# EMC TEST REPORT

## Report No.：ACS-E23114

| | | |
|---|---|---|
| Applicant | : | TPV Electronics (FuJian) Co., Ltd.<br>Rongqiao Economic and Technological Development Zone, Fuqing City, Fujian Province, P.R. China |
| Product | : | OLED Monitor |
| Model No. | : | AG456UCZD; AG456********<br>(*=0-9,A-Z,a-z,+,-,/,\ or blank) |
| Brand | : | AOC |
| Test Lab. | : | Audix Technology (Shenzhen) Co., Ltd.<br>No. 6, Kefeng Road, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China<br>Tel: (0755) 26639496<br>Fax: (0755) 26632877 |
| Date of Test | : | Jun.11~Jul.03, 2023 |
| Date of Report | : | Jul.11, 2023 |

TESTING
NVLAP LAB CODE 200372-0

Testing Laboratory
1418

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# TEST REPORT VERIFICATION

| | | |
|---|---|---|
| Applicant | : | TPV Electronics (FuJian) Co., Ltd. |
| Product | : | OLED Monitor |
| Model No. | : | AG456UCZD; AG456******** (*=0-9,A-Z,a-z,+,-,/,\ or blank) |
| Brand | : | AOC |
| Report No. | : | ACS-E23114 |
| Power Supply | : | AC 100-240V; 50/60Hz |
| Test Voltage | : | AC 230V/50Hz; AC 110V/60Hz; AC 100V/50Hz; AC 240V/50Hz |
| Standards | : | EN 55032: 2015 (Class B)<br>EN 55032: 2015+A11: 2020; EN 55032: 2015+A1: 2020<br>CISPR 32:2015+A1:2019; AS/NZS CISPR 32: 2015+A1: 2020<br>BS EN 55032: 2015 (Class B);<br>BS EN 55032: 2015+A11: 2020; BS EN 55032:2015+A1:2020<br>EN 61000-3-2: 2014, Class D / EN IEC 61000-3-2:2019+A1:2021<br>BS EN 61000-3-2: 2014; BS EN IEC 61000-3-2:2019+A1: 2021<br>EN 61000-3-3: 2013; EN 61000-3-3: 2013+A1:2019<br>EN 61000-3-3: 2013+A2:2021<br>BS EN 61000-3-3: 2013; BS EN 61000-3-3: 2013+A1: 2019<br>BS EN 61000-3-3: 2013+A2: 2021<br>EN 55035: 2017 / CISPR 35: 2016; EN 55035: 2017+A11:2020<br>BS EN 55035: 2017; BS EN 55035: 2017+A11: 2020<br>(IEC 61000-4-2: 2008; IEC 61000-4-3: 2020;<br>IEC 61000-4-4: 2012; IEC 61000-4-5: 2014+A1:2017;<br>IEC 61000-4-6: 2013; IEC 61000-4-8: 2009; IEC 61000-4-11: 2020) |

The device described above is tested by Audix Technology (Shenzhen) Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and EUT's performance criterion. The test results are contained in this test report and Audix Technology (Shenzhen) Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the requirements of EN 55032, BS EN 55032, EN 61000-3-2, BS EN 61000-3-2, EN 61000-3-3, BS EN 61000-3-3, EN 55035 and BS EN 55035 standards.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.
This report applies to single evaluation of one sample of above mentioned products. This report shall not be reproduced in parts without written approval of Audix Technology (Shenzhen) Co., Ltd.

Date of Test : Jun.11~Jul.03, 2023 Report of date: Jul.11, 2023

Prepared by : Sisi Wu
Sisi Wu / Assistant

Reviewed by : Fire Zhang
Fire Zhang / Assistant Manager

AUDIX 信華科技（深圳）有限公司
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report

Approved & Authorized Signer : Signature: David Jin
David Jin / Deputy General Manager

# 1. SUMMARY OF STANDARDS AND RESULTS

## 1.1.Description of Standards and Results

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

| EMISSION | | | |
|---|---|---|---|
| **Description of Test Item** | **Standard** | **Results** | **Remark** |
| Conducted emission at mains terminals | EN 55032; BS EN 55032 | PASS | Minimum passing margin is 16.76dB at 0.190MHz |
| Conducted emission at telecommunication port | EN 55032; BS EN 55032 | N/A | N/A |
| Radiated emission (30MHz-1000MHz) | EN 55032; BS EN 55032 | PASS | Minimum passing margin is 4.36dB at 34.850MHz |
| Radiated emission (1GHz-6GHz) | EN 55032; BS EN 55032 | PASS | Minimum passing margin is 14.18dB at 2856.816MHz |
| Harmonic current emissions | EN 61000-3-2 EN IEC 61000-3-2 BS EN 61000-3-2 | PASS | Meet the Class D requirement |
| Voltage fluctuations & flicker | EN 61000-3-3 BS EN 61000-3-3 | PASS | Meet the requirement |

| IMMUNITY | | | | |
|---|---|---|---|---|
| **Description of Test Item** | **Basic Standard** | **Results** | **Performance Criteria** | **Observation** |
| Electrostatic discharge (ESD) | IEC 61000-4-2 | PASS | B | A & B |
| Radiated, radio-frequency, electromagnetic field immunity test | IEC 61000-4-3 | PASS | A | A |
| Electrical fast transient (EFT) | IEC 61000-4-4 | PASS | B | A & B |
| Surge (Input a.c. power port) | IEC 61000-4-5 | PASS | B | A & B |
| Surge(Telecommunication port) | | N/A | N/A | N/A |
| Surge (Coaxial or Shielding) | | N/A | N/A | N/A |
| Continuous Conducted disturbance | IEC 61000-4-6 | PASS | A | A |
| Power frequency magnetic field | IEC 61000-4-8 | PASS | A | A |
| Voltage dips, >95% reduction | IEC 61000-4-11 | PASS | B | A |
| Voltage dips, 30% reduction | | PASS | C | A & C |
| Voltage interruptions | | PASS | C | C |
| N/A is an abbreviation for Not Applicable. | | | | |
| Note: Measurement uncertainty affection to the result is considered, the EUT is technically compliant with standard requirements. | | | | |

# 2. GENERAL INFORMATION

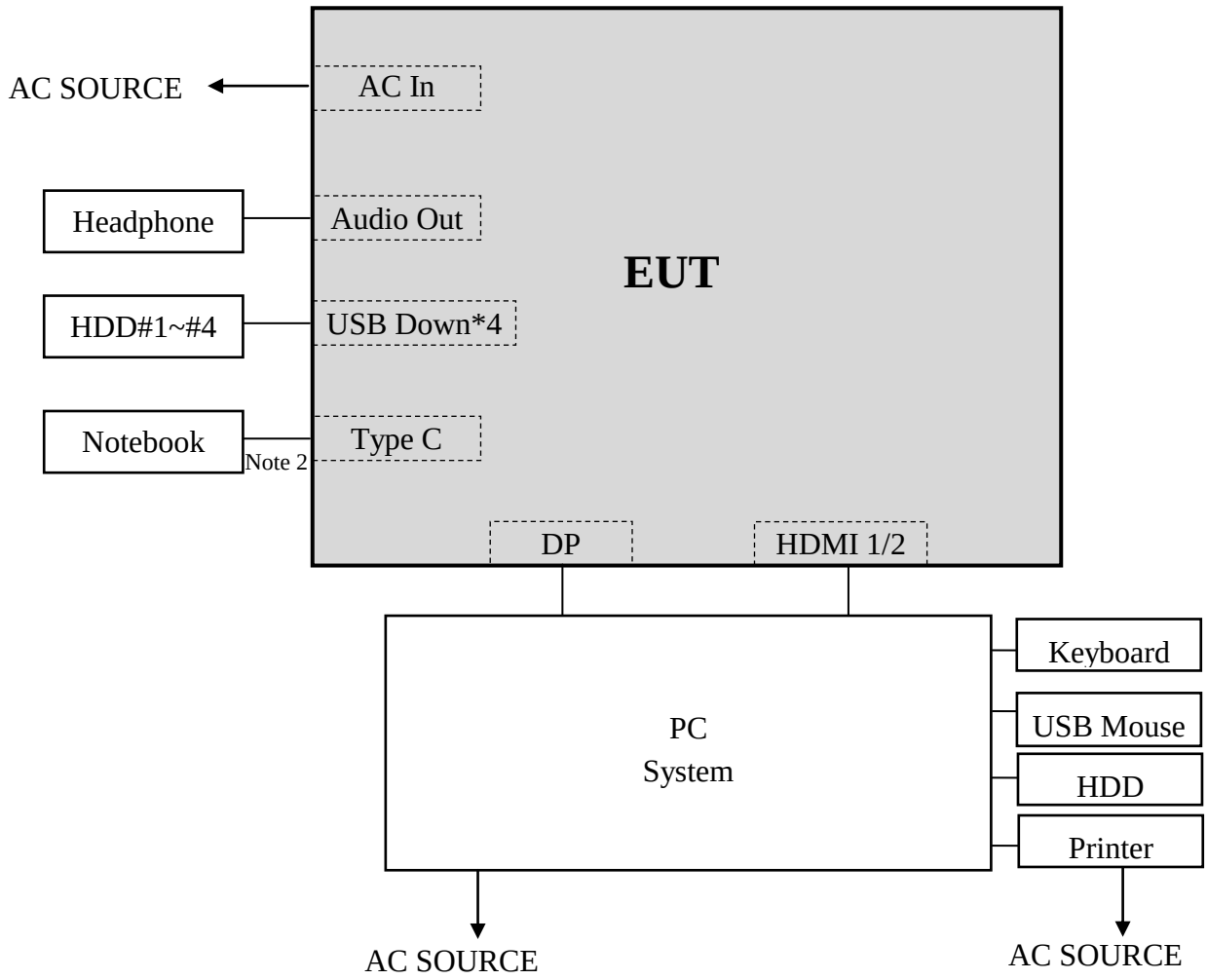
## 2.1. Description of Device (EUT)

| | | |
|---|---|---|
| Product | : | OLED Monitor |
| Model No. | : | AG456UCZD; AG456******** (*=0-9,A-Z,a-z,+,-,/,\ or blank)<br>Model differences(Declared by the Applicant ): Above all models difference are in sale marketing. |
| Test Model | : | AG456UCZD |
| Brand | : | AOC |
| Applicant | : | TPV Electronics (FuJian) Co., Ltd.<br>Rongqiao Economic and Technological Development Zone, Fuqing City, Fujian Province, P.R. China |
| Max. Resolution | : | HDMI: 3440*1440@100Hz<br>DP/Type C: 3440*1440@240Hz |
| Max.Work Frequency | : | Above 108MHz |
| I/O Port | : | (1)One AC Port<br>(2)Two HDMI Ports<br>(3)One DP Port<br>(4)One Type C Port<br>(5)One USB Up-Steam Port<br>(6)Four USB Down-Stream Ports<br>(7)One Audio Out Port |
| Power Cord | : | Unshielded, Detachable, 1.8m/1.5m (3 pins) |
| HDMI Cable | : | Shielded, Detachable, 1.8m/1.5m |
| DP Cable | : | Shielded, Detachable, 1.8m/1.5m |
| Type C Cable | : | Shielded, Detachable, 1.8m/1.5m |
| USB3.0 to Type C Cable | : | Shielded, Detachable, 1.8m/1.5m |
| USB3.0 Cable | : | Shielded, Detachable, 1.8m/1.5m |
| Date of Test | : | Jun.11~Jul.03, 2023 |
| Date of Receipt | : | Jun.07, 2023 |
| Sample Type | : | Prototype production |

## 2.2.Tested Supporting System Details

| No. | Description | ACS No. | Manufacturer | Model | Serial Number |
|---|---|---|---|---|---|
| 1. | Personal Computer (For EMI Test) | Test PC Z | DELL | Optiplex 7090MT | --- |
| | | Power Cord(3C): Unshielded, Detachable, 1.8m<br>HDMI Cable: Shielded, Detachable, 1.8m | | | |
| 2. | Personal Computer (For H/F&EMS Test) | Test PC V | Lenovo | T4900c-00 | R301NRS8 |
| | | Power Cord(3C): Unshielded, Detachable, 1.8m | | | |
| 3. | USB Keyboard | ACS-EMC-K03R | DELL | SK-8120 | CN-ODJ365-71616-2BE-0DCE-A00 |
| | | USB Cable: Shielded, Undetachable, 1.8m | | | |
| 4. | USB Mouse | ACS-EMC-M03R | DELL | M0C5UO | 512023253 |
| | | USB Cable: Shielded, Undetachable, 1.8m | | | |
| 5. | Printer | ACS-EMC-PT04 | HP | C9079A | N/A |
| | | USB Cable: Shielded, Detachable, 1.8m<br>Power Cord(2C): Unshielded, Detachable, 1.8m | | | |
| 6. | HDD01 | ACS-EMC-HDD01 | Terasys | F12-UF | A0100215-5390031 |
| | | USB Cable: Shielded, Detachable, 1.8m | | | |
| 7. | DVD | --- | Pioneer | DV-310NC-K | --- |
| | | Power Cord(2C): Unshielded, Detachable, 1.5m | | | |
| 8. | Headphone | ACS-EMC-EP01 | OVANN | 0V-T880V | --- |
| | | Data Cable: Shielded, Detachable, 2.0m | | | |
| 9. | HDD#1 | ACS-EMC-HDD42 | WD | WD Elements | WXA1A7396898 |
| | | Data Cable: Shielded, Detachable, 0.4m | | | |
| 10. | HDD#2 | ACS-EMC-HDD43 | WD | WD Elements | WX31E63TU717 |
| | | Data Cable: Shielded, Detachable, 0.4m | | | |
| 11. | HDD#3 | ACS-EMC-HDD44 | WD | WD Elements | WX11E73U9352 |
| | | Data Cable: Shielded, Detachable, 0.4m | | | |
| 12. | HDD#4 | ACS-EMC-HDD45 | WD | WD Elements | WXF1A19JNX5E |
| | | Data Cable: Shielded, Detachable, 0.4m | | | |
| 13. | Notebook | --- | DELL | precision 5550 | --- |

## 2.3.Block Diagram of connection between EUT and simulators




**Note 1: PC Mode, DVD Mode can not link the HDMI port at the same time.**
**Note2: The Type C Port can not Link to PC and Notebook at the same time.**

**(EUT: OLED Monitor)**

## 2.4.Method of Exercising EUT

| | |
|---|---|
| Operating System | Windows 7 of PC system |
| Test Program | BurnIn Test V9.0 |
| Video Signal (Display Image) | Color bars with moving picture element<br>“H” Pattern(Only for H/F test) |
| Audio | 1kHz signal playing |
| USB Port | Hard drive data read and write |
| Type C Port | Upstream port / downstream port / Display Port/ power charge |
| Other | Other peripheral devices were driven and operated in turn |

Display and video parameters

| Function | Setting |
|---|---|
| Hardware acceleration | Maximum |
| Screen settings | High/medium/low effective resolution |
| Color quality | Highest color bit depth |
| Brightness, contrast, color saturation | Use either the factory default settings or typical settings |
| Other | Adjusted to obtain a typical picture using settings giving the highest performance |

## 2.5. Test Facility

Site Description

Name of Firm : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Kefeng Road, Science & Technology Park,
Nanshan District, Shenzhen, Guangdong, China

EMC Lab. : Accredited by NVLAP, USA
NVLAP Code: 200372-0
Valid Date: Mar.31, 2024

Certificated by FCC, USA
Designation No: CN5022
Valid Date: Mar.31, 2024

Accredited by TAF, Taiwan
Registration No: 1418
Valid Date: Nov.30, 2023

## 2.6. Measurement Uncertainty (95% confidence levels, k=2)

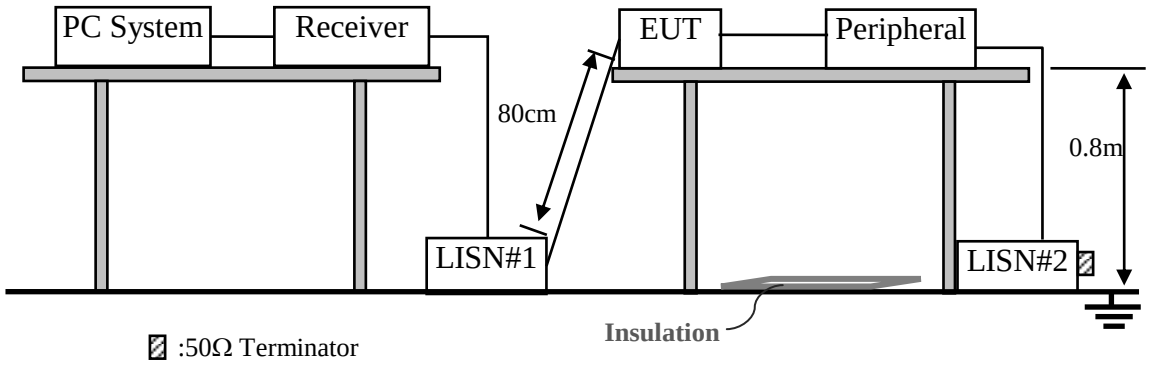
| Test Item | Uncertainty |
|---|---|
| Uncertainty for Conduction emission test in No. 2 Conduction | ±2.4dB (150kHz to 30MHz) |
| Uncertainty for Radiation Emission test in 10m chamber (Distance: 10m) | ±3.8dB (30~200MHz, Polarization: H) |
| | ±3.8dB (30~200MHz, Polarization: V) |
| | ±4.0dB (200M~1GHz, Polarization: H) |
| | ±4.4dB (200M~1GHz, Polarization: V) |
| Uncertainty for Radiation Emission test in 10m chamber (1GHz-18GHz) | ±4.4dB (1-6GHz, Distance: 3m) |
| | ±4.6dB (6-18GHz, Distance: 3m) |
| Uncertainty for $S_{VSWR}$ in 10m Chamber | ±2.8dB (1-6GHz,Distance: 3m) |
| | ±2.8dB (6-18GHz,Distance: 3m) |
| Uncertainty for Flicker test | ±1.5% |
| Uncertainty for Harmonic test | ±8.0% |
| Uncertainty for C/S Test | ±2.26dB (Using CDN test) |
| | ±3.0dB (Using EM clamp test) |
| Uncertainty for R/S Test | ±2.7dB (80MHz~1000MHz) |
| | ±2.7dB (1GHz~2.5GHz) |
| | ±2.7dB (2.5GHz to 6GHz) |
| Uncertainty for Magnetic field immunity test | ±2% |
| Uncertainty for test site temperature and humidity and Pressure | ±0.6℃ |
| | ±3% |
| | ±1kPa |

# 3. CONDUCTED EMISSION AT MAINS TERMINALS TEST

## 3.1.Test Equipments

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | 2# Shielding Room | AUDIX | N/A | N/A | Sep.16,22 | 5 Year |
| 2. | EMI Test Receiver | Rohde & Schwarz | ESCI | 100843 | Oct.09,22 | 1 Year |
| 3. | L.I.S.N.#1 | Rohde & Schwarz | ENV216 | 102834 | Jul.01,22 | 1 Year |
| 4. | L.I.S.N.#2 | Kyoritsu | KNW-407 | 8-1636-1 | Apr.01,23 | 1 Year |
| 5. | RF Cable | Eastsheep | RG223 | 190425 | Oct.09,22 | 1 Year |
| 6. | Terminator | Hubersuhner | 50Ω | No.4 | Apr.02,23 | 1 Year |
| 7. | Test Software | AUDIX | e3 | 210616 | N/A | N/A |
| Note: N/A means Not applicable. | | | | | | |

## 3.2.Block Diagram of Test Setup




## 3.3.Test Standard

EN 55032: 2015 (Class B)
EN 55032: 2015+A11: 2020
EN 55032: 2015+A1: 2020
BS EN 55032: 2015 (Class B)
BS EN 55032: 2015+A11: 2020
BS EN 55032: 2015+A1: 2020

## 3.4.Power Line Conducted Emission at Mains Terminals Class B Limits

| Frequency | Maximum RF Line Voltage | |
|---|---|---|
| | Quasi-Peak Level dB(μV) | Average Level dB(μV) |
| 150kHz ~ 500kHz | 66 ~ 56* | 56 ~ 46* |
| 500kHz ~ 5MHz | 56 | 46 |
| 5MHz ~ 30MHz | 60 | 50 |

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.
3. Emission Level (dBμV) = Factor (L.I.S.N.) (dB) + Cable Loss (dB) + Reading (Receiver) (dBμV).

## 3.5. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N. #2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 55032, BS EN 55032 Class B on conducted emission test.

The bandwidth of test receiver (R&S ESCI) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked. These test results of the conducted disturbance are recorded in section 3.6.

## 3.6. Conducted Emission at Mains Terminals Test Results

**PASS. (**All emissions not reported below are too low against the prescribed limits.)

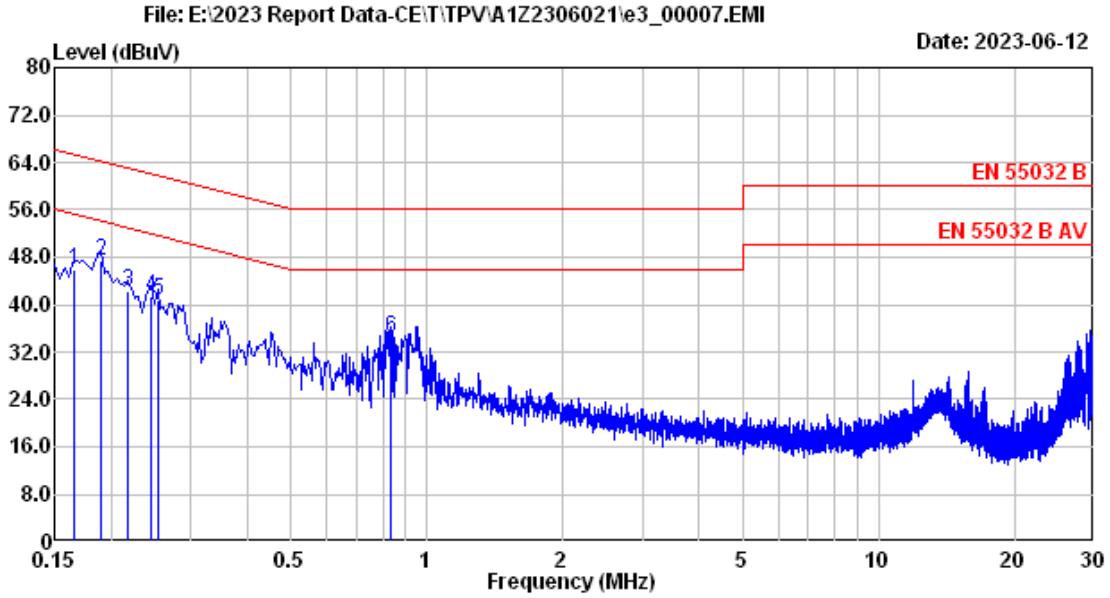
EUT: OLED Monitor Model No. : AG456UCZD

The EUT with following test modes were pre-tested:

| No. | Test Voltage | Test Mode | Input Port | Cable Length | Resolution & Frequency |
|---|---|---|---|---|---|
| 1. | AC 230V/50Hz | PC Mode | HDMI 1/2 | 1.8m | 640*480@60Hz |
| 2. | | | | | 1280*1024@75Hz |
| 3. | | | | | 3440*1440@100Hz |
| 4. | | | HDMI 1 | 1.5m | 3440*1440@100Hz |
| 5. | | | Type C | 1.8m | 640*480@60Hz |
| | | | | | 1280*1024@75Hz |
| | | | | | 3440*1440@240Hz |
| 6. | | | DP | 1.8m | 640*480@60Hz |
| 7. | | | | | 1280*1024@75Hz |
| 8. | | | | | 3440*1440@240Hz |
| 9. | | DVD Mode | HDMI 1/2 | 1.8m | Color Bar |
| 10. | | Standby | --- | --- | --- |
| 11. | | PIP Mode | HDMI+DP | 1.8m | 3440*1440@100Hz |
| 12. | | PBP Mode | HDMI+DP | 1.8m | 1720*1440@60Hz |
| 13. | AC 110V/60Hz | PC Mode | HDMI 1 | 1.8m | 3440*1440@100Hz |

The result of worst test mode is presented in the report as below and the test data are listed in next pages.

| No. | Test Voltage | Test Mode | Input Port | Cable Length | Resolution & Frequency | Reference Test Data No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Line | Neutral |
| 1. | AC 230V/50Hz | PC Mode | HDMI 1 | 1.8m | 3440*1440@100Hz | #7 | #8 |

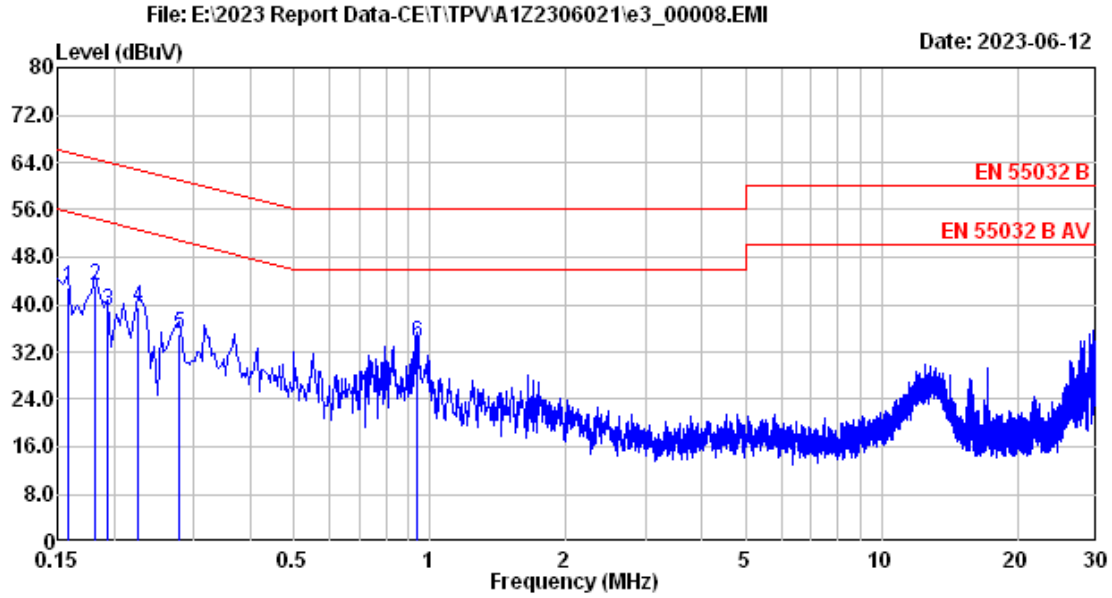



Site no :2# Conduction
Dis./Lisn :2022 ENV216 0.15-30M-L
Limit :EN 55032 B
Env./Ins. :23.3*C/46%
EUT :M/N:AG456UCZD
Power Rating :AC 230V/50Hz
Test Mode :HDMI1:3440*1440@100Hz
Line:1.8m

Data No :7
LISN phase:
Pressure :101.5kPa
Engineer :Fire

| No | Freq (MHz) | LISN Factor (dB) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV) | Limits (dBuV) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.166 | 9.40 | 0.02 | 36.33 | 45.75 | 65.16 | 19.41 | QP |
| 2 | 0.190 | 9.40 | 0.02 | 37.86 | 47.28 | 64.04 | 16.76 | QP |
| 3 | 0.218 | 9.40 | 0.02 | 32.76 | 42.18 | 62.89 | 20.71 | QP |
| 4 | 0.246 | 9.40 | 0.02 | 31.85 | 41.27 | 61.89 | 20.62 | QP |
| 5 | 0.254 | 9.40 | 0.02 | 31.25 | 40.67 | 61.63 | 20.96 | QP |
| 6 | 0.830 | 9.40 | 0.03 | 24.94 | 34.37 | 56.00 | 21.63 | QP |

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when using a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.




Site no :2# Conduction
Dis./Lisn :2022 ENV216 0.15-30M-N
Limit :EN 55032 B
Env./Ins. :23.3*C/46%
EUT :M/N:AG456UCZD
Power Rating :AC 230V/50Hz
Test Mode :HDMI1:3440*1440@100Hz
Line:1.8m

Data No :8
LISN phase:
Pressure :101.5kPa
Engineer :Fire

| No | Freq (MHz) | LISN Factor (dB) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV) | Limits (dBuV) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.158 | 9.50 | 0.02 | 33.48 | 43.00 | 65.57 | 22.57 | QP |
| 2 | 0.182 | 9.50 | 0.02 | 33.57 | 43.09 | 64.39 | 21.30 | QP |
| 3 | 0.194 | 9.50 | 0.02 | 29.37 | 38.89 | 63.86 | 24.97 | QP |
| 4 | 0.226 | 9.50 | 0.02 | 29.94 | 39.46 | 62.60 | 23.14 | QP |
| 5 | 0.278 | 9.50 | 0.02 | 25.57 | 35.09 | 60.88 | 25.79 | QP |
| 6 | 0.942 | 9.50 | 0.04 | 23.88 | 33.42 | 56.00 | 22.58 | QP |

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when using a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

# 4. RADIATED EMISSION TEST

## 4.1. Test Equipments

### 4.1.1. For frequency range 30MHz~1000MHz (In 10m Anechoic Chamber)

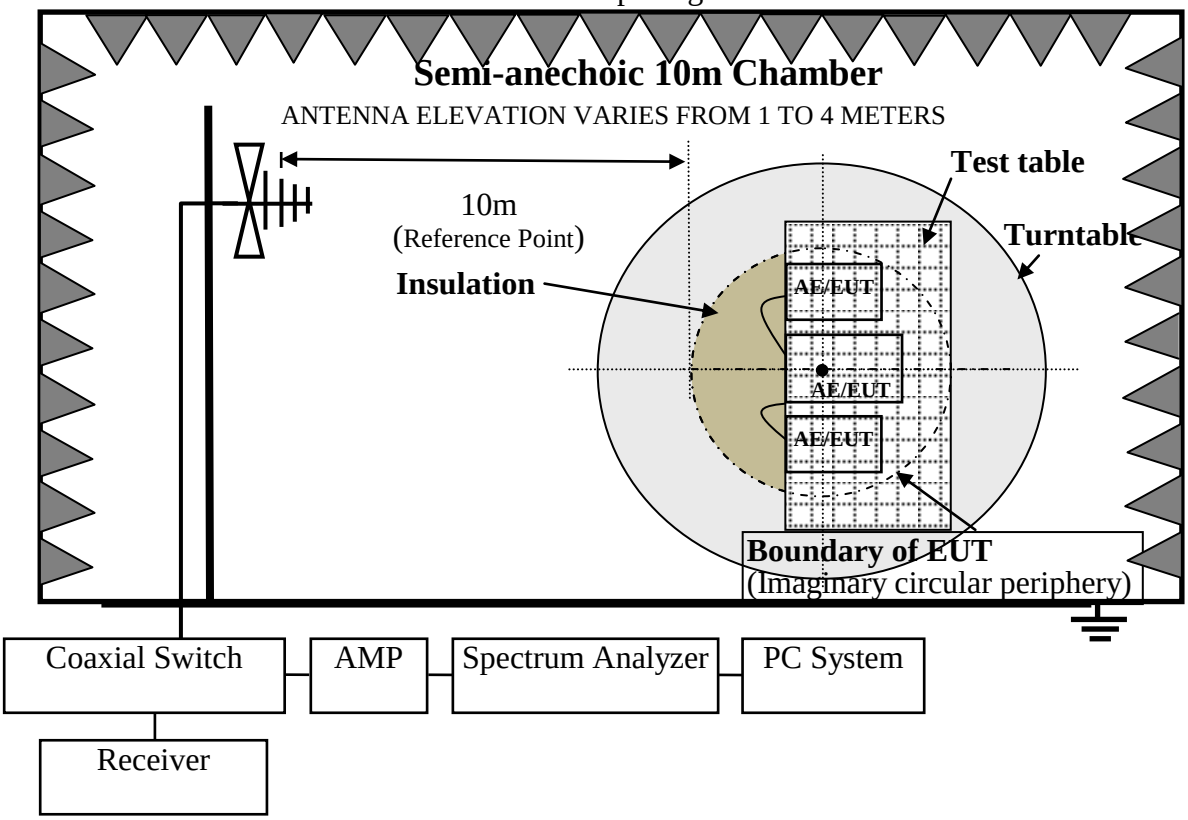
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | 10m Chamber(NSA) | AUDIX | N/A | N/A | Aug.12,22 | 5 Year |
| 2. | 10m Chamber(SE) | AUDIX | N/A | N/A | Sep.16,22 | 5 Year |
| 3. | Signal Analyzer | Rohde & Schwarz | FSV30 | 103669 | Oct.09,22 | 1 Year |
| 4. | Signal Analyzer | Rohde & Schwarz | FSV30 | 103670 | Jul.08,22 | 1 Year |
| 5. | EMI Test Receiver | Rohde & Schwarz | ESR3 | 102891 | Oct.10,22 | 1 Year |
| 6. | Amplifier | EMCI | EMC9135 | 980348 | Feb.23,23 | 1 Year |
| 7. | Amplifier | EMCI | EMC9135 | 980347 | Apr.02,23 | 1 Year |
| 8. | Tri-log-Broadband Antenna | SCHWARZBECK | VULB 9168 | 429 | Sep.19,22 | 1 Year |
| 9. | Tri-log-Broadband Antenna | SCHWARZBECK | VULB 9168 | 01313 | Aug.04,22 | 1 Year |
| 10. | RF Cable | SPUMA | CFD400NL-LW | NO.4 | Apr.02,23 | 1 Year |
| 11. | RF Cable | SPUMA | CFD400-NM-NM | 160727+160728 | Apr.02,23 | 1 Year |
| 12. | Coaxial Switch | Anritsu | MP59B | 6201397220 | Apr.02,23 | 1 Year |
| 13. | Coaxial Switch | Anritsu | MP59B | 6201397221 | Apr.02,23 | 1 Year |
| 14. | Coaxial Switch | Anritsu | MP59B | 6201397224 | Apr.02,23 | 1 Year |
| 15. | Test Software | AUDIX | e3 | 210616 | N/A | N/A |
| Note: N/A means Not applicable. | | | | | | |

### 4.1.2. For frequency range 1GHz~6GHz (In 10m Anechoic Chamber)

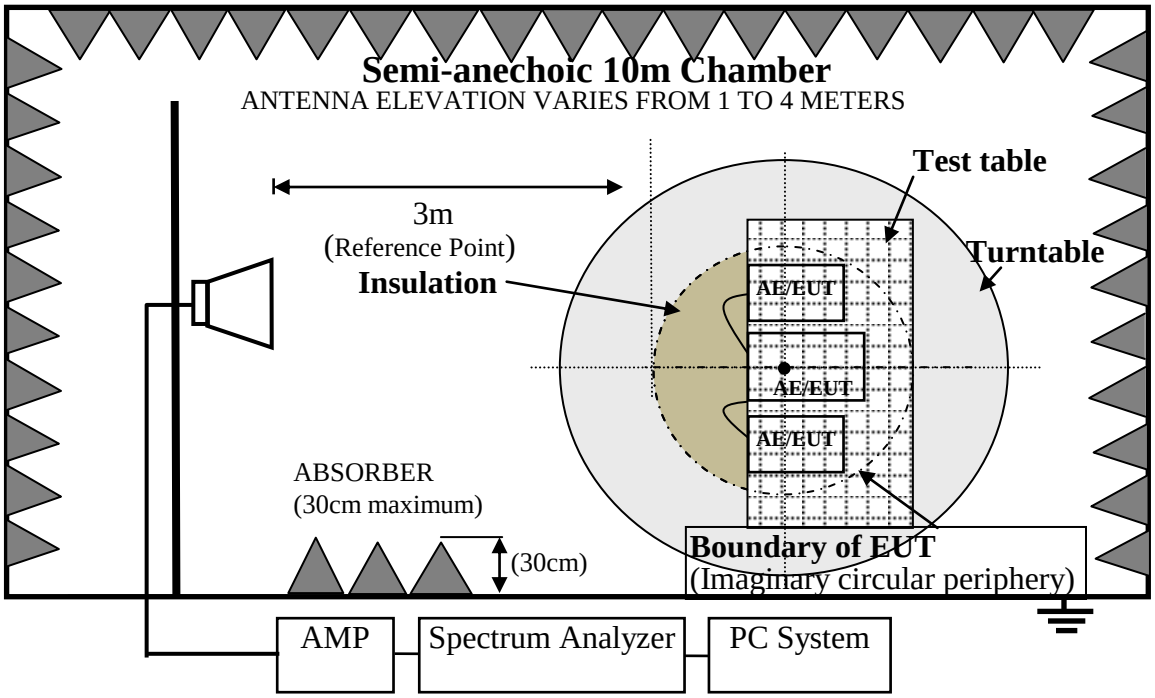
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | 10m Chamber(Svswr) | AUDIX | N/A | N/A | Aug.08,22 | 5 Year |
| 2. | 10m Chamber(SE) | AUDIX | N/A | N/A | Sep.16,22 | 5 Year |
| 3. | Signal Analyzer | Rohde & Schwarz | FSV30 | 103669 | Oct.09,22 | 1 Year |
| 4. | Horn Antenna | ETS | 3117 | 00218552 | Jan.29,23 | 1 Year |
| 5. | Amplifier | KEYSIGHT | 83017A | 39500711 | Apr.02,23 | 1 Year |
| 6. | RF Cable | EMCI | EMC104-SM-SM-15000 | 190408 | Apr.02,23 | 1 Year |
| 7. | Test Software | AUDIX | e3 | 210616 | N/A | N/A |
| Note: N/A means Not applicable. | | | | | | |

## 4.2.Block Diagram of Test Setup

### 4.2.1. In 10m Anechoic Chamber Test Setup Diagram for 30MHz-1000MHz




### 4.2.2. In 10m Anechoic Chamber Test Setup Diagram for 1GHz-6GHz



## 4.3. Test Standard

EN 55032: 2015 (Class B)
EN 55032: 2015+A11: 2020
EN 55032: 2015+A1: 2020
BS EN 55032: 2015 (Class B)
BS EN 55032: 2015+A11: 2020
BS EN 55032: 2015+A1: 2020

## 4.4. Radiated Emission Class B Limits

All emanations from a Class B computing devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:
Table 1

| Frequency (MHz) | Distance (Meters) | Field Strengths Limits (dBμV/m) |
|---|---|---|
| 30 ~ 230 | 10 | 30 |
| 230 ~ 1000 | 10 | 37 |
| 1000~3000 | 3 | 70(Peak) 50(Average) |
| 3000~6000 | 3 | 74(Peak) 54(Average) |

Notes: (1) Emission Level (dBμV/m) = Reading (Receiver) (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB)
Emission Level (dBμV/m) = Reading (Spectrum) (dBμV) + Antenna Factor (dB/m) –Amp Factor (dB) + Cable Loss (dB) (above 1000MHz)
(2) The lower limit shall apply at the transition frequencies.

Table 2: Limit for EN 55032:2015+A1:2020

| Frequency (MHz) | Distance (Meters) | Field Strengths Limits (dBμV/m) |
|---|---|---|
| 30 ~ 230 | 10 | 30 |
| 230 ~ 1000 | 10 | 37 |
| 1000~6000 | 3 | 74(Peak) 54(Average) |
| The limits listed in table 1 is strict than the limits listed in table 2.<br>The EUT which complies with table 1 limit is deemed to comply with table 2 limit. | | |

Notes: (1) Emission Level (dBμV/m) = Reading (Receiver) (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB)
Emission Level (dBμV/m) = Reading (Spectrum) (dBμV) + Antenna Factor (dB/m) –Amp Factor (dB) + Cable Loss (dB) (above 1000MHz)
(2) The lower limit shall apply at the transition frequencies.

## 4.5. Test Procedure

The EUT was placed on a non-metallic table, 80 cm above the ground plane measurement distance was 10m at a semi-anechoic chamber. An antenna was located 10m from the periphery of test system on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all the interface cables were changed according to EN 55032, BS EN 55032 Class B on radiated emission test.

The bandwidth setting on the test receiver is 120 kHz.

The resolution bandwidth of the Signal Analyzer was set at 1MHz. (For above 1GHz)

The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values.

The frequency range from 1GHz to 6GHz was checked and all final readings of measurement were with Peak and Average detector, measurement distance was 3m at semi-anechoic chamber. The EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. The portion of the test volume that was obstructed by absorber placed on the floor (30cm maximum).

Finally, selected operating situations at Anechoic Chamber measurement, all the test results are listed in section 4.6.

## 4.6. Radiated Emission Test Results

**PASS.** (All emissions not reported below are too low against the prescribed limits.)

**EUT: OLED Monitor Model No. : AG456UCZD**

**For frequency range 30MHz~1000MHz**

The EUT with following test modes were pre-tested:

| No. | Test Voltage | Test Mode | Input Port | Cable Length | Resolution & Frequency |
|---|---|---|---|---|---|
| 1. | AC 230V/50Hz | PC Mode | HDMI 1/2 | 1.8m | 640*480@60Hz |
| 2. | | | | | 1280*1024@75Hz |
| 3. | | | | | 3440*1440@100Hz |
| 4. | | | HDMI 1 | 1.5m | 3440*1440@100Hz |
| 5. | | | Type C | 1.8m | 640*480@60Hz |
| | | | | | 1280*1024@75Hz |
| | | | | | 3440*1440@240Hz |
| 6. | | | DP | 1.8m | 640*480@60Hz |
| 7. | | | | | 1280*1024@75Hz |
| 8. | | | | | 3440*1440@240Hz |
| 9. | | DVD Mode | HDMI 1/2 | 1.8m | Color Bar |
| 10. | | Standby | --- | --- | --- |
| 11. | | PIP Mode | HDMI+DP | 1.8m | 3440*1440@100Hz |
| 12. | | PBP Mode | HDMI+DP | 1.8m | 1720*1440@60Hz |
| 13. | | R-Load | Type C | --- | 20V/4.5A |
| 14. | AC 110V/60Hz | PC Mode | HDMI 1 | 1.8m | 3440*1440@100Hz |

The result of worst test mode is presented in the report as below and the test data are listed in next pages.

| No. | Test Voltage | Test Mode | Input Port | Cable Length | Resolution & Frequency | Reference Test Data No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Horizontal | Vertical |
| 1. | AC 230V/50Hz | PC Mode | HDMI 1 | 1.8m | 3440*1440@100Hz | #2 | #1 |

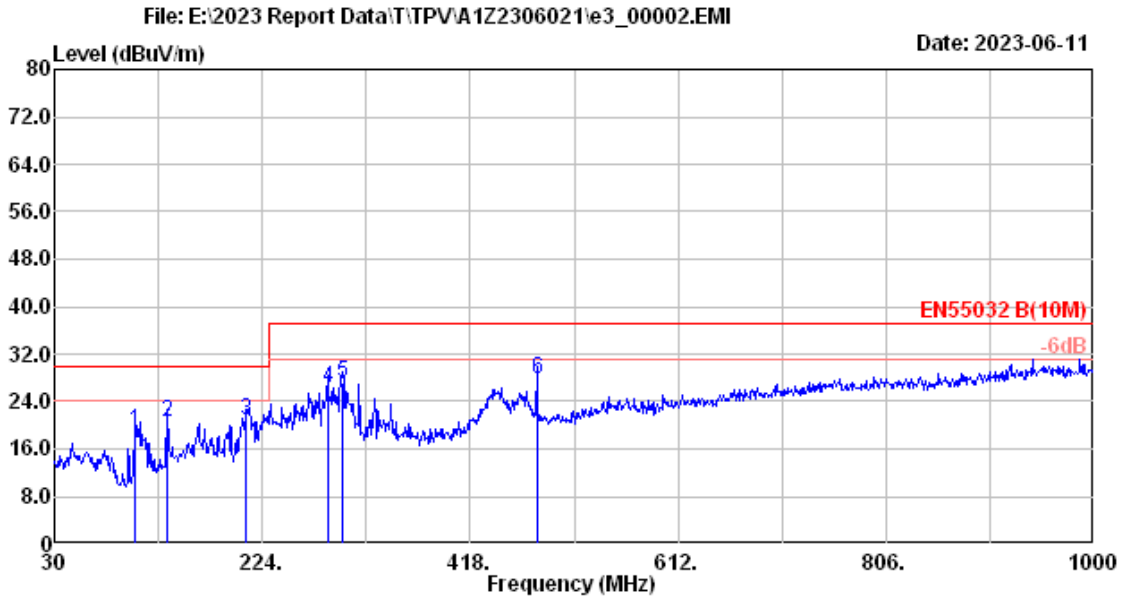
**For frequency range 1GHz~6GHz**

The EUT with following test modes were pre-tested:

| No. | Test Voltage | Test Mode | Input Port | Cable Length | Resolution & Frequency |
|---|---|---|---|---|---|
| 1. | AC 230V/50Hz | PC Mode | HDMI 1/2 | 1.8m | 1280*1024@75Hz |
| 2. | | | | | 3440*1440@100Hz |
| 3. | | | HDMI 1 | 1.5m | 3440*1440@100Hz |
| 4. | | | Type C | 1.8m | 1280*1024@75Hz |
| | | | | | 3440*1440@240Hz |
| 5. | | | DP | 1.8m | 1280*1024@75Hz |
| 6. | | | | | 3440*1440@240Hz |
| 7. | | DVD Mode | HDMI 1/2 | 1.8m | Color Bar |
| 8. | | Standby | --- | --- | --- |
| 9. | | PIP Mode | HDMI+DP | 1.8m | 3440*1440@100Hz |
| 10. | | PBP Mode | HDMI+DP | 1.8m | 1720*1440@60Hz |
| 11. | | R-Load | Type C | --- | 20V/4.5A |
| 12. | AC 110V/60Hz | PC Mode | HDMI 1 | 1.8m | 3440*1440@100Hz |

The result of worst test mode is presented in the report as below and the test data are listed in next pages.

| No. | Test Voltage | Test Mode | Input Port | Cable Length | Resolution & Frequency | Reference Test Data No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Horizontal | Vertical |
| 1. | AC 230V/50Hz | PC Mode | HDMI 1 | 1.8m | 3440*1440@100Hz | #16 | #15 |



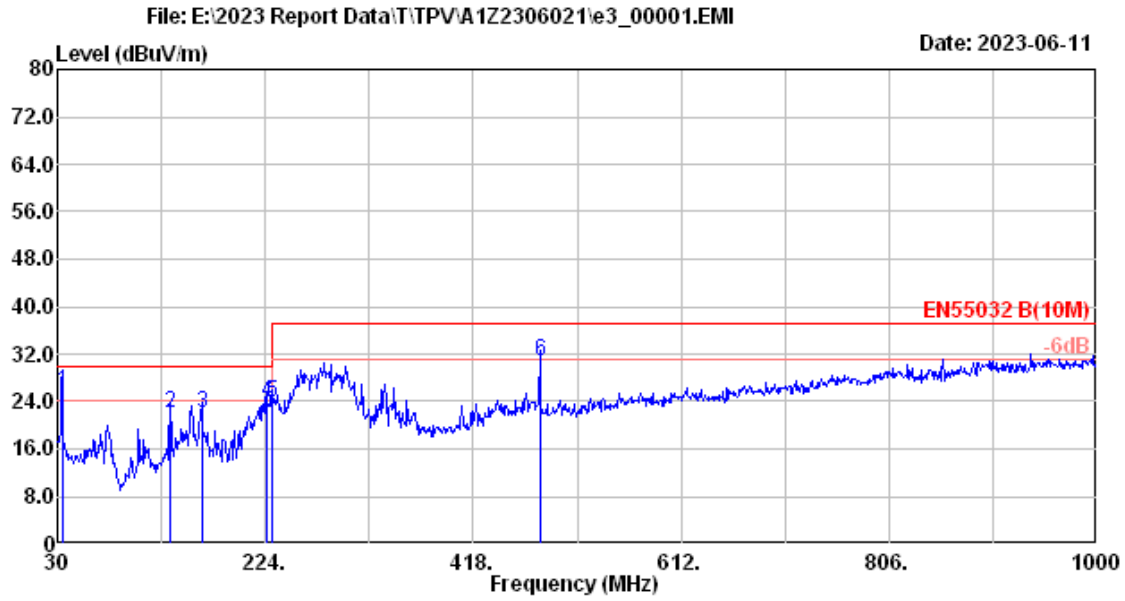

| | | | |
|---|---|---|---|
| Site no. | : 10m Chamber | Data no. | : 2 |
| Dis. / Ant. | : 10m 2022 VULB9168-01313 | Ant. pol. | : Horizontal |
| Limit | : EN55032 B(10M) | Pressure | :101.5kPa |
| Env. / Ins. | : 22.9*C/50% | Engineer | : Hongjie |
| EUT | : M/N:AG456UCZD | | |
| Power rating | : AC 230V/50Hz | | |
| Test Mode | : HDMI1:3440*1440@100Hz | | |
| | Line:1.8m | | |

| No. | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 105.660 | 15.49 | 1.03 | 2.56 | 19.08 | 30.00 | 10.92 | QP |
| 2 | 135.730 | 18.53 | 1.19 | 0.83 | 20.55 | 30.00 | 9.45 | QP |
| 3 | 209.450 | 16.50 | 1.57 | 2.62 | 20.69 | 30.00 | 9.31 | QP |
| 4 | 285.110 | 18.76 | 1.91 | 5.72 | 26.39 | 37.00 | 10.61 | QP |
| 5 | 298.690 | 19.16 | 1.96 | 5.97 | 27.09 | 37.00 | 9.91 | QP |
| 6 | 480.080 | 23.30 | 2.87 | 1.66 | 27.83 | 37.00 | 9.17 | QP* |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

2. The worst emission was detected at 480.080MHz with corrected signal level of 27.83 dBµV/m. (Antenna height 2.05m; Turntable degree 216°).

3. 0° was the table front facing the antenna. Degree is calculated from 0°clockwise facing the antenna.




Site no. : 10m Chamber
Dis. / Ant. : 10m 2022 VULB9168-429
Limit : EN55032 B(10M)
Env. / Ins. : 22.9*C/50%
EUT : M/N:AG456UCZD
Power rating : AC 230V/50Hz
Test Mode : HDMI1:3440*1440@100Hz
Line:1.8m

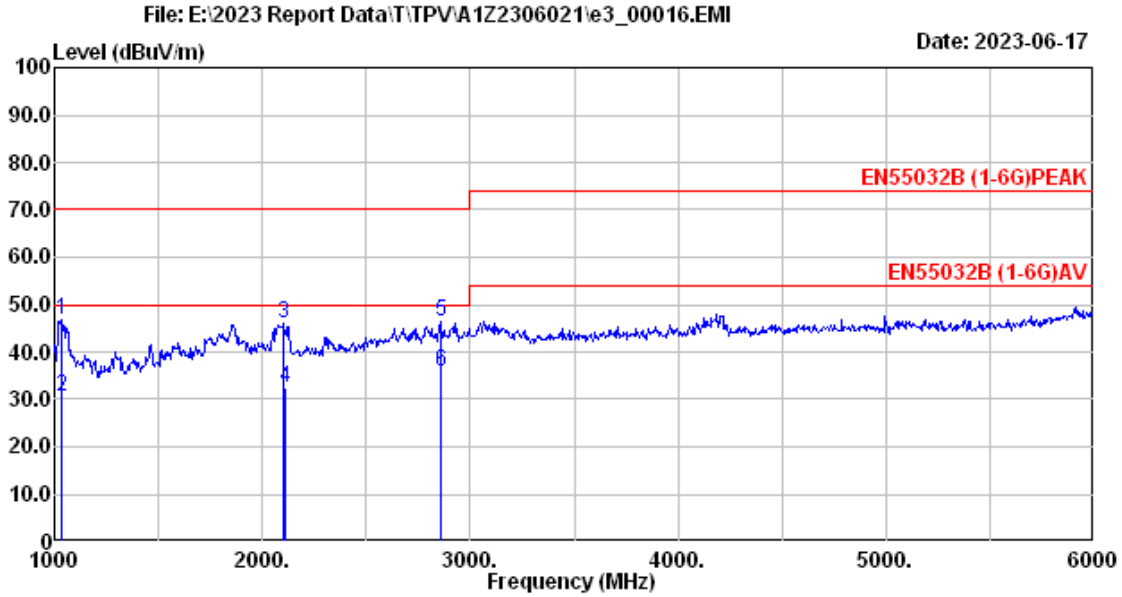
Data no. : 1
Ant. pol. : Vertical
Pressure :101.5kPa
Engineer : Hongjie

| No. | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 34.850 | 19.55 | 0.80 | 5.29 | 25.64 | 30.00 | 4.36 | QP* |
| 2 | 135.730 | 18.57 | 1.64 | 1.73 | 21.94 | 30.00 | 8.06 | QP |
| 3 | 164.830 | 18.96 | 1.80 | 1.22 | 21.98 | 30.00 | 8.02 | QP |
| 4 | 224.970 | 16.80 | 2.11 | 4.80 | 23.71 | 30.00 | 6.29 | QP |
| 5 | 229.820 | 16.98 | 2.14 | 4.79 | 23.91 | 30.00 | 6.09 | QP |
| 6 | 480.080 | 23.46 | 3.28 | 3.92 | 30.66 | 37.00 | 6.34 | QP |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

2. The worst emission was detected at 34.850MHz with corrected signal level of 25.64 dBµV/m. (Antenna height 2.23m; Turntable degree 201°).

3. 0° was the table front facing the antenna. Degree is calculated from 0°clockwise facing the antenna.

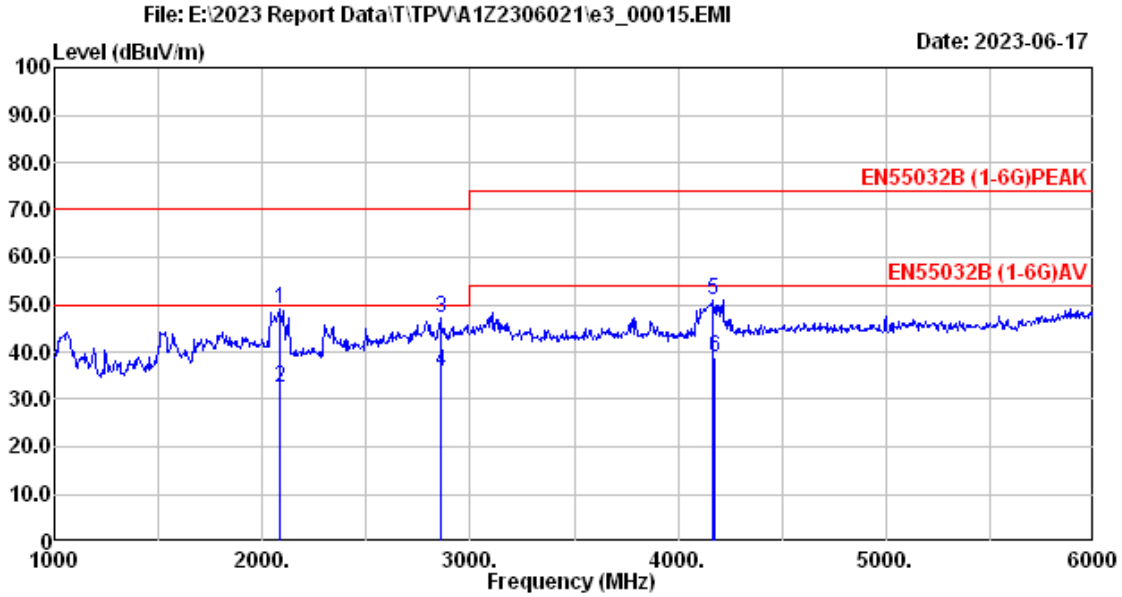



Site no. : 10m Chamber
Dis. / Ant. : 3m 2023 3117
Limit : EN55032B (1-6G)PEAK
Env. / Ins. : 23.5*C/51%
EUT : M/N:AG456UCZD
Power rating : AC 230V/50Hz
Test Mode : HDMI1:3440*1440@100Hz
Line:1.8m

Data no. : 16
Ant. pol. : Horizontal
Pressure : 101.6kPa
Engineer : Hongjie

| No. | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | AMP Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1035.000 | 28.97 | 4.53 | 34.51 | 47.82 | 46.81 | 70.00 | 23.19 | Peak |
| 2 | 1038.456 | 28.89 | 4.53 | 34.50 | 31.52 | 30.44 | 50.00 | 19.56 | Average |
| 3 | 2105.000 | 31.69 | 6.13 | 31.88 | 40.00 | 45.94 | 70.00 | 24.06 | Peak |
| 4 | 2108.265 | 31.68 | 6.14 | 31.88 | 26.51 | 32.45 | 50.00 | 17.55 | Average |
| 5 | 2855.000 | 32.26 | 8.10 | 31.06 | 37.20 | 46.50 | 70.00 | 23.50 | Peak |
| 6 | 2856.816 | 32.27 | 8.10 | 31.06 | 26.51 | 35.82 | 50.00 | 14.18 | Average |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading-Amp Factor.




Site no. : 10m Chamber
Dis. / Ant. : 3m 2023 3117
Limit : EN55032B (1-6G)PEAK
Env. / Ins. : 23.5*C/51%
EUT : M/N:AG456UCZD
Power rating : AC 230V/50Hz
Test Mode : HDMI1:3440*1440@100Hz
Line:1.8m

Data no. : 15
Ant. pol. : Vertical
Pressure : 101.6kPa
Engineer : Hongjie

| No. | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | AMP Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2085.000 | 31.67 | 6.08 | 31.91 | 43.26 | 49.10 | 70.00 | 20.90 | Peak |
| 2 | 2086.512 | 31.67 | 6.08 | 31.90 | 26.51 | 32.36 | 50.00 | 17.64 | Average |
| 3 | 2855.000 | 32.26 | 8.10 | 31.06 | 38.04 | 47.34 | 70.00 | 22.66 | Peak |
| 4 | 2856.816 | 32.27 | 8.10 | 31.06 | 26.51 | 35.82 | 50.00 | 14.18 | Average |
| 5 | 4170.000 | 33.53 | 8.96 | 30.27 | 38.86 | 51.08 | 74.00 | 22.92 | Peak |
| 6 | 4173.851 | 33.53 | 8.97 | 30.27 | 26.51 | 38.74 | 54.00 | 15.26 | Average |

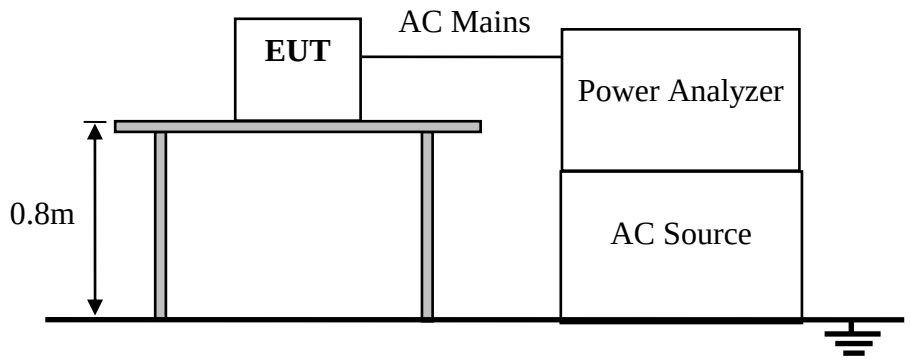
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading-Amp Factor.

# 5. HARMONIC CURRENT TEST

## 5.1.Test Equipments

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | No.2 Complex Immunity Test Site | AUDIX | N/A | N/A | Sep.16,22 | 5 Year |
| 2. | AC Power Source | California Instruments | 5001iX | 58481 | Oct.09,22 | 1 Year |
| 3. | Impedance Network | California Instruments | OMNI 1-18i | 1247A02235 | Oct.10,22 | 1 Year |
| 4. | Power Analyzer | California Instruments | PACS-1 | 72627 | Oct.10,22 | 1 Year |
| 5. | Test Software | California Instruments | CTS 4.0 | V 4.29 | N/A | N/A |
| Note: N/A means Not applicable. | | | | | | |

## 5.2.Block Diagram of Test Setup




## 5.3.Test Standard

EN 61000-3-2: 2014, Class D

EN IEC 61000-3-2:2019+A1:2021

BS EN 61000-3-2: 2014

BS EN IEC 61000-3-2:2019+A1: 2021

## 5.4. Limits of Harmonic Current

| Limits for Class D Equipment | | |
|---|---|---|
| **Harmonic order (h)** | **Maximum permissible harmonic current per watt (mA/W)** | **Maximum permissible harmonic current (A)** |
| 3 | 3.4 | 2.30 |
| 5 | 1.9 | 1.14 |
| 7 | 1.0 | 0.77 |
| 9 | 0.5 | 0.40 |
| 11 | 0.35 | 0.33 |
| 13≤h≤39 (odd harmonic only) | 3.85/h | See Table 1 |

Remark: if the EUT Power level is below 75 Watts and therefore has no defined limits.

## 5.5. Test Procedure

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

## 5.6. Test Results

**PASS. (Test results are recorded in next page)**

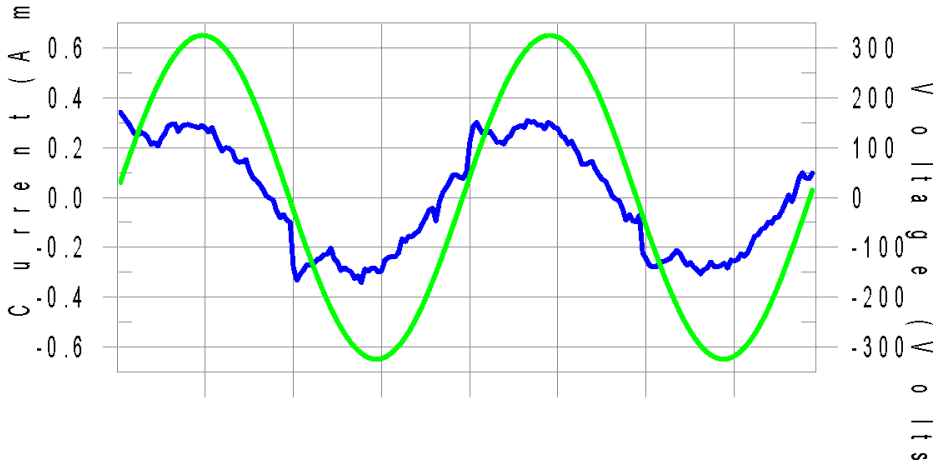
## Harmonics – Class-D per IEC 61000-3-2:2018/AMD1:2020(Run time) incl. inter-harmonics

EUT: AG456UCZD
Test category: Class-D (European limits)
Test date: 2023-7-3 Start time: 16:47:17 End time: 16:49:58
Test duration (min): 2.5 Data file name: H-000009.cts_data
Comment: Default Mode
Customer: TPV

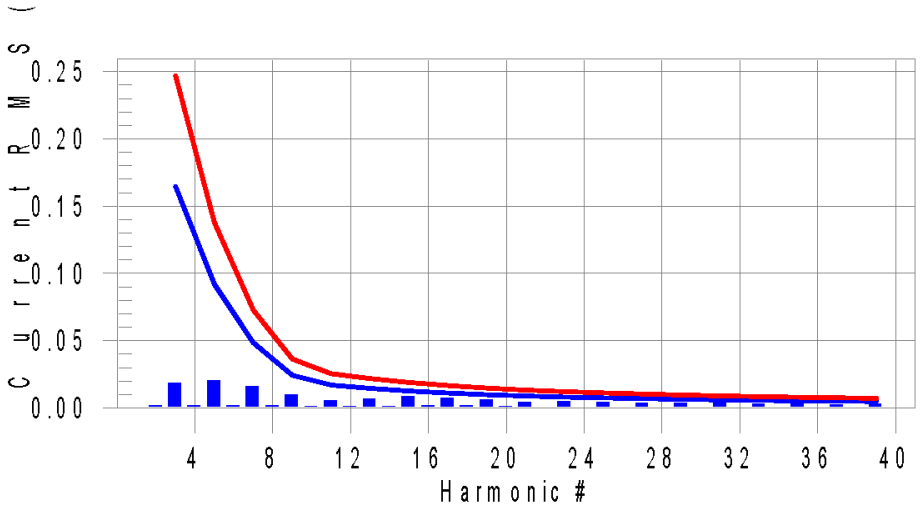
Tested by: Kennen
Test Margin: 100

Test Result: N/L Source qualification: Normal

Current & voltage waveforms




Harmonics and Class D limit line European Limits




Test result: N/L Worst harmonics H0-0.0% of 150% limit, H0-0% of 100% limit

## Current Test Result Summary (Run time)

EUT: AG456UCZD
Tested by: Kennen
Test category: Class-D (European limits)
Test Margin: 100
Test date: 2023-7-3
Start time: 16:47:17
End time: 16:49:58
Test duration (min): 2.5
Data file name: H-000009.cts_data
Comment: Default Mode
Customer: TPV

Test Result: N/L
Source qualification: Normal
THC(A): 0.039
I-THD(%): 17.0
POHC(A): 0.011
POHC Limit(A): 0.021

Highest parameter values during test:

| | | | |
|---|---|---|---|
| V_RMS (Volts): | 230.09 | Frequency(Hz): | 50.00 |
| I_Peak (Amps): | 0.391 | I_RMS (Amps): | 0.232 |
| I_Fund (Amps): | 0.228 | Crest Factor: | 1.768 |
| Power (Watts): | 48.4 | Power Factor: | 0.907 |

| Harm# | Harms(avg) | 100%Limit | %of Limit | Harms(max) | 150%Limit | %of Limit | Status |
|---|---|---|---|---|---|---|---|
| 2 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | N/L |
| 3 | 0.018 | 0.165 | N/A | 0.020 | 0.247 | N/A | N/L |
| 4 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | N/L |
| 5 | 0.021 | 0.092 | N/A | 0.021 | 0.138 | N/A | N/L |
| 6 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | N/L |
| 7 | 0.016 | 0.048 | N/A | 0.016 | 0.073 | N/A | N/L |
| 8 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | N/L |
| 9 | 0.010 | 0.024 | N/A | 0.010 | 0.036 | N/A | N/L |
| 10 | 0.001 | 0.000 | N/A | 0.002 | 0.000 | N/A | N/L |
| 11 | 0.006 | 0.017 | N/A | 0.006 | 0.025 | N/A | N/L |
| 12 | 0.001 | 0.000 | N/A | 0.002 | 0.000 | N/A | N/L |
| 13 | 0.007 | 0.015 | N/A | 0.007 | 0.022 | N/A | N/L |
| 14 | 0.001 | 0.000 | N/A | 0.002 | 0.000 | N/A | N/L |
| 15 | 0.009 | 0.013 | N/A | 0.009 | 0.019 | N/A | N/L |
| 16 | 0.002 | 0.000 | N/A | 0.004 | 0.000 | N/A | N/L |
| 17 | 0.007 | 0.011 | N/A | 0.008 | 0.017 | N/A | N/L |
| 18 | 0.002 | 0.000 | N/A | 0.004 | 0.000 | N/A | N/L |
| 19 | 0.006 | 0.010 | N/A | 0.007 | 0.015 | N/A | N/L |
| 20 | 0.001 | 0.000 | N/A | 0.002 | 0.000 | N/A | N/L |
| 21 | 0.004 | 0.009 | N/A | 0.005 | 0.013 | N/A | N/L |
| 22 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |
| 23 | 0.005 | 0.008 | N/A | 0.005 | 0.012 | N/A | N/L |
| 24 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |
| 25 | 0.004 | 0.007 | N/A | 0.005 | 0.011 | N/A | N/L |
| 26 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |
| 27 | 0.003 | 0.007 | N/A | 0.004 | 0.010 | N/A | N/L |
| 28 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |
| 29 | 0.003 | 0.006 | N/A | 0.004 | 0.010 | N/A | N/L |
| 30 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |
| 31 | 0.003 | 0.006 | N/A | 0.004 | 0.009 | N/A | N/L |
| 32 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |
| 33 | 0.003 | 0.006 | N/A | 0.003 | 0.008 | N/A | N/L |
| 34 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |
| 35 | 0.003 | 0.005 | N/A | 0.003 | 0.008 | N/A | N/L |
| 36 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |
| 37 | 0.003 | 0.005 | N/A | 0.003 | 0.008 | N/A | N/L |
| 38 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |
| 39 | 0.003 | 0.005 | N/A | 0.003 | 0.007 | N/A | N/L |
| 40 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | N/L |

*Note: The EUT power level is below 75.0 Watts and therefore has no defined limits*

## Voltage Source Verification Data (Run time)

EUT: AG456UCZD — Tested by: Kennen
Test category: Class-D (European limits) — Test Margin: 100
Test date: 2023-7-3 — Start time: 16:47:17 — End time: 16:49:58
Test duration (min): 2.5 — Data file name: H-000009.cts_data
Comment: Default Mode
Customer: TPV

Test Result: N/L — Source qualification: Normal

Highest parameter values during test:

| | | | |
|---|---|---|---|
| Voltage (Vrms): | 230.09 | Frequency(Hz): | 50.00 |
| I_Peak (Amps): | 0.391 | I_RMS (Amps): | 0.232 |
| I_Fund (Amps): | 0.228 | Crest Factor: | 1.768 |
| Power (Watts): | 48.4 | Power Factor: | 0.907 |

| Harm# | Harmonics V-rms | Limit V-rms | % of Limit | Status |
|---|---|---|---|---|
| 2 | 0.086 | 0.460 | 18.64 | OK |
| 3 | 0.454 | 2.070 | 21.94 | OK |
| 4 | 0.056 | 0.460 | 12.18 | OK |
| 5 | 0.060 | 0.920 | 6.55 | OK |
| 6 | 0.031 | 0.460 | 6.78 | OK |
| 7 | 0.056 | 0.690 | 8.14 | OK |
| 8 | 0.012 | 0.460 | 2.51 | OK |
| 9 | 0.020 | 0.460 | 4.40 | OK |
| 10 | 0.019 | 0.460 | 4.05 | OK |
| 11 | 0.012 | 0.230 | 5.23 | OK |
| 12 | 0.010 | 0.230 | 4.35 | OK |
| 13 | 0.013 | 0.230 | 5.62 | OK |
| 14 | 0.007 | 0.230 | 2.94 | OK |
| 15 | 0.012 | 0.230 | 5.34 | OK |
| 16 | 0.012 | 0.230 | 5.00 | OK |
| 17 | 0.012 | 0.230 | 5.05 | OK |
| 18 | 0.018 | 0.230 | 7.67 | OK |
| 19 | 0.011 | 0.230 | 4.93 | OK |
| 20 | 0.011 | 0.230 | 4.93 | OK |
| 21 | 0.007 | 0.230 | 3.08 | OK |
| 22 | 0.004 | 0.230 | 1.68 | OK |
| 23 | 0.011 | 0.230 | 4.86 | OK |
| 24 | 0.008 | 0.230 | 3.39 | OK |
| 25 | 0.009 | 0.230 | 3.74 | OK |
| 26 | 0.004 | 0.230 | 1.86 | OK |
| 27 | 0.007 | 0.230 | 2.97 | OK |
| 28 | 0.005 | 0.230 | 2.26 | OK |
| 29 | 0.009 | 0.230 | 3.74 | OK |
| 30 | 0.005 | 0.230 | 2.17 | OK |
| 31 | 0.009 | 0.230 | 4.00 | OK |
| 32 | 0.004 | 0.230 | 1.86 | OK |
| 33 | 0.006 | 0.230 | 2.53 | OK |
| 34 | 0.004 | 0.230 | 1.61 | OK |
| 35 | 0.006 | 0.230 | 2.70 | OK |
| 36 | 0.003 | 0.230 | 1.51 | OK |
| 37 | 0.006 | 0.230 | 2.66 | OK |
| 38 | 0.003 | 0.230 | 1.32 | OK |
| 39 | 0.006 | 0.230 | 2.82 | OK |
| 40 | 0.003 | 0.230 | 1.46 | OK |

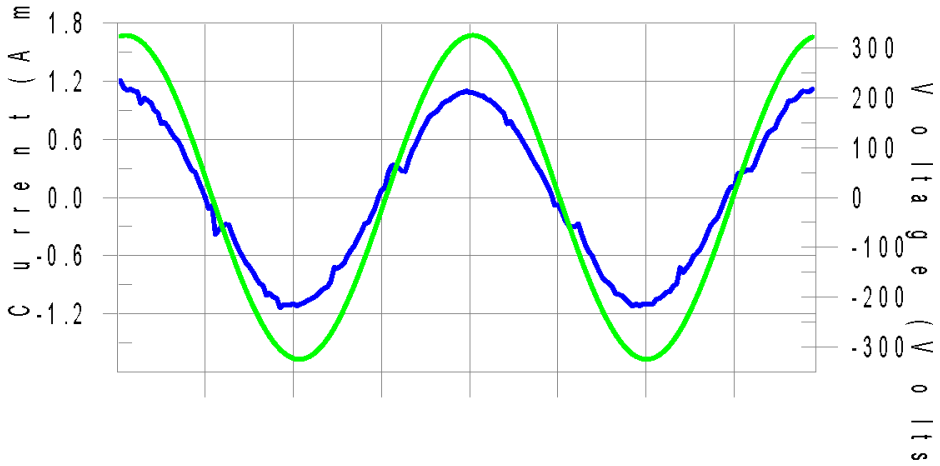
## Harmonics – Class-D per IEC 61000-3-2:2018/AMD1:2020(Run time) incl. inter-harmonics

EUT: AG456UCZD
Test category: Class-D (European limits)
Test date: 2023-7-3 Start time: 16:54:36
Test duration (min): 2.5 Data file name: H-000010.cts_data
Comment: Running "H" Pattern And 1KHz Playing
Customer: TPV

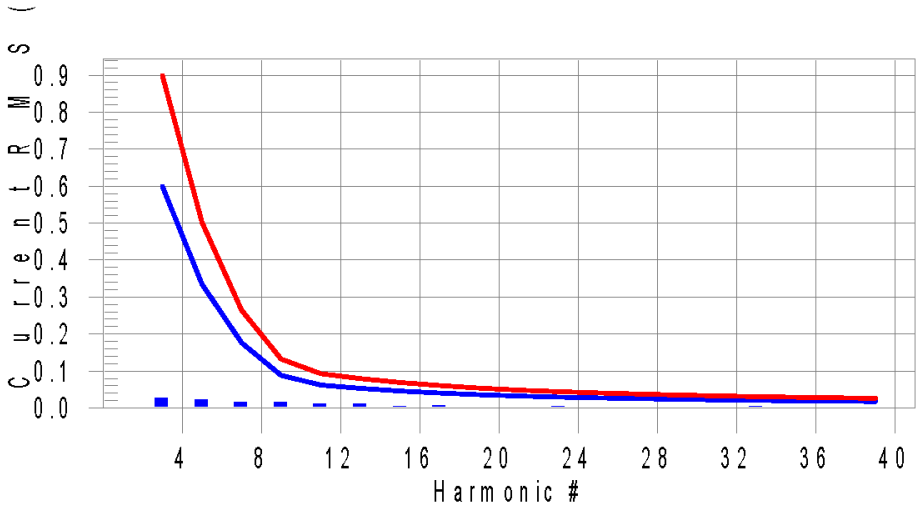
Tested by: Kennen
Test Margin: 100
End time: 16:57:17

Test Result: Pass Source qualification: Normal

Current & voltage waveforms




Harmonics and Class D limit line European Limits




Test result: Pass Worst harmonics H33-17.2% of 150% limit, H33-24.6% of 100% limit

## Current Test Result Summary (Run time)

EUT: AG456UCZD — Tested by: Kennen
Test category: Class-D (European limits) — Test Margin: 100
Test date: 2023-7-3 — Start time: 16:54:36 — End time: 16:57:17
Test duration (min): 2.5 — Data file name: H-000010.cts_data
Comment: Running "H" Pattern And 1KHz Playing
Customer: TPV

Test Result: Pass — Source qualification: Normal
THC(A): 0.046 — I-THD(%): 6.0 — POHC(A): 0.013 — POHC Limit(A): 0.076

Highest parameter values during test:

| | | | |
|---|---|---|---|
| V_RMS (Volts): | 230.06 | Frequency(Hz): | 50.00 |
| I_Peak (Amps): | 1.248 | I_RMS (Amps): | 0.772 |
| I_Fund (Amps): | 0.768 | Crest Factor: | 1.655 |
| Power (Watts): | 176.2 | Power Factor: | 0.996 |

| Harm# | Harms(avg) | 100%Limit | %of Limit | Harms(max) | 150%Limit | %of Limit | Status |
|---|---|---|---|---|---|---|---|
| 2 | 0.003 | 0.000 | N/A | 0.003 | 0.000 | N/A | Pass |
| 3 | 0.026 | 0.599 | 4.3 | 0.027 | 0.899 | 3.0 | Pass |
| 4 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 5 | 0.022 | 0.335 | 6.4 | 0.022 | 0.502 | 4.5 | Pass |
| 6 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 7 | 0.017 | 0.176 | 9.4 | 0.017 | 0.264 | 6.6 | Pass |
| 8 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 9 | 0.015 | 0.088 | 17.1 | 0.016 | 0.132 | 12.1 | Pass |
| 10 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 11 | 0.010 | 0.062 | 16.9 | 0.011 | 0.093 | 11.8 | Pass |
| 12 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 13 | 0.011 | 0.053 | 19.9 | 0.011 | 0.079 | 13.9 | Pass |
| 14 | 0.001 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 15 | 0.006 | 0.046 | 12.7 | 0.006 | 0.069 | 8.8 | Pass |
| 16 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 17 | 0.006 | 0.041 | 15.9 | 0.007 | 0.061 | 11.0 | Pass |
| 18 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 19 | 0.004 | 0.036 | N/A | 0.005 | 0.054 | N/A | Pass |
| 20 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 21 | 0.004 | 0.032 | N/A | 0.005 | 0.048 | N/A | Pass |
| 22 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 23 | 0.006 | 0.029 | 19.5 | 0.006 | 0.044 | 13.7 | Pass |
| 24 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 25 | 0.003 | 0.027 | N/A | 0.003 | 0.041 | N/A | Pass |
| 26 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 27 | 0.004 | 0.025 | N/A | 0.004 | 0.038 | N/A | Pass |
| 28 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 29 | 0.003 | 0.023 | N/A | 0.003 | 0.035 | N/A | Pass |
| 30 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 31 | 0.004 | 0.022 | N/A | 0.004 | 0.033 | N/A | Pass |
| 32 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 33 | 0.005 | 0.020 | 24.6 | 0.005 | 0.031 | 17.2 | Pass |
| 34 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 35 | 0.004 | 0.019 | N/A | 0.004 | 0.029 | N/A | Pass |
| 36 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 37 | 0.004 | 0.018 | N/A | 0.004 | 0.027 | N/A | Pass |
| 38 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 39 | 0.003 | 0.017 | N/A | 0.004 | 0.026 | N/A | Pass |
| 40 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |

*Note: Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.*

## Voltage Source Verification Data (Run time)

EUT: AG456UCZD — Tested by: Kennen
Test category: Class-D (European limits) — Test Margin: 100
Test date: 2023-7-3 — Start time: 16:54:36 — End time: 16:57:17
Test duration (min): 2.5 — Data file name: H-000010.cts_data
Comment: Running "H" Pattern And 1KHz Playing
Customer: TPV

Test Result: Pass — Source qualification: Normal

Highest parameter values during test:

| | | | |
|---|---|---|---|
| Voltage (Vrms): | 230.06 | Frequency(Hz): | 50.00 |
| I_Peak (Amps): | 1.248 | I_RMS (Amps): | 0.772 |
| I_Fund (Amps): | 0.768 | Crest Factor: | 1.655 |
| Power (Watts): | 176.2 | Power Factor: | 0.996 |

| Harm# | Harmonics V-rms | Limit V-rms | % of Limit | Status |
|---|---|---|---|---|
| 2 | 0.094 | 0.460 | 20.54 | OK |
| 3 | 0.467 | 2.070 | 22.54 | OK |
| 4 | 0.060 | 0.460 | 13.02 | OK |
| 5 | 0.067 | 0.920 | 7.23 | OK |
| 6 | 0.029 | 0.460 | 6.38 | OK |
| 7 | 0.056 | 0.690 | 8.13 | OK |
| 8 | 0.017 | 0.460 | 3.74 | OK |
| 9 | 0.024 | 0.460 | 5.11 | OK |
| 10 | 0.018 | 0.460 | 3.92 | OK |
| 11 | 0.014 | 0.230 | 6.20 | OK |
| 12 | 0.015 | 0.230 | 6.61 | OK |
| 13 | 0.014 | 0.230 | 6.01 | OK |
| 14 | 0.005 | 0.230 | 2.37 | OK |
| 15 | 0.013 | 0.230 | 5.52 | OK |
| 16 | 0.012 | 0.230 | 5.32 | OK |
| 17 | 0.012 | 0.230 | 5.24 | OK |
| 18 | 0.015 | 0.230 | 6.39 | OK |
| 19 | 0.011 | 0.230 | 4.75 | OK |
| 20 | 0.012 | 0.230 | 5.09 | OK |
| 21 | 0.007 | 0.230 | 3.22 | OK |
| 22 | 0.004 | 0.230 | 1.82 | OK |
| 23 | 0.009 | 0.230 | 4.05 | OK |
| 24 | 0.006 | 0.230 | 2.71 | OK |
| 25 | 0.006 | 0.230 | 2.72 | OK |
| 26 | 0.004 | 0.230 | 1.73 | OK |
| 27 | 0.009 | 0.230 | 3.84 | OK |
| 28 | 0.006 | 0.230 | 2.49 | OK |
| 29 | 0.006 | 0.230 | 2.80 | OK |
| 30 | 0.005 | 0.230 | 2.20 | OK |
| 31 | 0.007 | 0.230 | 3.03 | OK |
| 32 | 0.004 | 0.230 | 1.76 | OK |
| 33 | 0.007 | 0.230 | 2.94 | OK |
| 34 | 0.003 | 0.230 | 1.25 | OK |
| 35 | 0.007 | 0.230 | 3.15 | OK |
| 36 | 0.002 | 0.230 | 1.03 | OK |
| 37 | 0.005 | 0.230 | 2.15 | OK |
| 38 | 0.003 | 0.230 | 1.22 | OK |
| 39 | 0.008 | 0.230 | 3.30 | OK |
| 40 | 0.003 | 0.230 | 1.26 | OK |

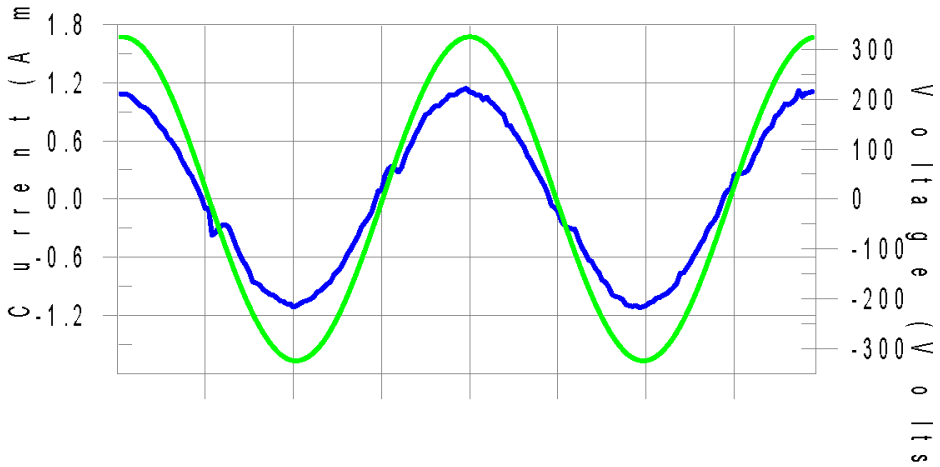
## Harmonics – Class-D per IEC 61000-3-2:2018/AMD1:2020(Run time) incl. inter-harmonics

EUT: AG456UCZD
Test category: Class-D (European limits)
Test date: 2023-7-3 Start time: 16:59:48 End time: 17:02:29
Test duration (min): 2.5 Data file name: H-000011.cts_data
Comment: TYPE-C:R LOAD
Customer: TPV

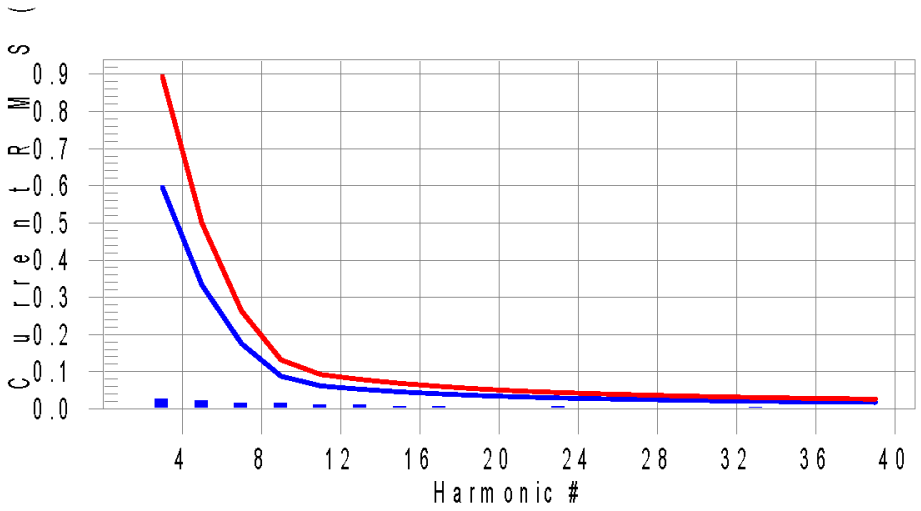
Tested by: Kennen
Test Margin: 100

Test Result: Pass Source qualification: Normal

Current & voltage waveforms




Harmonics and Class D limit line European Limits




Test result: Pass Worst harmonics H23-14.9% of 150% limit, H23-19.3% of 100% limit

## Current Test Result Summary (Run time)

EUT: AG456UCZD
Test category: Class-D (European limits)
Test date: 2023-7-3
Test duration (min): 2.5
Comment: TYPE-C:R LOAD
Customer: TPV

Tested by: Kennen
Test Margin: 100
Start time: 16:59:48
End time: 17:02:29
Data file name: H-000011.cts_data

Test Result: Pass
Source qualification: Normal
THC(A): 0.046
I-THD(%): 6.0
POHC(A): 0.013
POHC Limit(A): 0.075

Highest parameter values during test:

| | | | |
|---|---|---|---|
| V_RMS (Volts): | 230.06 | Frequency(Hz): | 50.00 |
| I_Peak (Amps): | 1.238 | I_RMS (Amps): | 0.767 |
| I_Fund (Amps): | 0.764 | Crest Factor: | 1.629 |
| Power (Watts): | 175.3 | Power Factor: | 0.996 |

| Harm# | Harms(avg) | 100%Limit | %of Limit | Harms(max) | 150%Limit | %of Limit | Status |
|---|---|---|---|---|---|---|---|
| 2 | 0.002 | 0.000 | N/A | 0.003 | 0.000 | N/A | Pass |
| 3 | 0.026 | 0.596 | 4.3 | 0.027 | 0.894 | 3.1 | Pass |
| 4 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 5 | 0.022 | 0.333 | 6.5 | 0.023 | 0.500 | 4.6 | Pass |
| 6 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 7 | 0.017 | 0.175 | 9.4 | 0.017 | 0.263 | 6.6 | Pass |
| 8 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 9 | 0.015 | 0.088 | 16.8 | 0.015 | 0.131 | 11.7 | Pass |
| 10 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 11 | 0.011 | 0.061 | 17.4 | 0.011 | 0.092 | 12.2 | Pass |
| 12 | 0.002 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 13 | 0.010 | 0.053 | 19.0 | 0.011 | 0.079 | 13.5 | Pass |
| 14 | 0.001 | 0.000 | N/A | 0.002 | 0.000 | N/A | Pass |
| 15 | 0.006 | 0.046 | 13.2 | 0.006 | 0.068 | 9.4 | Pass |
| 16 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 17 | 0.006 | 0.040 | 15.2 | 0.007 | 0.060 | 11.0 | Pass |
| 18 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 19 | 0.004 | 0.036 | N/A | 0.005 | 0.053 | N/A | Pass |
| 20 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 21 | 0.004 | 0.032 | N/A | 0.004 | 0.048 | N/A | Pass |
| 22 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 23 | 0.006 | 0.029 | 19.3 | 0.007 | 0.044 | 14.9 | Pass |
| 24 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 25 | 0.002 | 0.027 | N/A | 0.003 | 0.040 | N/A | Pass |
| 26 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 27 | 0.004 | 0.025 | N/A | 0.004 | 0.038 | N/A | Pass |
| 28 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 29 | 0.003 | 0.023 | N/A | 0.004 | 0.035 | N/A | Pass |
| 30 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 31 | 0.004 | 0.022 | N/A | 0.005 | 0.033 | N/A | Pass |
| 32 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 33 | 0.005 | 0.020 | N/A | 0.005 | 0.030 | N/A | Pass |
| 34 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 35 | 0.004 | 0.019 | N/A | 0.004 | 0.029 | N/A | Pass |
| 36 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 37 | 0.004 | 0.018 | N/A | 0.004 | 0.027 | N/A | Pass |
| 38 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |
| 39 | 0.003 | 0.017 | N/A | 0.004 | 0.026 | N/A | Pass |
| 40 | 0.001 | 0.000 | N/A | 0.001 | 0.000 | N/A | Pass |

*Note: Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.*

## Voltage Source Verification Data (Run time)

EUT: AG456UCZD
Test category: Class-D (European limits)
Test date: 2023-7-3 Start time: 16:59:48 End time: 17:02:29
Test duration (min): 2.5 Data file name: H-000011.cts_data
Comment: TYPE-C:R LOAD
Customer: TPV

Tested by: Kennen
Test Margin: 100

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

| | | | |
|---|---|---|---|
| Voltage (Vrms): | 230.06 | Frequency(Hz): | 50.00 |
| I_Peak (Amps): | 1.238 | I_RMS (Amps): | 0.767 |
| I_Fund (Amps): | 0.764 | Crest Factor: | 1.629 |
| Power (Watts): | 175.3 | Power Factor: | 0.996 |

| Harm# | Harmonics V-rms | Limit V-rms | % of Limit | Status |
|---|---|---|---|---|
| 2 | 0.098 | 0.460 | 21.23 | OK |
| 3 | 0.456 | 2.070 | 22.05 | OK |
| 4 | 0.060 | 0.460 | 13.02 | OK |
| 5 | 0.065 | 0.920 | 7.05 | OK |
| 6 | 0.029 | 0.460 | 6.31 | OK |
| 7 | 0.051 | 0.690 | 7.41 | OK |
| 8 | 0.015 | 0.460 | 3.35 | OK |
| 9 | 0.023 | 0.460 | 4.98 | OK |
| 10 | 0.017 | 0.460 | 3.70 | OK |
| 11 | 0.015 | 0.230 | 6.73 | OK |
| 12 | 0.014 | 0.230 | 6.12 | OK |
| 13 | 0.013 | 0.230 | 5.78 | OK |
| 14 | 0.005 | 0.230 | 2.30 | OK |
| 15 | 0.013 | 0.230 | 5.45 | OK |
| 16 | 0.010 | 0.230 | 4.55 | OK |
| 17 | 0.010 | 0.230 | 4.41 | OK |
| 18 | 0.014 | 0.230 | 6.10 | OK |
| 19 | 0.012 | 0.230 | 5.00 | OK |
| 20 | 0.012 | 0.230 | 5.27 | OK |
| 21 | 0.008 | 0.230 | 3.33 | OK |
| 22 | 0.005 | 0.230 | 1.97 | OK |
| 23 | 0.009 | 0.230 | 4.08 | OK |
| 24 | 0.006 | 0.230 | 2.66 | OK |
| 25 | 0.008 | 0.230 | 3.51 | OK |
| 26 | 0.003 | 0.230 | 1.44 | OK |
| 27 | 0.009 | 0.230 | 4.00 | OK |
| 28 | 0.006 | 0.230 | 2.57 | OK |
| 29 | 0.006 | 0.230 | 2.77 | OK |
| 30 | 0.005 | 0.230 | 2.06 | OK |
| 31 | 0.008 | 0.230 | 3.26 | OK |
| 32 | 0.004 | 0.230 | 1.63 | OK |
| 33 | 0.006 | 0.230 | 2.70 | OK |
| 34 | 0.003 | 0.230 | 1.26 | OK |
| 35 | 0.007 | 0.230 | 3.16 | OK |
| 36 | 0.002 | 0.230 | 1.04 | OK |
| 37 | 0.006 | 0.230 | 2.46 | OK |
| 38 | 0.003 | 0.230 | 1.13 | OK |
| 39 | 0.007 | 0.230 | 3.02 | OK |
| 40 | 0.003 | 0.230 | 1.22 | OK |

# 6. VOLTAGE FLUCTUATIONS & FLICKER TEST

## 6.1. Test Equipments

Same as Section 5.1.

## 6.2. Block Diagram of Test Setup

Same as Section 5.1.

## 6.3. Test Standard

EN 61000-3-3: 2013

EN 61000-3-3: 2013+A1:2019

EN 61000-3-3: 2013+A2:2021

BS EN 61000-3-3: 2013

BS EN 61000-3-3: 2013+A1:2019

BS EN 61000-3-3: 2013+A2: 2021

## 6.4. Limits of Voltage Fluctuation and Flick

| Test Item | Limit | Note |
|---|---|---|
| $P_{st}$ | 1.0 | $P_{st}$ means Short-term flicker indicator |
| $P_{lt}$ | 0.65 | $P_{lt}$ means long-term flicker indicator |
| $T_{max}$ | 500ms | $T_{max}$ means maximum time that d(t) exceeds 3.3% |
| $d_{max}$(%) | 4% | $d_{max}$ means maximum relative voltage change. |
| $D_c$(%) | 3.3% | $d_c$ means relative steady-state voltage change. |

## 6.5. Test Procedure

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal conditions During the flick measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

## 6.6. Test Results

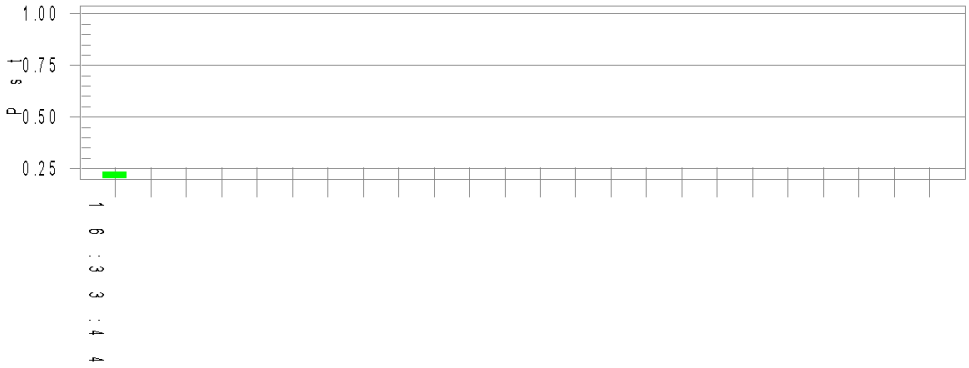
**PASS. (Test results are recorded in next page)**

## Flicker Test Summary per IEC61000-3-3:2013/AMD1:2017 (Run time)

EUT: AG456UCZD
Tested by: Kennen
Test category: All parameters (European limits)
Test Margin: 100
Test date: 2023-7-3
Start time: 16:23:23
End time: 16:33:51
Test duration (min): 10
Data file name: F-000007.cts_data
Comment: Running "H" Pattern And 1KHz Playing
Customer: TPV

Test Result: Pass
Status: Test Completed

Pst and limit line
European Limits




Plt and limit line


Parameter values recorded during the test:

| | | | | |
|---|---|---|---|---|
| Vrms at the end of test (Volt): | 229.81 | | | |
| Highest dt (%): | | Test limit (%): | | |
| T-max (mS): | 0 | Test limit (mS): | 500.0 | Pass |
| Highest dc (%): | 0.00 | Test limit (%): | 3.30 | Pass |
| Highest dmax (%): | -0.22 | Test limit (%): | 4.00 | Pass |
| Highest Pst (10 min. period): | 0.237 | Test limit: | 1.000 | Pass |
| Highest Plt (2 hr. period): | 0.103 | Test limit: | 0.650 | Pass |

# 7. IMMUNITY PERFORMANCE CRITERIA

**Performance Level**

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 level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:
1. Based on the used product standard
2. Based on the declaration of the manufacturer, requestor or purchaser

**For EN 55035; BS EN 55035**

**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.

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.
Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

**Performance criteria for audio output function**

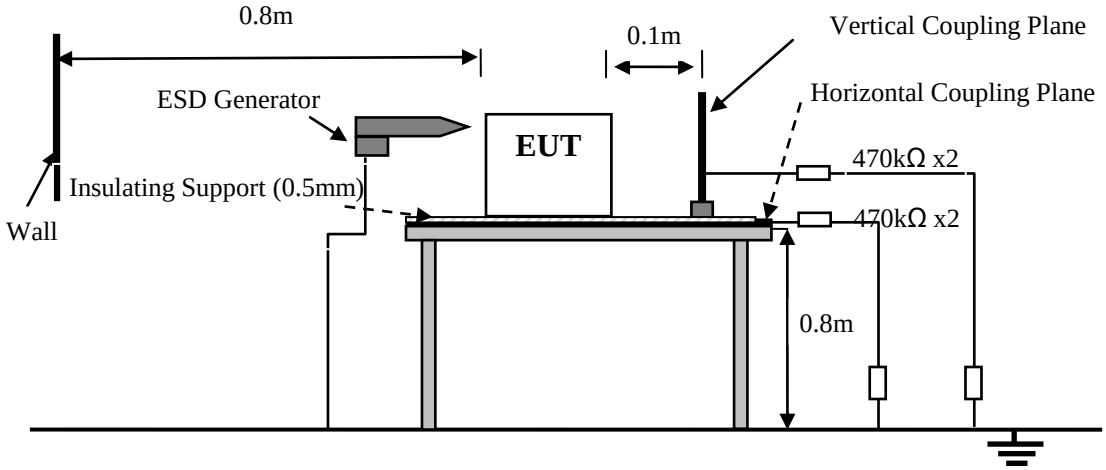
| Performance criterion for all other devices | |
|---|---|
| Criteria A | The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be –20 dB or better. |
| Criteria B | Use the general performance criterion B. |
| Criteria C | Use the general performance criterion C |

# 8. ELECTROSTATIC DISCHARGE IMMUNITY TEST

## 8.1.Test Equipments

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | No.1 Complex Immunity Test Site | AUDIX | N/A | N/A | Sep.16,22 | 5 Year |
| 2. | ESD Tester | EM Test | Dito | P1723199429 | Oct.12,22 | 1 Year |

## 8.2.Block Diagram of Test Setup




## 8.3.Test Standard

IEC 61000-4-2: 2008

(Severity for Air Discharge was Level 1 at ±2 kV & Level 2 at ±4 kV & Level 3 at ±8 kV, for Contact Discharge was Level 2 at ±4 kV)

## 8.4.Severity Levels and Performance Criterion

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

## 8.5. Test Procedure

### 8.5.1. Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed

### 8.5.2. Contact Discharge:

All the procedure was same as Section 8.5.1. except that the generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

### 8.5.3. Indirect discharge for horizontal coupling plane:

At least 10 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

### 8.5.4. Indirect discharge for vertical coupling plane:

At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

## 8.6. Test Results

**PASS. (Test results are recorded in next page)**

# Electrostatic Discharge Test Results

Audix Technology (Shenzhen) Co., Ltd.

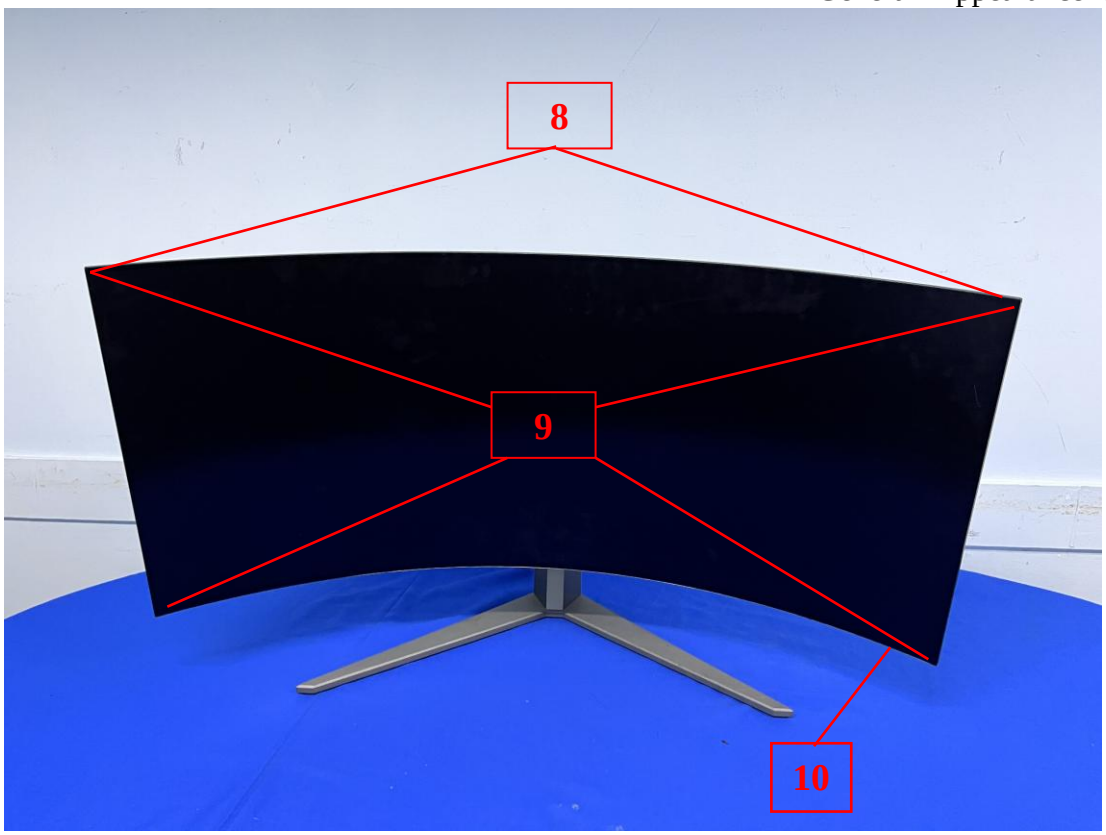
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| EUT | OLED Monitor | | | | | Model No. | AG456UCZD | | |
| Test Date | Jun.15, 2023 | | | | | Temperature | 21.3±0.6℃ | | |
| Input Power | AC 230V/50Hz; AC 100V/50Hz | | | | | Humidity | 49±3% | | |
| Test Mode | PC Mode | | | | | Pressure | 101.6±1kPa | | |
| Tested By | Kennen | | | | | Result | Pass | | |
| **Air Discharge** | **Voltage Level kV / Discharge per polarity 10 / Observation** | | | | | | | | |
| Test Location | +2 | -2 | +4 | -4 | +8 | -8 | --- | --- | Comments |
| AC Port(1) | ND | ND | ND | ND | ND | ND | --- | --- | --- |
| Switch(2) | ND | ND | ND | ND | ND | ND | --- | --- | --- |
| HDMI Ports(3) | A | A | A | A | A | A | --- | --- | --- |
| DP Port(4) | A | A | A | A | A | A | --- | --- | --- |
| Type C(5) | A | A | A | A | A | A | --- | --- | --- |
| AUDIO OUT(6) | ND | ND | ND | ND | ND | ND | --- | --- | --- |
| USB Ports(7) | A | A | A | A | A | A | --- | --- | --- |
| SLOT(8) | ND | ND | ND | ND | ND | ND | --- | --- | --- |
| Screen(9) | ND | ND | ND | ND | B | B | --- | --- | --- |
| LED(10) | ND | ND | ND | ND | ND | ND | --- | --- | --- |
| Buttons(11) | ND | ND | ND | ND | ND | ND | --- | --- | --- |
| Keylock(12) | ND | ND | ND | ND | ND | ND | --- | --- | --- |
| **Contact Discharge** | **Voltage Level kV / Discharge per polarity 10 / Observation** | | | | | | | | |
| Test Location | +4 | -4 | --- | --- | --- | --- | --- | --- | Comments |
| Metal (13) | B* | B* | --- | --- | --- | --- | --- | --- | --- |
| **Indirect Contact** | **Voltage Level kV / Discharge per polarity 10 / Observation** | | | | | | | | |
| Test Location | +4 | -4 | --- | --- | --- | --- | --- | --- | Comments |
| VCP Front | A | A | --- | --- | --- | --- | --- | --- | --- |
| VCP Right | A | A | --- | --- | --- | --- | --- | --- | --- |
| VCP Left | A | A | --- | --- | --- | --- | --- | --- | --- |
| VCP Back | A | A | --- | --- | --- | --- | --- | --- | --- |
| HCP Bottom | A | A | --- | --- | --- | --- | --- | --- | --- |
| Additional Notes | | | | | | | | | |
| **Measurement Points** | **Please refer to the Photos of ESD Test Points** | | | | | | | | |

ND=No Discharge; Meets criteria but unable to obtain an electrostatic discharge (ESD) at this test point.
Note: The class "B*" means the screen of EUT will be twinkle during test, but it can recover by itself after test.

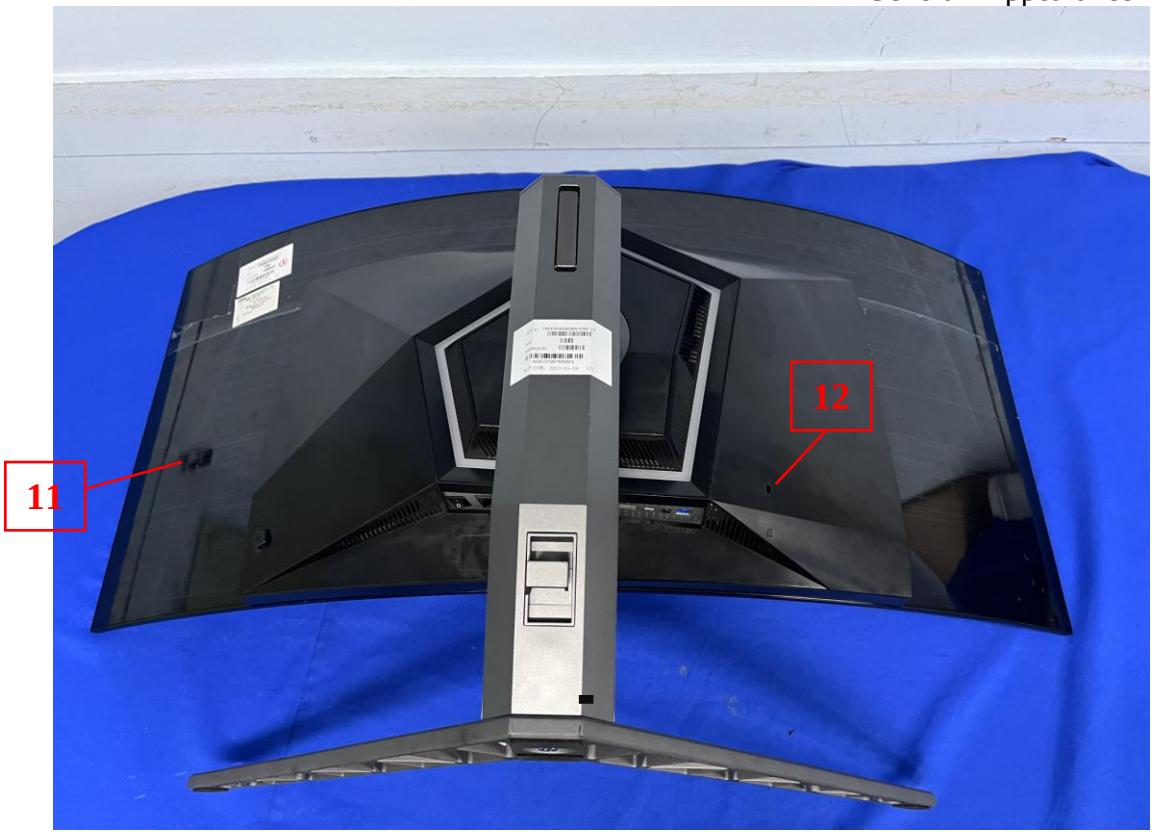
After discharge to the ungrounded part of EUT, it needs the bleeder resistor to remove the charge prior to next ESD pulse.
Discharge was considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

## 8.7.ESD Test Point Photos

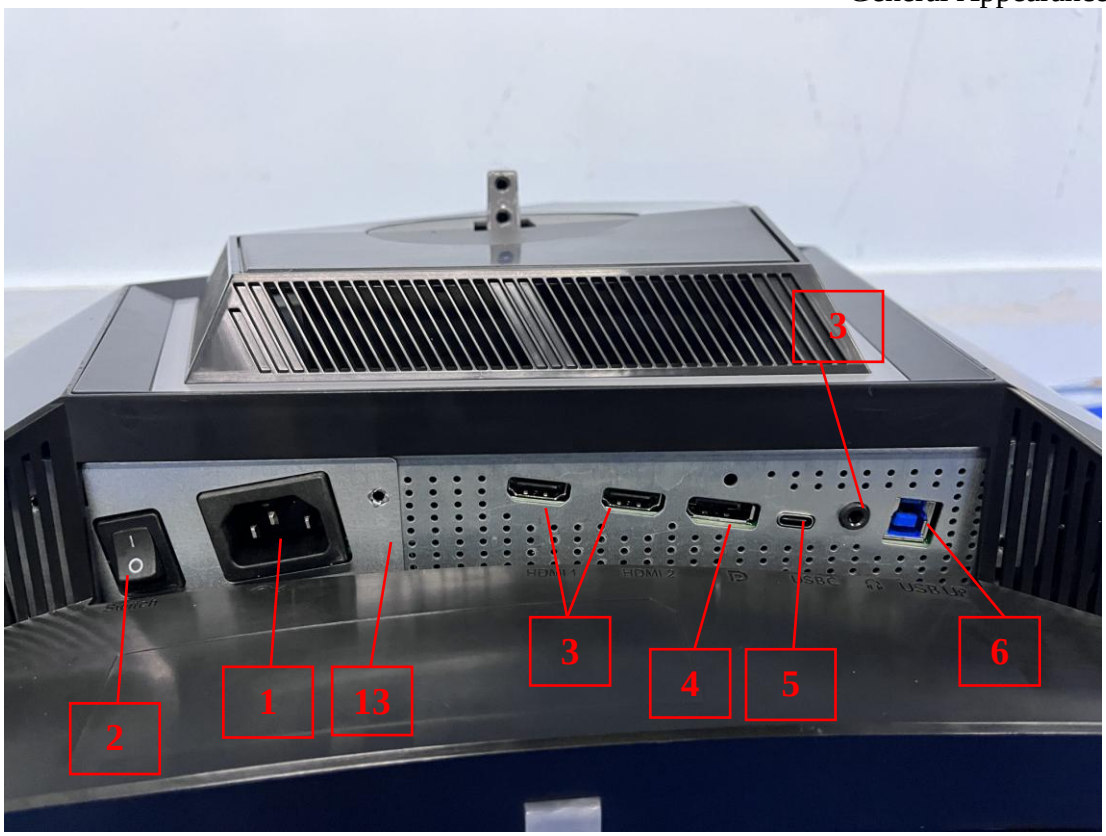
**ESD Figure 1**
General Appearance of the EUT




**ESD Figure 2**
General Appearance of the EUT



**ESD Figure 3**
General Appearance of the EUT




**ESD Figure 4**
General Appearance of the EUT

# 9. RF FIELD STRENGTH SUSCEPTIBILITY TEST

## 9.1. Test Equipments

### 9.1.1. For frequency range: 80MHz-1000MHz

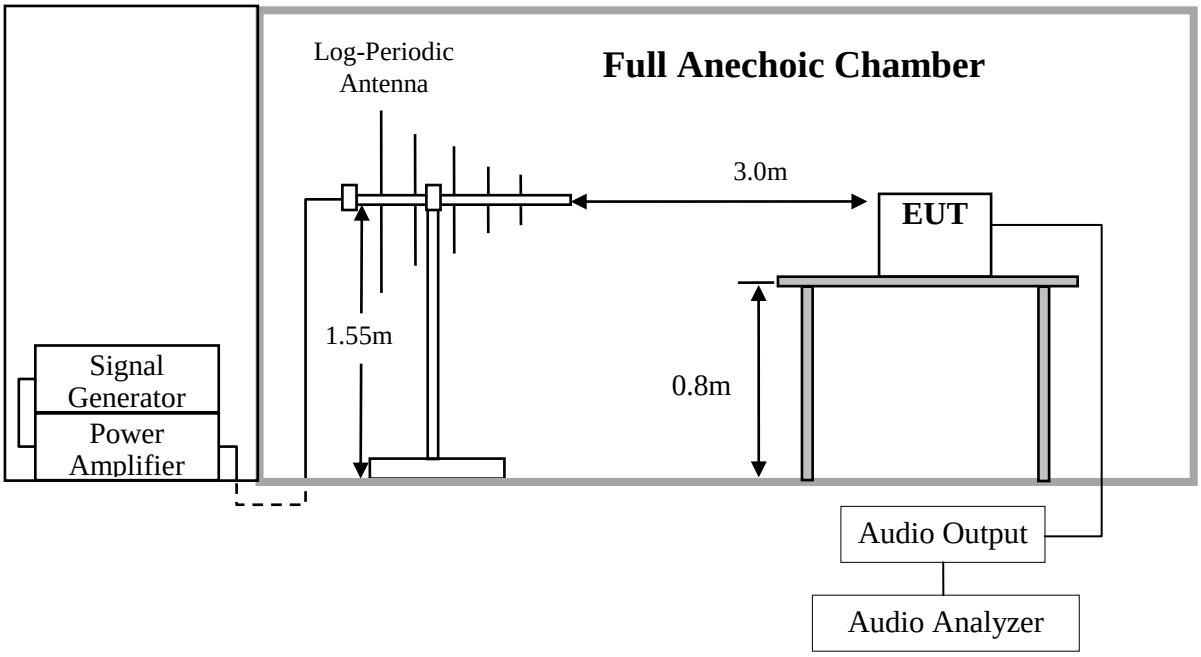
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | RS Chamber(FU) | AUDIX | N/A | N/A | Sep.14,22 | 1 Year |
| 2. | RS Chamber(SE) | AUDIX | N/A | N/A | Sep.17,22 | 5 Year |
| 3. | MXG Analog Signal Generator | Agilent | N5181A | MY49061013 | Oct.10,22 | 1Year |
| 4. | Amplifier | Rflight | NTWPA-00810 200E | 19053131 | Apr.02,23 | 1Year |
| 5. | Log-periodic Antenna | A&R | AT1080 | 16512 | NCR | NCR |
| 6. | RF Cable | STORM | MFR-57500 | NO.2 | NCR | NCR |
| 7. | RF Cable | EMCI | EMCCFD400-NM-NM-5000 | 190410 | NCR | NCR |
| 8. | Test Software | AUDIX | i2 | 3.2010-1-7 | N/A | N/A |
| 9. | Audio Analyzer | Rohde & Schwarz | UPL | 100687 | Apr.10,23 | 1Year |
| Notes: NCR means no calibration required(calibrated with system). | | | | | | |
| Notes: N/A means Not applicable. | | | | | | |

### 9.1.2. Frequency Range: Above 1GHz

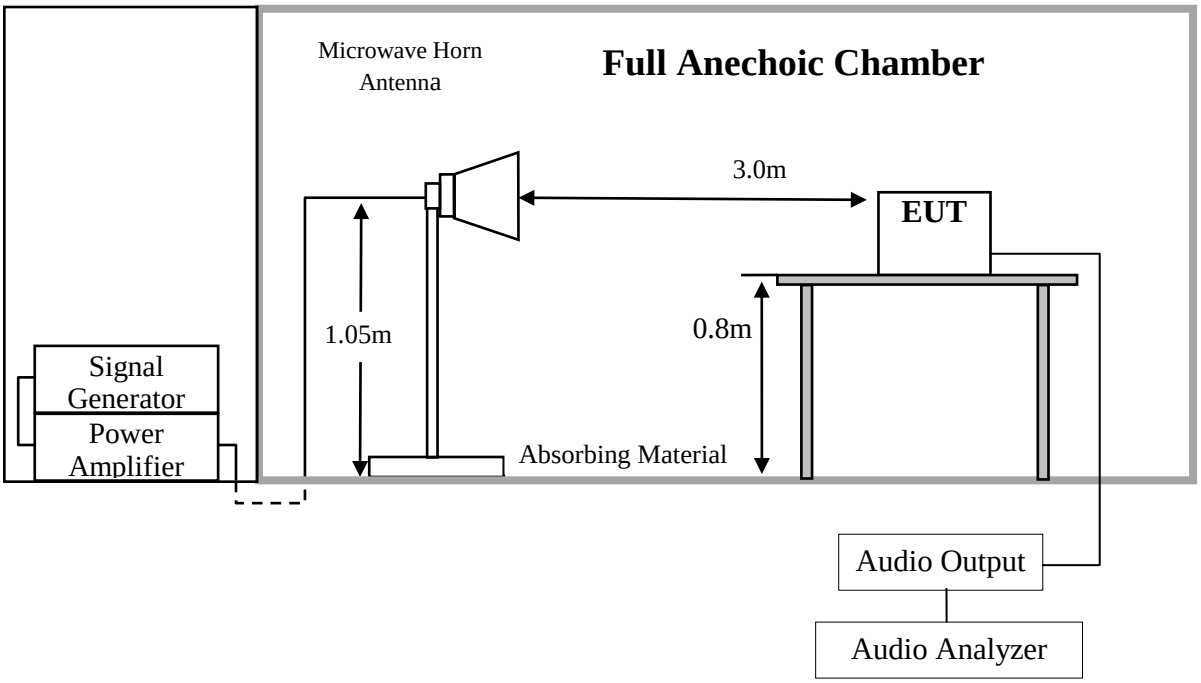
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | RS Chamber(FU) | AUDIX | N/A | N/A | Sep.14,22 | 1 Year |
| 2. | RS Chamber(SE) | AUDIX | N/A | N/A | Sep.17,22 | 5 Year |
| 3. | MXG Analog Signal Generator | Agilent | N5181A | MY49061013 | Oct.10,22 | 1Year |
| 4. | Amplifier | Rflight | NTWPA-1060 100E | 19053151 | Apr.02,23 | 1 Year |
| 5. | MICROWAVE HORN ANTENNA | SCHWARZBECK | STLP9149 | 00600 | NCR | NCR |
| 6. | RF Cable | STORM | MFR-57500 | NO.2 | NCR | NCR |
| 7. | RF Cable | EMCI | EMCCFD400-NM-NM-5000 | 190410 | NCR | NCR |
| 8. | Test Software | AUDIX | i2 | 3.2010-1-7 | N/A | N/A |
| 9. | Audio Analyzer | Rohde & Schwarz | UPL | 100687 | Apr.10,23 | 1Year |
| Notes: NCR means no calibration required (calibrated with system). | | | | | | |
| Notes:N/A means Not applicable. | | | | | | |

## 9.2.Block Diagram of Test Setup

### 9.2.1. For frequency range: 80MHz-1000MHz




### 9.2.2. For frequency range above 1GHz




## 9.3.Test Standard

IEC 61000-4-3: 2020

(Severity Level: 2 at 3V / m)

## 9.4. Severity Levels and Performance Criterion

| Severity Level | Test Field Strength V/m | Performance Criteria |
|---|---|---|
| 1. | 1 | **A** |
| 2. | 3 | |
| 3. | 10 | |
| X. | Special | |

## 9.5. Test Procedure

front of the EUT and Support system, and dwell time of the radiated interference was controlled by an automated, computer-controlled system. The signal source was stepped through the applicable frequency range at a rate no faster than 1% of the fundamental. The signal was amplitude modulated 80% over the frequency range 80MHz-1GHz; 1.8GHz; 2.6GHz; 3.5GHz; 5GHz at a level of 3V/m. The dwell time was set at 3s. Field presence was monitored during testing via a field probe placed in close proximity to the EUT. Throughout testing, the EUT was closely monitored for signs of susceptibility. The test was performed with the antennae oriented in both a horizontal and vertical polarization.

All the scanning conditions are as follows:

| Test conditions | |
|---|---|
| Frequency | 80MHz-1GHz; 1.8GHz; 2.6GHz; 3.5GHz; 5GHz |
| Frequency increments step | 1% of momentary used |
| Test level | 3V/m (un-modulated) |
| Dwell time | 3s |
| Test signal | 80% amplitude modulated by 1kHz sinusoidal audio signal |

## 9.6. Test Results

**PASS. (Test results are recorded in next page)**

# RF Field Strength Susceptibility Test Results

Audix Technology(Shenzhen) Co.,Ltd.

| | | | |
|---|---|---|---|
| EUT | OLED Monitor | Model No. | AG456UCZD |
| Test Date | Jun.19, 2023 | Temperature | 21.2±0.6℃ |
| Input Power | AC 230V/50Hz; AC 100V/50Hz | Humidity | 51±3% |
| Test Mode | PC Mode | Pressure | 101.6±1kPa |
| Tested By | Hogen | Result | Pass |
| Test Field Strength | 3V/m | | |

Modulation: ☑ AM 1kHz 80% ☐ Pulse ☐ none

Frequency Range : 80MHz-1000MHz; 1.8GHz; 2.6GHz; 3.5GHz; 5GHz

| | Horizontal | | Vertical | | Result |
|---|---|---|---|---|---|
| | Required | Observation | Required | Observation | (Pass / Fail) |
| Front | A | A | A | A | Pass |
| Right | A | A | A | A | Pass |
| Rear | A | A | A | A | Pass |
| Left | A | A | A | A | Pass |

Audio output function test

| Port | Polarization | Demodulated Audio Level (dBV) | Electrical Reference Level(dBV) | Electrical interference ratio(dB) | Limit(dB) |
|---|---|---|---|---|---|
| AUDIO OUT | V | -75.8 Note | -18.8 | -57 Note | -20 |
| AUDIO OUT | H | -74.5 Note | -18.8 | -55.7 Note | -20 |
| Speaker R | V | -79.1 Note | -19.7 | -59.4 Note | -20 |
| Speaker R | H | -79.8 Note | -19.7 | -60.1 Note | -20 |
| Speaker L | V | -80.5 Note | -20.4 | -60.1 Note | -20 |
| Speaker L | H | -81.4 Note | -20.4 | -61 Note | -20 |

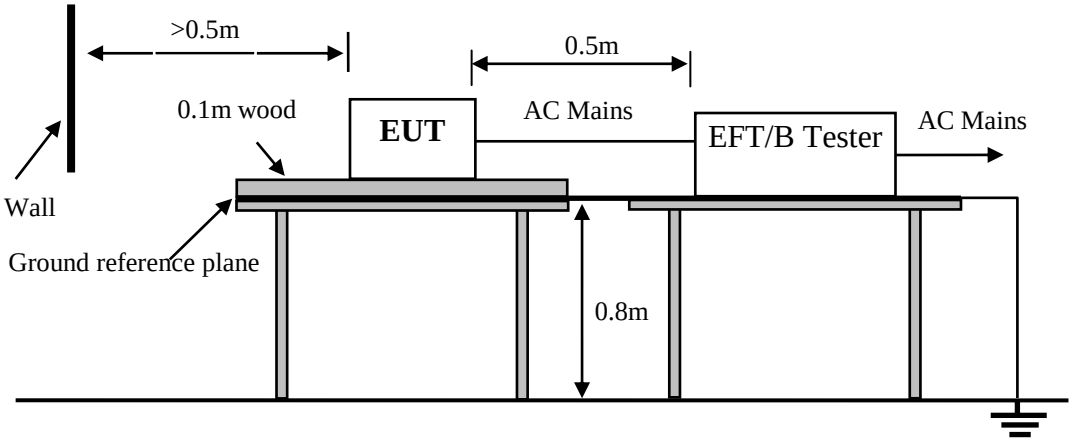
Note means worst frequency between 80-5000MHz

# 10. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

## 10.1. Test Equipments

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | No.1 Complex Immunity Test Site | AUDIX | N/A | N/A | Sep.16,22 | 5 Year |
| 2. | Burst Tester | TESEQ | NSG3025 | 28017 | Apr.02,23 | 1 Year |
| 3. | Test Software | Schaffner | Win3025 | V 4.00 | N/A | N/A |
| Note:N/A means Not applicable. | | | | | | |

## 10.2. Block Diagram of Test Setup




## 10.3. Test Standard

IEC 61000-4-4: 2012

(Severity Level**:** Level 1 at 0.5kV, Level 2 at 1kV)

## 10.4. Severity Levels and Performance Criterion

| Open Circuit Output Test Voltage ±10% | | | |
|---|---|---|---|
| Severity Level | On Power Supply Lines | On I/O (Input / Output) Signal data and control lines | Performance criterion |
| 1. | 0.5 kV | 0.25 kV | B |
| 2. | 1 kV | 0.5 kV | |
| 3. | 2 kV | 1 kV | |
| 4. | 4 kV | 2 kV | |
| X | Special | Special | |

## 10.5. Test Procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m ± 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

10.5.1. For input and AC power ports**:**
The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

10.5.2. For signal lines and control lines ports**:**
It's unnecessary to test.

10.5.3. For DC input and DC output power ports**:**
It's unnecessary to test.

## 10.6. Test Results

**PASS. (Test results are recorded in next page)**

# Electrical Fast Transient/Burst Test Results

Audix Technology (Shenzhen) Co., Ltd.

| EUT | OLED Monitor | Model No. | AG456UCZD |
|---|---|---|---|
| Test Date | Jun.15,2023 | Temperature | 21.3±0.6℃ |
| Input Power | AC 230V/50Hz; AC 100V/50Hz | Humidity | 49±3% |
| Test Mode | PC Mode | Pressure | 101.6±1kPa |
| Tested By | Kennen | Result | Pass |

Repetition Frequency : 5 kHz  Burst Duration : 15ms  Burst Period: 300ms

Inject Time(s): 120s

Inject Line(Inject Method): ☑AC Mains (Direct) □DC Supply(Direct) □ Signal(Capacitive Clamp)

| Line | Test Voltage | Performance | | | Result |
|---|---|---|---|---|---|
| | | Required | Observation(+ ) | Observation( - ) | (Pass/Fail) |
| L | 0.5kV | B | A | A | Pass |
| | 1kV | B | A | A | Pass |
| N | 0.5kV | B | A | A | Pass |
| | 1kV | B | A | A | Pass |
| PE | 0.5kV | B | A | A | Pass |
| | 1kV | B | A | A | Pass |
| L N | 0.5kV | B | A | A | Pass |
| | 1kV | B | A | A | Pass |
| L PE | 0.5kV | B | A | A | Pass |
| | 1kV | B | A | A | Pass |
| N PE | 0.5kV | B | A | A | Pass |
| | 1kV | B | A | A | Pass |
| L N PE | 0.5kV | B | A | A | Pass |
| | 1kV | B | A | A | Pass |

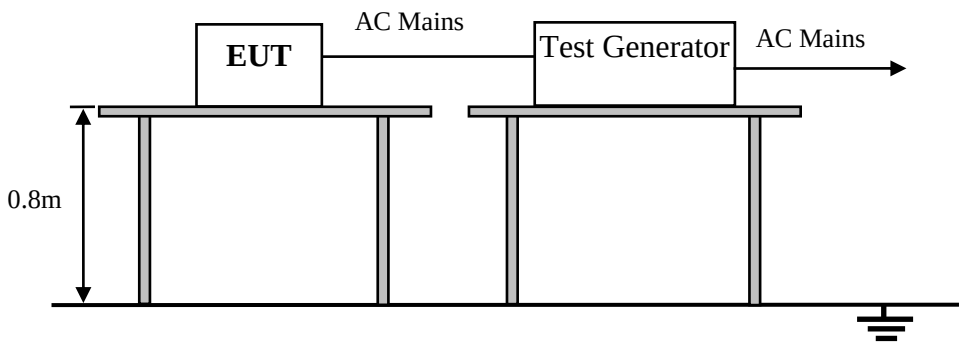
Remark:

# 11. SURGE TEST

## 11.1.Test Equipments

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | No.1 Complex Immunity Test Site | AUDIX | N/A | N/A | Sep.16,22 | 5 Year |
| 2. | Transient Test System | EMC PARTNER | TRANSIENT 2000 | TRA2006 F-S-T-D-R -1500 | Apr.02,23 | 1 Year |
| 3. | Test Software | Schaffner | Win3025 | V 4.00 | N/A | N/A |
| Note:N/A means Not applicable. | | | | | | |

## 11.2.Block Diagram of Test Setup




## 11.3.Test Standard

IEC 61000-4-5: 2014+A1: 2017

(Severity Level: Line to Line was Level 2 at 1kV,

Line to Ground was Level 2 at 1kV& Level 3 at 2kV)

## 11.4.Severity Levels and Performance Criterion

| Severity Level | Open-Circuit Test Voltage kV | Performance criterion |
|---|---|---|
| 1 | 0.5 | B |
| 2 | 1.0 | |
| 3 | 2.0 | |
| 4 | 4.0 | |
| * | Special | |

## 11.5.Test Procedure

1) Set up the EUT and test generator as shown on Section 11.2.
2) For line-to-line coupling mode, provide a 1kV 1.2/50μs voltage surge (at open-circuit condition) and 8/20μs current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.
3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.
4) Different phase angles are done individually.
5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

## 11.6.Test Results

**PASS. (Test results are recorded in next page)**

# Surge Immunity Test Results

Audix Technology (Shenzhen) Co., Ltd.

| EUT | OLED Monitor | Model No. | AG456UCZD |
|---|---|---|---|
| Test Date | Jun.15, 2023 | Temperature | 21.3±0.6℃ |
| Input Power | AC 230V/50Hz; AC 100V/50Hz | Humidity | 49±3% |
| Test Mode | PC Mode | Pressure | 101.6±1kPa |
| Tested By | Kennen | Result | Pass |

Repetion: 5 times per test Interval:60 Seconds

Line : ☑ AC Mains(1.2/50μs) □ DC Supply(1.2/50μs) □ Signal(LAN) (1.2/50μs)

| Location | Volt | 500V | | | 1kV | | | 2kV | | | Result |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Phase | Performance | | | Performance | | | Performance | | | (Pass/Fail) |
| | | Required | + | - | Required | + | - | Required | + | - | |
| L-N | 0° | B | A | A | B | A | A | --- | --- | --- | Pass |
| | 90° | B | A | A | B | A | A | --- | --- | --- | Pass |
| | 180° | B | A | A | B | A | A | --- | --- | --- | Pass |
| | 270° | B | A | A | B | A | A | --- | --- | --- | Pass |
| L-PE | 0° | B | A | A | B | A | A | B | A | A | Pass |
| | 90° | B | A | A | B | A | A | B | A | A | Pass |
| | 180° | B | A | A | B | A | A | B | A | A | Pass |
| | 270° | B | A | A | B | A | A | B | A | A | Pass |
| N-PE | 0° | B | A | A | B | A | A | B | A | A | Pass |
| | 90° | B | A | A | B | A | A | B | A | A | Pass |
| | 180° | B | A | A | B | A | A | B | A | A | Pass |
| | 270° | B | A | A | B | A | A | B | A | A | Pass |

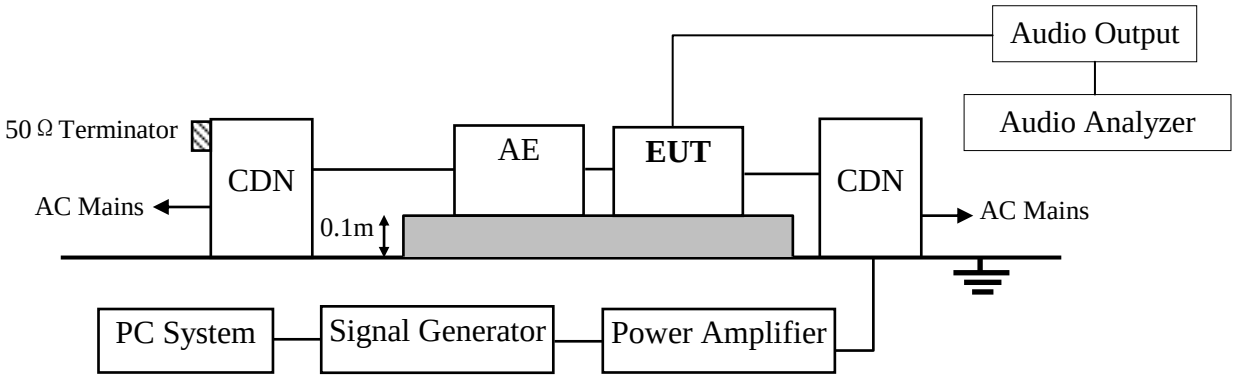
Remark:

# 12. CONTINUOUS CONDUCTED DISTURBANCE TEST

## 12.1.Test Equipments

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | MXG Analog Signal Generator | Agilent | N5181A | MY49061013 | Oct.10,22 | 1 Year |
| 2. | Amplifier | Rflight | NTWPA-4K04100 | 20073132 | Apr.02,23 | 1 Year |
| 3. | CDN | TESEQ | CDN M016 | 34608 | Apr.01,23 | 1 Year |
| 4. | CDN | FCC | FCC-801-M3-25A | 07045 | Apr.01,23 | 1 Year |
| 5. | Attenuator | Weinschel | 40-6-34 | LJ092 | Apr.01,23 | 1 Year |
| 6. | RF Cable | MICABLE | A04-07-07-7M | 09111341 | NCR | NCR |
| 7. | RF Cable | STORM | MFR-57500 | NO.2 | NCR | NCR |
| 8. | RF Cable | STORM | MFR-57500 | NO.3 | NCR | NCR |
| 9. | Test Software | AUDIX | i2 | 3.2010-1-7 | N/A | N/A |
| 10. | Audio Analyzer | Rohde & Schwarz | UPL | 100687 | Apr.10,23 | 1Year |
| Notes: NCR means no calibration required (calibrated with system). | | | | | | |
| Notes: N/A means Not applicable. | | | | | | |

## 12.2.Block Diagram of Test Setup




## 12.3.Test Standard

IEC 61000-4-6: 2013

## 12.4. Severity Levels and Performance Criterion

| Severity Level | Voltage Level (e.m.f.) V | Performance criterion |
|---|---|---|
| 1 | 1 | A |
| 2 | 3 | |
| 3 | 10 | |
| X | Special | |

## 12.5. Test Procedure

1) Set up the EUT, CDN and test generators as shown on Section 12.2.
2) Let the EUT work in test mode and test it.
3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
4) The disturbance signal described below is injected to EUT through CDN.
5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
6) The frequency range is swept from 0.150MHz to 10MHz using 3V signal level, from 10MHz to 30MHz using 3V to 1V signal level, from 30MHz to 80MHz using 1V signal level and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.
7) The rate of sweep shall not exceed $1.5*10^{-3}$decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

## 12.6. Test Results

**PASS. (Test results are recorded in next page)**

# Continuous Conducted disturbance Test Results

Audix Technology (Shenzhen)Co.,Ltd.

| | | | |
|---|---|---|---|
| EUT | OLED Monitor | Model No. | AG456UCZD |
| Test Date | Jun.19, 2023 | Temperature | 21.2±0.6℃ |
| Input Power | AC 230V/50Hz; AC 100V/50Hz | Humidity | 52±3% |
| Test Mode | PC Mode | Pressure | 101.6±1kPa |
| Tested By | Hogen | Result | Pass |

| Frequency Range (MHz) | Injected | Voltage Level (e.m.f.) | Required | Observation | Result (Pass / Fail) |
|---|---|---|---|---|---|
| 0.15 ~ 10 | AC Mains | 3V | A | A | PASS |
| 10 ~ 30 | AC Mains | 3V~1V | A | A | PASS |
| 30 ~ 80 | AC Mains | 1V | A | A | PASS |

Audio output function test

| Port | Injected | Demodulated Audio Level (dBV) | Electrical Reference Level(dBV) | Electrical interference ratio(dB) | Limit(dB) |
|---|---|---|---|---|---|
| Audio Out | AC Mains | -64.1 Note | -17.5 | -46.6 Note | -20 |
| Speaker R | AC Mains | -70.8 Note | -18.1 | -52.7 Note | -20 |
| Speaker L | AC Mains | -71.5 Note | -18.7 | -52.8 Note | -20 |

Note means worst frequency between 0.15-80MHz

Modulation Signal:1kHz 80% AM

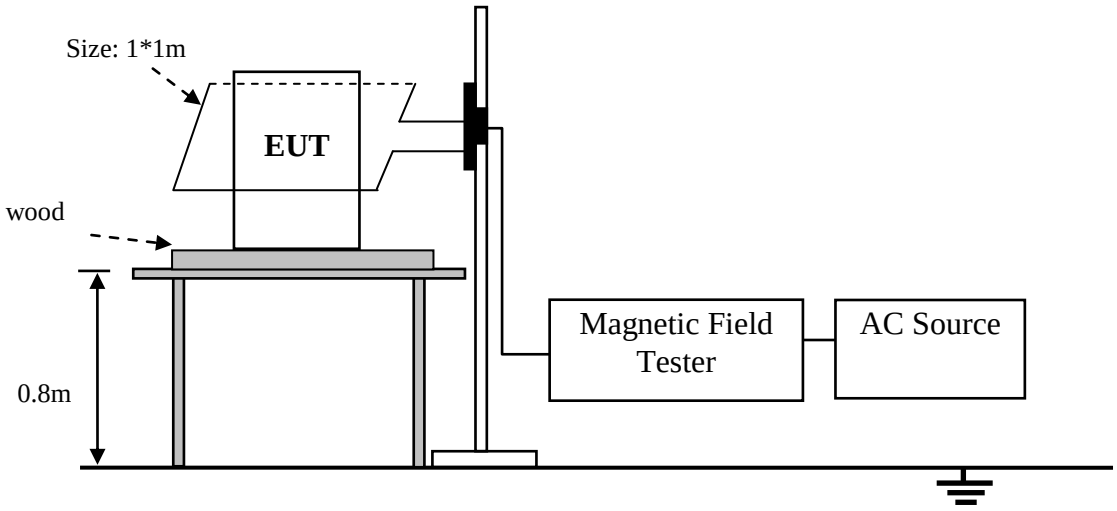
Dwell time: 3s

# 13. MAGNETIC FIELD IMMUNITY TEST

## 13.1. Test Equipments

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | No.1 Complex Immunity Test Site | AUDIX | N/A | N/A | Sep.16,22 | 5 Year |
| 2. | Magnetic Field Tester | HAEFELY | Mag100.1 | 083858-10 | Apr.01,23 | 1 Year |
| 3. | Line Disturbances Tester | HAEFELY | PLINE 1610 | 083690-05 | Apr.02,23 | 1 Year |

## 13.2. Block Diagram of Test Setup




## 13.3. Test Standard

IEC 61000-4-8: 2009

(Severity Level 1 at 1A/m)

## 13.4. Severity Levels and Performance Criterion

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

## 13.5. Test Procedure

The EUT was subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 13.2. The induction coil was then rotated by 90°in order to expose the EUT to the test field with different orientations.

## 13.6. Test Results

**PASS. (Test results are recorded in next page)**

# Magnetic Field Immunity Test Results

Audix Technology (Shenzhen) Co., Ltd.

| | | | |
|---|---|---|---|
| EUT | OLED Monitor | Model No. | AG456UCZD |
| May | Jun.24, 2023 | Temperature | 21.4±0.6℃ |
| Input Power | AC 230V/50Hz; AC 100V/50Hz | Humidity | 51±3% |
| Test Mode | PC Mode | Pressure | 101.6±1kPa |
| Tested By | Hogen | Result | Pass |

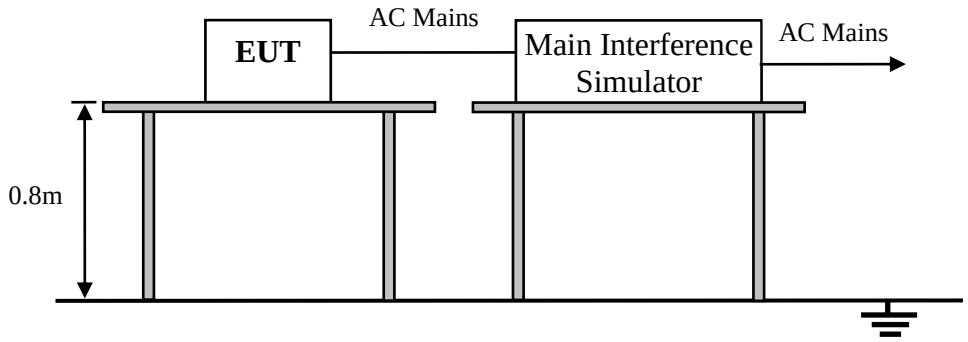
| Test Level | Testing Duration | Coil Orientation | Required | Observation | Result (Pass/Fail) |
|---|---|---|---|---|---|
| 1A/m | 5 min / coil | X-axis | A | A | PASS |
| 1A/m | 5 min / coil | Y-axis | A | A | PASS |
| 1A/m | 5 min / coil | Z-axis | A | A | PASS |

# 14. VOLTAGE DIPS AND INTERRUPTIONS TEST

## 14.1. Test Equipments

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | No.2 Complex Immunity Test Site | AUDIX | N/A | N/A | Sep.16,22 | 5 Year |
| 2. | Line Disturbances Tester | HAEFELY | PLINE 1610 | 083690-05 | Apr.01,23 | 1 Year |

## 14.2. Block Diagram of Test Setup




## 14.3. Test Standard

IEC 61000-4-11: 2020

## 14.4. Severity Levels and Performance Criterion

| Test Level %$U_T$ | Voltage dip and short interruptions %$U_T$ | Duration (in period) | Performance Criterion |
|---|---|---|---|
| 0 | 100 | 250/300[Note] | C |
| 0 | 100 | 0.5 | B |
| 70 | 30 | 25/30[Note] | C |

Note: "25/30 Cycles" means "25 cycles for 50Hz test" and"30 cycles for 60Hz test". "250/300 Cycles" means "250 cycles for 50Hz test" and"300 cycles for 60Hz test"

## 14.5. Test Procedure

1) The EUT and test generator were setup as shown on Section 14.2.
2) The interruption is introduced at selected phase angles with specified duration.
3) Record any degradation of performance.

## 14.6. Test Results

**PASS. (Test results are recorded in next page)**

# Voltage Dips And Interruptions Test Results

Audix Technology (Shenzhen) Co., Ltd.

| EUT | OLED Monitor | Model No. | AG456UCZD |
|---|---|---|---|
| Test Date | Jun.26, 2023 | Temperature | 22.4±0.6℃ |
| Input Power | AC 240V/50Hz & AC 100V/50Hz | Humidity | 52±3% |
| Test Mode | PC Mode | Pressure | 101.6±1kPa |
| Tested By | Hogen | Result | Pass |

**AC 240V/50Hz**

| Test Level % $U_T$ | Voltage Dips & Short Interruptions % $U_T$ | Duration (in period) | Phase Angle | Required | Observation | Result (Pass / Fail) |
|---|---|---|---|---|---|---|
| 0 | 100 | 0.5P | 0°,90°,180°,270° | B | A | PASS |
| 70 | 30 | 25P | 0°,90°,180°,270° | C | A | PASS |
| 0 | 100 | 250P | 0°,90°,180°,270° | C | C* | PASS |

**AC 100V/50Hz**

| Test Level % $U_T$ | Voltage Dips & Short Interruptions % $U_T$ | Duration (in period) | Phase Angle | Required | Observation | Result (Pass / Fail) |
|---|---|---|---|---|---|---|
| 0 | 100 | 0.5P | 0°,90°,180°,270° | B | A | PASS |
| 70 | 30 | 25P | 0°,90°,180°,270° | C | C* | PASS |
| 0 | 100 | 250P | 0°,90°,180°,270° | C | C* | PASS |

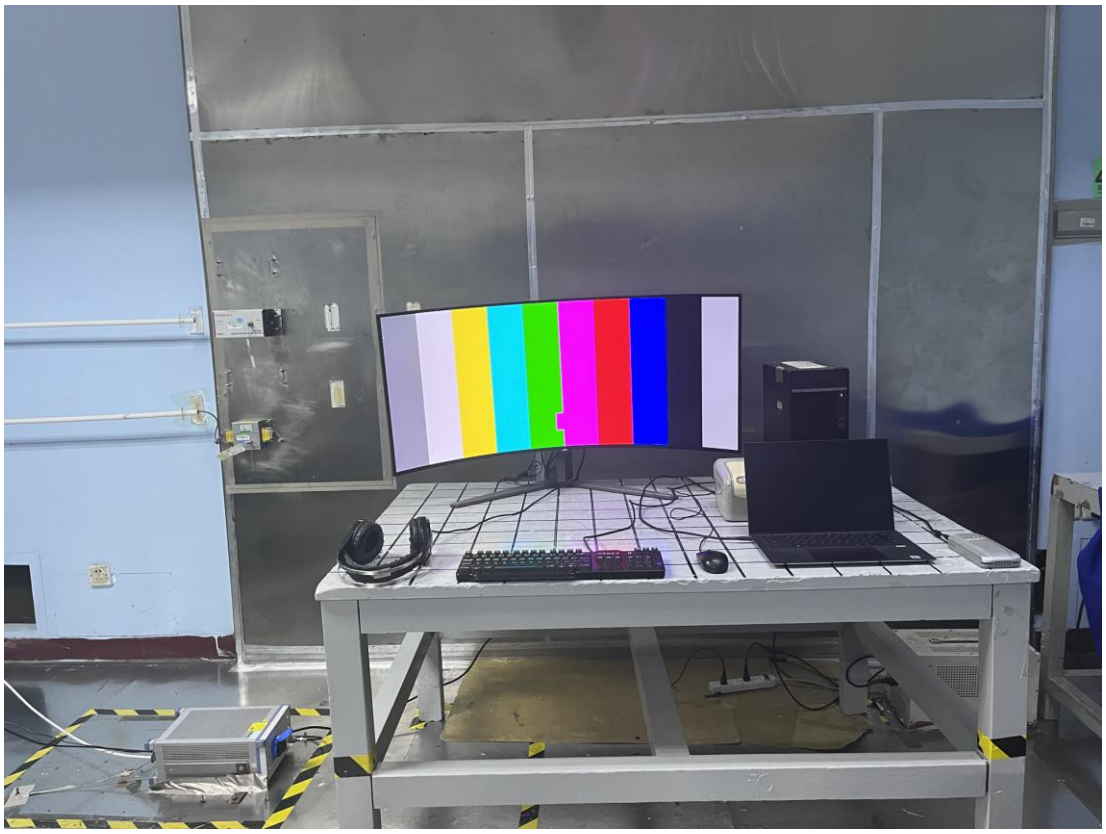
Note 1**:** $U_T$ is the rated voltage for the equipment.

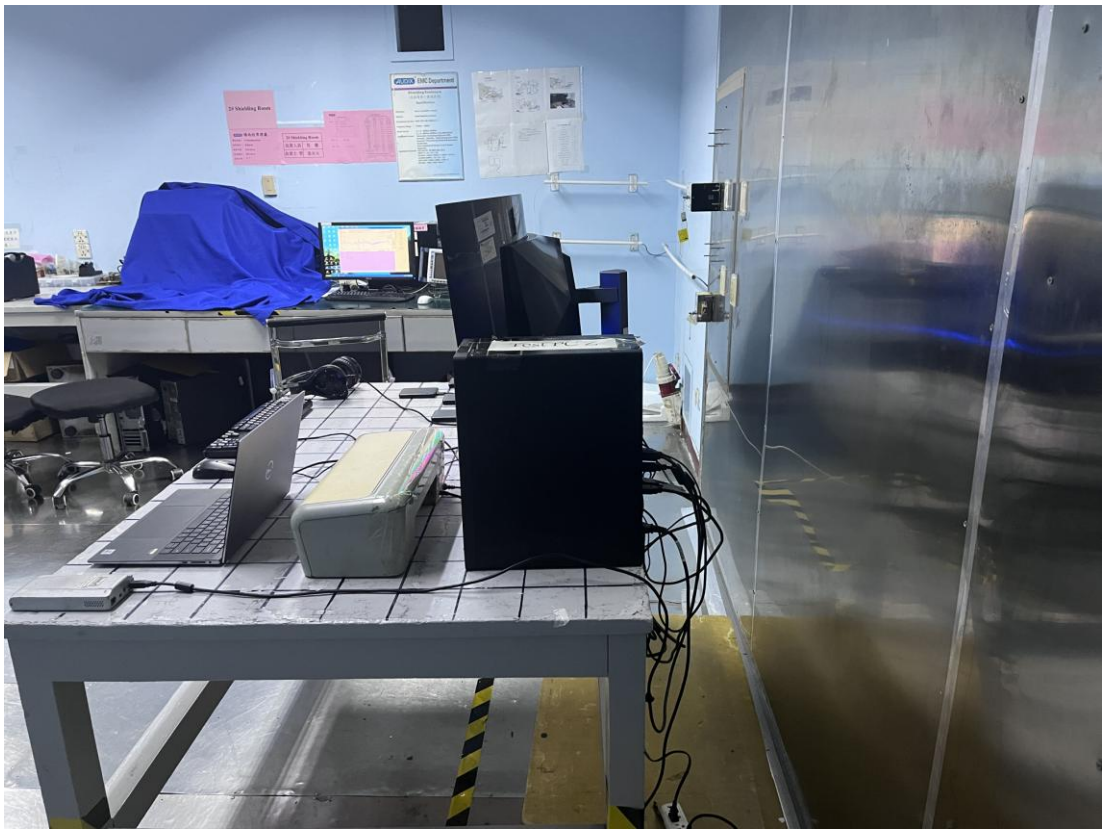
Note 2**:** The frequency of the test voltage shall be within ±2% of the rated frequency, the output voltage shall be within ±5% of the rated voltage.

Remark: The class "C*" means the EUT will black screen and power off restart during test, and the data transmitting form USB ports will interrupt, it need to recover to normal by manual.

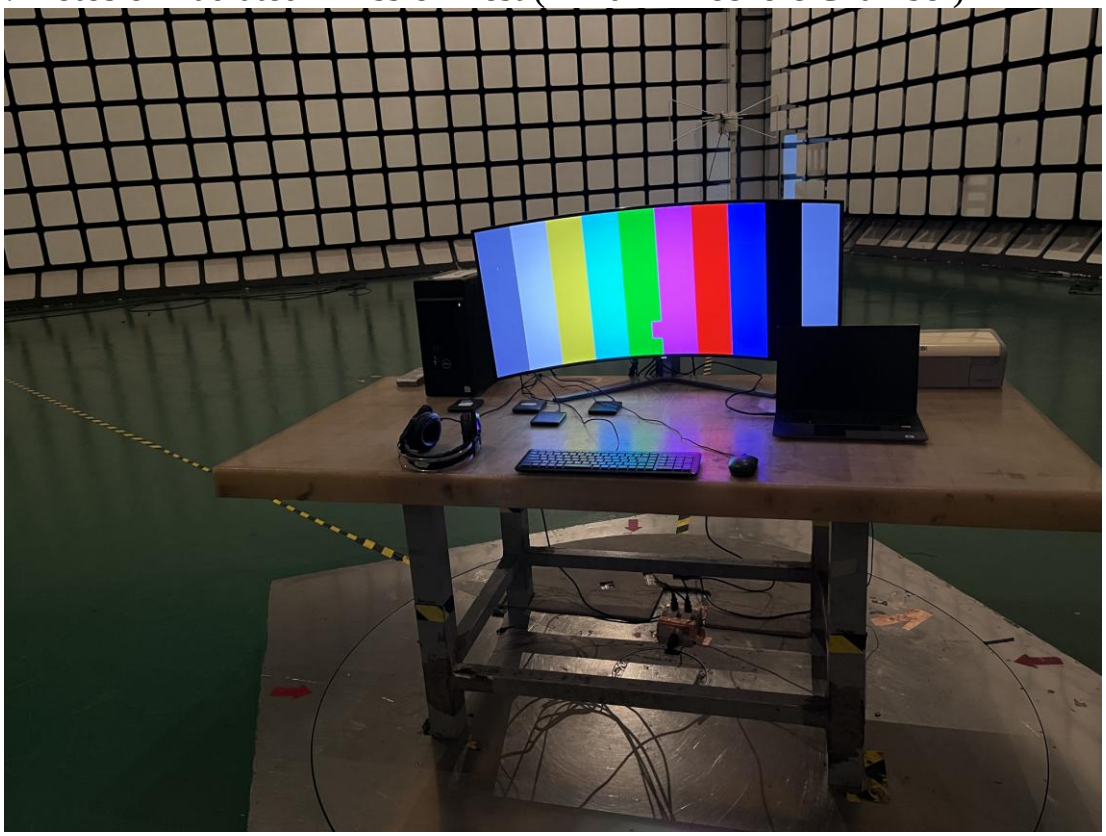
# 15. PHOTOGRAPHS

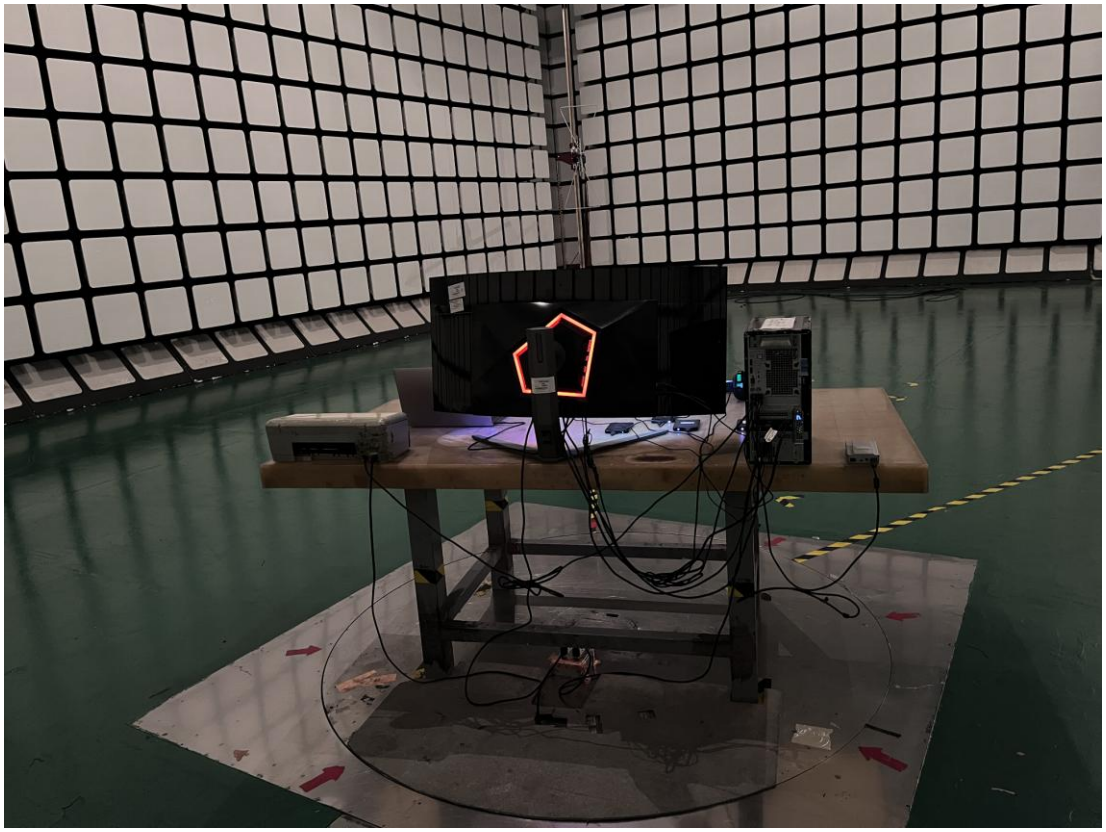
## 15.1.Photos of Power Line Conducted Emission Test



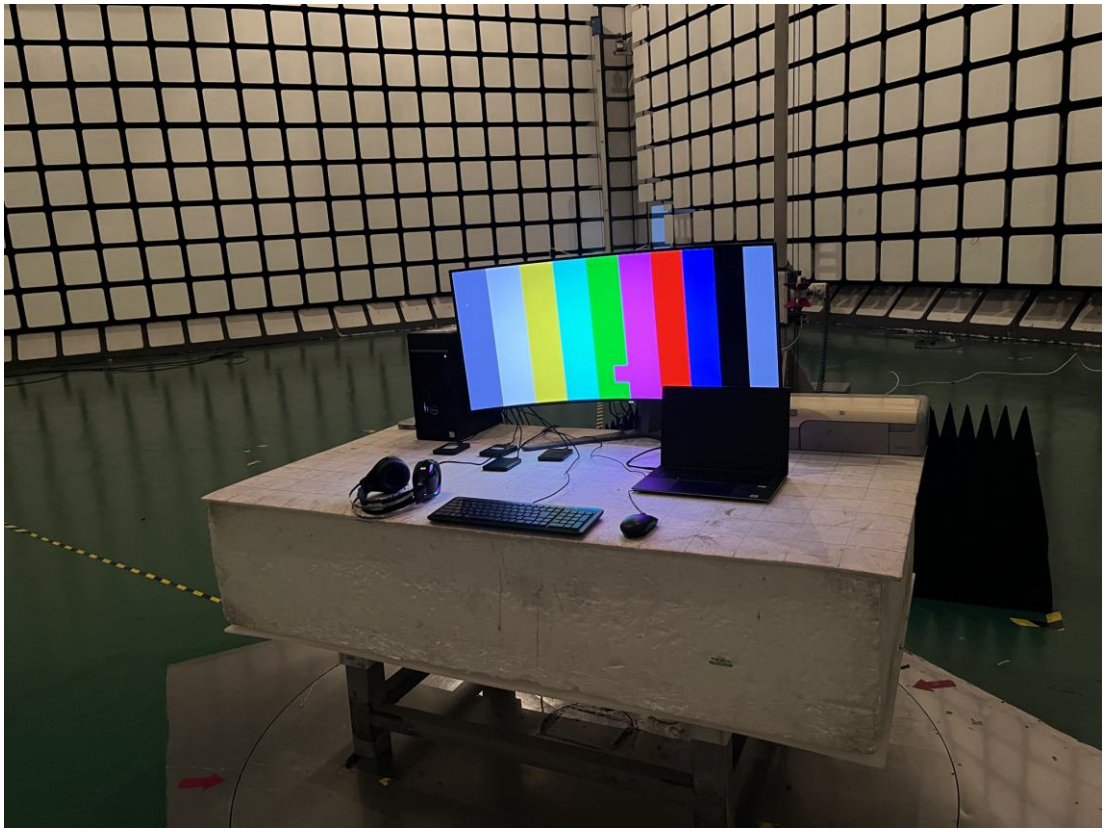


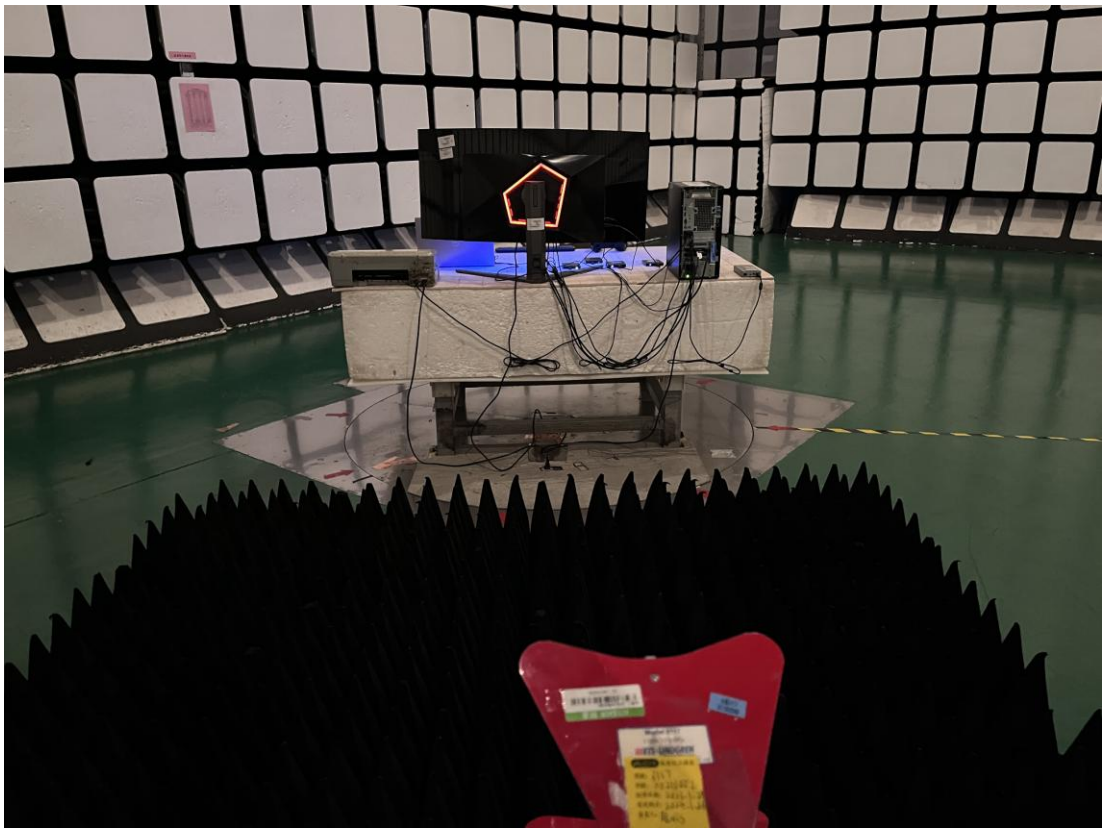
15.2.Photos of Radiated Emission Test (In 10m Anechoic Chamber)





In 10m Anechoic Chamber Test 1GHz – 6GHz

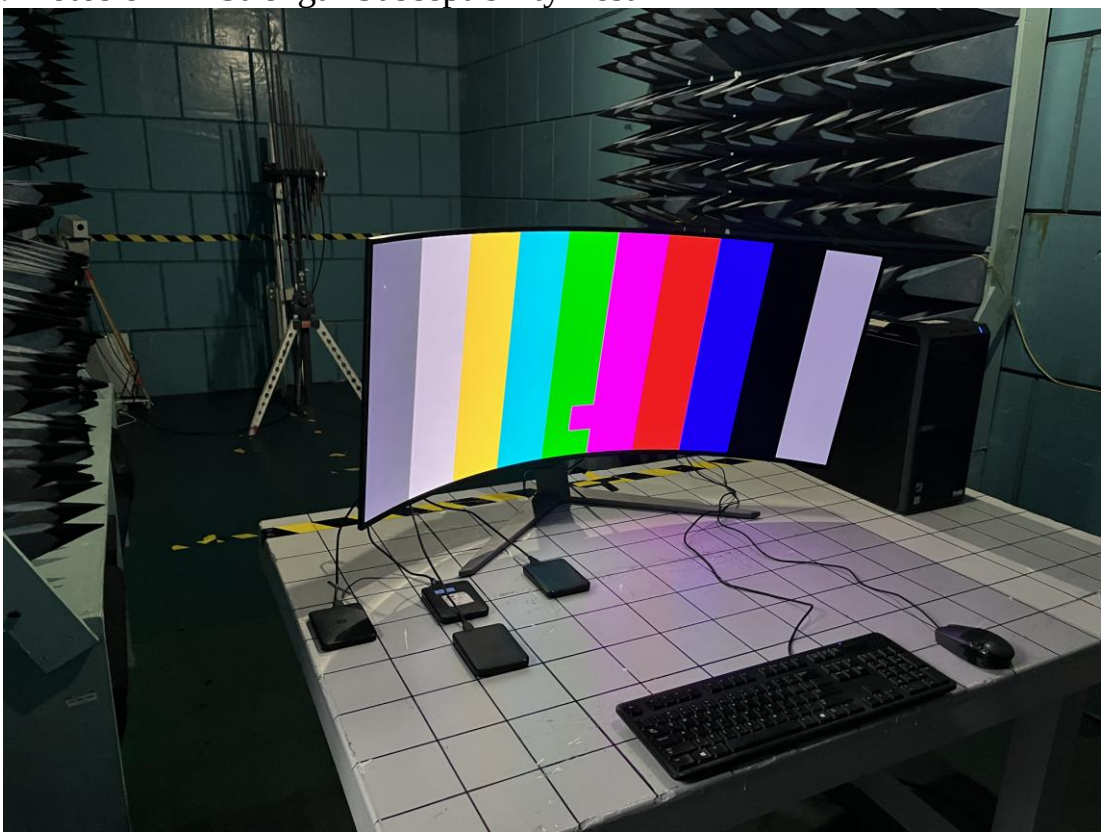




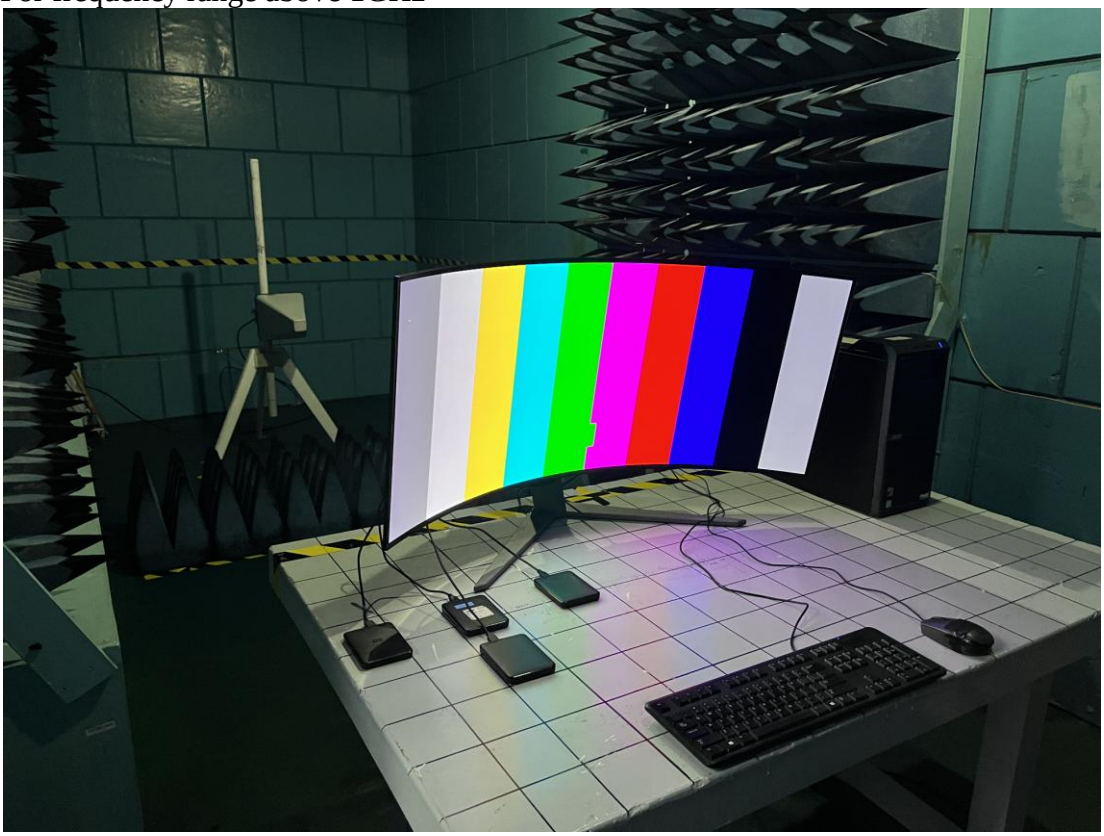
15.3.Photo of Harmonic / Flicker Test

15.4.Photos of Electrostatic Discharge Immunity Test


15.5.Photos of RF Strength Susceptibility Test

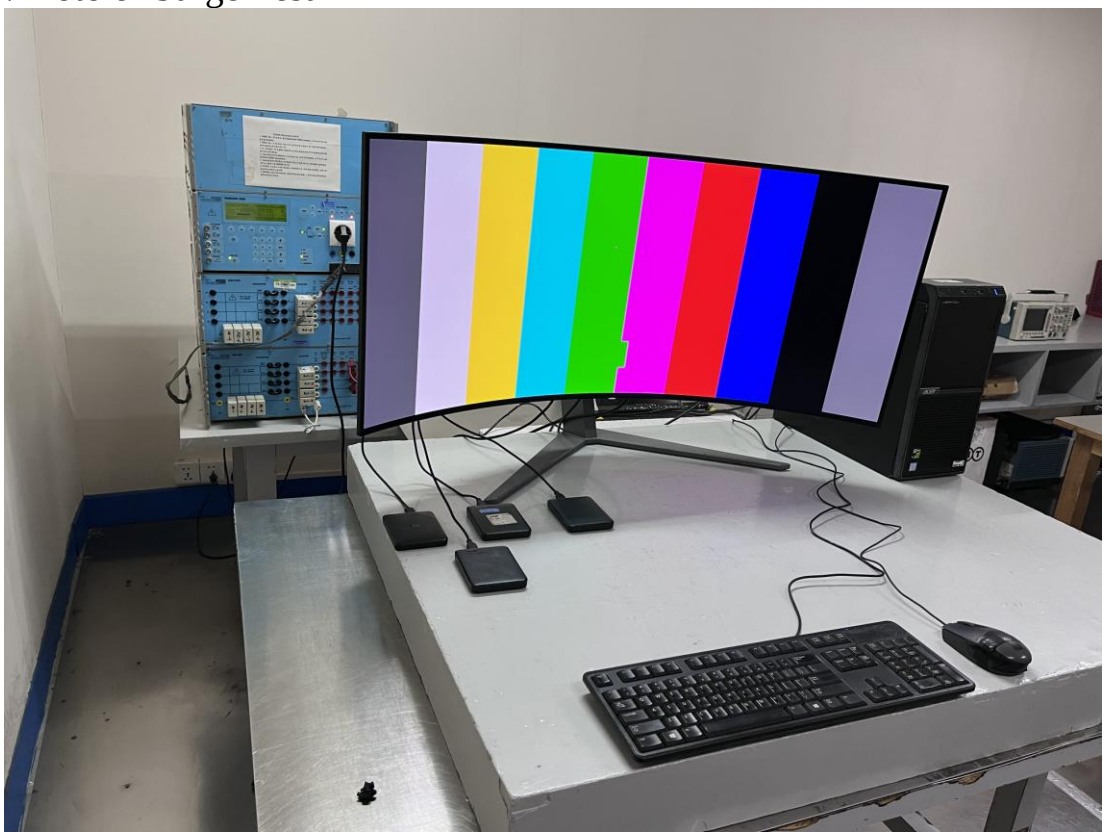


For frequency range above 1GHz

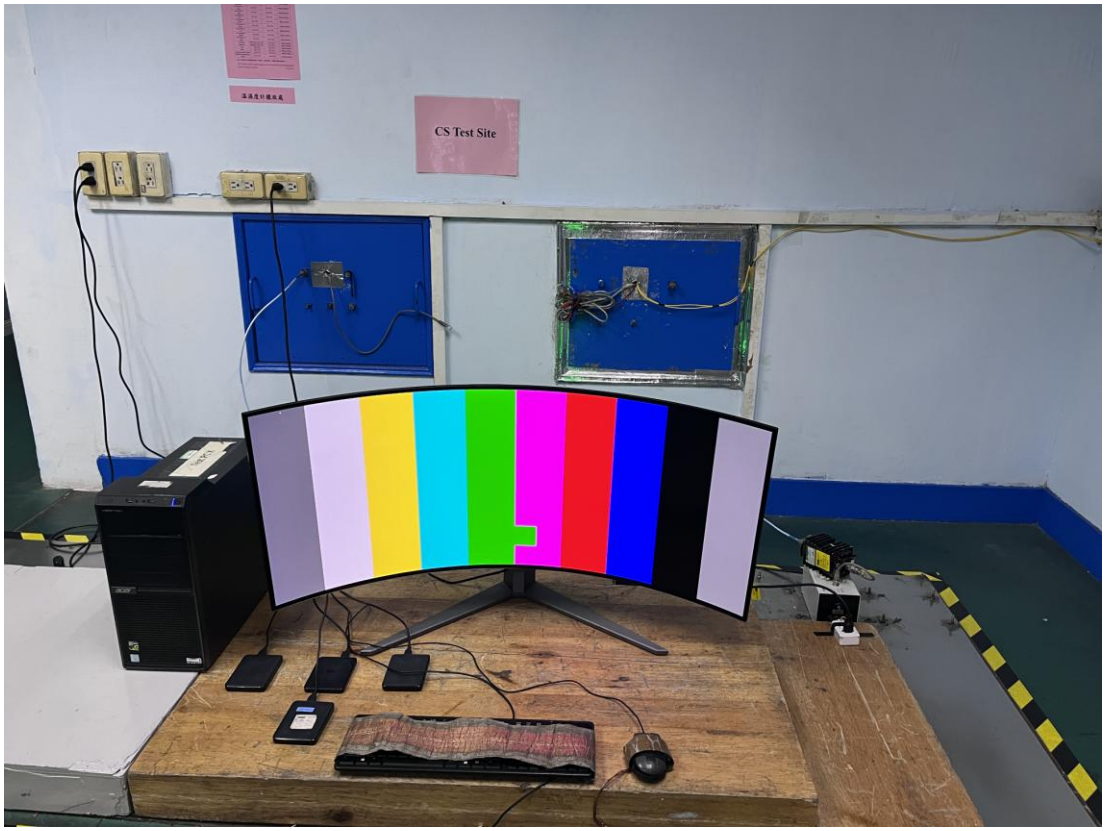


## 15.6.Photo of Electrical Fast Transient/Burst Immunity Test

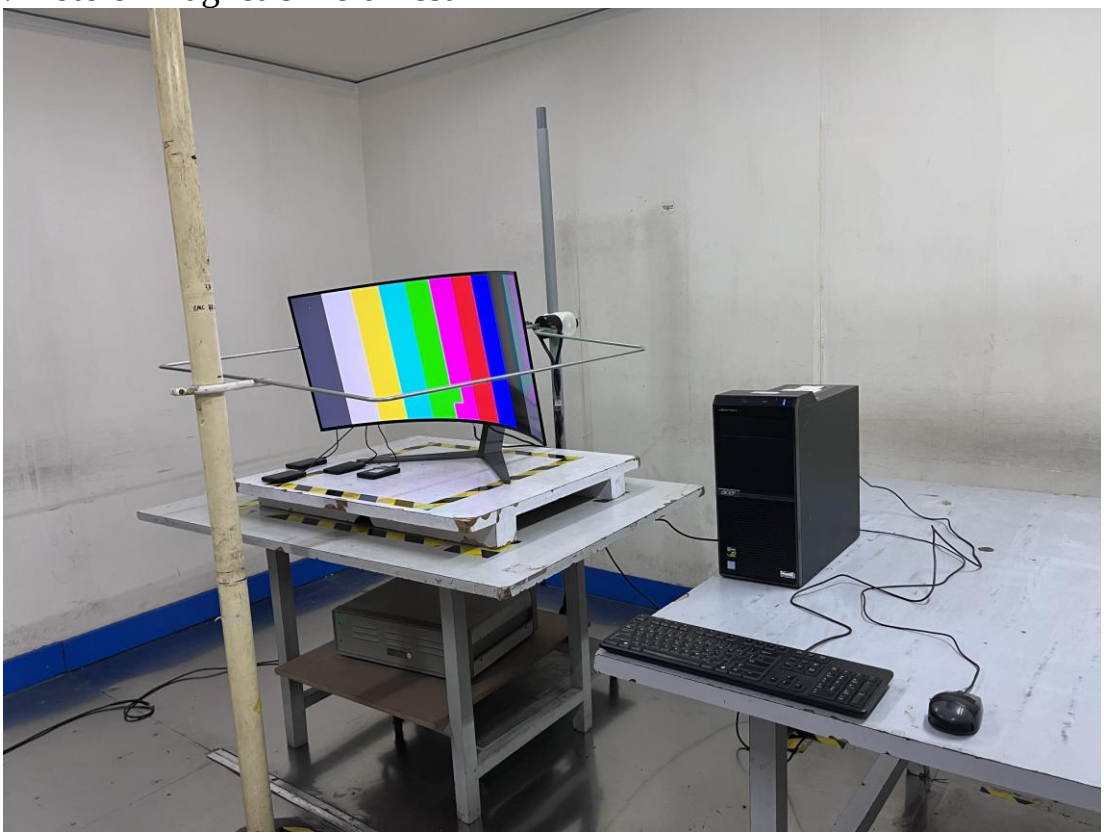
15.7.Photo of Surge Test



15.8.Photo of Continuous Conducted disturbance Test



15.9.Photo of Magnetic Field Test



15.10. Photo of Voltage Dips and interruptions test

**THE END**