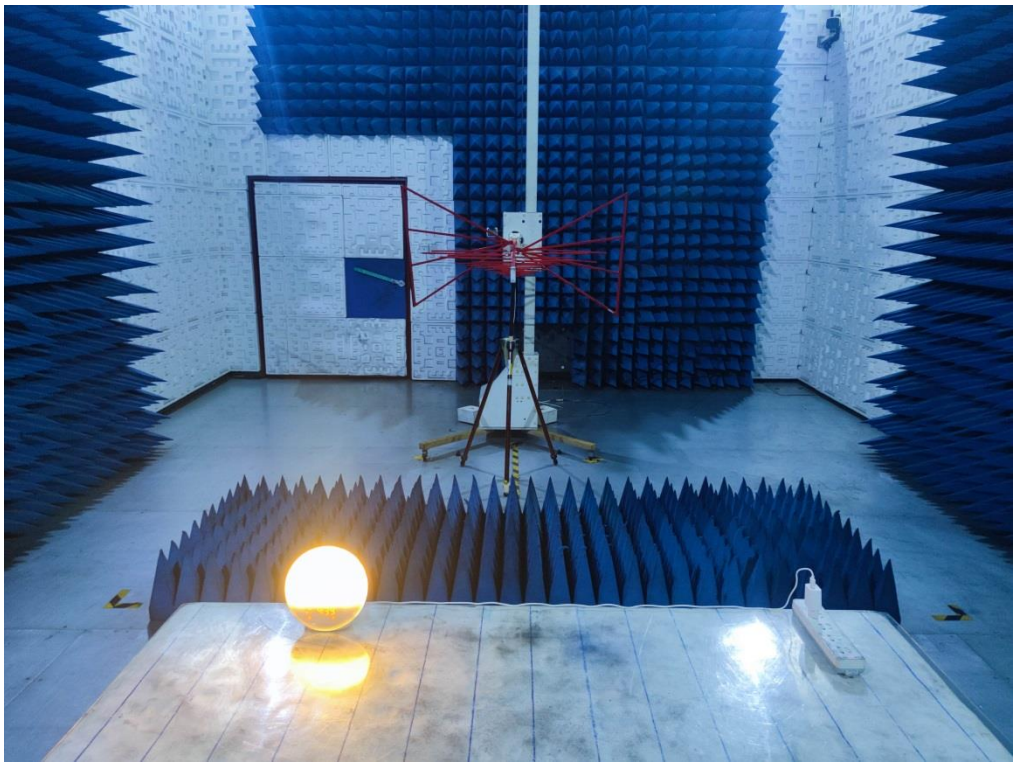


Radiated emissions at frequencies up to 1 GHz

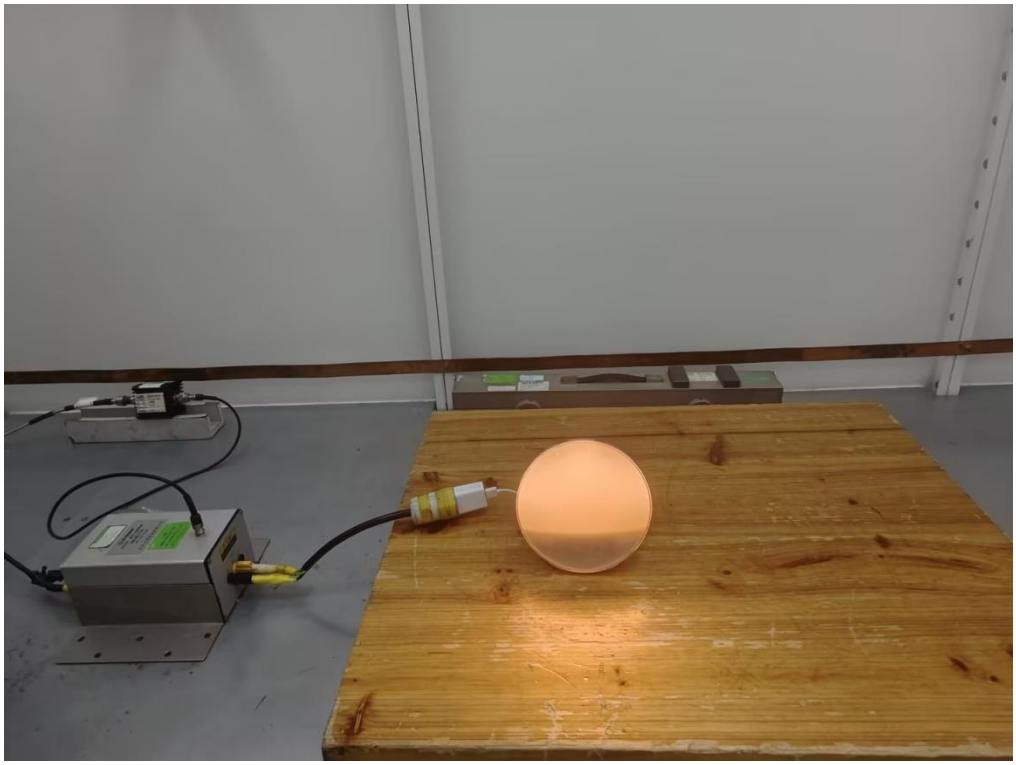


Harmonic current emissions & Voltage fluctuations and flicker

Electrostatic discharge

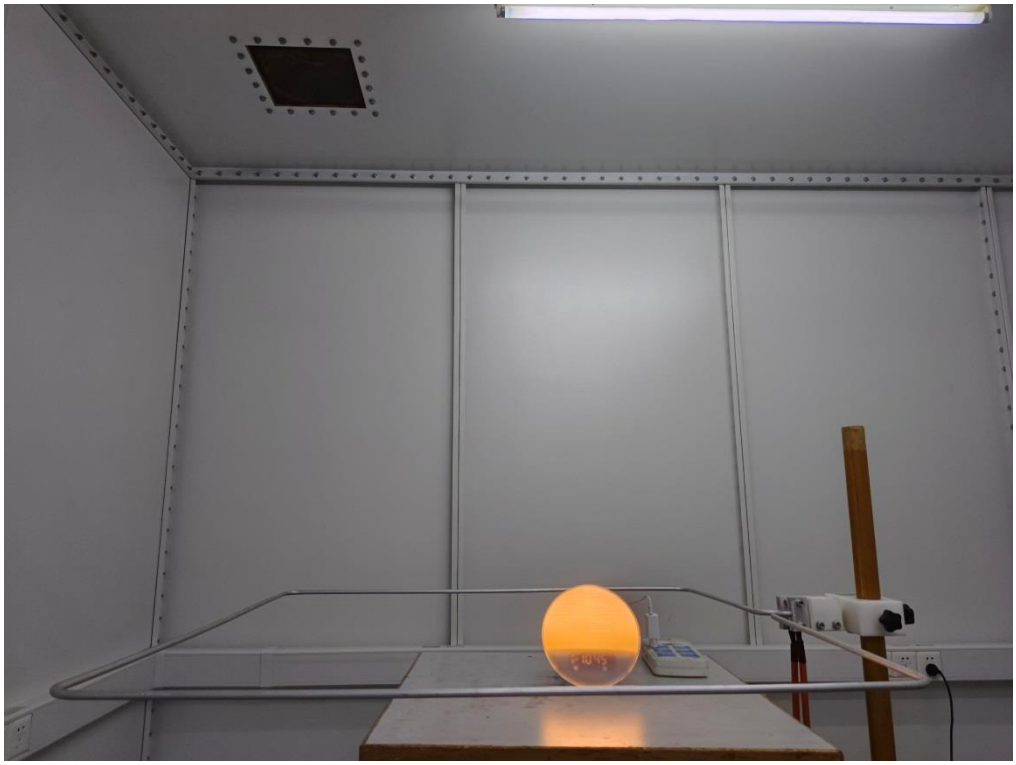


Radio-frequency electromagnetic field up to 1 GHz



Radio-frequency common mode at the AC mains power ports

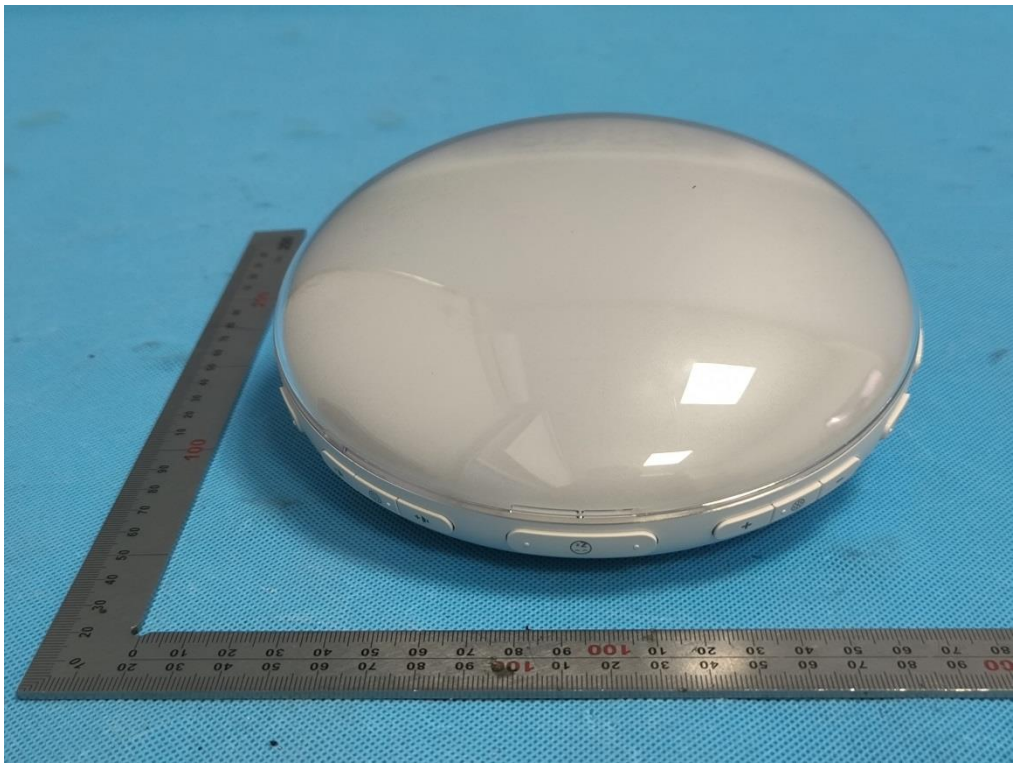
Fast transients/Surges/ Voltage dips at the AC mains power ports



Power-frequency magnetic field

## 18. Photographs of EUT

All view of EUT



Top view of EUT

Bottom view of EUT

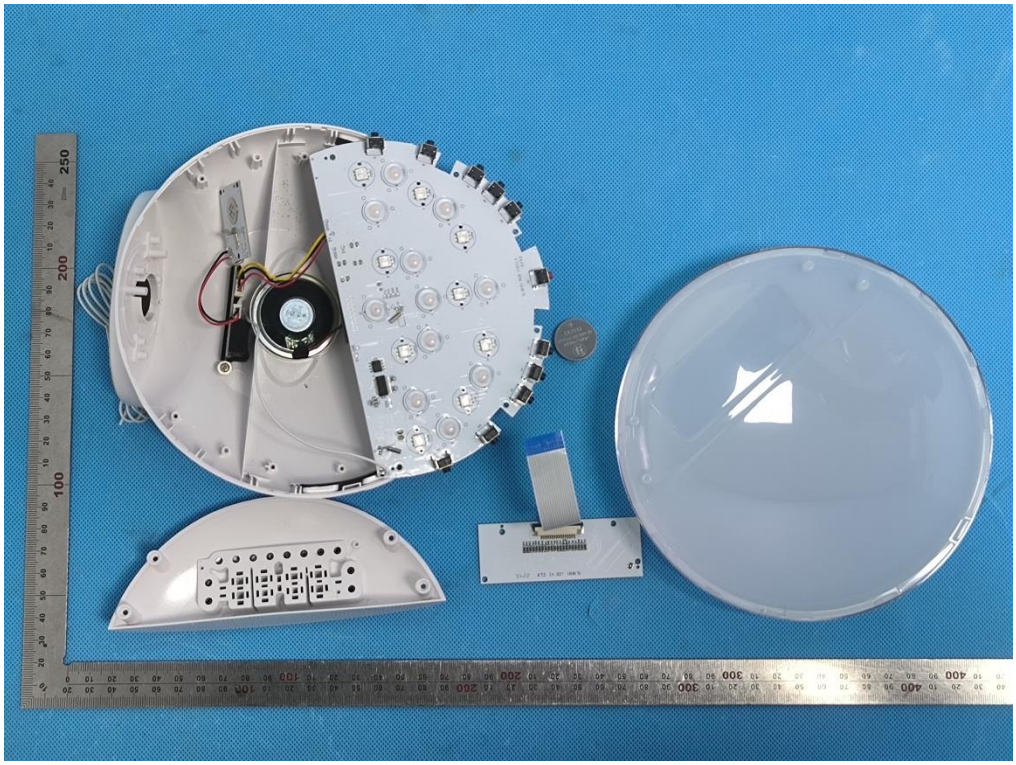
Front view of EUT

Back view of EUT

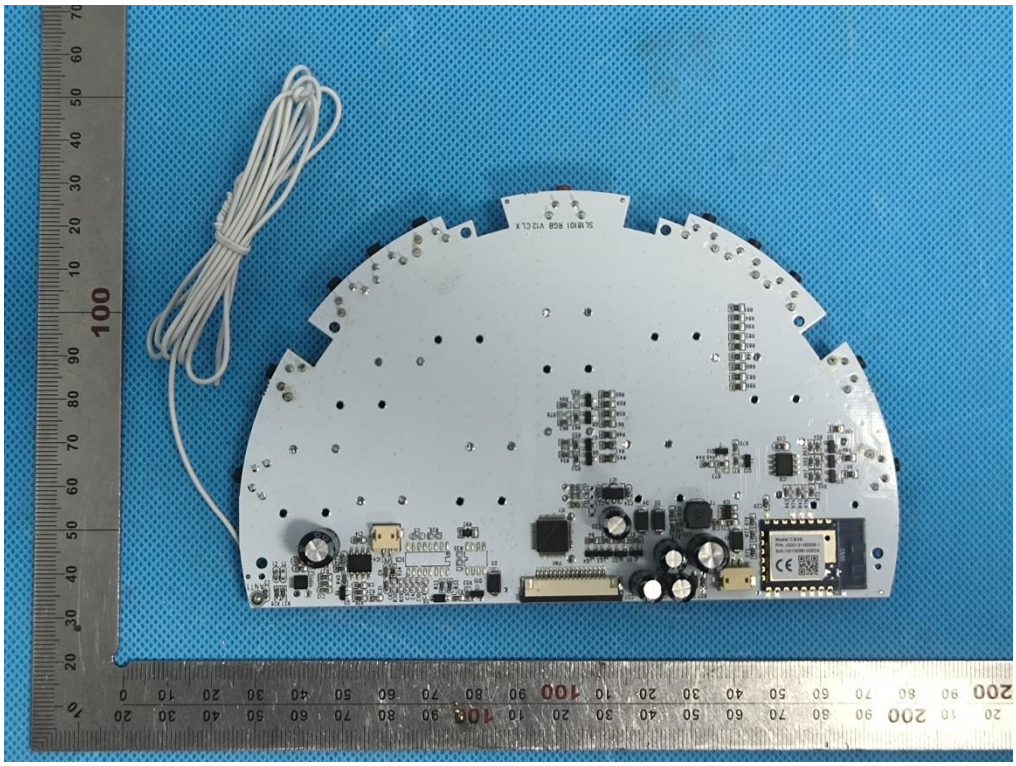
Left view of EUT

Right view of EUT

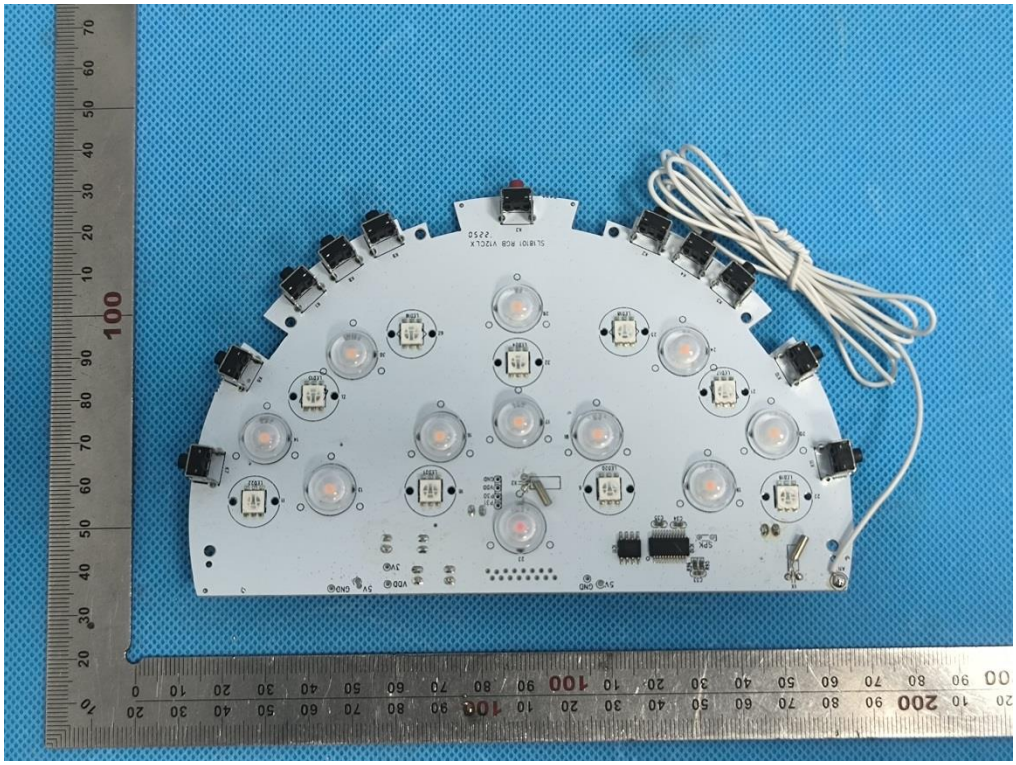
Port view of EUT



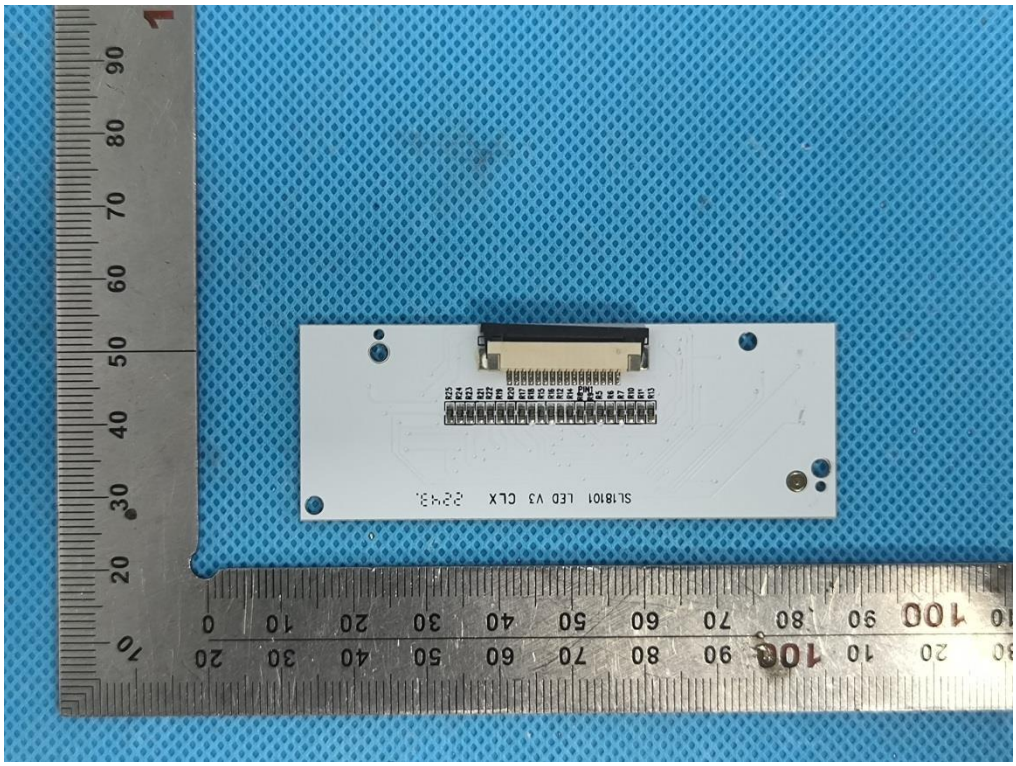
Open view of EUT



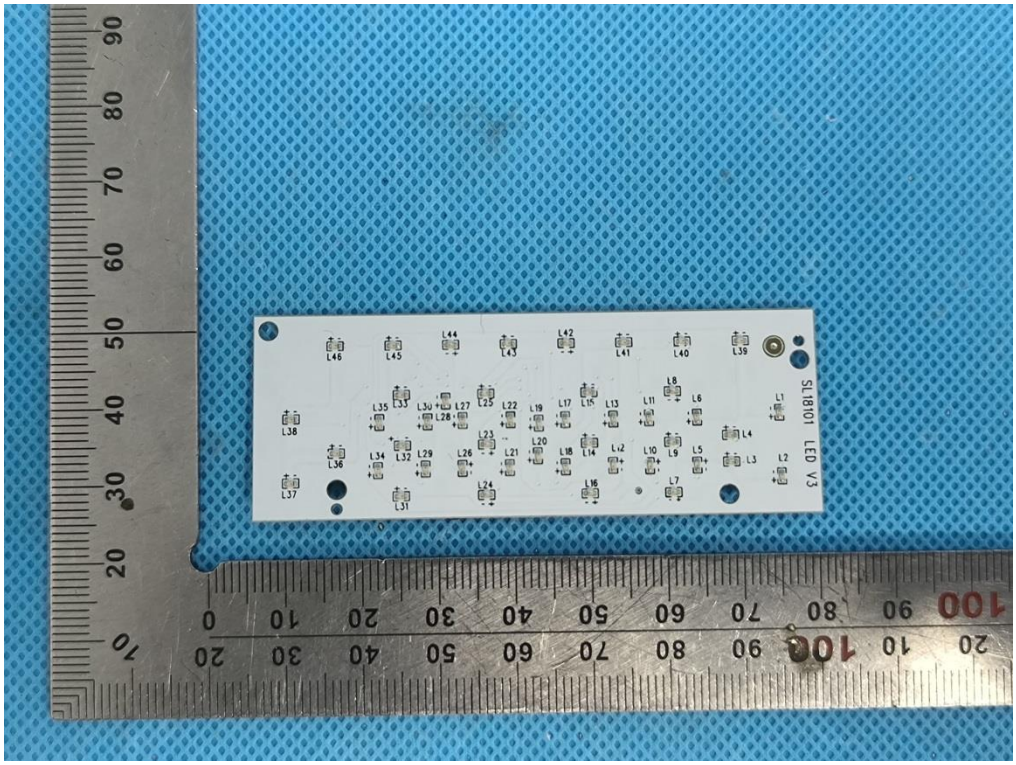
Internal view-1 of EUT



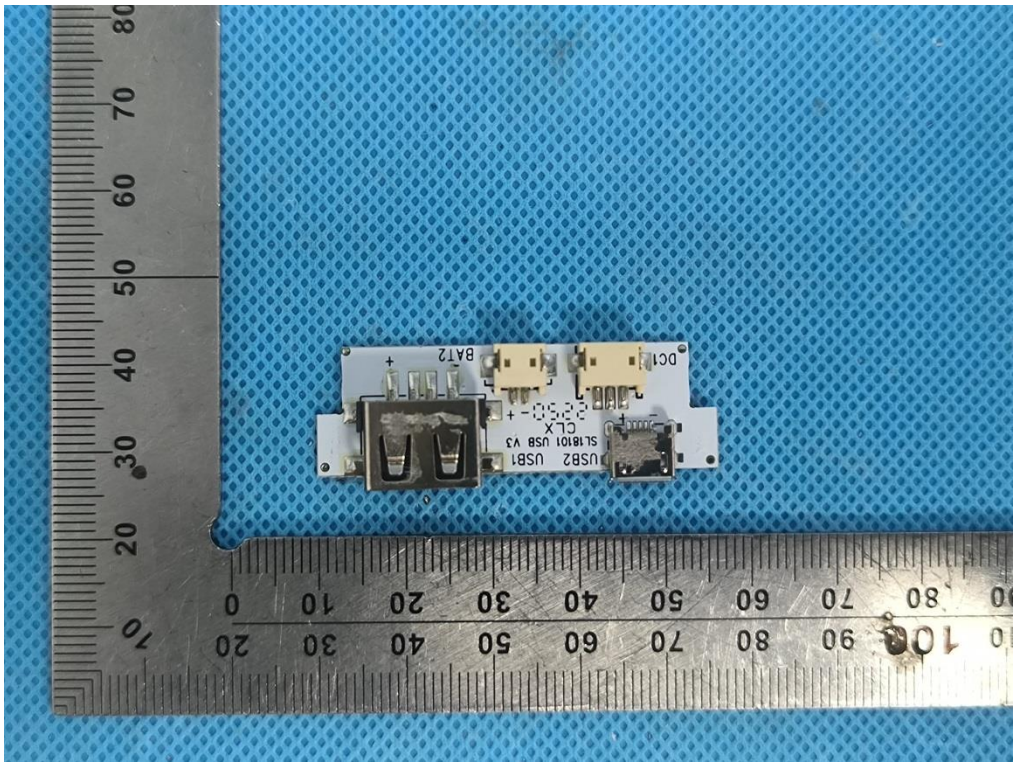
Internal view-2 of EUT



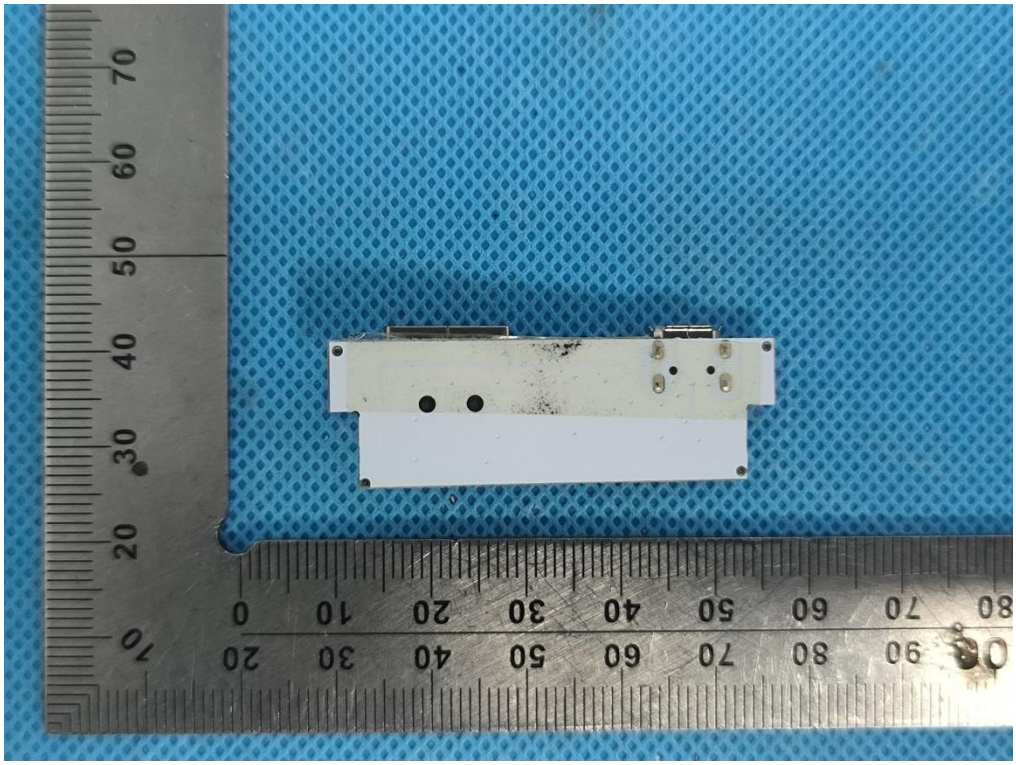
Internal view-3 of EUT



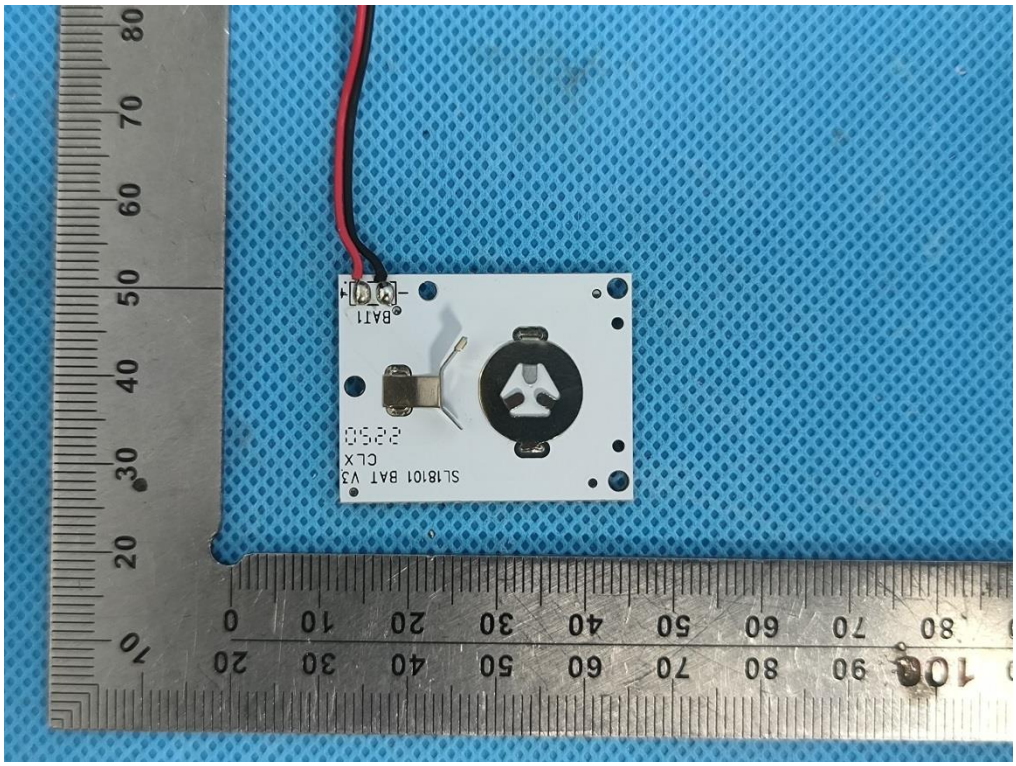

Internal view-4 of EUT



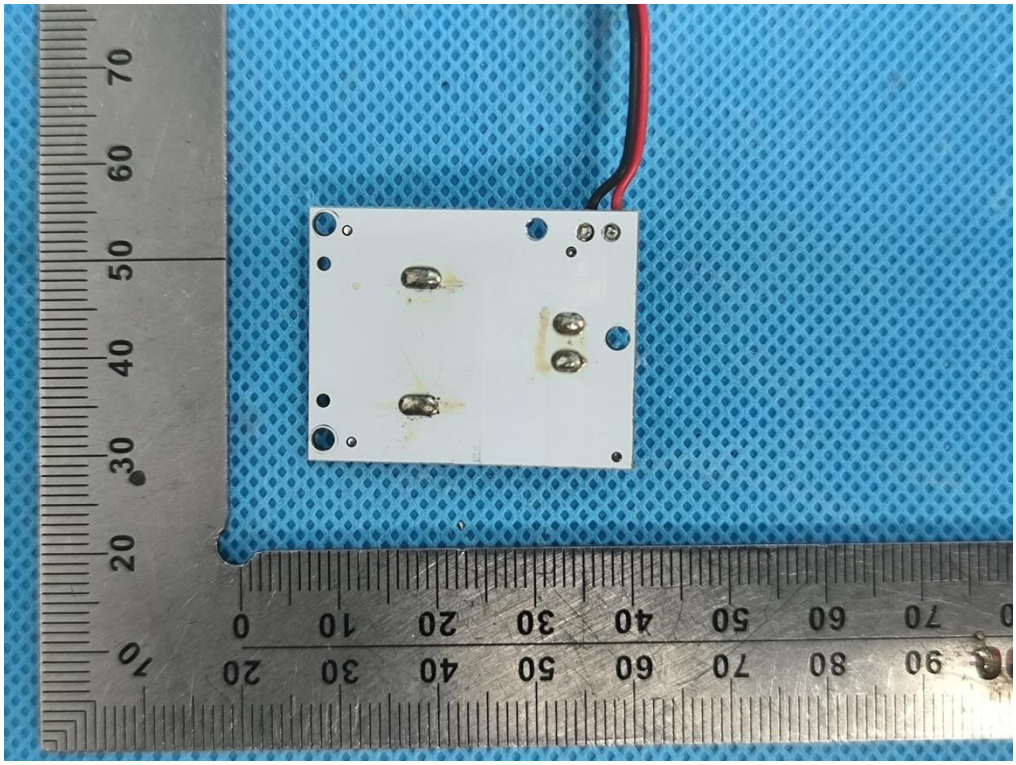

Internal view-5 of EUT



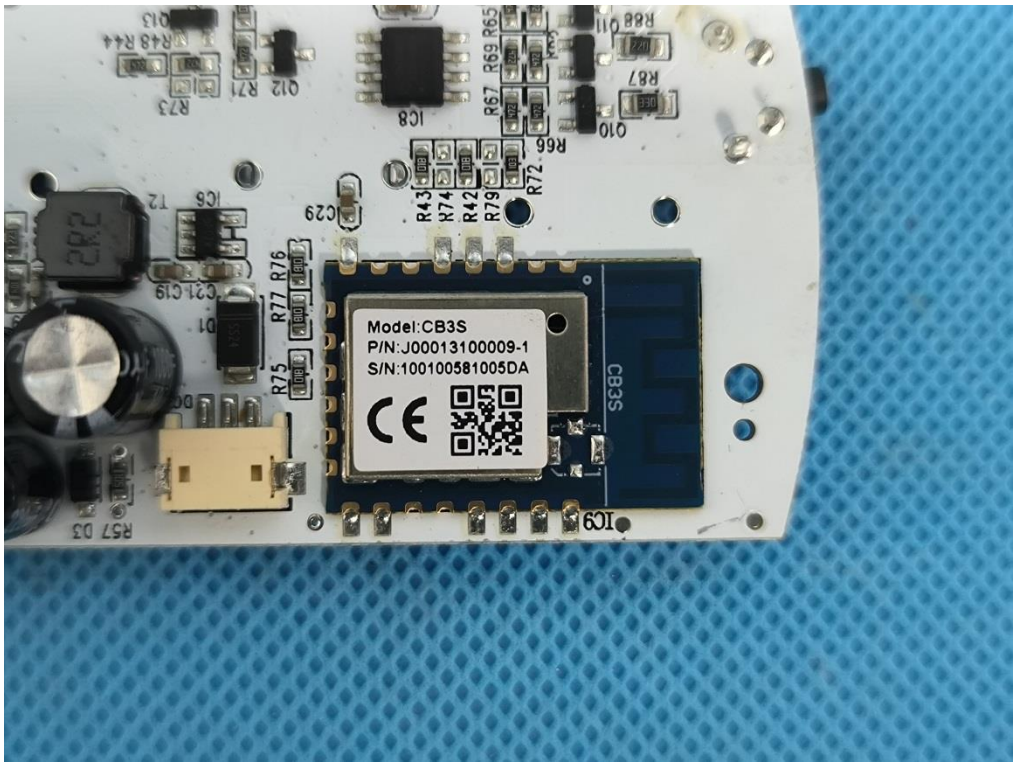
Internal view-6 of EUT



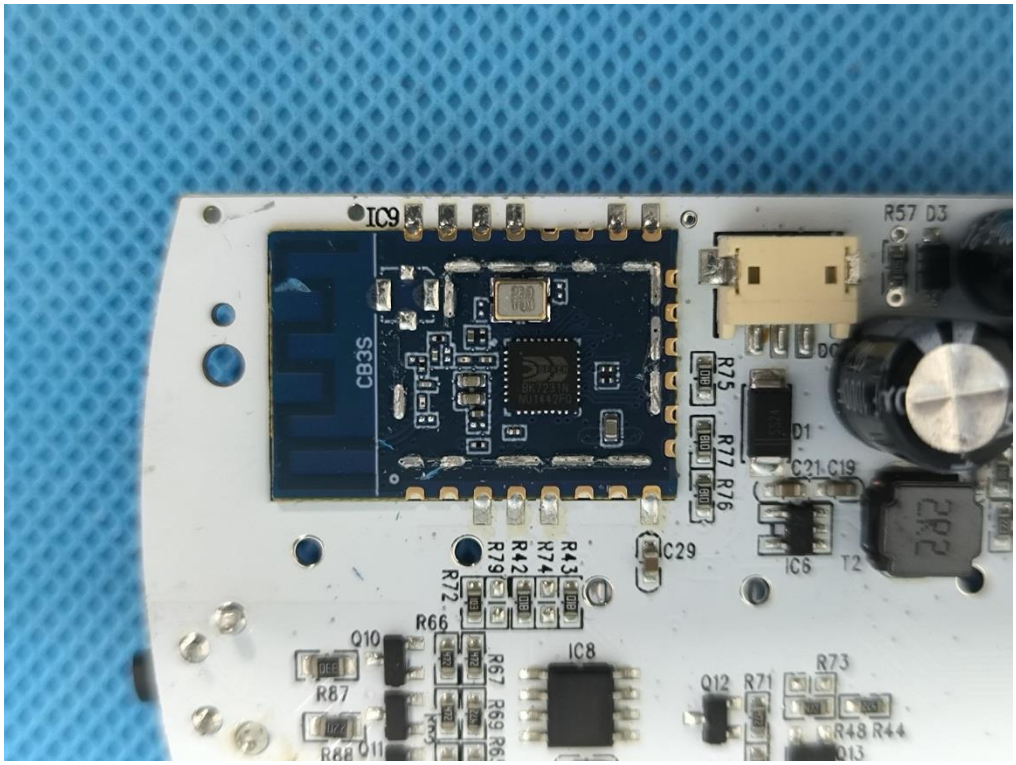

Internal view-7 of EUT



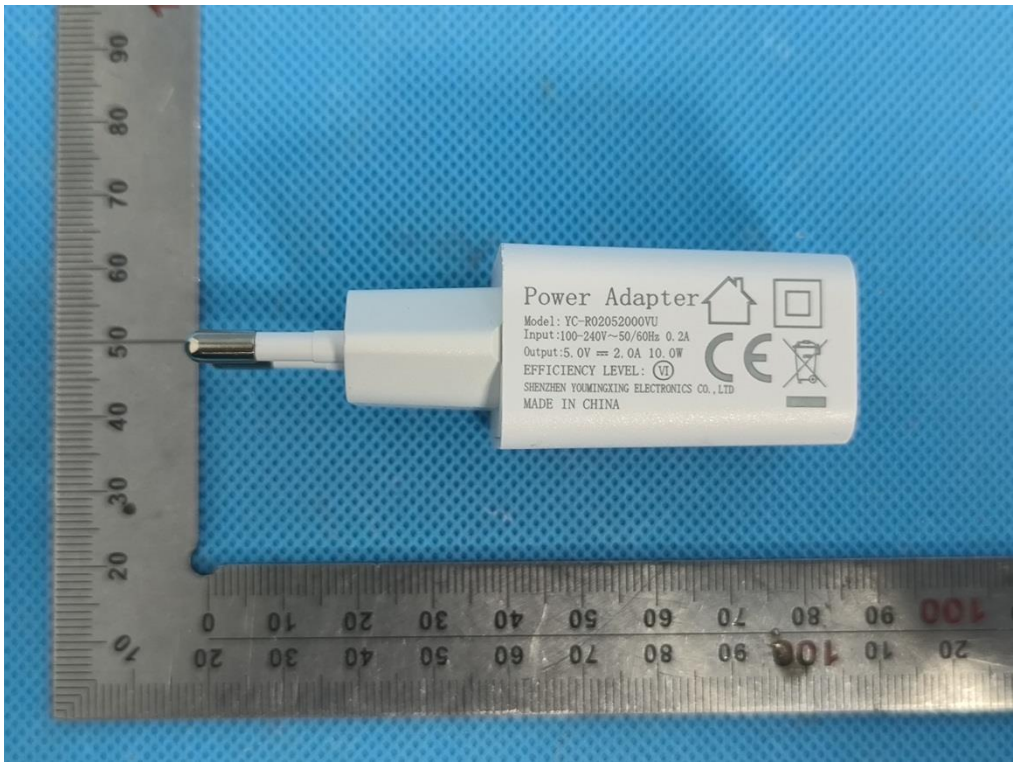
Internal view-8 of EUT



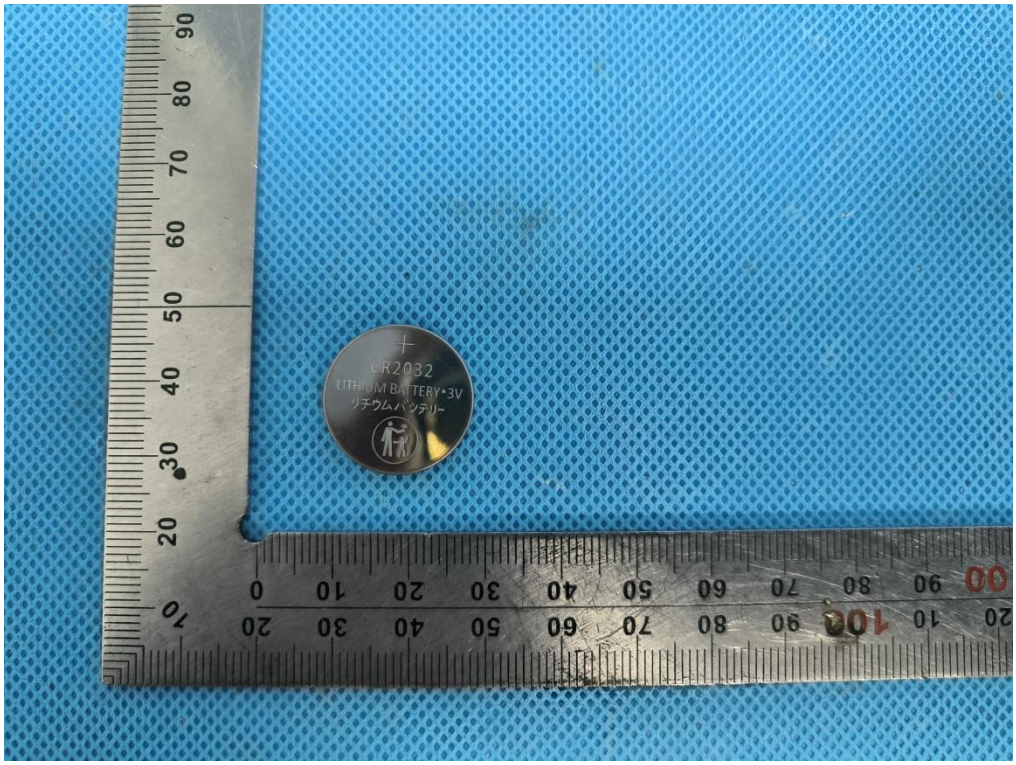

Internal view-9 of EUT




Internal view-10 of EUT




View of Adapter




View of Battery

**----End of Report----**

# Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

# EMC Test Report

Report No.: AGC01110230937ER01

| | | |
|---|---|---|
| **PRODUCT DESIGNATION** | : | Wake-up Light |
| **BRAND NAME** | : | N/A |
| **MODEL NAME** | : | ACA-002, ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **APPLICANT** | : | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **DATE OF ISSUE** | : | Oct. 08, 2023 |
| **STANDARD(S)** | : | ETSI EN 301 489-1 V2.2.3: 2019-11<br>ETSI EN 301 489-17 V3.2.4: 2020-09 |
| **REPORT VERSION** | : | V1.0 |

*A*ttestation of *G*lobal *C*ompliance (Shenzhen) Co., Ltd

## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Oct. 08, 2023 | Valid | Initial release |

## Table of contents

## 1. General information

| | |
|---|---|
| Applicant | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Manufacturer | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Factory | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Product Designation | Wake-up Light |
| Brand Name | N/A |
| Test Model | ACA-002 |
| Series Model(s) | ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| Difference Description | All the same except for the model name and appearance color. |
| Deviation from Standard | No any deviation from the test method |
| Date of receipt of test item | Sep. 19, 2023 |
| Date of Test | Sep. 19, 2023 to Oct. 08, 2023 |
| Test Result | Pass |
| Test Report Form No | AGCTR-ER-EMC-GEN-V1.0 |
| Note: The test results of this report relate only to the tested sample identified in this report. | |

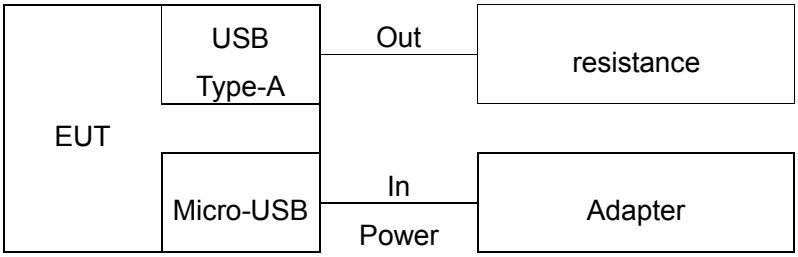
| | | |
|---|---|---|
| Prepared By | Cool Cheng<br>(Project Engineer) | Oct. 08, 2023 |
| Reviewed By | Calvin Liu<br>(Reviewer) | Oct. 08, 2023 |
| Approved By | Max Zhang<br>(Authorized Officer) | Oct. 08, 2023 |

# 2. Description of Test Configuration

## 2.1. Technical Description of Product

| | |
|---|---|
| Categorization of Equipment | Class B equipment |
| Test arrangements of EUT | Table-top |
| Hardware Version | V2.0 |
| Software Version | V2.0 |
| Highest Internal Frequency | More than 108MHz |
| EUT Input Rating | DC 5V by adapter |
| Adapter Information | Model: YC-R02052000VU<br>Input: AC 100-240V, 50/60HZ, 0.2A<br>Output: DC 5.0V, 2.0A,10.0W<br>Manufacturer: SHENZHEN YOUMINGXING ELECTRONICS CO., LTD |

**Connection Diagram of Host System**




**I/O Port Information (☒Applicable ☐Not Applicable)**

| Port Type | Input/Output | Number | Cable Description |
|---|---|---|---|
| USB Type-A | Out | 1 | -- |
| Micro-USB | In | 1 | 1.16m unshielded |

## 2.2. Description of Support Equipment

| Device Type | Manufacturer | Model Name | Specifications | Data Cable | Power Cable |
|---|---|---|---|---|---|
| Xiaomi phone | Xiaomi | Mi 10 | -- | -- | 1m,unshielded |
| Cement resistance | -- | -- | 5Ω | -- | 0.8m unshielded |

## 2.3. Description of Test Modes

| No. | Test Mode Description | Worst |
|---|---|---|
| 1 | 2.4G wifi mode ( with adapter ) | -- |

# 3. Summary of Measurement Results and Uncertainty

## 3.1. Test Specifications

| | |
|---|---|
| ETSI EN 301 489-1 V2.2.3 (2019-11) | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements |
| ETSI EN 301 489-17 V3.2.4 (2020-09) | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems |

## 3.2. Description of Measurement Results

| Test items | Test Standard(s) | Verdict |
|---|---|---|
| Conducted emissions from the AC mains power ports | EN 55032 | Pass |
| Radiated emissions at frequencies up to 1 GHz | EN 55032 | Pass |
| Radiated emissions at frequencies above 1 GHz | EN 55032 | Pass |
| Harmonic current emissions | EN IEC 61000-3-2 | Pass |
| Voltage fluctuations and flicker | EN 61000-3-3 | Pass |
| Electrostatic discharge | EN 61000-4-2 [a] | Pass |
| Radio-frequency electromagnetic field | EN 61000-4-3 [a] | Pass |
| Fast transients | EN 61000-4-4 [a] | Pass |
| Surges | EN 61000-4-5 [a] | Pass |
| Radio-frequency common mode (Injected currents) | EN 61000-4-6 [a] | Pass |
| Voltage dips and interruptions | EN 61000-4-11 [a] | Pass |

Note:
a. The applicable versions of the basic standards are defined in the standard which listed in the test specification.

Performance table

| EN 301 489-17 Performance criteria | | |
|---|---|---|
| Criteria | During Test | After Test<br>(i.e. as a result of the application of the test) |
| A | Shall operate as intended.<br>(see note).<br>Shall be no loss of function.<br>Shall be no unintentional transmissions. | Shall operate as intended.<br>Shall be no degradation of performance.<br>Shall be no loss of function.<br>Shall be no loss of critical stored data. |
| B | May be loss of function. | Functions shall be self-recoverable.<br>Shall operate as intended after recovering.<br>Shall be no loss of critical stored data. |
| C | May be loss of function. | Functions shall be recoverable by the operator.<br>Shall operate as intended after recovering.<br>Shall be no loss of critical stored data. |
| The performance criteria A shall apply for continuous phenomena.<br>The performance criteria B shall apply for transient phenomena, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.<br>Where the EUT is a transmitter in standby mode or receive mode, unintentional transmission shall not occur during the test. | | |
| Note: Operate as intended during the test allows a level of degradation in accordance with the Minimum performance level. | | |
| Minimum performance level | | |
| For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %.<br>For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment. | | |

### 3.3. Description of Measurement Uncertainty

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

| Item | Measurement Uncertainty |
|---|---|
| Conducted emissions from the AC mains power ports | Uc = ±2.9 dB |
| Radiated emissions at frequencies up to 1 GHz | Uc = ±3.9 dB |
| Radiated emissions at frequencies above 1 GHz | Uc = ±4.9 dB |

## 4. Test Facility

Laboratory name: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Laboratory Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified, or accredited by the following organizations:

**CNAS-Lab Code: L5488**

Attestation of Global Compliance (Shenzhen) Co., Ltd. is accredited in accordance with the recognized Interna tional Standard ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laborat ories (CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories).

**A2LA-Lab Cert. No.: 5054.02**

Attestation of Global Compliance (Shenzhen) Co., Ltd. is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This laboratory also meets the requirements of any additional program requirements in the Electrical field.

**FCC-Registration No.: 975832**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

**IC-Registration No.: 24842**

**CAB identifier: CN0063**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

**VCCI Membership No.: 4112**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered in accordance with VCCI Council Rules.

VCCI Registration No. C-20098 for conducted emissions at AC main power ports

VCCI Registration No. T-20102 for conducted emissions at telecommunication ports

VCCI Registration No. R-20136 for radiated emissions below 1GHz

VCCI Registration No. G-20132 for radiated emissions above 1GHz

# 5. Measurement of Conducted Emissions from the AC Mains Power Ports

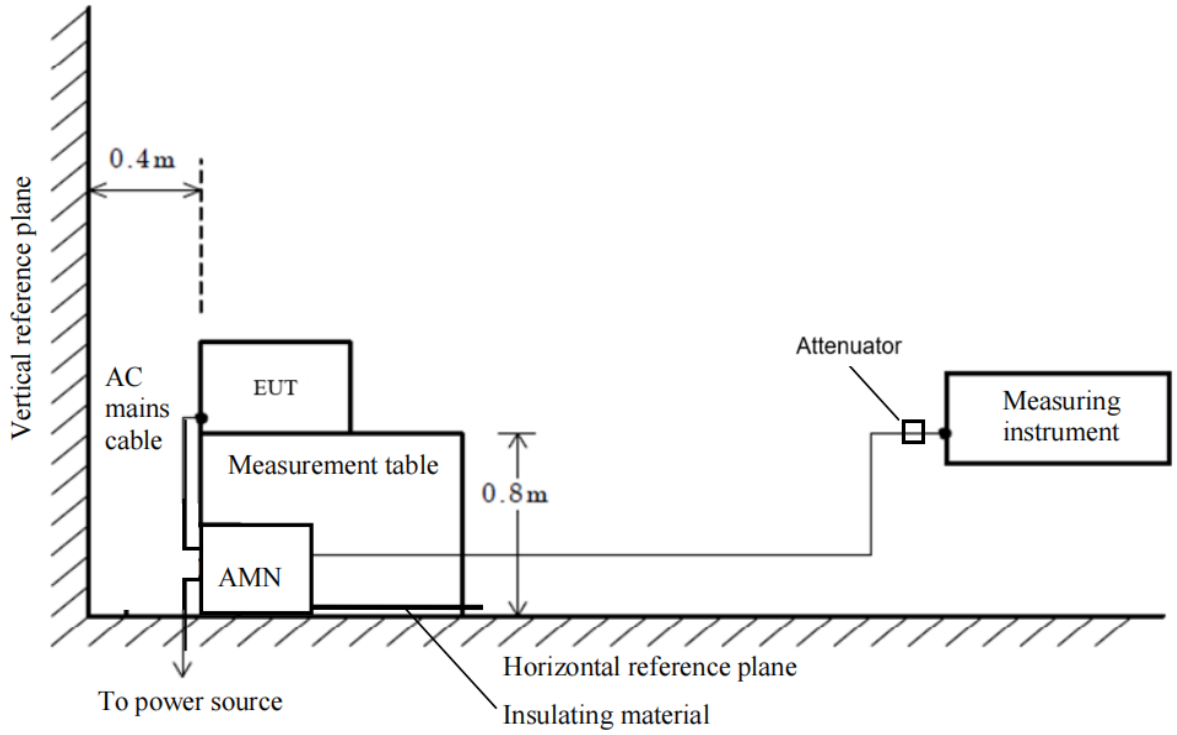
## 5.1. Requirements

Requirements for conducted emissions, low voltage AC mains port

| Network device | Detector type/ bandwidth | Frequency Range (MHz) | Limits dB(μV) | Measurement specifications |
|---|---|---|---|---|
| AMN | Quasi-peak/ 9kHz | 0.15 to 0.5 | 66 to 56 | Instrumentation: CISPR 16-1-1, Clauses 4, 5 and 7<br>Networks: CISPR 16-1-2, Clause 4<br>Method: CISPR 16-2-1, Clause 7<br>Set-up: CISPR 16-2-1, Clause 7 |
| | | 0.5 to 5 | 56 | |
| | | 5 to 30 | 60 | |
| | Average/ 9kHz | 0.15 to 0.5 | 56 to 46 | |
| | | 0.5 to 5 | 46 | |
| | | 5 to 30 | 50 | |

**Note:**
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.5MHz.

## 5.2. Block Diagram of Test Setup



### 5.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESPI | 101206 | Jun. 03, 2023 | Jun. 02, 2024 |
| Artificial Mains Network | R&S | ESH2-Z5 | 100086 | Jun. 03, 2023 | Jun. 02, 2024 |
| Attenuator | East sheep | LM-XX-6-5W | N/A | Jun. 09, 2023 | Jun. 08, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| ES-K1 | R&S | For EMC Measurement, Version 1.71 |

### 5.4. Configuration of the EUT and method of measurement

a. The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane, and was positioned at a distance of 0.4 m away from the vertical reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.

b. Support equipment, if needed, was placed as per CISPR 16-2-1.

c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-1.

d. The EMI receiver measured the emission levels emanating from the EUT into the AC Mains through an Artificial Mains Network (AMN) and an attenuator used on the front end of the EMI receiver. Testing included measurements on all live and neutral lines.

e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.

f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.

g. A conducted emission is calculated by the following equation:

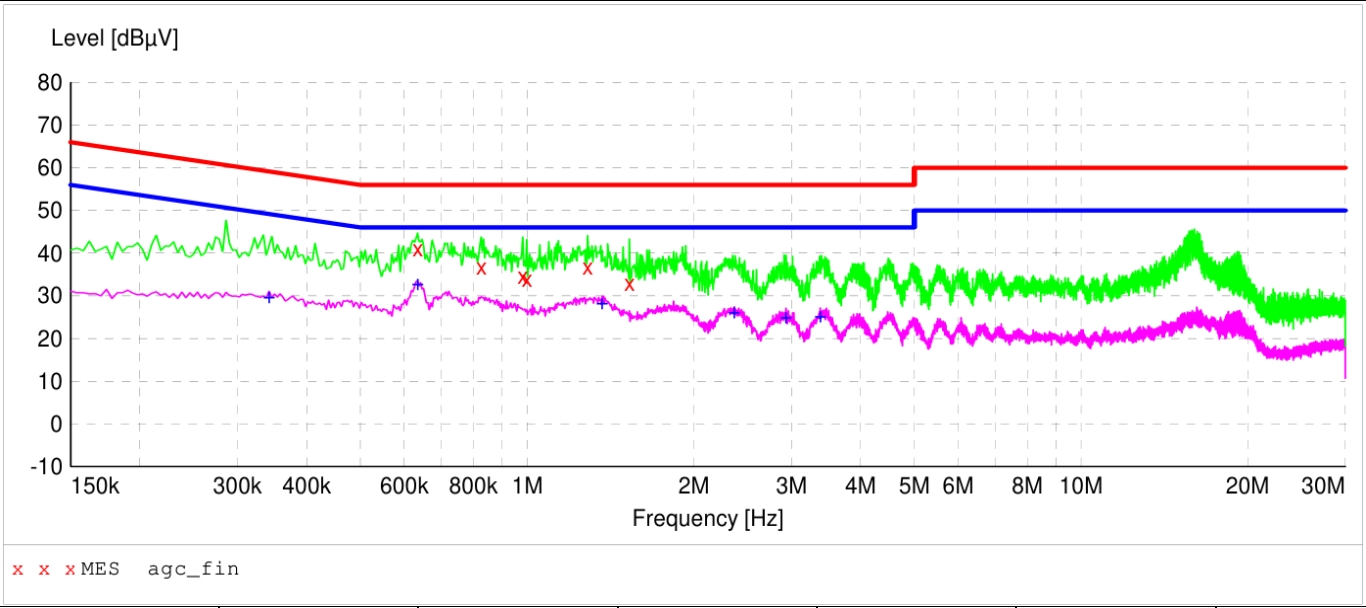
- Measurement Level (dBμV) = Receiver reading (dBμV) + Tansd (dB)
- Transd(dB)= AMN Factor(dB)+Cable Loss(dB)+Attenuation(dB)
- Margin= Limit-Level

### 5.5. Test Summary

| Test Engineer | Jimu | Temperature | 22.2 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 51.4 % |
| Verdict | Pass | | |

Test graph and data for Conducted Emission at line L1

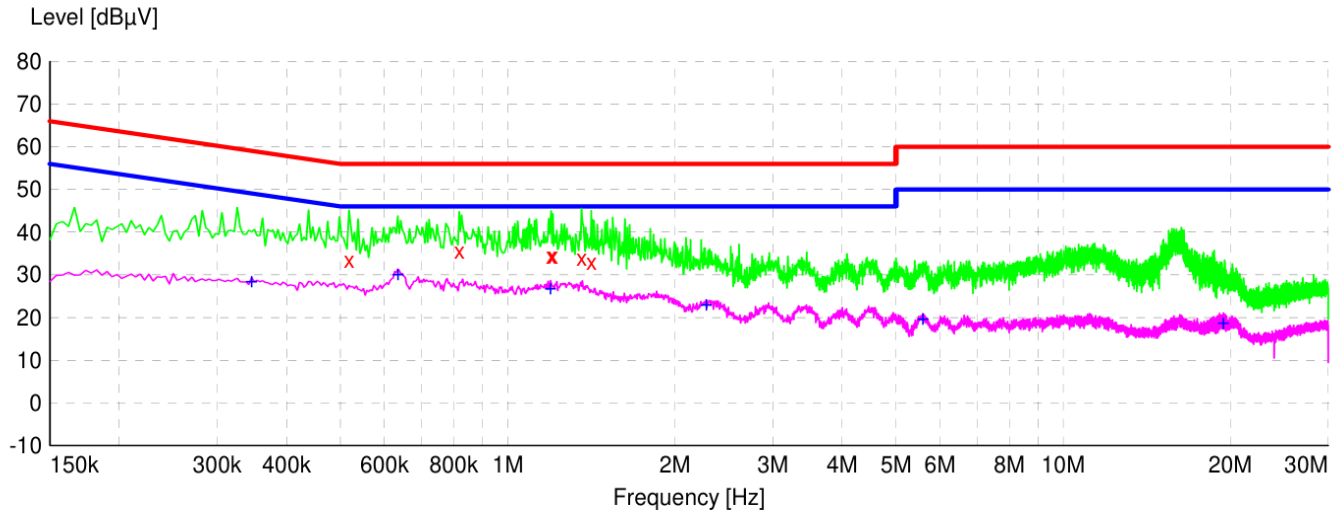
Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV] | Factor[dB] | Limit[dBµV] | Margin[dB] | Detector | Line |
|---|---|---|---|---|---|---|
| 0.634000 | 41.1 | 6.2 | 56.0 | 14.9 | QP | L1 |
| 0.826000 | 36.9 | 6.2 | 56.0 | 19.1 | QP | L1 |
| 0.982000 | 34.7 | 6.2 | 56.0 | 21.3 | QP | L1 |
| 0.998000 | 34.0 | 6.2 | 56.0 | 22.0 | QP | L1 |
| 1.286000 | 36.7 | 6.2 | 56.0 | 19.3 | QP | L1 |
| 1.530000 | 32.9 | 6.2 | 56.0 | 23.1 | QP | L1 |
| 0.342000 | 30.0 | 6.1 | 49.2 | 19.2 | AV | L1 |
| 0.634000 | 33.2 | 6.2 | 46.0 | 12.8 | AV | L1 |
| 1.366000 | 28.8 | 6.2 | 46.0 | 17.2 | AV | L1 |
| 2.366000 | 26.6 | 6.3 | 46.0 | 19.4 | AV | L1 |
| 2.934000 | 25.3 | 6.3 | 46.0 | 20.7 | AV | L1 |
| 3.382000 | 25.6 | 6.3 | 46.0 | 20.4 | AV | L1 |

Test graph and data for Conducted Emission at line N

Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV] | Factor[dB] | Limit[dBµV] | Margin[dB] | Detector | Line |
|---|---|---|---|---|---|---|
| 0.518000 | 33.4 | 6.2 | 56.0 | 22.6 | QP | N |
| 0.818000 | 35.7 | 6.2 | 56.0 | 20.3 | QP | N |
| 1.198000 | 34.5 | 6.2 | 56.0 | 21.5 | QP | N |
| 1.206000 | 34.4 | 6.2 | 56.0 | 21.6 | QP | N |
| 1.358000 | 33.9 | 6.2 | 56.0 | 22.1 | QP | N |
| 1.414000 | 33.1 | 6.2 | 56.0 | 22.9 | QP | N |
| 0.346000 | 28.9 | 6.1 | 49.1 | 20.2 | AV | N |
| 0.634000 | 30.7 | 6.2 | 46.0 | 15.3 | AV | N |
| 1.194000 | 27.4 | 6.2 | 46.0 | 18.6 | AV | N |
| 2.278000 | 23.5 | 6.3 | 46.0 | 22.5 | AV | N |
| 5.590000 | 20.1 | 6.4 | 50.0 | 29.9 | AV | N |
| 19.430000 | 19.2 | 7.1 | 50.0 | 30.8 | AV | N |

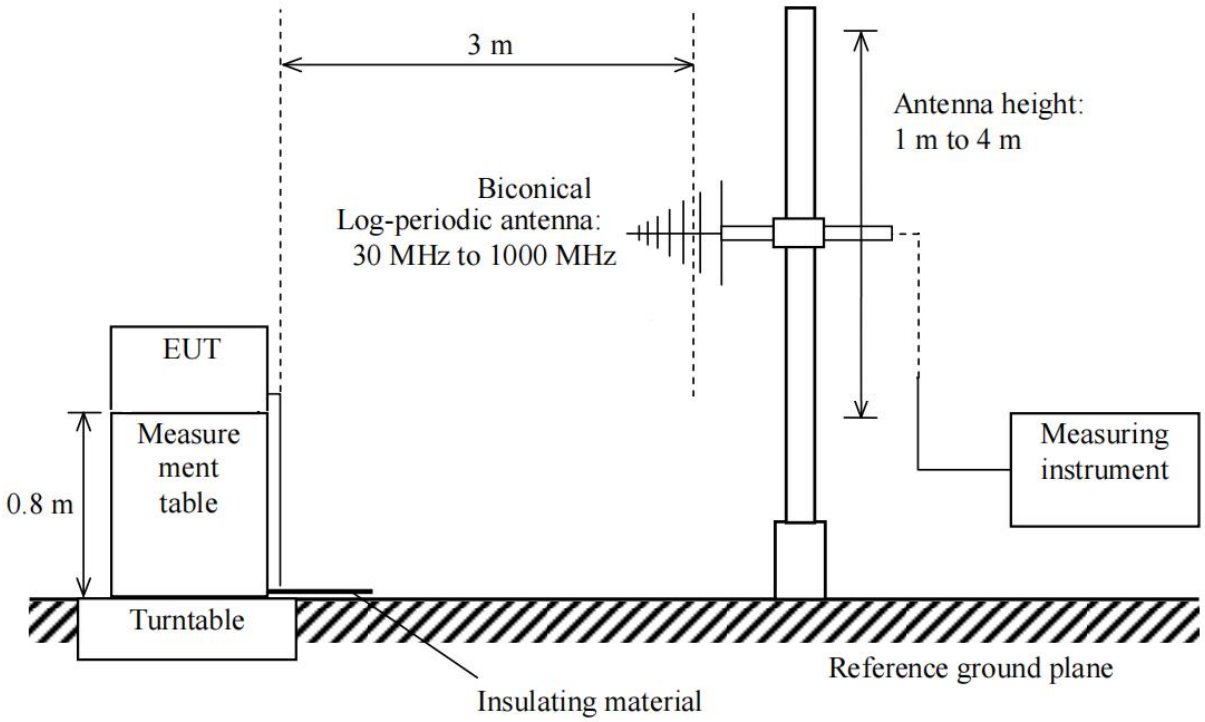
# 6. Measurement of Radiated Emissions at Frequencies up to 1 GHz

## 6.1. Requirements

Requirements for radiated emissions at frequencies up to 1 GHz at 3m distance

| Test facility | Detector type/ bandwidth | Frequency Range (MHz) | Limits dB(μV/m) | Measurement specifications |
|---|---|---|---|---|
| SAC | Quasi-peak/ 120kHz | 30 to 230 | 40 | Instrumentation: CISPR 16-1-1, Clauses 4, 5<br>Antennas: CISPR 16-1-4, Clause 4.5<br>Test Site: CISPR 16-1-4, Clause 6<br>Method: CISPR 16-2-3, Clause 7.6 |
| | | 230 to 1000 | 47 | |
| **Note:**<br>1. The lower limit shall apply at the transition frequency. | | | | |

## 6.2. Block Diagram of Test Setup



### 6.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESCI | 10096 | Feb. 18, 2023 | Feb. 17, 2024 |
| Antenna | SCHWARZBECK | VULB9168 | D69250 | May 11, 2023 | May 10, 2025 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| EZ-EMC | FARA | For EMC Measurement, Version RA-03A |

### 6.4. Configuration of the EUT and method of measurement

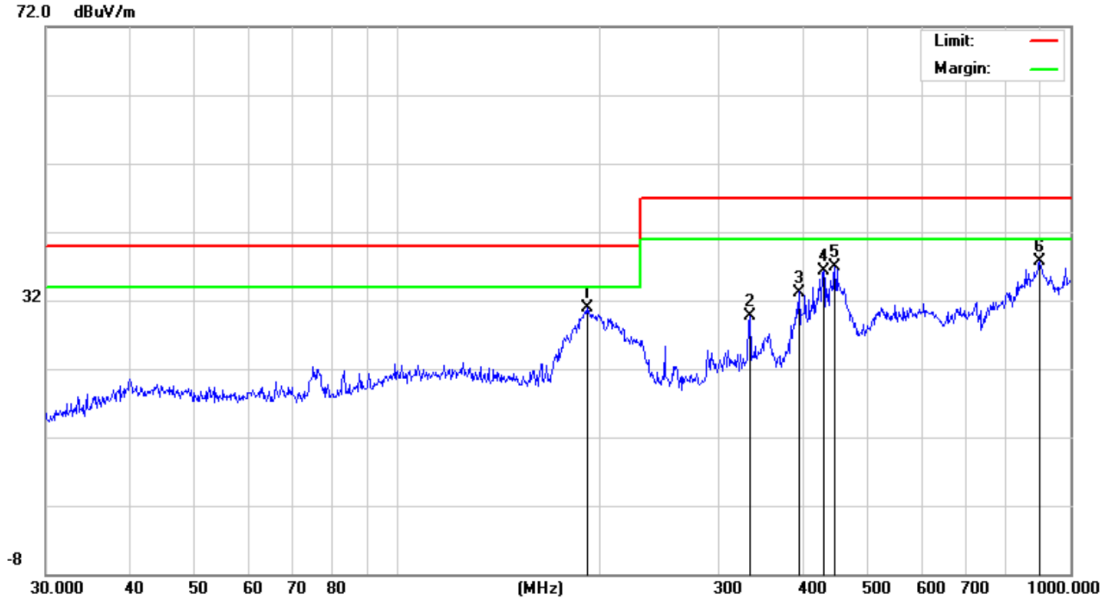
a. The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.
b. Support equipment, if needed, was placed as per CISPR 16-2-3.
c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-3.
d. The maximum receiving level of radiated emissions from the EUT was measured while the turntable was rotated from 0° to 360° and the antenna height was scanned between 1 m and 4 m. The cables were laid out to attain the maximum level of radiated emissions.
e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.
f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.
g. A radiated emission is calculated by the following equation:
    - Measurement Level dB(μV/m) = Receiver reading dB(μV) + Factor(dB/m)
    - Factor(dB/m) = Antenna Factor(dB/m) + Cable Loss(dB)
    - Margin= Limit-Level

### 6.5. Test Summary

| Test Engineer | Alex | Temperature | 23.7 ℃ |
|---|---|---|---|
| Test Date | Sep. 26, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 61.2 % |
| Verdict | Pass | | |

Test graph and data for Radiated Emission at Horizontal

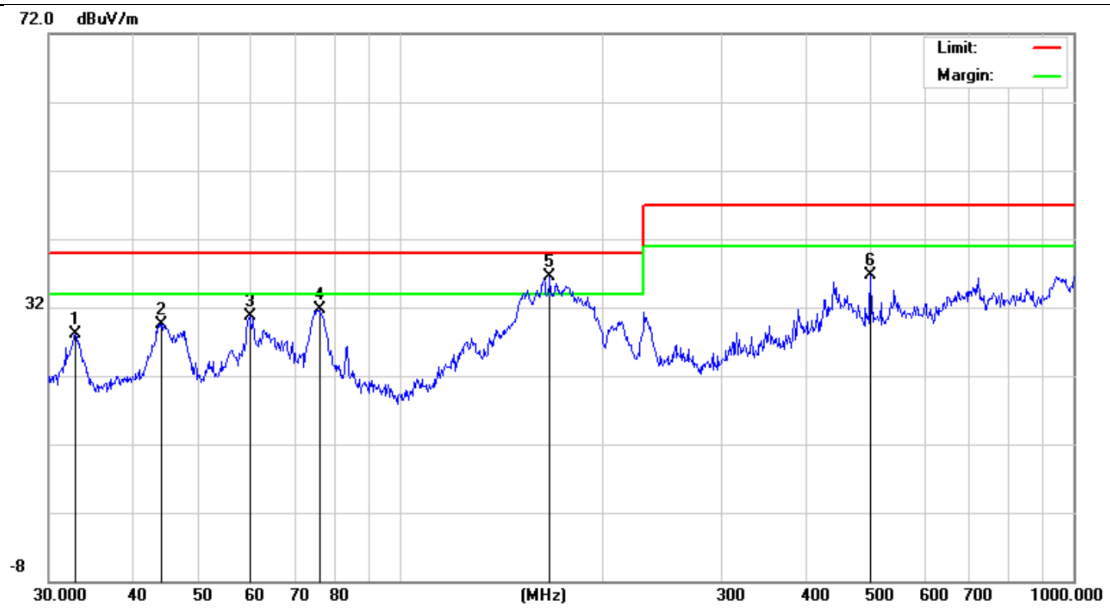
Test Mode: Mode 1




| Frequency[MHz] | Level[dBμV/m] | Factor[dB] | Limit[dBμV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 191.0738 | 30.93 | 13.47 | 40.00 | 9.07 | peak | Horizontal |
| 333.6867 | 29.69 | 16.91 | 47.00 | 17.31 | peak | Horizontal |
| 394.8545 | 33.20 | 19.83 | 47.00 | 13.8 | peak | Horizontal |
| 429.5228 | 36.36 | 22.85 | 47.00 | 10.64 | peak | Horizontal |
| 446.4141 | 36.96 | 24.88 | 47.00 | 10.04 | peak | Horizontal |
| 900.1474 | 37.67 | 31.78 | 47.00 | 9.33 | peak | Horizontal |

Test graph and data for Radiated Emission at Vertical

Test Mode: Mode 1




| Frequency[MHz] | Level[dBμV/m] | Factor[dB] | Limit[dBμV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 32.8637 | 28.04 | 14.54 | 40.00 | 11.96 | peak | Vertical |
| 44.1200 | 29.59 | 16.94 | 40.00 | 10.41 | peak | Vertical |
| 59.6492 | 30.66 | 17.10 | 40.00 | 9.34 | peak | Vertical |
| 75.7113 | 31.66 | 16.94 | 40.00 | 8.34 | peak | Vertical |
| 166.6513 | 36.51 | 18.30 | 40.00 | 3.49 | peak | Vertical |
| 499.4246 | 36.69 | 24.09 | 47.00 | 10.31 | peak | Vertical |

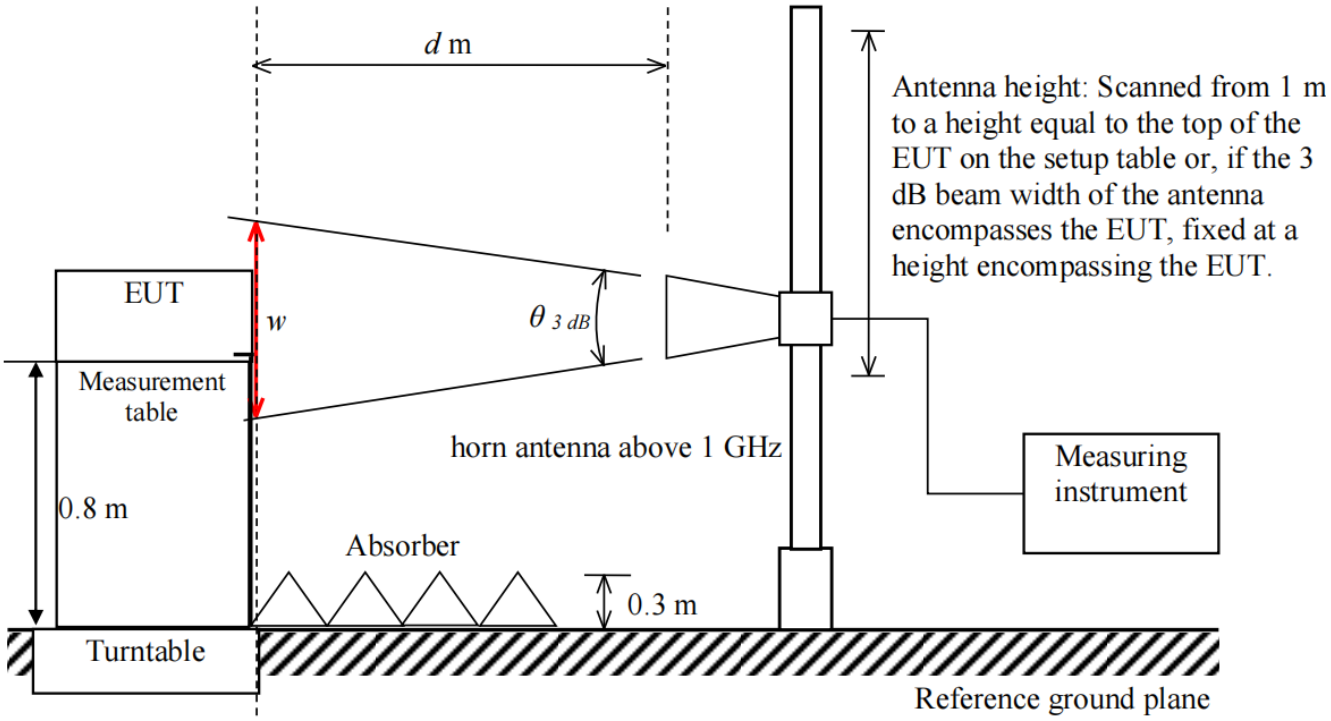
# 7. Measurement of Radiated Emissions at Frequencies Above 1 GHz

## 7.1. Requirements

Requirements for radiated emissions at frequencies above 1 GHz at 3m distance

| Test facility | Detector type/ bandwidth | Frequency Range (MHz) | Limits dB(μV/m) | Measurement specifications |
|---|---|---|---|---|
| FSOATS | Peak/ 1MHz | 1000 to 3000 | 70 | Instrumentation: CISPR 16-1-1, Clauses 4, 6, 7<br>Antennas: CISPR 16-1-4, Clause 4.6<br>Test Site: CISPR 16-1-4, Clause 7<br>Method: CISPR 16-2-3, Clause 7.6 |
| | | 3000 to 6000 | 74 | |
| | Average/ 1MHz | 1000 to 3000 | 50 | |
| | | 3000 to 6000 | 54 | |
| **Note:**<br>1. The lower limit shall apply at the transition frequency. | | | | |

## 7.2. Block Diagram of Test Setup



### 7.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Analyzer | Keysight | N9010A | MY53470504 | Jun. 01, 2023 | May 31, 2024 |
| Antenna | ETS | 3117 | 00154520 | Jun. 03, 2023 | Jun. 02, 2024 |
| Preamplifier | ETS | 3117PA | 00246148 | Aug. 04, 2023 | Aug. 03, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| TS+[JS32-RE] | Tonscend | For EMC measurement, version 4.0.0.0 |

### 7.4. Configuration of the EUT and method of measurement

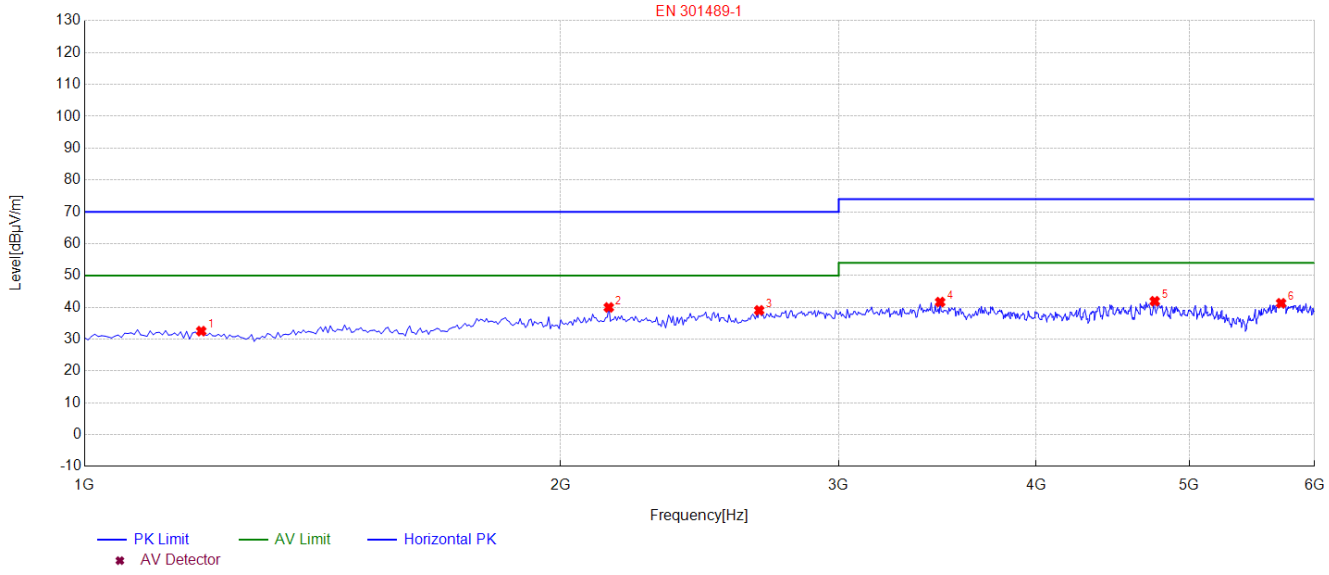
a. The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.
b. Support equipment, if needed, was placed as per CISPR 16-2-3.
c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-3.
d. The maximum receiving level of radiated emissions from the EUT was measured while the turntable was rotated from 0° to 360° and the antenna height scanned from 1 m to a height equal to the top of the EUT on the setup table or, if the 3 dB beam width of the antenna encompasses the EUT, fixed at a height encompassing the EUT. The cables were laid out to attain the maximum level of radiated emissions.
e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.
f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.
g. A radiated emission is calculated by the following equation:
   - Measurement Level dB(μV/m) = Receiver reading dB(μV) + Factor(dB/m)
   - Factor(dB/m) = Antenna Factor(dB/m) + Cable Loss(dB) – Amplifier Gain(dB)
   - Margin= Limit-Level

## 7.5. Test Summary

| Test Engineer | Alex | Temperature | 24.0 ℃ |
|---|---|---|---|
| Test Date | Sep. 26, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 59.7 % |
| Verdict | Pass | | |

Test graph and data for Radiated Emission Above 1GHz at Horizontal

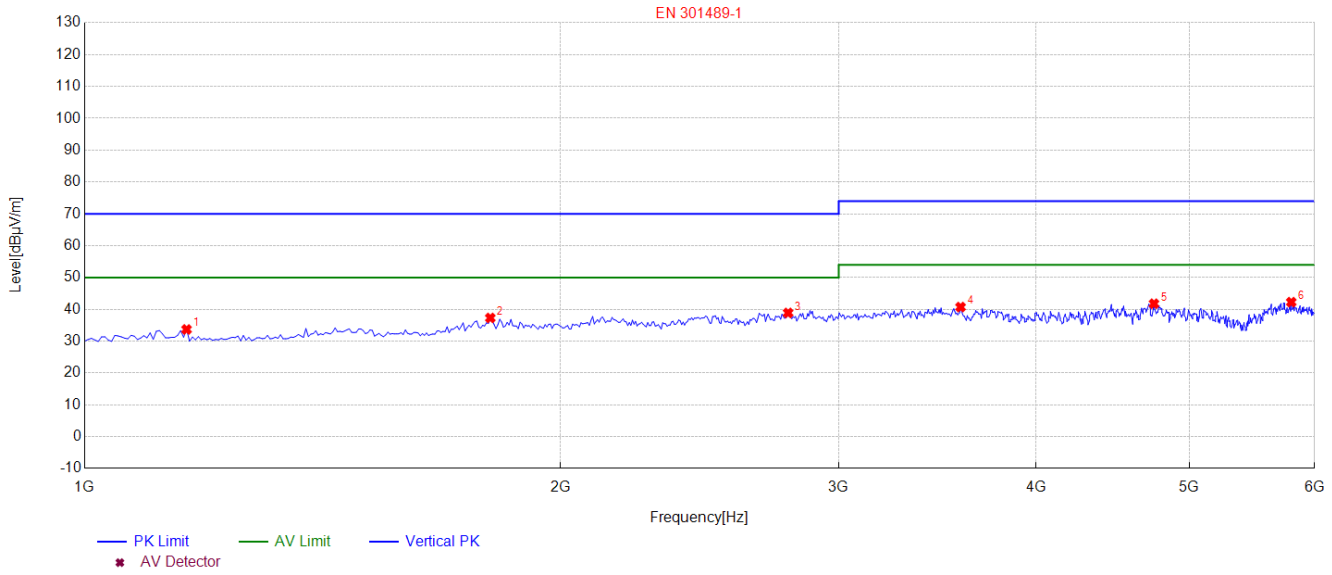
Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV/m] | Factor[dB] | Limit[dBµV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 1185.1852 | 32.52 | -17.95 | 70.00 | 37.48 | Peak | Horizontal |
| 2146.1461 | 39.97 | -13.24 | 70.00 | 30.03 | Peak | Horizontal |
| 2671.6717 | 39.05 | -12.30 | 70.00 | 30.95 | Peak | Horizontal |
| 3477.4775 | 41.65 | -10.90 | 74.00 | 32.35 | Peak | Horizontal |
| 4753.7538 | 41.91 | -7.91 | 74.00 | 32.09 | Peak | Horizontal |
| 5714.7147 | 41.28 | -6.39 | 74.00 | 32.72 | Peak | Horizontal |

Test graph and data for Radiated Emission Above 1GHz at Vertical

Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV/m] | Factor[dB] | Limit[dBµV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 1160.1602 | 33.68 | -18.01 | 70.00 | 36.32 | Peak | Vertical |
| 1805.8058 | 37.29 | -14.94 | 70.00 | 32.71 | Peak | Vertical |
| 2786.7868 | 38.87 | -12.21 | 70.00 | 31.13 | Peak | Vertical |
| 3582.5826 | 40.71 | -10.68 | 74.00 | 33.29 | Peak | Vertical |
| 4748.7487 | 41.76 | -7.91 | 74.00 | 32.24 | Peak | Vertical |
| 5799.7998 | 42.25 | -6.18 | 74.00 | 31.75 | Peak | Vertical |

# 8. Measurement of Harmonic Current Emissions

## 8.1. Requirements

Applicable test standard(s): EN IEC 61000-3-2:2019+A1:2021

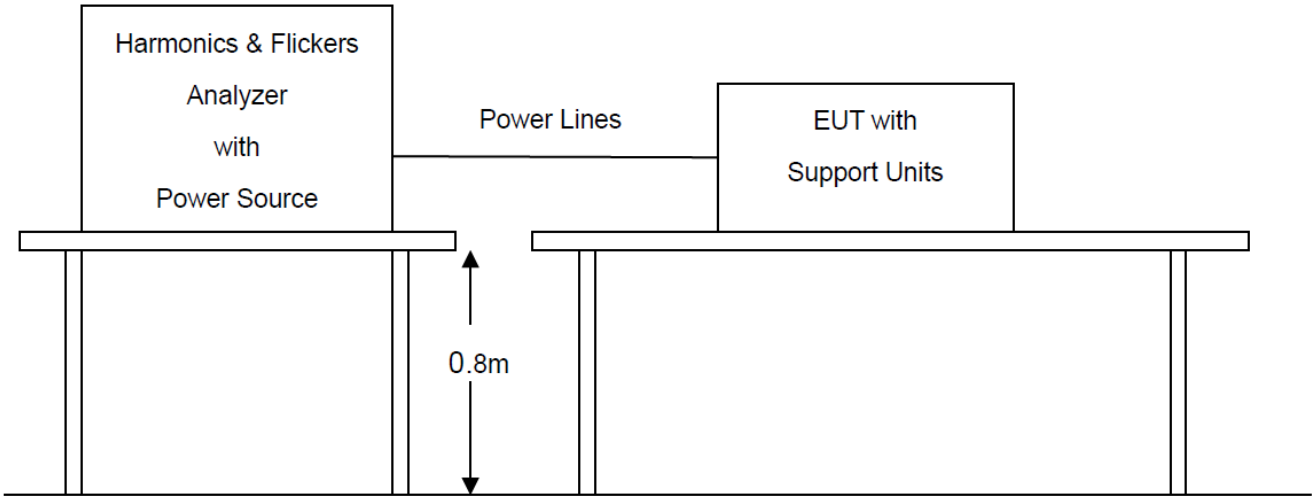
Limits of Harmonic Current Emissions

| Harmonic order *h* | Limits | | | | |
|---|---|---|---|---|---|
| | Class A | Class B | Class C[a] | Class D | |
| | Maximum permissible harmonic current (A) | | Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency (%) | Maximum permissible harmonic current per watt (mA/W) | Maximum permissible harmonic current (A) |
| 3 | 2.30 | 3.45 | 27[b] | 3.4 | 2.30 |
| 5 | 1.14 | 1.71 | 10 | 1.9 | 1.14 |
| 7 | 0.77 | 1.155 | 7 | 1.0 | 0.77 |
| 9 | 0.40 | 0.6 | 5 | 0.5 | 0.40 |
| 11 | 0.33 | 0.495 | 3 | 0.35 | 0.33 |
| 13 | 0.21 | 0.315 | 3 | 3.85/13 | 0.21 |
| 15≤*h*≤39(odd harmonics only) | 2.25/*h* | 3.375/*h* | 3 | 3.85/*h* | 2.25/*h* |
| 2 | 1.08 | 1.62 | 2 | Not applicable | Not applicable |
| 4 | 0.43 | 0.645 | Not applicable | | |
| 6 | 0.30 | 0.45 | | | |
| 8≤*h*≤40(even harmonics only) | 1.84/*h* | 2.76/*h* | | | |

Note:
(a) For some Class C products, other emission limits apply.
(b) The limit is determined based on the assumption of modern lighting technologies having power factors of 0.90 or higher.

The application of limits had been as defined in the applicable test standard.

## 8.2. Block Diagram of Test Setup




## 8.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Conditioning Unit | Schaffner | CCN1000-1 | 72431 | Jun. 02, 2023 | Jun. 01, 2024 |
| AC Source | Schaffner | NSG 1007 | 56825 | Jun. 02, 2023 | Jun. 01, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| CTS 4 | AMETEK | For harmonics and flickers measurement, version 4.29.0 |

## 8.4. Configuration of the EUT and method of measurement

a. The test shall be conducted according to the general requirements given in the applicable test standard. The test duration had been as defined in the applicable test standard.

b. The measurement of harmonic currents shall be performed as follows:

- for each harmonic order, measure the 1.5 s smoothed RMS harmonic current in each discrete Fourier transform (DFT) time window;
- calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period.

c. The value of the active input power to be used for the calculation of limits shall be determined as follows:

- measure the 1.5 s smoothed active input power in each DFT time window;
- determine the maximum of the measured values of active power from the DFT time windows over the entire duration of the test.

d. The harmonic currents and the active input power shall be measured under the same test conditions but need not be measured simultaneously.

### 8.5. Test Summary

Equipment with a rated power less than to 25W is deemed to fulfil all relevant requirements of this standard without testing.

# 9. Measurement of Voltage Fluctuations and Flicker

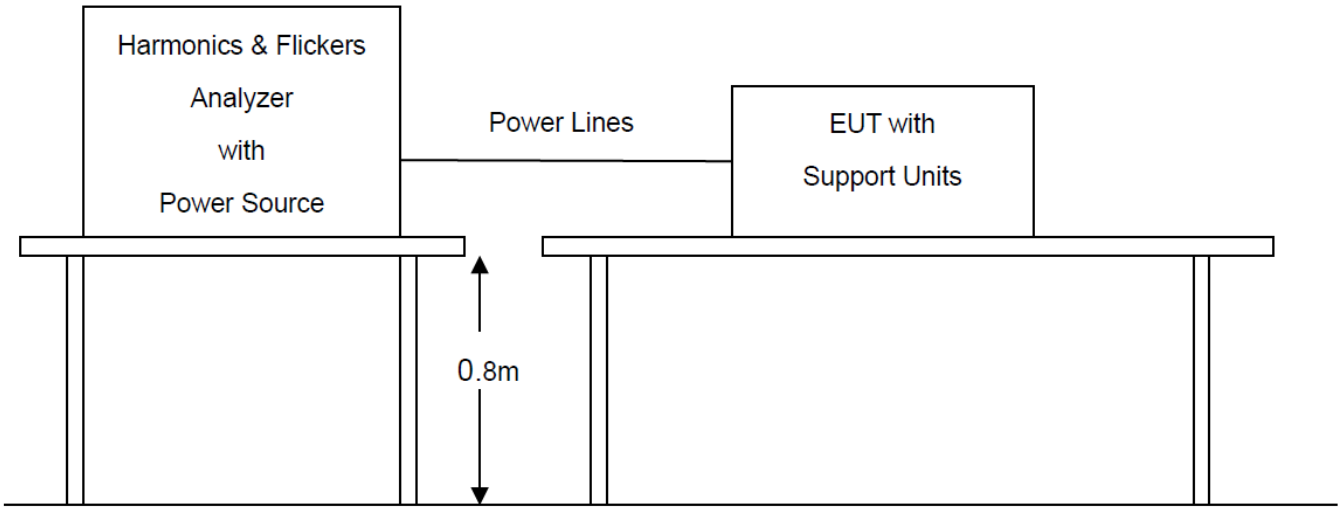
## 9.1. Requirements

Applicable test standard(s): EN 61000-3-3:2013+A2:2021

Limits of Voltage Fluctuations and Flicker

| Parameters | Definitions | Limits |
|---|---|---|
| $T_{max}$ | the accumulated time value of *d(t)* with a deviation exceeding 3.3 % during a single voltage change at the EUT terminals | ⩽500 ms |
| $d_c$ | the maximum relative steady-state voltage change | ⩽3.3% |
| $d_{max}$ | the maximum relative voltage change | ☒⩽4%<br>☐⩽6%<br>☐⩽7% |
| ☒$P_{st}$ | short-term flicker severity | ⩽0.65 |
| ☐$P_{lt}$ | long-term flicker severity | ⩽1.0 |

## 9.2. Block Diagram of Test Setup




## 9.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Conditioning Unit | Schaffner | CCN1000-1 | 72431 | Jun. 02, 2023 | Jun. 01, 2024 |
| AC Source | Schaffner | NSG 1007 | 56825 | Jun. 02, 2023 | Jun. 01, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| CTS 4 | AMETEK | For harmonics and flickers measurement, version 4.29.0 |

### 9.4. Configuration of the EUT and method of measurement

a. The test shall be conducted according to the general requirements given in the applicable test standard. The test duration and test condition had been as defined in the applicable test standard.

b. All types of voltage fluctuations would been assessed by direct measurement using a flicker meter which complies with the specification given in IEC 61000-4-15:2010.

### 9.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Jimu | Temperature | 22.6 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 53.2 % |
| Verdict | Pass | | |

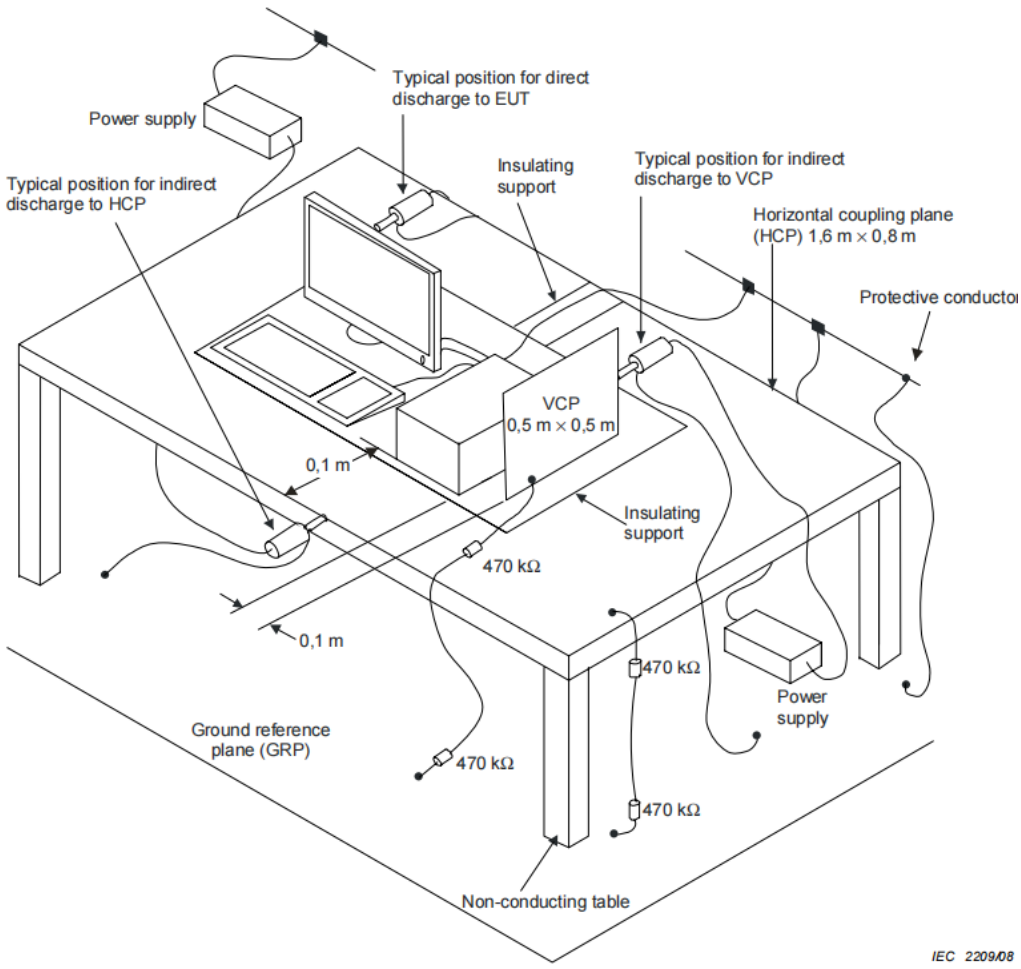
| Parameters | Measurement Value | Limits |
|---|---|---|
| $T_{max}$ | 0 | ⩽500 ms |
| $d_c$ | 0.00 | ⩽3.3% |
| $d_{max}$ | 0.00 | ⩽4% |
| $P_{st}$ | 0.119 | ⩽0.65 |

# 10. Measurement of Electrostatic discharge

## 10.1. Requirements

| | |
|---|---|
| Port | Enclosure |
| Basic Standard | EN 61000-4-2 |
| Required Performance Criterion | The performance criteria for transient phenomena shall apply. |
| Test Level | ±8.0 kV (Air Discharge)<br>±4.0 kV (Contact Discharge)<br>±4.0 kV (Indirect Discharge) |
| Time Between Each Discharge: | 1 second |
| Number of Discharge for Each Applied Voltage | 10 |

## 10.2. Block Diagram of Test Setup



### 10.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| ESD Simulator | Schaffner | NSG 438 | 782 | Dec. 30, 2022 | Dec. 29, 2023 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| -- | -- | -- |

### 10.4. Configuration of the EUT and method of measurement

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
c. The time interval between two successive single discharges was at least 1 second.
d. 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 EUT.
e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were completed.
g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT 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 EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed vertically to and 0.1 meters from the EUT.
i. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 10.5. Test Summary

| Test Engineer | Sam | Temperature | 23 ℃ |
|---|---|---|---|
| Test Date | Oct. 07, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1 | Relative Humidity | 47 % |
| Verdict | Pass | | |

| Voltage | Coupling | Observation | Results |
|---|---|---|---|
| ±4kV | Contact Discharge | No degradation of performance | Pass |
| ±2KV, ±4kV, ±8kV | Air Discharge | No degradation of performance | Pass |
| ±4kV | Indirect Discharge HCP | No degradation of performance | Pass |
| ±4kV | Indirect Discharge VCP | No degradation of performance | Pass |

Red line: Contact discharge

Blue line: Air discharge

# 11. Measurement of Radio-Frequency Electromagnetic Field

## 11.1. Requirements

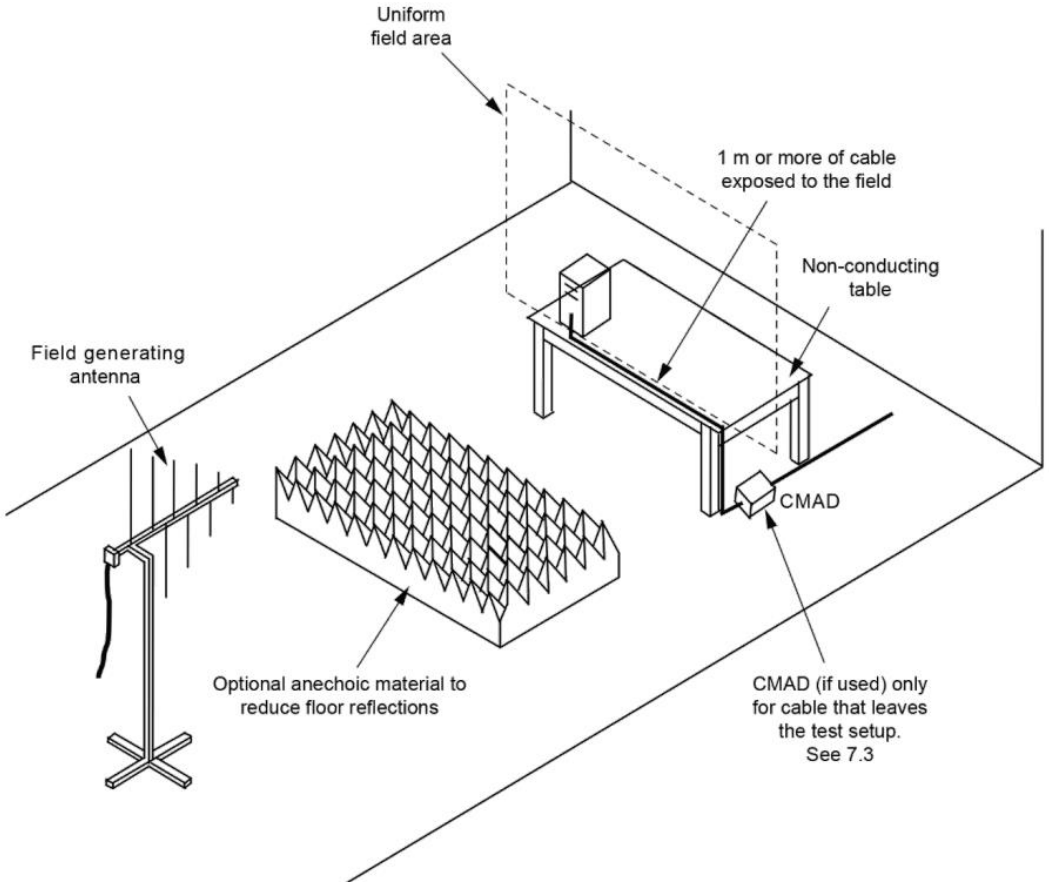
| | |
|---|---|
| Port | Enclosure |
| Basic Standard | IEC 61000-4-3 |
| Required Performance Criterion | A |
| Test Level | 3V/m with 80% AM. 1kHz Modulation at 80 to 1000MHz<br>3V/m with 80% AM. 1kHz Modulation at 1400 to 6000MHz |
| Antenna polarization | Vertical and Horizontal |
| Step size increment [a] | 1% |
| Dwell time [b] | ≤5 seconds |
| Test Distance | 3m |
| EUT position facing antenna | Front side, back side, left side and right side |

Notes:

a. Recognizing that a 1% step size is preferred, the frequency range can be swept incrementally with a step size not exceeding 4% of the previous frequency with a test level of twice the value of the specified test level in order to reduce the testing time for equipment requiring testing in multiple configurations and/or long cycle times.

b. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time shall not exceed 5 seconds at each of the frequencies during the scan. The time to exercise the EUT is not interpreted as a total time of a program or a cycle but related to the reaction time in case of failure of the EUT.

## 11.2. Block Diagram of Test Setup



### 11.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Generator | Aglient | E4421B | MY43351603 | Feb. 17, 2023 | Feb. 16, 2024 |
| Power Probe | R&S | URV5-Z4 | 100124 | Mar. 24, 2023 | Mar. 23, 2025 |
| Power Meter | R&S | NRVD | 8323781027 | Mar. 24, 2023 | Mar. 23, 2025 |
| Power Amplifier | KALMUS | 7100LC | 04-02/17-06-001 | Apr. 25, 2023 | Apr. 24, 2024 |
| Power Amplifier | Milmega | AS0104-55_55 | 1004793 | Apr. 25, 2023 | Apr. 24, 2024 |
| Power Amplifier | Rflight | NTWPA-2560100 | 17063183 | Apr. 25, 2023 | Apr. 24, 2024 |
| Biconilog Antenna | ETS | 3142C | 00060447 | N/A | N/A |
| Broadband high gain horn antenna | SCHWARZBECK | BBHA 9120 J | 00073 | N/A | N/A |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| TS+[JS35-RS] | Tonscend | For EMC measurement, version 2.0.1.8 |

### 11.4. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT) was positioned within the Uniform Field Area (UFA) on a supporting table, ensuring a 3-meter separation from the transmitting antenna. This setup aligns with the calibrated square area, guaranteeing field uniformity during testing. The supporting units were strategically located outside the UFA to avoid any potential interference. Nonetheless, the cables connected to the EUT were intentionally exposed to the precisely calibrated field within the UFA.

b. Before testing, it will verify the proper operation of the test equipment/system. This verification will involve measuring the field strength at one point within the Uniform Field Area (UFA) at various frequencies.

c. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

d. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 11.5. Test Summary

| Test Engineer | Alex | Temperature | 24.0 ℃ |
|---|---|---|---|
| Test Date | Sep. 26, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1 | Relative Humidity | 59.7 % |
| Verdict | Pass | | |

| Frequency | Exposed Side | Field Strength (V/m) | Observation | Performance |
|---|---|---|---|---|
| 80MHz to 1GHz | Front | 3V/m (rms) | No degradation of performance | A |
| | Left | | No degradation of performance | A |
| | Rear | | No degradation of performance | A |
| | Right | | No degradation of performance | A |
| 1.4GHz to 6GHz | Front | 3V/m (rms) | No degradation of performance | A |
| | Left | | No degradation of performance | A |
| | Rear | | No degradation of performance | A |
| | Right | | No degradation of performance | A |

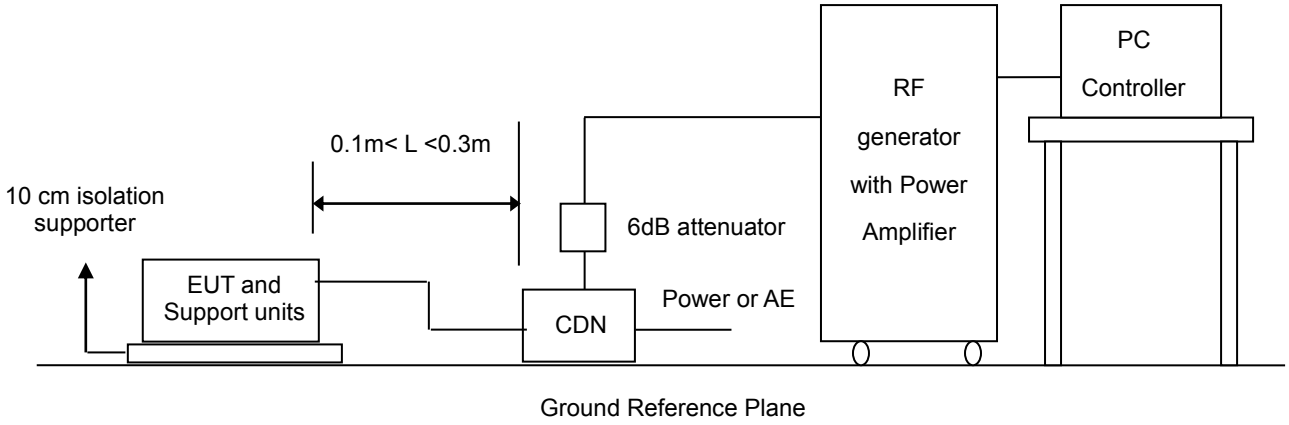
## 12. Measurement of Radio-frequency common mode

### 12.1. Requirements

| Port | ☒AC mains power ports | ☐signal, wired network and control ports [a] | ☐DC power ports [a] |
|---|---|---|---|
| Basic Standard | EN 61000-4-6 | | |
| Required Performance Criterion | The performance criteria for continuous phenomena shall apply. | | |
| Test Level | 0.15 to 80 MHz, 3 V RMS (unmodulated), 80 % AM (1 kHz) | | |
| Step size increment [b] | 1% | | |
| Dwell time [c] | ⩽5 seconds | | |

Notes:
a. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.
b. Recognizing that a 1% step size is preferred, the frequency range can be swept incrementally with a step size not exceeding 4% of the previous frequency with a test level of twice the value of the specified test level in order to reduce the testing time for equipment requiring testing in multiple configurations and/or long cycle times.
c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time shall not exceed 5 seconds at each of the frequencies during the scan. The time to exercise the EUT is not interpreted as a total time of a program or a cycle but related to the reaction time in case of failure of the EUT.

### 12.2. Block Diagram of Test Setup



### 12.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Power Amplifier | AR | 75A250 | 18464 | N/A | N/A |
| CDN | ZHINAN | ZN3751 | 15004 | Aug. 03, 2022 | Sep. 02, 2024 |
| 6dB attenuator | ZHINAN | E-002 | N/A | Aug. 04, 2022 | Aug. 03, 2024 |
| Power Probe | R&S | URV5-Z4 | 100124 | Mar. 24, 2023 | Mar. 23, 2025 |
| Electromagnetic Injection Clamp | Luthi | EM101 | 35773 | Aug. 12, 2022 | Aug. 11, 2024 |
| Power Meter | R&S | NRVD | 8323781027 | Mar. 24, 2023 | Mar. 23, 2025 |
| Signal Generator | Keysight | E4421B | MY43351603 | Feb. 17, 2023 | Feb. 16, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| TS+[JS35-CS] | Tonscend | For EMC measurement, version 2.0.1.7 |

### 12.4. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT) shall be tested within its intended operating and climatic conditions.

b. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane. The test shall be performed with the test generator connected to each of the coupling devices (CDN, EM clamp, current clamp) in turn. All other cables not under test shall either be disconnected (when functionally allowed) or provided with decoupling networks or unterminated CDNs only.

c. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

d. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 12.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Sam | Temperature | 23 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1 | Relative Humidity | 47 % |
| Verdict | Pass | | |

| Test port | Test Level | Coupling method | Observation | Results |
|---|---|---|---|---|
| AC Mains Input | 3 V | CDN | No degradation of performance | Pass |

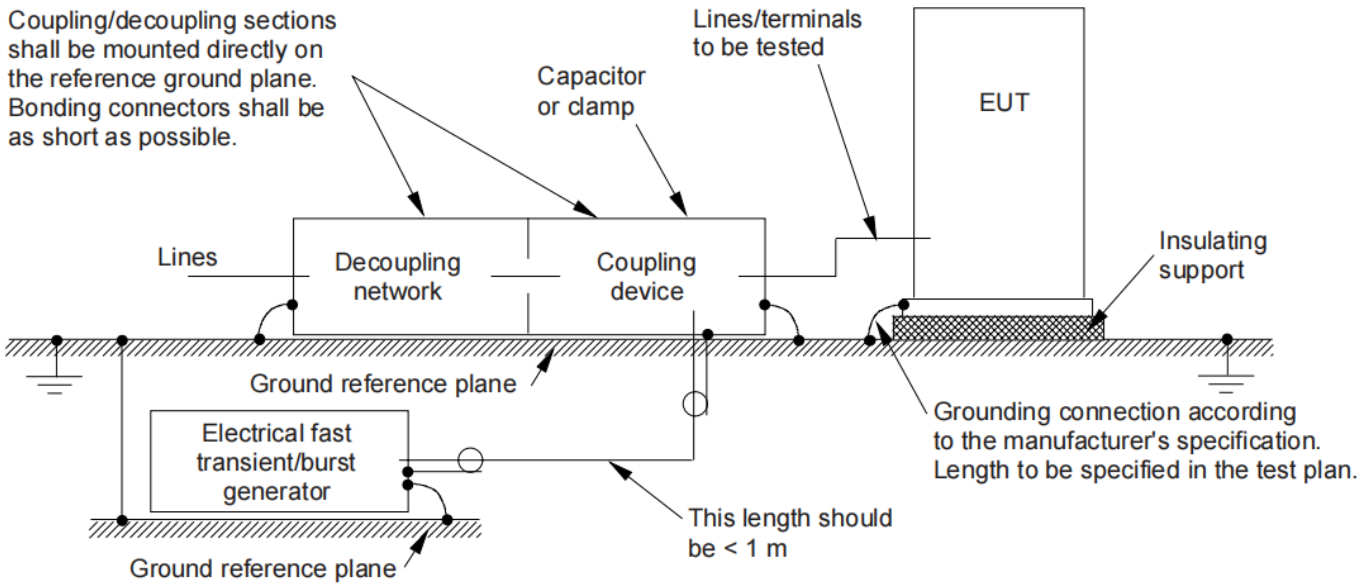
# 13. Measurement of Fast Transients

## 13.1. Requirements

| | | | |
|---|---|---|---|
| Port | ☒AC mains power ports | ☐signal, wired network and control ports [a] | ☐DC power ports [a] |
| Basic Standard | IEC 61000-4-4 | | |
| Required Performance Criterion | B | | |
| Test Level | 1 kV (peak) | 0.5 kV (peak) | 0.5 kV (peak) |
| Polarity | Positive/Negative | | |
| Impulse Frequency | 5kHz | | |
| Impulse wave shape | 5/50ns | | |
| Burst Duration | 15ms | | |
| Burst Period | 300ms | | |

Notes:
a. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.

## 13.2. Block Diagram of Test Setup



### 13.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| EFT/Surge/DIPS Generator | Schaffner | Modula 6150 | 34437 | Jun. 08, 2023 | Jun. 07, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| WinModula | Schaffner | For EFT/Surge/Dips measurement, version 2.31 c |

### 13.4. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT), whether stationary floor-mounted or table top, and equipment designed to be mounted in other configurations, shall be placed on a ground reference plane and shall be insulated from it by an insulating support 0,1 m ± 0,01 m thick.
b. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane.
c. The EUT shall be arranged and connected to satisfy its functional requirements, according to the equipment installation specifications. The minimum distance between the EUT and all other conductive structures (e.g. the walls of a shielded room), except the ground reference plane shall be more than 0,5 m. All cables to the EUT shall be placed on the insulation support 0,1 m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.
d. The test voltages shall be coupled to all of the EUT ports including those between two units of equipment involved in the test, unless the length of the interconnecting cable makes it impossible to test.
e. Either a direct coupling network or a capacitive clamp shall be used for the application of the test voltages.
f. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 13.5. Test Summary

| Test Engineer | Sam | Temperature | 23 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1 | Relative Humidity | 49 % |
| Verdict | Pass | | |

| Inject Line | Voltage(kV) | Inject Method | Observation | Performance |
|---|---|---|---|---|
| AC Lines | 0.5, 1 | Direct | No degradation of performance | A |

## 14. Measurement of Surges

### 14.1. Requirements

| Port | ☒AC mains power ports [a] | ☐signal, wired network and control ports [b] | ☐DC network power ports [b] |
|---|---|---|---|
| Basic Standard | IEC 61000-4-5 | | |
| Required Performance Criterion | B | B | B |
| Test Level | Line to line: 1 kV; Line to ground: 2 kV | shield to ground: 0.5 kV | Line to ground: 0.5 kV |
| Tr/Th | 1.2/50 (8/20) μs | | |
| Number of impulses | Five positive and five negative impulses | | |
| Time between successive impulses | 1 min | | |

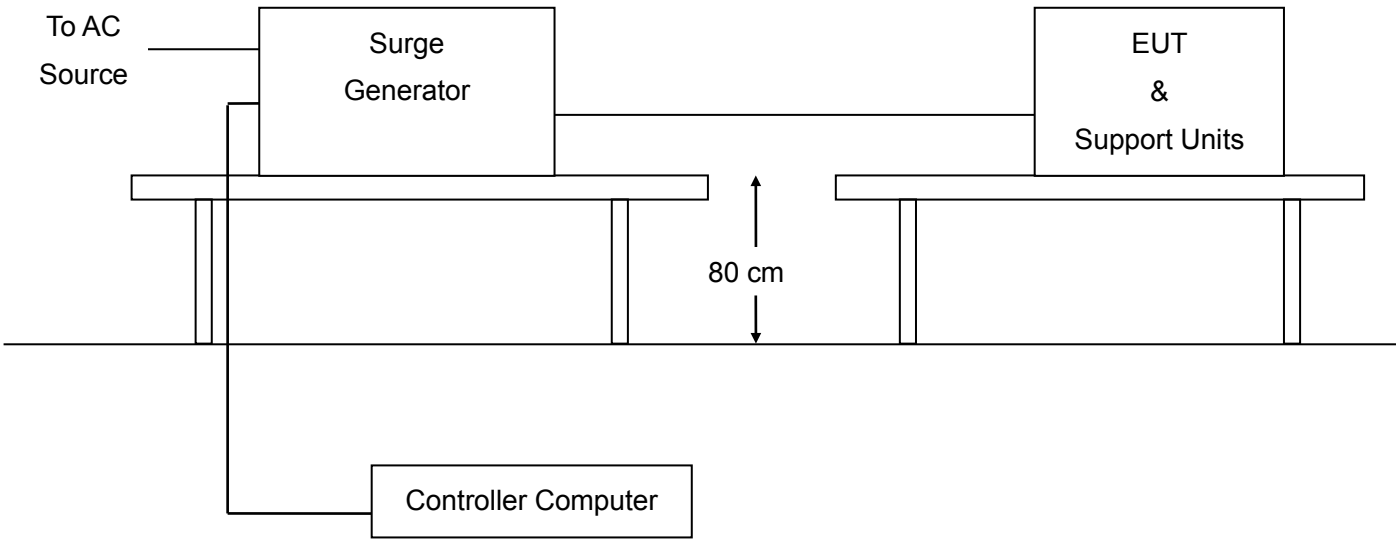
Notes:

a. The number of pulses applied shall be as follows:
- Five positive pulses line-to-neutral at 90° phase.
- Five negative pulses line-to-neutral at 270° phase.

The following additional pulses are required only if the EUT has an earth connection or if the EUT is earthed via any AE:
- Five positive pulses line-to-earth at 90° phase.
- Five negative pulses line-to-earth at 270° phase.
- Five negative pulses neutral-to-earth at 90° phase.
- Five positive pulses neutral-to-earth at 270° phase.

b. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.

### 14.2. Block Diagram of Test Setup



### 14.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| EFT/Surge/DIPS Generator | Schaffner | Modula 6150 | 34437 | Jun. 08, 2023 | Jun. 07, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| WinModula | Schaffner | For EFT/Surge/Dips measurement, version 2.31 c |

### 14.4. Configuration of the EUT and method of measurement

a. Verification shall be performed. It is preferable to perform the verification prior to the test.

b. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

c. When testing line-to-ground, the lines are tested individually in sequence, if there is no other specification.

d. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore, all lower test levels including the selected test level shall be tested.

e. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 14.5. Test Summary

| Test Engineer | Sam | Temperature | 23 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1 | Relative Humidity | 49 % |
| Verdict | Pass | | |

| Test port | Coupling | Voltage(kV) | Observation | Performance |
|---|---|---|---|---|
| AC Mains Input | line-to-neutral | 0.5, 1 | No degradation of performance | A |

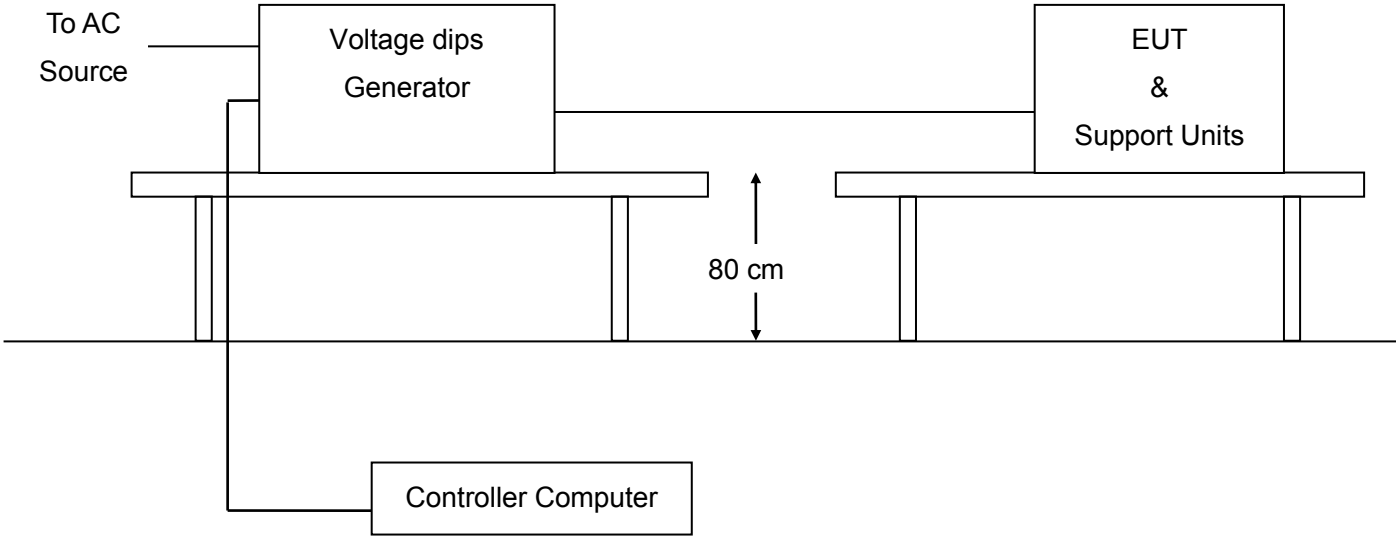
# 15. Measurement of Voltage dips and interruptions

## 15.1. Requirements

| | | | | |
|---|---|---|---|---|
| Port | AC mains power ports | | | |
| Basic Standard | EN 61000-4-11 | | | |
| Required Performance Criterion | B | B | C | C |
| Residual voltage [a] | 0 % | 0 % | 70 % | 0 % |
| Number of cycles [b] | 0.5 | 1 | 25 for 50 Hz<br>30 for 60 Hz | 250 for 50 Hz<br>300 for 60 Hz |
| Variation/dip repetition | Sequence of three dips/interruptions with an interval of 10 seconds between each test | | | |

Notes:
a. Changes to occur at 0 degree crossover point of the voltage waveform. If the EUT does not demonstrate compliance when tested with 0 degree switching, the test shall be repeated with the switching occurring at both 90 degrees and 270 degrees. If the EUT satisfies these alternative requirements, then it fulfils the requirements.
b. Apply at only one supply frequency of the EUT.

## 15.2. Block Diagram of Test Setup



### 15.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| EFT/Surge/DIPS Generator | Schaffner | Modula 6150 | 34437 | Jun. 08, 2023 | Jun. 07, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| WinModula | Schaffner | For EFT/Surge/Dips measurement, version 2.31 c |

Auxiliary Apparatus

| Device Type | Manufacturer | Model Name | Serial No. | Data Cable | Power Cable |
|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- |

### 15.4. Configuration of the EUT and method of measurement

a. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

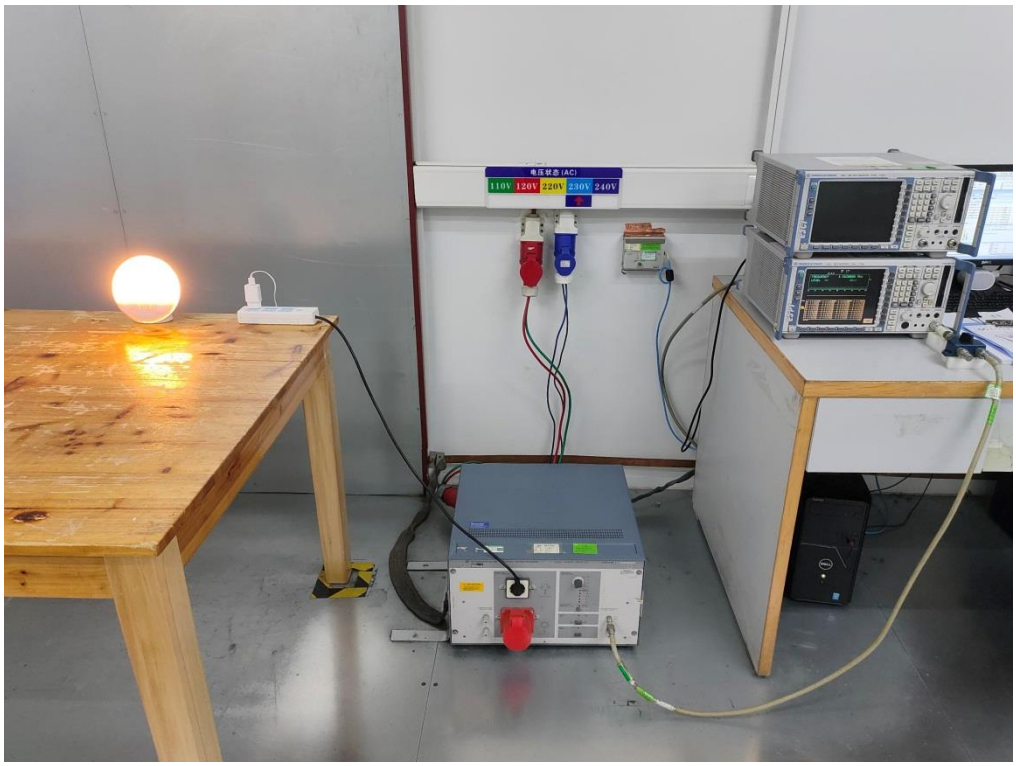
b. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 15.5. Test Summary

| Test Engineer | Sam | Temperature | 23 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1 | Relative Humidity | 49 % |
| Verdict | Pass | | |

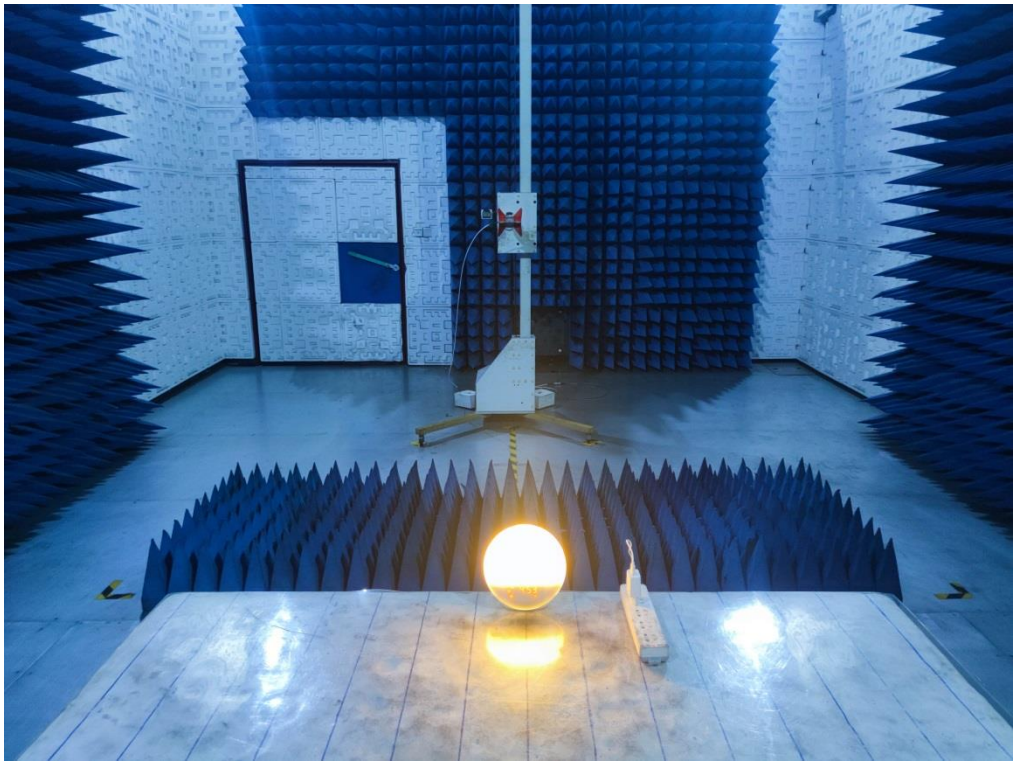
| Test port | Residual voltage (%) | Cycles | Observation | Performance |
|---|---|---|---|---|
| AC Mains Input | 0 | 0.5 | No degradation of performance | A |
| | 0 | 1 | No degradation of performance | A |
| | 70 | 25 | No degradation of performance | A |
| | 0 | 250 | EUT power cycled | B |

## 16. Photographs of Test Setup

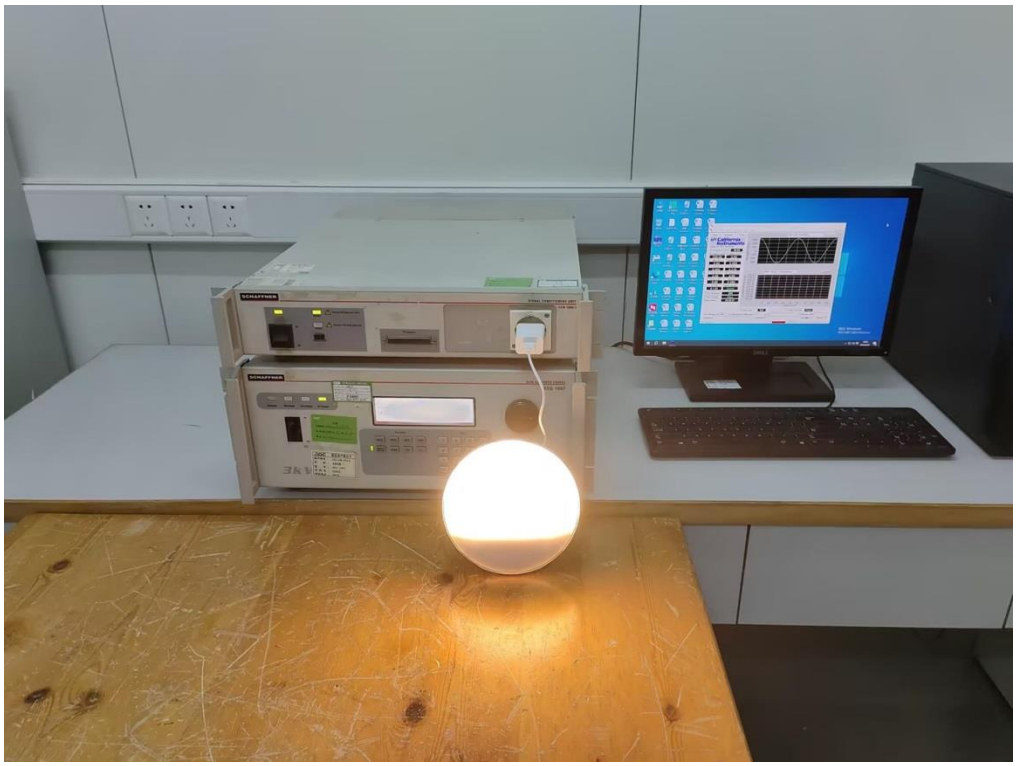



Conducted emissions from the AC mains power ports

Radiated emissions at frequencies up to 1 GHz

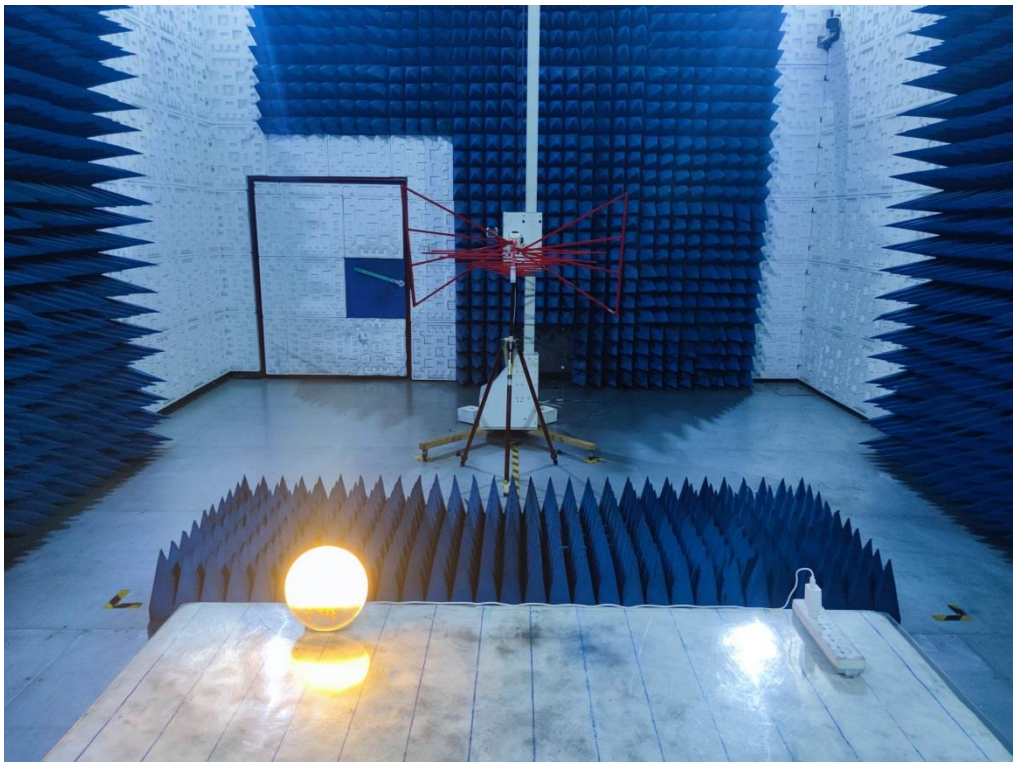


Radiated emissions at frequencies above 1 GHz

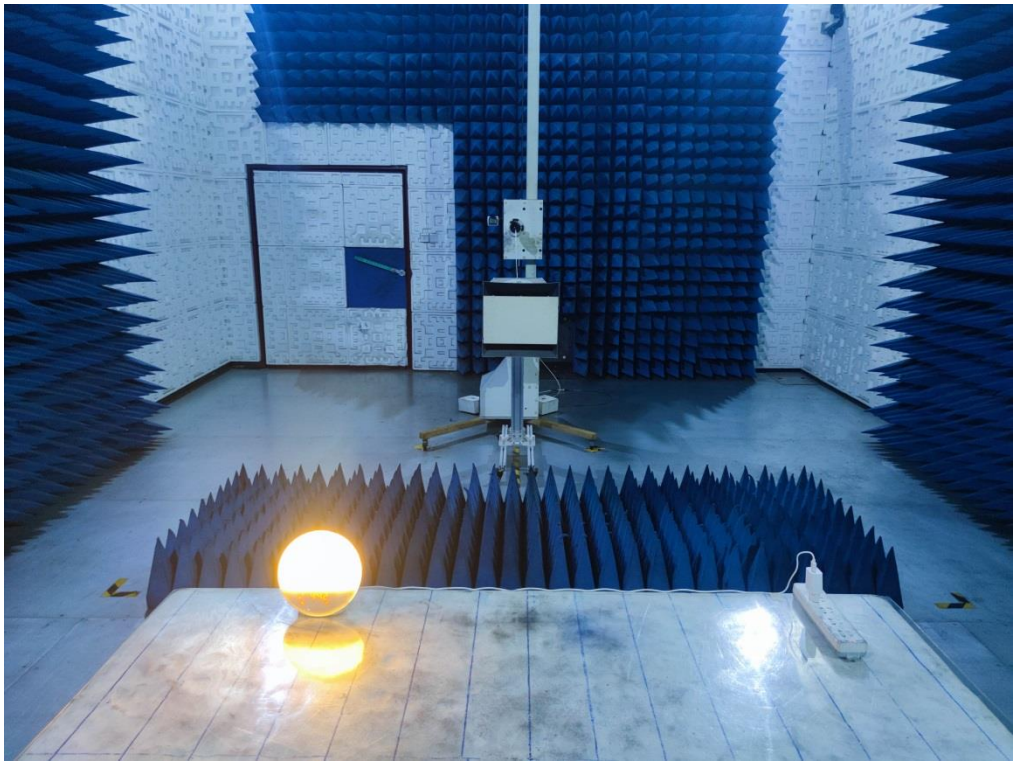


Harmonic current emissions & Voltage fluctuations and flicker

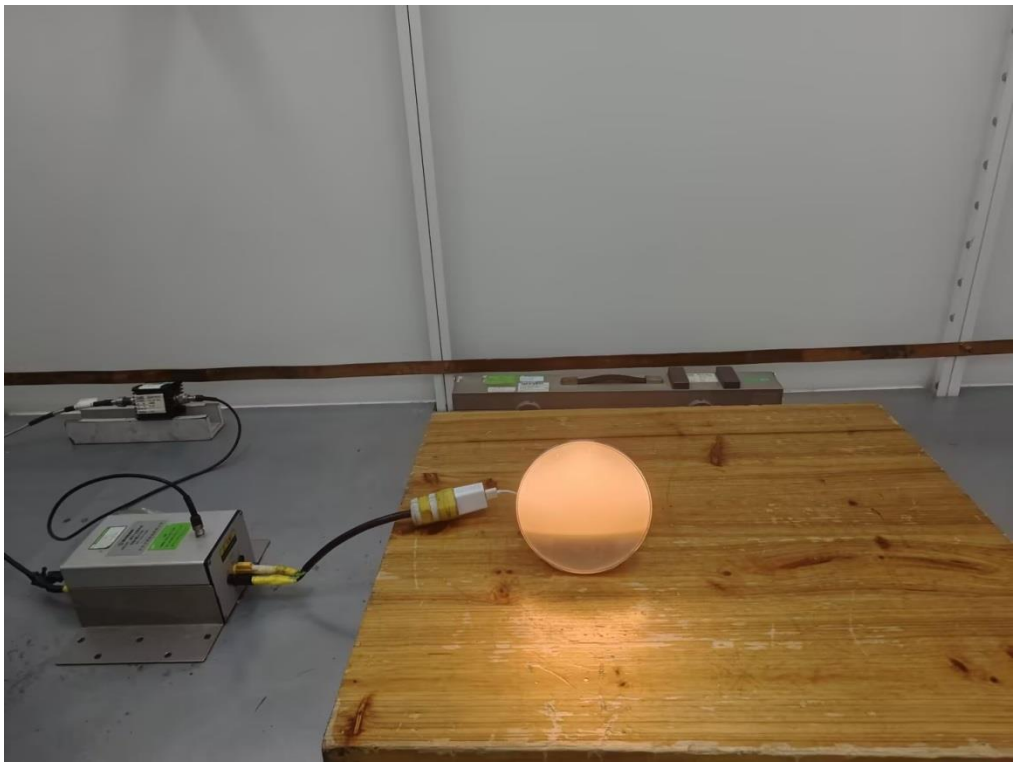
Electrostatic discharge



Radio-frequency electromagnetic field up to 1 GHz



Radio-frequency electromagnetic field above 1 GHz



Radio-frequency common mode at the AC mains power ports

Fast transients/Surges/ Voltage dips at the AC mains power ports

## 17. Photographs of EUT

Refer to the Report No.: AGC01110230937AP01

**----End of Report----**

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Bao'an District, Shenzhen, Guangdong, China

# Attestation of Conformity

| | |
|---|---|
| Registration No. | AGC01110230937E2 |
| Applicant | Shenzhen Juku Intelligent Technology Co., Ltd.<br>Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Product Designation | Wake-up Light |
| Brand Name | N/A |
| Model / Series Models | ACA-002, ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS ACA-002-PRO-B, ACA-002-PRO-S |
| Manufacturer | Shenzhen Juku Intelligent Technology Co., Ltd.<br>Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |

| Requirement | Applied Standards | Document Evidence | Result |
|---|---|---|---|
| EMC Directive | EN 55032:2015+A11:2020<br>EN 61000-3-3:2013+A2:2021<br>EN IEC 61000-3-2:2019+A1:2021<br>EN 55035:2017+A11:2020 | Test Report:<br>AGC01110230937EE01 | Conform |
| | EN IEC 55015:2019+A11:2020<br>EN 61000-3-3:2013+A2:2021<br>EN IEC 61000-3-2:2019+A1:2021<br>EN 61547:2009 | Test Report:<br>AGC01110230937EE02 | Conform |

CE

Signed by General Manager(King Zhang)
Issue Date: October 10, 2023

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# Attestation of Conformity

| | |
|---|---|
| Registration No. | AGC01110230937E0 |
| Applicant | Shenzhen Juku Intelligent Technology Co., Ltd.<br>Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Product Designation | Wake-up Light |
| Brand Name | N/A |
| Model / Series Models | ACA-002, ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB<br>ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| Manufacturer | Shenzhen Juku Intelligent Technology Co., Ltd.<br>Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |

| Requirement | Applied Standards | Document Evidence | Result |
|---|---|---|---|
| Art.3.1(a) Health | EN IEC 62311:2020<br>EN 50665:2017 | Test Report:<br>AGC01110230937EH01 | Conform |
| Art.3.1(a) Safety | EN IEC 62368-1:2020+A11:2020 | Test Report:<br>AGC01110230937ES01 | Conform |
| Art.3.1(b) EMC | ETSI EN 301 489-1 V2.2.3: 2019-11<br>ETSI EN 301 489-17 V3.2.4: 2020-09 | Test Report:<br>AGC01110230937ER01 | Conform |
| Art.3.2 Radio | ETSI EN 300 328 V2.2.2 (2019-07) | Test Report:<br>AGC01110230937ER02 | Conform |
| | ETSI EN 303 345-1 V1.1.1(2019-06)<br>ETSI EN 303 345-3 V1.1.1(2021-06) | Test Report:<br>AGC01110230937ER03 | Conform |

CE

Signed by General Manager (King Zhang)
Issue Date: October 10, 2023

This Attestation of Conformity is recognized by Attestation of Global Compliance (Shenzhen) Co., Ltd. and made in accordance with the RED Directive 2014/53/EU. The attestation doesn't imply assessment of the production. The Applicant of this attestation is authorized to use this attestation in connection with EC declaration of conformity to the Directive. The attestation is only applicable to the equipments described above. This attestation shall not be re-produced except in full without the written approval of Attestation of Global Compliance (Shenzhen) Co., Ltd.
Note: This attestation is part of the full test report(s) and should be used in conjunction with it.

Attestation of Global Compliance (Shenzhen) Co., Ltd.

# EMC Test Report

Report No.: AGC01110230937EE01

| | | |
|---|---|---|
| **PRODUCT DESIGNATION** | : | Wake-up Light |
| **BRAND NAME** | : | N/A |
| **MODEL NAME** | : | ACA-002, ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **APPLICANT** | : | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **DATE OF ISSUE** | : | Oct. 08, 2023 |
| **STANDARD(S)** | : | EN 55032:2015+A11:2020<br>EN 61000-3-3:2013+A2:2021<br>EN IEC 61000-3-2:2019+A1:2021<br>EN 55035:2017+A11:2020 |
| **REPORT VERSION** | : | V1.0 |

Attestation of Global Compliance (Shenzhen) Co., Ltd

***A**ttestation of **G**lobal **C**ompliance (Shenzhen) Co., Ltd*

## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Oct. 08, 2023 | Valid | Initial release |

## Table of contents

## 1. General information

| | |
|---|---|
| Applicant | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Manufacturer | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Factory | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| Product Designation | Wake-up Light |
| Brand Name | N/A |
| Test Model | ACA-002 |
| Series Model(s) | ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| Difference Description | All the same except for the model name and appearance color. |
| Deviation from Standard | No any deviation from the test method |
| Date of receipt of test item | Sep. 19, 2023 |
| Date of Test | Sep. 19, 2023 to Oct. 08, 2023 |
| Test Result | Pass |
| Test Report Form No | AGCER-EMC-GEN-V1 |
| Note: The test results of this report relate only to the tested sample identified in this report. | |

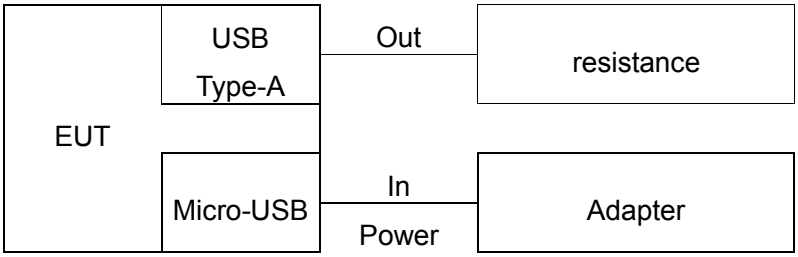
| | | |
|---|---|---|
| Prepared By | Cool Cheng<br>(Project Engineer) | Oct. 08, 2023 |
| Reviewed By | Calvin Liu<br>(Reviewer) | Oct. 08, 2023 |
| Approved By | Max Zhang<br>(Authorized Officer) | Oct. 08, 2023 |

# 2. Description of Test Configuration

## 2.1. Technical Description of Product

| | |
|---|---|
| Categorization of Equipment | Class B equipment |
| Test arrangements of EUT | Table-top |
| Hardware Version | V2.0 |
| Software Version | V2.0 |
| Highest Internal Frequency | More than 108MHz |
| EUT Input Rating | DC 5V by adapter |
| Adapter Information | Model: YC-R02052000VU<br>Input: AC 100-240V, 50/60HZ, 0.2A<br>Output: DC 5.0V, 2.0A,10.0W<br>Manufacturer: SHENZHEN YOUMINGXING ELECTRONICS CO., LTD |

**Connection Diagram of Host System**




**I/O Port Information (☒Applicable ☐Not Applicable)**

| Port Type | Input/Output | Number | Cable Description |
|---|---|---|---|
| USB Type-A | Out | 1 | -- |
| Micro-USB | In | 1 | 1.16m unshielded |

## 2.2. Description of Support Equipment

| Device Type | Manufacturer | Model Name | Specifications | Data Cable | Power Cable |
|---|---|---|---|---|---|
| Xiaomi phone | Xiaomi | Mi 10 | -- | -- | 1m,unshielded |
| Cement resistance | -- | -- | 5Ω | -- | 0.8m unshielded |
| Digital multimeter | FLUKE | 15B+ | -- | -- | -- |

## 2.3. Description of Test Modes

| No. | Test Mode Description | Worst |
|---|---|---|
| 1 | FM Receiving + USB discharging mode ( with adapter ) | -- |
| 2 | Standby mode (with adapter) | -- |

Note: 1. All modes have been tested and only the worst mode test data recorded in the test report.

# 3. Summary of Measurement Results and Uncertainty

## 3.1. Test Specifications

| | |
|---|---|
| EN 55032:2015+A11:2020 | Electromagnetic compatibility of multimedia equipment - Emission requirements |
| EN 55035:2017+A11:2020 | Electromagnetic compatibility of multimedia equipment - Immunity requirements |

## 3.2. Description of Measurement Results

| Test items | Test Standard(s) | Verdict |
|---|---|---|
| Conducted emissions from the AC mains power ports | EN 55032 | Pass |
| Radiated emissions at frequencies up to 1 GHz | EN 55032 | Pass |
| Radiated emissions at frequencies above 1 GHz | EN 55032 | Pass |
| Harmonic current emissions | EN IEC 61000-3-2 | Pass |
| Voltage fluctuations and flicker | EN 61000-3-3 | Pass |
| Electrostatic discharge | IEC 61000-4-2 [a] | Pass |
| Radio-frequency electromagnetic field | IEC 61000-4-3 [a] | Pass |
| Fast transients | IEC 61000-4-4 [a] | Pass |
| Surges | IEC 61000-4-5 [a] | Pass |
| Radio-frequency common mode (Injected currents) | IEC 61000-4-6 [a] | Pass |
| Voltage dips and interruptions | IEC 61000-4-11 [a] | Pass |

Note:
a. The applicable versions of the basic standards are defined in the standard which listed in the test specification.

Performance table

| Performance Criteria for Immunity | |
|---|---|
| Performance criterion A | The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer 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 derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended. |
| Performance criterion B | During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, 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 manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.<br>If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended. |
| 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 manufacturer's instructions. A reboot or re-start operation is allowed.<br>Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. |

### 3.3. Description of Measurement Uncertainty

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

| Item | Measurement Uncertainty |
|---|---|
| Conducted emissions from the AC mains power ports | Uc = ±2.9 dB |
| Radiated emissions at frequencies up to 1 GHz | Uc = ±3.9 dB |
| Radiated emissions at frequencies above 1 GHz | Uc = ±4.9 dB |

## 4. Test Facility

Laboratory name: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Laboratory Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified, or accredited by the following organizations:

**CNAS-Lab Code: L5488**

Attestation of Global Compliance (Shenzhen) Co., Ltd. is accredited in accordance with the recognized Interna tional Standard ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laborat ories (CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories).

**A2LA-Lab Cert. No.: 5054.02**

Attestation of Global Compliance (Shenzhen) Co., Ltd. is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This laboratory also meets the requirements of any additional program requirements in the Electrical field.

**FCC-Registration No.: 975832**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

**IC-Registration No.: 24842**

**CAB identifier: CN0063**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

**VCCI Membership No.: 4112**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered in accordance with VCCI Council Rules.

VCCI Registration No. C-20098 for conducted emissions at AC main power ports

VCCI Registration No. T-20102 for conducted emissions at telecommunication ports

VCCI Registration No. R-20136 for radiated emissions below 1GHz

VCCI Registration No. G-20132 for radiated emissions above 1GHz

# 5. Measurement of Conducted Emissions from the AC Mains Power Ports

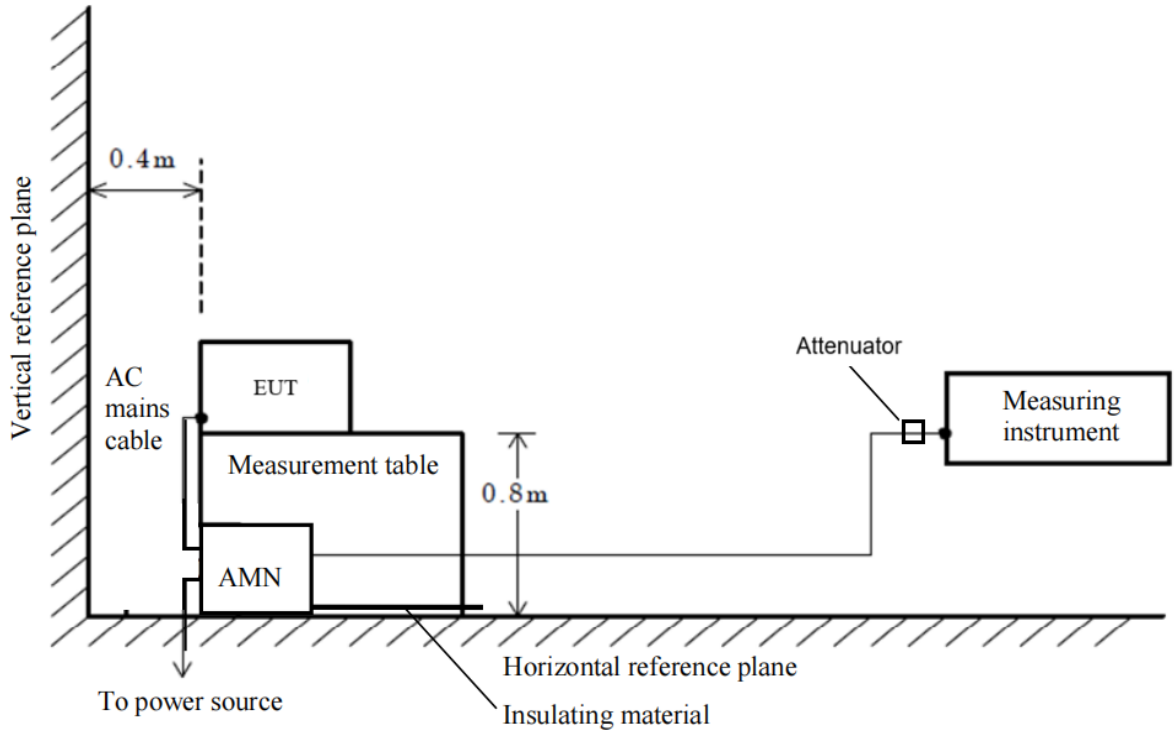
## 5.1. Requirements

Requirements for conducted emissions, low voltage AC mains port

| Network device | Detector type/ bandwidth | Frequency Range (MHz) | Limits dB(μV) | Measurement specifications |
|---|---|---|---|---|
| AMN | Quasi-peak/ 9kHz | 0.15 to 0.5 | 66 to 56 | Instrumentation: CISPR 16-1-1, Clauses 4, 5 and 7<br>Networks: CISPR 16-1-2, Clause 4<br>Method: CISPR 16-2-1, Clause 7<br>Set-up: CISPR 16-2-1, Clause 7 |
| | | 0.5 to 5 | 56 | |
| | | 5 to 30 | 60 | |
| | Average/ 9kHz | 0.15 to 0.5 | 56 to 46 | |
| | | 0.5 to 5 | 46 | |
| | | 5 to 30 | 50 | |

**Note:**
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.5MHz.

## 5.2. Block Diagram of Test Setup



## 5.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESPI | 101206 | Jun. 03, 2023 | Jun. 02, 2024 |
| Artificial Mains Network | R&S | ESH2-Z5 | 100086 | Jun. 03, 2023 | Jun. 02, 2024 |
| Attenuator | East sheep | LM-XX-6-5W | N/A | Jun. 09, 2023 | Jun. 08, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| ES-K1 | R&S | For EMC Measurement, Version 1.71 |

## 5.4. Configuration of the EUT and method of measurement

a. The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane, and was positioned at a distance of 0.4 m away from the vertical reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.

b. Support equipment, if needed, was placed as per CISPR 16-2-1.

c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-1.

d. The EMI receiver measured the emission levels emanating from the EUT into the AC Mains through an Artificial Mains Network (AMN) and an attenuator used on the front end of the EMI receiver. Testing included measurements on all live and neutral lines.

e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.

f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.

g. A conducted emission is calculated by the following equation:

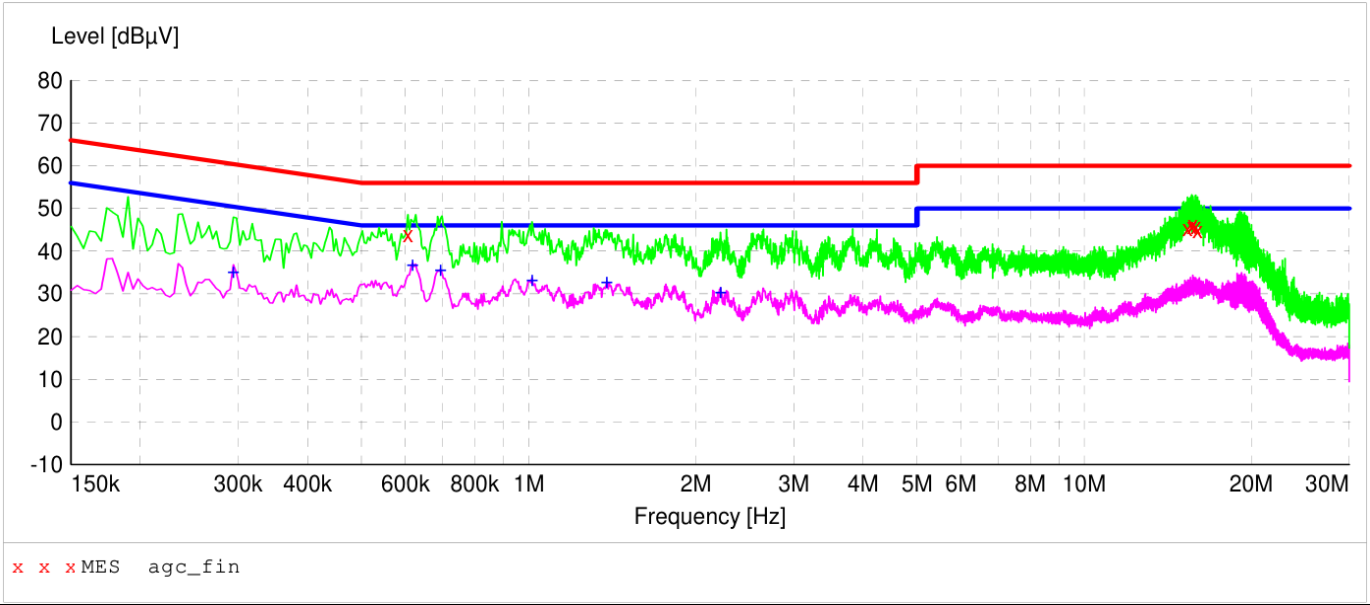
- Measurement Level (dBμV) = Receiver reading (dBμV) + Tansd (dB)
- Transd(dB)= AMN Factor(dB)+Cable Loss(dB)+Attenuation(dB)
- Margin= Limit-Level

### 5.5. Test Summary

| Test Engineer | Jimu | Temperature | 22.2 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 51.4 % |
| Verdict | Pass | | |

Test graph and data for Conducted Emission at line L1

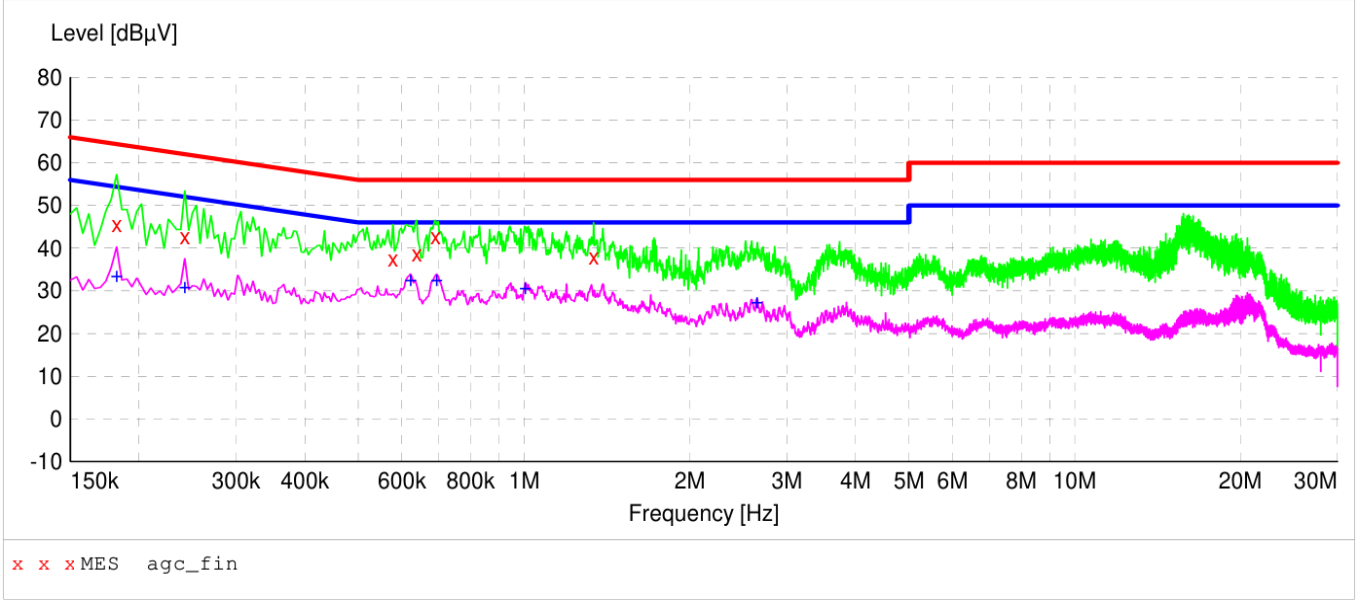
Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV] | Factor[dB] | Limit[dBµV] | Margin[dB] | Detector | Line |
|---|---|---|---|---|---|---|
| 0.606000 | 44.0 | 6.2 | 56.0 | 12.0 | QP | L1 |
| 15.346000 | 45.4 | 6.9 | 60.0 | 14.6 | QP | L1 |
| 15.610000 | 45.9 | 6.9 | 60.0 | 14.1 | QP | L1 |
| 15.682000 | 46.3 | 6.9 | 60.0 | 13.7 | QP | L1 |
| 15.882000 | 45.9 | 6.9 | 60.0 | 14.1 | QP | L1 |
| 15.998000 | 44.9 | 6.9 | 60.0 | 15.1 | QP | L1 |
| 0.294000 | 35.5 | 6.1 | 50.4 | 14.9 | AV | L1 |
| 0.618000 | 37.2 | 6.2 | 46.0 | 8.8 | AV | L1 |
| 0.694000 | 36.1 | 6.2 | 46.0 | 9.9 | AV | L1 |
| 1.014000 | 33.6 | 6.2 | 46.0 | 12.4 | AV | L1 |
| 1.382000 | 33.3 | 6.2 | 46.0 | 12.7 | AV | L1 |
| 2.214000 | 30.8 | 6.3 | 46.0 | 15.2 | AV | L1 |

Test graph and data for Conducted Emission at line N

Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV] | Factor[dB] | Limit[dBµV] | Margin[dB] | Detector | Line |
|---|---|---|---|---|---|---|
| 0.182000 | 45.5 | 6.1 | 64.4 | 18.9 | QP | N |
| 0.242000 | 42.8 | 6.1 | 62.0 | 19.2 | QP | N |
| 0.578000 | 37.4 | 6.2 | 56.0 | 18.6 | QP | N |
| 0.638000 | 38.8 | 6.2 | 56.0 | 17.2 | QP | N |
| 0.690000 | 42.8 | 6.2 | 56.0 | 13.2 | QP | N |
| 1.338000 | 38.0 | 6.2 | 56.0 | 18.0 | QP | N |
| 0.182000 | 33.8 | 6.1 | 54.4 | 20.6 | AV | N |
| 0.242000 | 31.4 | 6.1 | 52.0 | 20.6 | AV | N |
| 0.622000 | 33.1 | 6.2 | 46.0 | 12.9 | AV | N |
| 0.694000 | 32.9 | 6.2 | 46.0 | 13.1 | AV | N |
| 1.006000 | 31.2 | 6.2 | 46.0 | 14.8 | AV | N |
| 2.650000 | 27.7 | 6.3 | 46.0 | 18.3 | AV | N |

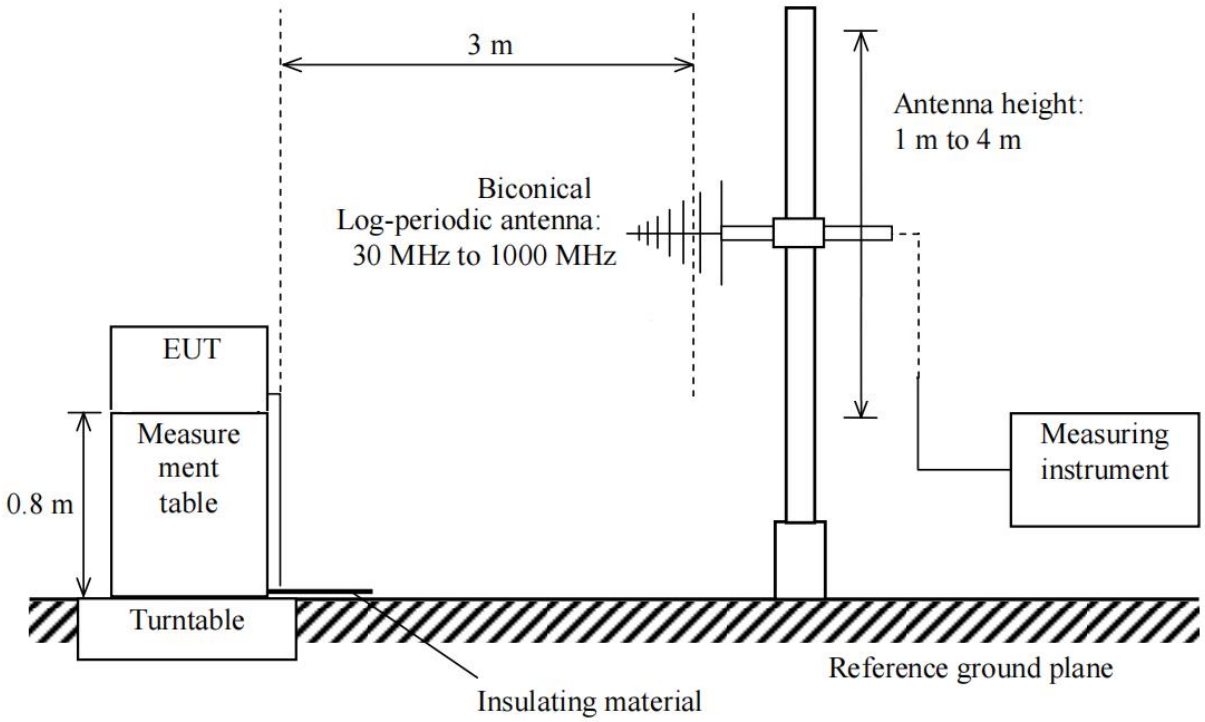
# 6. Measurement of Radiated Emissions at Frequencies up to 1 GHz

## 6.1. Requirements

Requirements for radiated emissions at frequencies up to 1 GHz at 3m distance

| Test facility | Detector type/ bandwidth | Frequency Range (MHz) | Limits dB(μV/m) | Measurement specifications |
|---|---|---|---|---|
| SAC | Quasi-peak/ 120kHz | 30 to 230 | 40 | Instrumentation: CISPR 16-1-1, Clauses 4, 5<br>Antennas: CISPR 16-1-4, Clause 4.5<br>Test Site: CISPR 16-1-4, Clause 6<br>Method: CISPR 16-2-3, Clause 7.6 |
| | | 230 to 1000 | 47 | |
| **Note:**<br>1. The lower limit shall apply at the transition frequency. | | | | |

## 6.2. Block Diagram of Test Setup



## 6.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESCI | 10096 | Feb. 18, 2023 | Feb. 17, 2024 |
| Antenna | SCHWARZBECK | VULB9168 | D69250 | May 11, 2023 | May 10, 2025 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| EZ-EMC | FARA | For EMC Measurement, Version RA-03A |

## 6.4. Configuration of the EUT and method of measurement

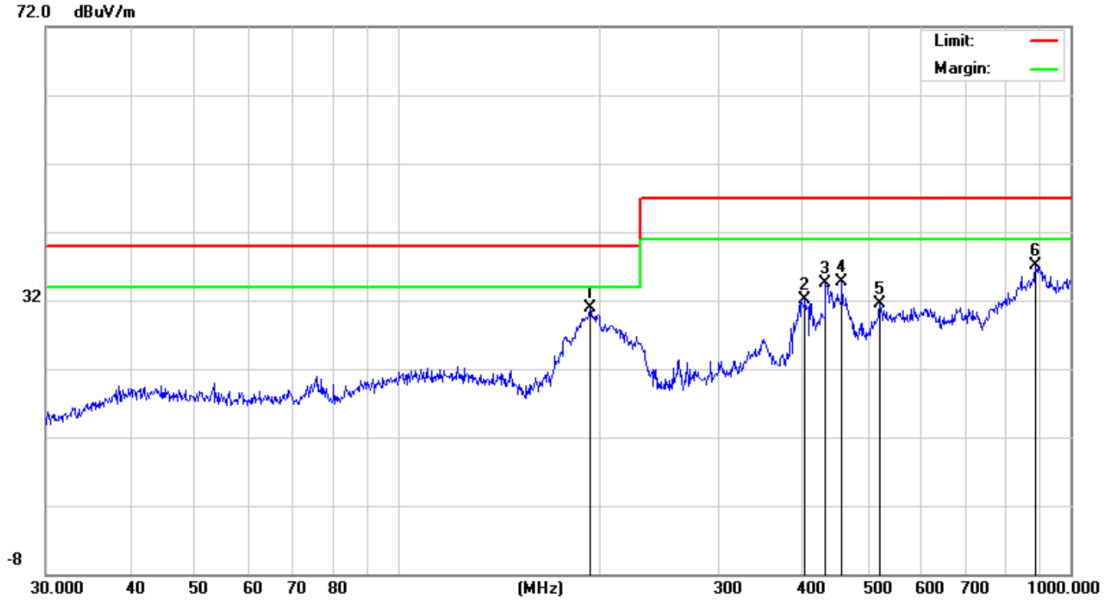
a. The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.
b. Support equipment, if needed, was placed as per CISPR 16-2-3.
c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-3.
d. The maximum receiving level of radiated emissions from the EUT was measured while the turntable was rotated from 0° to 360° and the antenna height was scanned between 1 m and 4 m. The cables were laid out to attain the maximum level of radiated emissions.
e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.
f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.
g. A radiated emission is calculated by the following equation:
    - Measurement Level dB(μV/m) = Receiver reading dB(μV) + Factor(dB/m)
    - Factor(dB/m) = Antenna Factor(dB/m) + Cable Loss(dB)
    - Margin= Limit-Level

### 6.5. Test Summary

| Test Engineer | Alex | Temperature | 23.7 ℃ |
|---|---|---|---|
| Test Date | Sep. 26, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 61.2 % |
| Verdict | Pass | | |

Test graph and data for Radiated Emission at Horizontal

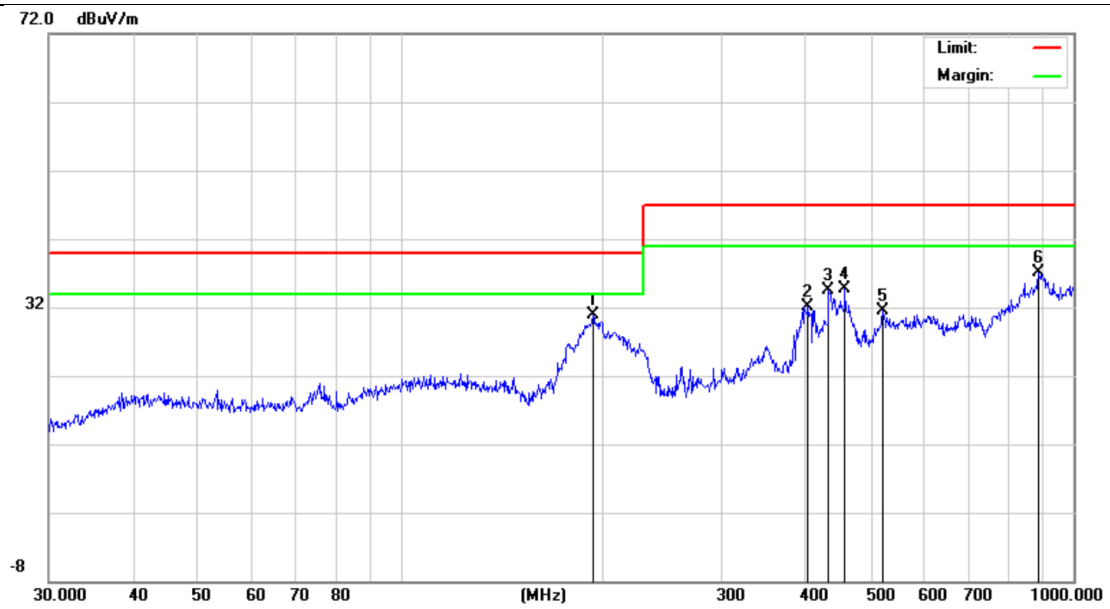
Test Mode: Mode 1




| Frequency[MHz] | Level[dBµV/m] | Factor[dB] | Limit[dBµV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 193.0945 | 30.81 | 13.71 | 40.00 | 9.19 | peak | Horizontal |
| 403.2500 | 32.17 | 20.46 | 47.00 | 14.83 | peak | Horizontal |
| 432.5457 | 34.58 | 23.50 | 47.00 | 12.42 | peak | Horizontal |
| 457.5072 | 34.72 | 24.49 | 47.00 | 12.28 | peak | Horizontal |
| 520.8881 | 31.42 | 25.14 | 47.00 | 15.58 | peak | Horizontal |
| 887.6099 | 37.19 | 30.25 | 47.00 | 9.81 | peak | Horizontal |

Test graph and data for Radiated Emission at Horizontal

Test Mode: Mode 1




| Frequency[MHz] | Level[dBμV/m] | Factor[dB] | Limit[dBμV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 193.0945 | 30.81 | 13.71 | 40.00 | 9.19 | peak | Horizontal |
| 403.2500 | 32.17 | 20.46 | 47.00 | 14.83 | peak | Horizontal |
| 432.5457 | 34.58 | 23.50 | 47.00 | 12.42 | peak | Horizontal |
| 457.5072 | 34.72 | 24.49 | 47.00 | 12.28 | peak | Horizontal |
| 520.8881 | 31.42 | 25.14 | 47.00 | 15.58 | peak | Horizontal |
| 887.6099 | 37.19 | 30.25 | 47.00 | 9.81 | peak | Horizontal |

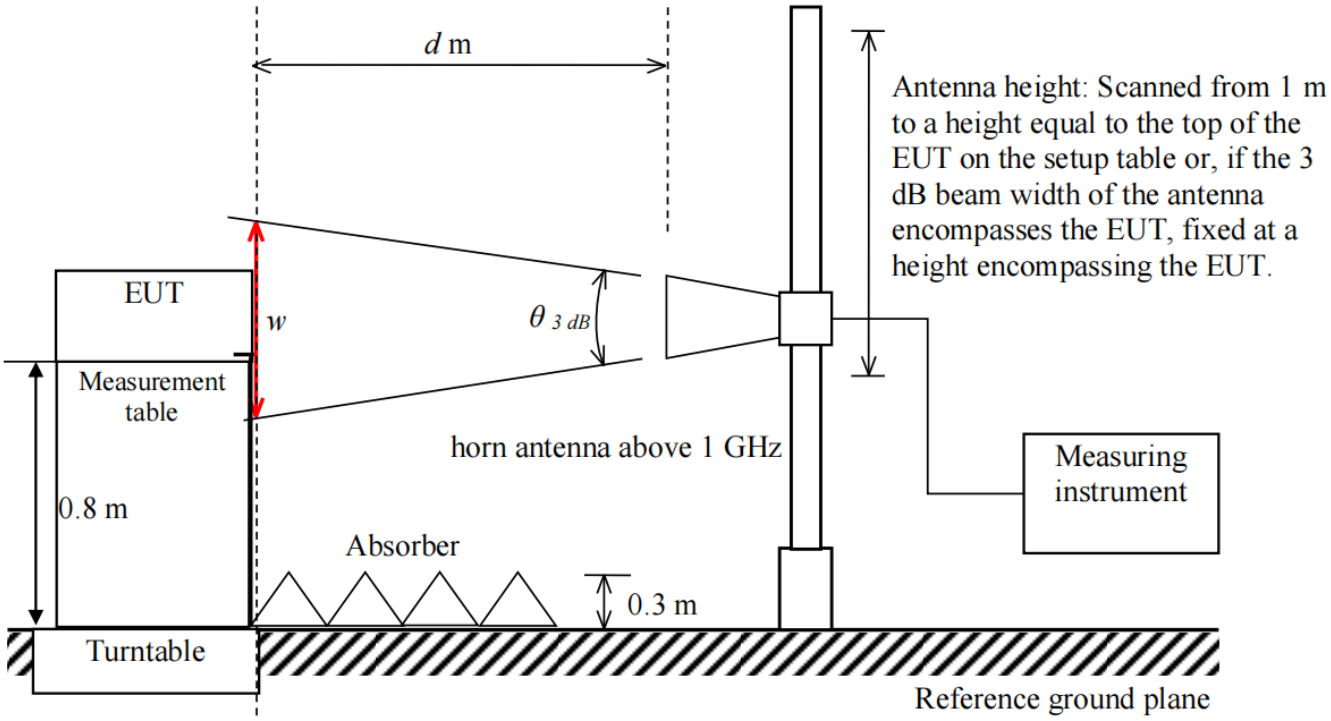
# 7. Measurement of Radiated Emissions at Frequencies Above 1 GHz

## 7.1. Requirements

Requirements for radiated emissions at frequencies above 1 GHz at 3m distance

| Test facility | Detector type/ bandwidth | Frequency Range (MHz) | Limits dB(μV/m) | Measurement specifications |
|---|---|---|---|---|
| FSOATS | Peak/ 1MHz | 1000 to 3000 | 70 | Instrumentation: CISPR 16-1-1, Clauses 4, 6, 7<br>Antennas: CISPR 16-1-4, Clause 4.6<br>Test Site: CISPR 16-1-4, Clause 7<br>Method: CISPR 16-2-3, Clause 7.6 |
| | | 3000 to 6000 | 74 | |
| | Average/ 1MHz | 1000 to 3000 | 50 | |
| | | 3000 to 6000 | 54 | |
| **Note:**<br>1. The lower limit shall apply at the transition frequency. | | | | |

## 7.2. Block Diagram of Test Setup



### 7.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Analyzer | Keysight | N9010A | MY53470504 | Jun. 01, 2023 | May 31, 2024 |
| Antenna | ETS | 3117 | 00154520 | Jun. 03, 2023 | Jun. 02, 2024 |
| Preamplifier | ETS | 3117PA | 00246148 | Aug. 04, 2023 | Aug. 03, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| TS+[JS32-RE] | Tonscend | For EMC measurement, version 4.0.0.0 |

### 7.4. Configuration of the EUT and method of measurement

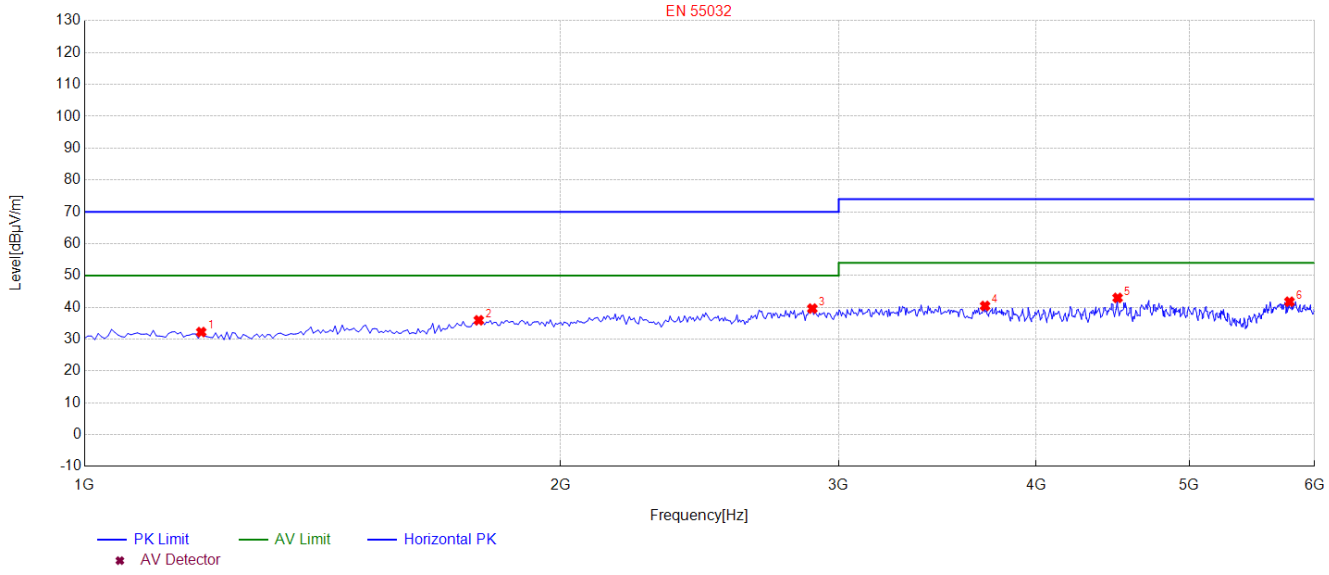
a. The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.
b. Support equipment, if needed, was placed as per CISPR 16-2-3.
c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-3.
d. The maximum receiving level of radiated emissions from the EUT was measured while the turntable was rotated from 0° to 360° and the antenna height scanned from 1 m to a height equal to the top of the EUT on the setup table or, if the 3 dB beam width of the antenna encompasses the EUT, fixed at a height encompassing the EUT. The cables were laid out to attain the maximum level of radiated emissions.
e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.
f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.
g. A radiated emission is calculated by the following equation:
   - Measurement Level dB(μV/m) = Receiver reading dB(μV) + Factor(dB/m)
   - Factor(dB/m) = Antenna Factor(dB/m) + Cable Loss(dB) – Amplifier Gain(dB)
   - Margin= Limit-Level

### 7.5. Test Summary

| Test Engineer | Alex | Temperature | 24.0 ℃ |
|---|---|---|---|
| Test Date | Sep. 26, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 2 | Relative Humidity | 59.7 % |
| Verdict | Pass | | |

Test graph and data for Radiated Emission Above 1GHz at Horizontal

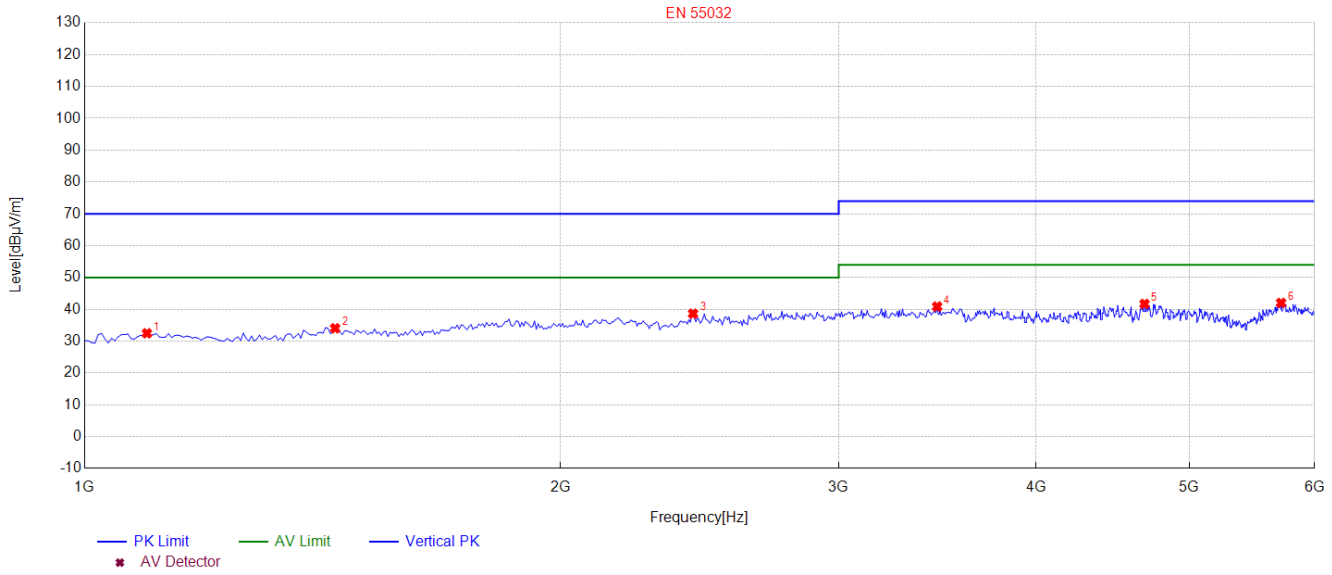
Test Mode: Mode 2




| Frequency[MHz] | Level[dBµV/m] | Factor[dB] | Limit[dBµV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 1185.1852 | 32.23 | -17.95 | 70.00 | 37.77 | Peak | Horizontal |
| 1775.7758 | 35.93 | -15.16 | 70.00 | 34.07 | Peak | Horizontal |
| 2886.8869 | 39.60 | -12.14 | 70.00 | 30.40 | Peak | Horizontal |
| 3712.7127 | 40.43 | -10.42 | 74.00 | 33.57 | Peak | Horizontal |
| 4503.5035 | 42.96 | -7.94 | 74.00 | 31.04 | Peak | Horizontal |
| 5784.7848 | 41.76 | -6.22 | 74.00 | 32.24 | Peak | Horizontal |

Test graph and data for Radiated Emission Above 1GHz at Vertical

Test Mode: Mode 2




| Frequency[MHz] | Level[dBµV/m] | Factor[dB] | Limit[dBµV/m] | Margin[dB] | Detector | Polarity |
|---|---|---|---|---|---|---|
| 1095.0951 | 32.47 | -18.19 | 70.00 | 37.53 | Peak | Vertical |
| 1440.4404 | 34.04 | -17.27 | 70.00 | 35.96 | Peak | Vertical |
| 2426.4264 | 38.63 | -12.60 | 70.00 | 31.37 | Peak | Vertical |
| 3462.4625 | 40.86 | -10.94 | 74.00 | 33.14 | Peak | Vertical |
| 4683.6837 | 41.71 | -7.92 | 74.00 | 32.29 | Peak | Vertical |
| 5714.7147 | 42.01 | -6.39 | 74.00 | 31.99 | Peak | Vertical |

# 8. Measurement of Harmonic Current Emissions

## 8.1. Requirements

Applicable test standard(s): EN IEC 61000-3-2:2019+A1:2021

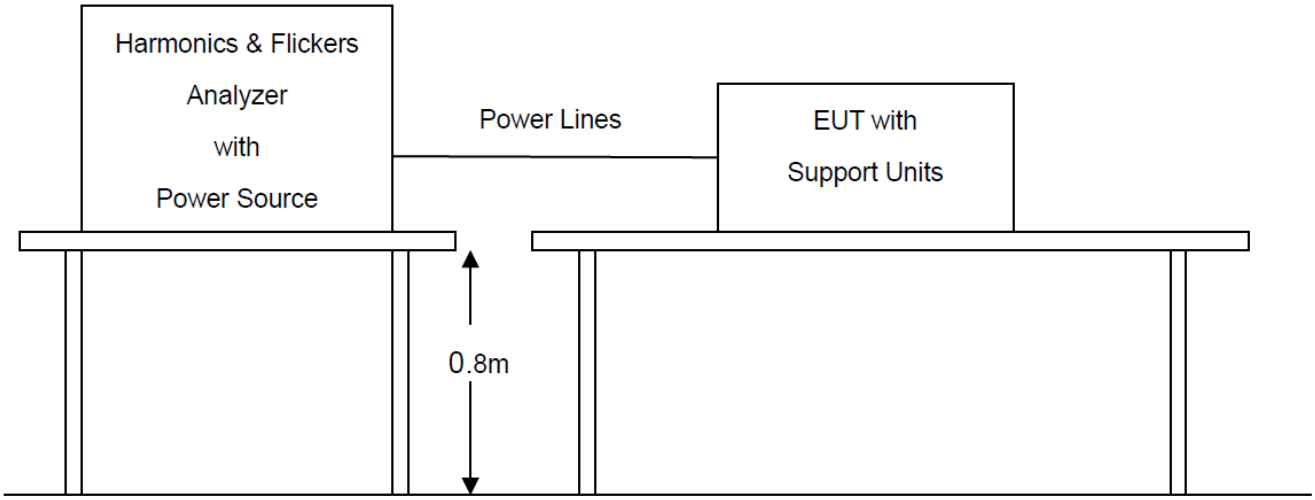
Limits of Harmonic Current Emissions

| Harmonic order *h* | Limits | | | | |
|---|---|---|---|---|---|
| | Class A | Class B | Class C[a] | Class D | |
| | Maximum permissible harmonic current (A) | | Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency (%) | Maximum permissible harmonic current per watt (mA/W) | Maximum permissible harmonic current (A) |
| 3 | 2.30 | 3.45 | 27[b] | 3.4 | 2.30 |
| 5 | 1.14 | 1.71 | 10 | 1.9 | 1.14 |
| 7 | 0.77 | 1.155 | 7 | 1.0 | 0.77 |
| 9 | 0.40 | 0.6 | 5 | 0.5 | 0.40 |
| 11 | 0.33 | 0.495 | 3 | 0.35 | 0.33 |
| 13 | 0.21 | 0.315 | 3 | 3.85/13 | 0.21 |
| 15≤*h*≤39(odd harmonics only) | 2.25/*h* | 3.375/*h* | 3 | 3.85/*h* | 2.25/*h* |
| 2 | 1.08 | 1.62 | 2 | Not applicable | Not applicable |
| 4 | 0.43 | 0.645 | Not applicable | | |
| 6 | 0.30 | 0.45 | | | |
| 8≤*h*≤40(even harmonics only) | 1.84/*h* | 2.76/*h* | | | |

Note:
(a) For some Class C products, other emission limits apply.
(b) The limit is determined based on the assumption of modern lighting technologies having power factors of 0.90 or higher.

The application of limits had been as defined in the applicable test standard.

## 8.2. Block Diagram of Test Setup




## 8.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Conditioning Unit | Schaffner | CCN1000-1 | 72431 | Jun. 02, 2023 | Jun. 01, 2024 |
| AC Source | Schaffner | NSG 1007 | 56825 | Jun. 02, 2023 | Jun. 01, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| CTS 4 | AMETEK | For harmonics and flickers measurement, version 4.29.0 |

## 8.4. Configuration of the EUT and method of measurement

a. The test shall be conducted according to the general requirements given in the applicable test standard. The test duration had been as defined in the applicable test standard.

b. The measurement of harmonic currents shall be performed as follows:

- for each harmonic order, measure the 1.5 s smoothed RMS harmonic current in each discrete Fourier transform (DFT) time window;
- calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period.

c. The value of the active input power to be used for the calculation of limits shall be determined as follows:

- measure the 1.5 s smoothed active input power in each DFT time window;
- determine the maximum of the measured values of active power from the DFT time windows over the entire duration of the test.

d. The harmonic currents and the active input power shall be measured under the same test conditions but need not be measured simultaneously.

### 8.5. Test Summary

Equipment with a rated power less than to 5W is deemed to fulfil all relevant requirements of this standard without testing.

# 9. Measurement of Voltage Fluctuations and Flicker

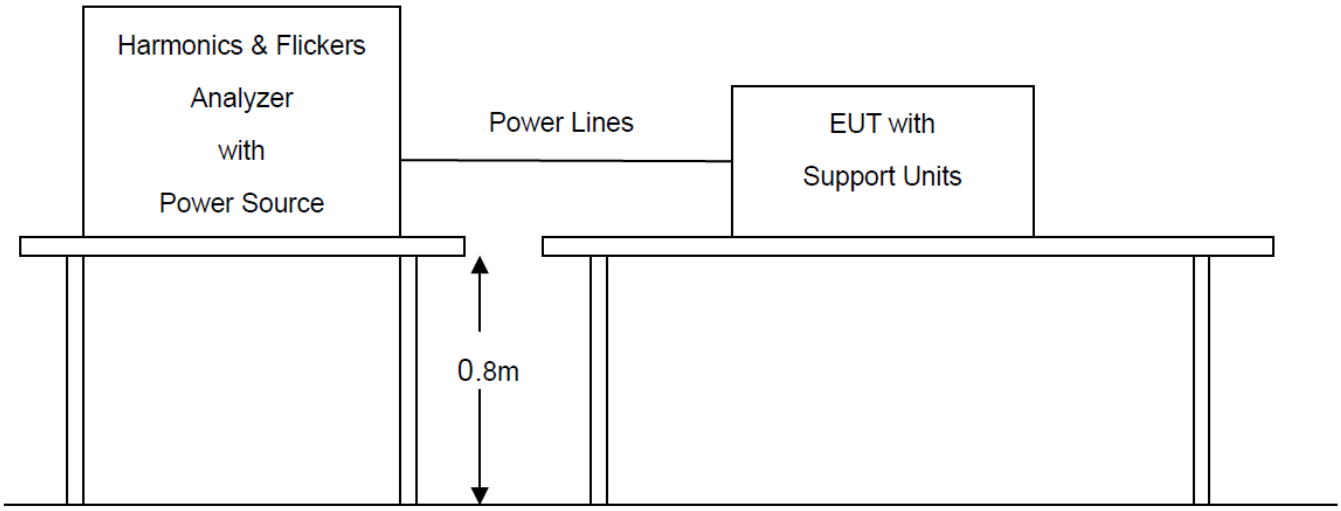
## 9.1. Requirements

Applicable test standard(s): EN 61000-3-3:2013+A2:2021

Limits of Voltage Fluctuations and Flicker

| Parameters | Definitions | Limits |
|---|---|---|
| $T_{max}$ | the accumulated time value of *d(t)* with a deviation exceeding 3.3 % during a single voltage change at the EUT terminals | ⩽500 ms |
| $d_c$ | the maximum relative steady-state voltage change | ⩽3.3% |
| $d_{max}$ | the maximum relative voltage change | ☒⩽4%<br>☐⩽6%<br>☐⩽7% |
| ☒$P_{st}$ | short-term flicker severity | ⩽0.65 |
| ☐$P_{lt}$ | long-term flicker severity | ⩽1.0 |

## 9.2. Block Diagram of Test Setup




## 9.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Conditioning Unit | Schaffner | CCN1000-1 | 72431 | Jun. 02, 2023 | Jun. 01, 2024 |
| AC Source | Schaffner | NSG 1007 | 56825 | Jun. 02, 2023 | Jun. 01, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| CTS 4 | AMETEK | For harmonics and flickers measurement, version 4.29.0 |

### 9.4. Configuration of the EUT and method of measurement

a. The test shall be conducted according to the general requirements given in the applicable test standard. The test duration and test condition had been as defined in the applicable test standard.

b. All types of voltage fluctuations would been assessed by direct measurement using a flicker meter which complies with the specification given in IEC 61000-4-15:2010.

### 9.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Jimu | Temperature | 22.6 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Worst Mode | Mode 1 | Relative Humidity | 53.2 % |
| Verdict | Pass | | |

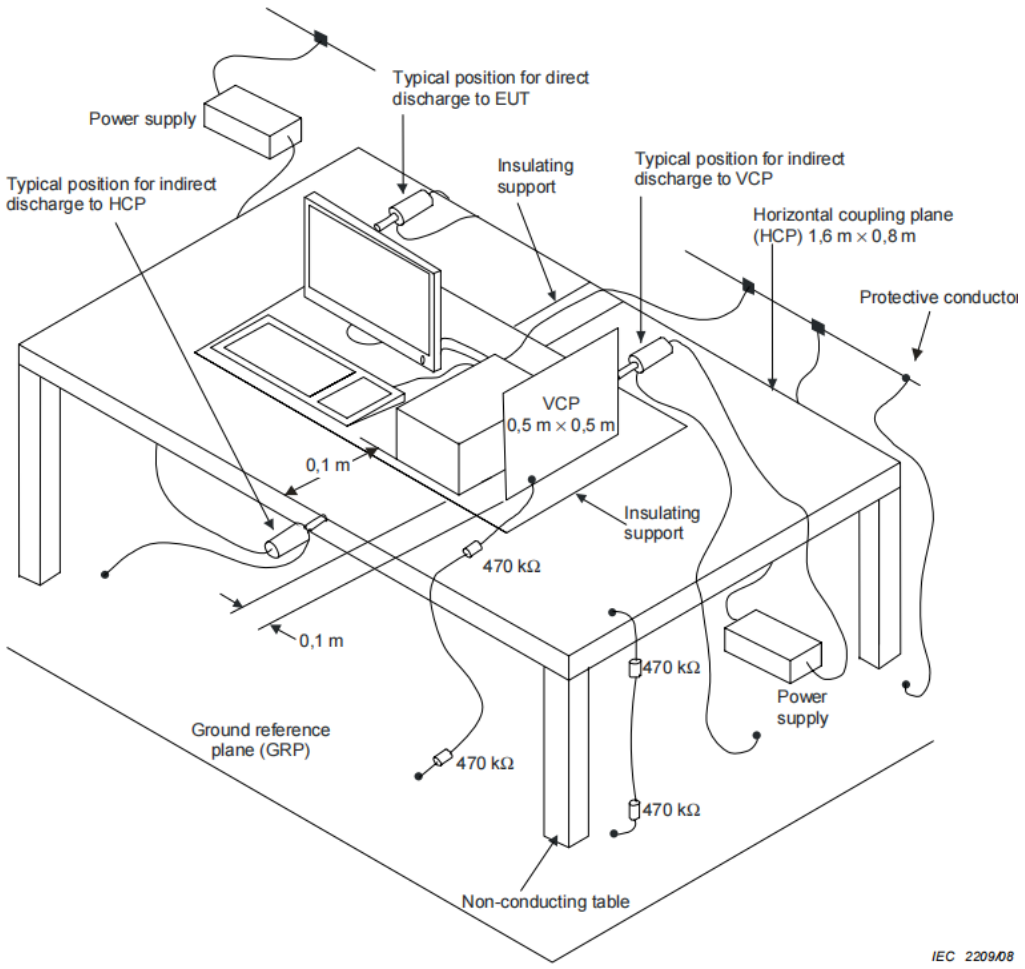
| Parameters | Measurement Value | Limits |
|---|---|---|
| $T_{max}$ | 0 | ⩽500 ms |
| $d_c$ | 0.00 | ⩽3.3% |
| $d_{max}$ | 0.00 | ⩽4% |
| $P_{st}$ | 0.119 | ⩽0.65 |

# 10. Measurement of Electrostatic discharge

## 10.1. Requirements

| | |
|---|---|
| Port | Enclosure |
| Basic Standard | IEC 61000-4-2 |
| Test Level | ±8.0 kV (Air Discharge)<br>±4.0 kV (Contact Discharge)<br>±4.0 kV (Indirect Discharge) |
| Required Performance Criterion | B |
| Time Between Each Discharge: | 1 second |
| Number of Discharge for Each Applied Voltage | 10 |

## 10.2. Block Diagram of Test Setup



### 10.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| ESD Simulator | Schaffner | NSG 438 | 782 | Dec. 30, 2022 | Dec. 29, 2023 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| -- | -- | -- |

### 10.4. Configuration of the EUT and method of measurement

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
c. The time interval between two successive single discharges was at least 1 second.
d. 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 EUT.
e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were completed.
g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT 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 EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed vertically to and 0.1 meters from the EUT.
i. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 10.5. Test Summary

| Test Engineer | Sam | Temperature | 23 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2 | Relative Humidity | 47 % |
| Verdict | Pass | | |

| Voltage | Coupling | Observation | Performance |
|---|---|---|---|
| ±4kV | Contact Discharge | No degradation of performance | A |
| ±2KV, ±4kV, ±8kV | Air Discharge | No degradation of performance | A |
| ±4kV | Indirect Discharge HCP | No degradation of performance | A |
| ±4kV | Indirect Discharge VCP | No degradation of performance | A |

Red line: Contact discharge

Blue line: Air discharge

# 11. Measurement of Radio-Frequency Electromagnetic Field

## 11.1. Requirements

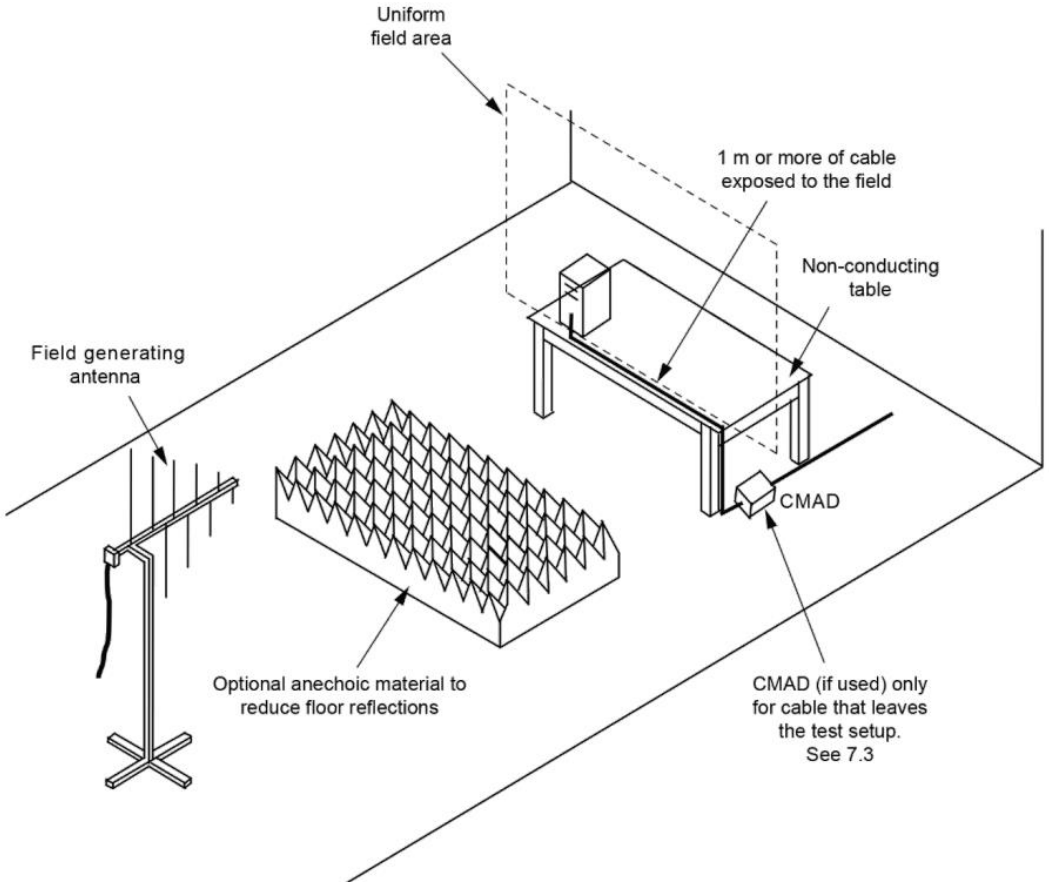
| | |
|---|---|
| Port | Enclosure |
| Basic Standard | IEC 61000-4-3 |
| Test Level | Swept test:<br>3V/m with 80% AM. 1kHz Modulation at 80 to 1000MHz<br>Spot test (Frequency (±1 %)):<br>3V/m with 80% AM. 1kHz Modulation at 1800, 2600, 3500, 5000MHz |
| Required Performance Criterion | A |
| Antenna polarization | Vertical and Horizontal |
| Step size increment [a] | 1% |
| Dwell time [b] | ≤5 seconds |
| Test Distance | 3m |
| EUT position facing antenna | Front side, back side, left side and right side |

Notes:

a. Recognizing that a 1% step size is preferred, the frequency range can be swept incrementally with a step size not exceeding 4% of the previous frequency with a test level of twice the value of the specified test level in order to reduce the testing time for equipment requiring testing in multiple configurations and/or long cycle times.

b. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time shall not exceed 5 seconds at each of the frequencies during the scan. The time to exercise the EUT is not interpreted as a total time of a program or a cycle but related to the reaction time in case of failure of the EUT.

## 11.2. Block Diagram of Test Setup



### 11.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Signal Generator | Aglient | E4421B | MY43351603 | Feb. 17, 2023 | Feb. 16, 2024 |
| Power Probe | R&S | URV5-Z4 | 100124 | Mar. 24, 2023 | Mar. 23, 2025 |
| Power Meter | R&S | NRVD | 8323781027 | Mar. 24, 2023 | Mar. 23, 2025 |
| Power Amplifier | KALMUS | 7100LC | 04-02/17-06-001 | Apr. 25, 2023 | Apr. 24, 2024 |
| Power Amplifier | Milmega | AS0104-55_55 | 1004793 | Apr. 25, 2023 | Apr. 24, 2024 |
| Power Amplifier | Rflight | NTWPA-2560100 | 17063183 | Apr. 25, 2023 | Apr. 24, 2024 |
| Biconilog Antenna | ETS | 3142C | 00060447 | N/A | N/A |
| Broadband high gain horn antenna | SCHWARZBECK | BBHA 9120 J | 00073 | N/A | N/A |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| TS+[JS35-RS] | Tonscend | For EMC measurement, version 2.0.1.8 |

### 11.4. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT) was positioned within the Uniform Field Area (UFA) on a supporting table, ensuring a 3-meter separation from the transmitting antenna. This setup aligns with the calibrated square area, guaranteeing field uniformity during testing. The supporting units were strategically located outside the UFA to avoid any potential interference. Nonetheless, the cables connected to the EUT were intentionally exposed to the precisely calibrated field within the UFA.

b. Before testing, it will verify the proper operation of the test equipment/system. This verification will involve measuring the field strength at one point within the Uniform Field Area (UFA) at various frequencies.

c. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

d. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 11.5. Test Summary

| Test Engineer | Alex | Temperature | 24.0 ℃ |
|---|---|---|---|
| Test Date | Sep. 26, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2 | Relative Humidity | 59.7 % |
| Verdict | Pass | | |

Swept test:

| Frequency | Exposed Side | Field Strength (V/m) | Observation | Performance |
|---|---|---|---|---|
| 80MHz to 6GHz | Front | 3V/m (rms) | No degradation of performance | A |
| 80MHz to 6GHz | Left | 3V/m (rms) | No degradation of performance | A |
| 80MHz to 6GHz | Rear | 3V/m (rms) | No degradation of performance | A |
| 80MHz to 6GHz | Right | 3V/m (rms) | No degradation of performance | A |

Spot test (Frequency (±1 %)):

| Frequency | Exposed Side | Field Strength (V/m) | Observation | Performance |
|---|---|---|---|---|
| 1800, 2600, 3500, 5000MHz | Front | 3V/m (rms) | No degradation of performance | A |
| 1800, 2600, 3500, 5000MHz | Left | 3V/m (rms) | No degradation of performance | A |
| 1800, 2600, 3500, 5000MHz | Rear | 3V/m (rms) | No degradation of performance | A |
| 1800, 2600, 3500, 5000MHz | Right | 3V/m (rms) | No degradation of performance | A |

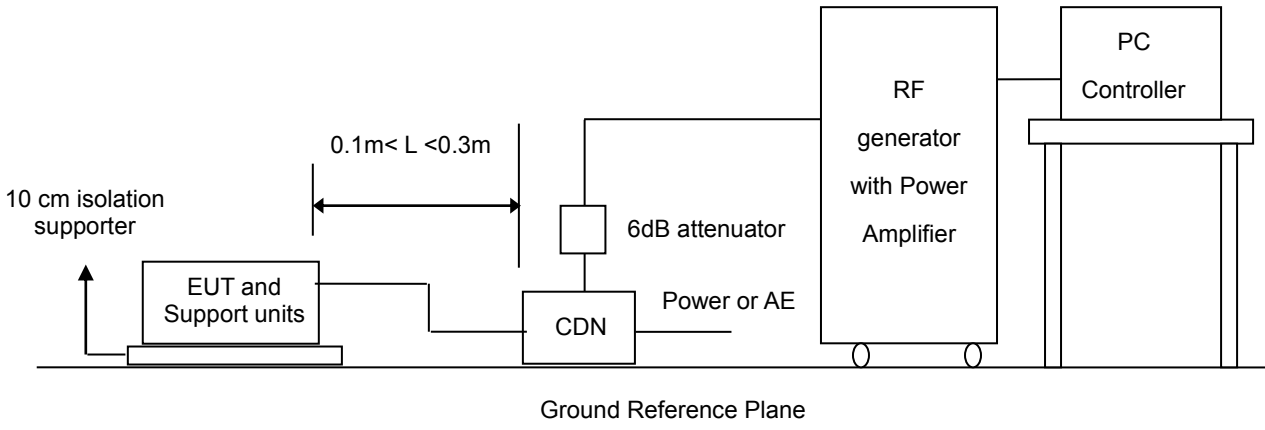
# 12. Measurement of Radio-frequency common mode

## 12.1. Requirements

| | | | |
|---|---|---|---|
| Port | ☒AC mains power ports | ☐ Analogue/digital data ports [a] | ☐ DC network power ports [a] |
| Basic Standard | IEC 61000-4-6 | | |
| Required Performance Criterion | A | | |
| Test Level | 0.15 to 10 MHz, 3 V RMS (unmodulated), 80 % AM (1 kHz)<br>10 to 30 MHz, 3 to 1 V RMS (unmodulated), 80 % AM (1 kHz)<br>30 to 80 MHz, 1 V RMS (unmodulated), 80 % AM (1 kHz) | | |
| Step size increment [b] | 1% | | |
| Dwell time [c] | ≤5 seconds | | |

Notes:
a. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.
b. Recognizing that a 1% step size is preferred, the frequency range can be swept incrementally with a step size not exceeding 4% of the previous frequency with a test level of twice the value of the specified test level in order to reduce the testing time for equipment requiring testing in multiple configurations and/or long cycle times.
c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time shall not exceed 5 seconds at each of the frequencies during the scan. The time to exercise the EUT is not interpreted as a total time of a program or a cycle but related to the reaction time in case of failure of the EUT.

## 12.2. Block Diagram of Test Setup



### 12.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Power Amplifier | AR | 75A250 | 18464 | N/A | N/A |
| CDN | ZHINAN | ZN3751 | 15004 | Aug. 03, 2022 | Sep. 02, 2024 |
| 6dB attenuator | ZHINAN | E-002 | N/A | Aug. 04, 2022 | Aug. 03, 2024 |
| Power Probe | R&S | URV5-Z4 | 100124 | Mar. 24, 2023 | Mar. 23, 2025 |
| Electromagnetic Injection Clamp | Luthi | EM101 | 35773 | Aug. 12, 2022 | Aug. 11, 2024 |
| Power Meter | R&S | NRVD | 8323781027 | Mar. 24, 2023 | Mar. 23, 2025 |
| Signal Generator | Keysight | E4421B | MY43351603 | Feb. 17, 2023 | Feb. 16, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| TS+[JS35-CS] | Tonscend | For EMC measurement, version 2.0.1.7 |

### 12.4. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT) shall be tested within its intended operating and climatic conditions.

b. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane. The test shall be performed with the test generator connected to each of the coupling devices (CDN, EM clamp, current clamp) in turn. All other cables not under test shall either be disconnected (when functionally allowed) or provided with decoupling networks or unterminated CDNs only.

c. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

d. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 12.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Sam | Temperature | 23 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2 | Relative Humidity | 47 % |
| Verdict | Pass | | |

| Test port | Test Level | Coupling method | Observation | Performance |
|---|---|---|---|---|
| AC Mains Input | 0.15 to 10 MHz: 3 V | CDN | No degradation of performance | A |
| | 10 to 30 MHz: 3 to 1 V | | | |
| | 30 to 80 MHz, 1 V | | | |

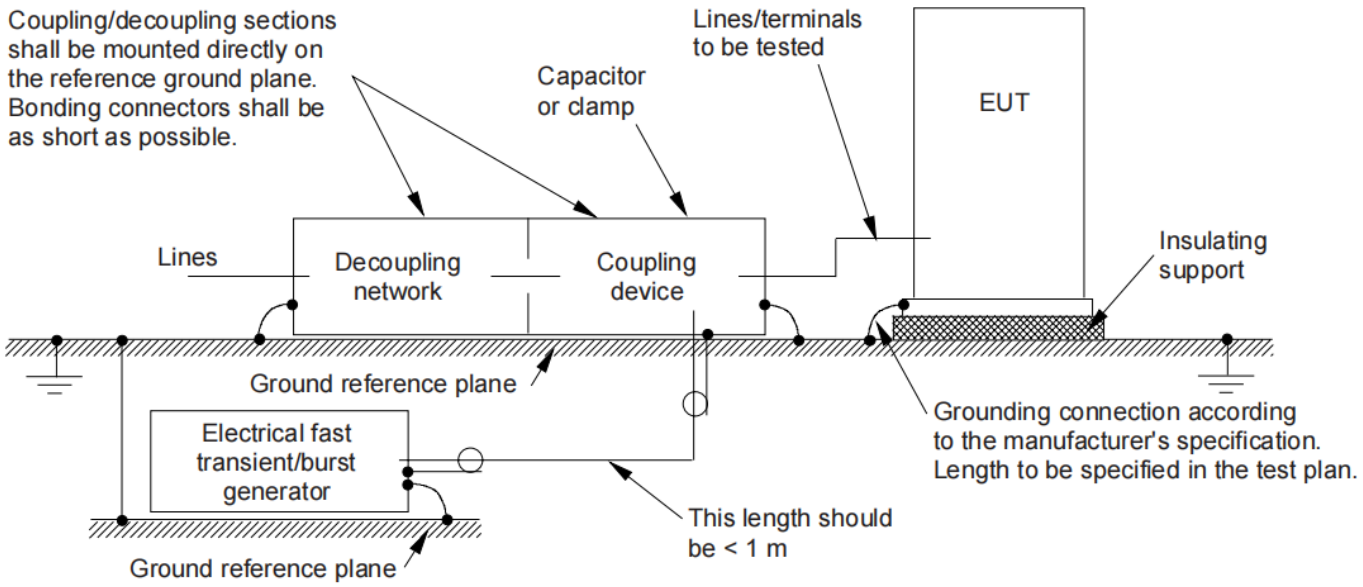
# 13. Measurement of Fast Transients

## 13.1. Requirements

| Port | ☒AC mains power ports | ☐ Analogue/digital data ports [a] | ☐ DC network power ports [a] |
|---|---|---|---|
| Basic Standard | IEC 61000-4-4 | | |
| Required Performance Criterion | B | | |
| Test Level | 1 kV (peak) | 0.5 kV (peak) | 0.5 kV (peak) |
| Polarity | Positive/Negative | | |
| Impulse Frequency | 5kHz | | |
| Impulse wave shape | 5/50ns | | |
| Burst Duration | 15ms | | |
| Burst Period | 300ms | | |

Notes:
a. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.

## 13.2. Block Diagram of Test Setup



### 13.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| EFT/Surge/DIPS Generator | Schaffner | Modula 6150 | 34437 | Jun. 08, 2023 | Jun. 07, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| WinModula | Schaffner | For EFT/Surge/Dips measurement, version 2.31 c |

### 13.4. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT), whether stationary floor-mounted or table top, and equipment designed to be mounted in other configurations, shall be placed on a ground reference plane and shall be insulated from it by an insulating support 0,1 m ± 0,01 m thick.
b. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane.
c. The EUT shall be arranged and connected to satisfy its functional requirements, according to the equipment installation specifications. The minimum distance between the EUT and all other conductive structures (e.g. the walls of a shielded room), except the ground reference plane shall be more than 0,5 m. All cables to the EUT shall be placed on the insulation support 0,1 m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.
d. The test voltages shall be coupled to all of the EUT ports including those between two units of equipment involved in the test, unless the length of the interconnecting cable makes it impossible to test.
e. Either a direct coupling network or a capacitive clamp shall be used for the application of the test voltages.
f. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 13.5. Test Summary

| Test Engineer | Sam | Temperature | 23 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2 | Relative Humidity | 49 % |
| Verdict | Pass | | |

| Inject Line | Voltage(kV) | Inject Method | Observation | Performance |
|---|---|---|---|---|
| AC Lines | 0.5, 1 | Direct | No degradation of performance | A |

## 14. Measurement of Surges

### 14.1. Requirements

| Port | ☒AC mains power ports [a] | ☐Analogue/digital data ports [b, c, d and e] | | ☐DC network power ports [f] |
|---|---|---|---|---|
| | | ☐Unshielded symmetrical | ☐Coaxial or shielded | |
| Basic Standard | IEC 61000-4-5 | | | |
| Required Performance Criterion | B | C | B | B |
| Test Level | Line to line: 1 kV; Line to ground: 2 kV | primary protection is intended: 1 and 4 kV (line to ground); primary protection is not intended: 1 kV (line to ground) | shield to ground: 0.5 kV | Line to ground: 0.5 kV |
| Tr/Th | 1.2/50 (8/20) μs | 10/700 (5/320) μs | 1.2/50 (8/20) μs | 1.2/50 (8/20) μs |
| Number of impulses | Five positive and five negative impulses | | | |
| Time between successive impulses | 1 min | | | |

Notes:

a. The number of pulses applied shall be as follows:
- Five positive pulses line-to-neutral at 90° phase.
- Five negative pulses line-to-neutral at 270° phase.

The following additional pulses are required only if the EUT has an earth connection or if the EUT is earthed via any AE:
- Five positive pulses line-to-earth at 90° phase.
- Five negative pulses line-to-earth at 270° phase.
- Five negative pulses neutral-to-earth at 90° phase.
- Five positive pulses neutral-to-earth at 270° phase.

b. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.

c. Surges are applied with primary protection fitted. Where possible, use the actual primary protector intended to be used in the installation.

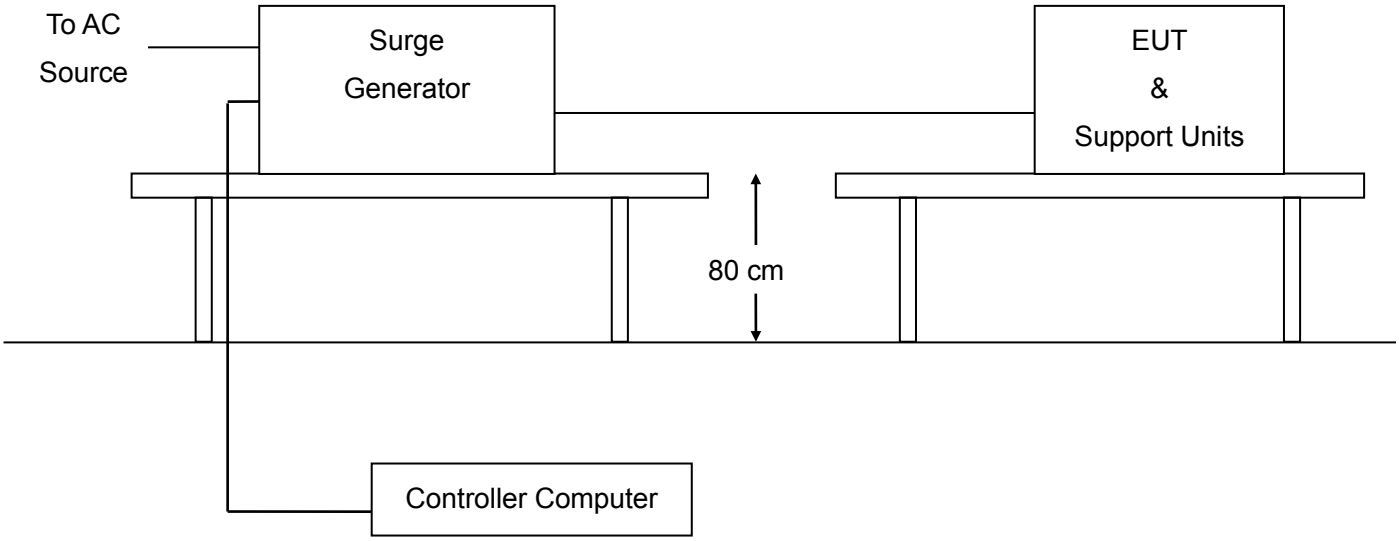
d. Where the surge coupling network for the 10/700 (5/320) μs waveform affects the functioning of high speed data ports, the test shall be carried out using a 1.2/50 (8/20) μs waveform and appropriate coupling network.

e. Surges are applicable to ports which satisfy all of the following conditions:
- May connect directly to cables that leave the building structure.
- Defined as an antenna port, a wired network port, or a broadcast receiver tuner port.

Typical ports covered include xDSL, PSTN, CATV, antenna and similar. Excluded ports are LAN and similar.

f. Applicable only to ports which, according to the manufacturer's specification, may connect directly to outdoor cables.

## 14.2. Block Diagram of Test Setup




## 14.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| EFT/Surge/DIPS Generator | Schaffner | Modula 6150 | 34437 | Jun. 08, 2023 | Jun. 07, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| WinModula | Schaffner | For EFT/Surge/Dips measurement, version 2.31 c |

### 14.4. Configuration of the EUT and method of measurement

a. Verification shall be performed. It is preferable to perform the verification prior to the test.

b. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

c. When testing line-to-ground, the lines are tested individually in sequence, if there is no other specification.

d. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore, all lower test levels including the selected test level shall be tested.

e. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

### 14.5. Test Summary

| | | | |
|---|---|---|---|
| Test Engineer | Sam | Temperature | 23 ℃ |
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2 | Relative Humidity | 49 % |
| Verdict | Pass | | |

| Test port | Coupling | Voltage(kV) | Observation | Performance |
|---|---|---|---|---|
| AC Mains Input | line-to-neutral | 0.5, 1 | No degradation of performance | A |

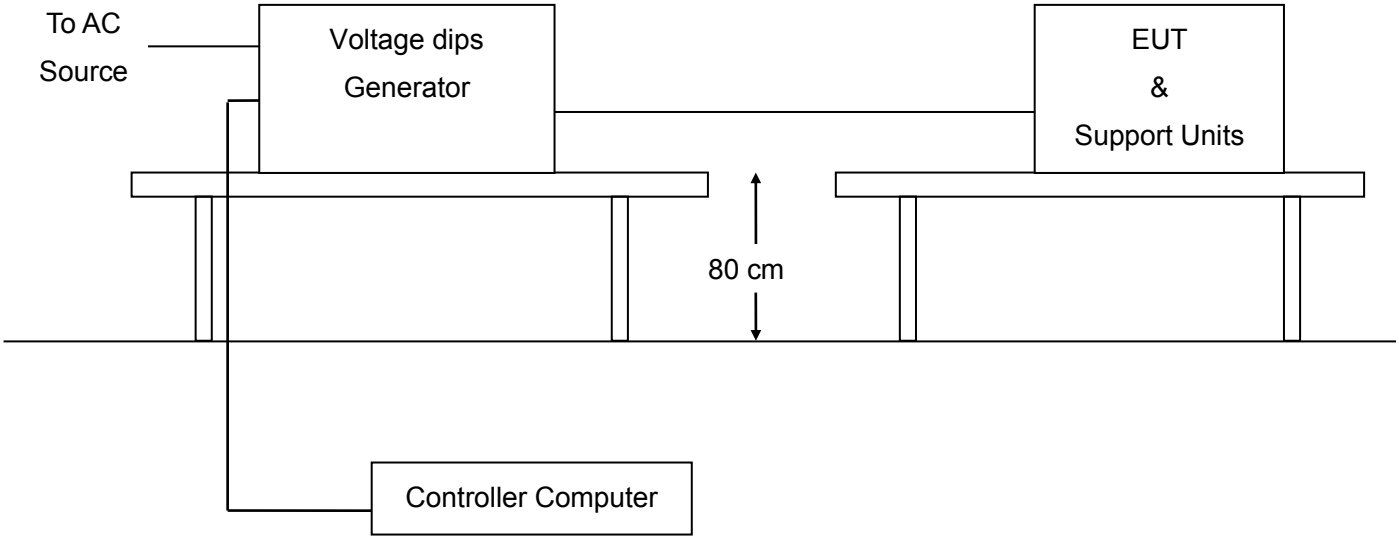
# 15. Measurement of Voltage dips and interruptions

## 15.1. Requirements

| | | | |
|---|---|---|---|
| Port | AC mains power ports | | |
| Basic Standard | IEC 61000-4-11 | | |
| Required Performance Criterion | B | B | C |
| Residual voltage [a] | < 5 % | 70 % | < 5 % |
| Number of cycles [b] | 0.5 | 25 for 50 Hz<br>30 for 60 Hz | 250 for 50 Hz<br>300 for 60 Hz |
| Variation/dip repetition | Sequence of three dips/interruptions with an interval of 10 seconds between each test | | |

Notes:
a. Changes to occur at 0 degree crossover point of the voltage waveform. If the EUT does not demonstrate compliance when tested with 0 degree switching, the test shall be repeated with the switching occurring at both 90 degrees and 270 degrees. If the EUT satisfies these alternative requirements, then it fulfils the requirements.
b. Apply at only one supply frequency of the EUT.

## 15.2. Block Diagram of Test Setup



### 15.3. Equipment Details

Measuring Instruments

| Instruments | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| EFT/Surge/DIPS Generator | Schaffner | Modula 6150 | 34437 | Jun. 08, 2023 | Jun. 07, 2024 |

Measuring Software

| Software Name | Manufacturer | Details |
|---|---|---|
| WinModula | Schaffner | For EFT/Surge/Dips measurement, version 2.31 c |

### 15.4. Configuration of the EUT and method of measurement

a. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

b. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

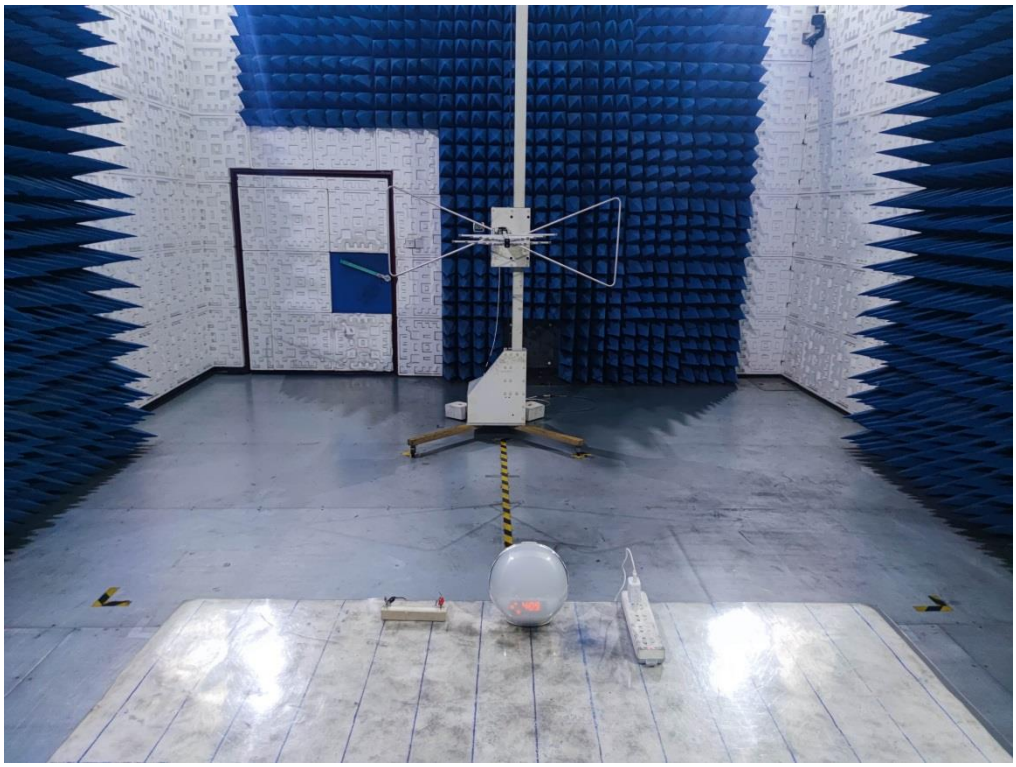
### 15.5. Test Summary

| Test Engineer | Sam | Temperature | 23 ℃ |
|---|---|---|---|
| Test Date | Sep. 27, 2023 | Air Pressure | 985 Mbar |
| Test Mode(s) | Mode 1/2 | Relative Humidity | 49 % |
| Verdict | Pass | | |

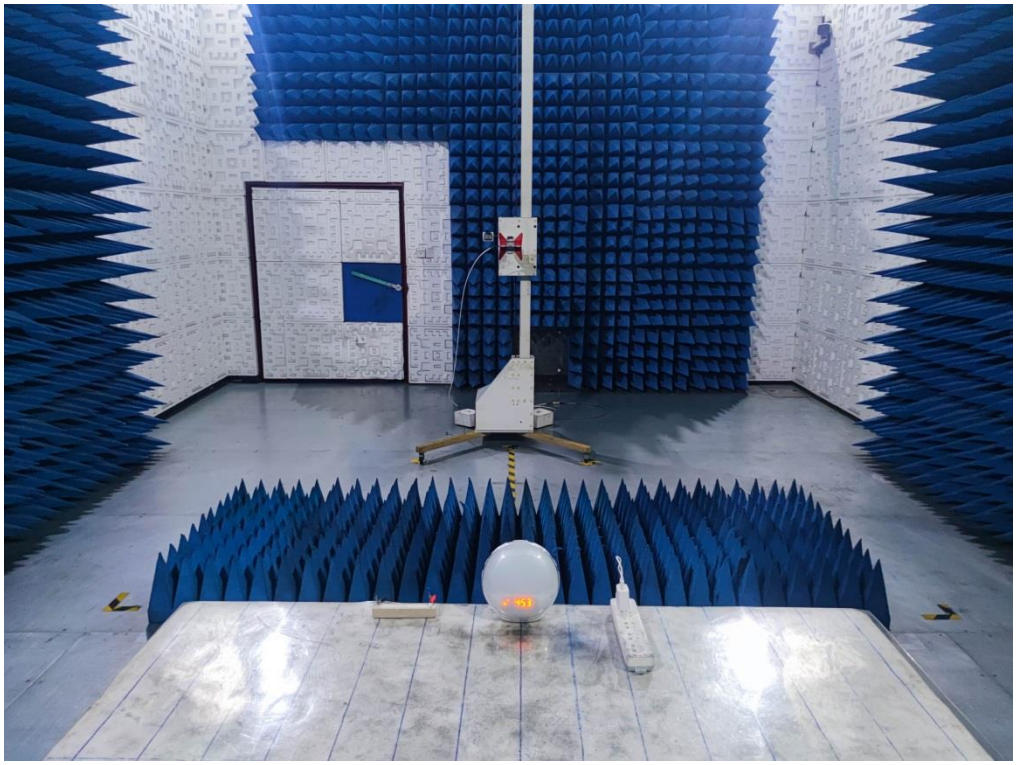
| Test port | Residual voltage (%) | Cycles | Observation | Performance |
|---|---|---|---|---|
| AC Mains Input | < 5 | 0.5 | No degradation of performance | A |
| | 70 | 25 | No degradation of performance | A |
| | < 5 | 250 | EUT power cycled | B |

## 16. Photographs of Test Setup

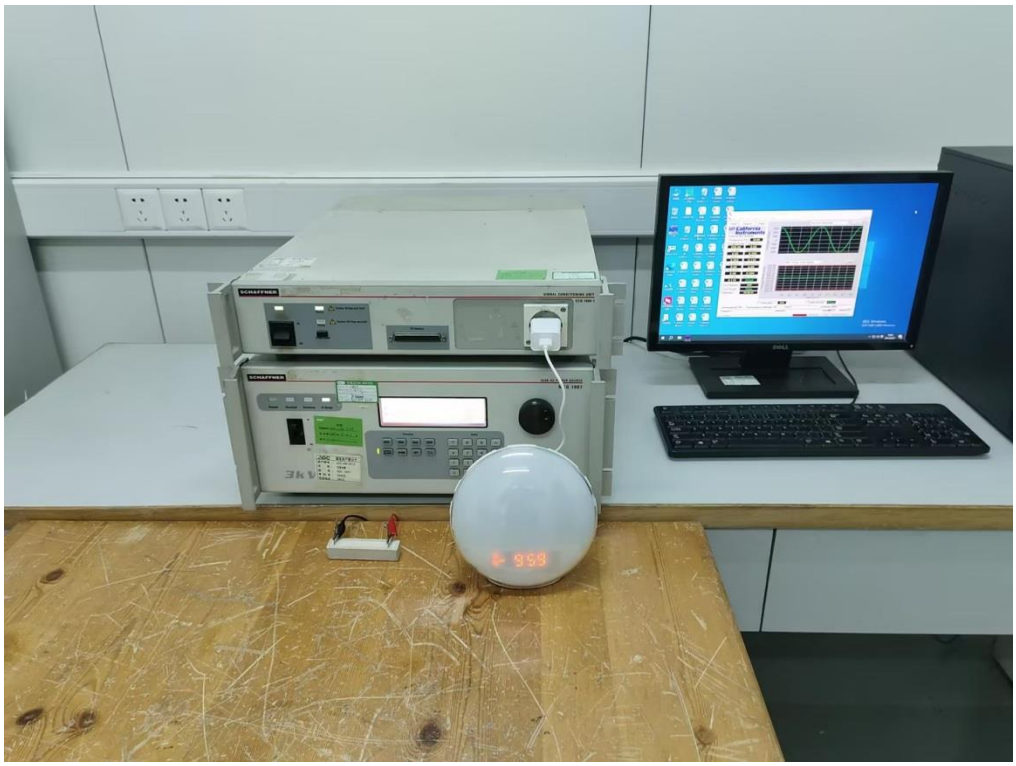

Conducted emissions from the AC mains power ports



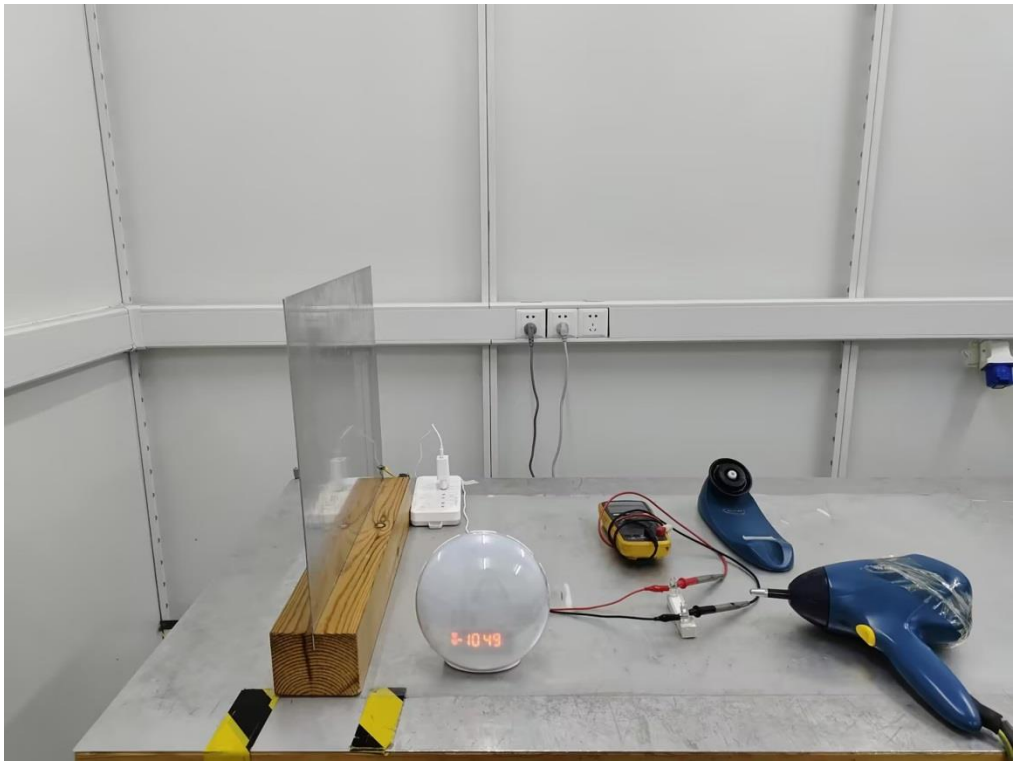
Radiated emissions at frequencies up to 1 GHz



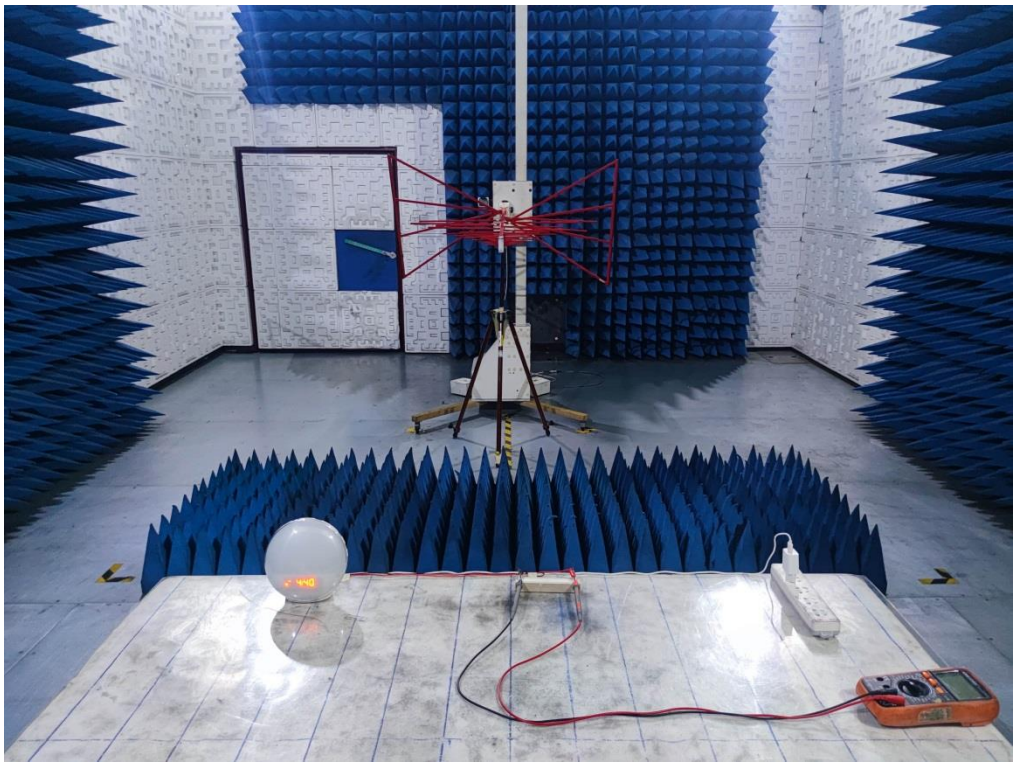
Radiated emissions at frequencies above 1 GHz



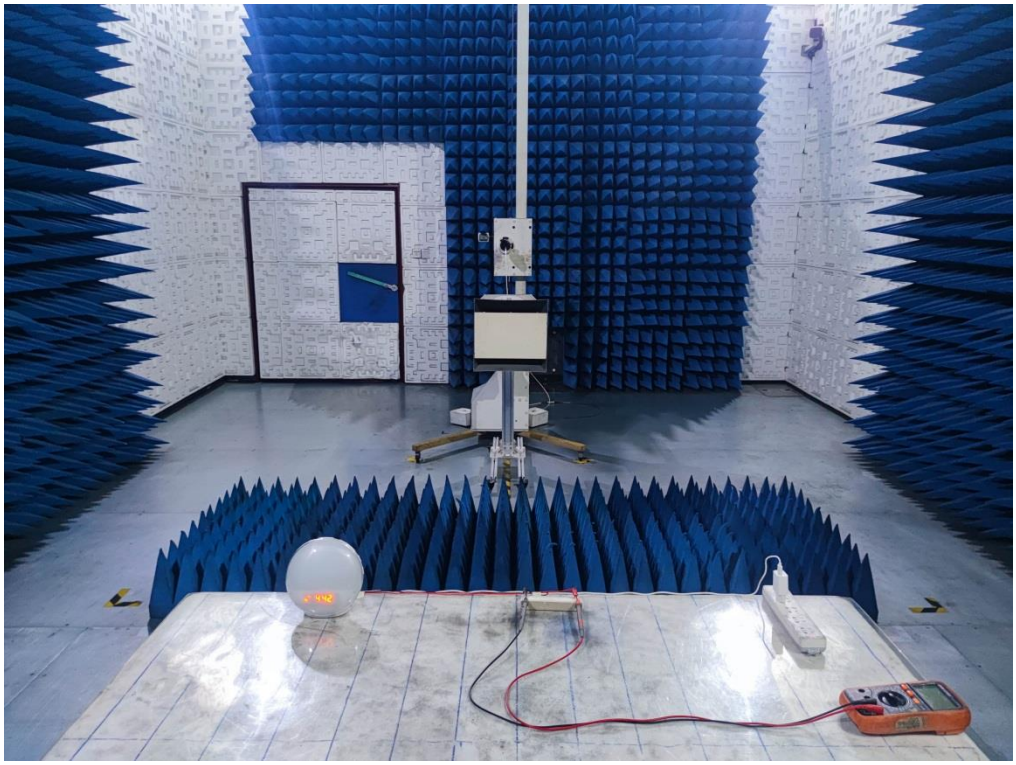
Harmonic current emissions & Voltage fluctuations and flicker



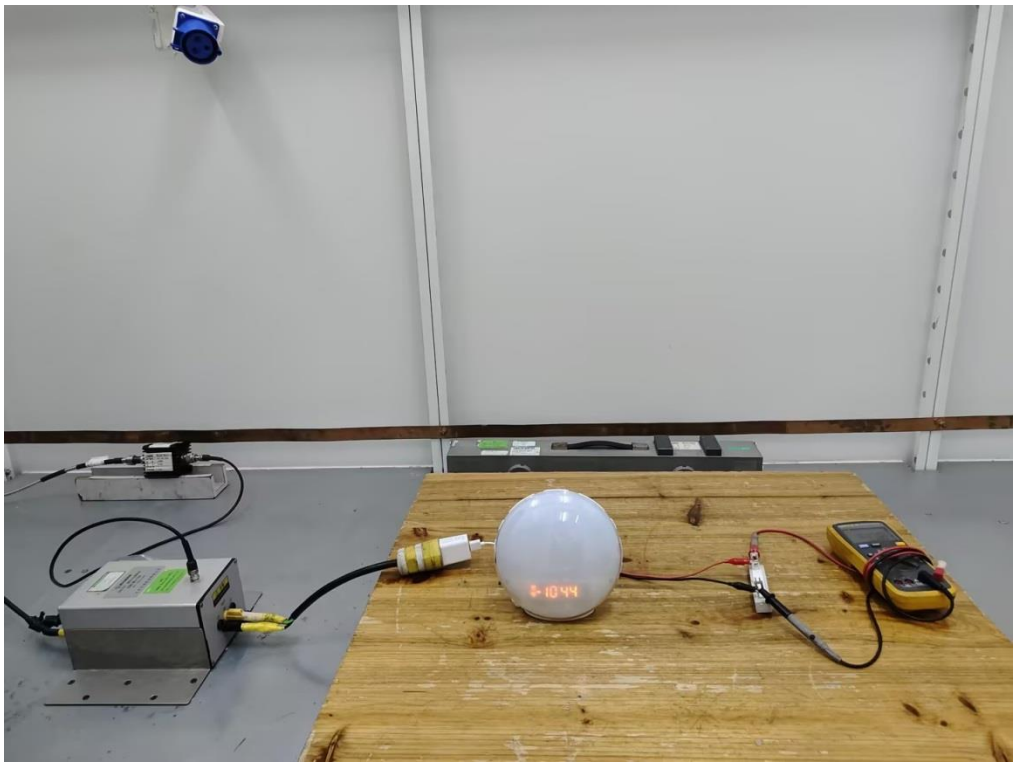
Electrostatic discharge



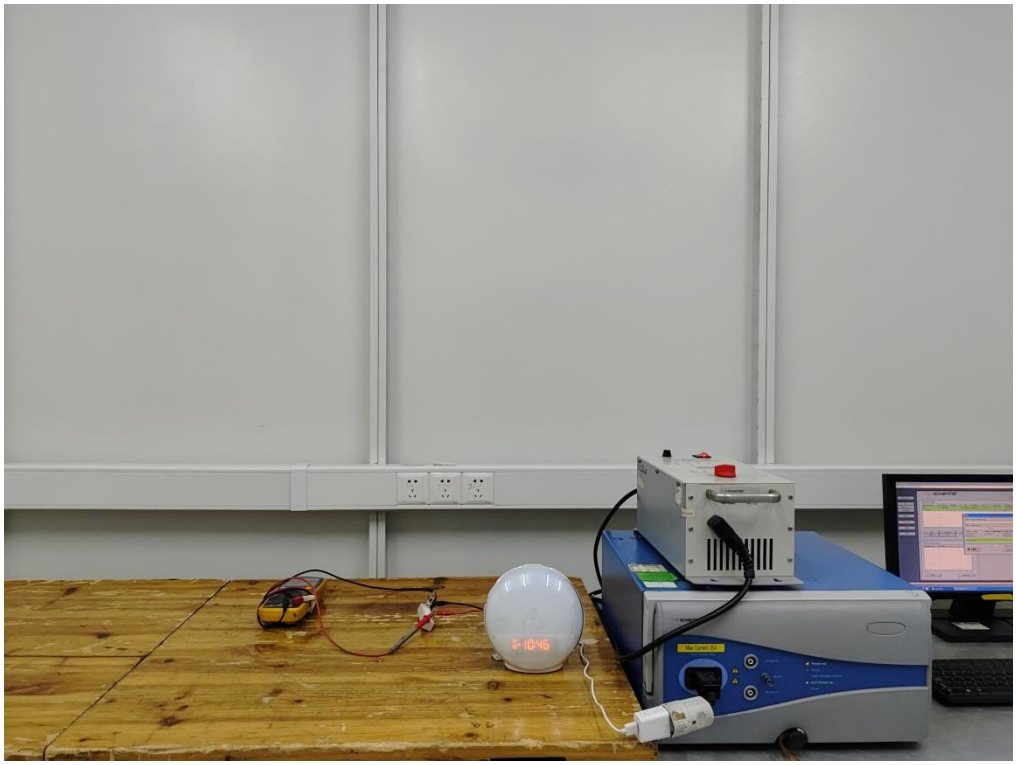
Radio-frequency electromagnetic field up to 1 GHz



Radio-frequency electromagnetic field above 1 GHz



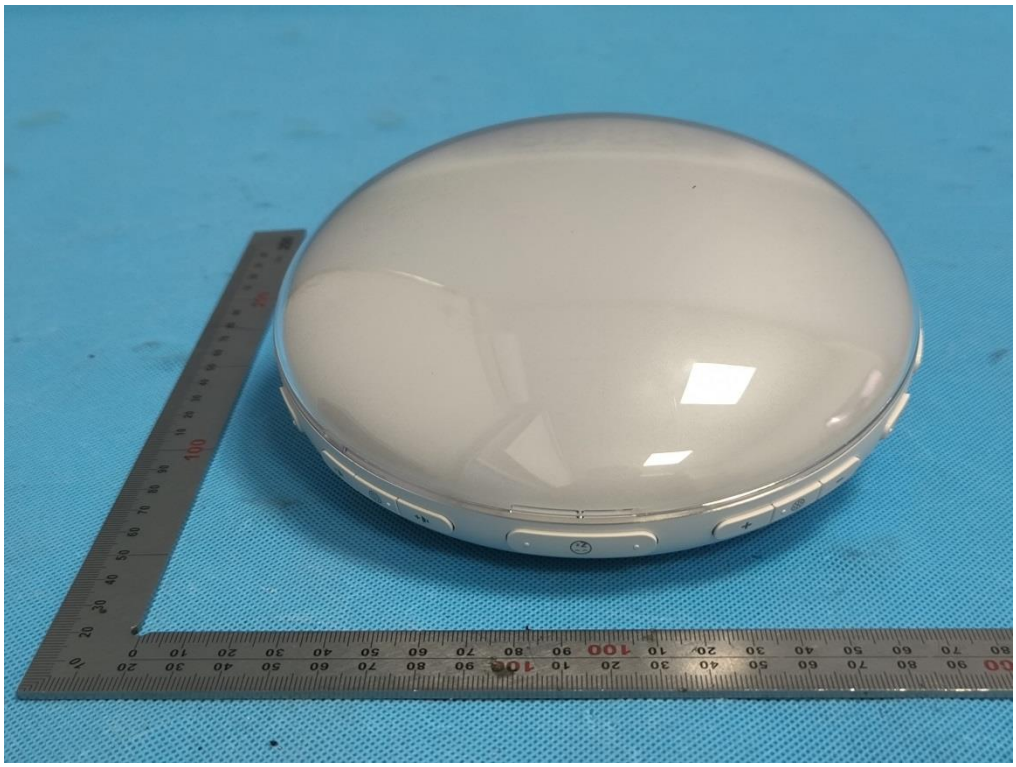
Radio-frequency common mode at the AC mains power ports



Fast transients/Surges/ Voltage dips at the AC mains power ports

## 17. Photographs of EUT

All view of EUT



Top view of EUT

Bottom view of EUT

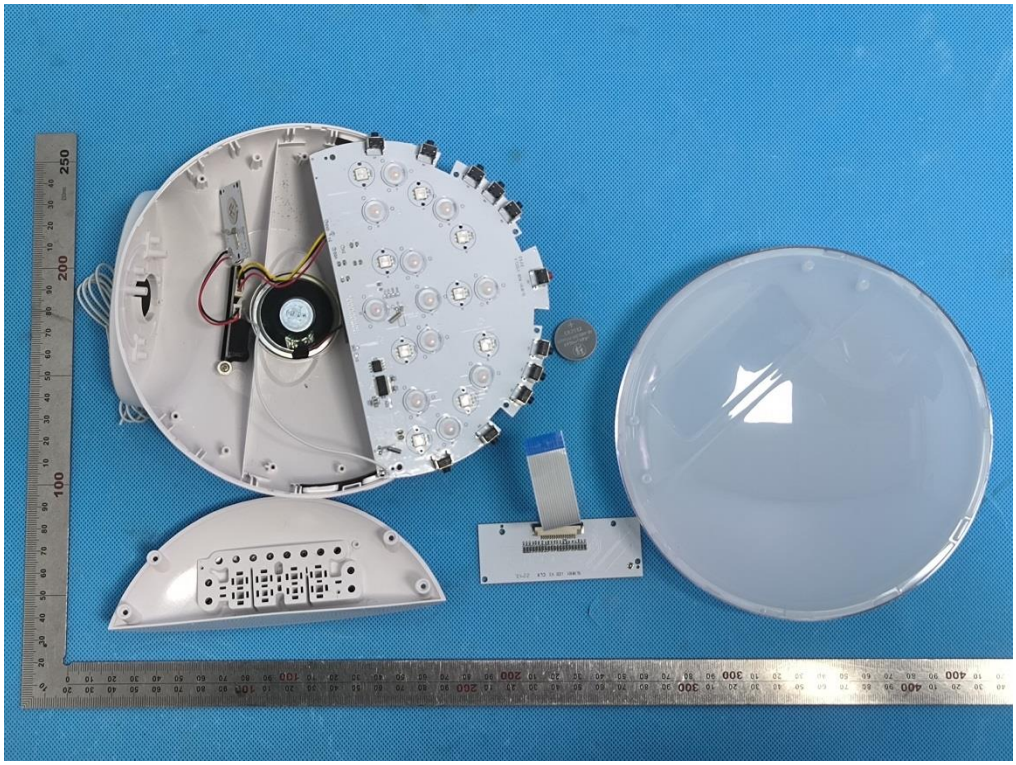
Front view of EUT

Back view of EUT

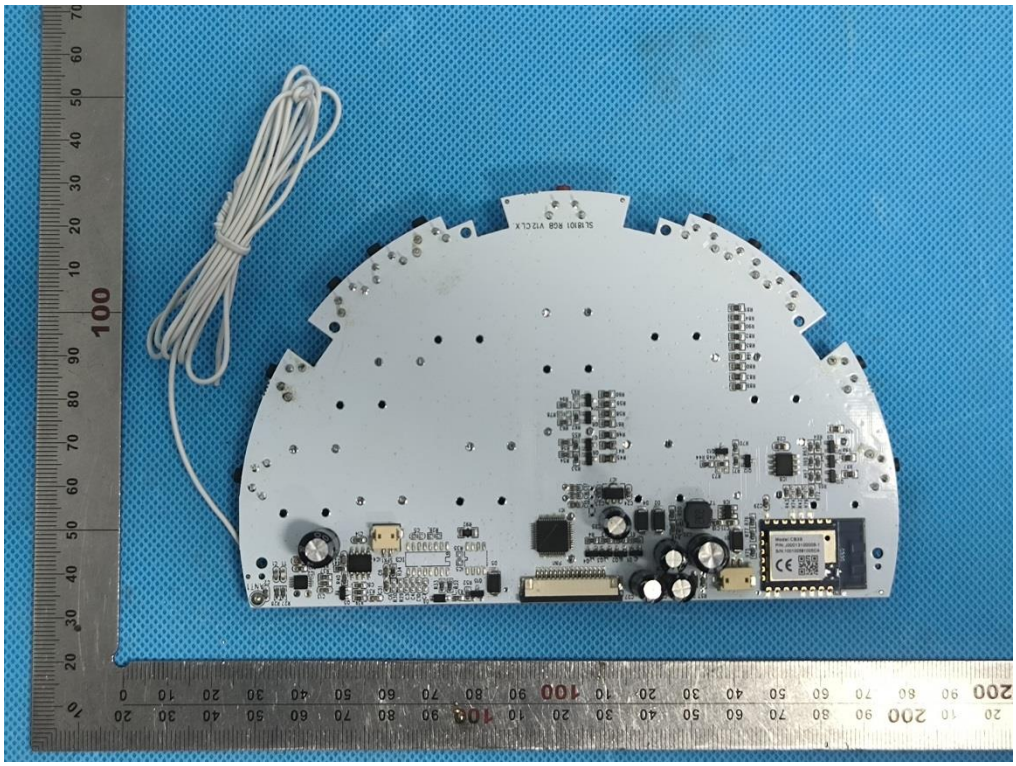
Left view of EUT

Right view of EUT

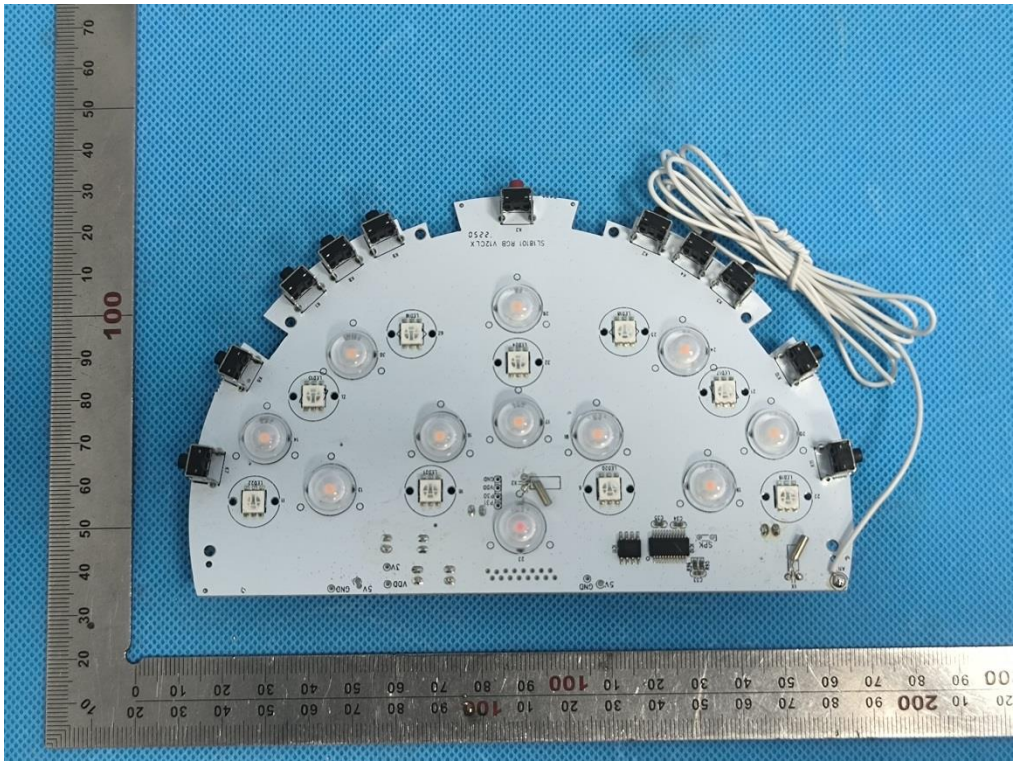
Port view of EUT



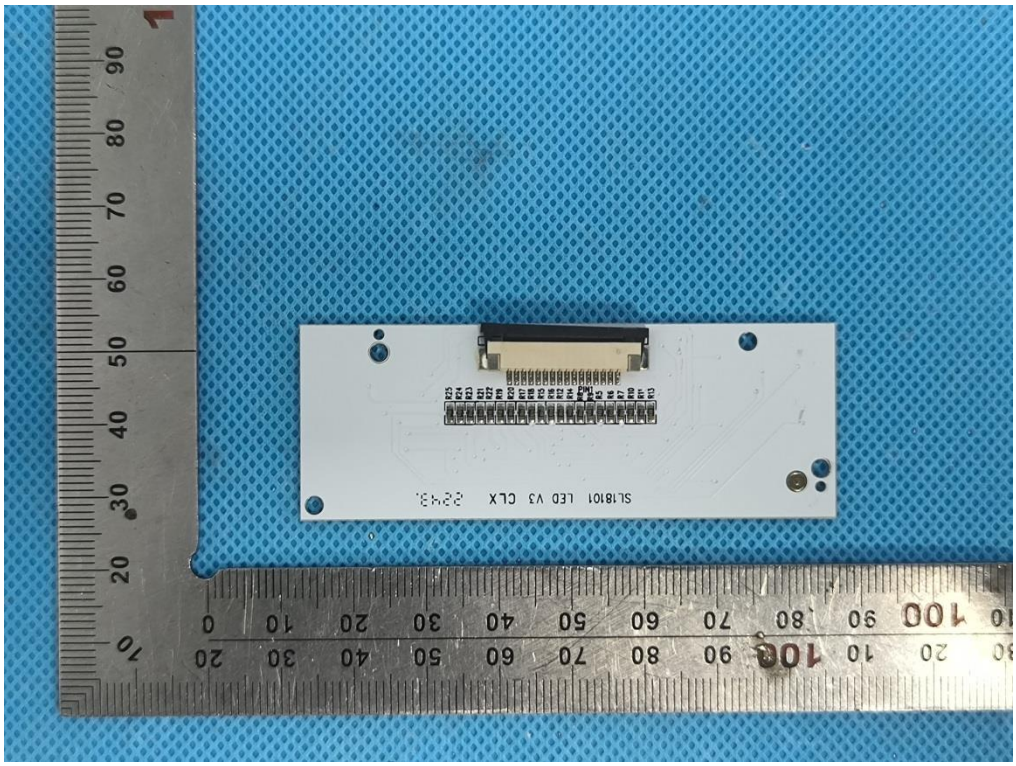
Open view of EUT



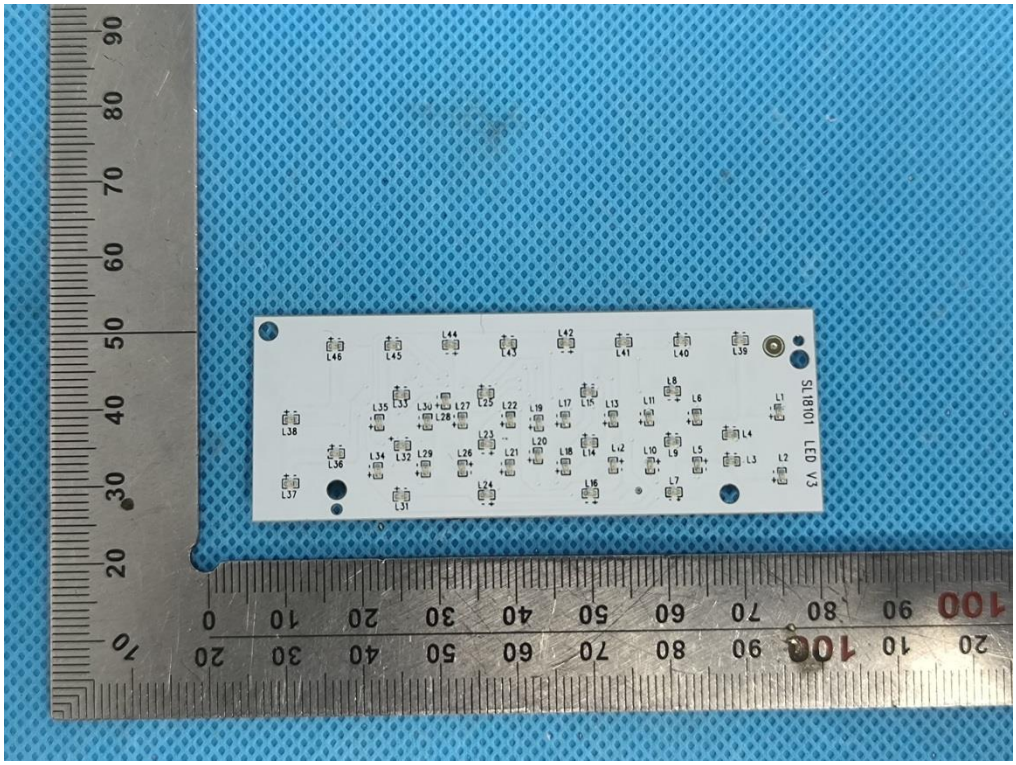
Internal view-1 of EUT



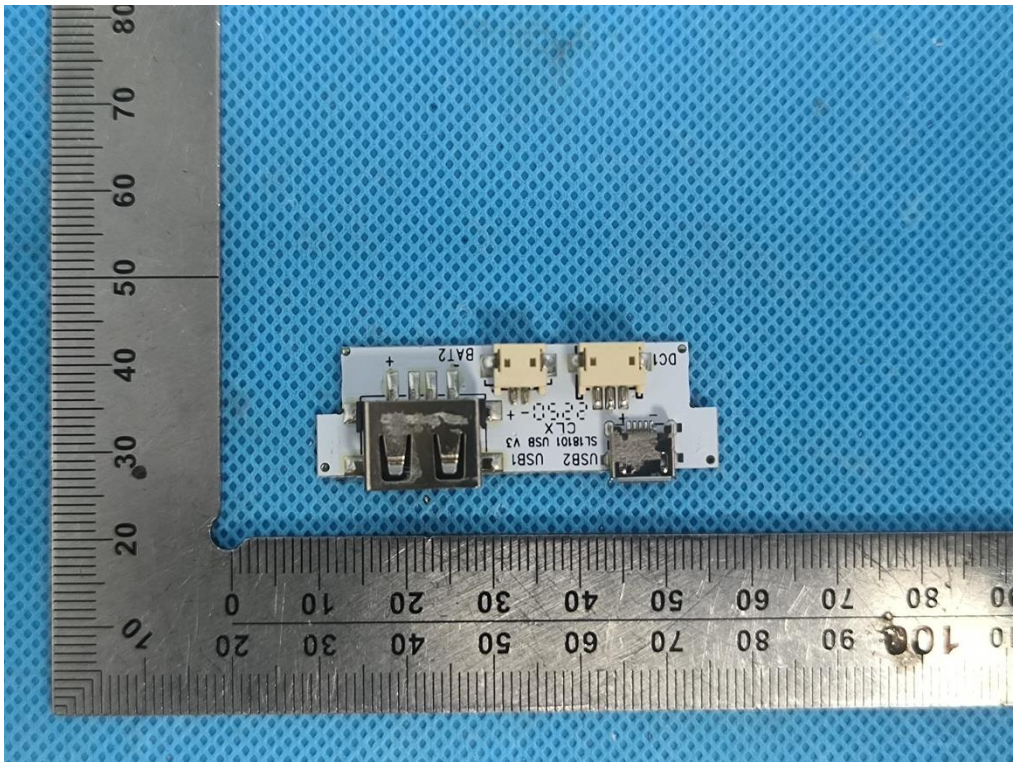
Internal view-2 of EUT



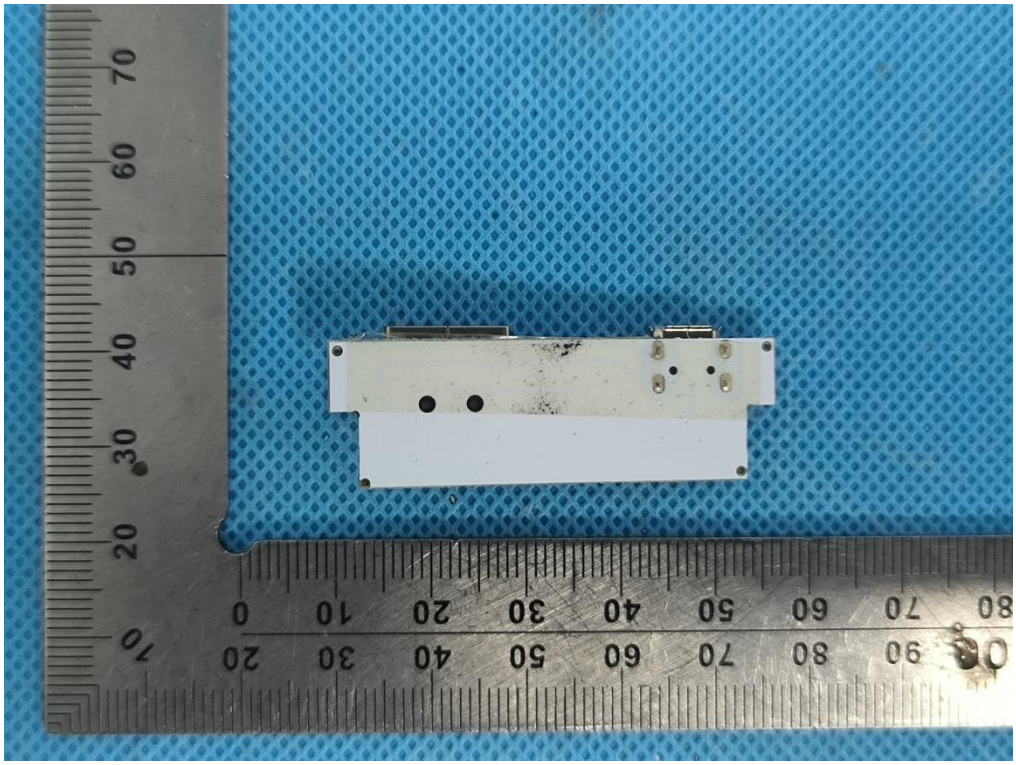
Internal view-3 of EUT



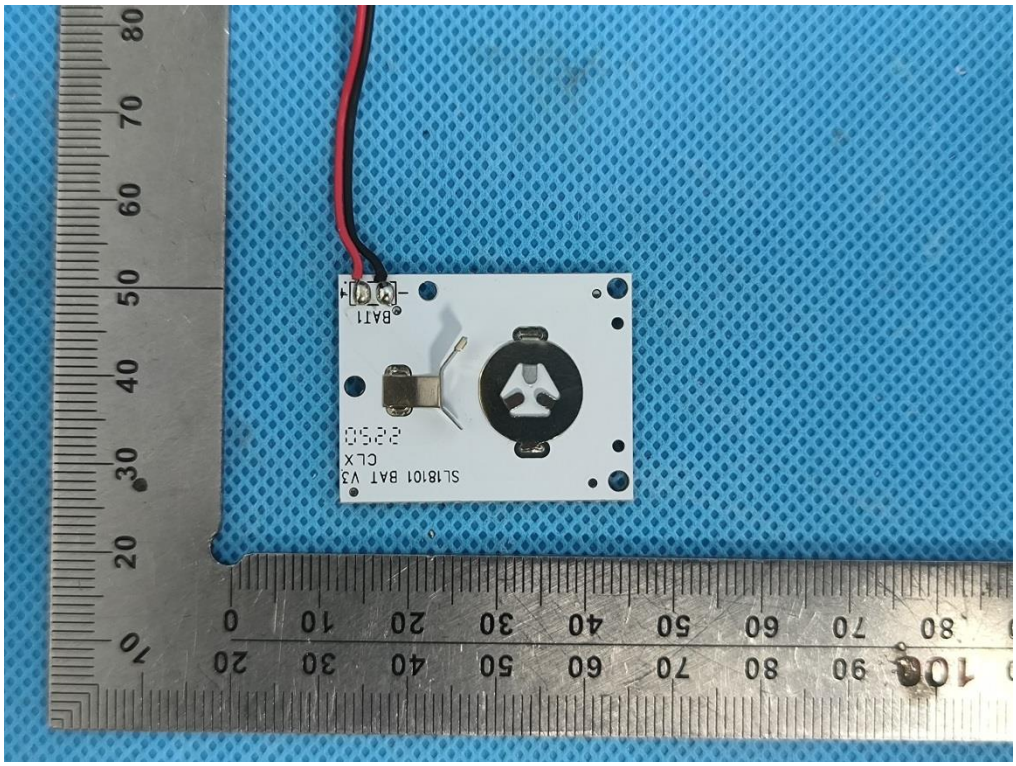

Internal view-4 of EUT



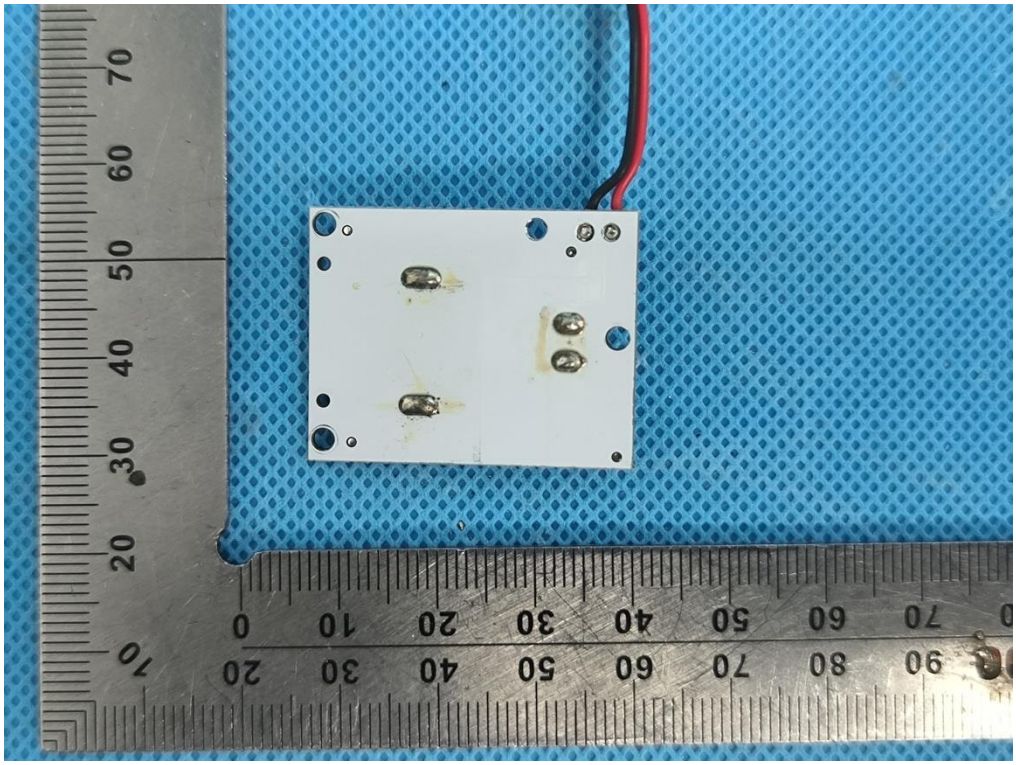

Internal view-5 of EUT



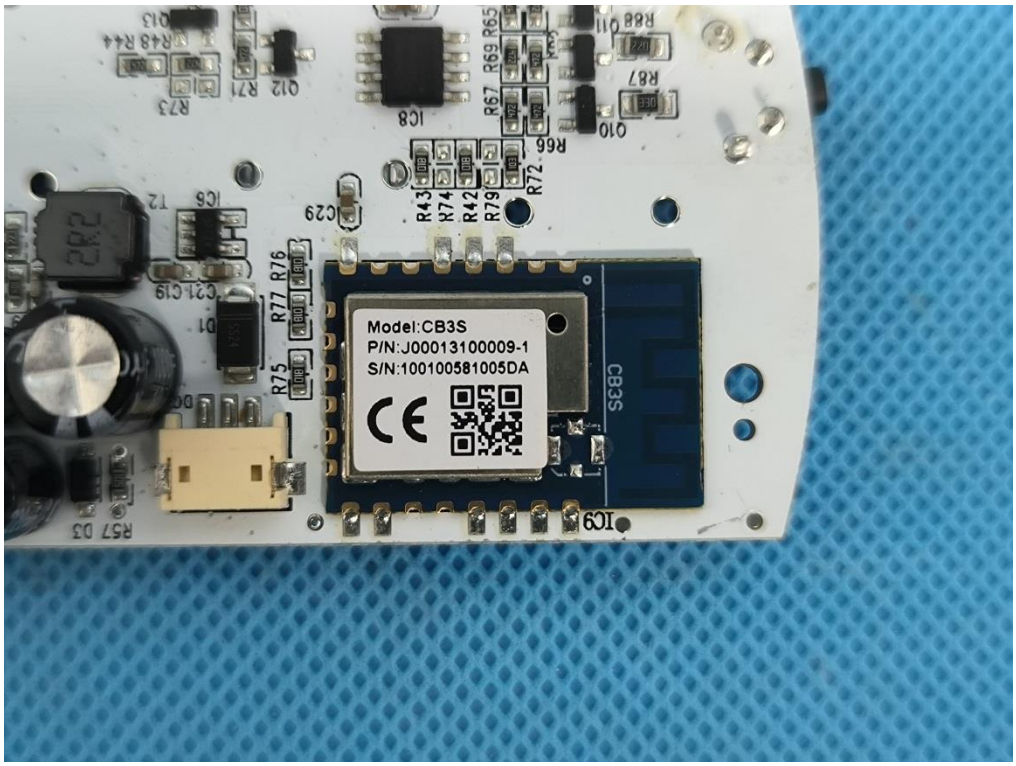
Internal view-6 of EUT



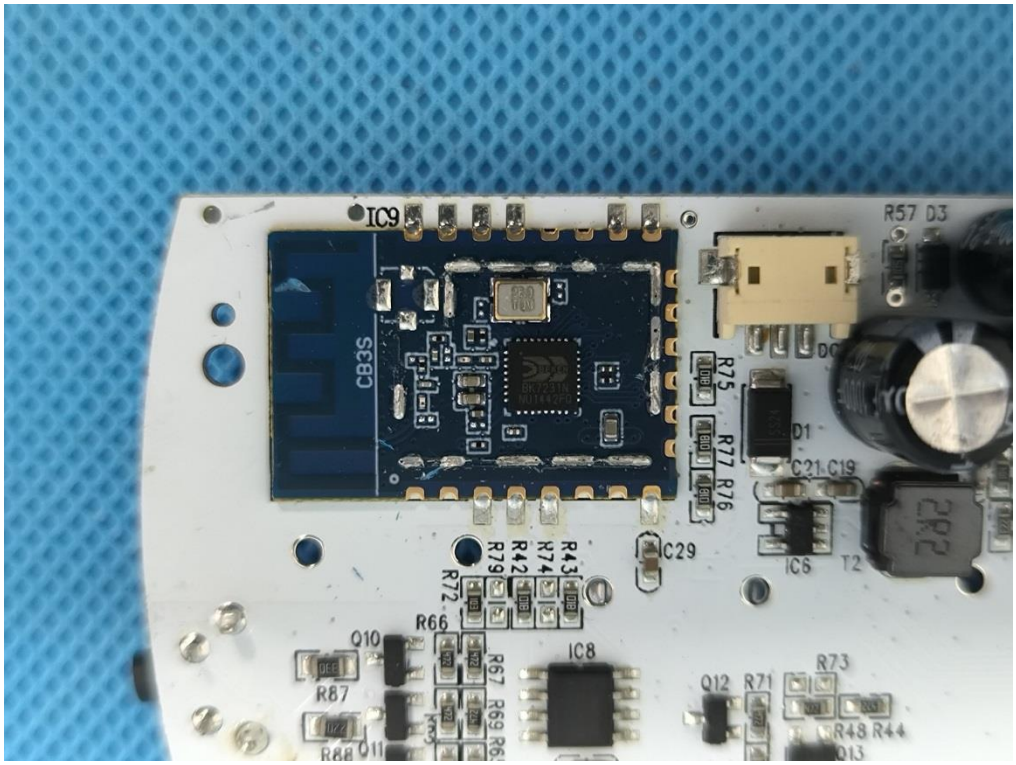

Internal view-7 of EUT



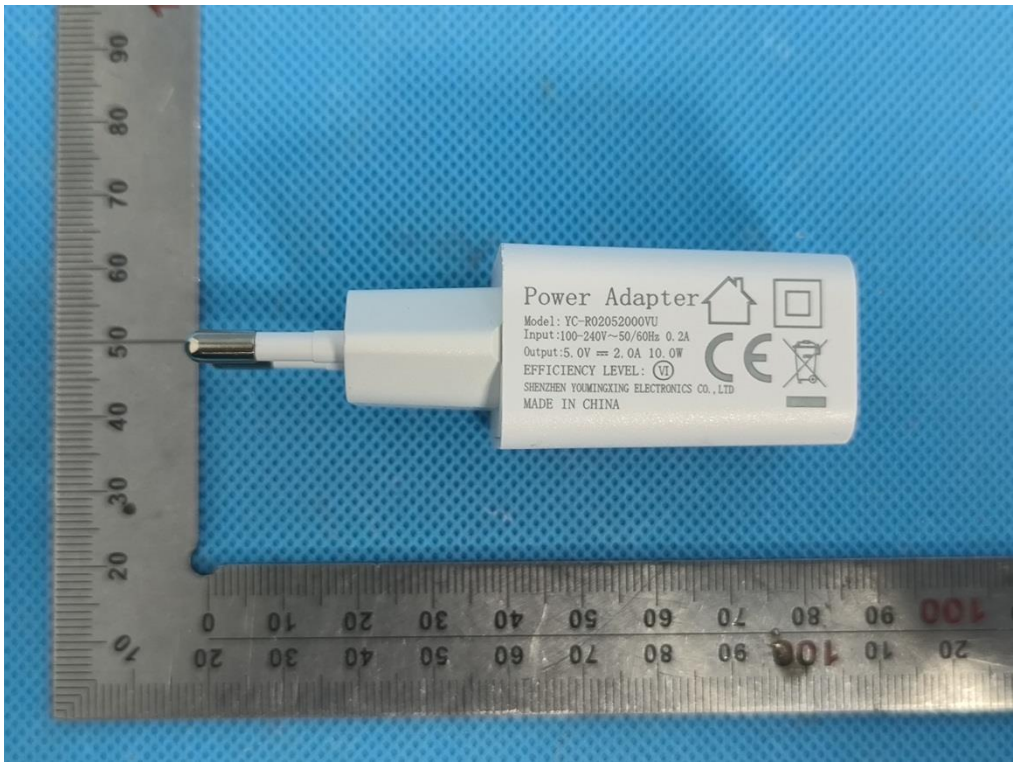
Internal view-8 of EUT



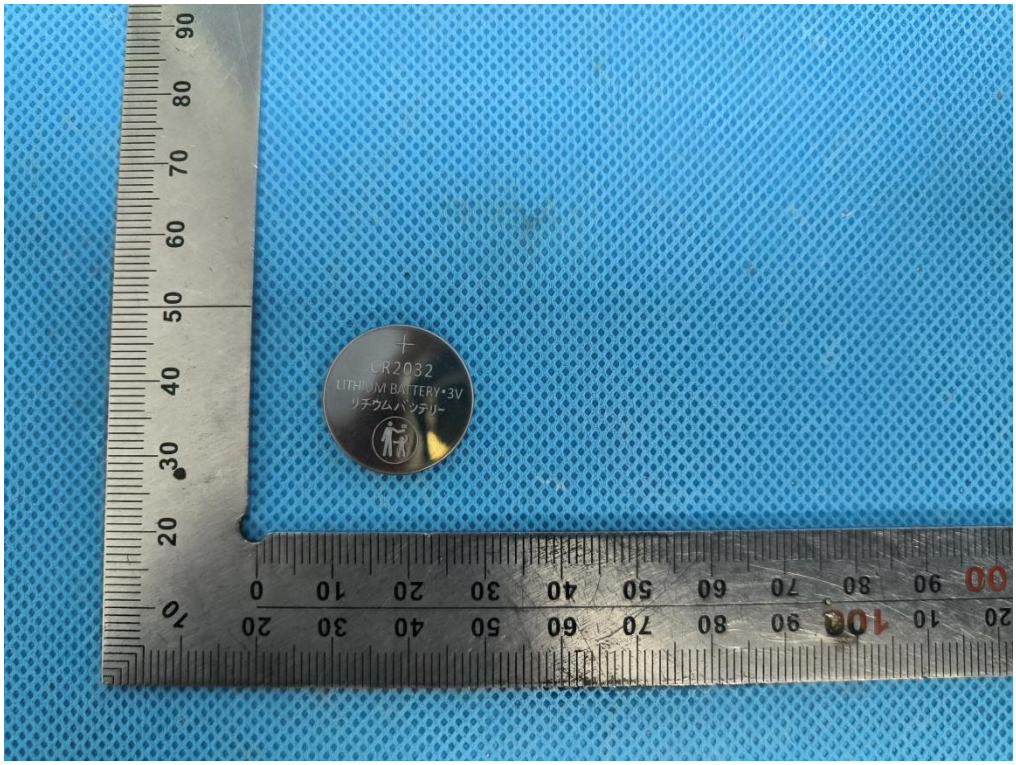

Internal view-9 of EUT




Internal view-10 of EUT




View of Adapter




View of Battery

**----End of Report----**

# Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

# Health Test Report

Report No.: AGC01110230937EH01

| | | |
|---|---|---|
| **PRODUCT DESIGNATION** | : | Wake-up Light |
| **BRAND NAME** | : | N/A |
| **MODEL NAME** | : | ACA-002, ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **APPLICANT** | : | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **DATE OF ISSUE** | : | Oct. 08, 2023 |
| **STANDARD(S)** | : | EN IEC 62311:2020<br>EN 50665:2017 |
| **REPORT VERSION** | : | V1.0 |

Attestation of Global Compliance (Shenzhen) Co., Ltd.

## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Oct. 08, 2023 | Valid | Initial release |

## TABLE OF CONTENTS

## 1. GENERAL INFORMATION

| | |
|---|---|
| **Applicant** | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **Address** | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| **Manufacturer** | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **Address** | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| **Factory** | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **Address** | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| **Product Designation** | Wake-up Light |
| **Brand Name** | N/A |
| **Test Model** | ACA-002 |
| **Series Model** | ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **Difference Description** | All the same except for the model name and appearance color. |
| **Date of receipt of test item** | Sep. 19, 2023 |
| **Date of test** | Sep. 19, 2023 to Oct. 08, 2023 |
| **Test Result** | Pass |

We (AGC), Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the European Standard EN IEC 62311:2020. The results of testing in this report apply to the product/system which was tested only.

| | | |
|---|---|---|
| Prepared By | Cool Cheng<br>(Project Engineer) | Oct. 08, 2023 |
| Reviewed By | Calvin Liu<br>(Reviewer) | Oct. 08, 2023 |
| Approved By | Max Zhang<br>(Authorized Officer) | Oct. 08, 2023 |

## 2. TECHNICAL INFORMATION

Note: the following data is based on the information by the applicant.

| | |
|---|---|
| **Product Designation** | Wake-up Light |
| **Brand Name** | N/A |
| **Test Model** | ACA-002 |
| **Hardware Version** | V2.0 |
| **Software Version** | V2.0 |
| **Operation Frequency** | 2412MHz-2472MHz |
| **Modulation type** | 802.11b: DQPSK, DBPSK, CCK<br>802.11g/n: 64-QAM, 16-QAM, QPSK, BPSK |
| **Antenna Type** | PCB Antenna |
| **Antenna gain** | 1.0 dBi |
| **Power Supply** | DC 5V by adapter |

**Note:** For more details, please refer to the user's manual of the EUT.

# 3. RF EXPOSURE MEASUREMENT

## 3.1 INTRODUCTION

This International Standard applies to electronic and electrical equipment for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.

This generic standard applies to electronic and electrical apparatus for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.

The frequency range covered is 0 Hz to 300 GHz.

The object of this generic standard is to provide assessment methods and criteria to evaluate such equipment against basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields and induced and contact current.

**NOTE**: This standard is intended to cover both intentional and non-intentional radiators. If the equipment complies with the requirements in another relevant standard, e.g. EN 62479 covering low power equipment, then the requirements of this standard (IEC 62311) are considered to be met and the application of this standard to that equipment is not necessary.

### 3.2 TEST LIMIT

According to EN IEC 62311:2020, the criteria listed in the following table shall be used toevaluate the environmental impact of human exposure to radio-frequency (RF) radiationas specified 1999/5/EC.

| Reference level for electric, magnetic and electromagnetic fields (0Hz to 300GHz, Unperturbed rms values) | | | | |
|---|---|---|---|---|
| Frequency Range | E-field Strength (V/m) | H-Field Strength (A/m) | B-Field (UT) | Equivalent plane Wave Power Density ($W/m^2$) |
| 0-1 Hz | -- | $3.2*10^4$ | $4*10^4$ | -- |
| 1-8 Hz | 10000 | $3.2*10^4/f^2$ | $4*10^4/f^2$ | -- |
| 8-25 Hz | 10000 | 4000/f | 5000/f | -- |
| 0.025-0.8 KHz | 250/f | 4/f | 5/f | -- |
| 0.8-3 KHz | 250/f | 5 | 6.25 | -- |
| 3-150 KHz | 87 | 5 | 6.25 | -- |
| 0.15-1 MHz | 87 | 0.73/f | 0.92/f | -- |
| 1-10 MHz | $87/f^{1/2}$ | 0.73/f | 0.92/f | -- |
| 10-400 MHz | 28 | 0.073 | 0.092 | 2 |
| 400-2000 MHz | $1.375\ f^{1/2}$ | $0.0037\ f^{1/2}$ | $0.0046\ f^{1/2}$ | f/200 |
| 2-300 GHz | 61 | 0.16 | 0.20 | 10 |

*Note:
1. f as indicated in the frequency range column.
2. Provided that basic restrictions are met and adverse indirect effects can be excluded, field strength values can be exceeded.
3. For frequencies between 100 kHz and 10 GHz, S, E2 , H2 and B2 are to be averaged over any 6-min period.
4. For peak values at frequencies up to 100 kHz see Table 4, note 3.
5. For peak values at frequencies exceeding 100 kHz see Figs.1 and 2. Between 100 KHz and 10MHz, peak values for the field strengths are obtained by interpolation from the 1.5-fold peak at 100 kHz to the 32-fold peak at 10 MHz. For frequencies exceeding 10 MHz it is suggested that the peak equivalent plane wave power density, as averaged over the pulse width, does not exceed 1,000 times the S restrictions, or that the field strength does not exceed 32 times the field strength exposure levels given in the table.
6. For frequencies exceeding 10 GHz, S, E2 , H2 and B2 are to be averaged over any 68/ f1.05 –min period (f in GHz).
7. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields, Electric shock from low impedance sources is prevented by established electrical safety procedures for such equipment

## 4. CLASSIFICATION OF THE ASSESSMENT METHODS

According to User manual, the antenna of the product is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. So, this product under normal use is located on electromagnetic far field between the human body.

Far Field Calculation Formula

$$E = \eta_0 H = \frac{\sqrt{30PG(\theta,\phi)}}{r}$$

G = antenna gain relative to an isotropic antenna
$\theta,\phi$ = elevation and azimuth angles to point of investigation
r = distance from observation point to the antenna
$\eta_0$ = Characteristic impedance of free space

The Pointing vector gives the power density:

$$S = E \times H = \frac{E^2}{\eta} = \frac{P}{4\pi r^2}$$

For the Simultaneous transmission may use below similar formular

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

## 5. EUT OPERATION CONDITION

Set the EUT to transmit at lowest, middle and highest channel individually at maximum power.

***Note:*** *only worst case recorded in the test report.*

## 6. TEST RESULT

| Operating Band | Frequency | Output Power | Antenna Gain (Linera) | Output Power | E-Field Strength | E-Field Limit | Result |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | (dBi) | W | V/m | V/m | Pass/Fail |
| 2.4GWIFI | 2442 | 16.90 | 1.26 | 0.049 | 6.800 | 61.00 | Pass |

**Note:**
1. The maximum output power refers to the project report number: **AGC01110230937ER02.**

## 7. CONCLUSION

Remark: EUT meets the basic requirements in the standard.

# Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

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6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

# RF Test Report

Report No.: AGC01110230937ER03

| | | |
|---|---|---|
| **PRODUCT DESIGNATION** | : | Wake-up Light |
| **BRAND NAME** | : | N/A |
| **TEST MODEL** | : | ACA-002, ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **APPLICANT** | : | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **DATE OF ISSUE** | : | Oct. 08, 2023 |
| **STANDARD(S)** | : | ETSI EN 303 345-1 V1.1.1(2019-06)<br>ETSI EN 303 345-3 V1.1.1(2021-06) |
| **REPORT VERSION** | : | V1.0 |

***A**ttestation of **G**lobal **C**ompliance (Shenzhen) Co., Ltd.*

## Report Revise Record

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Oct. 08, 2023 | Valid | Initial release |

## TABLE OF CONTENTS

## 1. VERIFICATION OF CONFORMITY

| | |
|---|---|
| **Applicant** | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **Address** | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| **Manufacturer** | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **Address** | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| **Factory** | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **Address** | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| **Product Designation** | Wake-up Light |
| **Brand Name** | N/A |
| **Test Model** | ACA-002 |
| **Series Model** | ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **Difference Description** | All the same except for the model name and appearance color. |
| **Date of receipt of test item** | Sep. 19, 2023 |
| **Date of test** | Sep. 19, 2023 to Oct. 08, 2023 |
| **Deviation** | None any deviation from the test method. |
| **Test Result** | Pass |
| Note: The test results of this report relate only to the tested sample identified in this report. | |

| | | |
|---|---|---|
| Prepared By | Cool Cheng<br>(Project Engineer) | Oct. 08, 2023 |
| Reviewed By | Calvin Liu<br>(Reviewer) | Oct. 08, 2023 |
| Approved By | Max Zhang<br>(Authorized Officer) | Oct. 08, 2023 |

# 2. TECHNICAL INFORMATION

## 2.1. EUT DESCRIPTION

Details of technical specification refer to the description in follows:

| | |
|---|---|
| **Hardware Version** | V2.0 |
| **Software Version** | V2.0 |
| **Modulation method** | Frequency modulation (FM) |
| **Frequency band** | VHF band II: 87.5 MHz to 108 MHz |
| **Antenna Type** | ☒Integral antenna ☐Built-in antenna ☐External antenna |
| **Power Supply** | DC 5V by adapter |

***NOTE:*** *For more information, please refer to User's Manual.*

## 2.2. OBJECTIVE

Perform Radio Spectrum tests for CE Marking according to the provisions of article 3.2 of the Radio Equipment Directive (2014/53/EU) for the broadcast sound receivers.

## 2.3. TEST SIGNAL CONFIGURATIONS

The generated FM signals (wanted and unwanted) and the blocking signal shall be in accordance with table The configuration is based on Recommendation ITU-R BS.641.

| **Parameter** | **FM signals** | | **AM signal** |
|---|---|---|---|
| | **Wanted** | **Unwanted** | **Blocking** |
| Audio modulation | 1 kHz tone | Weighted noise Recommendation ITU-R BS.559-2, clause 1, band limited to 15 kHz (See note 1) | 1 kHz tone |
| Other modulation parameters | ±60,8 kHz peak deviation | 15,9 kHz RMS deviation (See note 2) | 80 % depth |
| Pilot tone | None | None | None |
| Note 1: The filter shall have a cut-off frequency of 15 kHz and a minimum roll-off of 60 dB/octave.<br>Note 2: This is equivalent to a quasi-peak deviation of 34,8 kHz and has pre-emphasis enabled.<br>The quasi-peak level measurement is defined by Recommendation ITU-R BS.641, clause 5; with pre-emphasis disabled the quasi-peak deviation is 32 kHz (14,5 kHz RMS). | | | |

## 2.4. TEST ITEMS AND THE RESULTS

Test items and the results are as bellow:

| Basic Standard | Test Type | Result |
|---|---|---|
| EN 303 345-3 Clause 4.2 | Sensitivity | Pass |
| EN 303 345-3 Clause 4.3 | Adjacent channel selectivity and blocking | Pass |
| EN 303 345-3 Clause 4.4 | Unwanted emissions in the spurious domain | Pass |

## 2.5. DESCRIPTION OF TEST MODES

| NO. | TEST MODE DESCRIPTION |
|---|---|
| 1 | FM receiving mode at 98MHz |

## 2.6. ENVIRONMENTAL CONDITIONS

- Temperature: 15-35ºC
-Relative Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

## 3. TEST FACILITY

| | |
|---|---|
| Test Site: | Attestation of Global Compliance (Shenzhen) Co., Ltd. |
| Address: | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |

## 4. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by ISO.

- Uncertainty of Sensitivity, Uc = ±3.8dB
- Uncertainty of Adjacent channel selectivity and blocking, Uc = ±3.8dB

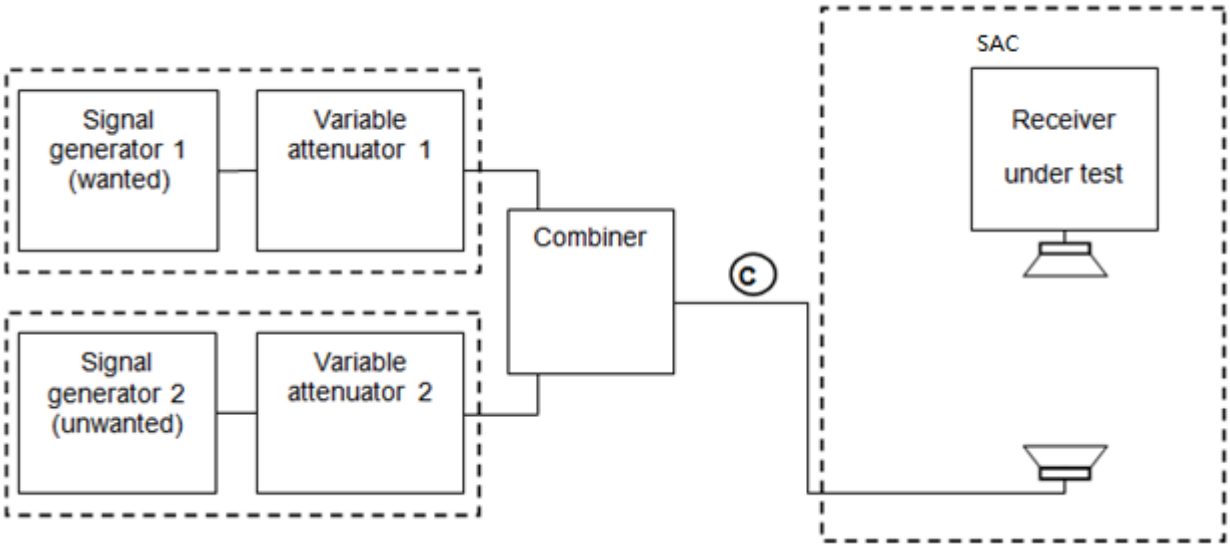
# 5. TECHNICAL REQUIREMENTS

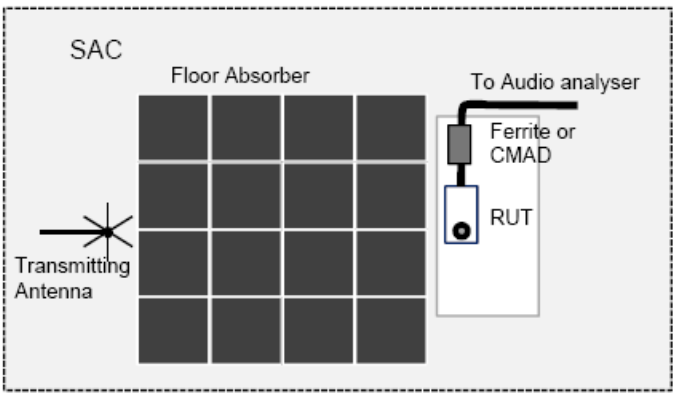
## 5.1 SENSITIVITY

### 5.1.1 MEASUREMENT EQUIPMENT USED:

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| MXG X-Series Vector Signal Generator | Agilent | N5182B | MY53050647 | Mar. 03, 2023 | Mar. 02, 2024 |
| MXG X-Series Vector Signal Generator | Agilent | N5182A | MY50140530 | Jun. 01, 2023 | May 31, 2024 |
| Audio Analyzer | R&S | UPV | 101349 | Jun. 02, 2023 | Jun. 01, 2025 |
| ANTENNA | SCHWARZBECK | VULB9168 | 494 | Jan. 05, 2023 | Jan. 04, 2025 |

### 5.1.2 TEST SETUP:



### 5.1.3 TEST LIMITS:

The limits for sensitivity specified in the table shall apply. Each figure quoted is the required level of wanted signal which provides a given level of audio quality. The audio impairment criteria relevant for these tests is that the audio SNR ⩾ 40 dBQ ref ±60,8 kHz deviation, and that there shall be 10 seconds of audio with no subjective impairments (e.g. clicks resulting from FM threshold effects).

**FM sensitivity requirements**

| De-modulation | Tuned frequency band | Wanted signal Centre frequency (MHz) | Required sensitivity limit | |
|---|---|---|---|---|
| | | | Conducted (dBm) | Radiated (dB μ V/m) |
| FM | VHF band II | 98 | -90 | 50 (see note) |
| NOTE: For products with an integral antenna, the requirement is relaxed to 67 dBμV/m. | | | | |

### 5.1.4 TEST PROCEDURE:

1. For radiated testing, the EUT is placed in semi anechoic chamber (SAC). The field strength generated by the signal generator applying to the EUT at 3 meters distance from the antenna is pre-calibrated before testing.

2. The 'unwanted' signal generator remains switched off for the duration of the test.

3. The 'wanted' signal generator is set to the required modulation method and test configuration as specified, and to the frequency specified. The signal level is adjusted to provide the level, as measured at ©, specified plus 30 dB.

4. The receiver (EUT) is tuned to the frequency of the 'wanted' signal generator. The audio level shall be set so as to provide clean 1 kHz audio tone at the audio output (that is less than 10 % total harmonic distortion) but of sufficient level to drive the measurement device.
5. The level of the 'wanted' signal generator is adjusted to provide the level, as measured at ©

6. The audio output, measured using the measurement device, is recorded as the signal level, S.

7. The modulating audio signal for the 'wanted' signal generator is removed. The audio output, measured using the measurement device, is recorded as the noise level, N.

8. If the impairment criteria given are met then the receiver has passed the test.

### 5.1.5 TEST RESULTS:

| FM VHF band II 98MHz (☒Integral antenna ☐Built-in antenna ☐External antenna) | | | | | |
|---|---|---|---|---|---|
| Wanted Signal Level at © (dBμV/m) | S (mV) | N (mV) | SNR (dBQ) | Limit (dBQ) | Result |
| 67 | 45.42 | 0.07 | 56.24 | ≥ 40 | Pass |

## 5.2 ADJACENT CHANNEL SELECTIVITY AND BLOCKING

### 5.2.1 MEASUREMENT EQUIPMENT USED:

Same as 5.1.1

### 5.2.2 TEST SETUP:

Same as 5.1.2

### 5.2.3 TEST LIMITS:

The limits for selectivity and blocking specified in the first table shall apply with the channel spacings given in the second table. Each figure quoted is the minimum acceptable level of unwanted signal, relative to that of the wanted signal, which provides a given level of audio quality. The audio impairment criteria relevant for these tests is that the audio SNR ⩾ 40 dBQ ref ±60,8 kHz deviation, and that there shall be 10 seconds of audio with no subjective impairments (e.g. clicks resulting from FM threshold effects).

**Channel spacing for adjacent channel selectivity and blocking**

| Demodulation | Tuned frequency band | Unwanted frequency (N = 2, 3, 4) | Unwanted frequency (blocking) |
|---|---|---|---|
| FM | VHF band II | ±N × 100 kHz | ±800 kHz |

**Adjacent channel selectivity and blocking requirements**

| Demodulation (see note 1) | Tuned frequency band | C Wanted signal centre frequency (MHz) | C Wanted signal level | | Required I/C ratio (see notes 2 and 3) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Conducted (dBm) | Radiated (dB μ V/m) | N = 2 (dB) | N = 3 (dB) | N = 4 (dB) | Blocking (dB) |
| FM (built-in or integral antenna) | VHF band II | 98 | n/a | 56 (see note 4) | -15 | -3 | 8 | 20 |
| FM (external antenna) | VHF band II | 98 | -84 | n/a | 3 | 17 | 30 | 30 |

NOTE 1: The ACS and blocking requirements are currently separated into different limits for radiated and conducted testing methods. These limits are likely to be unified in a future revision of the present document. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.
NOTE 2: The frequency of the interferer shall be calculated using the channel spacing data in table 3 for each of the 6 defined adjacent channels N = {-4, -3, -2, +2, +3, +4} and the two blocking offsets. Each row of table 4 thus defines 8 individual tests.
NOTE 3: The minimum level of I for the relevant level of impairment is calculated by adding the I/C ratio to the wanted C level.
NOTE 4: The wanted signal level for receivers with integral antenna is 73 dB μ V/m.

**5.2.4 TEST PROCEDURE:**

1. For radiated testing, the EUT is placed in semi anechoic chamber (SAC). The field strength generated by the signal generator applying to the EUT at 3 meters distance from the antenna is pre-calibrated before testing.

2. The 'wanted' signal generator is set to the required modulation method and test configuration as specified, and to the frequency specified. The signal level is adjusted to provide the level, as measured at ©, specified in above table, with the 'unwanted' generator switched off

3. The receiver (EUT) is tuned to the frequency of the 'wanted' signal generator. The audio level shall be set so as to provide clean 1 kHz audio tone at the audio output (that is less than 10 % total harmonic distortion) but of sufficient level to drive the measurement device.

4. The 'unwanted' signal generator is set to the required modulation method and test configuration as specified. and to the frequency calculated from the wanted signal centre frequency and the required offset specified in above Table. The signal level is adjusted to provide the level, as measured at ©, specified in above Table, with the 'wanted' generator switched off. For the blocking test only, the audio modulation of the 'unwanted' signal shall be removed whilst measuring the level at ©.

5. The 'wanted' signal generator is switched back on.

6. The audio output, measured using the measurement device, is recorded as the signal level, S.

7. The modulating audio signal for the 'wanted' signal generator is removed. The audio output, measured using the measurement device, is recorded as the noise level, N.

8. If the impairment criteria given are met then the receiver has passed the test.

**5.2.5 TEST RESULTS:**

| FM VHF band II 98MHz (☒Integral antenna ☐Built-in antenna ☐External antenna) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Adjacency and Blocking | C Wanted signal level at © (dBμV/m) | I Unwanted Signal Level at © (dBμV/m) | Required I/C ratio(dB) | S (mV) | N (mV) | SNR (dBQ) | Limit (dBQ) | Result |
| 97.8 MHz | 73 | 58 | -15 | 43.56 | 0.08 | 54.72 | ≥ 40 | Pass |
| 98.2 MHz | 73 | 58 | -15 | 43.56 | 0.08 | 54.72 | ≥ 40 | Pass |
| 97.7 MHz | 73 | 70 | -3 | 43.56 | 0.08 | 54.72 | ≥ 40 | Pass |
| 98.3 MHz | 73 | 70 | -3 | 43.56 | 0.08 | 54.72 | ≥ 40 | Pass |
| 97.6 MHz | 73 | 81 | 8 | 43.56 | 0.08 | 54.72 | ≥ 40 | Pass |
| 98.4 MHz | 73 | 81 | 8 | 43.56 | 0.08 | 54.72 | ≥ 40 | Pass |
| 97.2 MHz | 73 | 93 | 20 | 43.56 | 0.08 | 54.72 | ≥ 40 | Pass |
| 98.8 MHz | 73 | 93 | 20 | 43.56 | 0.08 | 54.72 | ≥ 40 | Pass |

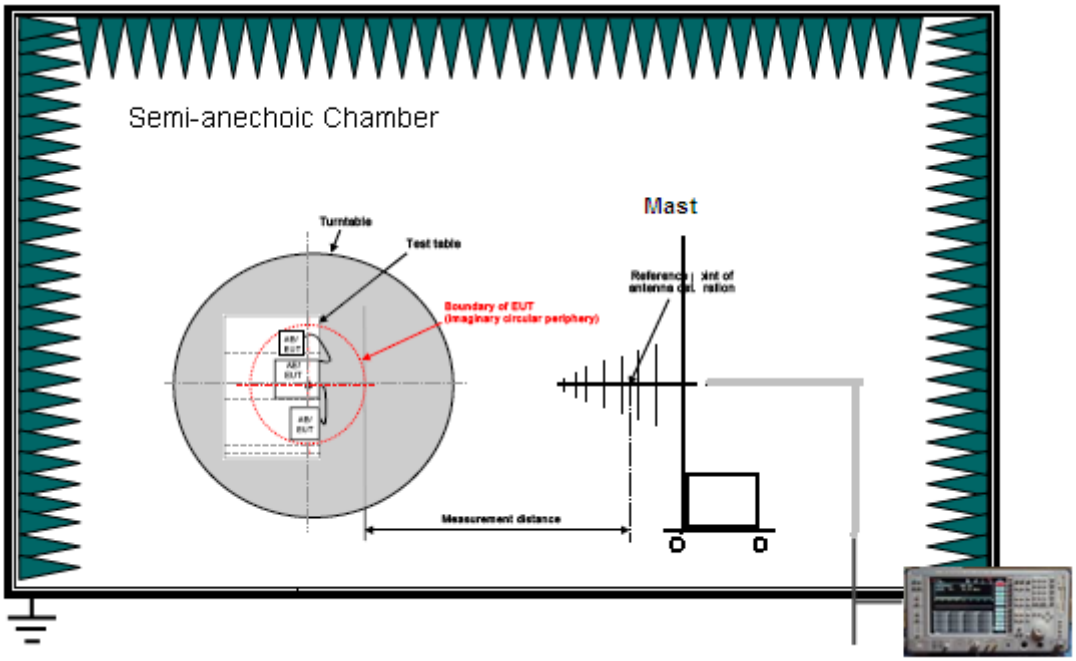
## 5.3 UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

### 5.3.1 MEASUREMENT EQUIPMENT USED:

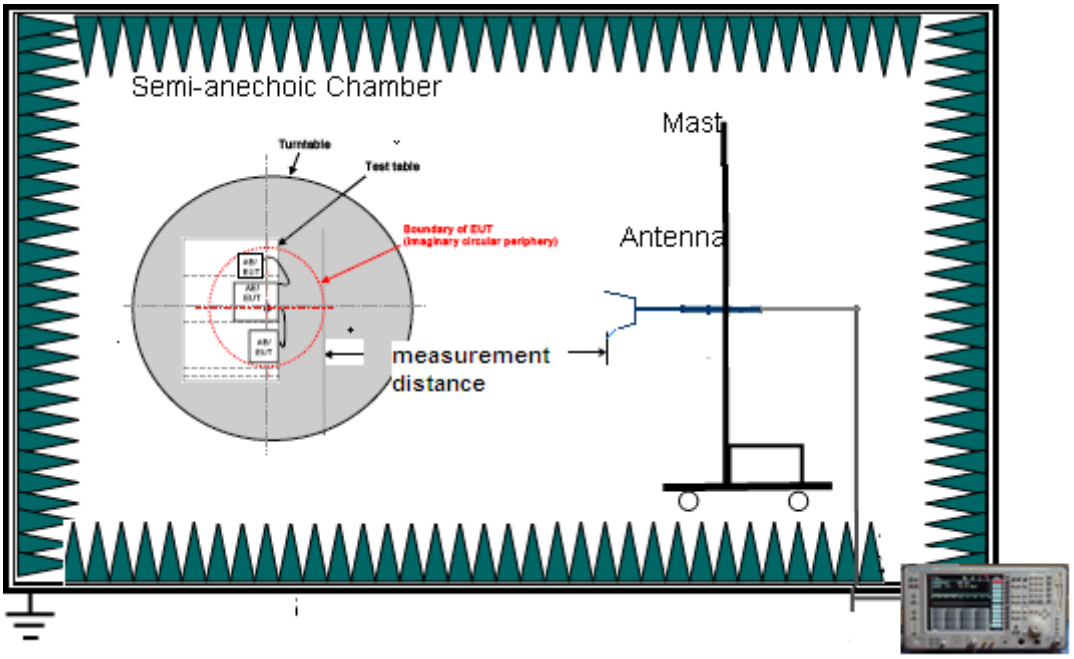
| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| TEST RECEIVER | R&S | ESCI | 10096 | Feb. 18, 2023 | Feb. 17, 2024 |
| EXA Signal Analyzer | Aglient | N9010A | MY53470504 | Jun. 01, 2023 | May 31, 2024 |
| Double-Ridged Waveguide Horn | ETS-LINDGREN | 3117 | 00034609 | Mar. 23, 2023 | Mar. 22, 2024 |
| ANTENNA | SCHWARZBECK | VULB9168 | 494 | Feb. 18, 2023 | Feb. 17, 2024 |

**5.3.2 TEST SETUP:**

Radiated emission below 1GHz




Radiated emission Above 1GHz



**5.3.3 TEST LIMITS:**

Limits for radiated emission 30MHz to 1 GHz at a measurement distance of 3 m

| Frequency range (MHz) | Class B limits dB(μV/m) |
|---|---|
| 30 to 230 | 40 |
| 230 to 1000 | 47 |

Limits for radiated emission above 1 GHz at a measurement distance of 3 m

| Frequency (MHz) | Class B limits dB(μV/m) | |
|---|---|---|
| | Peak | Average |
| 1000 to 3000 | 70 | 50 |
| 3000 to 6000 | 74 | 54 |

Limits for radiated emission from FM receivers at a measurement distance of 3 m

| Frequency (MHz) | Class B limits dB(μV/m) | |
|---|---|---|
| | Fundamental | Harmonics |
| 30 to 230 | 60 | 52 |
| 230 to 300 | | 52 |
| 300 to 1 000 | | 56 |
| Note: These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO. Signals at all other frequencies shall be compliant with the limits given in the above tables. | | |

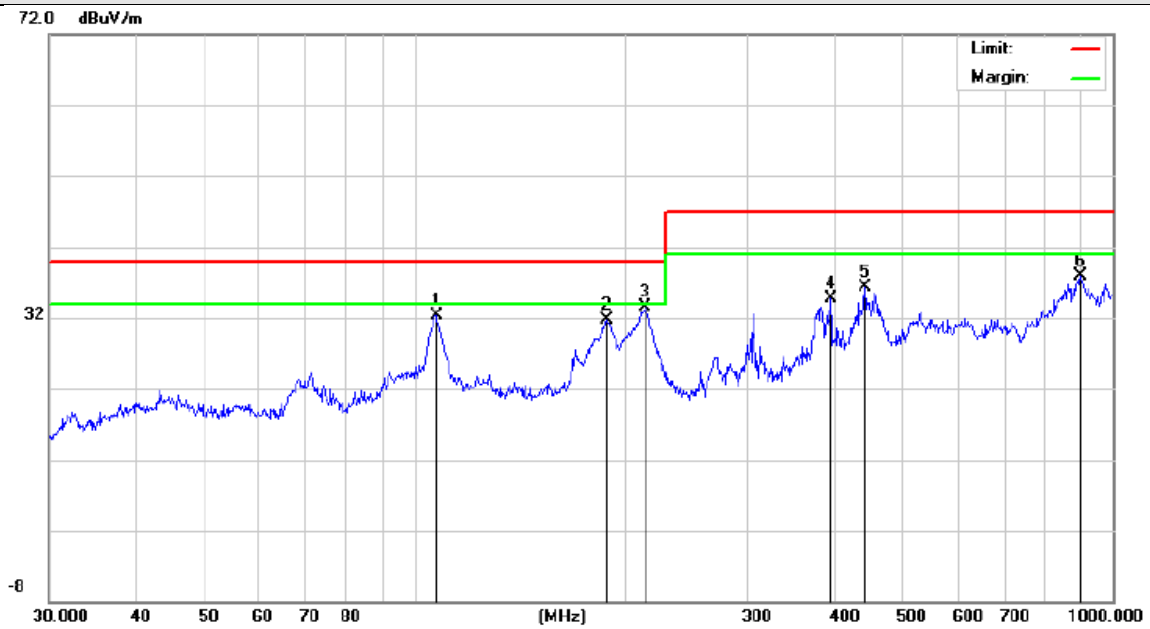
**5.3.4 TEST PROCEDURE:**

(1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10cm non-conductive covering to insulate the EUT from the ground plane.
(2) Support equipment, if needed, was placed as per EN 55032.
(3) All I/O cables were positioned to simulate typical actual usage as per EN 55032.
(4) The EUT was operated in the selected mode(s) while the ports are exercised in accordance with Clause 2.
(5) The antenna was placed at 3 meters away from the EUT as stated in EN 55032. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
(6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
(7) The test mode(s) were scanned during the test:
(8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

### 5.3.5 TEST RESULTS:

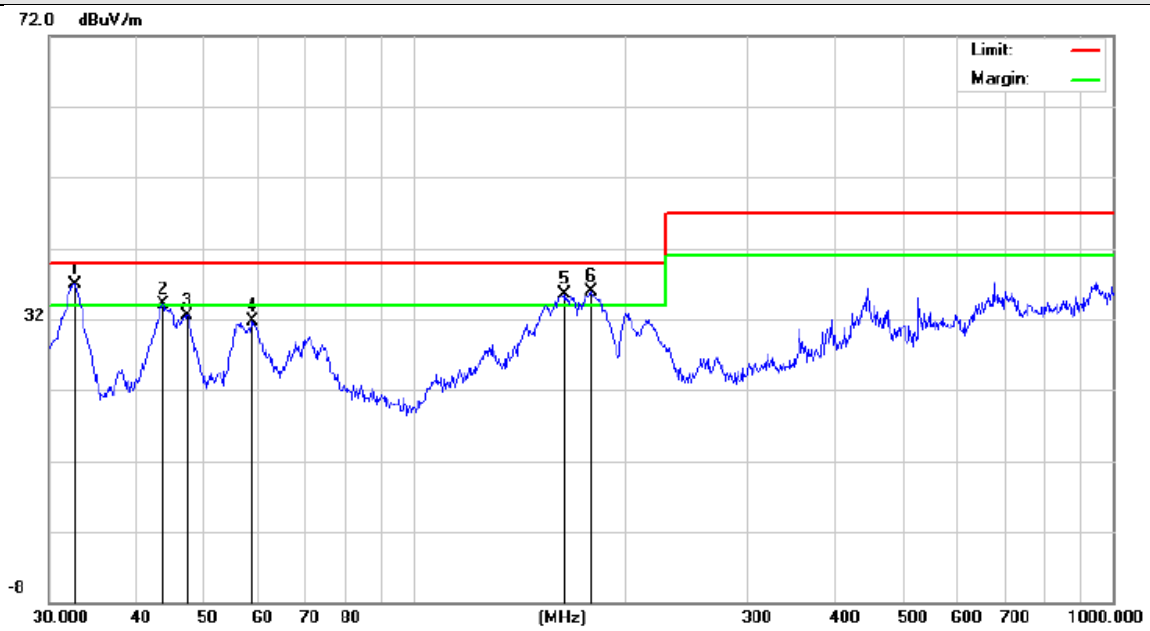
Test graph and data for Radiated Emission below 1GHz

Test Mode: Mode 1




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | | 107.5101 | 15.95 | 16.28 | 32.23 | 40.00 | -7.77 | peak |
| 2 | | 188.4125 | 18.51 | 13.17 | 31.68 | 40.00 | -8.32 | peak |
| 3 | * | 213.7634 | 19.08 | 14.43 | 33.51 | 40.00 | -6.49 | peak |
| 4 | | 394.8545 | 14.81 | 19.83 | 34.64 | 47.00 | -12.36 | peak |
| 5 | | 441.7426 | 11.20 | 25.04 | 36.24 | 47.00 | -10.76 | peak |
| 6 | | 900.1474 | 6.19 | 31.78 | 37.97 | 47.00 | -9.03 | peak |

| Test graph and data for Radiated Emission below 1GHz |
|---|
| Test Mode: Mode 1 |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | * | 32.6340 | 22.52 | 14.47 | 36.99 | 40.00 | -3.01 | peak |
| 2 | ! | 43.6584 | 17.07 | 16.94 | 34.01 | 40.00 | -5.99 | peak |
| 3 | | 47.3255 | 15.57 | 16.97 | 32.54 | 40.00 | -7.46 | peak |
| 4 | | 58.6126 | 14.69 | 17.09 | 31.78 | 40.00 | -8.22 | peak |
| 5 | ! | 164.3301 | 17.28 | 18.26 | 35.54 | 40.00 | -4.46 | peak |
| 6 | ! | 179.3863 | 17.37 | 18.49 | 35.86 | 40.00 | -4.14 | peak |

**Result: Pass**

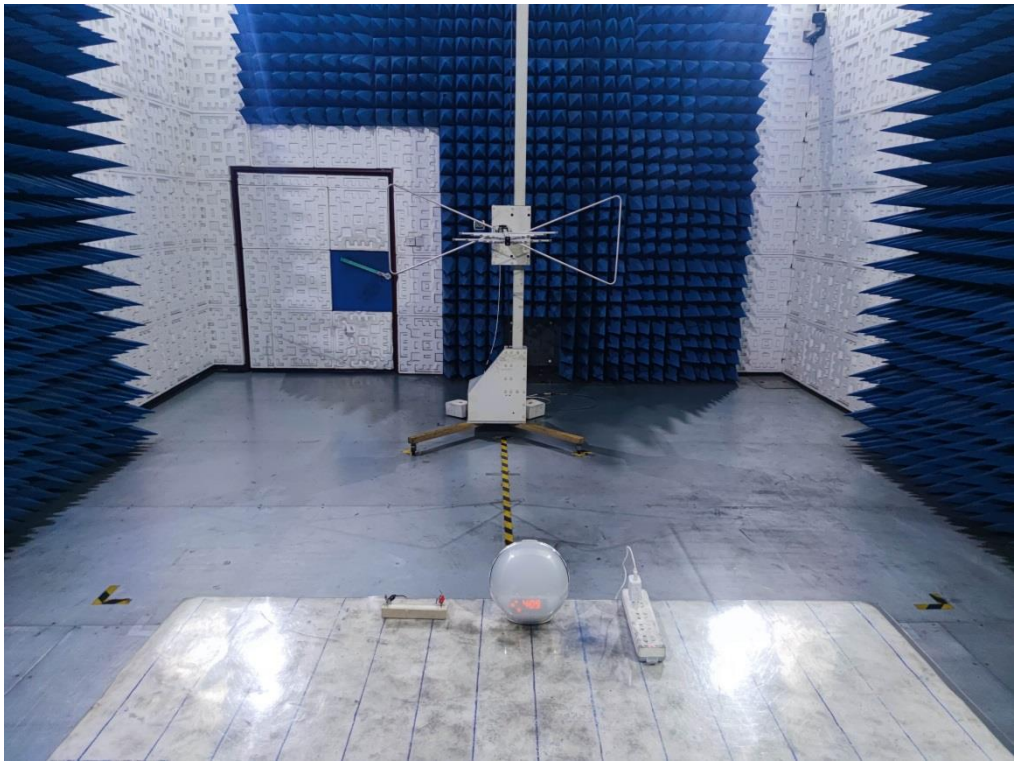
Note:

1. Margin = Limit – Level; Factor = Cable Loss + Antenna Factor.
2. The highest internal frequency of EUT is not more than 108MHz, so the highest measured frequency is 1GHz for radiated emission.

# APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Sensitivity, Adjacent channel selectivity and blocking

Radiated Emission below 1GHz



## APPENDIX B: PHOTOGRAPHS OF THE EUT

Refer to report of EUT photo (Report No.: AGC01110230937AP01).

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

# Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

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# RF Test Report

Report No.: AGC01110230937ER02

| | | |
|---|---|---|
| **PRODUCT DESIGNATION** | : | Wake-up Light |
| **BRAND NAME** | : | N/A |
| **MODEL NAME** | : | ACA-002, ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **APPLICANT** | : | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **DATE OF ISSUE** | : | Oct. 08, 2023 |
| **STANDARD(S)** | : | ETSI EN 300 328 V2.2.2 (2019-07) |
| **REPORT VERSION** | : | V1.0 |

Attestation of Global Compliance (Shenzhen) Co., Ltd

## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Oct. 08, 2023 | Valid | Initial release |

## TABLE OF CONTENTS

## 1. VERIFICATION OF CONFORMITY

| | |
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| **Applicant** | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **Address** | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| **Manufacturer** | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **Address** | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| **Factory** | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **Address** | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen, Guangdong, China |
| **Product Designation** | Wake-up Light |
| **Brand Name** | N/A |
| **Test Model** | ACA-002 |
| **Series Model** | ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **Difference Description** | All the same except for the model name and appearance color. |
| **Date of receipt of test item** | Sep. 19, 2023 |
| **Date of test** | Sep. 19, 2023 to Oct. 08, 2023 |
| **Deviation** | None |
| **Condition of Test Sample** | Normal |
| **Test Result** | Pass |
| **Report Template** | AGCRT-EC-Wi-Fi/RF |
| Note: The test results of this report relate only to the tested sample identified in this report. | |

| | | |
|---|---|---|
| Prepared By | Cool Cheng<br>(Project Engineer) | Oct. 08, 2023 |
| Reviewed By | Calvin Liu<br>(Reviewer) | Oct. 08, 2023 |
| Approved By | Max Zhang<br>(Authorized Officer) | Oct. 08, 2023 |

# 2. GENERAL INFORMATION

## 2.1. DESCRIPTION OF EUT

| | | |
|---|---|---|
| **Hardware Version** | V2.0 | |
| **Software Version** | V2.0 | |
| **The type of the equipment** | non-FHSS adaptive equipment with only one antenna | |
| **The maximum RF Output Power** | 16.90 dBm | |
| **Nominal Channel Bandwidth** | ☒20MHz ☐40MHz | |
| **Operating Frequency (WIFI)** | 2412MHz-2472MHz | |
| **Support Channels** | 13 Channels | |
| **Modulation (WIFI)** | 802.11b: DQPSK, DBPSK, CCK<br>802.11g/n: 64-QAM, 16-QAM, QPSK, BPSK | |
| **Antenna designation** | PCB Antenna | |
| **Antenna Gain** | 1.0 dBi | |
| **Power Supply** | DC 5V by adapter | |
| **Channels Frequency** | 01: 2412MHz<br>02: 2417MHz<br>03: 2422MHz<br>04: 2427MHz<br>05: 2432MHz<br>06: 2437MHz<br>07: 2442MHz | 08: 2447MHz<br>09: 2452MHz<br>10: 2457MHz<br>11: 2462MHz<br>12: 2467MHz<br>13: 2472MHz |

**Note:**

1. For 802.11b, 802.11g, 802.11n 20MHz bandwidth system use Channel 1 to Channel 13.
2. The above information was declared by the manufacturer.
3. The equipment submitted are representative production models.
4. The EUT is a stand-alone and portable equipment according to ETSI EN 300 328 V2.2.2.
5. For more details, please refer to the User's manual of the EUT.

## 2.2. SUPPORT EQUIPMENT

| Item | Equipment | Mfr/Brand | Model/Type No. | Remark |
|---|---|---|---|---|
| -- | -- | -- | -- | -- |

## 2.3. DESCRIPTION OF TEST MODES

| Test Mode | Description |
|---|---|
| 11b_TX _2412_1Mbps | 802.11b Transmitting mode (Channel: 2412, Rate: 1Mbps) |
| 11b_TX _2442_1Mbps | 802.11b Transmitting mode (Channel: 2442, Rate: 1Mbps) |
| 11b_TX _2472_1Mbps | 802.11b Transmitting mode (Channel: 2472, Rate: 1Mbps) |
| 11g_TX _2412_6Mbps | 802.11g Transmitting mode (Channel: 2412, Rate: 6Mbps) |
| 11g_TX _2442_6Mbps | 802.11g Transmitting mode (Channel: 2442, Rate: 6Mbps) |
| 11g_TX _2472_6Mbps | 802.11g Transmitting mode (Channel: 2472, Rate: 6Mbps) |
| 11n20_TX _2412_MCS0 | 802.11n20 Transmitting mode (Channel: 2412, Rate: MCS0) |
| 11n20_TX _2442_MCS0 | 802.11n20 Transmitting mode (Channel: 2442, Rate: MCS0) |
| 11n20_TX _2472_MCS0 | 802.11n20 Transmitting mode (Channel: 2472, Rate: MCS0) |
| 11b_RX _2412_1Mbps | 802.11b Receiving mode (Channel: 2412, Rate: 1Mbps) |
| 11b_RX _2472_1Mbps | 802.11b Receiving mode (Channel: 2472, Rate: 1Mbps) |
| 11g_RX _2412_6Mbps | 802.11g Receiving mode (Channel: 2412, Rate: 6Mbps) |
| 11g_RX _2472_6Mbps | 802.11g Receiving mode (Channel: 2472, Rate: 6Mbps) |
| 11n20_RX _2412_ MCS0 | 802.11n20 Receiving mode (Channel: 2412, Rate: MCS0) |
| 11n20_RX _2472_ MCS0 | 802.11n20 Receiving mode (Channel: 2472, Rate: MCS0) |
| Note: All modes have been tested and the worst mode test data recording in the test report, if no any other data. | |

## 2.4. OBJECTIVE

Perform Radio Spectrum tests for CE Marking according to the provisions of article 3.2 of the Radio Equipment Directive (2014/53/EU) for the Wi-Fi function of the EUT.

## 2.5. TEST ITEMS AND THE RESULTS

The EUT has been tested according to ETSI EN 300 328 V2.2.2(2019-07).

| | |
|---|---|
| **ETSI EN 300 328 V2.2.2 (2019-07)** | Wideband transmission systems;<br>Data transmission equipment operating in the 2,4 GHz band;<br>Harmonised Standard for access to radio spectrum |

Test items and the results are as bellow:

| No. | Basic Standard | Test Type | Result |
|---|---|---|---|
| 1 | ETSI EN 300 328 4.3.2.2 | RF Output Power | Pass |
| 2 | ETSI EN 300 328 4.3.2.3 | Power Spectral Density | Pass |
| 3 | ETSI EN 300 328 4.3.2.4 | Duty Cycle, Tx-sequence, Tx-gap | N/A |
| 4 | ETSI EN 300 328 4.3.2.5 | Medium Utilisation (MU) factor | N/A |
| 5 | ETSI EN 300 328 4.3.2.6 | Adaptivity | Pass |
| 6 | ETSI EN 300 328 4.3.2.7 | Occupied Channel Bandwidth | Pass |
| 7 | ETSI EN 300 328 4.3.2.8 | Transmitter unwanted emissions in the out-of-band domain | Pass |
| 8 | ETSI EN 300 328 4.3.2.9 | Transmitter unwanted emissions in the spurious domain | Pass |
| 9 | ETSI EN 300 328 4.3.2.10 | Receiver spurious emissions | Pass |
| 10 | ETSI EN 300 328 4.3.2.11 | Receiver Blocking | Pass |

**Note:** 1. N/A- Not Applicable.

2. The latest versions of basic standards are applied.

## 2.6. ENVIRONMENTAL CONDITIONS

- Temperature: 13-35ºC
- Relative Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

## 3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in Measurement” (GUM) published by ISO.

| Item | Measurement Uncertainty |
|---|---|
| Uncertainty of Radio Frequency | Uc=±1 x $10^{-7}$ |
| Uncertainty of total RF power, conducted | Uc = ±0.8dB |
| Uncertainty of RF power density, conducted | Uc = ±2.6dB |
| Uncertainty of spurious emissions, conducted | $U_c$ = ±2.7dB |
| Uncertainty of spurious emissions, radiated | $U_c$ = ±5.4dB |
| Uncertainty of Temperature | $U_c$ = 0.5°C |
| Uncertainty of Humidity | $U_c$ = ±1 % |
| Uncertainty of DC and low frequency voltages | $U_c$ = ±2 % |

## 4. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

| | |
|---|---|
| **Site** | Attestation of Global Compliance (Shenzhen) Co., Ltd. |
| **Location** | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |

### LIST OF EQUIPMENTS USED

| Description | Manufacturer | Model No. | S/N | Calibration Date | Calibration Due. |
|---|---|---|---|---|---|
| MXG X-Series Vector Signal Generator | Agilent | N5182B | MY53050647 | Mar. 03, 2023 | Mar. 02, 2024 |
| RF Analog Signal Generator | Aglient | N5171B | MY53050474 | Jun. 01, 2023 | May 31, 2024 |
| Signal Analyzer | Aglient | N9020A | MY52090123 | Jun. 03, 2023 | Jun. 02, 2024 |
| Signal Analyzer | Aglient | N9020A | MY49100060 | Jun. 01, 2023 | May 31, 2024 |
| USB Wideband Power Sensor | Aglient | U2021XA | MY54110007 | Jun. 03, 2023 | Jun. 02, 2024 |
| USB Wideband Power Sensor | Aglient | U2021XA | MY54110009 | Jun. 03, 2023 | Jun. 02, 2024 |
| USB Wideband Power Sensor | Aglient | U2021XA | MY541100B | Feb. 18, 2023 | Feb. 17, 2024 |
| Universal Radio Communication Tester | R&S | CMW270 | 101933 | Jun. 02, 2023 | Jun. 01, 2024 |
| Attenuator | Wariors | W13 | 11324 | Feb. 18, 2023 | Feb. 17, 2024 |
| Power spliter | Mini-Circuits | ZFRSC-183-s | 3122 | N/A | N/A |
| 2.4GHz Filter | EM Electronics | N/A | N/A | Mar. 18, 2022 | Mar. 19, 2024 |
| Small environment tester | ESPEC | SH-242 | 93008290 | Aug. 03, 2022 | Aug. 02, 2024 |
| Preamplifier Assembly | ETS | 3117PA | 00225134 | Sep. 01, 2022 | Sep. 02, 2024 |
| Wideband Antenna | SCHWARZBECK | VULB9168 | VULB9168-494 | Jan. 05, 2023 | Jan. 04, 2025 |
| Wideband Antenna | SCHWARZBECK | VULB9168 | D69250 | May 11, 2023 | May 10, 2025 |
| Double-Ridged Waveguide Horn | ETS | 3117 | 00154520 | Jun. 03, 2023 | Jun. 02, 2024 |
| Double-Ridged Waveguide Horn | ETS | 3117 | 00034609 | Mar. 23, 2023 | Mar. 22, 2024 |
| RF Cable | Harbour | FLCA-7312-80-10000S2 | FL0000169 | Nov. 11, 2022 | Nov. 10, 2024 |

# 5. ETSI EN 300 328 REQUIREMENTS

## 5.1. RF OUTPUT POWER

### 5.1.1 LIMIT

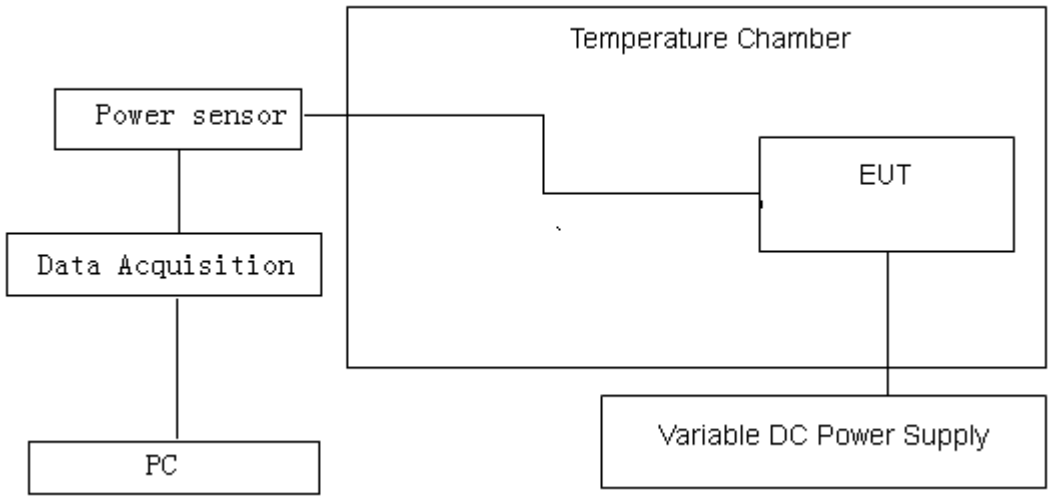
RF Output Power <= 100mW (20dBm) over Normal and Extreme conditions.

### 5.1.2 MEASUREMENT PROCEDURE

1) Use a fast power sensor and set the samples speed 1MS/s or faster.
2)Connect one power sensor to each transmit port, Trigger the power sensors so that they start sampling at the same time. For each instant in time, sum the power of the individual samples of all ports and store them. Use these stored samples in all following steps.
3) Find the start and stop times of each burst in the stored measurement samples.
4) Between the start and stop times of each individual burst calculate the RMS power over the burst. Save these P burst values, as well as the start and stop times for each burst.
5) The highest of all P burst values (Value “A” in dBm) will be used for maximum e.i.r.p calculations.
6)The cable loss and attenuator factor shall be considered to the value “A”.
6) Add the (stated) antenna assembly gain “G” in dBi of the individual antenna. If applicable, add the additional beamforming gain “Y” in dB.
7) The RF output power (P) shall be calculated using the formula: P=A+G+Y

### 5.1.3 TEST CONFIGURATION

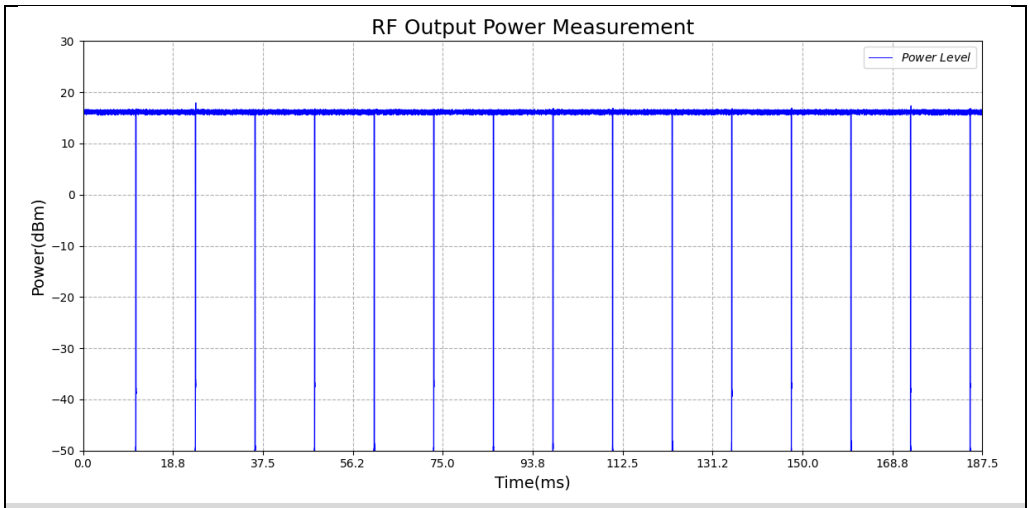
**Temperature and Voltage Measurement (under normal and extreme test conditions)**



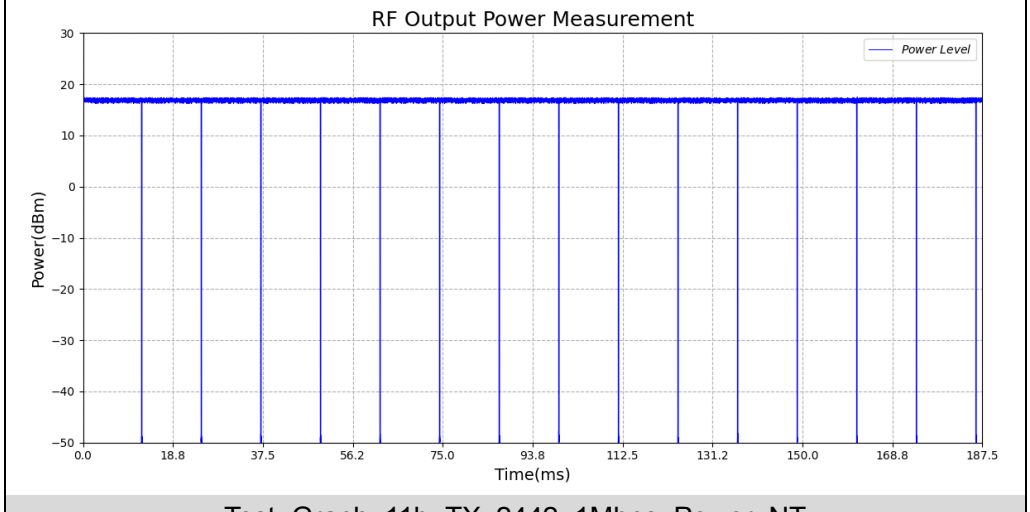
### 5.1.4 MEASUREMENT RESULTS

| Test Data of RF Output Power | | | | | |
|---|---|---|---|---|---|
| Test Mode | RF Output Power [dBm] | | | Limit [dBm] | Verdict |
| | NT | LT | HT | | |
| 11b_TX_2412_1Mbps | 16.16 | 16.11 | 16.08 | 20 | Pass |
| 11b_TX_2442_1Mbps | 16.90 | 16.80 | 16.76 | 20 | Pass |
| 11b_TX_2472_1Mbps | 16.73 | 16.71 | 16.71 | 20 | Pass |
| 11g_TX_2412_6Mbps | 15.45 | 15.40 | 15.39 | 20 | Pass |
| 11g_TX_2442_6Mbps | 16.51 | 16.47 | 16.48 | 20 | Pass |
| 11g_TX_2472_6Mbps | 16.52 | 16.50 | 16.51 | 20 | Pass |
| 11n20_TX_2412_MCS0 | 15.44 | 15.35 | 15.28 | 20 | Pass |
| 11n20_TX_2442_MCS0 | 16.69 | 16.67 | 16.69 | 20 | Pass |
| 11n20_TX_2472_MCS0 | 16.24 | 16.20 | 16.18 | 20 | Pass |

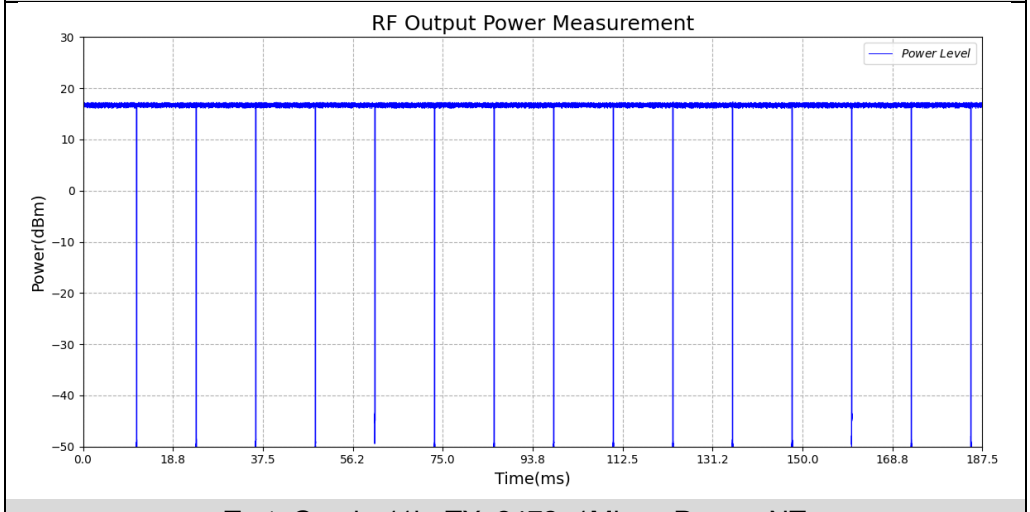
## Test Graphs of RF Output Power



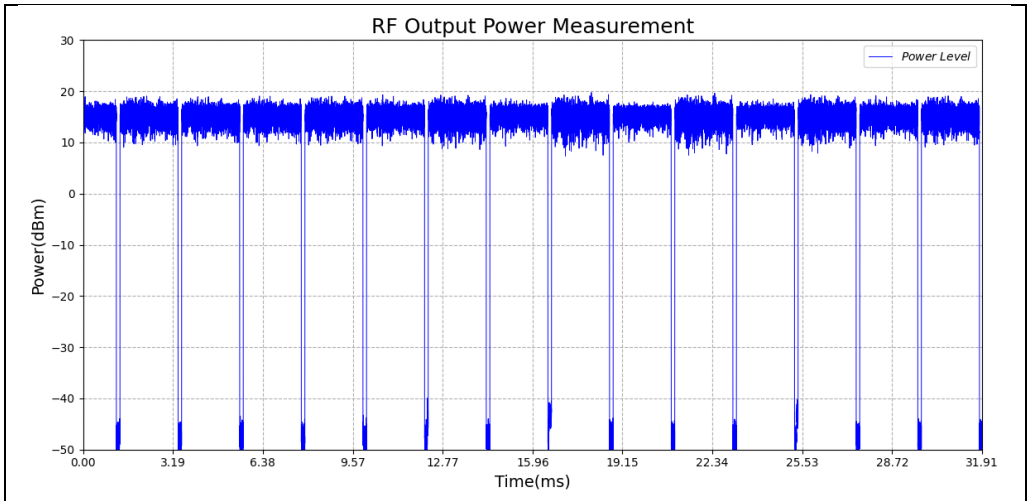

Test_Graph_11b_TX_2412_1Mbps_Power_NT



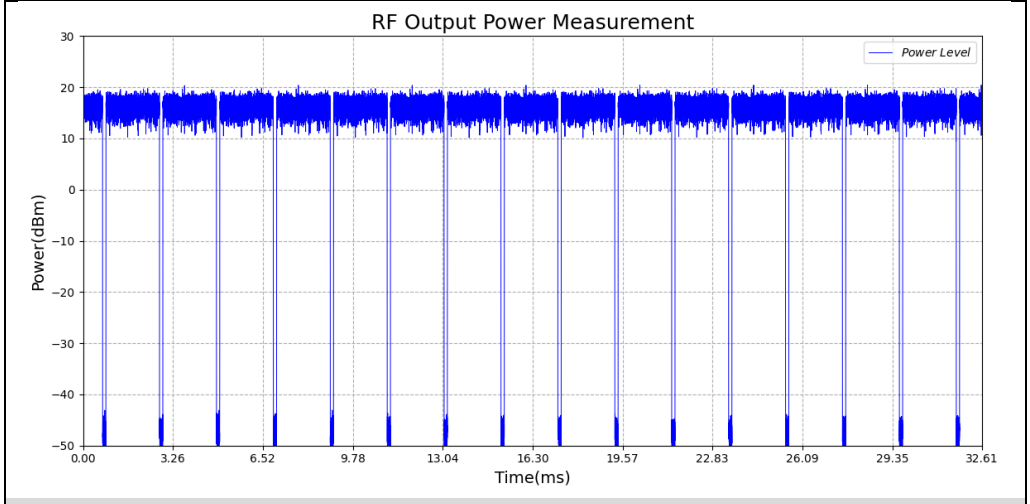

Test_Graph_11b_TX_2442_1Mbps_Power_NT



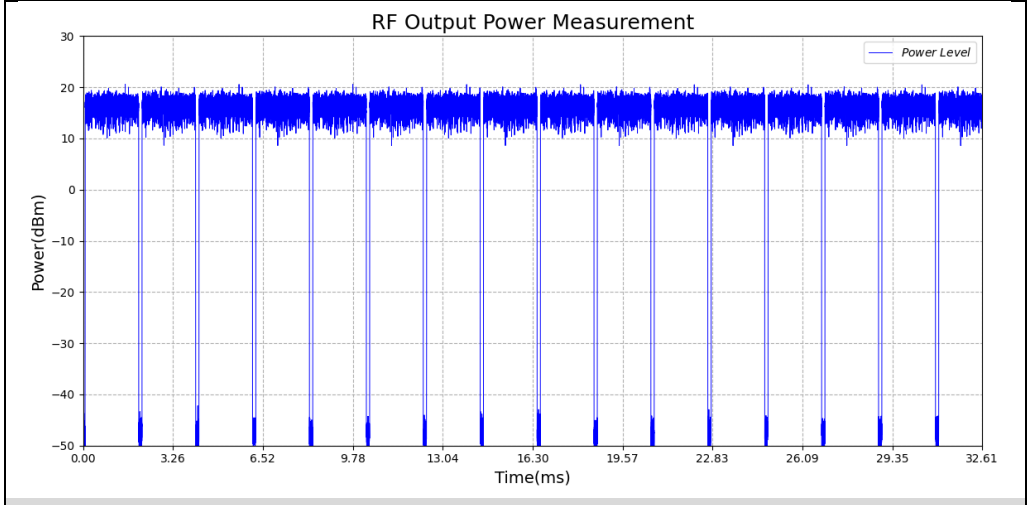

Test_Graph_11b_TX_2472_1Mbps_Power_NT



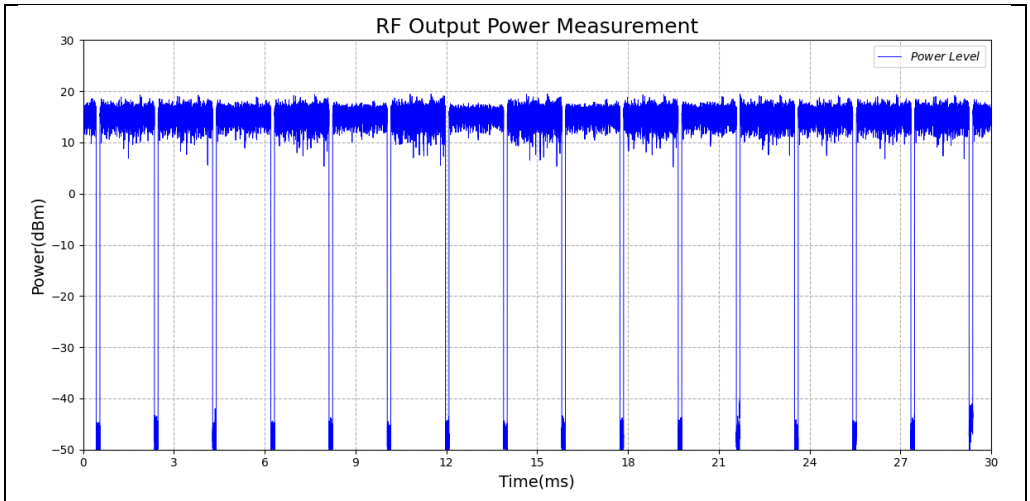

Test_Graph_11g_TX_2412_6Mbps_Power_NT



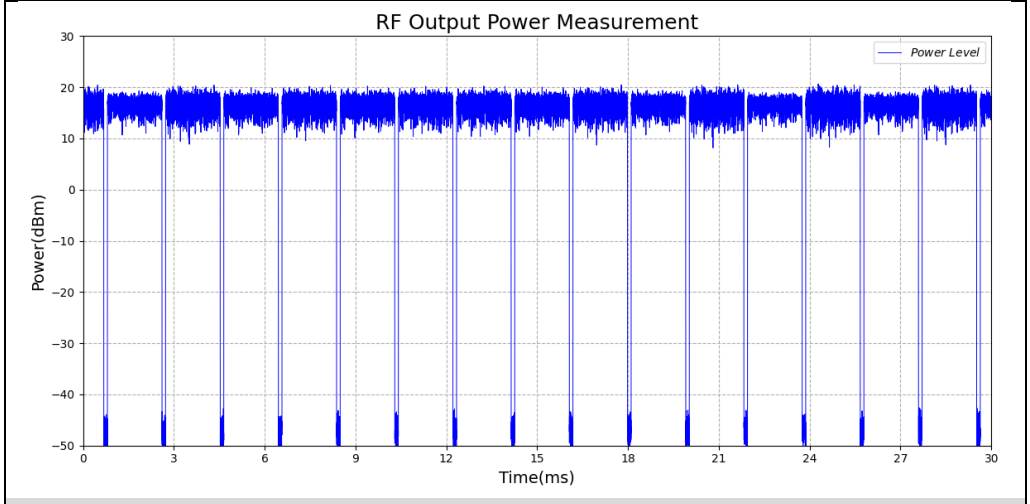

Test_Graph_11g_TX_2442_6Mbps_Power_NT



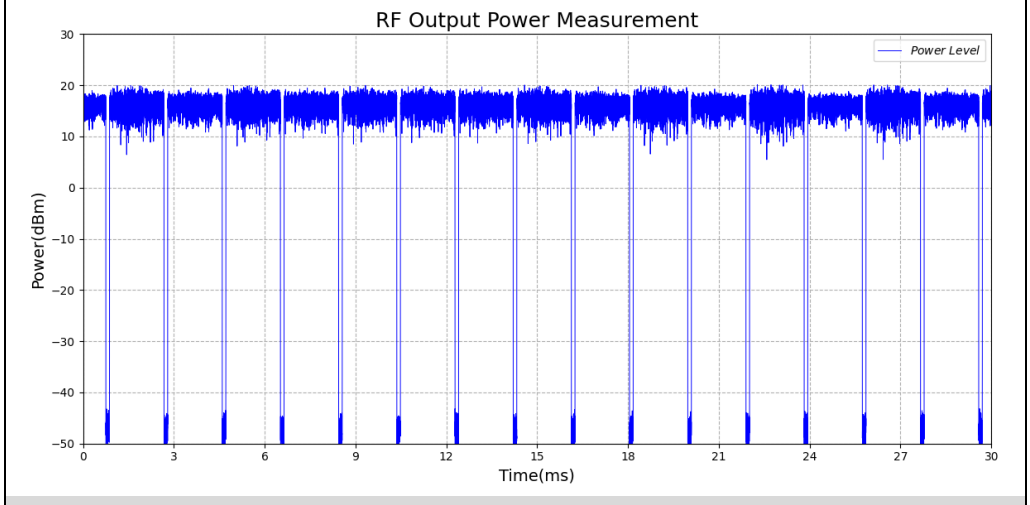

Test_Graph_11g_TX_2472_6Mbps_Power_NT




Test_Graph_11n20_TX_2412_MCS0_Power_NT




Test_Graph_11n20_TX_2442_MCS0_Power_NT




Test_Graph_11n20_TX_2472_MCS0_Power_NT

Note: Only the data of worst case is reported as above.

## 5.2. POWER SPECTRAL DENSITY

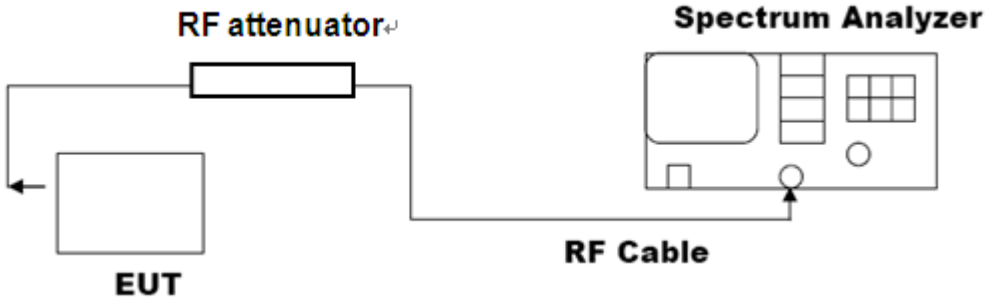
### 5.2.1 LIMIT

For non-adaptive equipment using wide band modulations other than FHSS, the maximum Power spectral density is limited to 10mW Per MHz

### 5.2.2 TEST PROCEDURE

1) Set the frequency from 2400MHz to 2483.5MHz, use 10kHz RBW and 30kHz VBW for pre-scan. The number of sweep points shall be more than 8350.Wait for the trace to be completed and save the (trace) data set to a file.
2) Add up the values for amplitude (power) for all the samples in the file.
3) Normalize the individual values for amplitude so that the sum is equal to the RF Output Power (e.i.r.p) measured in 5.1.
4)Starting from the first sample in the file (lowest frequency), add up the power of the following samples representing a 1MHz segment and record the results for power and position (i.e. sample #1 to #100). This is the Power Spectral Density (e.i.r.p) for the first 1MHz segment which shall be recorded.
5) Shift the start point of the samples added up in step 5 by 1 sample and repeat the procedure in step 4(i.e. sample #2 to #101).
6) Repeat step 5 until the end of the data set and record the radiated power spectral Density values for each of the 1MHz segments.
7) The cable loss and attenuator factor shall be considered to the test result.
8) The highest value shall be recorded in the test report.

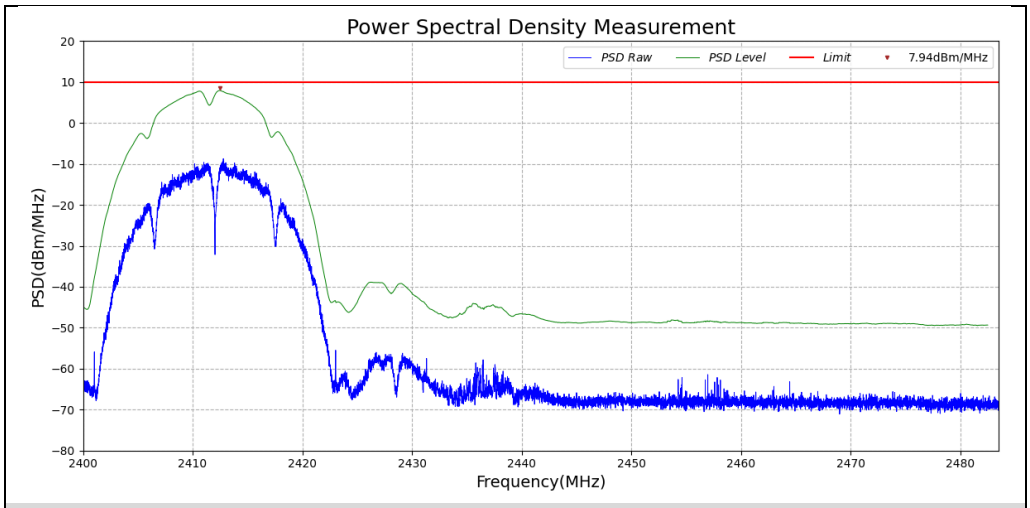
### 5.2.3 TEST CONFIGURATION



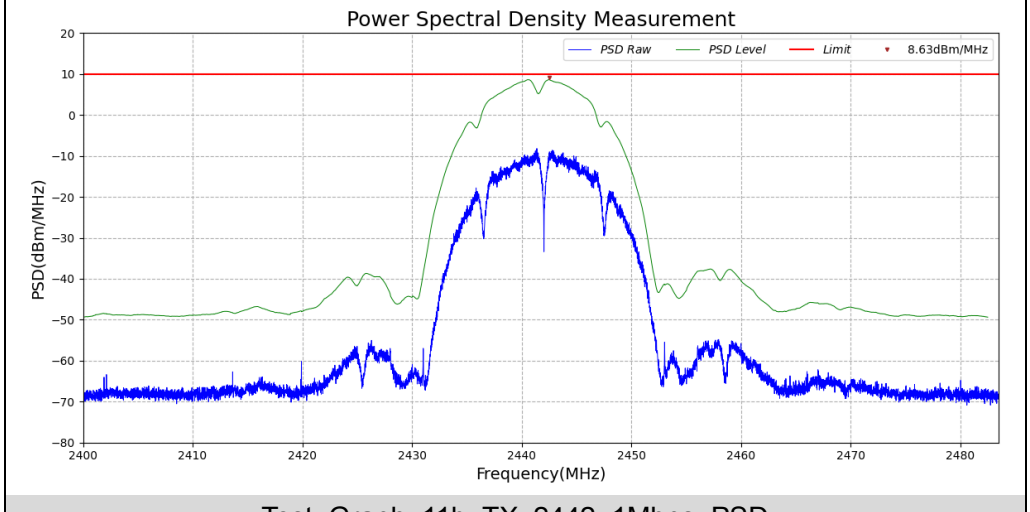
### 5.2.4 TEST RESULTS

| Test Data of Power Spectral Density | | | |
|---|---|---|---|
| Test Mode | Power Spectral Density [dBm/MHz] | Limit [dBm/MHz] | Verdict |
| 11b_TX_2412_1Mbps | 7.94 | 10 | Pass |
| 11b_TX_2442_1Mbps | 8.63 | 10 | Pass |
| 11b_TX_2472_1Mbps | 8.45 | 10 | Pass |
| 11g_TX_2412_6Mbps | 3.83 | 10 | Pass |
| 11g_TX_2442_6Mbps | 4.95 | 10 | Pass |
| 11g_TX_2472_6Mbps | 4.91 | 10 | Pass |
| 11n20_TX_2412_MCS0 | 3.55 | 10 | Pass |
| 11n20_TX_2442_MCS0 | 4.93 | 10 | Pass |
| 11n20_TX_2472_MCS0 | 4.39 | 10 | Pass |

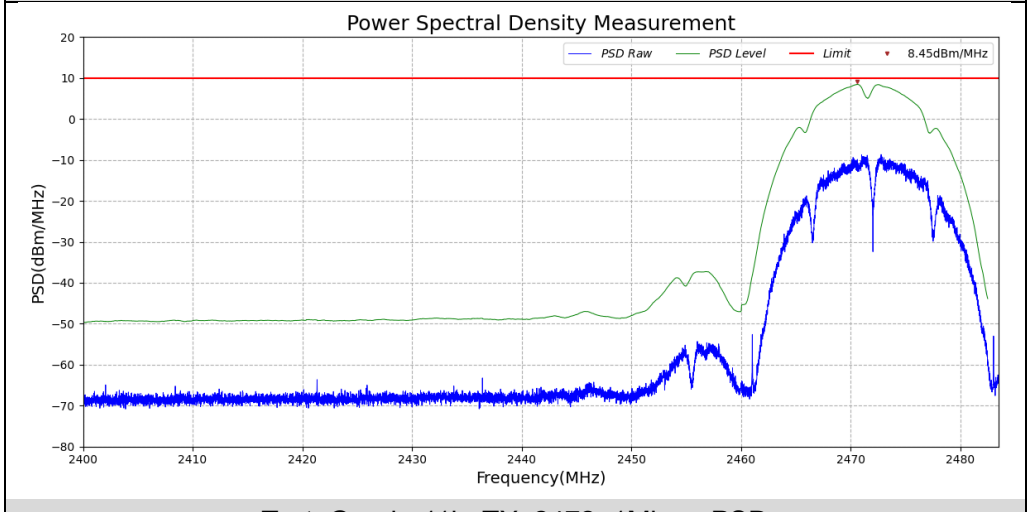
## Test Graphs of Power Spectral Density



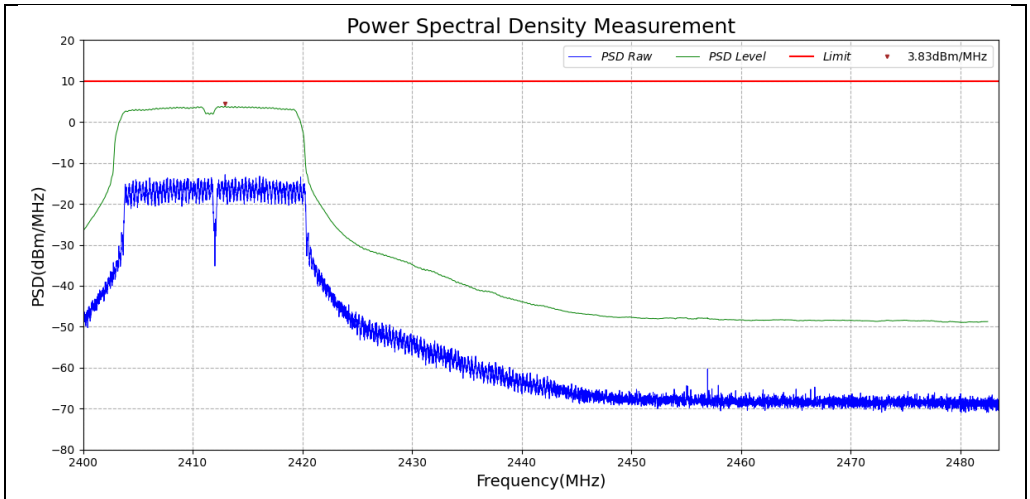

Test_Graph_11b_TX_2412_1Mbps_PSD



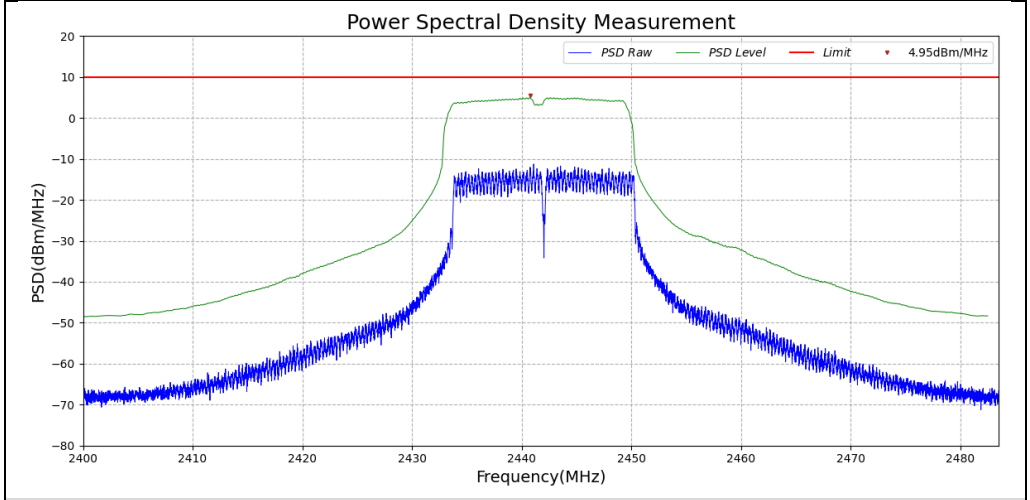

Test_Graph_11b_TX_2442_1Mbps_PSD



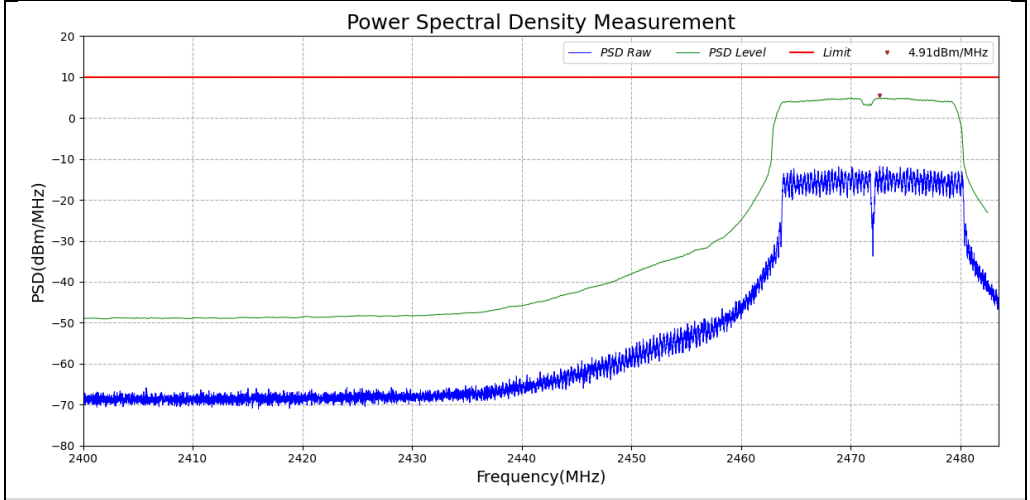

Test_Graph_11b_TX_2472_1Mbps_PSD



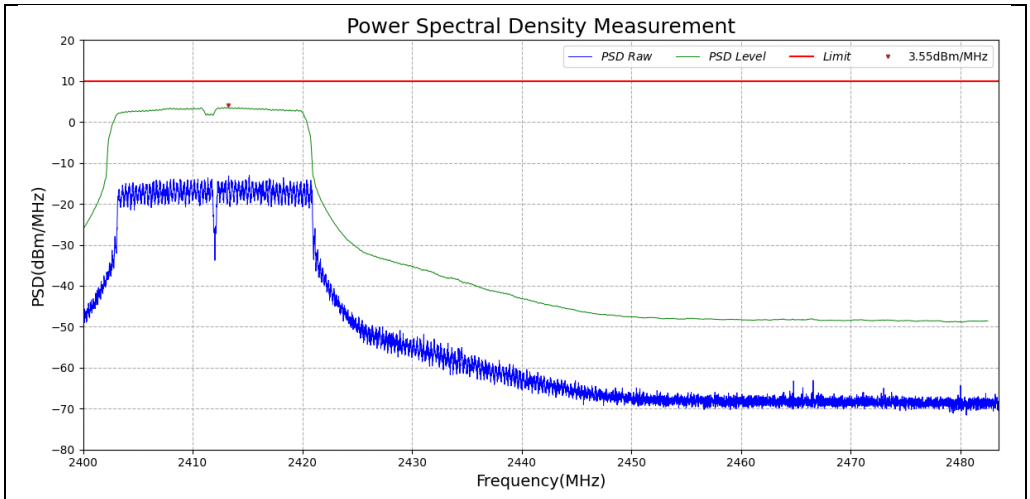

Test_Graph_11g_TX_2412_6Mbps_PSD



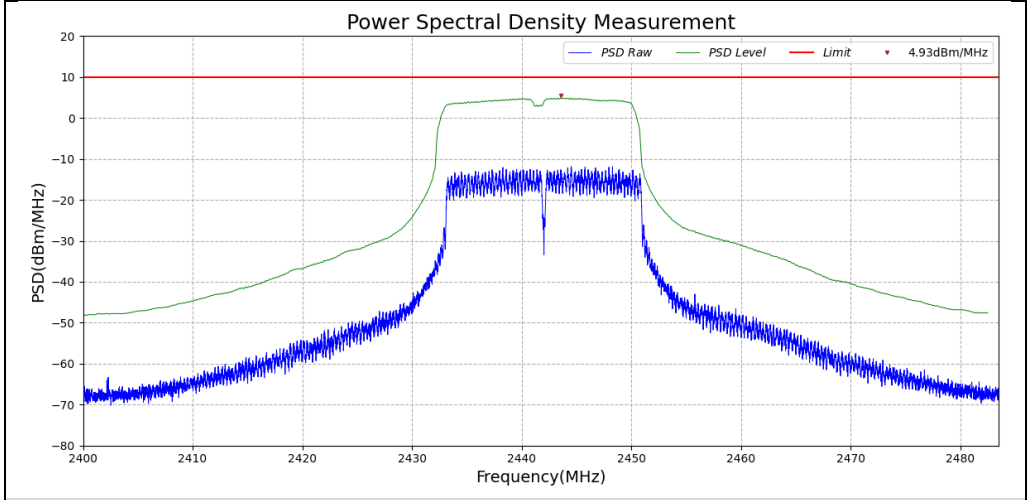

Test_Graph_11g_TX_2442_6Mbps_PSD



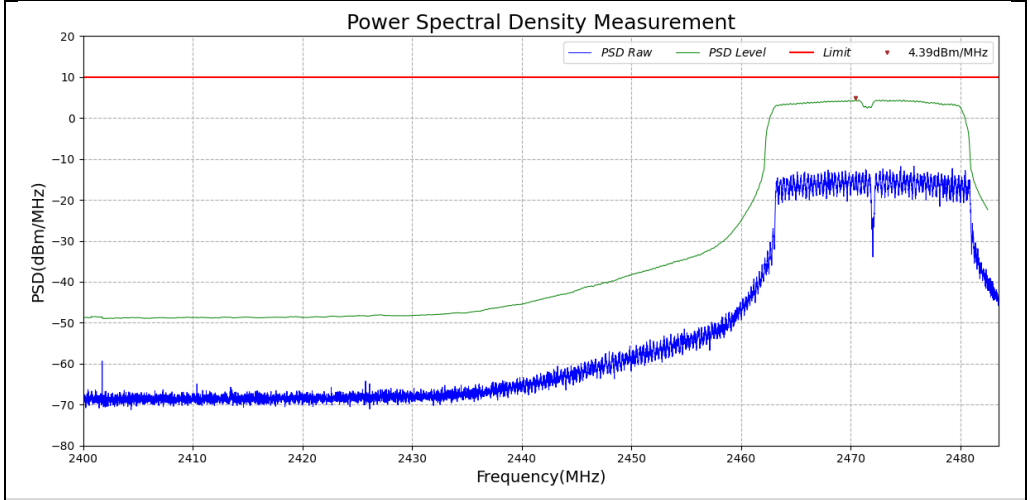

Test_Graph_11g_TX_2472_6Mbps_PSD




Test_Graph_11n20_TX_2412_MCS0_PSD




Test_Graph_11n20_TX_2442_MCS0_PSD




Test_Graph_11n20_TX_2472_MCS0_PSD

### 5.3. ADAPTIVITY

The method of adaptivity is using LBT based on LBE.

#### 5.3.1 LIMIT

The Channel Occupancy Time shall be less than 13ms.

If implemented, Short Control Signalling Transmissions of adaptive equipment using wide band modulations other than FHSS shall have a maximum duty cycle of 10 % within an observation period of 50 ms.

For power levels less than 20 dBm e.i.r.p., the CCA threshold level (TL) may be relaxed to:

TL = -70 dBm/MHz + 10 × log10 (100 mW / Pout) (Pout in mW e.i.r.p.)

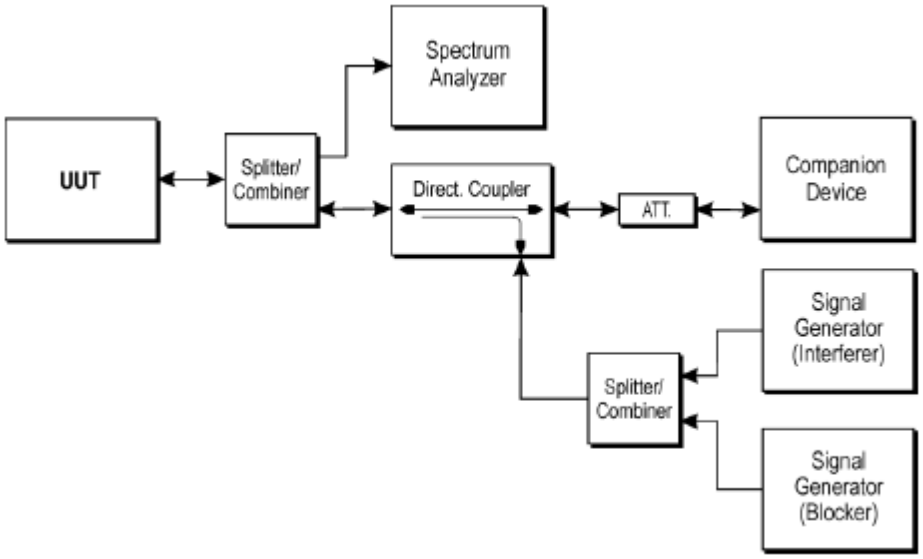
An unwanted CW signal as defined in the below table.

| Wanted signal mean power from companion device | Unwanted signal frequency (MHz) | Unwanted signal power (dBm) |
|---|---|---|
| sufficient to maintain the link (see note 2) | 2 395 or 2 488,5 (see note 1) | -35 (see note 3) |
| NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1. | | |
| NOTE 2: A typical conducted value which can be used in most cases is -50 dBm/MHz. | | |
| NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna. | | |

#### 5.3.2 TEST PROCEDURE

1) The EUT connect to a companion device during the test. Adjust the received signal level at the EuT to the value of -50dBm/MHz.
2) the analyzer shall be set as below: RBW>=Occupied Channel Bandwidth (if the analyser does not support this setting, the highest available setting shall be used) and VBW>=3×RBW.
3) Configure the EUT for normal transmission with a sufficiently high payload to allow demonstration of compliance of the adaptive mechanism on the channel being tested.
4) Adding the interference signal and verification of reaction to the interference signal.
5) Adding the unwanted signal and verification of reaction to the unwanted signal.
6) Removing the interference and unwanted signal.

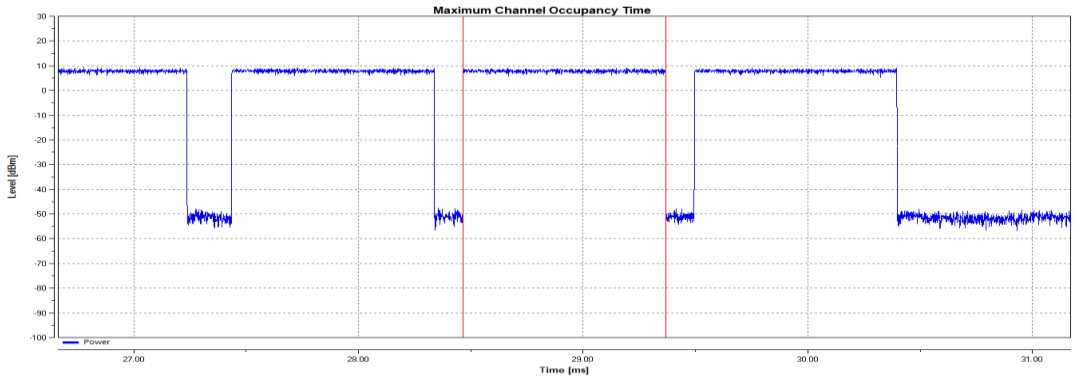
### 5.3.3 TEST CONFIGURATION

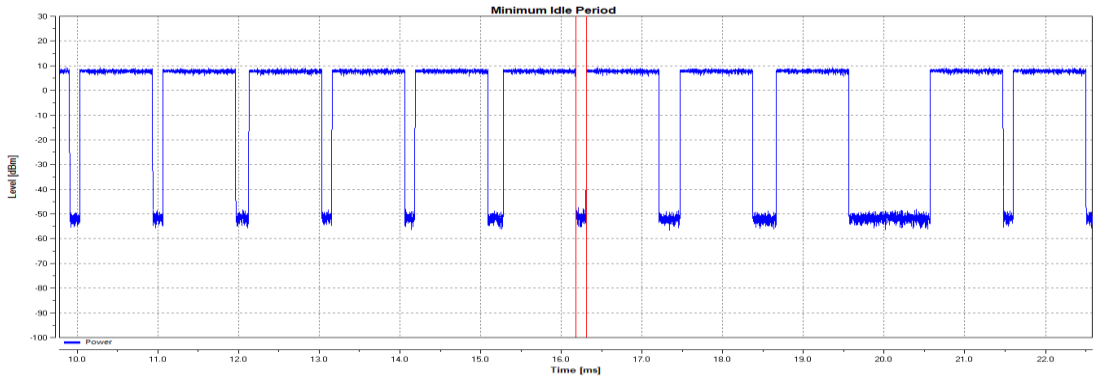


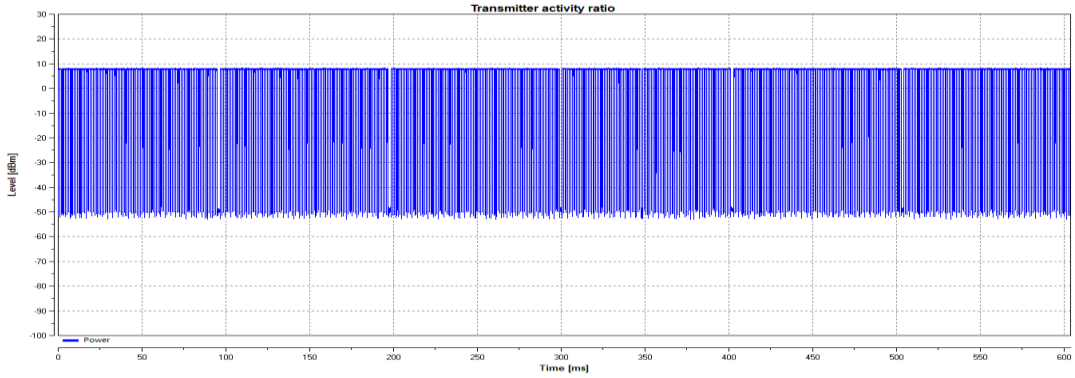
### 5.3.4 TEST RESULTS

| IEEE802.11 b Low Channel | |
|---|---|
| **Threshold Level (dBm/MHz)** | -66.16 |
| **Blocking Interference Level (dBm)** | -33 |
| **Max COT Time (ms)** | 0.901 |
| **Minimum Idle Time (ms)** | 0.128 |
| **Duty Cycle (%) after adding the interference signal 50ms** | 0.00 |
| **Duty Cycle (%) after adding the blocking signal with the interfering signal 50ms** | 0.00 |
| **Verdict** | Pass |

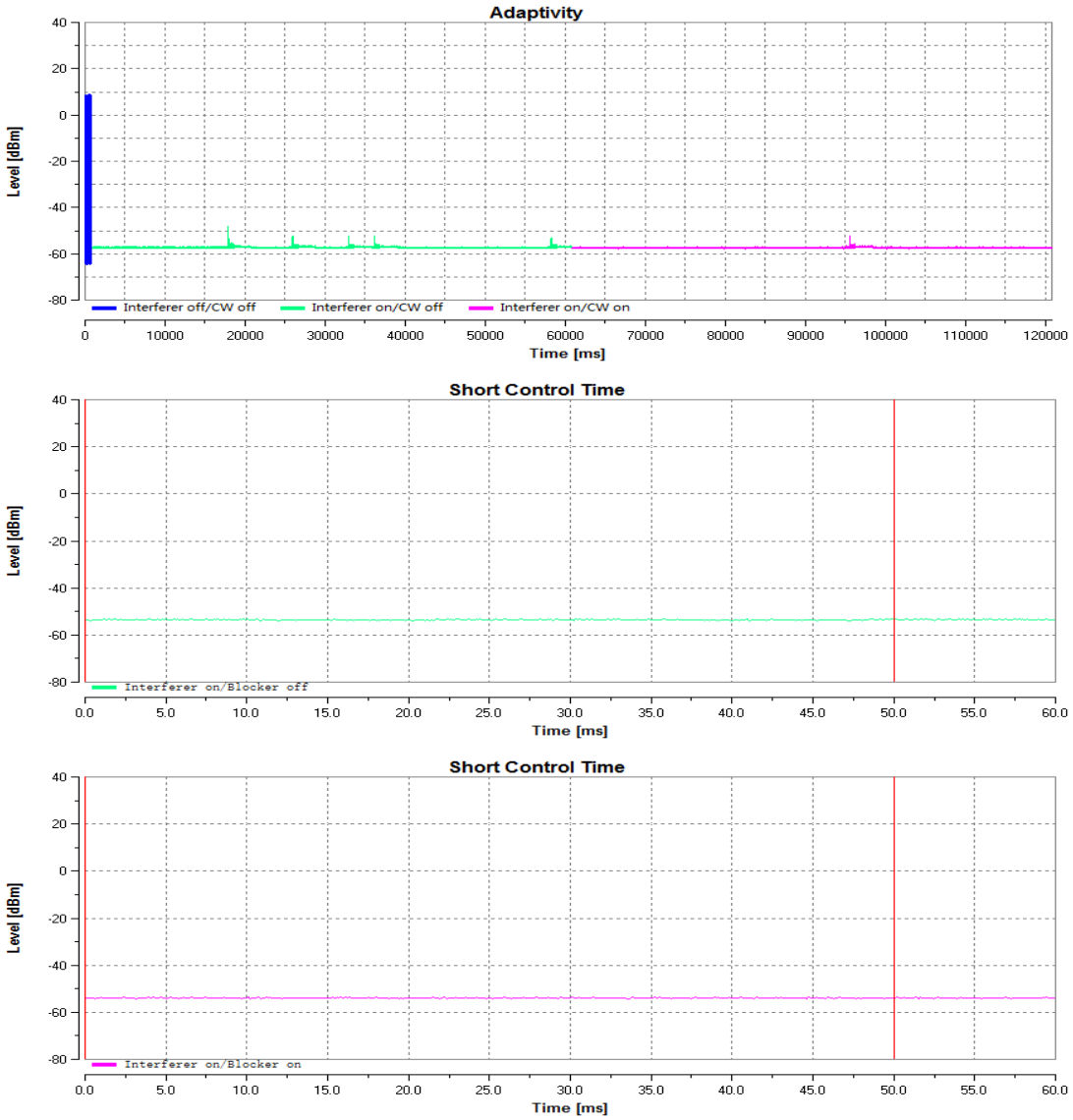
**Max COT Time and Minimum Idle time**



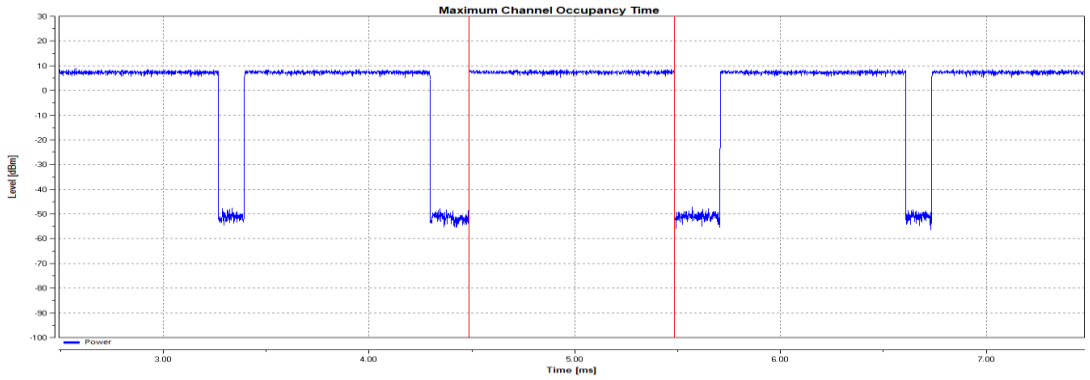



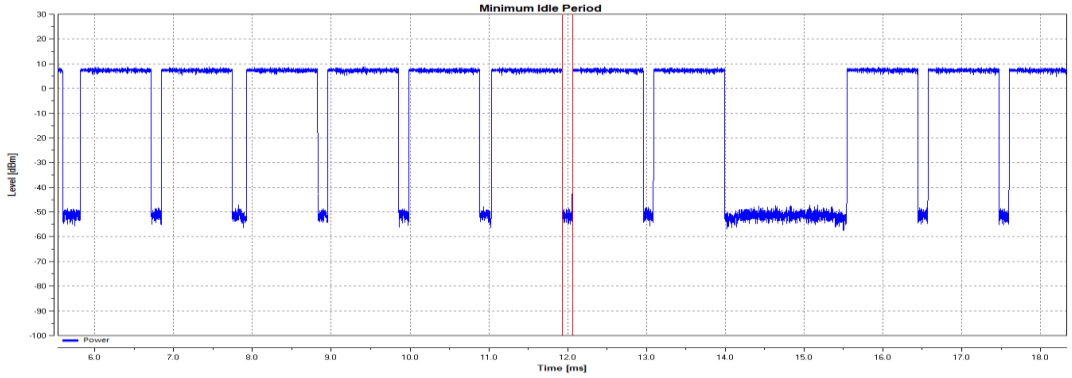
## Adding the interference signal(Green line) and the unwanted signal(Red line)

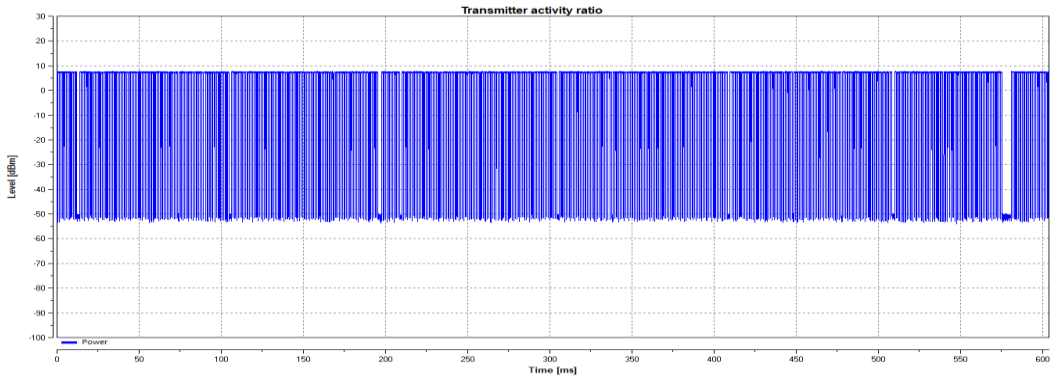


| IEEE802.11 b High Channel | |
|---|---|
| **Threshold Level (dBm/MHz)** | -66.73 |
| **Blocking Interference Level (dBm)** | -33 |
| **Max COT Time (ms)** | 0.997 |
| **Minimum Idle Time (ms)** | 0.128 |
| **Duty Cycle (%) after adding the interference signal 50ms** | 0.00 |
| **Duty Cycle (%) after adding the blocking signal with the interfering signal 50ms** | 0.00 |
| **Verdict** | Pass |

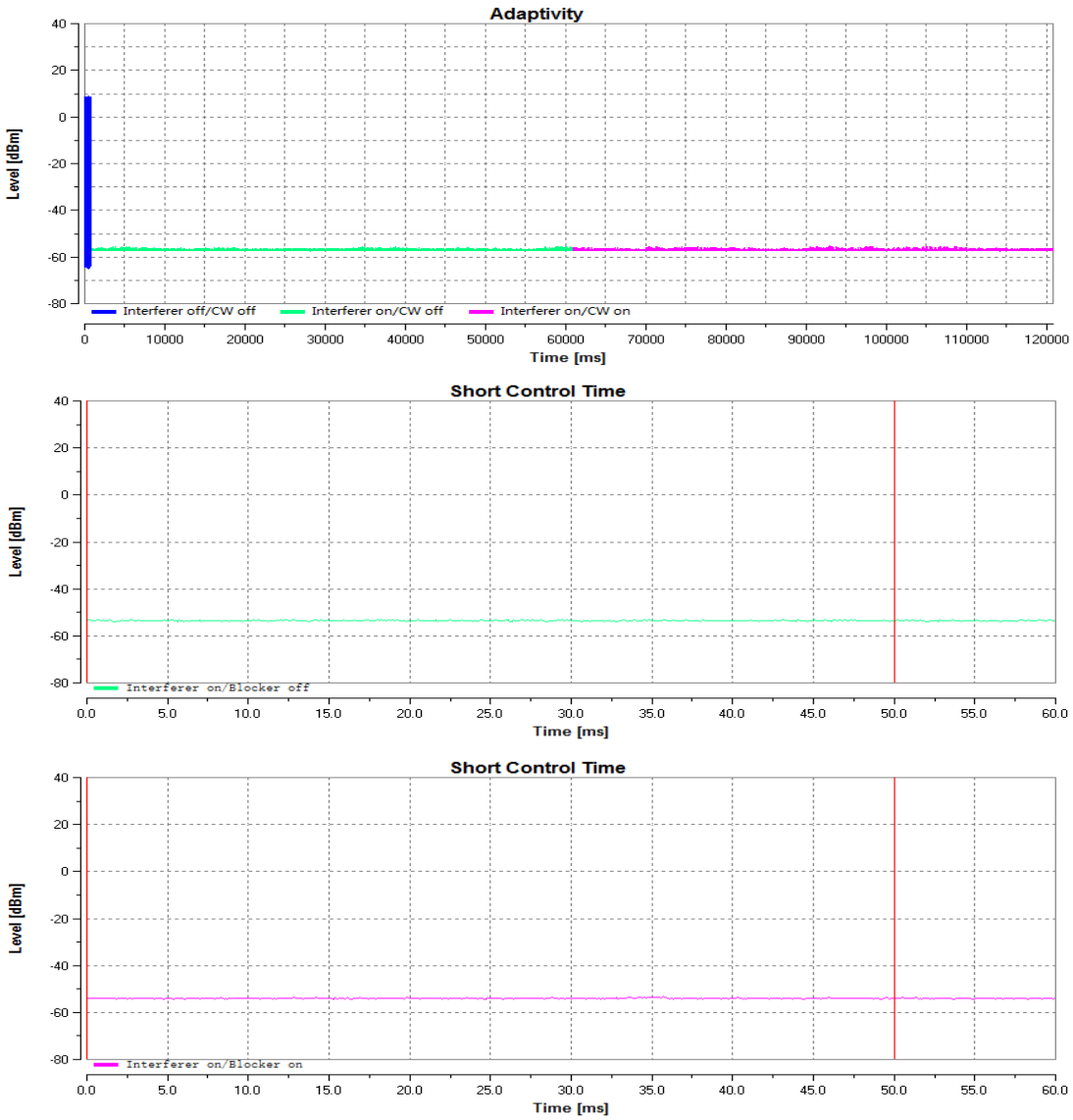
**Max COT Time and Minimum Idle time**



**Adding the interference signal(Green line) and the unwanted signal(Red line)**




**Note:** When removal of the interference and blocking signal the UUT will be transmitting again on this channel. The 802.11b mode is the worst case because the threshold level is the lowest.

## 5.4. OCCUPIED CHANNEL BANDWIDTH

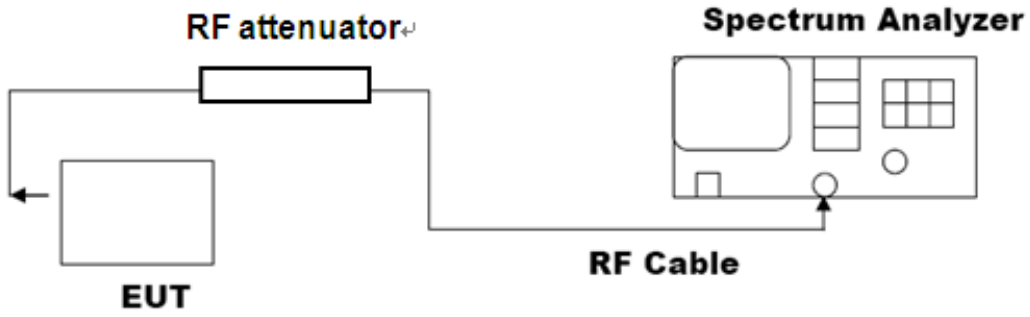
### 5.4.1 LIMIT

The Occupied Channel Bandwidth shall fall completely within the band 2400MHz to 2483.5MHz.

### 5.4.2 TEST PROCEDURE

1)The spectrum analyser shall be used the following settings:
Centre Frequency: The centre frequency of the channel under test
Resolution BW: ~1% of the span without going below 1%
Video BW: 3×RBW
Span: 2×OBW
Detector: RMS
Trace mode: Max Hold
2) Wait until the trace is completed, find the peak value of the trace and place the analyser marker on this peak.
3) Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.

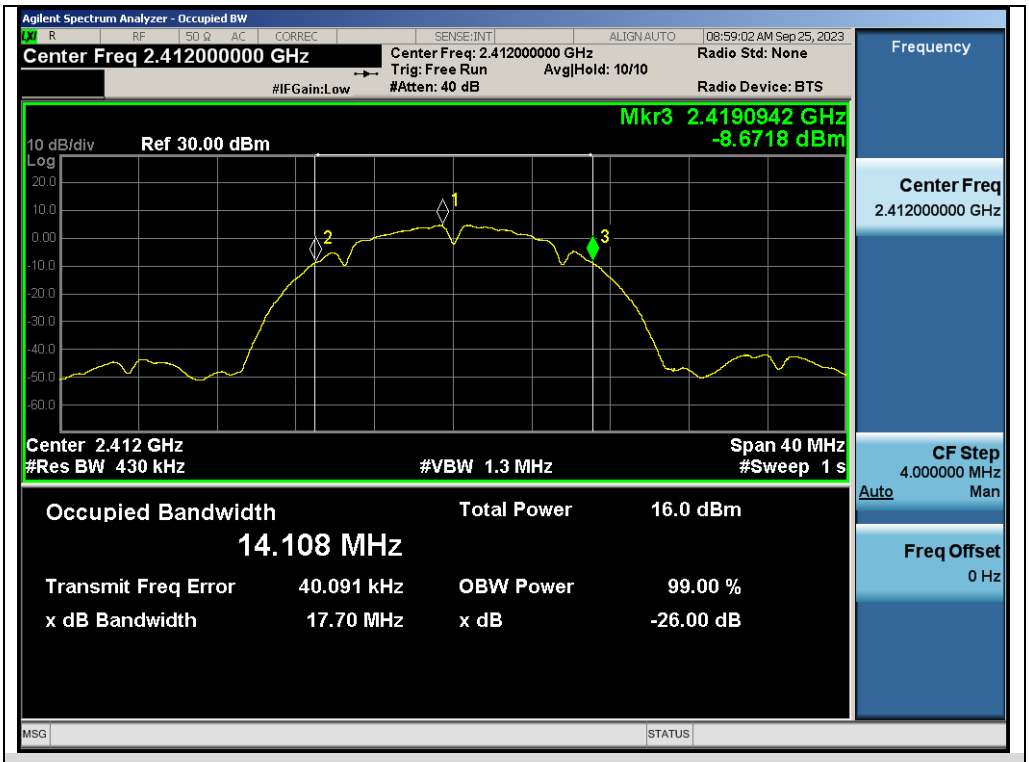
### 5.4.3 TEST CONFIGURATION



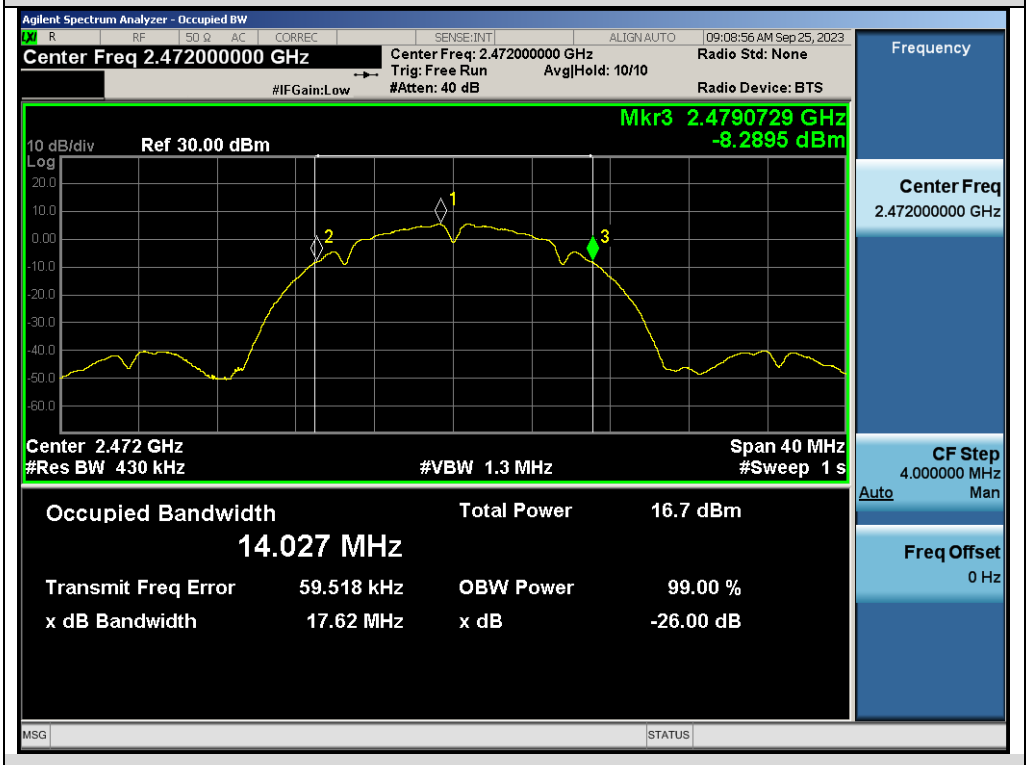
### 5.4.4 TEST RESULTS

| Test Data of Occupied Channel Bandwidth | | | | | |
|---|---|---|---|---|---|
| Test Mode | Occupied Channel Bandwidth [MHz] | | | Limit [MHz] | Verdict |
| | OCB | FL | FH | | |
| 11b_TX_2412_1Mbps | 14.108 | 2404.986 | 2419.094 | 2400 to 2483.5 | Pass |
| 11b_TX_2472_1Mbps | 14.027 | 2465.046 | 2479.073 | 2400 to 2483.5 | Pass |
| 11g_TX_2412_6Mbps | 16.619 | 2403.737 | 2420.356 | 2400 to 2483.5 | Pass |
| 11g_TX_2472_6Mbps | 16.625 | 2463.720 | 2480.344 | 2400 to 2483.5 | Pass |
| 11n20_TX_2412_MCS0 | 17.792 | 2403.148 | 2420.939 | 2400 to 2483.5 | Pass |
| 11n20_TX_2472_MCS0 | 17.803 | 2463.146 | 2480.948 | 2400 to 2483.5 | Pass |

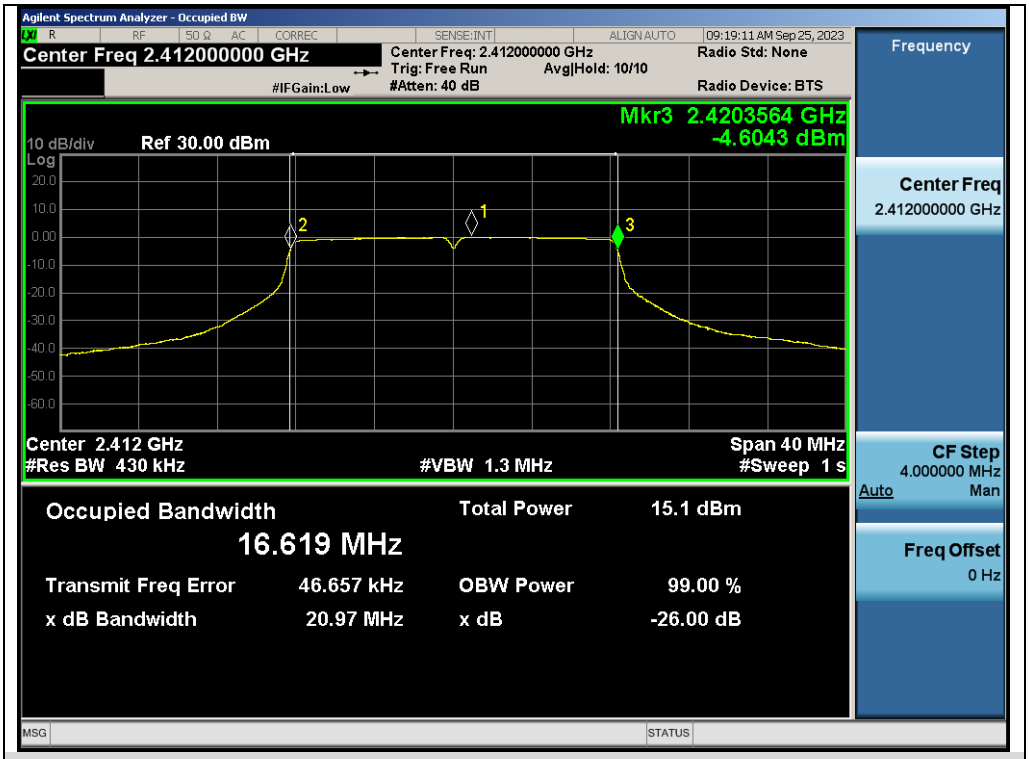
## Test Graphs of Occupied Channel Bandwidth



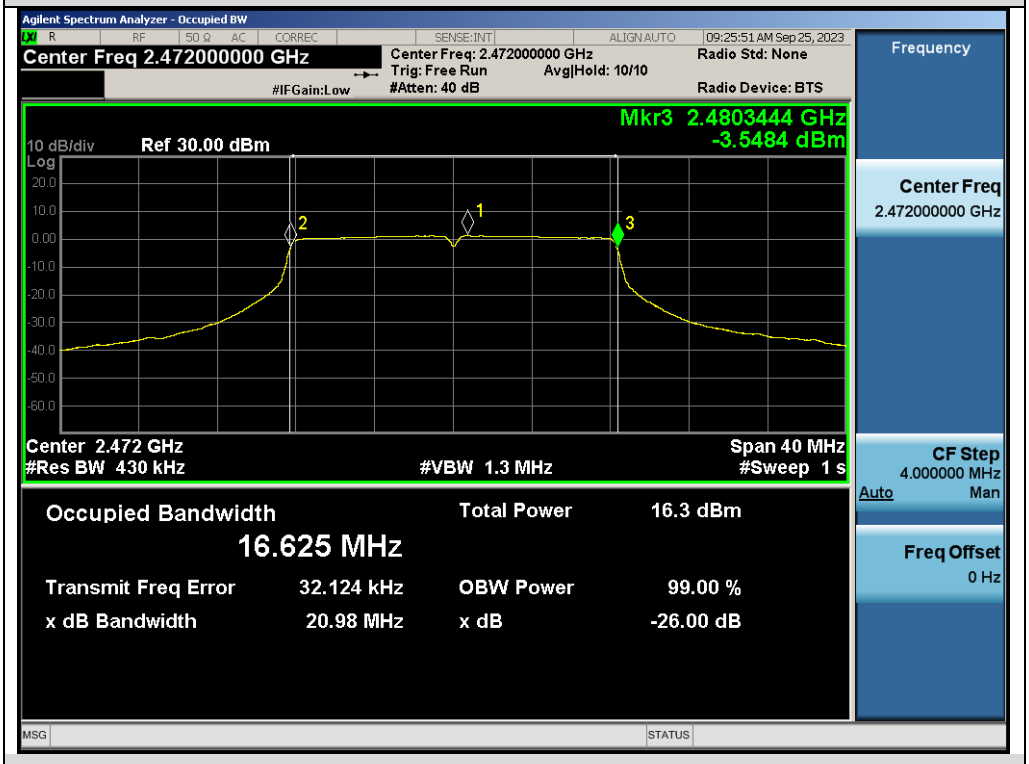

Test_Graph_11b_TX_2412_1Mbps_OBW



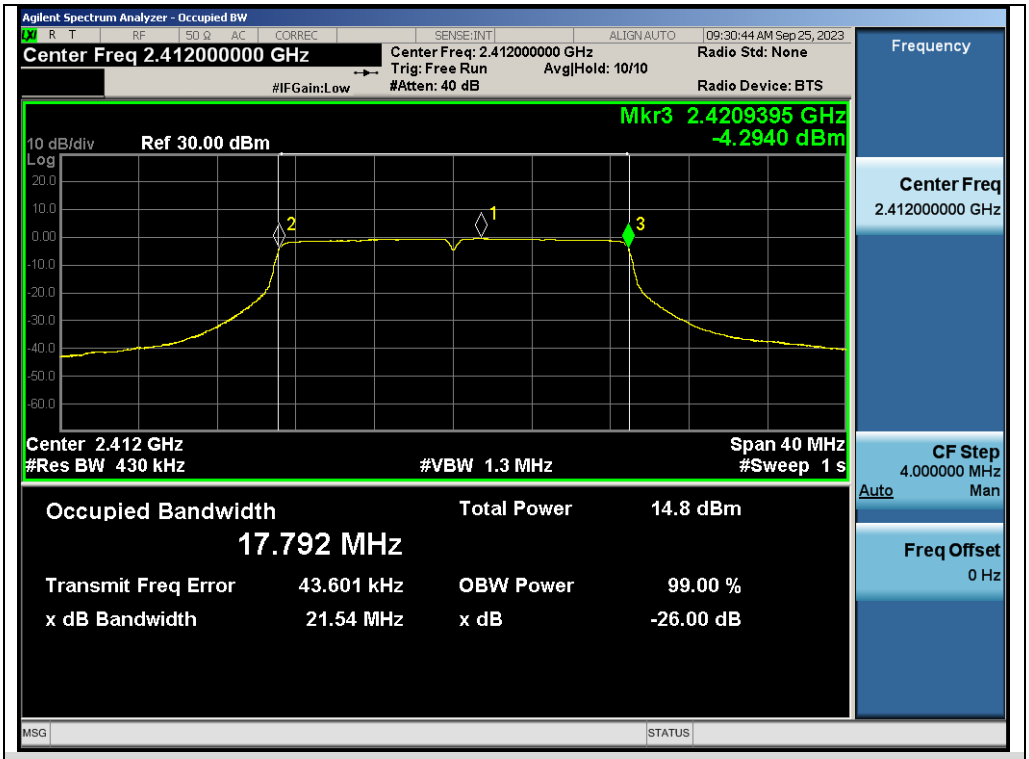

Test_Graph_11b_TX_2472_1Mbps_OBW



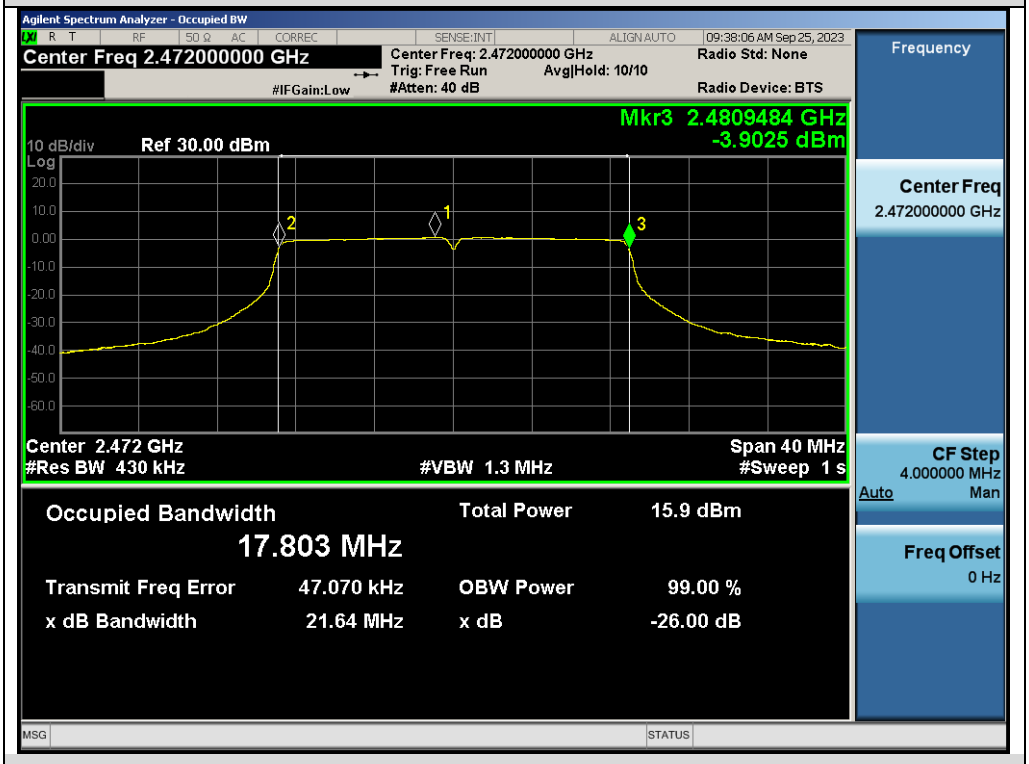

Test_Graph_11g_TX_2412_6Mbps_OBW




Test_Graph_11g_TX_2472_6Mbps_OBW




Test_Graph_11n20_TX_2412_MCS0_OBW

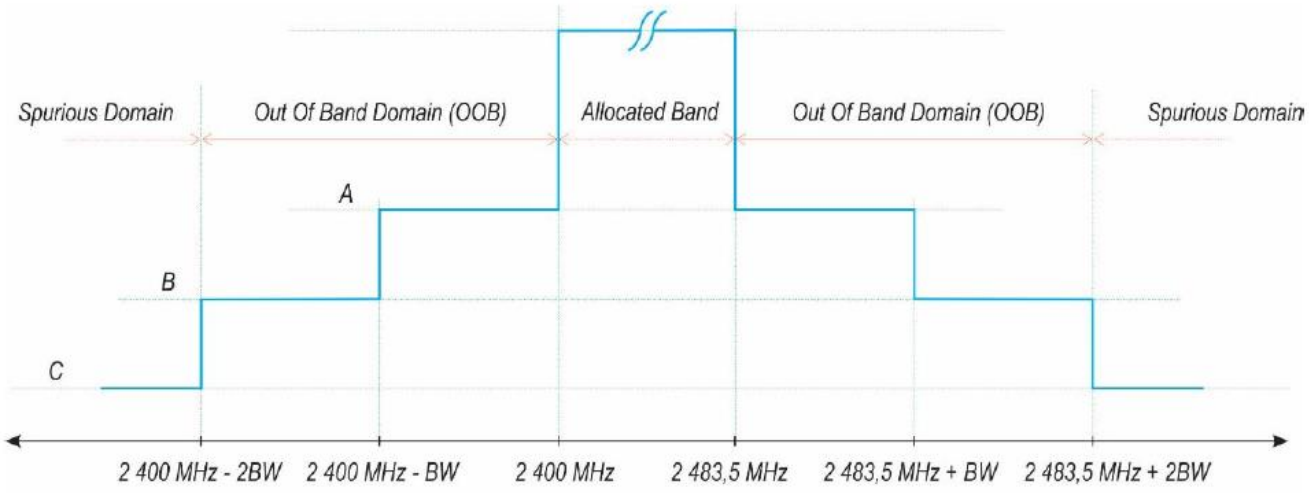



Test_Graph_11n20_TX_2472_MCS0_OBW

## 5.5. TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN

### 5.5.1 LIMIT

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask.




A: -10 dBm/MHz e.i.r.p.
B: -20 dBm/MHz e.i.r.p.
C: Spurious Domain limits

BW = Occupied Channel Bandwidth in MHz or 1 MHz whichever is greater

### 5.5.2 TEST PROCEDURE

1) The spectrum analyser shall be used the following settings:
Centre Frequency: 2484MHz
Resolution BW: 1MHz; Video BW: 3MHz; Span: 0Hz; Detector: RMS
Trace mode: Max Hold; Sweep Points: 5000

2) (segment 2 483.5 MHz to 2 483.5 MHz + BW)
Adjust the trigger level to select the transmissions with the highest power level.

Increase the centre frequency in steps of 1 MHz and repeat this measurement for every 1 MHz segment within the range 2 483.5 MHz to 2 483.5 MHz + BW.

3)Segment 2 483.5 MHz + BW to 2 483.5 MHz + 2BW
Change the centre frequency of the analyser to 2 484 MHz + BW and perform the measurement for the first 1 MHz segment within range 2 483.5 MHz + BW to 2 483.5 MHz + 2BW. Increase the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 483,5 MHz + 2 BW – 0.5 MHz.

4)Segment 2 400 MHz - BW to 2 400 MHz

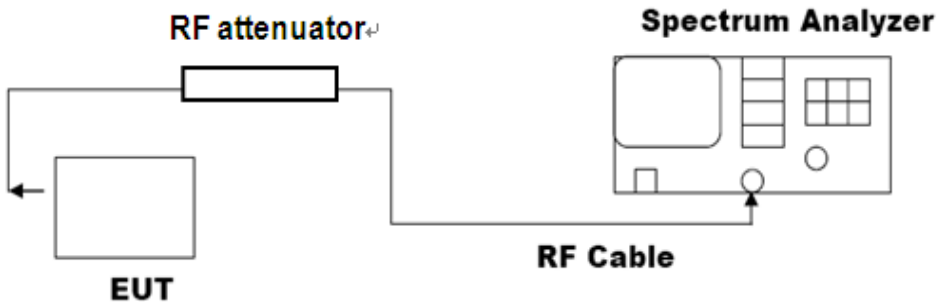
Change the centre frequency of the analyser to 2 399.5 MHz and perform the measurement for the first 1 MHz segment within range 2 400 MHz - BW to 2 400 MHz Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - 2BW + 0.5 MHz.

5)Segment 2 400 MHz - 2BW to 2 400 MHz - BW

Change the centre frequency of the analyser to 2 399,5 MHz - BW and perform the measurement for the first 1 MHz segment within range 2 400 MHz - 2BW to 2 400 MHz - BW. Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - 2BW + 0.5 MHz.

6)The cable loss and attenuator factor shall be considered to the test result.

### 5.5.3 TEST CONFIGURATION



### 5.5.4 TEST RESULT

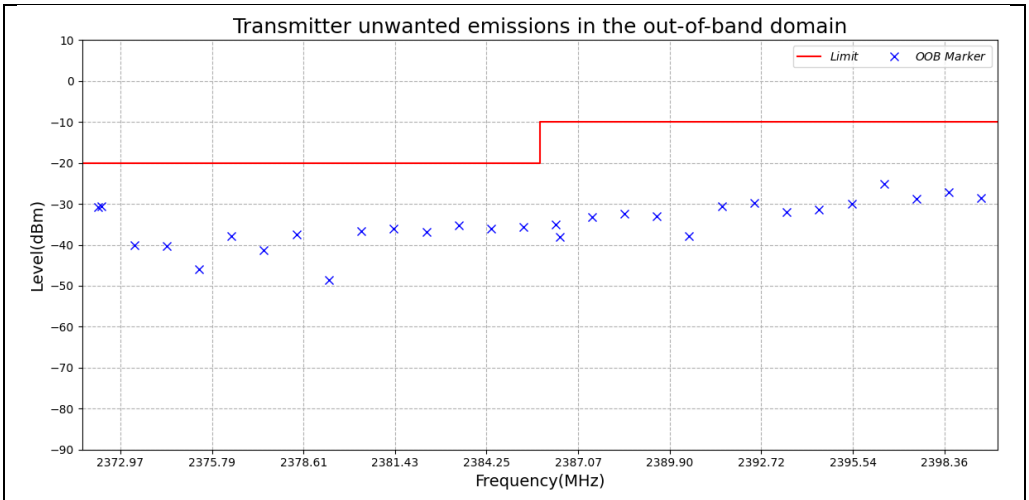
| Test Data of OOB Emissions | | | | |
|---|---|---|---|---|
| Test Mode | Frequency [MHz] | Level [dBm] | Limit [dBm] | Verdict |
| 11b_TX_2412_1Mbps | 2399.500 | -28.52 | -10 | Pass |
| | 2398.500 | -27.17 | -10 | Pass |
| | 2397.500 | -28.75 | -10 | Pass |
| | 2396.500 | -25.17 | -10 | Pass |
| | 2395.500 | -29.92 | -10 | Pass |
| | 2394.500 | -31.45 | -10 | Pass |
| | 2393.500 | -31.91 | -10 | Pass |
| | 2392.500 | -29.84 | -10 | Pass |
| | 2391.500 | -30.60 | -10 | Pass |
| | 2390.500 | -37.91 | -10 | Pass |
| | 2389.500 | -33.06 | -10 | Pass |
| | 2388.500 | -32.45 | -10 | Pass |
| | 2387.500 | -33.20 | -10 | Pass |
| | 2386.500 | -38.14 | -10 | Pass |
| | 2386.392 | -35.04 | -10 | Pass |
| | 2385.392 | -35.72 | -20 | Pass |
| | 2384.392 | -36.14 | -20 | Pass |
| | 2383.392 | -35.27 | -20 | Pass |
| | 2382.392 | -36.78 | -20 | Pass |
| | 2381.392 | -36.15 | -20 | Pass |
| | 2380.392 | -36.68 | -20 | Pass |
| | 2379.392 | -48.69 | -20 | Pass |
| | 2378.392 | -37.47 | -20 | Pass |
| | 2377.392 | -41.31 | -20 | Pass |
| | 2376.392 | -37.88 | -20 | Pass |
| | 2375.392 | -45.93 | -20 | Pass |
| | 2374.392 | -40.28 | -20 | Pass |
| | 2373.392 | -40.06 | -20 | Pass |
| | 2372.392 | -30.57 | -20 | Pass |
| | 2372.284 | -30.73 | -20 | Pass |
| | 2484.000 | -43.48 | -10 | Pass |
| | 2485.000 | -42.05 | -10 | Pass |
| | 2486.000 | -42.37 | -10 | Pass |
| | 2487.000 | -44.14 | -10 | Pass |

| | | | | |
|---|---|---|---|---|
| | 2488.000 | -41.18 | -10 | Pass |
| | 2489.000 | -39.69 | -10 | Pass |
| | 2490.000 | -41.88 | -10 | Pass |
| | 2491.000 | -40.89 | -10 | Pass |
| | 2492.000 | -43.91 | -10 | Pass |
| | 2493.000 | -42.64 | -10 | Pass |
| | 2494.000 | -44.96 | -10 | Pass |
| | 2495.000 | -44.76 | -10 | Pass |
| | 2496.000 | -42.92 | -10 | Pass |
| | 2497.000 | -44.80 | -10 | Pass |
| | 2497.108 | -41.78 | -10 | Pass |
| | 2498.108 | -41.65 | -20 | Pass |
| | 2499.108 | -45.79 | -20 | Pass |
| | 2500.108 | -44.47 | -20 | Pass |
| | 2501.108 | -44.62 | -20 | Pass |
| | 2502.108 | -42.17 | -20 | Pass |
| | 2503.108 | -43.36 | -20 | Pass |
| | 2504.108 | -43.12 | -20 | Pass |
| | 2505.108 | -47.00 | -20 | Pass |
| | 2506.108 | -44.78 | -20 | Pass |
| | 2507.108 | -45.38 | -20 | Pass |
| | 2508.108 | -42.97 | -20 | Pass |
| | 2509.108 | -47.54 | -20 | Pass |
| | 2510.108 | -44.48 | -20 | Pass |
| | 2511.108 | -43.07 | -20 | Pass |
| | 2511.216 | -47.23 | -20 | Pass |
| 11b_TX_2472_1Mbps | 2399.500 | -42.48 | -10 | Pass |
| | 2398.500 | -45.08 | -10 | Pass |
| | 2397.500 | -45.11 | -10 | Pass |
| | 2396.500 | -43.42 | -10 | Pass |
| | 2395.500 | -45.24 | -10 | Pass |
| | 2394.500 | -43.70 | -10 | Pass |
| | 2393.500 | -44.17 | -10 | Pass |
| | 2392.500 | -44.76 | -10 | Pass |
| | 2391.500 | -45.91 | -10 | Pass |
| | 2390.500 | -45.50 | -10 | Pass |

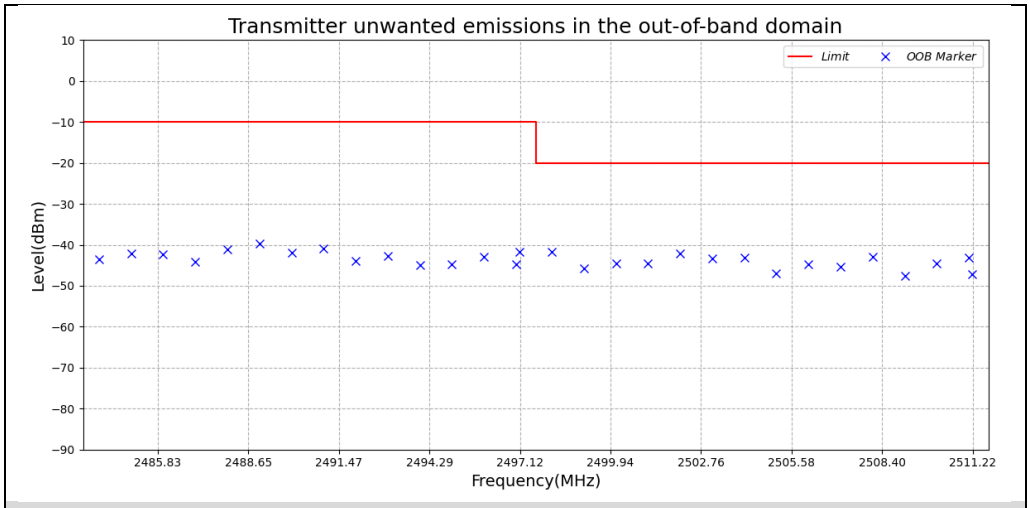
| | | | | |
|---|---|---|---|---|
| | 2389.500 | -46.00 | -10 | Pass |
| | 2388.500 | -45.84 | -10 | Pass |
| | 2387.500 | -46.13 | -10 | Pass |
| | 2386.500 | -46.02 | -10 | Pass |
| | 2386.473 | -46.88 | -10 | Pass |
| | 2385.473 | -44.15 | -20 | Pass |
| | 2384.473 | -50.60 | -20 | Pass |
| | 2383.473 | -47.22 | -20 | Pass |
| | 2382.473 | -45.84 | -20 | Pass |
| | 2381.473 | -47.28 | -20 | Pass |
| | 2380.473 | -46.27 | -20 | Pass |
| | 2379.473 | -46.78 | -20 | Pass |
| | 2378.473 | -47.53 | -20 | Pass |
| | 2377.473 | -47.54 | -20 | Pass |
| | 2376.473 | -49.66 | -20 | Pass |
| | 2375.473 | -50.78 | -20 | Pass |
| | 2374.473 | -45.53 | -20 | Pass |
| | 2373.473 | -49.61 | -20 | Pass |
| | 2372.473 | -47.47 | -20 | Pass |
| | 2372.446 | -48.02 | -20 | Pass |
| | 2484.000 | -21.89 | -10 | Pass |
| | 2485.000 | -25.23 | -10 | Pass |
| | 2486.000 | -22.53 | -10 | Pass |
| | 2487.000 | -23.91 | -10 | Pass |
| | 2488.000 | -23.38 | -10 | Pass |
| | 2489.000 | -26.78 | -10 | Pass |
| | 2490.000 | -35.08 | -10 | Pass |
| | 2491.000 | -37.22 | -10 | Pass |
| | 2492.000 | -29.13 | -10 | Pass |
| | 2493.000 | -31.35 | -10 | Pass |
| | 2494.000 | -28.89 | -10 | Pass |
| | 2495.000 | -32.11 | -10 | Pass |
| | 2496.000 | -35.13 | -10 | Pass |
| | 2497.000 | -30.70 | -10 | Pass |
| | 2497.027 | -33.23 | -10 | Pass |
| | 2498.027 | -35.80 | -20 | Pass |

| | | | | |
|---|---|---|---|---|
| | 2499.027 | -31.81 | -20 | Pass |
| | 2500.027 | -31.65 | -20 | Pass |
| | 2501.027 | -38.67 | -20 | Pass |
| | 2502.027 | -34.84 | -20 | Pass |
| | 2503.027 | -33.53 | -20 | Pass |
| | 2504.027 | -34.40 | -20 | Pass |
| | 2505.027 | -33.37 | -20 | Pass |
| | 2506.027 | -37.28 | -20 | Pass |
| | 2507.027 | -36.03 | -20 | Pass |
| | 2508.027 | -34.11 | -20 | Pass |
| | 2509.027 | -37.85 | -20 | Pass |
| | 2510.027 | -39.47 | -20 | Pass |
| | 2511.027 | -33.76 | -20 | Pass |
| | 2511.054 | -45.78 | -20 | Pass |

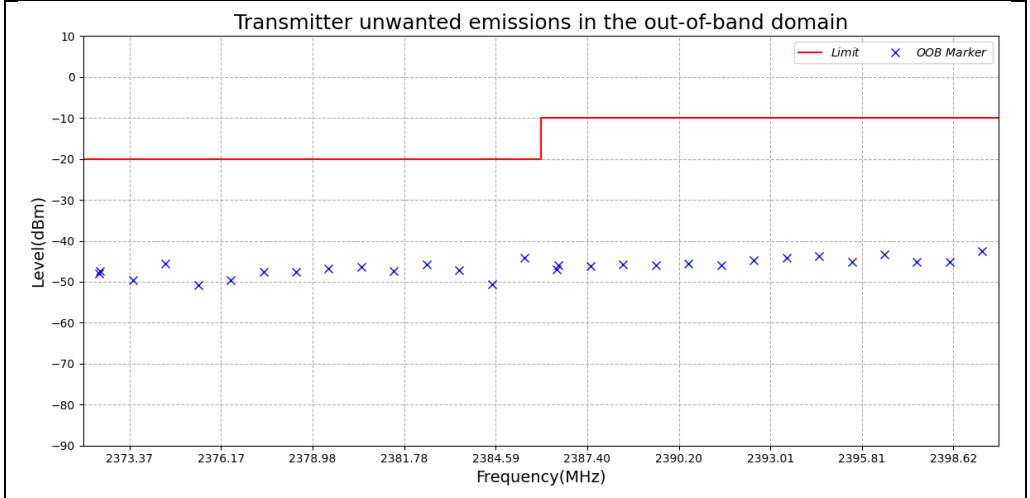
**Test Graphs of OOB Emissions**



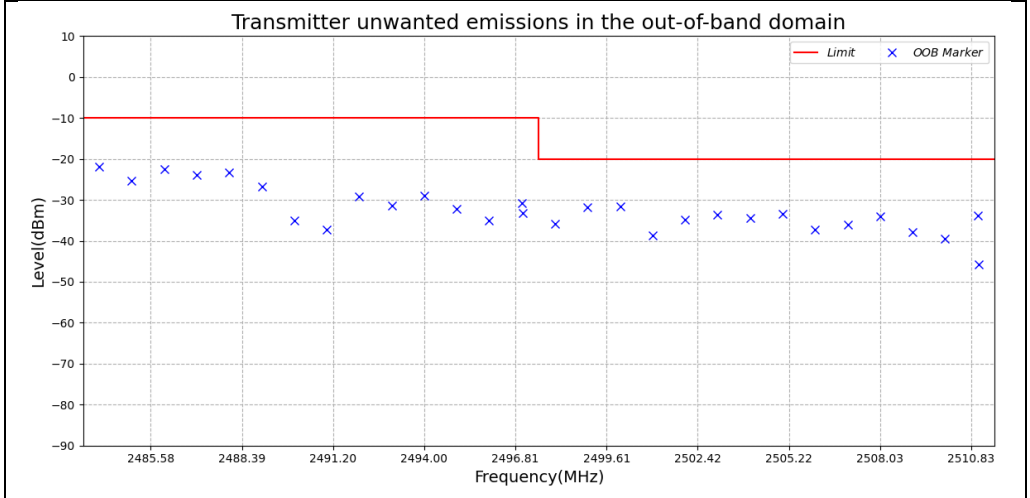

Test_Graph_11b_TX_2412_1Mbps_OOB_L




Test_Graph_11b_TX_2412_1Mbps_OOB_R




Test_Graph_11b_TX_2472_1Mbps_OOB_L




Test_Graph_11b_TX_2472_1Mbps_OOB_R

**Note:** All the modes had been tested, but only the worst data recorded in the report.

## 5.6. TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

### 5.6.1 LIMIT

The spurious emissions of the transmitter shall not exceed the values in tables in the indicated bands:

| Frequency Range | Maximum Power e.r.p(<=1GHz)/e.i.r.p(>1GHz) | Bandwidth |
|---|---|---|
| 30 MHz to 47 MHz | -36dBm | 100kHz |
| 47 MHz to 74 MHz | -54dBm | 100kHz |
| 74 MHz to 87.5 MHz | -36dBm | 100kHz |
| 87.5 MHz to 118 MHz | -54dBm | 100kHz |
| 118 MHz to 174 MHz | -36dBm | 100kHz |
| 174 MHz to 230 MHz | -54dBm | 100kHz |
| 230 MHz to 470 MHz | -36dBm | 100kHz |
| 470 MHz to 694 MHz | -54dBm | 100kHz |
| 694 MHz to 1GHz | -36dBm | 100kHz |
| 1 GHz to 12.75 GHz | -30dBm | 1MHz |

**5.6.2 TEST PROCEDURE**

1)The emissions over the range 30 MHz to 1 000 MHz shall be identified.

2)Spectrum analyzer settings:

Resolution bandwidth: 100 kHz

Video bandwidth: 300 kHz

Detector mode: Peak

Sweep Points: ≥19 400

Trace Mode: Max Hold

3)Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using RMS detector and compared to the limits.

4) The emissions over the range 1 GHz to 12,75 GHz shall be identified.

5) Resolution bandwidth: 1 MHz

Video bandwidth: 3 MHz

Detector mode: Peak

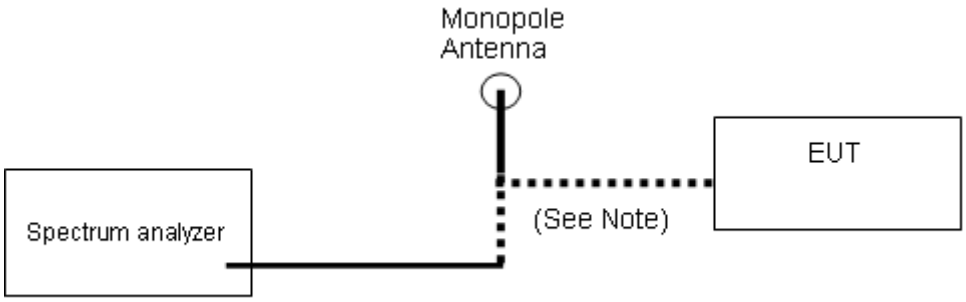
Trace Mode: Max Hold

Sweep Points: ≥23 500

6) Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using RMS detector and compared to the limits.

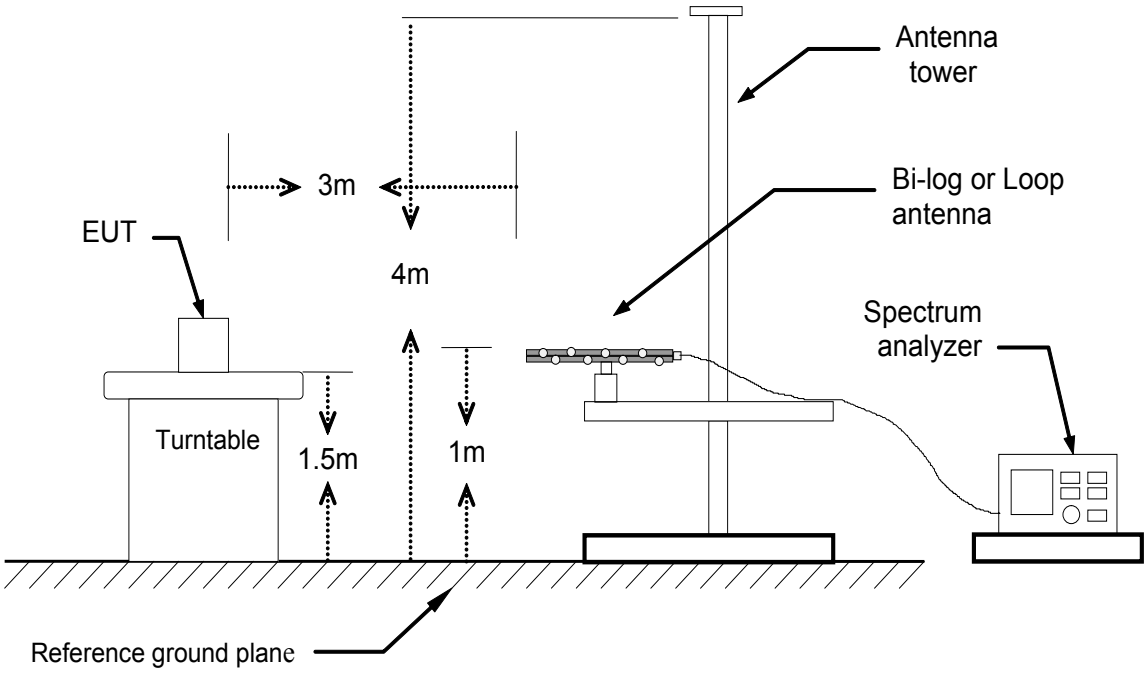
7) For radiated method, the applicable measurement procedures as described in the EN 300 328 V2.2.2 annex C.2 and C.4 are used.

### 5.6.3 TEST CONFIGURATION

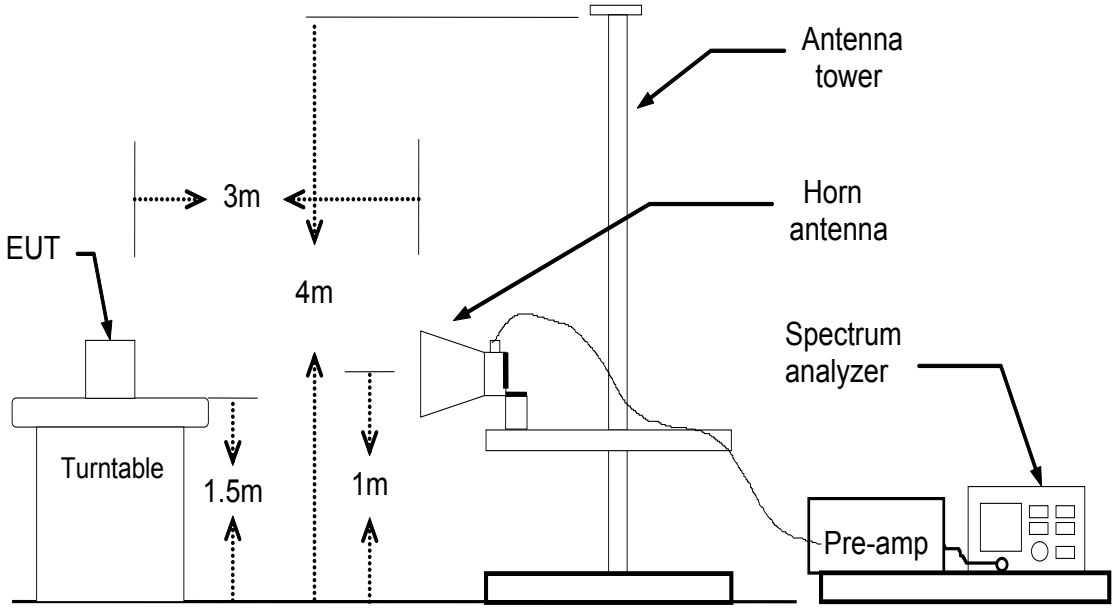



**Conducted Method**

**Below 1GHz**



**Above 1GHz**



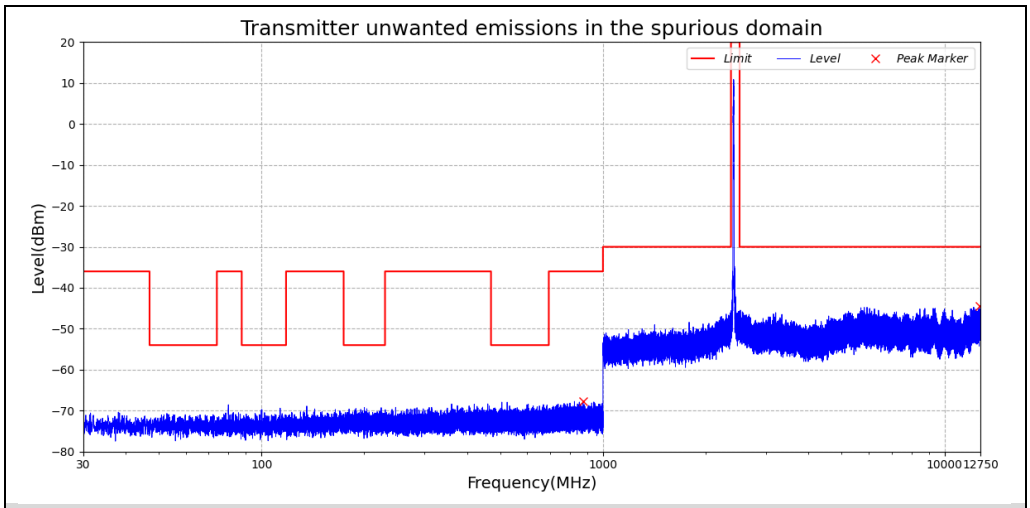

**Radiated Method**

### 5.6.4TEST RESULT

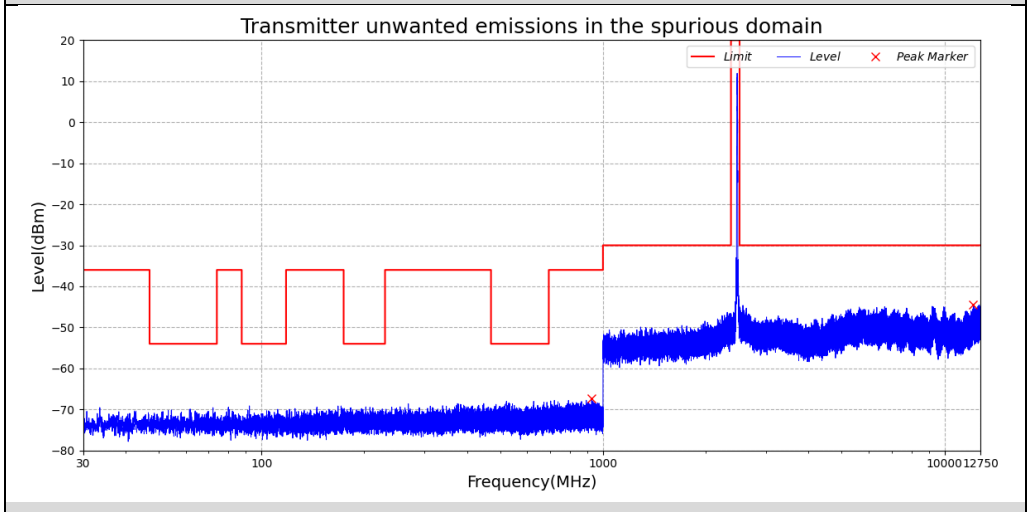
**(Worst Case: Low channel, 11B)**

| Test Data of Transmitter Spurious Emissions (Conducted Method) | | | | | |
|---|---|---|---|---|---|
| Test Mode | Detector | Frequency [MHz] | Level [dBm] | Limit [dBm] | Verdict |
| 11b_TX_2412_1Mbps | Peak | 874.025 | -67.72 | -36.00 | Pass |
| | Peak | 12647.772 | -44.46 | -30.00 | Pass |
| 11b_TX_2472_1Mbps | Peak | 926.601 | -67.37 | -36.00 | Pass |
| | Peak | 12149.555 | -44.53 | -30.00 | Pass |

**Test Graphs of Transmitter Spurious Emissions (Conducted Method)**




Test_Graph_11b_TX_2412_1Mbps_TX




Test_Graph_11b_TX_2472_1Mbps_TX

**Radiated Method:**

**(Worst Case: Low channel)**

Transmitter Spurious Emission below 1GHz (30MHz-1GHz)

| Frequency | Reading Level | Antenna | S.G. | Cable Loss | Ant.Gain | Emission Level | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBuV/m) | Polarization | (dBm) | (dB) | (dBi) | (dBm) | (dBm) | (dB) |
| 75.70 | 28.66 | V | -63.69 | 0.03 | -1.10 | -64.82 | -36.00 | 28.82 |
| 235.77 | 29.27 | V | -69.78 | 0.11 | 6.60 | -63.29 | -36.00 | 27.29 |
| 380.46 | 28.16 | V | -70.56 | 0.28 | 6.50 | -64.34 | -36.00 | 28.34 |
| 385.95 | 29.73 | V | -68.83 | 0.29 | 6.45 | -62.67 | -36.00 | 26.67 |
| 422.46 | 27.48 | V | -72.25 | 0.33 | 7.06 | -65.52 | -36.00 | 29.52 |
| 827.57 | 30.87 | V | -67.23 | 0.66 | 6.45 | -61.44 | -36.00 | 25.44 |
| Other(30-1000) | -- | V | -- | -- | -- | -- | -36.00/-54.00 | -- |
| | | | | | | | | |
| 137.85 | 30.65 | H | -63.28 | 0.05 | 0.00 | -63.33 | -36.00 | 27.33 |
| 338.05 | 33.12 | H | -65.35 | 0.23 | 5.78 | -59.80 | -36.00 | 23.80 |
| 397.72 | 29.47 | H | -69.76 | 0.30 | 6.54 | -63.52 | -36.00 | 27.52 |
| 456.51 | 28.35 | H | -70.64 | 0.37 | 6.58 | -64.43 | -36.00 | 28.43 |
| 614.36 | 30.93 | H | -69.37 | 0.50 | 6.66 | -63.21 | -54.00 | 9.21 |
| 765.25 | 30.59 | H | -69.36 | 0.61 | 6.75 | -63.22 | -36.00 | 27.22 |
| Other(30-1000) | -- | H | -- | -- | -- | -- | -36.00/-54.00 | -- |

Transmitter Spurious Emission above 1GHz (1GHz-12.75GHz)

| Frequency | Reading Level | Antenna | S.G. | Cable Loss | Ant.Gain | Emission Level | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBuV/m) | Polarization | (dBm) | (dB) | (dBi) | (dBm) | (dBm) | (dB) |
| 4804 | 52.01 | V | -41.25 | 2.64 | 9.30 | -34.58 | -30.00 | 4.58 |
| 7206 | 46.70 | V | -45.65 | 3.14 | 11.28 | -37.51 | -30.00 | 7.51 |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| Other(1000-12750) | -- | V | -- | -- | -- | -- | -30.00 | -- |
| | | | | | | | | |
| 4804 | 51.32 | H | -40.47 | 2.64 | 9.30 | -33.81 | -30.00 | 3.81 |
| 7206 | 44.41 | H | -44.41 | 3.14 | 11.28 | -36.27 | -30.00 | 6.27 |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| Other(1000-12750) | -- | H | -- | -- | -- | -- | -30.00 | -- |

Note: 1. The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “--” remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that’s already beyond the background noise floor.

**(Worst Case: High channel)**

Transmitter Spurious Emission below 1GHz (30MHz-1GHz)

| Frequency | Reading Level | Antenna | S.G. | Cable Loss | Ant.Gain | Emission Level | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBuV/m) | Polarization | (dBm) | (dB) | (dBi) | (dBm) | (dBm) | (dB) |
| 77.21 | 28.61 | V | -64.49 | 0.04 | -0.70 | -65.23 | -36.00 | 29.23 |
| 235.89 | 29.34 | V | -71.14 | 0.11 | 6.60 | -64.65 | -36.00 | 28.65 |
| 380.41 | 27.67 | V | -71.88 | 0.28 | 6.50 | -65.66 | -36.00 | 29.66 |
| 384.30 | 28.75 | V | -70.47 | 0.28 | 6.46 | -64.30 | -36.00 | 28.30 |
| 425.57 | 26.93 | V | -72.29 | 0.33 | 7.00 | -65.62 | -36.00 | 29.62 |
| 831.46 | 30.42 | V | -69.12 | 0.66 | 6.37 | -63.41 | -36.00 | 27.41 |
| Other(30-1000) | -- | V | -- | -- | -- | -- | -36.00/-54.00 | -- |
| | | | | | | | | |
| 137.33 | 31.16 | H | -62.90 | 0.05 | 0.00 | -62.95 | -36.00 | 26.95 |
| 339.04 | 32.75 | H | -65.90 | 0.23 | 5.74 | -60.39 | -36.00 | 24.39 |
| 397.46 | 28.86 | H | -70.96 | 0.30 | 6.54 | -64.72 | -36.00 | 28.72 |
| 459.79 | 28.59 | H | -70.23 | 0.37 | 6.67 | -63.93 | -36.00 | 27.93 |
| 613.55 | 30.92 | H | -68.53 | 0.50 | 6.62 | -62.41 | -54.00 | 8.41 |
| 769.49 | 31.45 | H | -68.23 | 0.62 | 6.87 | -61.98 | -36.00 | 25.98 |
| Other(30-1000) | -- | H | -- | -- | -- | -- | -36.00/-54.00 | -- |

Transmitter Spurious Emission above 1GHz (1GHz-12.75GHz)

| Frequency | Reading Level | Antenna | S.G. | Cable Loss | Ant.Gain | Emission Level | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBuV/m) | Polarization | (dBm) | (dB) | (dBi) | (dBm) | (dBm) | (dB) |
| 4960 | 51.83 | V | -41.57 | 2.75 | 9.62 | -34.70 | -30.00 | 4.70 |
| 7440 | 47.22 | V | -49.32 | 3.09 | 11.62 | -40.79 | -30.00 | 10.79 |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| Other(1000-12750) | -- | V | -- | -- | -- | -- | -30.00 | -- |
| | | | | | | | | |
| 4960 | 51.70 | H | -42.59 | 2.75 | 9.62 | -35.72 | -30.00 | 5.72 |
| 7440 | 44.11 | H | -49.53 | 3.09 | 11.62 | -41.00 | -30.00 | 11.00 |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| Other(1000-12750) | -- | H | -- | -- | -- | -- | -30.00 | -- |

Note: 1. The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “--” remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that’s already beyond the background noise floor.

## 5.7. RECEIVER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

### 5.7.1 LIMIT

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

The spurious emissions of the receiver shall not exceed the values given in table.

| Frequency Range | Maximum Power e.r.p(<=1GHz)/e.i.r.p(>1GHz) | Measurement Bandwidth |
|---|---|---|
| 30 MHz to 1000 MHz | -57dBm | 100kHz |
| 1 GHz to 12.75 GHz | -47dBm | 1MHz |

### 5.7.2 TEST PROCEDURE

1)The emissions over the range 30 MHz to 1 000 MHz shall be identified.

2)Spectrum analyzer settings:

Resolution bandwidth: 100 kHz

Video bandwidth: 300 kHz

Detector mode: Peak

Sweep Points: ⩾19 400

Trace Mode: Max Hold

3)Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using RMS detector and compared to the limits given in 5.7.1.

4) The emissions over the range 1 GHz to 12.75 GHz shall be identified.

5) Resolution bandwidth: 1 MHz

Video bandwidth: 3 MHz

Detector mode: Peak

Trace Mode: Max Hold

Sweep Points: ⩾23200

6) Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using RMS detector and compared to the limits given in 5.7.1.

7) For radiated method, the applicable measurement procedures as described in the EN 300 328 V2.2.2 annex C.2 and C.4 are used.

### 5.7.3 TEST CONFIGURATION

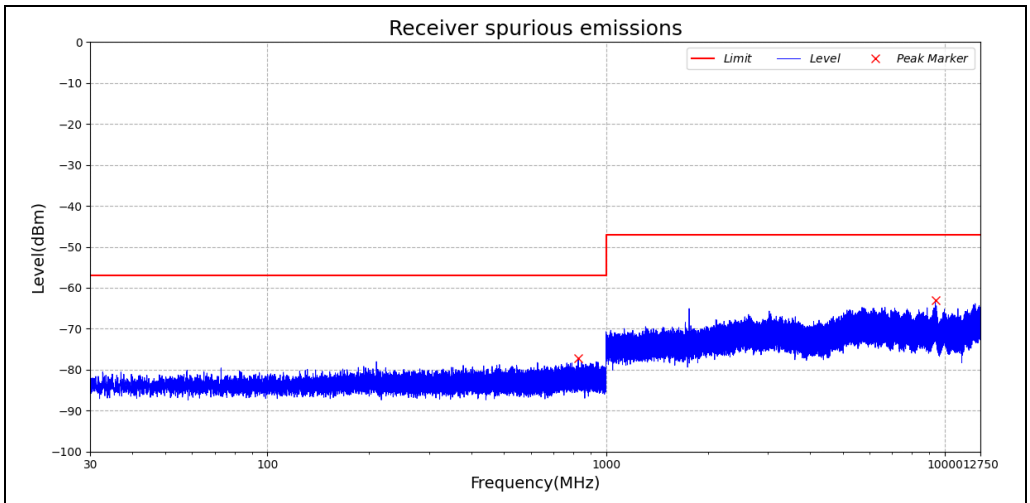
Refer to 5.6.3

### 5.7.4 TEST RESULT

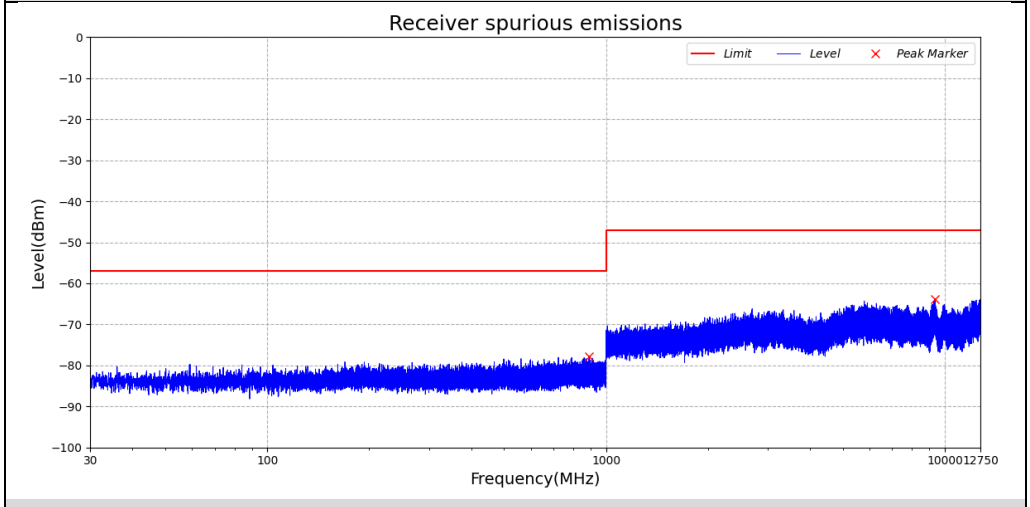
**(Worst Case: Low channel, 11B)**

| Test Data of Receiver Spurious Emissions (Conducted Method) | | | | | |
|---|---|---|---|---|---|
| Test Mode | Detector | Frequency [MHz] | Level [dBm] | Limit [dBm] | Verdict |
| 11b_RX_2412_1Mbps | Peak | 828.175 | -77.25 | -57.00 | Pass |
| | Peak | 9384.296 | -63.01 | -47.00 | Pass |
| 11b_RX_2472_1Mbps | Peak | 892.617 | -77.81 | -57.00 | Pass |
| | Peak | 9376.463 | -63.90 | -47.00 | Pass |

**Test Graphs of Receiver Spurious Emissions (Conducted Method)**




Test_Graph_11b_RX_2412_1Mbps_RX




Test_Graph_11b_RX_2472_1Mbps_RX

**Radiated Method:**

**(Worst Case: Low channel)**

Receiver Spurious Emission below 1GHz (30MHz-1GHz)

| Frequency | Reading Level | Antenna | S.G. | Cable Loss | Ant.Gain | Emission Level | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBuV/m) | Polarization | (dBm) | (dB) | (dBi) | (dBm) | (dBm) | (dB) |
| 91.52 | 28.21 | V | -66.24 | 0.04 | 1.48 | -64.80 | -57.00 | 7.80 |
| 237.24 | 30.62 | V | -68.86 | 0.11 | 6.60 | -62.37 | -57.00 | 5.37 |
| 314.56 | 27.39 | V | -72.36 | 0.20 | 6.28 | -66.29 | -57.00 | 9.29 |
| 385.25 | 29.96 | V | -70.24 | 0.29 | 6.45 | -64.07 | -57.00 | 7.07 |
| 474.70 | 28.79 | V | -70.78 | 0.39 | 6.84 | -64.33 | -57.00 | 7.33 |
| 831.04 | 31.31 | V | -67.91 | 0.66 | 6.37 | -62.20 | -57.00 | 5.20 |
| Other(30-1000) | -- | V | -- | -- | -- | -- | -57.00 | -- |
| | | | | | | | | |
| 137.91 | 29.26 | H | -63.24 | 0.05 | 0.00 | -63.29 | -57.00 | 6.29 |
| 332.94 | 29.09 | H | -70.44 | 0.22 | 6.02 | -64.65 | -57.00 | 7.65 |
| 397.96 | 30.14 | H | -69.25 | 0.30 | 6.54 | -63.01 | -57.00 | 6.01 |
| 569.20 | 29.63 | H | -69.73 | 0.47 | 6.81 | -63.39 | -57.00 | 6.39 |
| 616.87 | 28.19 | H | -70.66 | 0.51 | 6.74 | -64.43 | -57.00 | 7.43 |
| 818.00 | 28.90 | H | -69.75 | 0.65 | 6.86 | -63.54 | -57.00 | 6.54 |
| Other(30-1000) | -- | H | -- | -- | -- | -- | -57.00 | -- |

Receiver Spurious Emission above 1GHz (1GHz-12.75GHz)

| Frequency | Reading Level | Antenna | S.G. | Cable Loss | Ant.Gain | Emission Level | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBuV/m) | Polarization | (dBm) | (dB) | (dBi) | (dBm) | (dBm) | (dB) |
| 1838.06 | 32.39 | V | -66.36 | 1.26 | 7.15 | -60.47 | -47.00 | 13.47 |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| Other(1000-12750) | -- | V | -- | -- | -- | -- | -47.00 | -- |
| | | | | | | | | |
| 1779.41 | 30.92 | H | -67.75 | 1.22 | 6.89 | -62.09 | -47.00 | 15.09 |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| Other(1000-12750) | -- | H | -- | -- | -- | -- | -47.00 | -- |

Note: 1. The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "--" remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**(Worst Case: High channel)**

Receiver Spurious Emission below 1GHz (30MHz-1GHz)

| Frequency | Reading Level | Antenna | S.G. | Cable Loss | Ant.Gain | Emission Level | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBuV/m) | Polarization | (dBm) | (dB) | (dBi) | (dBm) | (dBm) | (dB) |
| 93.67 | 28.58 | V | -66.13 | 0.04 | 1.64 | -64.53 | -57.00 | 7.53 |
| 241.40 | 30.13 | V | -68.87 | 0.12 | 6.66 | -62.32 | -57.00 | 5.32 |
| 313.36 | 27.71 | V | -72.10 | 0.20 | 6.31 | -65.99 | -57.00 | 8.99 |
| 387.12 | 30.16 | V | -68.68 | 0.29 | 6.43 | -62.54 | -57.00 | 5.54 |
| 478.53 | 27.76 | V | -72.38 | 0.39 | 6.88 | -65.90 | -57.00 | 8.90 |
| 828.37 | 30.81 | V | -67.18 | 0.66 | 6.40 | -61.44 | -57.00 | 4.44 |
| Other(30-1000) | -- | V | -- | -- | -- | -- | -57.00 | -- |
| | | | | | | | | |
| 140.74 | 29.87 | H | -63.67 | 0.05 | 0.00 | -63.72 | -57.00 | 6.72 |
| 335.58 | 28.99 | H | -69.89 | 0.23 | 5.90 | -64.21 | -57.00 | 7.21 |
| 396.03 | 29.59 | H | -68.97 | 0.30 | 6.52 | -62.75 | -57.00 | 5.75 |
| 569.35 | 28.96 | H | -69.72 | 0.47 | 6.81 | -63.38 | -57.00 | 6.38 |
| 615.97 | 27.97 | H | -71.13 | 0.50 | 6.70 | -64.93 | -57.00 | 7.93 |
| 819.24 | 28.33 | H | -71.63 | 0.65 | 6.83 | -65.45 | -57.00 | 8.45 |
| Other(30-1000) | -- | H | -- | -- | -- | -- | -57.00 | -- |

Receiver Spurious Emission above 1GHz (1GHz-12.75GHz)

| Frequency | Reading Level | Antenna | S.G. | Cable Loss | Ant.Gain | Emission Level | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBuV/m) | Polarization | (dBm) | (dB) | (dBi) | (dBm) | (dBm) | (dB) |
| 1830.66 | 33.07 | V | -65.94 | 1.26 | 7.15 | -60.05 | -47.00 | 13.05 |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| -- | -- | V | -- | -- | -- | -- | -- | -- |
| Other(1000-12750) | -- | V | -- | -- | -- | -- | -47.00 | -- |
| | | | | | | | | |
| 1782.94 | 31.79 | H | -66.81 | 1.23 | 6.93 | -61.11 | -47.00 | 14.11 |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| -- | -- | H | -- | -- | -- | -- | -- | -- |
| Other(1000-12750) | -- | H | -- | -- | -- | -- | -47.00 | -- |

Note: 1. The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "--" remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

## 5.8. RECEIVER BLOCKING

### 5.8.1 LIMIT

☒Receiver Blocking parameters for Receiver Category 1 equipment

| Wanted signal mean power from companion device (dBm) (see notes 1 and 4) | Blocking signal frequency (MHz) | Blocking signal power (dBm) (see note 4) | Type of blocking signal |
|---|---|---|---|
| (-133 dBm + 10 × log10(OCBW)) or -68 dBm whichever is less (see note 2) | 2 380<br>2 504 | -34 | CW |
| (-139 dBm + 10 × log10(OCBW)) or -74 dBm whichever is less (see note 3) | 2 300<br>2 330<br>2 360<br>2 524<br>2 584<br>2 674 | | |

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.

NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 20 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.

NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

☐Receiver Blocking parameters for Receiver Category 2 equipment

| Wanted signal mean power from companion device (dBm) (see notes 1 and 3) | Blocking signal frequency (MHz) | Blocking signal power (dBm) (see note 3) | Type of blocking signal |
|---|---|---|---|
| (-139 dBm + 10 × log10(OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2) | 2 380<br>2 504<br>2 300<br>2 584 | -34 | CW |

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.

NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

☐Receiver Blocking parameters for Receiver Category 3 equipment

| Wanted signal mean power from companion device (dBm) (see notes 1 and 3) | Blocking signal frequency (MHz) | Blocking signal power (dBm) (see note 3) | Type of blocking signal |
|---|---|---|---|
| (-139 dBm + 10 × log10(OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less (see note 2) | 2 380<br>2 504<br>2 300<br>2 584 | -34 | CW |

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 30 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.

NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

**5.8.2 TEST PROCEDURE**

For non-FHSS equipment, having more than one operating channel, the operating channels on which the testing has to be performed shall be selected as follows:

- For testing blocking frequencies less than 2 400 MHz, the equipment shall operate on the lowest operating channel.
- For testing blocking frequencies greater than 2 500 MHz, the equipment shall operate on the highest operating channel.

The simplified conducted measure procedures are as follows:

1) For non-FHSS equipment, the UUT shall be set to the lowest operating channel on which the blocking test has to be performed.

2) The blocking signal generator is set to the first frequency as defined in the appropriate table corresponding to the receiver category and type of equipment.

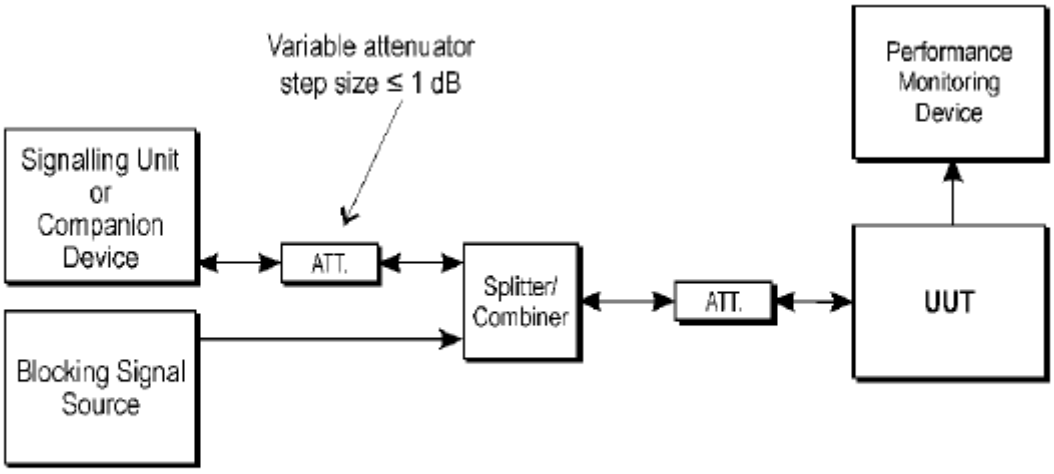
3)With the blocking signal generator switched off, a communication link is established between the UUT and the associated companion device using the test setup. The level of the wanted signal shall be set to the value provided in the table corresponding to the receiver category and type of equipment. This level may be measured directly at the output of the companion device and a correction is made for the coupling loss into the UUT. The actual level for the wanted signal shall be recorded in the test report.

4) The blocking signal at the UUT is set to the level provided in the table corresponding to the receiver category and type of equipment. It shall be verified and recorded in the test report that the performance criteria is met.

5) Repeat step 4 for each remaining combination of frequency and level for the blocking signal as provided in the table corresponding to the receiver category and type of equipment.

6)Repeat step 2 to step 5 with the UUT operating at the highest operating channel.

### 5.8.3 TEST CONFIGURATION




**Test Set-up for receiver blocking**

### 5.8.4 TEST RESULT

(802.11 b mode 1Mbps)

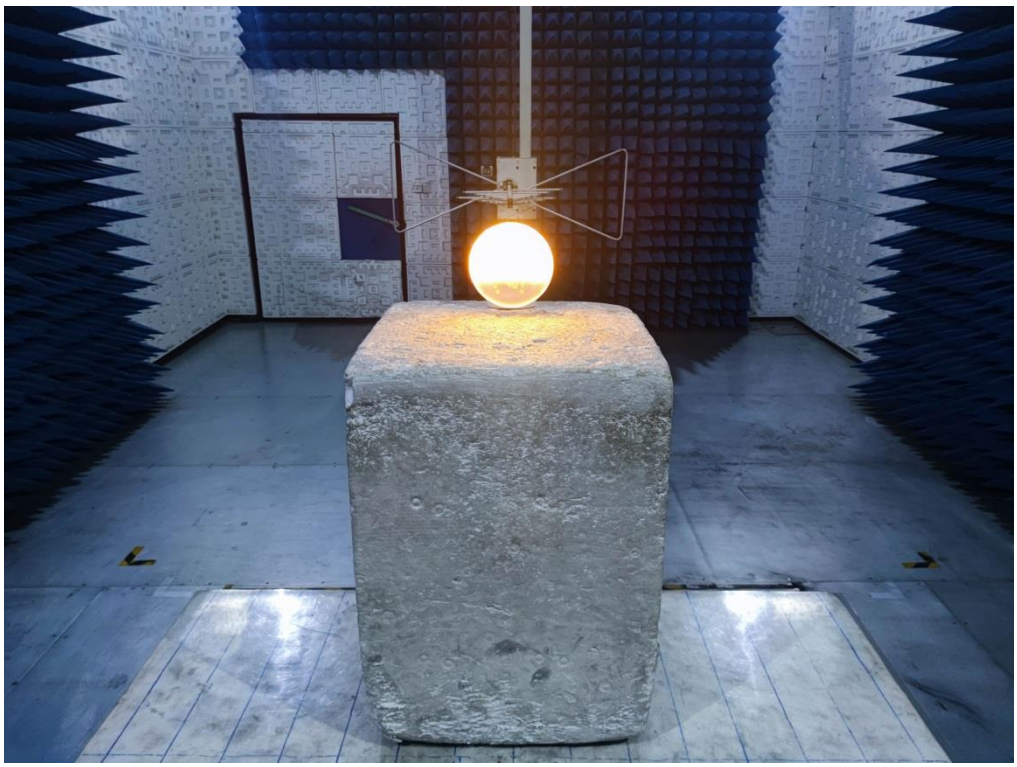
| Test Data of Receiver Blocking | | | | | | |
|---|---|---|---|---|---|---|
| Test channel | Blocking Signal Frequency (MHz) | Blocking Signal Power(dBm) | Wanted signal mean power from companion device(dBm) | Performance PER | Limit PER | Result |
| Low | 2300 | -33.00 | -73.00 | 1.56% | 10% | Pass |
| | 2330 | | -73.00 | 0.73% | | |
| | 2360 | | -73.00 | 2.56% | | |
| | 2380 | | -67.00 | 1.78% | | |
| High | 2504 | | -67.00 | 0.46% | | |
| | 2524 | | -73.00 | 1.39% | | |
| | 2584 | | -73.00 | 1.07% | | |
| | 2674 | | -73.00 | 1.25% | | |

Note:

1. If the equipment can be configured to operate with different Nominal Channel Bandwidths (e.g. 20 MHz) and different data rates, then the combination of the smallest channel bandwidth and the lowest data rate for this channel bandwidth which still allows the equipment to operate as intended shall be used.
2. The levels of the blocking signal and wanted signal have to be corrected for the (in-band) antenna assembly gain.

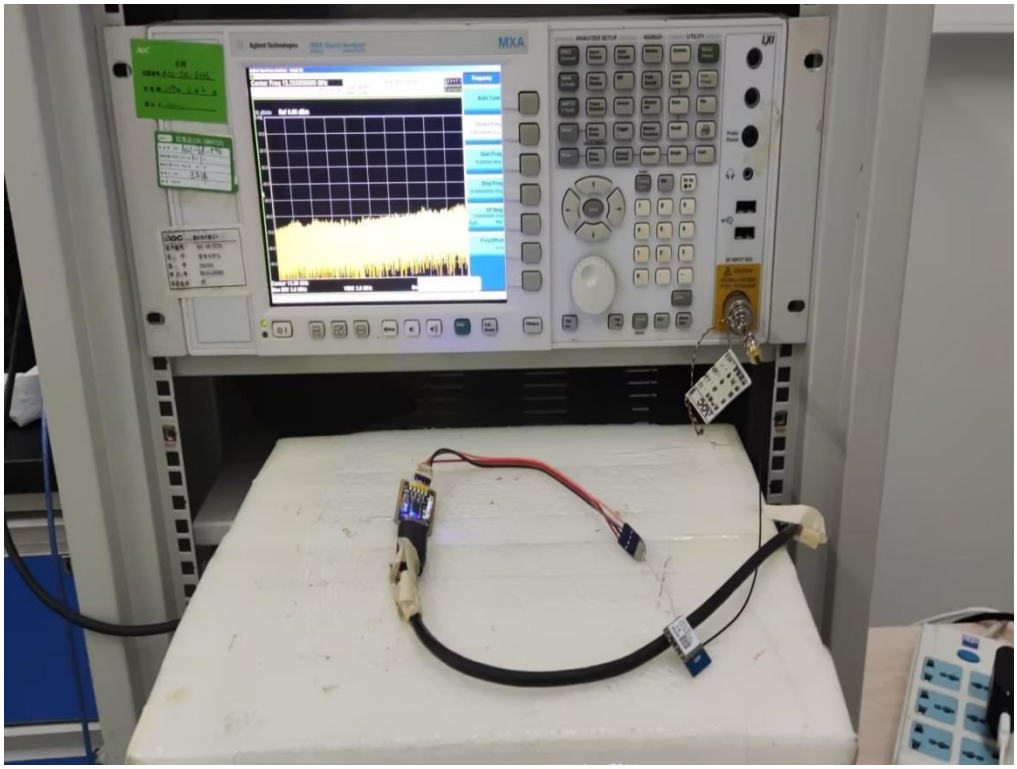
# APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED SPURIOUS EMISSION TEST SETUP



RADIATED SPURIOUS EMISSION ABOVE 1G TEST SETUP

CONDUCTED TEST SETUP



## APPENDIX B: PHOTOGRAPHS OF EUT

Refer to the Report No.: AGC01110230937AP01

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

# Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

# Safety Test Report

Report No.: AGC01110230937ES01

| | | |
|---|---|---|
| **PRODUCT DESIGNATION** | : | Wake-up Light |
| **BRAND NAME** | : | N/A |
| **MODEL NAME** | : | ACA-002, ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| **APPLICANT** | : | Shenzhen Juku Intelligent Technology Co., Ltd. |
| **DATE OF ISSUE** | : | Sep. 27, 2023 |
| **STANDARD(S)** | : | EN IEC 62368-1:2020+A11:2020 |
| **REPORT VERSION** | : | V1.0 |

*A*ttestation of *G*lobal *C*ompliance (Shenzhen) Co., Ltd.

# TEST REPORT

## EN IEC 62368-1

## Audio/video, information and communication technology equipment
## Part 1: Safety requirements

| | | |
|---|---|---|
| Report Number. ..... : | AGC01110230937ES01 | |
| Tested by (+ signature). ..... : | Rudy Lin | Rudy Lin |
| Reviewed by (+ signature). ..... : | Byron Wang | Byron Wang |
| Approved by (+ signature). ..... : | Matte He<br>(Authorized Officer) | Matte He |
| Date of issue ..... : | Sep. 27, 2023 | |
| Total number of pages ..... : | Total 69 ages | |

**Testing laboratory**

| | |
|---|---|
| Name ..... : | Attestation of Global Compliance (Shenzhen) Co., Ltd. |
| Address ..... : | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| Testing location ..... : | Same as above. |

**Applicant**

| | |
|---|---|
| Name ..... : | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address ..... : | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen , Guangdong, China |

**Manufacturer**

| | |
|---|---|
| Name ..... : | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address ..... : | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen , Guangdong, China |

**Factory**

| | |
|---|---|
| Name | Shenzhen Juku Intelligent Technology Co., Ltd. |
| Address | Room 1009, Building 11, Tianan Yungu, Gangtou Community, Bantian Street, Longgang District, Shenzhen , Guangdong, China |

**Test specification:**

| | |
|---|---|
| Standard ..... : | EN IEC 62368-1:2020+A11:2020 |
| Test procedure ..... : | Type test |
| Procedure deviation ..... : | N/A |
| Non-standard test method ..... : | N/A |

| | |
|---|---|
| **Test Report Form/blank test report** | |
| Test Report Form No. ..... : | AGC62368A3 |
| TRF originator. ..... : | AGC |
| Master TRF ..... : | 2020-07 |
| **Test item** | |
| Test item description. .....: | Wake-up Light |
| Trade Mark .....: | N/A |
| Test model.....: | ACA-002 |
| Series model.....: | ACA-002-B, ACA-002-S, ACA-002-M, ACA-002-MB, ACA-002-MS, ACA-002-PRO-B, ACA-002-PRO-S |
| Ratings .....: | Input: 5.0V⎓ 2A |
| **Test item particulars** | |
| Product group ..... : | ☒ end product ☐ built-in component |
| Classification of use by ..... : | ☒ Ordinary person ☐ Children likely present<br>☒ Instructed person<br>☒ Skilled person |
| Supply connection..... : | ☐ AC mains ☐ DC mains<br>☒ not mains connected:<br>☒ ES1 ☐ ES2 ☐ ES3 |
| Supply tolerance ..... : | ☐ +10%/-10%<br>☐ +20%/-15%<br>☐ + %/ - %<br>☒ None |
| Supply connection – type ..... : | ☐ pluggable equipment type A -<br>☐ non-detachable supply cord<br>☐ appliance coupler<br>☐ direct plug-in<br>☐ pluggable equipment type B -<br>☐ non-detachable supply cord<br>☐ appliance coupler<br>☐ permanent connection<br>☐ mating connector ☒ other: not mains connected |
| Considered current rating of protective device..... : | ☐ 16 A;<br>Location: ☐ building ☐ equipment<br>☒ N/A |
| Equipment mobility ..... : | ☒ movable ☐ hand-held ☒ transportable<br>☐ direct plug-in ☐ stationary<br>☐ for building-in<br>☐ wall/ceiling-mounted ☐ SRME/rack-mounted<br>☐ other: |
| Overvoltage category (OVC) ..... : | ☐ OVC I ☐ OVC II ☐ OVC III<br>☐ OVC IV ☒ other: not mains connected |

| | |
|---|---|
| Class of equipment ..... : | ☐ Class I ☐ Class II ☒ Class III ☐ Not classified ☐ |
| Special installation location ..... : | ☒ N/A ☐ restricted access area ☐ outdoor location ☐ |
| Pollution degree (PD) ..... : | ☐ PD 1 ☒ PD 2 ☐ PD 3 |
| Manufacturer's specified $T_{ma}$ ..... : | 25°C |
| IP protection class ..... : | ☒ IPX0 ☐ IP |
| Power systems ..... : | ☐ TN ☐ TT ☐ IT - $V_{L-L}$ ☒ not AC mains |
| Altitude during operation (m) ..... : | ☒ 2000 m or less ☐ m |
| Altitude of test laboratory (m) ..... : | ☒ 2000 m or less ☐ m |
| Mass of equipment (kg) ..... : | ☒ <1 kg |

**Possible test case verdicts:**

- test case does not apply to the test object..... : N(/A)
- test object does meet the requirement..... : P (Pass)
- test object does not meet the requirement ..... : F (Fail)

**Testing:**

Date of receipt of test item..... : Sep. 19, 2023

Date (s) of performance of tests..... : Sep. 20, 2023 – Sep. 27, 2023

**Attachments:**

Attachment A..... : Photos of product

**General remarks:**

This report shall not be reproduced except in full without the written approval of the testing laboratory.
The test results presented in this report relate only to the item tested.
"(See remark #)" refers to a remark appended to the report.
"(See appended table)" refers to a table appended to the report.
Throughout this report a point is used as the decimal separator.

Report Revise Record:

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Sep. 27, 2023 | Valid | Initial release |

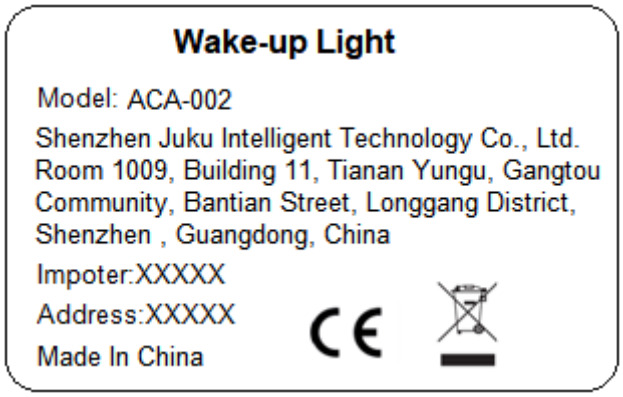
**General product information and other remarks:**

The product is Wake-up Light, which charged by approved adapter via Micro-B port. It is regard as IT equipment for dry location used only.
All models are identical except for model name and colour of enclosure which have no effect on testing.
Instructions and equipment marking related to safety is applied in the language that is acceptable in the country in which the equipment is to be sold.
The product was submitted and tested for use at the manufacturer's recommended ambient temperature (Tma) of 25°C.

**Summary of testing**

The product fulfils the requirements of EN IEC 62368-1:2020+A11:2020.

**Copy of marking plate:**




Remark:

1) The CE marking and WEEE symbol (if any) should be at least 5mm and 7mm respectively in height.

2) The markings and instructions are the minimum requirements required by safety standard. For final production samples, the additional markings which do not give rise to misunderstanding may be added.

3) As declared by the applicant, the importer (and manufacturer, if it is different)'s name, registered trade name or mark and the postal address will be marked on the products before being place on the market.

4) Marking on the packaging or in a document accompanying the electrical equipment is only acceptable if it is not possible to place such markings on the product.

| OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS | | | | |
|---|---|---|---|---|
| **Clause** | **Possible Hazard** | | | |
| 5 | Electrically-caused injury | | | |
| Class and Energy Source (e.g. ES3: Primary circuit) | Body Part (e.g. Ordinary) | Safeguards | | |
| | | B | S | R |
| ES1: All internal circuits | Ordinary person | N/A | N/A | N/A |
| 6 | Electrically-caused fire | | | |
| Class and Energy Source (e.g. PS2: 100 Watt circuit) | Material part (e.g. Printed board) | Safeguards | | |
| | | B | 1st S | 2nd S |
| PS2: Internal circuits<br>PS1: USB output<br>PS1: Button cell | All Flammable materials inside and plastic enclosure | 1. No ignition occurred.<br>2. No parts exceeding 90% of its spontaneous ignition temperature. | 1. PCB is complied with V-0 material;<br>2. all other components: at least V-2 except for mounted on min. V-1 material or small parts of combustible material | N/A |
| 7 | Injury caused by hazardous substances | | | |
| Class and Energy Source (e.g. Ozone) | Body Part (e.g., Skilled) | Safeguards | | |
| | | B | S | R |
| Button cell battery | Ordinary person | N/A | N/A | Complied with annex M |
| 8 | Mechanically-caused injury | | | |
| Class and Energy Source (e.g. MS3: Plastic fan blades) | Body Part (e.g. Ordinary) | Safeguards | | |
| | | B | S | R |
| MS1: Edges and corners | Ordinary person | N/A | N/A | N/A |
| MS1: Equipment mass | Ordinary person | N/A | N/A | N/A |
| 9 | Thermal burn | | | |
| Class and Energy Source (e.g. TS1: Keyboard caps) | Body Part (e.g., Ordinary) | Safeguards | | |
| | | B | S | R |
| TS1: Accessible enclosure | Ordinary person | N/A | N/A | N/A |
| 10 | Radiation | | | |
| Class and Energy Source (e.g. RS1: PMP sound output) | Body Part (e.g., Ordinary) | Safeguards | | |
| | | B | S | R |
| RS1: LED lights | Ordinary person | N/A | N/A | N/A |
| Supplementary Information: “B” – Basic Safeguard; “S” – Supplementary Safeguard; “R” – Reinforced Safeguard | | | | |

| ENERGY SOURCE DIAGRAM |
| --- |
| **Optional**. Manufacturers are to provide the energy sources diagram identify declared energy sources and identifying the demarcations are between power sources. Recommend diagram be provided included in power supply and multipart systems.<br>Insert diagram below. Example diagram designs are; Block diagrams; image(s) with layered data; mechanical drawings |
| **See OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS for details**<br>☒ **ES** ☒ **PS** ☒ **MS** ☒ **TS** ☒ **RS** |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **4** | **GENERAL REQUIREMENTS** | | P |
| 4.1.1 | Acceptance of materials, components and subassemblies | See appended table 4.1.2 | P |
| 4.1.2 | Use of components | Components which are certified to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment. | P |
| 4.1.3 | Equipment design and construction | No accessible part which could cause injury | P |
| 4.1.4 | Specified ambient temperature for outdoor use ($^{o}$C) ..... : | | N |
| 4.1.5 | Constructions and components not specifically covered | No such parts. | N |
| 4.1.8 | Liquids and liquid filled components (LFC) | No such parts. | N |
| 4.1.15 | Markings and instructions | (See Annex F) | P |
| 4.4.3 | Safeguard robustness | | P |
| 4.4.3.1 | General | | P |
| 4.4.3.2 | Steady force tests | (See Annex T.4) | P |
| 4.4.3.3 | Drop tests | (See Annex T.7) | P |
| 4.4.3.4 | Impact tests | | N |
| 4.4.3.5 | Internal accessible safeguard tests | | N |
| 4.4.3.6 | Glass impact tests | | N |
| 4.4.3.7 | Glass fixation tests | | N |
| | Glass impact test (1J) | | N |
| | Push/pull test (10 N) | | N |
| 4.4.3.8 | Thermoplastic material tests | (See Annex T.8) | P |
| 4.4.3.9 | Air comprising a safeguard | | N |
| 4.4.3.10 | Accessibility, glass, safeguard effectiveness | Safeguard remain effective. | P |
| 4.4.4 | Displacement of a safeguard by an insulating liquid | | N |
| 4.4.5 | Safety interlocks | No such component within equipment. | N |
| **4.5** | **Explosion** | | P |
| 4.5.1 | General | No explosion occurs during normal/abnormal operation and | P |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | | single fault conditions | |
| 4.5.2 | No explosion during normal/abnormal operating condition | (See Clause B.2, B.3) | P |
| | No harm by explosion during single fault conditions | (See Clause B.4) | P |
| **4.6** | **Fixing of conductors** | | N |
| | Fix conductors not to defeat a safeguard | Not defeat a safeguard. | N |
| | Compliance is checked by test.....: | | N |
| **4.7** | **Equipment for direct insertion into mains socket–outlets** | | N |
| 4.7.2 | Mains plug part complies with relevant standard .: | | N |
| 4.7.3 | Torque (Nm) .....: | | N |
| **4.8** | **Equipment containing coin/button cell batteries** | | P |
| 4.8.1 | General | | P |
| 4.8.2 | Instructional safeguard .....: | | P |
| 4.8.3 | Battery compartment door/cover construction | | P |
| | Open torque test | | P |
| 4.8.4.2 | Stress relief test | | P |
| 4.8.4.3 | Battery replacement test | | P |
| 4.8.4.4 | Drop test | | P |
| 4.8.4.5 | Impact test | | P |
| 4.8.4.6 | Crush test | | P |
| 4.8.5 | Compliance | | P |
| | 30N force test with test probe | | P |
| | 20N force test with test hook | | P |
| **4.9** | **Likelihood of fire or shock due to entry of conductive object** | | N |
| **4.10** | **Component requirements** | | N |
| 4.10.1 | Disconnect Device | | N |
| 4.10.2 | Switches and relays | | N |
| **5** | **ELECTRICALLY-CAUSED INJURY** | | P |
| **5.2** | **Classification and limits of electrical energy sources** | | P |
| 5.2.2 | ES1, ES2 and ES3 limits | (See appended table 5.2) | P |
| 5.2.2.2 | Steady-state voltage and current limits.....: | ES1 | P |
| 5.2.2.3 | Capacitance limits.....: | | N |
| 5.2.2.4 | Single pulse limits .....: | No such single pulses with the EUT | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.2.2.5 | Limits for repetitive pulses ..... | No such repetitive pulses with the EUT | N |
| 5.2.2.6 | Ringing signals | No such ringing signals with the EUT | N |
| 5.2.2.7 | Audio signals | | N |
| **5.3** | **Protection against electrical energy sources** | | N |
| 5.3.1 | General Requirements for accessible parts to ordinary, instructed and skilled persons | ES1 | N |
| 5.3.1 a) | Accessible ES1/ES2 derived from ES2/ES3 circuits | | N |
| 5.3.1 b) | Skilled persons not unintentional contact ES3 bare conductors | | N |
| 5.3.2.1 | Accessibility to electrical energy sources and safeguards | | N |
| | Accessibility to outdoor equipment bare parts | | N |
| 5.3.2.2 | Contact requirements | | N |
| | Test with test probe from Annex V | | - |
| 5.3.2.2 a) | Air gap – electric strength test potential (V)..... | | N |
| 5.3.2.2 b) | Air gap – distance (mm) ..... | | N |
| 5.3.2.3 | Compliance | | N |
| 5.3.2.4 | Terminals for connecting stripped wire | | N |
| **5.4** | **Insulation materials and requirements** | | N |
| 5.4.1.2 | Properties of insulating material | | N |
| 5.4.1.3 | Material is non-hygroscopic | | N |
| 5.4.1.4 | Maximum operating temperature for insulating materials..... | | N |
| 5.4.1.5 | Pollution degrees ..... | | N |
| 5.4.1.5.2 | Test for pollution degree 1 environment and for an insulating compound | | N |
| 5.4.1.5.3 | Thermal cycling test | | N |
| 5.4.1.6 | Insulation in transformers with varying dimensions | | N |
| 5.4.1.7 | Insulation in circuits generating starting pulses | | N |
| 5.4.1.8 | Determination of working voltage..... | | N |
| 5.4.1.9 | Insulating surfaces | | N |
| 5.4.1.10 | Thermoplastic parts on which conductive metallic parts are directly mounted | | N |
| 5.4.1.10.2 | Vicat test ..... | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.4.1.10.3 | Ball pressure test | | N |
| 5.4.2 | Clearances | | N |
| 5.4.2.1 | General requirements | | N |
| | Clearances in circuits connected to AC Mains, Alternative method | | N |
| 5.4.2.2 | Procedure 1 for determining clearance | | N |
| | Temporary overvoltage | | — |
| 5.4.2.3 | Procedure 2 for determining clearance | | N |
| 5.4.2.3.2.2 | a.c. mains transient voltage | | — |
| 5.4.2.3.2.3 | d.c. mains transient voltage | | — |
| 5.4.2.3.2.4 | External circuit transient voltage | | — |
| 5.4.2.3.2.5 | Transient voltage determined by measurement | | — |
| 5.4.2.4 | Determining the adequacy of a clearance using an electric strength test | | N |
| 5.4.2.5 | Multiplication factors for clearances and test voltages | | N |
| 5.4.2.6 | Clearance measurement | | N |
| 5.4.3 | Creepage distances | | N |
| 5.4.3.1 | General | | N |
| 5.4.3.3 | Material group | | — |
| 5.4.3.4 | Creepage distances measurement | | N |
| 5.4.4 | Solid insulation | | N |
| 5.4.4.1 | General requirements | | N |
| 5.4.4.2 | Minimum distance through insulation | | N |
| 5.4.4.3 | Insulating compound forming solid insulation | | N |
| 5.4.4.4 | Solid insulation in semiconductor devices | | N |
| 5.4.4.5 | Insulating compound forming cemented joints | | N |
| 5.4.4.6 | Thin sheet material | | N |
| 5.4.4.6.1 | General requirements | | N |
| 5.4.4.6.2 | Separable thin sheet material | | N |
| | Number of layers (pcs) | | N |
| 5.4.4.6.3 | Non-separable thin sheet material | | N |
| | Number of layers (pcs) | | N |
| 5.4.4.6.4 | Standard test procedure for non-separable thin sheet material | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.4.4.6.5 | Mandrel test | | N |
| 5.4.4.7 | Solid insulation in wound components | | N |
| 5.4.4.9 | Solid insulation at frequencies >30 kHz, $E_P$, $K_R$, $d$, $V_{PW}$ (V) | | N |
| | Alternative by electric strength test, tested voltage (V), $K_R$ | | N |
| 5.4.5 | Antenna terminal insulation | | N |
| 5.4.5.1 | General | | N |
| 5.4.5.2 | Voltage surge test | | N |
| 5.4.5.3 | Insulation resistance (MΩ) | | N |
| | Electric strength test | | N |
| 5.4.6 | Insulation of internal wire as part of supplementary safeguard | | N |
| 5.4.7 | Tests for semiconductor components and for cemented joints | | N |
| 5.4.8 | Humidity conditioning | | N |
| | Relative humidity (%), temperature (°C), duration (h) | | — |
| 5.4.9 | Electric strength test | | N |
| 5.4.9.1 | Test procedure for type test of solid insulation | | N |
| 5.4.9.2 | Test procedure for routine test | | N |
| 5.4.10 | Safeguards against transient voltages from external circuits | | N |
| 5.4.10.1 | Parts and circuits separated from external circuits | | N |
| 5.4.10.2 | Test methods | | N |
| 5.4.10.2.1 | General | | N |
| 5.4.10.2.2 | Impulse test | | N |
| 5.4.10.2.3 | Steady-state test | | N |
| 5.4.10.3 | Verification for insulation breakdown for impulse test | | N |
| 5.4.11 | Separation between external circuits and earth | | N |
| 5.4.11.1 | Exceptions to separation between external circuits and earth | | N |
| 5.4.11.2 | Requirements | | N |
| | SPDs bridge separation between external circuit and earth | | N |
| | Rated operating voltage $U_{op}$ (V) | | — |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Nominal voltage $U_{peak}$ (V) ..... | | — |
| | Max increase due to variation $\Delta U_{sp}$ ..... | | — |
| | Max increase due to ageing $\Delta U_{sa}$ ..... | | — |
| 5.4.11.3 | Test method and compliance ..... | | N |
| 5.4.12 | Insulating liquid | | N |
| 5.4.12.1 | General requirements | | N |
| 5.4.12.2 | Electric strength of an insulating liquid ..... | | N |
| 5.4.12.3 | Compatibility of an insulating liquid ..... | | N |
| 5.4.12.4 | Container for insulating liquid ..... | | N |
| **5.5** | **Components as safeguards** | | N |
| 5.5.1 | General | | N |
| 5.5.2 | Capacitors and RC units | | N |
| 5.5.2.1 | General requirement | | N |
| 5.5.2.2 | Safeguards against capacitor discharge after disconnection of a connector..... | | N |
| 5.5.3 | Transformers | | N |
| 5.5.4 | Optocouplers | | N |
| 5.5.5 | Relays | | N |
| 5.5.6 | Resistors | | N |
| 5.5.7 | SPDs | | N |
| 5.5.8 | Insulation between the mains and an external circuit consisting of a coaxial cable ..... | | N |
| 5.5.9 | Safeguards for socket-outlets in outdoor equipment | | N |
| | RCD rated residual operating current (mA)..... | | — |
| **5.6** | **Protective conductor** | | N |
| 5.6.2 | Requirement for protective conductors | | N |
| 5.6.2.1 | General requirements | | N |
| 5.6.2.2 | Colour of insulation | | N |
| 5.6.3 | Requirement for protective earthing conductors | | N |
| | Protective earthing conductor size ($mm^2$) ..... | | — |
| | Protective earthing conductor serving as a reinforced safeguard | | N |
| | Protective earthing conductor serving as a double safeguard | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.6.4 | Requirements for protective bonding conductors | | N |
| 5.6.4.1 | Protective bonding conductors | | N |
| | Protective bonding conductor size ($mm^2$)..... | | — |
| 5.6.4.2 | Protective current rating (A) ..... | | N |
| 5.6.5 | Terminals for protective conductors | | N |
| 5.6.5.1 | Terminal size for connecting protective earthing conductors (mm) ..... | | N |
| | Terminal size for connecting protective bonding conductors (mm)..... | | N |
| 5.6.5.2 | Corrosion | | N |
| 5.6.6 | Resistance of the protective bonding system | | N |
| 5.6.6.1 | Requirements | | N |
| 5.6.6.2 | Test Method..... | | N |
| 5.6.6.3 | Resistance (Ω) or voltage drop ..... | | N |
| 5.6.7 | Reliable connection of a protective earthing conductor | | N |
| 5.6.8 | Functional earthing | | N |
| | Conductor size ($mm^2$) ..... | | N |
| | Class II with functional earthing marking ..... | | N |
| | Appliance inlet cl & cr (mm)..... | | N |
| **5.7** | **Prospective touch voltage, touch current and protective conductor current** | | N |
| 5.7.2 | Measuring devices and networks | | N |
| 5.7.2.1 | Measurement of touch current | | N |
| 5.7.2.2 | Measurement of voltage | | N |
| 5.7.3 | Equipment set-up, supply connections and earth connections | | N |
| 5.7.4 | Unearthed accessible parts..... | | N |
| 5.7.5 | Earthed accessible conductive parts..... | | N |
| 5.7.6 | Requirements when touch current exceeds ES2 limits | | N |
| | Protective conductor current (mA) ..... | | N |
| | Instructional Safeguard ..... | | N |
| 5.7.7 | Prospective touch voltage and touch current associated with external circuits | | N |
| 5.7.7.1 | Touch current from coaxial cables | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.7.7.2 | Prospective touch voltage and touch current associated with paired conductor cables | | N |
| 5.7.8 | Summation of touch currents from external circuits | | N |
| | a) Equipment connected to earthed external circuits, current (mA) ..... : | | N |
| | b) Equipment connected to unearthed external circuits, current (mA) ..... : | | N |
| **5.8** | **Backfeed safeguard in battery backed up supplies** | | N |
| | Mains terminal ES..... : | | N |
| | Air gap (mm) ..... : | | N |
| **6** | **ELECTRICALLY- CAUSED FIRE** | | P |
| **6.2** | **Classification of PS and PIS** | | P |
| 6.2.2 | Power source circuit classifications..... : | PS (power source) classification determined by measuring the maximum power in Figures 34 and 35 for load and power source circuits. | P |
| 6.2.3 | Classification of potential ignition sources | (See appended table 6.2.2) | P |
| 6.2.3.1 | Arcing PIS ..... : | | N |
| 6.2.3.2 | Resistive PIS ..... : | | N |
| **6.3** | **Safeguards against fire under normal operating and abnormal operating conditions** | | P |
| 6.3.1 | No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials ..... : | (See appended table B.1.5 and B.3) | P |
| | Combustible materials outside fire enclosure ..... : | No such materials used. | N |
| **6.4** | **Safeguards against fire under single fault conditions** | | P |
| 6.4.1 | Safeguard method | | P |
| 6.4.2 | Reduction of the likelihood of ignition under single fault conditions in PS1 circuits | | N |
| 6.4.3 | Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits | Method by control of fire spread. | N |
| 6.4.3.1 | Supplementary safeguards | | N |
| 6.4.3.2 | Single Fault Conditions ..... : | | N |
| | Special conditions for temperature limited by fuse | | N |
| 6.4.4 | Control of fire spread in PS1 circuits | | P |
| 6.4.5 | Control of fire spread in PS2 circuits | | P |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 6.4.5.2 | Supplementary safeguards | Refer to appended table 4.1.2 for detail. PCB rated V-0 | P |
| 6.4.6 | Control of fire spread in PS3 circuits | | N |
| 6.4.7 | Separation of combustible materials from a PIS | | N |
| 6.4.7.2 | Separation by distance | | N |
| 6.4.7.3 | Separation by a fire barrier | | N |
| 6.4.8 | Fire enclosures and fire barriers | | N |
| 6.4.8.2 | Fire enclosure and fire barrier material properties | | N |
| 6.4.8.2.1 | Requirements for a fire barrier | | N |
| 6.4.8.2.2 | Requirements for a fire enclosure | | N |
| 6.4.8.3 | Constructional requirements for a fire enclosure and a fire barrier | | N |
| 6.4.8.3.1 | Fire enclosure and fire barrier openings | No opening | N |
| 6.4.8.3.2 | Fire barrier dimensions | No barrier used. | N |
| 6.4.8.3.3 | Top openings and properties | | N |
| | Openings dimensions (mm).....: | | N |
| 6.4.8.3.4 | Bottom openings and properties | | N |
| | Openings dimensions (mm).....: | | N |
| | Flammability tests for the bottom of a fire enclosure | | N |
| | Instructional Safeguard.....: | | N |
| 6.4.8.3.5 | Side openings and properties | | N |
| | Openings dimensions (mm).....: | | N |
| 6.4.8.3.6 | Integrity of a fire enclosure, condition met: a), b) or c).....: | | N |
| 6.4.8.4 | Separation of a PIS from a fire enclosure and a fire barrier distance (mm) or flammability rating ...: | | N |
| 6.4.9 | Flammability of insulating liquid .....: | | N |
| **6.5** | **Internal and external wiring** | | N |
| 6.5.1 | General requirements | | N |
| 6.5.2 | Requirements for interconnection to building wiring .....: | | – |
| 6.5.3 | Internal wiring size ($mm^2$) for socket-outlets.....: | No such wiring, outlet and inlet. | N |
| **6.6** | **Safeguards against fire due to the connection to additional equipment** | | P |
| **7** | **INJURY CAUSED BY HAZARDOUS SUBSTANCES** | | P |
| **7.2** | **Reduction of exposure to hazardous substances** | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **7.3** | **Ozone exposure** | | N |
| **7.4** | **Use of personal safeguards or personal protective equipment (PPE)** | | N |
| | Personal safeguards and instructions .....: | No PPE used. | — |
| **7.5** | **Use of instructional safeguards and instructions** | | N |
| | Instructional safeguard (ISO 7010) .....: | | — |
| **7.6** | **Batteries and their protection circuits** | | P |
| **8** | **MECHANICALLY-CAUSED INJURY** | | P |
| **8.2** | **Mechanical energy source classifications** | | P |
| **8.3** | **Safeguards against mechanical energy sources** | | N |
| **8.4** | **Safeguards against parts with sharp edges and corners** | | N |
| 8.4.1 | Safeguards | MS1 only | N |
| | Instructional Safeguard.....: | | N |
| 8.4.2 | Sharp edges or corners | No sharp edges and corners | N |
| **8.5** | **Safeguards against moving parts** | | N |
| 8.5.1 | Fingers, jewellery, clothing, hair, etc., contact with MS2 or MS3 parts | | N |
| | MS2 or MS3 part required to be accessible for the function of the equipment | | N |
| | Moving MS3 parts only accessible to skilled person | | N |
| 8.5.2 | Instructional safeguard .....: | | N |
| 8.5.4 | Special categories of equipment containing moving parts | | N |
| 8.5.4.1 | General | | N |
| 8.5.4.2 | Equipment containing work cells with MS3 parts | | N |
| 8.5.4.2.1 | Protection of persons in the work cell | | N |
| 8.5.4.2.2 | Access protection override | | N |
| 8.5.4.2.2.1 | Override system | | N |
| 8.5.4.2.2.2 | Visual indicator | | N |
| 8.5.4.2.3 | Emergency stop system | | N |
| | Maximum stopping distance from the point of activation (m).....: | | N |
| | Space between end point and nearest fixed mechanical part (mm).....: | | N |
| 8.5.4.2.4 | Endurance requirements | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Mechanical system subjected to 100 000 cycles of operation | | N |
| | - Mechanical function check and visual inspection | | N |
| | - Cable assembly ..... : | | N |
| 8.5.4.3 | Equipment having electromechanical device for destruction of media | | N |
| 8.5.4.3.1 | Equipment safeguards | | N |
| 8.5.4.3.2 | Instructional safeguards against moving parts ..... : | | N |
| 8.5.4.3.3 | Disconnection from the supply | | N |
| 8.5.4.3.4 | Cut type and test force (N) ..... : | | N |
| 8.5.4.3.5 | Compliance | | N |
| 8.5.5 | High pressure lamps | | N |
| | Explosion test ..... : | | N |
| 8.5.5.3 | Glass particles dimensions (mm) ..... : | | N |
| **8.6** | **Stability of equipment** | | N |
| 8.6.1 | General | | N |
| | Instructional safeguard ..... : | | N |
| 8.6.2 | Static stability | | N |
| 8.6.2.2 | Static stability test ..... : | | N |
| 8.6.2.3 | Downward force test | | N |
| 8.6.3 | Relocation stability | | N |
| | Wheels diameter (mm) ..... : | | — |
| | Tilt test | | N |
| 8.6.4 | Glass slide test | | N |
| 8.6.5 | Horizontal force test ..... : | | N |
| **8.7** | **Equipment mounted to wall, ceiling or other structure** | | N |
| 8.7.1 | Mount means type ..... : | | N |
| 8.7.2 | Test methods | | N |
| | Test 1, additional downwards force (N) ..... : | | N |
| | Test 2, number of attachment points and test force (N) ..... : | | N |
| | Test 3 Nominal diameter (mm) and applied torque (Nm) ..... : | | N |
| **8.8** | **Handles strength** | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.8.1 | General | No handles. | N |
| 8.8.2 | Handle strength test | | N |
| | Number of handles..... : | | — |
| | Force applied (N) ..... : | | — |
| **8.9** | **Wheels or casters attachment requirements** | | N |
| 8.9.2 | Pull test | No wheels or casters | N |
| **8.10** | **Carts, stands and similar carriers** | | N |
| 8.10.1 | General | No such part | N |
| 8.10.2 | Marking and instructions..... : | | N |
| 8.10.3 | Cart, stand or carrier loading test | | N |
| | Loading force applied (N) ..... : | | N |
| 8.10.4 | Cart, stand or carrier impact test | | N |
| 8.10.5 | Mechanical stability | | N |
| | Force applied (N) ..... : | | — |
| 8.10.6 | Thermoplastic temperature stability | | N |
| **8.11** | **Mounting means for slide-rail mounted equipment (SRME)** | | N |
| 8.11.1 | General | No slide-rail mounted. | N |
| 8.11.2 | Requirements for slide rails | | N |
| | Instructional Safeguard..... : | | N |
| 8.11.3 | Mechanical strength test | | N |
| 8.11.3.1 | Downward force test, force (N) applied..... : | | N |
| 8.11.3.2 | Lateral push force test | | N |
| 8.11.3.3 | Integrity of slide rail end stops | | N |
| 8.11.4 | Compliance | | N |
| **8.12** | **Telescoping or rod antennas** | | N |
| | Button/ball diameter (mm) ..... : | No antenna | — |
| **9** | **THERMAL BURN INJURY** | | P |
| **9.2** | **Thermal energy source classifications** | | P |
| **9.3** | **Touch temperature limits** | | P |
| 9.3.1 | Touch temperatures of accessible parts ..... : | (See appended table 9.3) | P |
| 9.3.2 | Test method and compliance | Checked by test. | P |
| **9.4** | **Safeguards against thermal energy sources** | | P |
| **9.5** | **Requirements for safeguards** | | P |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 9.5.1 | Equipment safeguard | Enclosure as a safeguard. | P |
| 9.5.2 | Instructional safeguard ..... : | | N |
| **9.6** | **Requirements for wireless power transmitters** | | N |
| 9.6.1 | General | No wireless power transmitters | N |
| 9.6.2 | Specification of the foreign objects | | N |
| 9.6.3 | Test method and compliance ..... : | | N |
| **10** | **RADIATION** | | P |
| **10.2** | **Radiation energy source classification** | | P |
| 10.2.1 | General classification | | P |
| | Lasers ..... : | | — |
| | Lamps and lamp systems ..... : | RS1: LED lights | — |
| | Image projectors ..... : | | — |
| | X-Ray ..... : | | — |
| | Personal music player ..... : | | — |
| **10.3** | **Safeguards against laser radiation** | | N |
| | The standard(s) equipment containing laser(s) comply ..... : | No laser | N |
| **10.4** | **Safeguards against optical radiation from lamps and lamp systems (including LED types)** | | P |
| 10.4.1 | General requirements | RS1: LED lights | P |
| | Instructional safeguard provided for accessible radiation level needs to exceed | | N |
| | Risk group marking and location ..... : | | N |
| | Information for safe operation and installation | | N |
| 10.4.2 | Requirements for enclosures | | N |
| | UV radiation exposure ..... : | | N |
| 10.4.3 | Instructional safeguard ..... : | | N |
| **10.5** | **Safeguards against X-radiation** | | N |
| 10.5.1 | Requirements | No X-radiation | N |
| | Instructional safeguard for skilled persons ..... : | | — |
| 10.5.3 | Maximum radiation (pA/kg) ..... : | | — |
| **10.6** | **Safeguards against acoustic energy sources** | | N |
| 10.6.1 | General | | N |
| 10.6.2 | Classification | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Acoustic output $L_{Aeq,T}$, dB(A)..... : | | N |
| | Unweighted RMS output voltage (mV)..... : | | N |
| | Digital output signal (dBFS)..... : | | N |
| 10.6.3 | Requirements for dose-based systems | | N |
| 10.6.3.1 | General requirements | | N |
| 10.6.3.2 | Dose-based warning and automatic decrease | | N |
| 10.6.3.3 | Exposure-based warning and requirements | | N |
| | 30 s integrated exposure level (MEL30) ..... : | | N |
| | Warning for MEL ≥ 100 dB(A) ..... : | | N |
| 10.6.4 | Measurement methods | | N |
| 10.6.5 | Protection of persons | | N |
| | Instructional safeguards .....: | | N |
| 10.6.6 | Requirements for listening devices (headphones, earphones, etc.) | | N |
| 10.6.6.1 | Corded listening devices with analogue input | | N |
| | Listening device input voltage (mV) .....: | | N |
| 10.6.6.2 | Corded listening devices with digital input | | N |
| | Max. acoustic output $L_{Aeq,T}$, dB(A)..... : | | N |
| 10.6.6.3 | Cordless listening devices | | N |
| | Max. acoustic output $L_{Aeq,T}$, dB(A)..... : | | N |
| **B** | **NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS** | | P |
| **B.1** | **General** | | P |
| B.1.5 | Temperature measurement conditions | (See appended table B.1.5) | P |
| **B.2** | **Normal operating conditions** | | P |
| B.2.1 | General requirements.....: | (See Test Item Particulars and appended test tables) | P |
| | Audio Amplifiers and equipment with audio amplifiers .....: | | P |
| B.2.3 | Supply voltage and tolerances | (See appended table B.2.5) | P |
| B.2.5 | Input test.....: | (See appended table B.2.5) | P |
| **B.3** | **Simulated abnormal operating conditions** | | P |
| B.3.1 | General | | P |
| B.3.2 | Covering of ventilation openings | No ventilation openings | N |
| | Instructional safeguard .....: | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| B.3.3 | DC mains polarity test | No DC mains | N |
| B.3.4 | Setting of voltage selector | No such device. | N |
| B.3.5 | Maximum load at output terminals | | P |
| B.3.6 | Reverse battery polarity | | P |
| B.3.7 | Audio amplifier abnormal operating conditions | | P |
| B.3.8 | Safeguards functional during and after abnormal operating conditions .....: | | P |
| **B.4** | **Simulated single fault conditions** | | P |
| B.4.1 | General | | P |
| B.4.2 | Temperature controlling device | | N |
| B.4.3 | Blocked motor test | | N |
| B.4.4 | Functional insulation | See the following details. | P |
| B.4.4.1 | Short circuit of clearances for functional insulation | (See appended table B.3 &B.4) | P |
| B.4.4.2 | Short circuit of creepage distances for functional insulation | (See appended table B.3 &B.4) | P |
| B.4.4.3 | Short circuit of functional insulation on coated printed boards | No coated printed boards within the EUT | N |
| B.4.5 | Short-circuit and interruption of electrodes in tubes and semiconductors | | P |
| B.4.6 | Short circuit or disconnection of passive components | (See appended table B.3 &B.4) | P |
| B.4.7 | Continuous operation of components | The EUT is continuous operating type and no such components intended for short time operation or intermittent operation | N |
| B.4.8 | Compliance during and after single fault conditions.....: | (See appended table B.3&B.4) | P |
| B.4.9 | Battery charging and discharging under single fault conditions | | N |
| **C** | **UV RADIATION** | | N |
| **C.1** | **Protection of materials in equipment from UV radiation** | | N |
| C.1.2 | Requirements | No UV radiation | N |
| C.1.3 | Test method | | N |
| **C.2** | **UV light conditioning test** | | N |
| C.2.1 | Test apparatus.....: | | N |
| C.2.2 | Mounting of test samples | | N |
| C.2.3 | Carbon-arc light-exposure test | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| C.2.4 | Xenon-arc light-exposure test | | N |
| **D** | **TEST GENERATORS** | | N |
| **D.1** | **Impulse test generators** | | N |
| **D.2** | **Antenna interface test generator** | | N |
| **D.3** | **Electronic pulse generator** | | N |
| **E** | **TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS** | | P |
| **E.1** | **Electrical energy source classification for audio signals** | | P |
| | Maximum non-clipped output power (W).....: | | — |
| | Rated load impedance (Ω) .....: | 8Ω | — |
| | Open-circuit output voltage (V).....: | | — |
| | Instructional safeguard .....: | | — |
| **E.2** | **Audio amplifier normal operating conditions** | | N |
| | Audio signal source type .....: | | — |
| | Audio output power (W).....: | | — |
| | Audio output voltage (V).....: | | — |
| | Rated load impedance (Ω) .....: | | — |
| | Requirements for temperature measurement | | N |
| E.3 | Audio amplifier abnormal operating conditions | | P |
| **F** | **EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS** | | P |
| **F.1** | **General** | | P |
| | Language .....: | Only english version review.<br>Versions in other language will be provided when submitted for national approval. | — |
| **F.2** | **Letter symbols and graphical symbols** | | P |
| F.2.1 | Letter symbols according to IEC60027-1 | Letter symbols for quantities and units are complied with IEC 60027-1. | P |
| F.2.2 | Graphic symbols according to IEC, ISO or manufacturer specific | Graphical symbols are complied with IEC 60417, ISO 3864-2, ISO 7000 or ISO 7010. | P |
| **F.3** | **Equipment markings** | | P |
| F.3.1 | Equipment marking locations | Equipment marking is located on the exterior surface and is easily visible. | P |
| F.3.2 | Equipment identification markings | See the following details. | P |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| F.3.2.1 | Manufacturer identification .....: | See copy of marking plate. | — |
| F.3.2.2 | Model identification .....: | See copy of marking plate. | — |
| F.3.3 | Equipment rating markings | See the following details. | P |
| F.3.3.1 | Equipment with direct connection to mains | | N |
| F.3.3.2 | Equipment without direct connection to mains | See above. | P |
| F.3.3.3 | Nature of the supply voltage.....: | ⎓ (no show) | P |
| F.3.3.4 | Rated voltage.....: | 5V (no show) | P |
| F.3.3.5 | Rated frequency .....: | | N |
| F.3.3.6 | Rated current or rated power.....: | 2A (no show) | P |
| F.3.3.7 | Equipment with multiple supply connections | | N |
| F.3.4 | Voltage setting device | | N |
| F.3.5 | Terminals and operating devices | | P |
| F.3.5.1 | Mains appliance outlet and socket-outlet markings .....: | No such devices on the equipment. | N |
| F.3.5.2 | Switch position identification marking.....: | No such switch on the equipment. | N |
| F.3.5.3 | Replacement fuse identification and rating markings .....: | | N |
| | Instructional safeguards for neutral fuse .....: | | N |
| F.3.5.4 | Replacement battery identification marking .....: | | P |
| F.3.5.5 | Neutral conductor terminal | | N |
| F.3.5.6 | Terminal marking location | | N |
| F.3.6 | Equipment markings related to equipment classification | Class III | N |
| F.3.6.1 | Class I equipment | | N |
| F.3.6.1.1 | Protective earthing conductor terminal.....: | | N |
| F.3.6.1.2 | Protective bonding conductor terminals .....: | | N |
| F.3.6.2 | Equipment class marking .....: | | N |
| F.3.6.3 | Functional earthing terminal marking .....: | | N |
| F.3.7 | Equipment IP rating marking .....: | This equipment is classified as IPX0. | — |
| F.3.8 | External power supply output marking .....: | | N |
| F.3.9 | Durability, legibility and permanence of marking | See the following details. | P |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| F.3.10 | Test for permanence of markings | The label was subjected to the permanence of marking test, 15 sec. for water and 15 sec. for petroleum spirit.<br>After each test, the marking remained legible. | P |
| **F.4** | **Instructions** | | P |
| | a) Information prior to installation and initial use | | N |
| | b) Equipment for use in locations where children not likely to be present | Relevant safety caution texts and installation instruction are available. | P |
| | c) Instructions for installation and interconnection | | P |
| | d) Equipment intended for use only in restricted access area | | N |
| | e) Equipment intended to be fastened in place | No such terminal | N |
| | f) Instructions for audio equipment terminals | | N |
| | g) Protective earthing used as a safeguard | | N |
| | h) Protective conductor current exceeding ES2 limits | | N |
| | i) Graphic symbols used on equipment | The EUT is not a permanently connected equipment | N |
| | j) Permanently connected equipment not provided with all-pole mains switch | | N |
| | k) Replaceable components or modules providing safeguard function | | P |
| | l) Equipment containing insulating liquid | | N |
| | m) Installation instructions for outdoor equipment | | N |
| **F.5** | Instructional safeguards | | N |
| **G** | **COMPONENTS** | | P |
| **G.1** | **Switches** | | N |
| G.1.1 | General | | N |
| G.1.2 | Ratings, endurance, spacing, maximum load | | N |
| G.1.3 | Test method and compliance | | N |
| **G.2** | **Relays** | | N |
| G.2.1 | Requirements | No relays | N |
| G.2.2 | Overload test | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| G.2.3 | Relay controlling connectors supplying power to other equipment | | N |
| G.2.4 | Test method and compliance | | N |
| **G.3** | **Protective devices** | | N |
| G.3.1 | Thermal cut-offs | No such device | N |
| | Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b) | No thermal cut-off provided within the equipment. | N |
| | Thermal cut-outs tested as part of the equipment as indicated in c) | | N |
| G.3.1.2 | Test method and compliance | | N |
| G.3.2 | Thermal links | | N |
| G.3.2.1 | a) Thermal links tested separately according to IEC 60691 with specifics | | N |
| | b) Thermal links tested as part of the equipment | | N |
| G.3.2.2 | Test method and compliance | | N |
| G.3.3 | PTC thermistors | No such device | N |
| G.3.4 | Overcurrent protection devices | | N |
| G.3.5 | Safeguards components not mentioned in G.3.1 to G.3.4 | | N |
| G.3.5.1 | Non-resettable devices suitably rated and marking provided | | N |
| G.3.5.2 | Single faults conditions.....: | | N |
| **G.4** | **Connectors** | | N |
| G.4.1 | Spacings | No such connector within the EUT | N |
| G.4.2 | Mains connector configuration.....: | | N |
| G.4.3 | Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely | | N |
| **G.5** | **Wound components** | | N |
| G.5.1 | Wire insulation in wound components | No such component. | N |
| G.5.1.2 | Protection against mechanical stress | | N |
| G.5.2 | Endurance test | | N |
| G.5.2.1 | General test requirements | | N |
| G.5.2.2 | Heat run test | | N |
| | Test time (days per cycle) .....: | | — |
| | Test temperature (°C).....: | | — |
| G.5.2.3 | Wound components supplied from the mains | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| G.5.2.4 | No insulation breakdown | | N |
| G.5.3 | Transformers | | N |
| G.5.3.1 | Compliance method.....: | | N |
| | Position .....: | | N |
| | Method of protection .....: | | N |
| G.5.3.2 | Insulation | | N |
| | Protection from displacement of windings.....: | | — |
| G.5.3.3 | Transformer overload tests | | N |
| G.5.3.3.1 | Test conditions | | N |
| G.5.3.3.2 | Winding temperatures | | N |
| G.5.3.3.3 | Winding temperatures - alternative test method | | N |
| G.5.3.4 | Transformers using FIW | | N |
| G.5.3.4.1 | General | | N |
| | FIW wire nominal diameter.....: | | — |
| G.5.3.4.2 | Transformers with basic insulation only | | N |
| G.5.3.4.3 | Transformers with double insulation or reinforced insulation.....: | | N |
| G.5.3.4.4 | Transformers with FIW wound on metal or ferrite core | | N |
| G.5.3.4.5 | Thermal cycling test and compliance | | N |
| G.5.3.4.6 | Partial discharge test | | N |
| G.5.3.4.7 | Routine test | | N |
| G.5.4 | Motors | | N |
| G.5.4.1 | General requirements | | N |
| G.5.4.2 | Motor overload test conditions | | N |
| G.5.4.3 | Running overload test | | N |
| G.5.4.4.2 | Locked-rotor overload test | | N |
| | Test duration (days) .....: | | — |
| G.5.4.5 | Running overload test for DC motors | | N |
| G.5.4.5.2 | Tested in the unit | | N |
| G.5.4.5.3 | Alternative method | | N |
| G.5.4.6 | Locked-rotor overload test for DC motors | | N |
| G.5.4.6.2 | Tested in the unit | | N |
| | Maximum Temperature .....: | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| G.5.4.6.3 | Alternative method | | N |
| G.5.4.7 | Motors with capacitors | | N |
| G.5.4.8 | Three-phase motors | | N |
| G.5.4.9 | Series motors | | N |
| | Operating voltage .....: | | — |
| **G.6** | **Wire Insulation** | | N |
| G.6.1 | General | | N |
| G.6.2 | Enamelled winding wire insulation | | N |
| **G.7** | **Mains supply cords** | | N |
| G.7.1 | General requirements | | N |
| | Type.....: | | — |
| G.7.2 | Cross sectional area ($mm^2$ or AWG).....: | | N |
| G.7.3 | Cord anchorages and strain relief for non-detachable power supply cords | | N |
| G.7.3.2 | Cord strain relief | | N |
| G.7.3.2.1 | Requirements | | N |
| | Strain relief test force (N).....: | | N |
| G.7.3.2.2 | Strain relief mechanism failure | | N |
| G.7.3.2.3 | Cord sheath or jacket position, distance (mm).....: | | N |
| G.7.3.2.4 | Strain relief and cord anchorage material | | N |
| G.7.4 | Cord Entry | | N |
| G.7.5 | Non-detachable cord bend protection | | N |
| G.7.5.1 | Requirements | | N |
| G.7.5.2 | Test method and compliance | | N |
| | Overall diameter or minor overall dimension, *D* (mm) .....: | | — |
| | Radius of curvature after test (mm).....: | | — |
| G.7.6 | Supply wiring space | | N |
| G.7.6.1 | General requirements | | N |
| G.7.6.2 | Stranded wire | | N |
| G.7.6.2.1 | Requirements | | N |
| G.7.6.2.2 | Test with 8 mm strand | | N |
| **G.8** | **Varistors** | | N |
| G.8.1 | General requirements | No such device. | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| G.8.2 | Safeguards against fire | | N |
| G.8.2.1 | General | | N |
| G.8.2.2 | Varistor overload test | | N |
| G.8.2.3 | Temporary overvoltage test | | N |
| **G.9** | **Integrated circuit (IC) current limiters** | | N |
| G.9.1 | Requirements | No such device. | N |
| | IC limiter output current (max. 5A).....: | | — |
| | Manufacturers' defined drift .....: | | — |
| G.9.2 | Test Program | | N |
| G.9.3 | Compliance | | N |
| **G.10** | **Resistors** | | N |
| G.10.1 | General | No such device. | N |
| G.10.2 | Conditioning | | N |
| G.10.3 | Resistor test | | N |
| G.10.4 | Voltage surge test | | N |
| G.10.5 | Impulse test | | N |
| G.10.6 | Overload test | | N |
| **G.11** | **Capacitors and RC units** | | N |
| G.11.1 | General requirements | | N |
| G.11.2 | Conditioning of capacitors and RC units | | N |
| G.11.3 | Rules for selecting capacitors | | N |
| **G.12** | **Optocouplers** | | N |
| | Optocouplers comply with IEC 60747-5-5 with specifics | No such device. | N |
| | Type test voltage $V_{ini,a}$.....: | | — |
| | Routine test voltage, $V_{ini,b}$ .....: | | — |
| **G.13** | **Printed boards** | | P |
| G.13.1 | General requirements | | P |
| G.13.2 | Uncoated printed boards | | P |
| G.13.3 | Coated printed boards | No coated printed board provided within the equipment. | N |
| G.13.4 | Insulation between conductors on the same inner surface | | N |
| G.13.5 | Insulation between conductors on different surfaces | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Distance through insulation .....: | | N |
| | Number of insulation layers (pcs) .....: | | — |
| G.13.6 | Tests on coated printed boards | | N |
| G.13.6.1 | Sample preparation and preliminary inspection | | N |
| G.13.6.2 | Test method and compliance | | N |
| **G.14** | **Coating on components terminals** | | N |
| G.14.1 | Requirements .....: | | N |
| **G.15** | **Pressurized liquid filled components** | | N |
| G.15.1 | Requirements | No such components used | N |
| G.15.2 | Test methods and compliance | | N |
| G.15.2.1 | Hydrostatic pressure test | | N |
| G.15.2.2 | Creep resistance test | | N |
| G.15.2.3 | Tubing and fittings compatibility test | | N |
| G.15.2.4 | Vibration test | | N |
| G.15.2.5 | Thermal cycling test | | N |
| G.15.2.6 | Force test | | N |
| G.15.3 | Compliance | | N |
| **G.16** | **IC including capacitor discharge function (ICX)** | | N |
| G.16.1 | Condition for fault tested is not required | No such device | N |
| | ICX with associated circuitry tested in equipment | | N |
| | ICX tested separately | | N |
| G.16.2 | Tests | | N |
| | Smallest capacitance and smallest resistance specified by ICX manufacturer for impulse test....: | | — |
| | Mains voltage that impulses to be superimposed on.....: | | — |
| | Largest capacitance and smallest resistance for ICX tested by itself for 10000 cycles test .....: | | — |
| G.16.3 | Capacitor discharge test.....: | | N |
| **H** | **CRITERIA FOR TELEPHONE RINGING SIGNALS** | | N |
| **H.1** | **General** | | N |
| **H.2** | **Method A** | | N |
| **H.3** | **Method B** | | N |
| H.3.1 | Ringing signal | No such telephone ringing signal | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| H.3.1.1 | Frequency (Hz) .....: | | — |
| H.3.1.2 | Voltage (V) .....: | | — |
| H.3.1.3 | Cadence; time (s) and voltage (V) .....: | | — |
| H.3.1.4 | Single fault current (mA):.....: | | — |
| H.3.2 | Tripping device and monitoring voltage | | N |
| H.3.2.1 | Conditions for use of a tripping device or a monitoring voltage | | N |
| H.3.2.2 | Tripping device | | N |
| H.3.2.3 | Monitoring voltage (V) .....: | | N |
| **J** | **INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION** | | N |
| **J.1** | **General** | | N |
| | Winding wire insulation.....: | | — |
| | Solid round winding wire, diameter (mm).....: | | N |
| | Solid square and rectangular (flatwise bending) winding wire, cross-sectional area ($mm^2$).....: | | N |
| **J.2/J.3** | Tests and Manufacturing | | — |
| **K** | **SAFETY INTERLOCKS** | | N |
| **K.1** | **General requirements** | | N |
| | Instructional safeguard .....: | No such device. | N |
| **K.2** | **Components of safety interlock safeguard mechanism** | | N |
| **K.3** | **Inadvertent change of operating mode** | | N |
| **K.4** | **Interlock safeguard override** | | N |
| **K.5** | **Fail-safe** | | N |
| K.5.1 | Under single fault condition | | N |
| **K.6** | **Mechanically operated safety interlocks** | | N |
| K.6.1 | Endurance requirement | | N |
| K.6.2 | Test method and compliance .....: | | N |
| **K.7** | **Interlock circuit isolation** | | N |
| K.7.1 | Separation distance for contact gaps & interlock circuit elements | | N |
| | In circuit connected to mains, separation distance for contact gaps (mm).....: | | N |
| | In circuit isolated from mains, separation distance for contact gaps (mm).....: | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Electric strength test before and after the test of K.7.2 .....: | | N |
| K.7.2 | Overload test, Current (A) .....: | | N |
| K.7.3 | Endurance test | | N |
| K.7.4 | Electric strength test | | N |
| **L** | **DISCONNECT DEVICES** | | N |
| L.1 | General requirements | | N |
| L.2 | Permanently connected equipment | | N |
| L.3 | Parts that remain energized | | N |
| L.4 | Single-phase equipment | | N |
| L.5 | Three-phase equipment | | N |
| L.6 | Switches as disconnect devices | | N |
| L.7 | Plugs as disconnect devices | | N |
| L.8 | Multiple power sources | | N |
| | Instructional safeguard .....: | | N |
| **M** | **EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS** | | P |
| **M.1** | **General requirements** | | P |
| **M.2** | **Safety of batteries and their cells** | | P |
| M.2.1 | Batteries and their cells comply with relevant IEC standards .....: | | P |
| **M.3** | **Protection circuits for batteries provided within the equipment** | | P |
| M.3.1 | Requirements | | P |
| M.3.2 | Test method | | P |
| | Overcharging of a rechargeable battery | | N |
| | Excessive discharging | | N |
| | Unintentional charging of a non-rechargeable battery | | N |
| | Reverse charging of a rechargeable battery | | N |
| M.3.3 | Compliance | | N |
| **M.4** | **Additional safeguards for equipment containing a portable secondary lithium battery** | | N |
| M.4.1 | General | | N |
| M.4.2 | Charging safeguards | | N |
| M.4.2.1 | Requirements | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| M.4.2.2 | Compliance.....: | | N |
| M.4.3 | Fire enclosure.....: | | N |
| M.4.4 | Drop test of equipment containing a secondary lithium battery | | N |
| M.4.4.2 | Preparation and procedure for the drop test | | N |
| M.4.4.3 | Drop, Voltage on reference and dropped batteries (V); voltage difference during 24 h period (%): .... | | N |
| M.4.4.4 | Check of the charge/discharge function | | N |
| M.4.4.5 | Charge / discharge cycle test | | N |
| M.4.4.6 | Compliance | | N |
| **M.5** | **Risk of burn due to short-circuit during carrying** | | N |
| M.5.1 | Requirement | | N |
| M.5.2 | Test method and compliance | | N |
| **M.6** | **Safeguards against short-circuits** | | N |
| M.6.1 | External and internal faults | | N |
| M.6.2 | Compliance | | N |
| **M.7** | **Risk of explosion from lead acid and NiCd batteries** | | N |
| M.7.1 | Ventilation preventing explosive gas concentration | | N |
| | Calculated hydrogen generation rate .....: | | N |
| M.7.2 | Test method and compliance | | N |
| | Minimum air flow rate, $Q$ ($m^3$/h).....: | | N |
| M.7.3 | Ventilation tests | | N |
| M.7.3.1 | General | | N |
| M.7.3.2 | Ventilation test – alternative 1 | | N |
| | Hydrogen gas concentration (%).....: | | N |
| M.7.3.3 | Ventilation test – alternative 2 | | N |
| | Obtained hydrogen generation rate.....: | | N |
| M.7.3.4 | Ventilation test – alternative 3 | | N |
| | Hydrogen gas concentration (%).....: | | N |
| M.7.4 | Marking.....: | | N |
| **M.8** | **Protection against internal ignition from external spark sources of batteries with aqueous electrolyte** | | N |
| M.8.1 | General | | N |
| M.8.2 | Test method | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| M.8.2.1 | General | | N |
| M.8.2.2 | Estimation of hypothetical volume $V_Z$ ($m^3$/s) .....: | | — |
| M.8.2.3 | Correction factors .....: | | — |
| M.8.2.4 | Calculation of distance *d* (mm) .....: | | — |
| **M.9** | **Preventing electrolyte spillage** | | N |
| M.9.1 | Protection from electrolyte spillage | | N |
| M.9.2 | Tray for preventing electrolyte spillage | | N |
| **M.10** | Instructions to prevent reasonably foreseeable misuse | | N |
| | Instructional safeguard .....: | | N |
| **N** | **ELECTROCHEMICAL POTENTIALS** | | N |
| | Material(s) used .....: | | — |
| **O** | **MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES** | | N |
| | Value of *X* (mm).....: | | — |
| **P** | **SAFEGUARDS AGAINST CONDUCTIVE OBJECTS** | | N |
| **P.1** | **General** | No opening | N |
| **P.2** | **Safeguards against entry or consequences of entry of a foreign object** | | N |
| P.2.1 | General | | N |
| P.2.2 | Safeguards against entry of a foreign object | | N |
| | Location and Dimensions (mm) .....: | | — |
| P.2.3 | Safeguards against the consequences of entry of a foreign object | | N |
| P.2.3.1 | Safeguard requirements | | N |
| | The ES3 and PS3 keep-out volume in Figure P.3 not applicable to transportable equipment | | N |
| | Transportable equipment with metalized plastic parts.....: | | N |
| P.2.3.2 | Consequence of entry test.....: | | N |
| **P.3** | **Safeguards against spillage of internal liquids** | | N |
| P.3.1 | General | No such part. | N |
| P.3.2 | Determination of spillage consequences | | N |
| P.3.3 | Spillage safeguards | | N |
| P.3.4 | Compliance | | N |
| **P.4** | **Metallized coatings and adhesives securing parts** | | N |
| P.4.1 | General | No such application | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| P.4.2 | Tests | | N |
| | Conditioning, $T_C$ (°C) .....: | | — |
| | Duration (weeks) .....: | | — |
| **Q** | **CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING** | | N |
| **Q.1** | **Limited power sources** | | N |
| Q.1.1 | Requirements | | N |
| | a) Inherently limited output | | N |
| | b) Impedance limited output | | N |
| | c) Regulating network limited output | | N |
| | d) Overcurrent protective device limited output | | N |
| | e) IC current limiter complying with G.9 | | N |
| Q.1.2 | Test method and compliance .....: | | N |
| | Current rating of overcurrent protective device (A) .....: | | N |
| **Q.2** | **Test for external circuits – paired conductor cable** | No such circuit. | N |
| | Maximum output current (A) .....: | | N |
| | Current limiting method .....: | | — |
| **R** | **LIMITED SHORT CIRCUIT TEST** | | N |
| **R.1** | **General** | Class III equipment | N |
| **R.2** | **Test setup** | | N |
| | Overcurrent protective device for test .....: | | — |
| **R.3** | **Test method** | | N |
| | Cord/cable used for test .....: | | — |
| **R.4** | **Compliance** | | N |
| **S** | **TESTS FOR RESISTANCE TO HEAT AND FIRE** | | N |
| **S.1** | **Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W** | | N |
| | Samples, material.....: | Approved material used. | — |
| | Wall thickness (mm) .....: | | — |
| | Conditioning (°C) .....: | | — |
| | Test flame according to IEC 60695-11-5 with conditions as set out | | N |
| | - Material not consumed completely | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - Material extinguishes within 30s | | N |
| | - No burning of layer or wrapping tissue | | N |
| **S.2** | **Flammability test for fire enclosure and fire barrier integrity** | | |
| | Samples, material.....: | | — |
| | Wall thickness (mm) .....: | | — |
| | Conditioning (°C) .....: | | — |
| **S.3** | **Flammability test for the bottom of a fire enclosure** | | N |
| S.3.1 | Mounting of samples | | N |
| S.3.2 | Test method and compliance | | N |
| | Mounting of samples .....: | | — |
| | Wall thickness (mm) .....: | | — |
| **S.4** | **Flammability classification of materials** | | N |
| **S.5** | **Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power exceeding 4 000 W** | | N |
| | Samples, material.....: | | — |
| | Wall thickness (mm) .....: | | — |
| | Conditioning (°C) .....: | | — |
| **T** | **MECHANICAL STRENGTH TESTS** | | P |
| **T.1** | **General** | | P |
| **T.2** | **Steady force test, 10 N .....:** | | N |
| **T.3** | **Steady force test, 30 N .....:** | | N |
| **T.4** | **Steady force test, 100 N .....:** | (See appended table T.4) | P |
| **T.5** | **Steady force test, 250 N .....:** | | N |
| **T.6** | **Enclosure impact test** | | N |
| | Fall test | | N |
| | Swing test | | N |
| **T.7** | **Drop test .....:** | (See appended table T.7) | P |
| **T.8** | **Stress relief test.....:** | (See appended table T.8) | P |
| **T.9** | **Glass Impact Test ..... :** | | N |
| **T.10** | **Glass fragmentation test** | | N |
| | Number of particles counted..... : | No glass | N |
| **T.11** | **Test for telescoping or rod antennas** | | N |
| | Torque value (Nm) .....: | No antenna | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **U** | **MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION** | | N |
| **U.1** | **General** | | N |
| | Instructional safeguard .....**:** | | N |
| **U.2** | **Test method and compliance for non-intrinsically protected CRTs** | | N |
| **U.3** | **Protective screen** | | N |
| **V** | **DETERMINATION OF ACCESSIBLE PARTS** | | N |
| **V.1** | **Accessible parts of equipment** | | N |
| V.1.1 | General | No hazards can be accessible by figure V.1 and V.5 | N |
| V.1.2 | Surfaces and openings tested with jointed test probes | | N |
| V.1.3 | Openings tested with straight unjointed test probes | | N |
| V.1.4 | Plugs, jacks, connectors tested with blunt probe | | N |
| V.1.5 | Slot openings tested with wedge probe | | N |
| V.1.6 | Terminals tested with rigid test wire | | N |
| **V.2** | **Accessible part criterion** | | N |
| **X** | **ALTERNATIVE METHOD FOR DETERMINING CLEARANCES FOR INSULATION IN CIRCUITS CONNECTED TO AN AC MAINS NOT EXCEEDING 420 V PEAK (300 V RMS)** | | N |
| | Clearance ..... : | | N |
| **Y** | **CONSTRUCTION REQUIREMENTS FOR OUTDOOR ENCLOSURES** | | N |
| **Y.1** | **General** | | N |
| **Y.2** | **Resistance to UV radiation** | | N |
| **Y.3** | **Resistance to corrosion** | | N |
| **Y.3** | **Resistance to corrosion** | | N |
| Y.3.1 | Metallic parts of outdoor enclosures are resistant to effects of water-borne contaminants by .....: | | N |
| Y.3.2 | Test apparatus | | N |
| Y.3.3 | Water – saturated sulphur dioxide atmosphere | | N |
| Y.3.4 | Test procedure .....: | | N |
| Y.3.5 | Compliance | | N |
| **Y.4** | **Gaskets** | | N |
| Y.4.1 | General | | N |
| Y.4.2 | Gasket tests | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| Y.4.3 | Tensile strength and elongation tests | | N |
| | Alternative test methods .....: | | N |
| Y.4.4 | Compression test | | N |
| Y.4.5 | Oil resistance | | N |
| Y.4.6 | Securing means | | N |
| **Y.5** | **Protection of equipment within an outdoor enclosure** | | N |
| Y.5.1 | General | | N |
| Y.5.2 | Protection from moisture | | N |
| | Relevant tests of IEC 60529 or Y.5.3 .....: | | N |
| Y.5.3 | Water spray test | | N |
| Y.5.4 | Protection from plants and vermin | | N |
| Y.5.5 | Protection from excessive dust | | N |
| Y.5.5.1 | General | | N |
| Y.5.5.2 | IP5X equipment | | N |
| Y.5.5.3 | IP6X equipment | | N |
| **Y.6** | **Mechanical strength of enclosures** | | N |
| Y.6.1 | General | | N |
| Y.6.2 | Impact test .....: | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement – Test | Result – Remark | Verdict |
| ATTACHMENT TO TEST REPORT IEC 62368-1<br>EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES<br>(Audio/video, information and communication technology equipment Part 1: Safety requirements) | | | |
| | **CENELEC COMMON MODIFICATIONS (EN)** | | -- |
| | Clause numbers in the cells that are shaded light grey are clause references in EN IEC 62368-1:2020+A11:2020. All other clause numbers in that column, except for those in the paragraph below, refers to IEC 62368-1:2018.<br><br>Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2018 are prefixed "Z". | | P |
| | Add the following annexes:<br>Annex ZA (normative) Normative references to international publications with their corresponding European publications<br>Annex ZB (normative) Special national conditions<br>Annex ZC (informative) A-deviations<br>Annex ZD (informative) IEC and CENELEC code designations for flexible cords | | P |
| **1** | **Modification to Clause 3.** | | -- |
| **3.3.19** | **Sound exposure**<br>*Replace 3.3.19 of IEC 62368-1 with the following definitions:* | | N |
| **3.3.19.1** | **momentary exposure level, MEL**<br>metric for estimating 1 s sound exposure level from the HD 483-1 S2 test signal applied to both channels, based on EN 50332-1:2013, 4.2.<br><br>Note 1 to entry: MEL is measured as A-weighted levels in dB.<br>Note 2 to entry: See B.3 of EN 50332-3:2017 for additional information. | | N |
| **3.3.19.3** | **sound exposure, *E***<br><br>A-weighted sound pressure ($p$) squared and integrated over a stated period of time, $T$<br><br>Note 1 to entry: The SI unit is $Pa^2$ s.<br>$E = \int_0^T p(t)^2 \, dt$ | | N |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
| **3.3.19.4** | **sound exposure level, *SEL***<br><br>logarithmic measure of sound exposure relative to a reference value, $E_0$, typically the 1 kHz threshold of hearing in humans.<br><br>Note 1 to entry: *SEL* is measured as A-weighted levels in dB.<br><br>$SEL = 10 \lg\left(\frac{E}{E_0}\right)$ dB<br><br>Note 2 to entry: See B.4 of EN 50332-3:2017 for additional information. | | N |
| **3.3.19.5** | **digital signal level relative to full scale, dBFS**<br><br>levels reported in dBFS are always r.m.s. Full scale level, 0 dBFS, is the level of a dc-free 997-Hz sine wave whose undithered positive peak value is positive digital full scale, leaving the code corresponding to negative digital full scale unused<br><br>Note 1 to entry: It is invalid to use dBFS for non-r.m.s. levels. Because the definition of full scale is based on a sine wave, the level of signals with a crest factor lower than that of a sine wave may exceed 0 dBFS. In particular, square wave signals may reach +3,01 dBFS. | | N |
| **2** | **Modification to Clause 10** | | -- |
| **10.6** | **Safeguards against acoustic energy sources**<br>Replace 10.6 of IEC 62368-1 with the following: | | N |
| **10.6.1.1** | **Introduction**<br><br>**Safeguard** requirements for protection against long-term exposure to excessive sound pressure levels from personal music players closely coupled to the ear are specified below. Requirements for earphones and headphones intended for use with personal music players are also covered.<br>A personal music player is a portable equipment intended for use by an **ordinary person**, that:<br><br>– is designed to allow the user to listen to audio or audiovisual content / material; and<br>– uses a listening device, such as headphones or earphones that can be worn in or on or around the ears; and<br>– has a player that can be body worn (of a size suitable to be carried in a clothing pocket) and is intended for the user to walk around with while in continuous use (for example, on a street, in a subway, at an airport, etc.).<br><br>EXAMPLES Portable CD players, MP3 audio players, mobile phones with MP3 type features, PDAs or similar equipment. | | N |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
| | Personal music players shall comply with the requirements of either 10.6.2 or 10.6.3.<br><br>NOTE 1 Protection against acoustic energy sources from telecom applications is referenced to ITU-T P.360.<br><br>NOTE 2 It is the intention of the Committee to allow the alternative methods for now, but to only use the dose measurement method as given in 10.6.5 in future. Therefore, manufacturers are encouraged to implement 10.6.5 as soon as possible.<br><br>Listening devices sold separately shall comply with the requirements of 10.6.6.<br>These requirements are valid for music or video mode only.<br>The requirements do not apply to:<br>– professional equipment;<br><br>NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment.<br><br>– hearing aid equipment and other devices for assistive listening;<br>– the following type of analogue personal music players:<br>• long distance radio receiver (for example, a multiband radio receiver or world band radio receiver, an AM radio receiver), and<br>• cassette player/recorder;<br><br>NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies.<br><br>– a player while connected to an external amplifier that does not allow the user to walk around while in use.<br><br>For equipment that is clearly designed or intended primarily for use by children, the limits of the relevant toy standards may apply.<br><br>The relevant requirements are given in EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply. | | |
| **10.6.1.2** | **Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz**<br><br>The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz).<br>For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time- | | N |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
| | Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body mounted devices, attention is drawn to EN 50360 and EN 50566. | | |
| **10.6.2** | **Classification of devices without the capacity to estimate sound dose** | | N |
| **10.6.2.1** | **General**<br><br>This standard is transitioning from short-term based (30 s) requirements to long-term based (40 hour) requirements. These clauses remain in effect only for devices that do not comply with sound dose estimation as stipulated in EN 50332-3.<br><br>For classifying the acoustic output $L_{Aeq,T}$, measurements are based on the A-weighted equivalent sound pressure level over a 30 s period.<br><br>For music where the average sound pressure (long term $L_{Aeq,T}$) measured over the duration of the song is lower than the average produced by the programme simulation noise, measurements may be done over the duration of the complete song. In this case, $T$ becomes the duration of the song.<br><br>NOTE Classical music, acoustic music and broadcast typically has an average sound pressure (long term $L_{Aeq,T}$) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the content and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song does not exceed the required limit.<br>For example, if the player is set with the programme simulation noise to 85 dB, but the average music level of the song is only 65 dB, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dB. | | N |
| **10.6.2.2** | **RS1 limits (to be superseded, see 10.6.3.2)**<br><br>RS1 is a class 1 acoustic energy source that does not exceed the following:<br>– for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 85 dB when playing the fixed “programme simulation noise” described in EN 50332-1.<br>– for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 27 mV (analogue interface) or -25 dBFS (digital interface) when playing the fixed “programme simulation noise” described in EN 50332-1.<br>– The RS1 limits will be updated for all devices as per | | N |

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| | 10.6.3.2. | | |
| **10.6.2.3** | **RS2 limits (to be superseded, see 10.6.3.3)**<br><br>RS2 is a class 2 acoustic energy source that does not exceed the following:<br>– for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or when the combination of player and listening device is known by other means such as setting or automatic 130 detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 100 dB(A) when playing the fixed "programme simulation noise" as described in EN 50332-1.<br>– for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 150 mV (analogue interface) or -10 dBFS (digital interface) when playing the fixed "programme simulation noise" as described in EN 50332-1. | | N |
| **10.6.3** | **Classification of devices (new)** | | N |
| **10.6.3.1** | **General**<br><br>Previous limits (10.6.2) created abundant false negative and false positive PMP sound level warnings. New limits, compliant with The Commission Decision of 23 June 2009, are given below. | | N |
| **10.6.3.2** | **RS1 limits (new)**<br><br>RS1 is a class 1 acoustic energy source that does not exceed the following:<br>– for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 80 dB when playing the fixed "programme simulation noise" described in EN 50332-1.<br>– for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 15 mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed "programme simulation noise" described in EN 50332-1. | | N |
| **10.6.3.3** | **RS2 limits (new)**<br><br>RS2 is a class 2 acoustic energy source that does not exceed the following:<br>– for equipment provided as a package (player with its listening device), and with a proprietary connector | | N |

| EN IEC 62368-1 | | | |
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| | between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the weekly sound exposure level, as described in EN 50332-3, shall be ≤ 80 dB when playing the fixed "programme simulation noise" described in EN 50332-1.<br>– for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output level, integrated over one week, as described in EN50332-3, shall be ≤ 15 mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed "programme simulation noise" described in EN 50332-1. | | |
| **10.6.4** | **Requirements for maximum sound exposure** | | N |
| **10.6.4.1** | **Measurement methods**<br><br>All volume controls shall be turned to maximum during tests.<br><br>Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable. | | N |
| **10.6.4.2** | **Protection of persons**<br><br>Except as given below, protection requirements for parts **accessible** to **ordinary persons**, **instructed persons** and **skilled persons** are given in 4.3.<br><br>NOTE 1 Volume control is not considered a **safeguard.**<br><br>Between RS2 and an **ordinary person**, the **basic safeguard** may be replaced by an **instructional safeguard** in accordance with Clause F.5, except that the **instructional safeguard** shall be placed on the equipment, or on the packaging, or in the instruction manual.<br>Alternatively, the **instructional safeguard** may be given through the equipment display during use.<br><br>The elements of the **instructional safeguard** shall be as follows:<br><br>– element 1a: the symbol  , IEC 60417-6044 (2011-01)<br>– element 2: "High sound pressure" or equivalent wording<br>– element 3: "Hearing damage risk" or equivalent wording<br>– element 4: "Do not listen at high volume levels for long periods." or equivalent wording<br><br>An **equipment safeguard** shall prevent exposure of an **ordinary person** to an RS2 source without intentional | | N |

| EN IEC 62368-1 | | | |
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| | physical action from the **ordinary person** and shall automatically return to an output level not exceeding what is specified for an RS1 source when the power is switched off.<br><br>The equipment shall provide a means to actively inform the user of the increased sound level when the equipment is operated with an output exceeding RS1. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an output exceeding RS1. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time.<br><br>NOTE 2 Examples of means include visual or audible signals. Action from the user is always needed.<br><br>NOTE 3 The 20 h listening time is the accumulative listening time, independent of how often and how long the personal music player has been switched off.<br><br>A **skilled person** shall not be unintentionally exposed to RS3. | | |
| **10.6.5** | **Requirements for dose-based systems** | | N |
| **10.6.5.1** | **General requirements**<br><br>Personal music players shall give the warnings as provided below when tested according to EN 50332-3, using the limits from this clause.<br><br>The manufacturer may offer optional settings to allow the users to modify when and how they wish to receive the notifications and warnings to promote a better user experience without defeating the safeguards. This allows the users to be informed in a method that best meets their physical capabilities and device usage needs. If such optional settings are offered, an administrator (for example, parental restrictions, business/educational administrators, etc.) shall be able to lock any optional settings into a specific configuration.<br><br>The personal music player shall be supplied with easy to understand explanation to the user of the dose management system, the risks involved, and how to use the system safely. The user shall be made aware that other sources may significantly contribute to their sound exposure, for example work, transportation, concerts, clubs, cinema, car races, etc. | | N |
| **10.6.5.2** | **Dose-based warning and requirements**<br><br>When a dose of 100 % *CSD* is reached, and at least at every 100 % further increase of *CSD*, the device shall warn the user and require an acknowledgement. In case | | N |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
| | the user does not acknowledge, the output level shall automatically decrease to compliance with class RS1.<br><br>The warning shall at least clearly indicate that listening above 100 % *CSD* leads to the risk of hearing damage or loss. | | |
| **10.6.5.3** | **Exposure-based requirements**<br><br>With only dose-based requirements, cause and effect could be far separated in time, defying the purpose of educating users about safe listening practice. In addition to dose-based requirements, a PMP shall therefore also put a limit to the short-term sound level a user can listen at.<br><br>The exposure-based limiter (EL) shall automatically reduce the sound level not to exceed 100 dB(A) or 150 mV integrated over the past 180 s, based on methodology defined in EN 50332-3.<br>The EL settling time (time from starting level reduction to reaching target output) shall be 10 s or faster.<br><br>Test of EL functionality is conducted according to EN 50332-3, using the limits from this clause. For equipment provided as a package (player with its listening device), the level integrated over 180 s shall be 100 dB or lower. For equipment provided with a standardized connector, the unweighted level integrated over 180 s shall be no more than 150 mV for an analogue interface and no more than -10 dBFS for a digital interface.<br><br>NOTE In case the source is known not to be music (or test signal), the EL may be disabled. | | N |
| **10.6.6** | **Requirements for listening devices (headphones, earphones, etc.)** | | N |
| **10.6.6.1** | **Corded listening devices with analogue input**<br><br>With 94 dB $L_{Aeq}$ acoustic pressure output of the listening device, and with the volume and sound settings in the listening device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the input voltage of the listening device when playing the fixed “programme simulation noise” as described in EN 50332-1 shall be ≥ 75 mV.<br><br>NOTE The values of 94 dB and 75 mV correspond with 85 dB and 27 mV or 100 dB and 150 mV. | | N |
| **10.6.6.2** | **Corded listening devices with digital input**<br><br>With any playing device playing the fixed “programme simulation noise” described in EN 50332-1, and with the | | N |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
| | volume and sound settings in the listening device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the $L_{Aeq,T}$ acoustic output of the listening device shall be ≤ 100 dB with an input signal of -10 dBFS. | | |
| **10.6.6.3** | **Cordless listening devices**<br><br>In cordless mode,<br>– with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and<br>– respecting the cordless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and<br>– with volume and sound settings in the receiving device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the above mentioned programme simulation noise, the $L_{Aeq,T}$ acoustic output of the listening device shall be ≤ 100 dB with an input signal of -10 dBFS. | | N |
| **10.6.6.4** | **Measurement method**<br><br>*Measurements shall be made in accordance with EN 50332-2 as applicable.* | | N |
| **3** | **Modification to the whole document** | | -- |
| | **Delete** all the “country” notes in the reference document according to the following list: | | P |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
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| 0.2.1 | Note 1 and 2 | 1 | Note 4 and 5 | 3.3.8.1 | Note 2 |
| 3.3.8.3 | Note 1 | 4.1.15 | Note | 4.7.3 | Note 1 and 2 |
| 5.2.2.2 | Note | 5.4.2.3.2.2 Table 12 | Note c | 5.4.2.3.2.4 | Note 1 and 3 |
| 5.4.2.3.2.4 Table 13 | Note 2 | 5.4.2.5 | Note 2 | 5.4.5.1 | Note |
| 5.4.10.2.1 | Note | 5.4.10.2.2 | Note | 5.4.10.2.3 | Note |
| 5.5.2.1 | Note | 5.5.6 | Note | 5.6.4.2.1 | Note 2 and 3 and 4 |
| 5.6.8 | Note 2 | 5.7.6 | Note | 5.7.7.1 | Note 1 and Note 2 |
| 8.5.4.2.3 | Note | 10.2.1 Table 39 | Note 3 and 4 and 5 | 10.5.3 | Note 2 |
| ~~10.6.1~~ | Note 3 | F.3.3.6 | Note 3 | Y.4.1 | Note |
| Y.4.5 | Note | | | | |

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| **4** | **Modification to Clause 1** | | -- |
| **1** | ***Add** the following note:*<br><br>*NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.* | | P |
| **5** | **Modification to 4.Z1** | | -- |
| **4.Z1** | ***Add** the following new subclause after 4.9:*<br><br>To protect against excessive current, short-circuits and earth faults in circuits connected to an a.c. **mains**, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c):<br>a) except as detailed in b) and c), protective devices necessary to comply with the requirements of B.3.1 and B.4 shall be included as parts of the equipment;<br>b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation;<br>c) it is permitted for **pluggable equipment type B** or **permanently connected equipment**, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully | | N |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
| | specified in the installation instructions.<br><br>If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for **pluggable equipment type A** the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet. | | |
| **6** | **Modification to 5.4.2.3.2.4** | | -- |
| **5.4.2.3.2.4** | ***Add** the following to the end of this subclause:*<br><br>The requirement for interconnection with **external circuit** is in addition given in EN 50491-3:2009. | | N |
| **7** | **Modification to 10.2.1** | | -- |
| **10.2.1** | Add the following to [c] and [d] in table 39:<br><br>For additional requirements, see 10.5.1. | | N |
| **8** | **Modification to 10.5.1** | | -- |
| **10.5.1** | ***Add** the following after the first paragraph:*<br><br>For RS1 compliance is checked by measurement under the following conditions:<br><br>In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those internal adjustments or pre-sets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made.<br><br>NOTE Z1 Soldered joints and paint lockings are examples of adequate locking.<br><br>The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm², at any point 10 cm from the outer surface of the apparatus.<br><br>Moreover, the measurement shall be made under fault conditions causing an increase of the high voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made.<br><br>For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level.<br><br>NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996. | | N |
| **9** | **Modification to G.7.1** | | -- |
| **G.7.1** | ***Add** the following note:* | | N |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
| | NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD. | | |
| **10** | **Modification to Bibliography** | | -- |
| | **Add** the following notes for the standards indicated:<br><br>IEC 60130-9 NOTE Harmonized as EN 60130-9.<br>IEC 60269-2 NOTE Harmonized as HD 60269-2.<br>IEC 60309-1 NOTE Harmonized as EN 60309-1.<br>IEC 60364 NOTE some parts harmonized in HD 38<br>IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4.<br>IEC 60664-5 NOTE Harmonized as EN 60664-5.<br>IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (<br>IEC 61508-1 NOTE Harmonized as EN 61508-1.<br>IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1.<br>IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4.<br>IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6.<br>IEC 61643-1 NOTE Harmonized as EN 61643-1.<br>IEC 61643-21 NOTE Harmonized as EN 61643-21.<br>IEC 61643-311 NOTE Harmonized as EN 61643-311.<br>IEC 61643-321 NOTE Harmonized as EN 61643-321.<br>IEC 61643-331 NOTE Harmonized as EN 61643-331. | | N |
| **11** | **ADDITION OF ANNEXES** | | -- |
| **ZB** | **ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)** | | N |
| **4.1.15** | **Denmark, Finland, Norway** and **Sweden**<br><br>To the end of the subclause the following is added:<br>**Class I pluggable equipment type A** intended for connection to other equipment or a network shall, if safety relies on connection to reliable earthing or if surge suppressors are connected between the network terminals and **accessible** parts, have a marking stating that the equipment shall be connected to an earthed **mains** socket-outlet.<br><br>The marking text in the applicable countries shall be as follows:<br><br>In **Denmark**: “Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.”<br>In **Finland**: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"<br>In **Norway**: “Apparatet må tilkoples jordet stikkontakt”<br>In **Sweden**: “Apparaten skall anslutas till jordat uttag” | | N |
| **4.7.3** | **United Kingdom**<br><br>To the end of the subclause the following is added: | | N |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
| | The torque test is performed using a socket-outlet complying with BS 1363, and the plug part shall be assessed to the relevant clauses of BS 1363. Also see Annex G.4.2 of this annex | | |
| **5.2.2.2** | **Denmark**<br><br>After the 2nd paragraph add the following:<br><br>A warning (marking safeguard) for high touch current is required if the touch current exceeds the limits of 3,5 mA a.c. or 10 mA d.c. | | N |
| **5.4.11.1 and Annex G** | **Finland and Sweden**<br><br>To the end of the subclause the following is added:<br><br>For separation of the telecommunication network from earth the following is applicable:<br><br>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either<br>• two layers of thin sheet material, each of which shall pass the electric strength test below, or<br><br>• one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below.<br><br>If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition<br><br>• passes the tests and inspection criteria of 5.4.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 5.4.9 shall be performed using 1,5 kV),<br><br>and<br><br>• is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV.<br><br>It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2.<br><br>A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under | | N |

| EN IEC 62368-1 | | | |
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| Clause | Requirement – Test | Result – Remark | Verdict |
| | the following conditions:<br><br>• the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in 5.4.11;<br><br>• the additional testing shall be performed on all the test specimens as described in EN 60384-14;<br><br>the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14. | | |
| **5.5.2.1** | **Norway**<br><br>After the 3rd paragraph the following is added:<br><br>Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V). | | N |
| **5.5.6** | **Finland, Norway** and **Sweden**<br><br>To the end of the subclause the following is added:<br><br>Resistors used as **basic safeguard** or bridging **basic insulation** in **class I pluggable equipment type A** shall comply with G.10.1 and the test of G.10.2. | | N |
| **5.6.1** | **Denmark**<br><br>**Add** to the end of the subclause<br>Due to many existing installations where the socket-outlets can be protected with fuses<br>with higher rating than the rating of the socket-outlets the protection for pluggable<br>equipment type A shall be an integral part of the equipment.<br>*Justification:*<br>In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse. | | N |
| **5.6.4.2.1** | **Ireland and United Kingdom**<br><br>After the indent for **pluggable equipment type A**, the following is added:<br>– the **protective current rating** is taken to be 13 A, this being the largest rating of fuse used in the **mains** plug. | | N |
| **5.6.4.2.1** | **France**<br><br>After the indent for **pluggable equipment type A**, the following is added:<br>– in certain cases, the **protective current rating** of the circuit supplied from the mains is taken as 20 A instead of 16 A. | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement – Test | Result – Remark | Verdict |
| **5.6.5.1** | To the second paragraph the following is added:<br><br>The range of conductor sizes of flexible cords to be accepted by terminals for equipment with a rated current over 10 A and up to and including 13 A is:<br>1,25 $mm^2$ to 1,5 $mm^2$ in cross-sectional area. | | N |
| **5.6.8** | **Norway**<br><br>To the end of the subclause the following is added:<br>Equipment connected with an earthed mains plug is classified as **class I equipment**. See the Norway marking requirement in 4.1.15. The symbol IEC 60417-6092, as specified in F.3.6.2, is accepted. | | N |
| **5.7.6** | **Denmark**<br><br>To the end of the subclause the following is added:<br><br>The installation instruction shall be affixed to the equipment if the **protective conductor current** exceeds the limits of 3,5 mA a.c. or 10 mA d.c. | | N |
| **5.7.6.2** | **Denmark**<br><br>To the end of the subclause the following is added:<br>The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA . | | N |
| **5.7.7.1** | **Norway and Sweden**<br><br>To the end of the subclause the following is added:<br>The screen of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building.<br>Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system.<br><br>It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example.<br><br>The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in:<br><br>“Apparatus connected to the protective earthing of the building installation through the mains connection or through other apparatus with a connection to protective earthing –<br>and to a television distribution system using coaxial | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement – Test | Result – Remark | Verdict |
| | cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)"<br><br>NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min.<br><br>Translation to Norwegian (the Swedish text will also be accepted in Norway):<br><br>"Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet<br>utstyr – og er tilkoplet et koaksialbasert kabel-TV nett, kan forårsake brannfare.<br>For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en<br>galvanisk isolator mellom apparatet og kabel-TV nettet."<br><br>Translation to Swedish:<br>"Apparater som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet.". | | |
| **8.5.4.2.3** | **United Kingdom**<br><br>Add the following after the 2nd dash bullet in 3rd paragraph:<br><br>An emergency stop system complying with the requirements of IEC 60204-1 and ISO 13850 is required where there is a risk of personal injury. | | N |
| **B.3.1 and B.4** | **Ireland and United Kingdom**<br><br>The following is applicable:<br><br>To protect against excessive currents and short-circuits in the primary circuit of **direct plug-in equipment**, tests according to Annexes B.3.1 and B.4 shall be conducted using an external miniature circuit breaker complying with EN 60898-1, Type B, rated 32A. If the equipment does not pass these tests, suitable protective devices shall be included as an integral part of the **direct plug-in equipment**, until the requirements of Annexes B.3.1 and B.4 are met | | N |
| **G.4.2** | **Denmark**<br><br>To the end of the subclause the following is added: | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement – Test | Result – Remark | Verdict |
| | Supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1:2011.<br><br>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.<br><br>If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a polyphase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2.<br><br>Mains socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance DS 60884-2-D1:2011 standard sheet DKA 1-4a.<br><br>Other current rating socket outlets shall be in compliance with Standard Sheet DKA 1-3a or DKA 1-1c.<br><br>Mains socket-outlets with earth shall be in compliance with DS 60884-2-D1:2011<br>Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a<br><br>*Justification:*<br>Heavy Current Regulations, Section 6c | | |
| **G.4.2** | **United Kingdom**<br><br>To the end of the subclause the following is added:<br><br>The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply. | | N |
| **G.7.1** | **United Kingdom**<br><br>To the first paragraph the following is added:<br><br>Equipment which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord shall be fitted with a ‘standard plug’ in | | N |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement – Test | Result – Remark | Verdict |
| | accordance with the Plugs and Sockets etc. (Safety) Regulations 1994, Statutory Instrument 1994 No. 1768, unless exempted by those regulations.<br><br>NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug. | | |
| **G.7.1** | **Ireland**<br><br>To the first paragraph the following is added:<br><br>Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, "13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. S.I. 525 provides for the recognition of a standard of another Member State which is equivalent to the relevant Irish Standard | | N |
| **G.7.2** | **Ireland and United Kingdom**<br><br>To the first paragraph the following is added:<br><br>A power supply cord with a conductor of 1,25 $mm^2$ is allowed for equipment which is rated over 10 A and up to and including 13 A. | | N |

| | | | |
|---|---|---|---|
| **ZC** | **ANNEX ZC, NATIONAL DEVIATIONS (EN)** | | N |
| **10.5.2** | **Germany**<br><br>The following requirement applies:<br><br>For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking.<br><br>*Justification*:<br>German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM.<br><br>**NOTE** Contact address:<br>Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig,<br>Tel.: Int+49-531-592-6320, Internet: http://www.ptb.de | | N |

| | | |
|---|---|---|
| **ZD** | **IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS (EN)** | |

| EN IEC 62368-1 | | | |
|---|---|---|---|
| Clause | Requirement – Test | Result – Remark | Verdict |
| | | | N |

| Type of flexible cord | Code designations | |
|---|---|---|
| | IEC | CENELEC |
| **PVC insulated cords** | | |
| Flat twin tinsel cord | 60227 IEC 41 | H03VH-Y |
| Light polyvinyl chloride sheathed flexible cord | 60227 IEC 52 | H03VV-F<br>H03VVH2-F |
| Ordinary polyvinyl chloride sheathed flexible cord | 60227 IEC 53 | H05VV-F<br>H05VVH2-F |
| **Rubber insulated cords** | | |
| Braided cord | 60245 IEC 51 | H03RT-F |
| Ordinary tough rubber sheathed flexible cord | 60245 IEC 53 | H05RR-F |
| Ordinary polychloroprene sheathed flexible cord | 60245 IEC 57 | H05RN-F |
| Heavy polychloroprene sheathed flexible cord | 60245 IEC 66 | H07RN-F |
| **Cords having high flexibility** | | |
| Rubber insulated and sheathed cord | 60245 IEC 86 | H03RR-H |
| Rubber insulated, crosslinked PVC sheathed cord | 60245 IEC 87 | H03RV4-H |
| Crosslinked PVC insulated and sheathed cord | 60245 IEC 88 | H03V4V4-H |
| **Cords insulated and sheathed with halogen-free thermoplastic compounds** | | |
| Light halogen-free thermoplastic insulated and sheathed flexible cords | | H03Z1Z1-F<br>H03Z1Z1H2-F |
| Ordinary halogen-free thermoplastic insulated and sheathed flexible cords | | H05Z1Z1-F<br>H05Z1Z1H2-F |

| 5.2 | TABLE: Classification of electrical energy sources | | | | | | P |
|---|---|---|---|---|---|---|---|
| Supply Voltage | Location (e.g. circuit designation) | Test conditions | Parameters | | | | ES Class |
| | | | U (V) | I (mA) | Type[1)] | Additional Info [2)] | |
| 5Vdc | Internal circuit | Normal | 5Vdc | -- | -- | -- | ES1 |
| | | Abnormal: | -- | -- | -- | -- | |
| | | Single fault : | -- | -- | -- | -- | |
| Supplementary information: | | | | | | | |

| 5.4.1.8 | TABLE: Working voltage measurement | | | | N |
|---|---|---|---|---|---|
| Location | RMS voltage (V) | Peak voltage (V) | Frequency (Hz) | Comments | |
| -- | -- | -- | -- | -- | |
| -- | -- | -- | -- | -- | |
| Supplementary information: | | | | | |

| 5.4.1.10.2 | TABLE: Vicat softening temperature of thermoplastics | | N |
|---|---|---|---|
| Method .....: | ISO 306 / B50 | | — |
| Object/ Part No./Material | Manufacturer/trademark | Thickness (mm) | T softening (°C) |
| -- | -- | -- | -- |
| -- | -- | -- | -- |
| Supplementary information: | | | |

| 5.4.1.10.3 | TABLE: Ball pressure test of thermoplastics | | | | N |
|---|---|---|---|---|---|
| Allowed impression diameter (mm) ..... : | | | | | — |
| Object/Part No./Material | Manufacturer/trademark | Thickness (mm) | Test temperature (°C) | Impression diameter (mm) | |
| -- | -- | -- | -- | -- | |
| Supplementary information: | | | | | |

| 5.4.2, 5.4.3 | TABLE: Minimum Clearances/Creepage distance | | | | | | | N |
|---|---|---|---|---|---|---|---|---|
| Clearance (cl) and creepage distance (cr) at/of/between: | $U_p$ (V) | $U_{rms}$ (V) | Freq [1)] (Hz) | Required cl (mm) | cl (mm) | E.S. [2)] (V) | Required cr (mm) | cr (mm) |
| -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Supplementary information: | | | | | | | | |

| 5.4.4.2 | TABLE: Minimum distance through insulation | | | N |
|---|---|---|---|---|
| Distance through insulation (DTI) at/of | Peak voltage (V) | Insulation | Required DTI (mm) | Measured DTI (mm) |
| -- | -- | -- | -- | -- |
| Supplementary information: | | | | |

| 5.4.4.9 | TABLE: Solid insulation at frequencies >30 kHz | | | | | N |
|---|---|---|---|---|---|---|
| Insulation material | $E_P$ | Frequency (kHz) | $K_R$ | Thickness $d$ (mm) | Insulation | $V_{PW}$ (Vpk) |
| -- | -- | -- | -- | -- | -- | -- |
| Supplementary information: | | | | | | |

| 5.4.9 | TABLE: Electric strength tests | | | N |
|---|---|---|---|---|
| Test voltage applied between: | Voltage shape (Surge, Impulse, AC, DC, etc.) | Test voltage (V) | Breakdown Yes / No | |
| -- | -- | -- | -- | |
| -- | -- | -- | -- | |
| Supplementary information: | | | | |

| 5.5.2.2 | TABLE: Stored discharge on capacitors | | | | N |
|---|---|---|---|---|---|
| Location | Supply voltage (V) | Operating and fault condition [1)] | Switch position | Measured voltage (Vpk) | ES Class |
| -- | -- | -- | -- | -- | -- |
| Supplementary information:<br>X-capacitors installed for testing:<br>☐ bleeding resistor rating:<br>☐ ICX:<br>1) Normal operating condition (e.g., normal operation, or open fuse), SC= short circuit, OC= open circuit | | | | | |

| 5.6.6 | TABLE: Resistance of protective conductors and terminations | | | | N |
|---|---|---|---|---|---|
| Location | Test current (A) | Duration (min) | Voltage drop (V) | Resistance (Ω) | |
| -- | -- | -- | -- | -- | |
| Supplementary information: | | | | | |

| 5.7.4 | TABLE: Unearthed accessible parts | | | N |
|---|---|---|---|---|
| Location | Operating and | Supply | Parameters | ES class |

| | fault conditions | Voltage (V) | Voltage ($V_{rms}$ or $V_{pk}$) | Current ($A_{rms}$ or $A_{pk}$) | Freq. (Hz) | |
|---|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- | -- |
| Supplementary information:<br>Abbreviation: SC= short circuit; OC= open circuit | | | | | | |

| 5.7.5 | TABLE: Earthed accessible conductive part | | | N |
|---|---|---|---|---|
| Supply voltage (V) ..... : | | | | — |
| Phase(s) ..... : | [] Single Phase; [ ] Three Phase: [ ] Delta [ ] Wye | | | |
| Power Distribution System ..... : | ☐ TN ☐ TT ☐ IT | | | |
| Location | Fault Condition No in IEC 60990 clause 6.2.2 | Touch current (mA) | Comment | |
| -- | -- | -- | -- | |
| Supplementary Information: | | | | |

| 5.8 | TABLE: Backfeed safeguard in battery backed up supplies | | | | | N |
|---|---|---|---|---|---|---|
| Location | Supply voltage (V) | Operating and fault condition | Time (s) | Open-circuit voltage (V) | Touch current (A) | ES Class |
| -- | -- | -- | -- | -- | -- | -- |
| Supplementary information:<br>Abbreviation: SC= short circuit, OC= open circuit | | | | | | |

| 6.2.2 | TABLE: Power source circuit classifications | | | | | P |
|---|---|---|---|---|---|---|
| Location | Operating and fault condition | Voltage (V) | Current (A) | Max. Power[1)] (W) | Time (S) | PS class |
| Internal circuit | Normal | -- | -- | -- | -- | PS2 by declared |
| Button cell | -- | -- | -- | -- | -- | PS1 by declared |
| USB output | Normal | 4.45 | 2.26 | 10.05 | 3 | PS1 |
| | D1, S-C | 0 | 0 | 0 | 3 | PS1 |
| Supplementary information: | | | | | | |

| 6.2.3.1 | TABLE: Determination of Arcing PIS | | | N |
|---|---|---|---|---|
| Location | Open circuit voltage after 3 s (Vpk) | Measured r.m.s current (A) | Calculated value | Arcing PIS? Yes / No |
| -- | -- | -- | -- | -- |
| Supplementary information: | | | | |

| 6.2.3.2 | TABLE: Determination of resistive PIS | | N |
|---|---|---|---|
| Location | Operating and fault condition | Dissipate power (W) | Resistive PIS? Yes / No |
| -- | -- | -- | -- |
| Supplementary information:<br>Abbreviation: SC= short circuit; OC= open circuit | | | |

| 8.5.5 | TABLE: High pressure lamp | | | N |
|---|---|---|---|---|
| Lamp manufacturer | Lamp type | Explosion method | Longest axis of glass particle (mm) | Particle found beyond 1 m Yes / No |
| -- | -- | -- | -- | -- |
| Supplementary information: | | | | |

| 9.6 | TABLE: Temperature measurements for wireless power transmitters | | | | | | | | N |
|---|---|---|---|---|---|---|---|---|---|
| Supply voltage (V) ..... : | | | | | | | | | — |
| Max. transmit power of transmitter (W) ..... : | | | | | | | | | — |
| Foreign objects | w/o receiver and direct contact | | with receiver and direct contact | | with receiver and at distance of 2 mm | | with receiver and at distance of 5 mm | | |
| | Object ($^{o}$C) | Ambient ($^{o}$C) | Object ($^{o}$C) | Ambient ($^{o}$C) | Object ($^{o}$C) | Ambient ($^{o}$C) | Object ($^{o}$C) | Ambient ($^{o}$C) | |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| Supplementary information: | | | | | | | | | |

| 5.4.1.4, 9.3, B.1.5, B.2.6 | TABLE: Temperature measurements | | | P |
|---|---|---|---|---|
| Supply voltage (V) ..... : | a) Normal working, USB load: 5.0V, 1.5A | | | — |
| Ambient temperature during test $T_{amb}$ (°C) ..... : | 40.0 | -- | -- | — |
| Maximum measured temperature $T$ of part/at: | $T$ (°C) | | | Allowed $T_{max}$ (°C) |
| **Test condition No.:** | a) | -- | -- | -- |
| PCB near LED | 41.8 | -- | -- | 130 |
| PCB near IC1 | 39.5 | -- | -- | 130 |
| Button cell | 26.2 | -- | -- | Ref. |
| Enclosure inside near IC1 | 37.4 | -- | -- | Ref. |
| Enclosure outside near IC1 | 31.2 | -- | -- | 77 |
| Button | 26.9 | -- | -- | 48 |
| Ambient | 25.0 | -- | -- | -- |

| Supplementary information: *) Temperature limits for winding include less 10K for thermocouple measurement method. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
| -- | -- | -- | -- | -- | -- | -- | -- |
| Supplementary information:<br>Note 1: Tma should be considered as directed by applicable requirement<br>Note 2: Tma is not included in assessment of Touch Temperatures (Clause 9) | | | | | | | |

| **B.2.5** | **TABLE: Input test** | | | | | | | P |
|---|---|---|---|---|---|---|---|---|
| U (V) | Hz | I (A) | I rated (A) | P (W) | P rated (W) | Fuse No | I fuse (A) | Condition/status |
| 5V | -- | 1.80 | 2.0 | 9.0 | -- | -- | -- | Normal operation, USB output: 5.0V, 1.5A |
| Supplementary information: -- | | | | | | | | |

| **B.3, B.4** | **TABLE: Abnormal operating and fault condition tests** | | | | | **P** |
|---|---|---|---|---|---|---|
| Ambient temperature $T_{amb}$ (°C) ..... : | | | See below | | | — |
| Power source for EUT: Manufacturer, model/type, outputrating .. : | | | -- | | | — |
| Component No. | Condition | Supply voltage (V) | Test time | Fuse no. | Fuse current (A) | Observation |
| USB output | S-C | 5.0V | 10mins | -- | -- | USB no output, no damage, no hazards. |
| USB output | O-L | 5.0V | 1h45mins | -- | -- | EUT unit shutdown when USB is loaded to 2.27A, no damage, no hazards.<br>PCB near IC1: 41.2°C<br>Enclosure outside near IC1: 32.4°C<br>Ambient: 25°C |
| Speaker | S-C | 5.0V | 10mins | -- | -- | Speaker did not work, no damage, no hazards. |
| IC6, pin 1-5 | S-C | 5.0V | 10mins | -- | -- | USB no output, no damage, no hazards. |
| D1 | S-C | 5.0V | 10mins | -- | -- | USB no output, no damage, no hazards. |
| Button cell | reversed | 5.0V | 10mins | -- | -- | No damage, no hazards. |
| Supplementary information: S-C= short circuit. | | | | | | |

| **M.3** | **TABLE: Protection circuits for batteries provided within the equipment** | | N |
|---|---|---|---|
| Is it possible to install the battery in a reverse polarity position? ..... : | | Impossible | — |
| Equipment Specification | Charging | | |
| | Voltage (V) | Current (A) | |

| | | |
|---|---|---|
| | -- | -- |

| Manufacturer/type | Battery specification | | | | | |
|---|---|---|---|---|---|---|
| | Non-rechargeable batteries | | Rechargeable batteries | | | |
| | Discharging current (A) | Unintentional charging current (A) | Charging | | Discharging current (A) | Reverse charging current (A) |
| | | | Voltage (V) | Current (A) | | |
| -- | -- | -- | -- | -- | -- | -- |

| | | |
|---|---|---|
| Note: The tests of M.3.2 are applicable only when above appropriate data is not available. | | |
| Specified battery temperature (°C) ..... : | -- | -- |

| Component No. | Fault condition | Charge/ discharge mode | Test time | Temp. (°C) | Current (A) | Voltage (V) | Observation |
|---|---|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- |
| Supplementary information: | | | | | | | |

| **M.4.2** | **TABLE: Charging safeguards for equipment containing a secondary lithium battery** | **N** |
|---|---|---|
| Maximum specified charging voltage (V) ..... : | -- | — |
| Maximum specified charging current (A) ..... : | -- | — |
| Highest specified charging temperature (°C) ..... : | -- | |
| Lowest specified charging temperature (°C) ..... : | -- | |

| Battery manufacturer/type | Operating and fault condition | Measurement | | | Observation |
|---|---|---|---|---|---|
| | | Charging voltage (V) | Charging current (A) | Temp. (°C) | |
| -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- |
| Supplementary information: | | | | | |

| **Q.1** | **TABLE: Circuits intended for interconnection with building wiring (LPS)** | | | | | | P |
|---|---|---|---|---|---|---|---|
| Output Circuit | Condition | $U_{oc}$ (V) | Time (s) | $I_{sc}$ (A) | | S (VA) | |
| | | | | Meas. | Limit | Meas. | Limit |
| USB output | Normal | 5.15 | 5 | 2.26 | 8 | 10.05 | 100 |
| USB output | D1, S-C | 0 | 5 | 0 | 8 | 0 | 100 |
| Supplementary Information: | | | | | | | |

| **T.2, T.3, T.4, T.5** | **TABLE: Steady force test** | P |
|---|---|---|

| Part/Location | Material | Thickness (mm) | Probe | Force (N) | Test Duration (s) | Observation |
|---|---|---|---|---|---|---|
| Top enclosure | Plastic | See table 4.1.2 | 30mm probe | 100 | 5 | No damaged |
| Side enclosure | Plastic | See table 4.1.2 | 30mm probe | 100 | 5 | No damaged |
| Bottom enclosure | Plastic | See table 4.1.2 | 30mm probe | 100 | 5 | No damaged |
| Supplementary information: | | | | | | |

| T.6, T.9 | TABLE: Impact test | | | N |
|---|---|---|---|---|
| Location/part | Material | Thickness (mm) | Height (mm) | Observation |
| -- | -- | -- | -- | -- |
| Supplementary information: | | | | |

| T.7 | TABLE: Drop test | | | P |
|---|---|---|---|---|
| Location/part | Material | Thickness (mm) | Height (mm) | Observation |
| Top enclosure | Plastic | See table 4.1.2 | 1000 | No damaged |
| Side enclosure | Plastic | See table 4.1.2 | 1000 | No damaged |
| Bottom enclosure | Plastic | See table 4.1.2 | 1000 | No damaged |
| Supplementary information: | | | | |

| T.8 | TABLE: Stress relief test | | | | P |
|---|---|---|---|---|---|
| Location/Part | Material | Thickness (mm) | Oven Temperature (°C) | Duration (h) | Observation |
| Completed sample | Plastic enclosure (for all sources) | See table 4.1.2 | 70 | 7 | No damaged, no hazards. |
| Supplementary information: | | | | | |

| X | TABLE: Alternative method for determining minimum clearances distances | | | N |
|---|---|---|---|---|
| Clearance distanced between: | Peak of working voltage (V) | Required cl (mm) | Measured cl (mm) | |
| -- | -- | -- | -- | |
| Supplementary information: | | | | |

| 4.1.2 | TABLE: Critical components information | | | | P |
|---|---|---|---|---|---|
| Object / part No. | Manufacturer/ trademark | Type / model | Technical data | Standard | Mark(s) of conformity |
| Power Adapter | Shenzhen Youmingxing Technology Co., Ltd. | YC-R02052000VU | Input: 100-240V~ 50/60Hz 0.2A<br>Output: DC5V/2.0A<br>(25°C, LPS) | IEC 6268-1: 2014 | TUV Rheinland Report No.: CN226GQ3 001 |
| LEDs | Shenzhen Juku Intelligent Technology Co., Ltd. | ACA-002 | Exempt Group | EN 62471: 2008 | Report No.: AGC0926419 1001SS01 |
| Speaker | Interchangeable | Interchangeable | 8ohm, 2.0W | EN IEC 6268-1 | Tested with appliance |
| Enclosure | KINGFA SCI & TECH CO LTD | JH830 | Min. 1.0mm, V-0, 80°C | UL94 | UL<br>E171666 |
| Button cell | CHANGZHOU JINTAN Chao Chuang Battery Co., Ltd | CR2032 | 3.0V | IEC 60086-4: 2019 | Report No.: GJW2020-1665 |
| PCB | Interchangeable | Interchangeable | V-0, 130°C | UL 94 | UL |
| Supplementary information: | | | | | |

# Attachment A
# Photos of product

Fig. 1 – over view

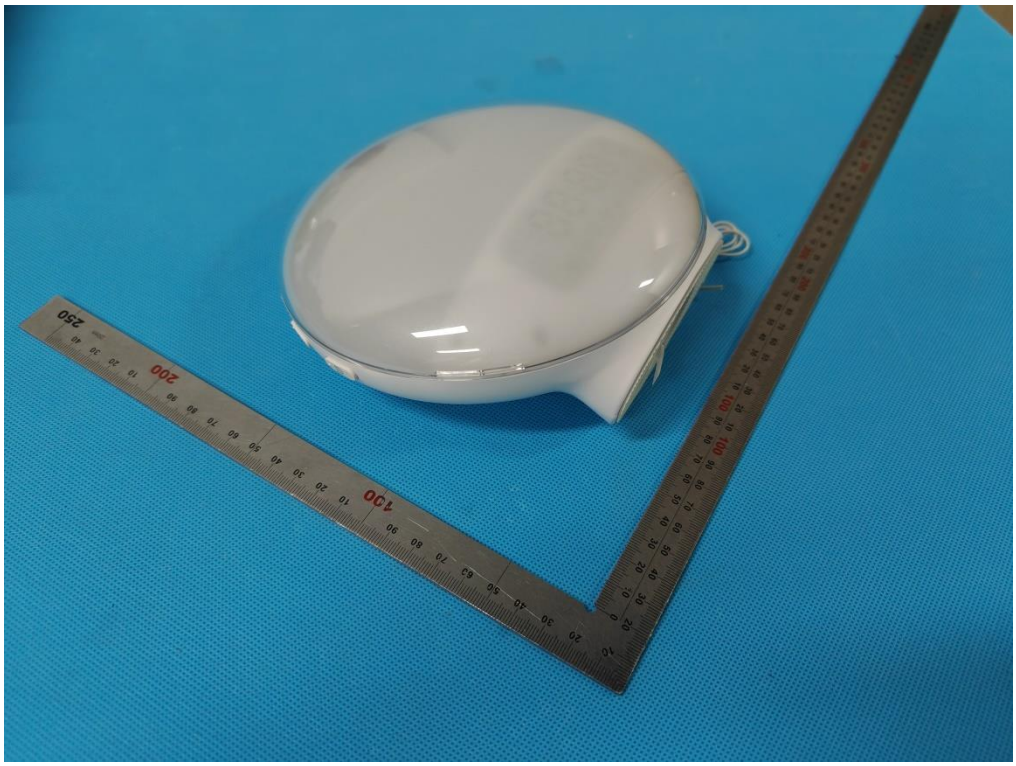

Fig. 2 – over view

Fig. 3 – over view

Fig. 4 – port view

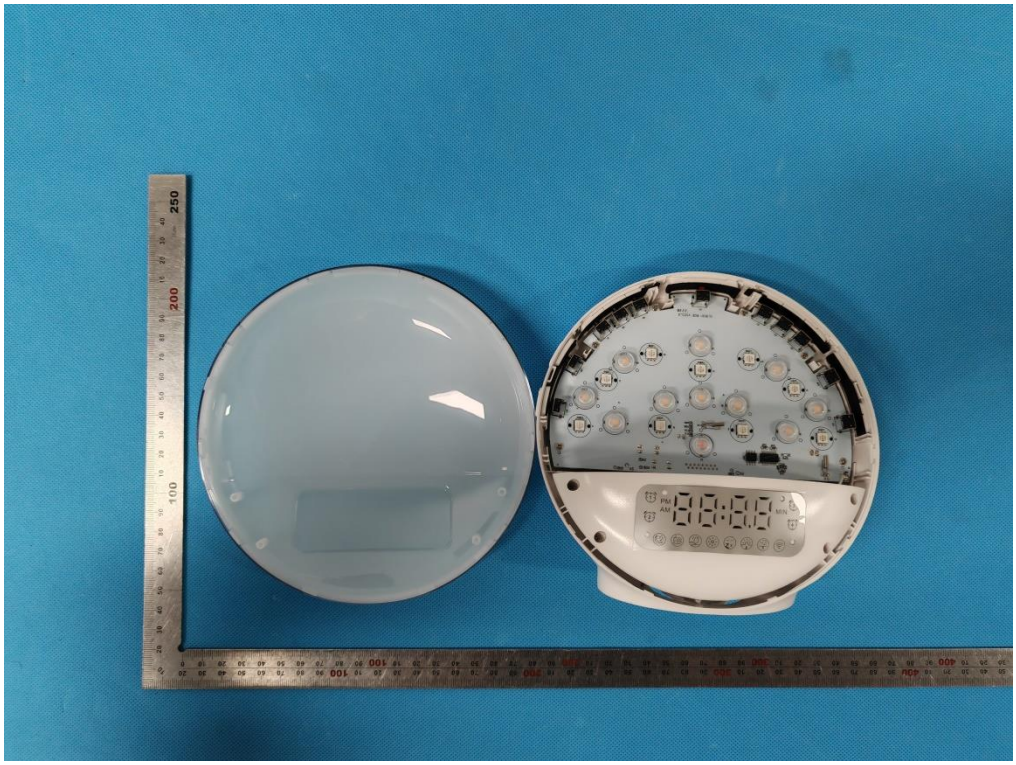

Fig. 5 – open view

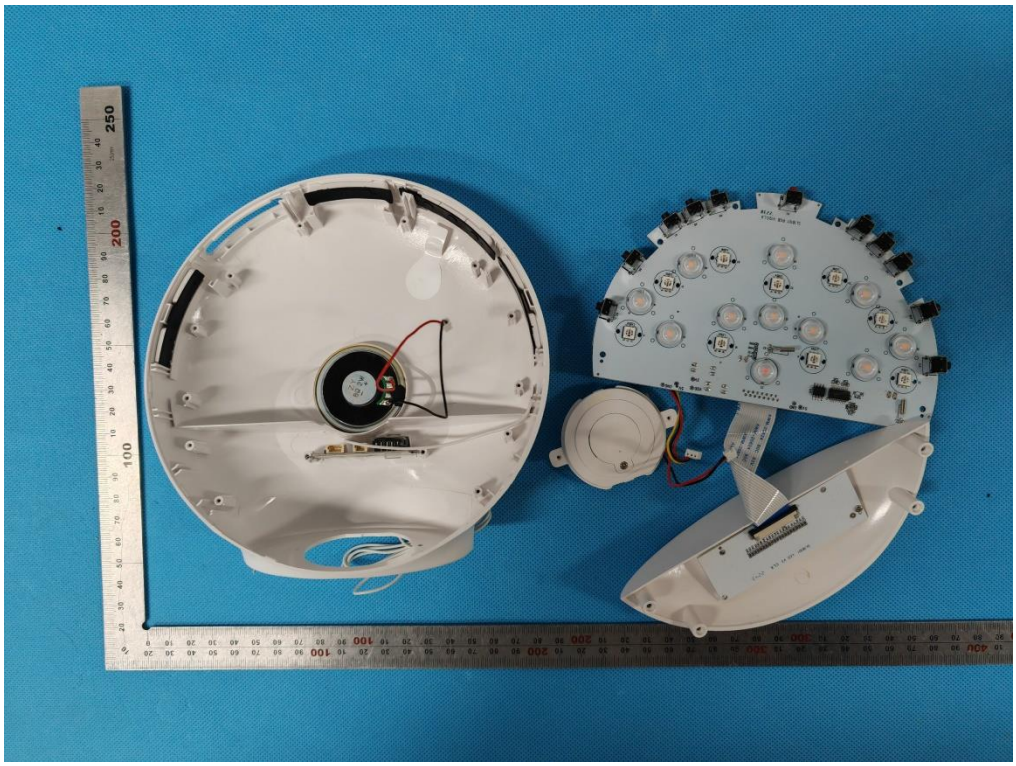

Fig. 6 – part view

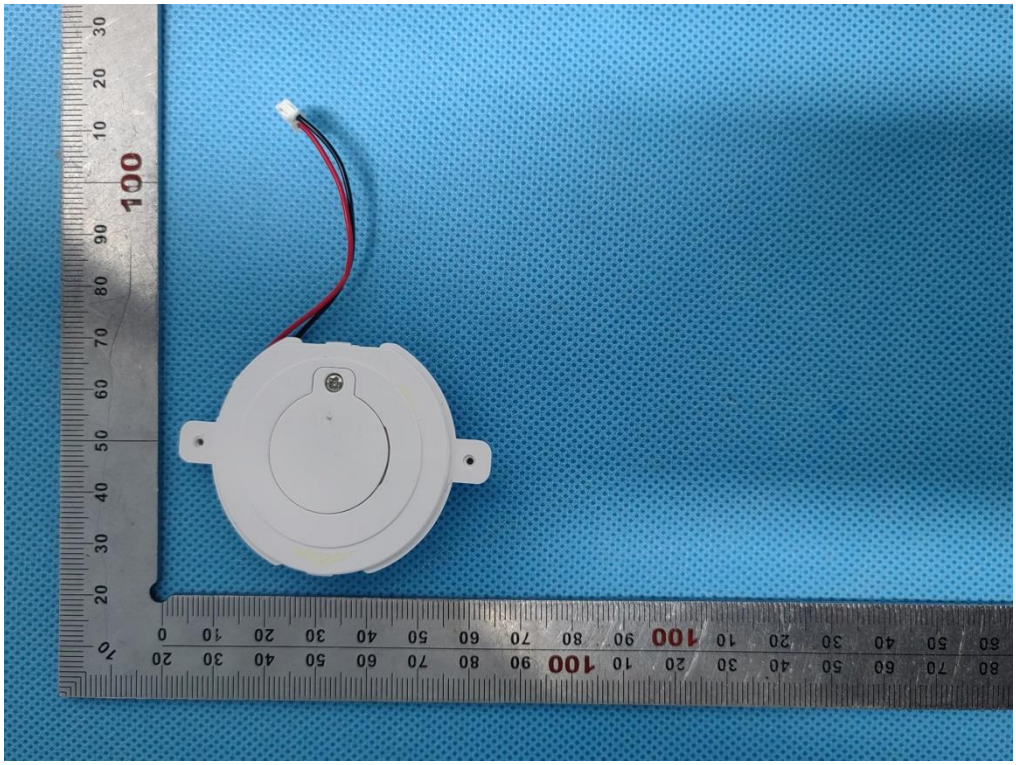

Fig. 7 – part view

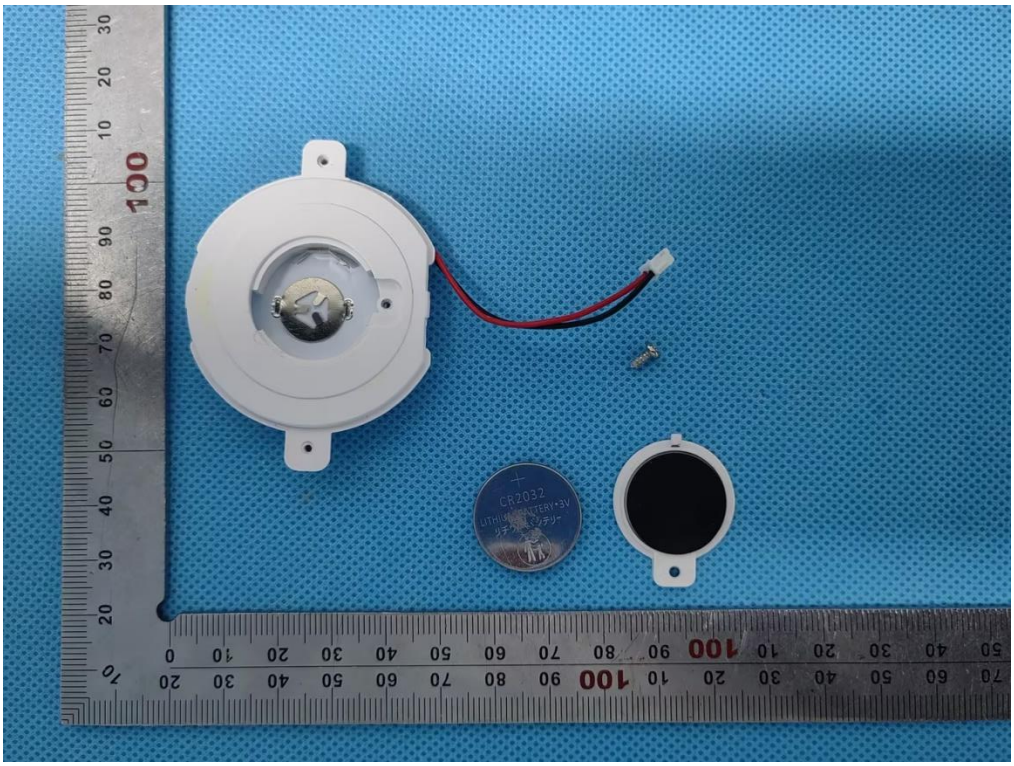


Fig. 8 – part view

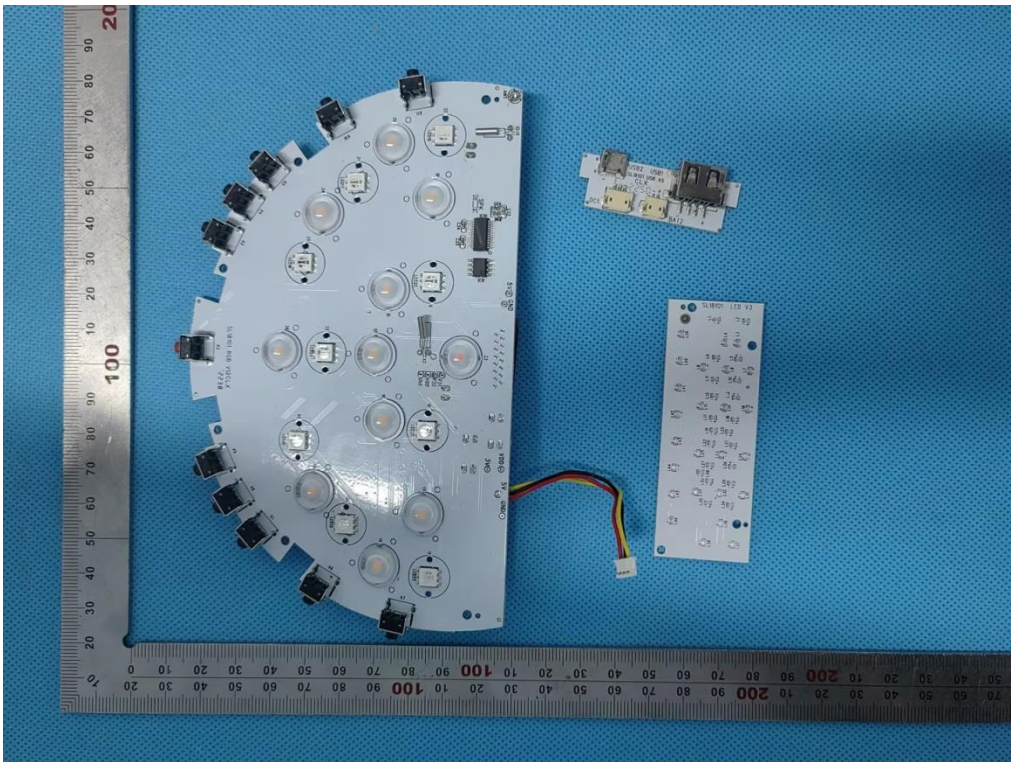

Fig. 9 – PCB view

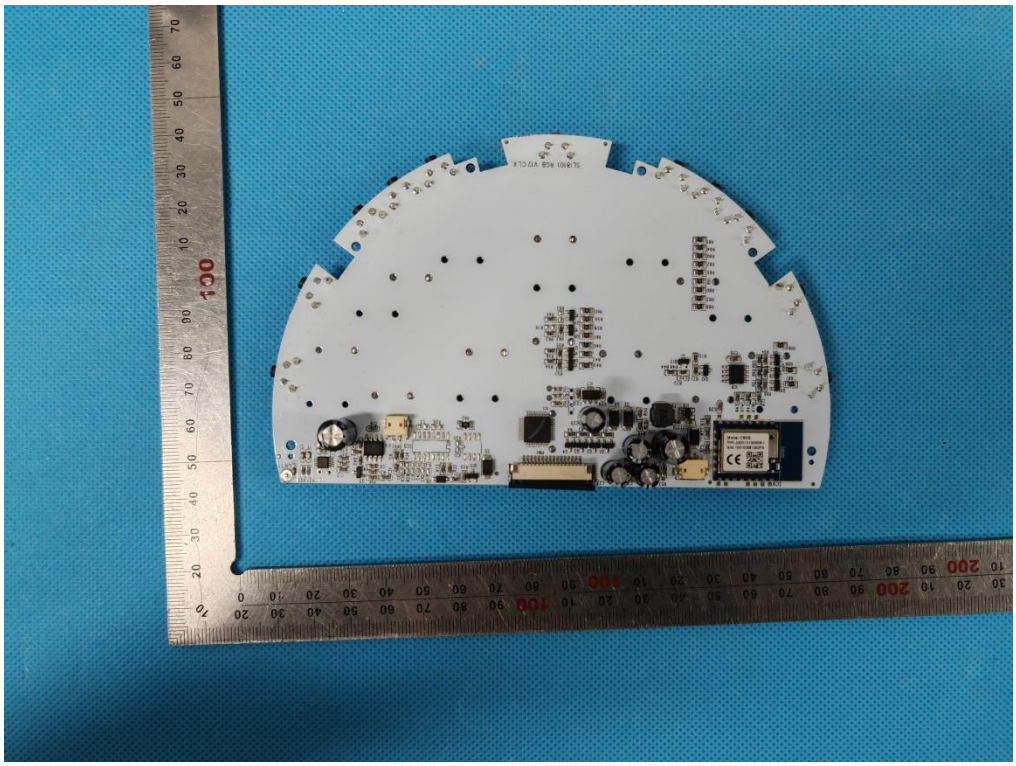

Fig. 10 – PCB view

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

# Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.