TCT 通测检测 TESTING CENTRE TECHNOLOGY

# EMC TEST REPORT

## Multimedia equipment

| | | |
|---|---|---|
| **Test Report No. .....:** | TCT210629E033 | |
| **Date of issue .....:** | Jul. 07, 2021 | |
| **Testing laboratory.....:** | SHENZHEN TONGCE TESTING LAB | |
| **Testing location/ address.....:** | TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China | |
| **Applicant's name .....:** | ORICO Technologies Co., Ltd. | |
| **Address.....:** | 1903-1904.14A, Zhonghaixin Innovation Industrial park, no.12, Gan Lee Sixth Road, Gankeng Community, Jihua Street, Shenzhen, China | |
| **Manufacturer's name .....:** | ORICO Technologies Co., Ltd. | |
| **Address.....:** | 1903-1904.14A, Zhonghaixin Innovation Industrial park, no.12, Gan Lee Sixth Road, Gankeng Community, Jihua Street, Shenzhen, China | |
| **Standard(s) .....:** | EN 55032:2015+A1:2020+A11:2020 (BS EN 55032:2015+A1:2020+A11:2020)<br>EN 55035:2017+A11:2020 (BS EN 55035:2017+A11:2020)<br>EN IEC 61000-3-2:2019(BS EN IEC 61000-3-2:2019)<br>EN 61000-3-3:2013+A1:2019(BS EN 61000-3-3:2013+A1:2019) | |
| **Test item description.....:** | Charger | |
| **Trade Mark.....:** | N/A | |
| **Model/Type reference .....:** | DUK-4P, XXX-4P (X Expression A to Z) | |
| **Rating(s) .....:** | Input: AC 100-240 V, 50/60 Hz, 0.8 A Max<br>Output per port: DC 5.0 V, 2.4 A<br>Total output: DC5.0 V, 6.0 A, 30.0 W Max | |
| **Date of receipt of test item.....:** | Jun. 29, 2021 | |
| **Date (s) of performance of test:** | See dates for each test case | |
| **Tested by (+signature).....:** | Ronaldo Luo | Ronaldo Luo |
| **Check by (+signature) .....:** | Howie Lyu | Howie Lyu |
| **Approved by (+signature) .....:** | Tomsin | Tomsin |

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# 1. General Product Information

## 1.1.EUT description

| | | |
|---|---|---|
| **Test item description ..... :** | Charger | |
| **Model/Type reference ..... :** | DUK-4P | |
| **Rating(s) ..... :** | Input: AC 100-240 V, 50/60 Hz, 0.8 A Max<br>Output per port: DC 5.0 V, 2.4 A<br>Total output: DC5.0 V, 6.0 A, 30.0 W Max | |
| **Highest internal frequency $F_x$..... :** | ☒ | $F_x$ < 108 MHz |
| | ☐ | 108 MHz < $F_x$ ≤ 500 MHz |
| | ☐ | 500 MHz < $F_x$ ≤ 1 GHz |
| | ☐ | $F_x$ > 1 GHz |
| **AC Line ..... :** | ☐Shielded ☒Unshielded, ☒Detachable ☐Un-detachable<br>☐No applicable ☒Length: 1.17 m | |
| **DC Line ..... :** | ☐Shielded ☐Unshielded, ☐Detachable ☐Un-detachable<br>☒No applicable ☐Length: | |

## 1.2.Model(s) list

| No. | Model No. | Tested with |
|---|---|---|
| 1 | DUK-4P | ☒ |
| Other models | XXX-4P (X Expression A to Z) | ☐ |
| Note: DUK-4P is tested model, other models are derivative models. The models are identical in circuit and PCB layout, only different on the model names. So the test data of DUK-4P can represent the remaining models. | | |

# 2. Test Information

## 2.1.EUT operation mode(s)

| Mode # | Operating mode description | Test voltage |
|---|---|---|
| 1 | USB Output (5 V 2.4A) | AC 230 V/50 Hz |
| 2 | USB Total Output (5 V 6A) | AC 230 V/50 Hz |

| Test worst operating mode | |
|---|---|
| Disturbance voltage at mains terminals | Mode 2 |
| Radiated emission | Mode 1 |
| Remark: The worst measurement data and graphical presentation show in this report. | |

## 2.2.Special accessories and auxiliary equipment

| Product Type | Manufacturer | Model No. | Serial No. |
|---|---|---|---|
| / | / | / | / |

## 2.3.Configuration of system under test


**(EUT: Charger)**

## 2.4.General test conditions

**Environmental reference conditions**

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.

The climatic conditions during the tests were within the following limits:

| Temperature | Humidity | Atmospheric pressure |
|---|---|---|
| 15 °C – 35 °C | 30 % - 60 % | 86 kPa – 106 kPa |

If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.

**Measurement uncertainties**

| Test Item | Uncertainty |
|---|---|
| Uncertainty for Disturbance voltage at the mains terminals | 3.10 dB |
| Uncertainty for Disturbance voltage at the telecommunication terminals | 4.06 dB |
| Uncertainty for Radiated emission (30 MHz to 1 GHz) | 4.56 dB |
| Uncertainty for Radiated emission (1 GHz to 6 GHz) | 4.22 dB |

The overall measurement uncertainty of a measurement is defined as the range of which can be supposed that it contains the true value with a specified probability.

This probability is 95 % for the generally specified measurement uncertainty (so-called expanded measurement uncertainty).

The limits for emission measurements and the Test levels for immunity tests in the applied standards were defined taking into consideration the accuracy limits for measurement and testing equipment required by the Basic standards.

All measurement and test results of the EMC laboratory of SHENZHEN TONGCE TESTING LAB fulfil the requirements for measurement uncertainties according to the standards applied.

Decision rule for statement(s) of conformity is based on accuracy method specified in Clause 4.4.3 in IEC Guide 115:2021.

# 3. Test Result Summary

| EN 55032:2015+A1:2020+A11:2020 | |
|---|---|
| **Requirement – Test case** | **Verdict** |
| Classification Class (☐A ☒B) | - |
| Disturbance voltage at mains terminals | Pass |
| Disturbance voltage at telecommunication terminals | N/A |
| Disturbance voltage at antenna terminals | N/A |
| Conducted disturbance between 1 GHz to 18 GHz | N/A |
| Radiated disturbance 30 MHz – 6 GHz | Pass |
| OUTDOOR UNITS – Limits of radiated disturbance between 1 GHz to 18 GHz | N/A |
| **EN IEC 61000-3-2:2019** | |
| **Requirement – Test case** | **Verdict** |
| Harmonic current emissions | N/A |
| **EN 61000-3-3:2013+A1:2019** | |
| **Requirement – Test case** | **Verdict** |
| Voltage changes, voltage fluctuations and flicker | Pass |
| **EN 55035:2017+A11:2020** | |
| **Requirement – Test case** | **Verdict** |
| Electrostatic discharge immunity (ESD) | Pass |
| Radiated, radio-frequency, electromagnetic field immunity (RS) | Pass |
| Electrical fast transient/burst immunity (EFT/B) | Pass |
| Surge immunity | Pass |
| Immunity to conducted disturbances, induced by radio-frequency fields (CS) | Pass |
| Broadband impulse noise disturbances for xDSl ports | N/A |
| Power frequency magnetic field immunity (PFMF) | N/A |
| Voltage dips, short interruptions and voltage variations immunity (DIPS) | Pass |
| Remark: This test report also conforms BS EN 55032:2015+A1:2020+A11:2020; BS EN 55035:2017+A11:2020; BS EN IEC 61000-3-2:2019; BS EN 61000-3-3:2013+A1:2019 standards requirement. | |

| 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) |

# 4. List of Test Equipment

| Equipment | Manufacturer | Model No. | Serial No. | Cal. Due |
|---|---|---|---|---|
| **Disturbance voltage at mains terminals** | | | | |
| EMI Test Receiver | R&S | ESCI3 | 100898 | 2021/07/27 |
| Line Impedance Stabilisation Newtork(LISN) | Schwarzbeck | NSLK 8126 | 8126453 | 2022/03/11 |
| Attenuator | N/A | 10 dB | 164080 | 2021/09/02 |
| **Disturbance voltage at telecommunication terminals** | | | | |
| EMI Test Receiver | R&S | ESCI3 | 100898 | 2021/07/27 |
| Line Impedance Stabilisation Newtork(LISN) | Schwarzbeck | NSLK 8126 | 8126453 | 2022/03/11 |
| ISN | Schwarzbeck | CAT5 8158 | 151 | 2022/03/01 |
| **Radiated emission (30 MHz to 1 GHz)** | | | | |
| Broadband Antenna | Schwarzbeck | VULB9163 | 340 | 2022/09/04 |
| EMI Test Receiver | R&S | ESIB7 | 100197 | 2021/07/27 |
| Pre-amplifier | HP | 8447D | 2727A05017 | 2021/09/02 |
| **Radiated emission (1 GHz to 6 GHz)** | | | | |
| Horn Antenna | Schwarzbeck | BBHA 9120 D | 02372 | 2023/03/06 |
| EMI Test Receiver | R&S | ESIB7 | 100197 | 2021/07/27 |
| Pre-amplifier | SKET | LNPA_0118G-45 | SK2021012102 | 2022/03/11 |
| **Harmonic current emissions & Voltage Fluctuations and Flicker** | | | | |
| AC Power Supply | KIKUSUI | PCR4000M | UC002552 | 2021/09/11 |
| Harmonic/Flicker Analyzer | KIKUSUI | KHA1000 | UD002324 | 2021/09/11 |
| Line Impedance Network | KIKUSUI | LIN1020JF | UC001738 | 2021/07/27 |
| **Electrostatic discharge immunity (ESD)** | | | | |
| Electrostatic Discharge Generator | HAEFELY | PESD300 | H012056 | 2021/09/17 |
| **Radiated, radio-frequency, electromagnetic field immunity (RS)** | | | | |
| Antenna | SKET | STLP 9129_Plus | / | / |
| Signal Generator | Agilent | N5182A | MY47070282 | 2021/09/02 |
| Amplifier | SKET | HAP_80M01G-250W | / | 2022/03/11 |
| Amplifier | SKET | HAP_01G03G-75W | 202104180 | 2022/03/11 |

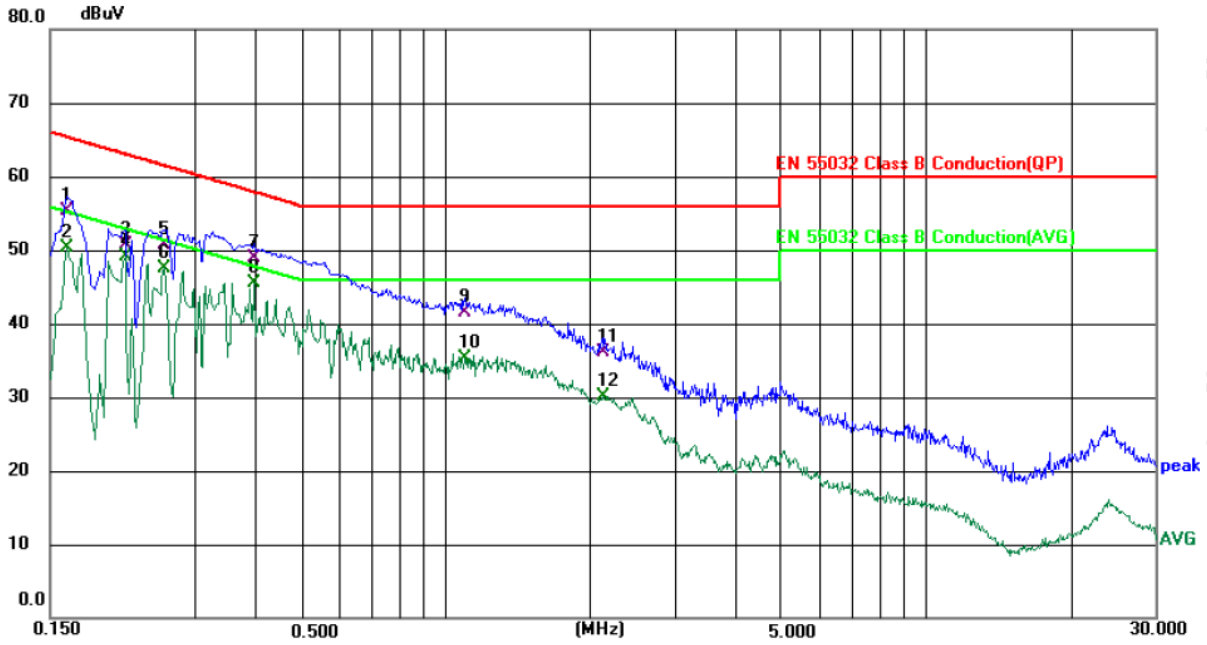
| | | | | |
|---|---|---|---|---|
| Amplifier | SKET | HAP_03G06G-80W | 202004044 | 2022/03/11 |
| Field Probe | Narda | EP-601 | 611WX80256 | 2022/03/07 |
| USB Power Sensor | Agilent | U2001A | MY53410013 | 2022/3/11 |
| USB Power Sensor | Agilent | U2001A | MZ54330012 | 2022/3/11 |
| **Electrical fast transient/burst immunity (EFT/B)** | | | | |
| Fast Transient Burst Simulator | Prima | EFT61004BG | PR12074375 | 2021/09/11 |
| Capacitive Coupling folder | Prima | EFT-CLAMP | N/A | 2021/09/11 |
| **Surge immunity** | | | | |
| Lightning Surge Generator | Prima | SUG61005BG | PR12125534 | 2021/09/11 |
| **Immunity to conducted disturbances, induced by radio-frequency fields (CS)** | | | | |
| Conducted Immunity Test System | Schloder | CDG-6000-75 | 126B1290/2014 | 2021/09/11 |
| CDN | Schloder | CDN M2+M3-16 | A2210281/2014 | 2021/09/11 |
| EM-Clamp | Schloder | EMCL-20 | 132A1194/2014 | 2021/09/11 |
| RF Attenuator | PE | 75W 6dB | N/A | 2021/07/27 |
| **Power frequency magnetic field immunity (PFMF)** | | | | |
| Power Frequency Magnetic Field Generator | EVERFINE | EMS61000-8K | G121941CS1341114 | 2021/09/02 |
| Adjsutable Magnetic Field Coil | EVERFINE | MFC-4 | G1242BBS1341114 | 2021/09/02 |
| **Voltage dips, short interruptions and voltage variations immunity (DIPS)** | | | | |
| Cycle Sag Simulator | Prima | DRP61011AG | PR12106201 | 2021/09/11 |

# 5. Test Conditions and Results (Emission)

## 5.1. Disturbance voltage at mains terminals

| | | | |
|---|---|---|---|
| **Test requirement.....:** | EN 55032:2015+A1:2020+A11:2020 | | |
| **Test frequency range.....:** | 150 kHz to 30 MHz | | |
| **Limits.....:** | **Limits – Class A** | | |
| | **Frequency (MHz)** | **dBµV Quasi-peak** | **dBµV Average** |
| | 0.15 to 0.5 | 79 | 66 |
| | 0.5 to 30 | 73 | 60 |
| | **Limits – Class B** | | |
| | **Frequency (MHz)** | **dBµV Quasi-peak** | **dBµV Average** |
| | 0.15 to 0.5 | 66 to 56 | 56 to 46 |
| | 0.5 to 5 | 56 | 46 |
| | 5 to 30 | 60 | 50 |
| **Test method.....:** | The AMN placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN. | | |
| **Ambient temperature.....:** | 27.4 °C | | |
| **Relative humidity.....:** | 48 % | | |
| **Test location.....:** | TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China | | |
| **Test model(s) .....:** | DUK-4P | | |
| **EUT operation mode.....:** | Mode 2 | | |
| **Test date .....:** | Jun. 30, 2021 | | |
| **Test results .....:** | Pass | | |
| **Remark.....:** | / | | |

**Measurement data and Graphical presentation of the result**



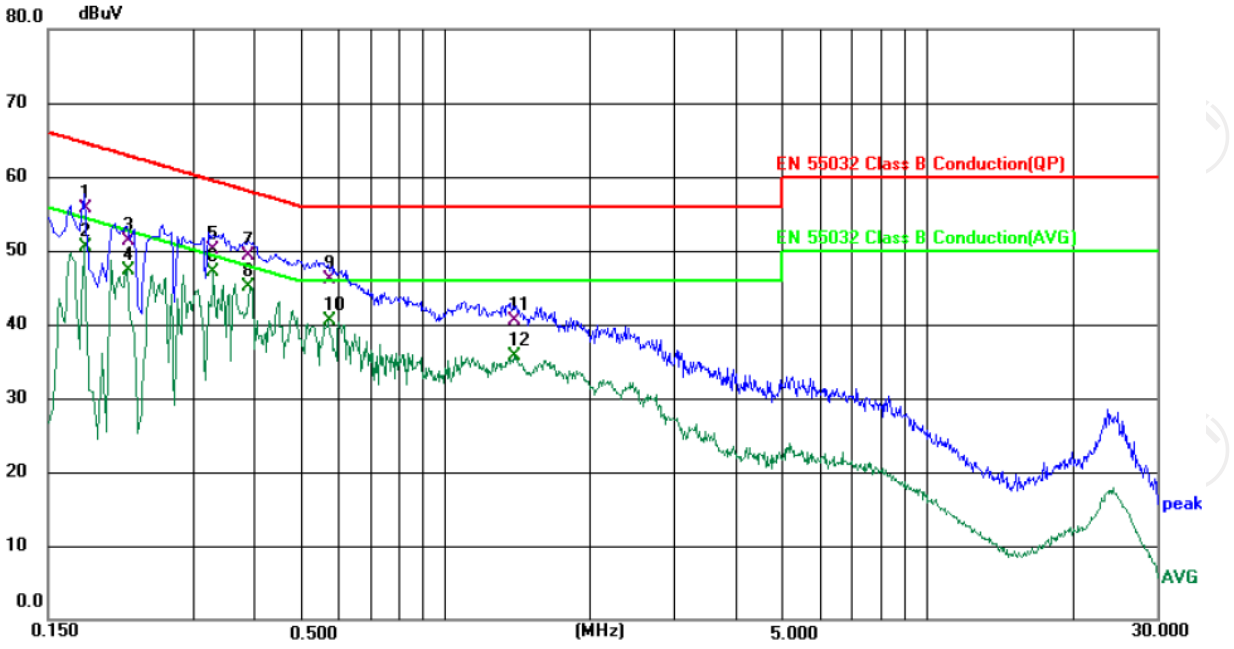

Site 844 Shielding Room Phase: *L1* Temperature: 27.4 (℃) Humidity: 48 %

Limit: EN 55032 Class B Conduction(QP) Power: AC 230 V/50 Hz

Mode: USB Total Output（5V/6A）

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1620 | 45.65 | 9.60 | 55.25 | 65.36 | -10.11 | QP | |
| 2 | | 0.1620 | 40.71 | 9.60 | 50.31 | 55.36 | -5.05 | AVG | |
| 3 | | 0.2140 | 41.27 | 9.39 | 50.66 | 63.05 | -12.39 | QP | |
| 4 | | 0.2140 | 39.66 | 9.39 | 49.05 | 53.05 | -4.00 | AVG | |
| 5 | | 0.2580 | 41.33 | 9.37 | 50.70 | 61.50 | -10.80 | QP | |
| 6 | | 0.2580 | 38.23 | 9.37 | 47.60 | 51.50 | -3.90 | AVG | |
| 7 | | 0.3980 | 39.63 | 9.27 | 48.90 | 57.90 | -9.00 | QP | |
| 8 | * | 0.3980 | 36.16 | 9.27 | 45.43 | 47.90 | -2.47 | AVG | |
| 9 | | 1.0940 | 32.05 | 9.41 | 41.46 | 56.00 | -14.54 | QP | |
| 10 | | 1.0940 | 25.96 | 9.41 | 35.37 | 46.00 | -10.63 | AVG | |
| 11 | | 2.1220 | 26.54 | 9.51 | 36.05 | 56.00 | -19.95 | QP | |
| 12 | | 2.1220 | 20.50 | 9.51 | 30.01 | 46.00 | -15.99 | AVG | |




Site 844 Shielding Room Phase: *N* Temperature: 27.4 (℃) Humidity: 48 %

Limit: EN 55032 Class B Conduction(QP) Power: AC 230 V/50 Hz

Mode: USB Total Output（5V/6A）

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1780 | 46.28 | 9.37 | 55.65 | 64.58 | -8.93 | QP | |
| 2 | | 0.1780 | 41.12 | 9.37 | 50.49 | 54.58 | -4.09 | AVG | |
| 3 | | 0.2180 | 42.00 | 9.33 | 51.33 | 62.89 | -11.56 | QP | |
| 4 | | 0.2180 | 37.93 | 9.33 | 47.26 | 52.89 | -5.63 | AVG | |
| 5 | | 0.3300 | 40.81 | 9.36 | 50.17 | 59.45 | -9.28 | QP | |
| 6 | * | 0.3300 | 37.76 | 9.36 | 47.12 | 49.45 | -2.33 | AVG | |
| 7 | | 0.3899 | 39.98 | 9.30 | 49.28 | 58.07 | -8.79 | QP | |
| 8 | | 0.3899 | 35.71 | 9.30 | 45.01 | 48.07 | -3.06 | AVG | |
| 9 | | 0.5740 | 36.91 | 9.27 | 46.18 | 56.00 | -9.82 | QP | |
| 10 | | 0.5740 | 31.14 | 9.27 | 40.41 | 46.00 | -5.59 | AVG | |
| 11 | | 1.3820 | 31.14 | 9.42 | 40.56 | 56.00 | -15.44 | QP | |
| 12 | | 1.3820 | 26.21 | 9.42 | 35.63 | 46.00 | -10.37 | AVG | |

## 5.2.Disturbance voltage at telecommunication terminals

| | | | | | |
|---|---|---|---|---|---|
| **Test requirement.....:** | EN 55032:2015+A1:2020+A11:2020 | | | | |
| **Test frequency range.....:** | 150 kHz to 30 MHz | | | | |
| **Limits.....:** | **Limits – Class A** | | | | |
| | **Frequency** | **Voltage Limits** | | **Current Limits** | |
| | **MHz** | **dBµV Quasi-peak** | **dBµV Average** | **dBµV Quasi-peak** | **dBµV Average** |
| | 0.15 to 0.5 | 97 to 87 | 84 to 74 | 53 to 43 | 40 to 30 |
| | 0.5 to 30 | 87 | 74 | 43 | 30 |
| | **Limits – Class B** | | | | |
| | **Frequency** | **Voltage Limits** | | **Current Limits** | |
| | **MHz** | **dBµV Quasi-peak** | **dBµV Average** | **dBµV Quasi-peak** | **dBµV Average** |
| | 0.15 to 0.5 | 84 to 74 | 74 to 64 | 40 to 30 | 30 to 20 |
| | 0.5 to 30 | 74 | 64 | 30 | 20 |
| **Test method.....:** | The AMN placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN. | | | | |
| **Ambient temperature.....:** | / | | | | |
| **Relative humidity.....:** | / | | | | |
| **Test location.....:** | / | | | | |
| **Test model(s) .....:** | / | | | | |
| **EUT operation mode.....:** | / | | | | |
| **Test date .....:** | / | | | | |
| **Test results .....:** | N/A | | | | |
| **Remark.....:** | This test isn’t applicable because the EUT doesn’t have relative function. Therefore this test is not applicable for this EUT. | | | | |

## 5.3.Disturbance voltage at antenna terminals

<table>
<tr><td>Test requirement ..... :</td><td colspan="6">EN 55032:2015+A1:2020+A11:2020</td></tr>
<tr><td>Test frequency range... :</td><td colspan="6">30 MHz to 2150 MHz</td></tr>
<tr><td rowspan="12">Limits..... :</td><td rowspan="2">Table clause</td><td rowspan="2">Frequency range (MHz)</td><td rowspan="2">Detector type/ bandwidth</td><td colspan="3">Class B limits dBµV 75 Ω</td></tr>
<tr><td>Other</td><td>Local Oscillator Fundamental</td><td>Local Oscillator Harmonics</td></tr>
<tr><td rowspan="2">a</td><td>30 to 950</td><td rowspan="10">For frequencies ≥1 GHz QP/120 kHz<br><br>For frequencies ≥1 GHz Peak/1 MHz</td><td>46</td><td>46</td><td>46</td></tr>
<tr><td>950 to 2150</td><td>46</td><td>54</td><td>54</td></tr>
<tr><td>b</td><td>950 to 2150</td><td>46</td><td>54</td><td>54</td></tr>
<tr><td rowspan="2">c</td><td>30 to 300</td><td rowspan="2">46</td><td rowspan="2">54</td><td>50</td></tr>
<tr><td>300 to 1000</td><td>52</td></tr>
<tr><td rowspan="2">d</td><td>30 to 300</td><td rowspan="2">46</td><td rowspan="2">66</td><td>59</td></tr>
<tr><td>300 to 1000</td><td>52</td></tr>
<tr><td rowspan="2">e</td><td>30 to 950</td><td rowspan="2">46</td><td>76</td><td>46</td></tr>
<tr><td>950 to 2150</td><td>n/a</td><td>54</td></tr>
<tr><td colspan="6">a Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.<br>b Tuner units (not the LNB) for satellite signal reception.<br>c Frequency modulation audio receivers and PC tuner cards.<br>d Frequency modulation car radios.<br>e Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports. Limits specified for the LO are for the RF modulator carrier signal and harmonics.</td></tr>
<tr><td>Test method..... :</td><td colspan="6">The measurement was performed in accordance with the requirement set in clause 5.4.<br>The antenna terminal of the sample and the signal generator were connected to the EMI receiver by means of coaxial cables and a resistive combining network having a minimum attenuation of 6dB.<br>The following results were those measured accordingly.</td></tr>
<tr><td>Ambient temperature... :</td><td colspan="6">/</td></tr>
<tr><td>Relative humidity ..... :</td><td colspan="6">/</td></tr>
<tr><td>Test location ..... :</td><td colspan="6">/</td></tr>
<tr><td>Test model(s) ..... :</td><td colspan="6">/</td></tr>
<tr><td>EUT operation mode.... :</td><td colspan="6">/</td></tr>
<tr><td>Test date ..... :</td><td colspan="6">/</td></tr>
<tr><td>Test results ..... :</td><td colspan="6">/</td></tr>
<tr><td>Remark..... :</td><td colspan="6">This test isn’t applicable because the EUT doesn’t have relative function.</td></tr>
</table>

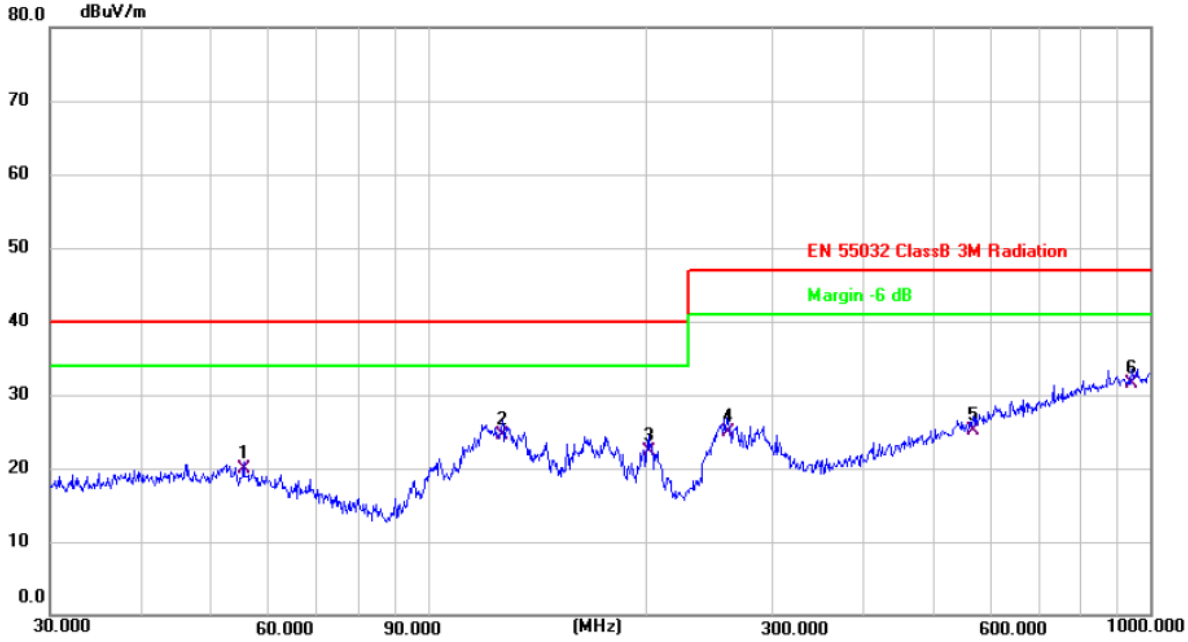
## 5.4.Conducted disturbance between 1 GHz to 18 GHz

| | | |
|---|---|---|
| **Test requirement.....:** | EN 55032:2015+A1:2020+A11:2020 | |
| **Test frequency range.....:** | 1 GHz to 18 GHz | |
| **Limits.....:** | **Frequency (GHz)** | **Power limits (dBpW)** |
| | | **Average** |
| | 1 to 18 | 63 |
| **Test method.....:** | In the case of a detachable feed horn, the radiated emission of the LO leakage within 7° of the main beam axis can be measured directly by a power measurement at the feed horn interface. If a suitable interface (typically types R120, C120) is available, a power meter or spectrum analyzer can be connected to the LNB via a suitable adapter. Due allowance shall be made for the feed losses between the available interface and the antenna flange. | |
| **Ambient temperature.....:** | / | |
| **Relative humidity.....:** | / | |
| **Test location.....:** | / | |
| **Test model(s) .....:** | / | |
| **EUT operation mode.....:** | / | |
| **Test date .....:** | / | |
| **Test results .....:** | / | |
| **Remark.....:** | This test isn't applicable because the EUT doesn't have relative function. | |

## 5.5.Radiated emission

<table>
<tr><td>Test requirement.....:</td><td colspan="3">EN 55032:2015+A1:2020+A11:2020</td></tr>
<tr><td>Test frequency range..:</td><td colspan="3">30 MHz to 6 GHz</td></tr>
<tr><td rowspan="15">Limits.....:</td><td colspan="3">Limits – Class A (OATS or SAC)</td></tr>
<tr><td rowspan="2">Frequency (MHz)</td><td>10 m measurement distance</td><td>3 m measurement distance</td></tr>
<tr><td colspan="2">dBµV/m</td></tr>
<tr><td>30 to 230</td><td>40 Quasi-peak</td><td>50 Quasi-peak</td></tr>
<tr><td>230 to 1000</td><td>47 Quasi-peak</td><td>57 Quasi-peak</td></tr>
<tr><td colspan="3">Limits – Class B (OATS or SAC)</td></tr>
<tr><td rowspan="2">Frequency (MHz)</td><td>3 m measurement distance</td><td>10 m measurement distance</td></tr>
<tr><td colspan="2">dBµV/m</td></tr>
<tr><td>30 to 230</td><td>30 Quasi-peak</td><td>40 Quasi-peak</td></tr>
<tr><td>230 to 1000</td><td>37 Quasi-peak</td><td>47 Quasi-peak</td></tr>
<tr><td colspan="3">Limits – Class A (FSOATS)</td></tr>
<tr><td rowspan="2">Frequency (MHz)</td><td>Peak</td><td>Average</td></tr>
<tr><td colspan="2">dBµV/m</td></tr>
<tr><td>1000 to 6000</td><td>80</td><td>60</td></tr>
<tr><td colspan="3">Limits – Class B (FSOATS)</td></tr>
<tr><td rowspan="2">Frequency (MHz)</td><td>Peak</td><td>Average</td></tr>
<tr><td colspan="2">dBµV/m</td></tr>
<tr><td>1000 to 6000</td><td>74</td><td>54</td></tr>
<tr><td>Test method.....:</td><td colspan="3">Measurements were made in a 3/10-meter semi-anechoic chamber that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3/10 meters with the receive antenna located at 1 to 4-meter height in both horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.</td></tr>
<tr><td>Ambient temperature..:</td><td colspan="3">25.1 °C</td></tr>
<tr><td>Relative humidity.....:</td><td colspan="3">46 %</td></tr>
<tr><td>Test location.....:</td><td colspan="3">TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao’an District Shenzhen, Guangdong, 518103, People’s Republic of China</td></tr>
<tr><td>Test model(s) .....:</td><td colspan="3">DUK-4P</td></tr>
<tr><td>EUT operation mode..:</td><td colspan="3">Mode 1</td></tr>
<tr><td>Test date .....:</td><td colspan="3">Jul. 02, 2021</td></tr>
<tr><td>Test results .....:</td><td colspan="3">Pass</td></tr>
<tr><td>Remark.....:</td><td colspan="3">The EUT highest internal frequency less 108 MHz, So don't need to test above 1 GHz.</td></tr>
</table>

**Measurement data and Graphical presentation of the result**

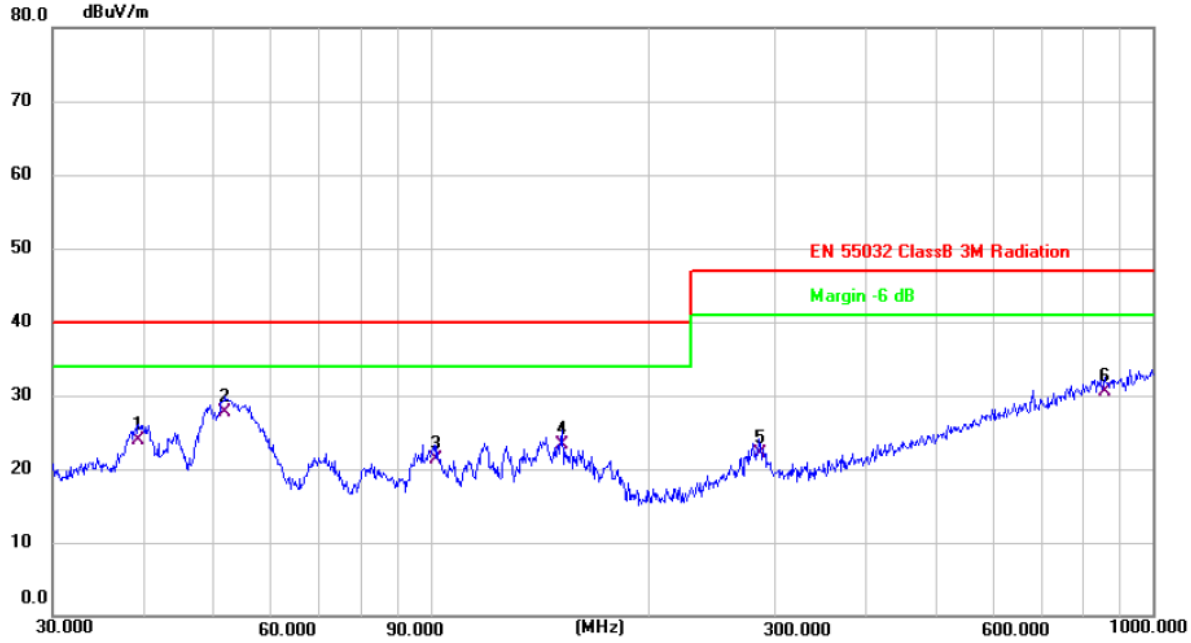



Site
Limit: EN 55032 ClassB 3M Radiation

Polarization: *Horizontal*
Power: AC 230 V/50 Hz

Temperature: 25.1(C)
Humidity: 46 %

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 55.6093 | 6.83 | 13.07 | 19.90 | 40.00 | -20.10 | QP | P | |
| 2 * | 126.7723 | 12.02 | 12.48 | 24.50 | 40.00 | -15.50 | QP | P | |
| 3 | 202.1004 | 11.67 | 10.73 | 22.40 | 40.00 | -17.60 | QP | P | |
| 4 | 259.2338 | 12.05 | 12.85 | 24.90 | 47.00 | -22.10 | QP | P | |
| 5 | 568.6126 | 4.45 | 20.65 | 25.10 | 47.00 | -21.90 | QP | P | |
| 6 | 942.1304 | 5.37 | 26.13 | 31.50 | 47.00 | -15.50 | QP | P | |




Site
Limit: EN 55032 ClassB 3M Radiation

Polarization: *Vertical*
Power: AC 230 V/50 Hz

Temperature: 25.1(C)
Humidity: 46 %

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 39.4371 | 10.07 | 13.93 | 24.00 | 40.00 | -16.00 | QP | P | |
| 2 * | 52.0251 | 14.29 | 13.51 | 27.80 | 40.00 | -12.20 | QP | P | |
| 3 | 101.2885 | 10.79 | 10.51 | 21.30 | 40.00 | -18.70 | QP | P | |
| 4 | 152.1297 | 9.70 | 13.60 | 23.30 | 40.00 | -16.70 | QP | P | |
| 5 | 284.9767 | 8.51 | 13.69 | 22.20 | 47.00 | -24.80 | QP | P | |
| 6 | 857.0246 | 5.45 | 25.05 | 30.50 | 47.00 | -16.50 | QP | P | |

## 5.6. OUTDOOR UNITS – Limits of radiated disturbance between 1 GHz to 18 GHz

<table>
<tr><td>Test requirement.....:</td><td colspan="2">EN 55032:2015+A1:2020+A11:2020</td></tr>
<tr><td>Test frequency range..:</td><td colspan="2">1 GHz to 18 GHz</td></tr>
<tr><td rowspan="6">Limits.....:</td><td colspan="2">Limits – LO leakage and spurious radiated emissions from the EUT, in the region outside +/- 7° of the main beam axis.</td></tr>
<tr><td rowspan="2">Frequency (GHz)</td><td>Class B limits (dBµV/m)</td></tr>
<tr><td>Average</td></tr>
<tr><td>1 to 2.5</td><td>50</td></tr>
<tr><td>2.5 to 18</td><td>64</td></tr>
<tr><td colspan="2">Limits – LO leakage from the EUT, in the region within +/- 7° of the main beam axis.</td></tr>
<tr><td rowspan="2">Frequency (GHz)</td><td>Class B limits (dBµV/m)</td></tr>
<tr><td>Average</td></tr>
<tr><td>1 to 18</td><td>70</td></tr>
<tr><td>Test method.....:</td><td colspan="2">Measurements were made in a 3-meter Open Area Test Site that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 meter above 1GHz. The EUT was rotated 360° with the receive antenna located in horizontal and vertical polarities. Final measurements (average detector above 1GHz) were then performed by rotating the EUT 360°. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.</td></tr>
<tr><td>Ambient temperature..:</td><td colspan="2">/</td></tr>
<tr><td>Relative humidity.....:</td><td colspan="2">/</td></tr>
<tr><td>Test location.....:</td><td colspan="2">/</td></tr>
<tr><td>Test model(s) .....:</td><td colspan="2">/</td></tr>
<tr><td>EUT operation mode..:</td><td colspan="2">/</td></tr>
<tr><td>Test date .....:</td><td colspan="2">/</td></tr>
<tr><td>Test results .....:</td><td colspan="2">/</td></tr>
<tr><td>Remark.....:</td><td colspan="2">This test isn’t applicable because the EUT doesn’t have relative function.</td></tr>
</table>

## 5.7.Harmonic current emissions

<table>
<tr><td>Test requirement ..... :</td><td colspan="3">EN IEC 61000-3-2:2019</td></tr>
<tr><td rowspan="20">Limit classification in accordance with the standard ..... :</td><td colspan="3">Limits - Class A equipment</td></tr>
<tr><td colspan="3">Odd harmonics</td></tr>
<tr><td>Harmonic order (n)</td><td colspan="2">Maximum permissible harmonic current (A)</td></tr>
<tr><td>3</td><td colspan="2">2.30</td></tr>
<tr><td>5</td><td colspan="2">1.14</td></tr>
<tr><td>7</td><td colspan="2">0.77</td></tr>
<tr><td>9</td><td colspan="2">0.40</td></tr>
<tr><td>11</td><td colspan="2">0.33</td></tr>
<tr><td>13</td><td colspan="2">0.21</td></tr>
<tr><td>15 ≤ n ≤ 39</td><td colspan="2">0.15 x 15/n</td></tr>
<tr><td colspan="3">Even harmonics</td></tr>
<tr><td>2</td><td colspan="2">1.08</td></tr>
<tr><td>4</td><td colspan="2">0.43</td></tr>
<tr><td>6</td><td colspan="2">0.30</td></tr>
<tr><td>8 ≤ n ≤ 40</td><td colspan="2">0.23 x 8/n</td></tr>
<tr><td colspan="3">Limits – Class D equipment</td></tr>
<tr><td>Harmonic order (n)</td><td>Maximum permissible harmonic current per watt Ma/W</td><td>Maximum permissible harmonic current A</td></tr>
<tr><td>3</td><td>3.4</td><td>2.30</td></tr>
<tr><td>5</td><td>1.9</td><td>1.14</td></tr>
<tr><td>7</td><td>1.0</td><td>0.77</td></tr>
<tr><td>9</td><td>0.5</td><td>0.40</td></tr>
<tr><td>11</td><td>0.35</td><td>0.33</td></tr>
<tr><td>13 ≤ n ≤ 39</td><td>3.85/n</td><td>See Class A limits</td></tr>
<tr><td>Test method ..... :</td><td colspan="3">This test consists on the measurement of harmonics components of the input current which may be produced by equipment having an input current up to and including 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.</td></tr>
<tr><td>Ambient temperature ..... :</td><td colspan="3">/</td></tr>
<tr><td>Relative humidity ..... :</td><td colspan="3">/</td></tr>
<tr><td>Test location ..... :</td><td colspan="3">/</td></tr>
<tr><td>Test model(s) ..... :</td><td colspan="3">/</td></tr>
<tr><td>EUT operation mode ..... :</td><td colspan="3">/</td></tr>
<tr><td>Test date ..... :</td><td colspan="3">/</td></tr>
<tr><td>Test results ..... :</td><td colspan="3">N/A</td></tr>
<tr><td>Remark ..... :</td><td colspan="3">Refer to the product description of user, the rated power of the EUT is less than 75 W, according to the standard, “Equipment with a rated power of 75 W or less are not specified on this edition of the standard.” Therefore the requirements are fulfilled without further testing.</td></tr>
</table>

## 5.8. Voltage changes, voltage fluctuations and flicker

| | |
|---|---|
| **Test requirement ..... :** | EN 61000-3-3:2013+A1:2019 |
| **Applied limit ..... :** | The value of $P_{st}$ shall be not greater than 1.0<br>The value of $P_{lt}$ shall be not greater than 0.65<br>The value of d(t) during a voltage change shall not exceed 3.3 % for more than 500 ms<br>The relative steady-state voltage change, dc shall not exceed 3.3 %<br>The maximum relative voltage change $d_{max}$ shall not exceed:<br>a) 4 % without additional conditions<br>b) 6 % for equipment which is:<br>- switched manually, or<br>- switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption<br>c) 7 % for equipment which is<br>- attended whilst in use (for example : hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as mowers, portable tools such as electric drills), or<br>- switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption. |
| **Test method ..... :** | This test consists on the measurement of voltage changes, voltage fluctuations and flicker which may be produced by equipment having an input current ≤ 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation. |
| **Observation time ..... :** | 10 Minutes |
| | 120 Minutes |
| | 24 times switching according to Annex B |
| **Ambient temperature..... :** | 24.3 °C |
| **Relative humidity ..... :** | 55 % |
| **Test location ..... :** | TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China |
| **Test model(s) ..... :** | DUK-4P |
| **EUT operation mode..... :** | Mode 2 |
| **Test date ..... :** | Jul. 03, 2021 |
| **Test results ..... :** | Pass |
| **Remark..... :** | / |

**Measurement data of the result**

## Test Data of Voltage Fluctuation and Flicker

| | |
|---|---|
| Final Test Result | Pass |
| Nominal Voltage | 230 V |
| Nominal Frequency | 50 Hz |
| Plt Test Duration | 600 s |
| Flicker Margin | 100 % |
| d Measurement Margin | 100 % |

| Segment | Pst | dmax(%) | dc(%) | Tmax(ms) | Judge |
|---|---|---|---|---|---|
| Limit | 1.000 | 4.000 | 3.300 | 500 | |
| Seg. 1 | 0.022 | 0.070 | 0.061 | 0 | Pass |

| Plt | Value | Judge |
|---|---|---|
| Limit | 0.650 | |
| Measurement | 0.010 | Pass |


Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

# 6. Test Conditions and Results (Immunity)

## 6.1.General information

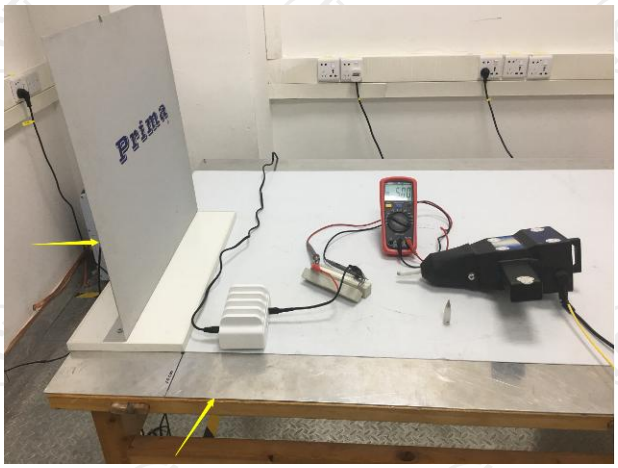
| Performance criteria as defined by the standard | |
|---|---|
| **Criterion** | **Description from standard** |
| **A** | The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the 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. |
| **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.<br>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.<br>The performance level may be replaced by a permissible loss of performance. |
| **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. |

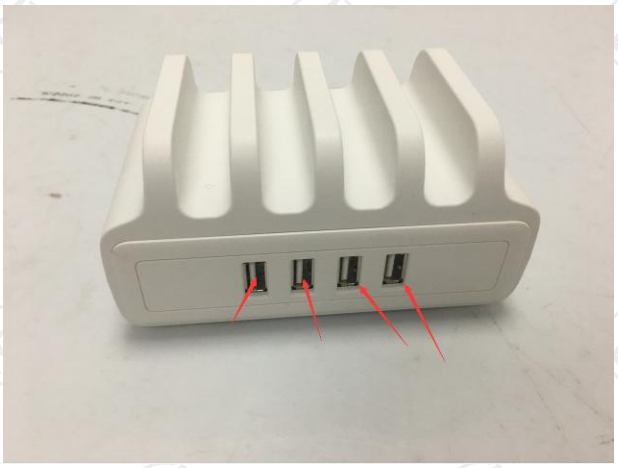
## 6.2.Electrostatic discharge immunity

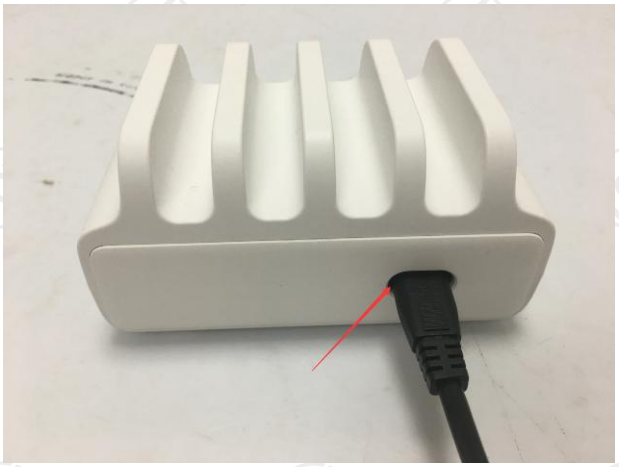
| | | |
|---|---|---|
| **Test requirement ..... :** | EN 55035:2017+A11:2020 | |
| **Basic standard ..... :** | EN 61000-4-2:2009 | |
| **Test level ..... :** | **Discharge type** | **Discharge voltage** |
| | Contact discharge voltage | ±4 kV |
| | Air discharge voltage | ±8 kV |
| **Storage capacitor ..... :** | 150 pF | |
| **Discharge resistor ..... :** | 330 Ω | |
| **Horizontal coupling plate ..... :** | 1.6 x 0.8 m | |
| **Vertical coupling plate ..... :** | 0.5 x 0.5 m | |
| **Number of discharges ..... :** | Min. 10 per discharge location | |
| **Discharge interval ..... :** | 1 second | |
| **Performance criteria ..... :** | B | |
| **Test method ..... :** | The table-top equipment under test is placed on a wooden table, 0.8 m high, standing on the ground reference plane. A horizontal coupling plane (HCP), 1.6 x 0.8 m, is placed on the table. The EUT and the cables are isolated from the coupling plane by an insulating support 0.5 mm thick. The floor standing equipment is isolated from the ground reference plane by an insulating support about 0.1 m thick. The vertical coupling plane (VCP) of dimensions 0.5 m x 0.5 m is placed parallel to, and positioned at a distance of 0.1 m from, the EUT. | |
| **Ambient temperature ..... :** | 23.4 °C | |
| **Relative humidity ..... :** | 52 % | |
| **Air pressure ..... :** | 100.6 kPa | |
| **Test location ..... :** | TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China | |
| **Test model(s) ..... :** | DUK-4P | |
| **EUT operation mode ..... :** | Mode 1, Mode 2 | |
| **Test date ..... :** | Jul. 06, 2021 | |
| **Test results ..... :** | Pass | |
| **Remark ..... :** | / | |

## 6.2.1. Test results for electrostatic discharges

**Photos of selected test points:**
**( Air Discharge)**
**( Contact Discharge)**





| Contact discharges | | | |
|---|---|---|---|
| Test point | Positive polarity | Negative polarity | Observations |
| | 4 kV | 4 kV | |
| VCP- Four Sides | Pass | Pass | ☒1 ☐2 ☐3 |
| HCP- Four Sides | Pass | Pass | ☒1 ☐2 ☐3 |

| Air discharges | | | |
|---|---|---|---|
| Test point | Positive polarity | Negative polarity | Observations |
| | 8 kV | 8 kV | |
| Points on non-conductive surface as indicated in the picture above | Pass | Pass | ☒1 ☐2 ☐3 |

### 6.2.2. Test results of observations description

| |
|---|
| / - Not performed or not required. |
| 1 –No obvious change of function was found after the test. |
| 2 –The function stopped during the test, but can be recoverable by itself operation after the test. |
| 3 –The function stopped during the test, but can be recoverable manually after the test. |

## 6.3.Radiated, radio-frequency, electromagnetic field immunity

| | | | |
|---|---|---|---|
| **Test requirement ..... :** | EN 55035:2017+A11:2020 | | |
| **Basic standard ..... :** | EN 61000-4-3:2006+A1:2008+A2:2010 | | |
| **Test level ..... :** | **Frequency (MHz)** | **Field strength** | **Modulation** |
| | 80 to1000 | 3 V/m (r.m.s.) (unmodulated) | 80% AM (1 kHz) |
| | 1800 | 3 V/m (r.m.s.) (unmodulated) | 80% AM (1 kHz) |
| | 2600 | 3 V/m (r.m.s.) (unmodulated) | 80% AM (1 kHz) |
| | 3500 | 3 V/m (r.m.s.) (unmodulated) | 80% AM (1 kHz) |
| | 5000 | 3 V/m (r.m.s.) (unmodulated) | 80% AM (1 kHz) |
| **Dwell time ..... :** | 2; 5 second | | |
| **Step size ..... :** | 1 % | | |
| **Distance antenna to EUT..... :** | 3 m | | |
| **Performance criteria..... :** | A | | |
| **Test method..... :** | Measurements were made in a fully anechoic chamber and the indicated field strength was pre-calibrated prior to placement of the system under test. Tests were performed in both the horizontal and vertical polarities, where applicable. The antenna was placed 3 meters from the product under test. All sides of the EUT were investigated for anomalies. | | |
| **Ambient temperature..... :** | 24.3 °C | | |
| **Relative humidity ..... :** | 54 % | | |
| **Air pressure..... :** | 100.6 kPa | | |
| **Test location ..... :** | TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China | | |
| **Test model(s) ..... :** | DUK-4P | | |
| **EUT operation mode..... :** | Mode 1, Mode 2 | | |
| **Test date ..... :** | Jul. 06, 2021 | | |
| **Test results ..... :** | Pass | | |
| **Remark..... :** | / | | |

### 6.3.1. Test results for radio-frequency electromagnetic field

| Frequency | EUT side | Antenna polarity | Field strength | Observation | Results |
|---|---|---|---|---|---|
| ☒ 80 MHz to 1 GHz<br>☒ 1.8 GHz<br>☒ 2.6 GHz<br>☒ 3.5 GHz<br>☒ 5 GHz | Front | Horizontal | 3 V/m | ☒1 ☐2 ☐3 | Pass |
| | Left Side | Horizontal | 3 V/m | ☒1 ☐2 ☐3 | Pass |
| | Right Side | Horizontal | 3 V/m | ☒1 ☐2 ☐3 | Pass |
| | Rear | Horizontal | 3 V/m | ☒1 ☐2 ☐3 | Pass |
| | Front | Vertical | 3 V/m | ☒1 ☐2 ☐3 | Pass |
| | Left Side | Vertical | 3 V/m | ☒1 ☐2 ☐3 | Pass |
| | Right Side | Vertical | 3 V/m | ☒1 ☐2 ☐3 | Pass |
| | Rear | Vertical | 3 V/m | ☒1 ☐2 ☐3 | Pass |

### 6.3.2. Test results of observations description

| |
|---|
| / - Not performed or not required. |
| 1 –No obvious change of function was found after the test. |
| 2 –The function stopped during the test, but can be recoverable by itself operation after the test. |
| 3 –The function stopped during the test, but can be recoverable manually after the test. |

## 6.4.Electrical fast transient/burst immunity

| | | |
|---|---|---|
| **Test requirement ..... :** | EN 55035:2017+A11:2020 | |
| **Basic standard ..... :** | EN 61000-4-4:2012 | |
| **Test level ..... :** | **Measurement port** | **Voltage** |
| | Input a.c. power ports | ±1 kV |
| | Input d.c. power ports | ±0.5 kV |
| | Analogue/digital data ports | ±0.5 kV |
| | xDSl | ±0.5 kV |
| **Burst duration ..... :** | 15 ms | |
| **Burst period ..... :** | 300 ms | |
| **Repetition frequency ..... :** | 5 kHz or 100 kHz | |
| **Test time ..... :** | 2 minutes per level & polarity | |
| **Performance criteria ..... :** | B | |
| **Test method ..... :** | Measurements were made on a ground plane that extends 0.5-meter minimum beyond all sides of the system under test. Mains power tests were conducted with the product connected to a Coupling/Decoupling Network (CDN). One of each unique interface was tested for a period of 2 minute per polarity. The bursts are applied on the mains supply port by using a coupling decoupling network and on signal and control lines ports by using a capacitive clamp. | |
| **Ambient temperature ..... :** | 24.3 °C | |
| **Relative humidity ..... :** | 55 % | |
| **Air pressure ..... :** | 100.6 kPa | |
| **Test location ..... :** | TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China | |
| **Test model(s) ..... :** | DUK-4P | |
| **EUT operation mode ..... :** | Mode 1, Mode 2 | |
| **Test date ..... :** | Jul. 06, 2021 | |
| **Test results ..... :** | Pass | |
| **Remark ..... :** | / | |

### 6.4.1. Test results for electrical fast transient/burst

| Measurement port | Level | Polarity | Observation | Results |
|---|---|---|---|---|
| AC power port | 1 kV | Positive & Negative | ☐1 ☒2 ☐3 | Pass |

### 6.4.2. Test results of observations description

| |
|---|
| / - Not performed or not required. |
| 1 –No obvious change of function was found after the test. |
| 2 –The function stopped during the test, but can be recoverable by itself operation after the test. |
| 3 –The function stopped during the test, but can be recoverable manually after the test. |

## 6.5.Surge immunity

| | | | |
|---|---|---|---|
| **Test requirement ..... :** | EN 55035:2017+A11:2020 | | |
| **Basic standard ..... :** | EN 61000-4-5:2014+A1:2017 | | |
| **Test level ..... :** | **Measurement port** | **Coupling point** | **Open-circuit peak voltage** |
| | Input a.c. power ports | Line to line | ±1 kV |
| | | Line to earth | ±2 kV |
| | Input d.c. power ports | Line to earth | ±0.5 kV |
| | Analogue/digital data ports (a), (b) | Line to earth | ±1 kV and ±4 kV<br>Apply when primary protection is intended |
| | Analogue/digital data ports (b) | Line to earth | ±1 kV<br>Apply when primary protection is not intended |
| | Analogue/digital data ports coaxial or shielded (c) | Line to earth | ±0.5 kV |
| | Supplementary information:<br>(a): Surges are applied with primary protection fitted. Where possible, use the actual primary protector intended to be used in the installation.<br>(b): Where the surge coupling network for the 10/700 (5/320) μ s waveform affects the functioning of high speed data ports, the test shall be carried out using a 1.2/50 (8/20) μ s waveform and appropriate coupling network.<br>(c) Surges are applicable to ports which satisfy all the following conditions:<br>-may connect directly to cables that leave the building structure,<br>-defined as an antenna port (3.1.3), a wired network port (3.1.34), or a broadcast receiver tuner port (3.1.8). | | |
| **Repetition rate ..... :** | 1/min | | |
| **Phase angles ..... :** | Positive pulses are applied 90° and negative pulses are applied 270° | | |
| **Number of pulses for each coupling ..... :** | 5 | | |
| **Performance criteria ..... :** | B | | |
| **Test method ..... :** | Mains power tests were conducted with the product connected to a Coupling/Decoupling Network (CDN). The test voltage was increased from the lowest indicated level up to the maximum level. Five positive polarity pulses at the 90º phase angle, five negative polarity pulses at the 270º phase angle. Each surge was applied 60 seconds after the previous surge. Signal and Telecommunications ports were subject to five (5) positive and five (negative) surges applied through the appropriate Coupling/Decoupling Network (CDN). | | |
| **Ambient temperature ..... :** | 24.3 °C | | |
| **Relative humidity ..... :** | 54 % | | |
| **Air pressure ..... :** | 100.6 kPa | | |
| **Test location ..... :** | TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China | | |
| **Test model(s) ..... :** | DUK-4P | | |

| | |
|---|---|
| **EUT operation mode..... :** | Mode 1, Mode 2 |
| **Test date ..... :** | Jul. 06, 2021 |
| **Test results ..... :** | Pass |
| **Remark..... :** | / |

### 6.5.1. Test results for surge

| Measurement port | | Level | Polarity | Observation | Results |
|---|---|---|---|---|---|
| AC power port | L-N | 1 kV | Positive | ☒1 ☐2 ☐3 | Pass |
| | | | Negative | ☒1 ☐2 ☐3 | Pass |

### 6.5.2. Test results of observations description

| |
|---|
| / - Not performed or not required. |
| 1 –No obvious change of function was found after the test. |
| 2 –The function stopped during the test, but can be recoverable by itself operation after the test. |
| 3 –The function stopped during the test, but can be recoverable manually after the test. |

## 6.6.Immunity to conducted disturbances, induced by radio-frequency fields

| | | |
|---|---|---|
| **Test requirement ..... :** | EN 55035:2017+A11:2020 | |
| **Basic standard ..... :** | EN 61000-4-6:2014 | |
| **Frequency range ..... :** | 150 kHz to 80 MHz | |
| **Test level ..... :** | **Measurement port** | **Frequency range / discrete frequencies** |
| | Input a.c. power ports | 0.15 MHz to 10 MHz; 3 V<br>10 MHz to 30 MHz; 3 V to 1 V<br>30 MHz to 80 MHz; 1 V |
| | Input d.c. power ports | |
| | Analogue/digital data ports | |
| | xDSl | |
| **Dwell time ..... :** | 1 second | |
| **Step size ..... :** | 1 % | |
| **Modulation ..... :** | 80% AM (1kHz) | |
| **Performance criteria ..... :** | A | |
| **Test method ..... :** | The test allows estimating of the conducted immunity of electrical and electronic equipment to electromagnetic disturbances coming from intended radio-frequency (RF) transmitters in the frequency range 150 kHz to 80 MHz. The interference is applied on mains supply, signal line and earth connection ports by using coupling decoupling networks or a clamp. | |
| **Ambient temperature ..... :** | 24.3 °C | |
| **Relative humidity ..... :** | 54 % | |
| **Air pressure ..... :** | 100.6 kPa | |
| **Test location ..... :** | TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China | |
| **Test model(s) ..... :** | DUK-4P | |
| **EUT operation mode ..... :** | Mode 1, Mode 2 | |
| **Test date ..... :** | Jul. 06, 2021 | |
| **Test results ..... :** | Pass | |
| **Remark ..... :** | / | |

### 6.6.1. Test results for Immunity to injected currents

| Measurement port | Frequency | Coupling type | Level | Observation | Results |
|---|---|---|---|---|---|
| AC power port | 0.15 MHz to 10 MHz | CDN | 3 V | ☒1 ☐2 ☐3 | Pass |
| | 10 MHz to 30 MHz | | 3 V to 1 V | ☒1 ☐2 ☐3 | Pass |
| | 30 MHz to 80 MHz | | 1 V | ☒1 ☐2 ☐3 | Pass |

### 6.6.2. Test results of observations description

| |
|---|
| / - Not performed or not required. |
| 1 –No obvious change of function was found after the test. |
| 2 –The function stopped during the test, but can be recoverable by itself operation after the test. |
| 3 –The function stopped during the test, but can be recoverable manually after the test. |

## 6.7.Broadband impulse noise disturbances for xDSl ports

<table>
<tr><td>Test requirement ..... :</td><td colspan="4">EN 55035:2017+A11:2020</td></tr>
<tr><td>Basic standard ..... :</td><td colspan="4">EN 61000-4-6:2014</td></tr>
<tr><td>Frequency range ..... :</td><td colspan="4">150 kHz to 80 MHz</td></tr>
<tr><td rowspan="8">Test level ..... :</td><td colspan="4">Broadband impulse noise disturbances, repetitive</td></tr>
<tr><td>Frequency (MHz)</td><td>(dBuV)</td><td>Burst duration</td><td>Burst period</td></tr>
<tr><td>0.150 – 5</td><td>107</td><td rowspan="3">0.7 ms</td><td rowspan="3">8.3 (for 60 Hz)<br>10 (for 50 Hz)</td></tr>
<tr><td>5 – 10</td><td>107 to 36</td></tr>
<tr><td>10 – 30</td><td>36 to 30</td></tr>
<tr><td colspan="4">Broadband impulse noise disturbances, isolated</td></tr>
<tr><td>Frequency (MHz)</td><td>(dBuV)</td><td>Burst duration</td><td>Burst period</td></tr>
<tr><td>0.150 – 30</td><td>107</td><td>0.24 ms<br>10 ms<br>300 ms</td><td>/</td></tr>
<tr><td>Performance criteria ..... :</td><td colspan="4">A(repetitive)<br>B(isolated)</td></tr>
<tr><td>Test set up description ..... :</td><td colspan="4">Measurements were made on a ground plane that extends 0.5-meter minimum beyond all sides of the system under test. The EUT was located 10cm above the reference ground plane and any associated I/O cables attached to the EUT were located between 30mm and 50mm above the ground plane. The indicated field was pre-calibrated prior to placement of the system under test.<br>For the repetitive impulse test the disturbance shall be applied for a period of at least 2 min for each port under test.<br>For the isolated impulse test a minimum of 5 isolated impulses shall be applied with an interval of at least 60 s between successive impulses.</td></tr>
<tr><td>Ambient temperature ..... :</td><td colspan="4">/</td></tr>
<tr><td>Relative humidity ..... :</td><td colspan="4">/</td></tr>
<tr><td>Air pressure ..... :</td><td colspan="4">/</td></tr>
<tr><td>Test location ..... :</td><td colspan="4">/</td></tr>
<tr><td>Test model(s) ..... :</td><td colspan="4">/</td></tr>
<tr><td>EUT operation mode ..... :</td><td colspan="4">/</td></tr>
<tr><td>Test date ..... :</td><td colspan="4">/</td></tr>
<tr><td>Test results ..... :</td><td colspan="4">/</td></tr>
<tr><td>Remark ..... :</td><td colspan="4">This test isn’t applicable because the EUT doesn’t have relative function.</td></tr>
</table>

## 6.8.Power frequency magnetic field immunity (PFMF)

| | | |
|---|---|---|
| **Test requirement ..... :** | EN 55035:2017+A11:2020 | |
| **Basic standard ..... :** | EN 61000-4-8:2010 | |
| **Test level ..... :** | **Frequency** | **A/m** |
| | 50/60 Hz | 1 |
| **Performance criteria ..... :** | A | |
| **Test method ..... :** | Measurements were made on a ground plane that extends 1-meter minimum beyond all sides of the system under test. The EUT was located 80cm above the reference ground plane and the indicated field was pre-calibrated prior to placement of the system under test. | |
| **Ambient temperature ..... :** | / | |
| **Relative humidity ..... :** | / | |
| **Air pressure ..... :** | / | |
| **Test location ..... :** | / | |
| **Test model(s) ..... :** | / | |
| **EUT operation mode ..... :** | / | |
| **Test date ..... :** | / | |
| **Test results ..... :** | N/A | |
| **Remark ..... :** | The EUT does not contain components susceptible to magnetic fields, therefore this test is not applicable for this EUT. | |

## 6.9. Voltage dips, short interruptions and voltage variations immunity

| | | | |
|---|---|---|---|
| **Test requirement ..... :** | EN 55035:2017+A11:2020 | | |
| **Basic standard ..... :** | EN IEC 61000-4-11:2020 | | |
| **Test level ..... :** | **Voltage Dips** | | |
| | **Frequency** | **Test level in % $U_T$** | **Duration** |
| | 50 Hz | 0 | 0.5 cycle |
| | 50 Hz | 70 | 25 cycles |
| | 60 Hz | 70 | 30 cycles |
| | **Voltage interruptions** | | |
| | **Frequency** | **Test level in % $U_T$** | **Duration** |
| | 50 Hz | 0 | 250 cycles |
| | 60 Hz | 0 | 300 cycles |
| | $U_T$ is the rated voltage of the equipment under test. | | |
| **Repetition rate ..... :** | 10 seconds | | |
| **Number of dips or interruptions ..... :** | 3 | | |
| **Performance criteria ..... :** | B & C | | |
| **Test method ..... :** | The test allows estimating of the conducted immunity of electrical and electronic equipment connected to low-voltage power supply networks for voltage dips and short interruptions. The interference is applied on mains supply port by using a testing generator. | | |
| **Ambient temperature ..... :** | 24.3 °C | | |
| **Relative humidity ..... :** | 54 % | | |
| **Air pressure ..... :** | 100.6 kPa | | |
| **Test location ..... :** | TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China | | |
| **Test model(s) ..... :** | DUK-4P | | |
| **EUT operation mode ..... :** | Mode 1, Mode 2 | | |
| **Test date ..... :** | Jul. 06, 2021 | | |
| **Test results ..... :** | Pass | | |
| **Remark ..... :** | / | | |

### 6.9.1. Test results for Voltage dips

| % of $U_T$ | Frequency | Duration in cycles | Sync Angle | Observation | Results |
|---|---|---|---|---|---|
| 0 | 50 Hz | 0.5 | 0° | ☒1 ☐2 ☐3 | Pass |
| 70 | 50 Hz | 25 | 0° | ☒1 ☐2 ☐3 | Pass |

### 6.9.2. Test results for Voltage interruptions

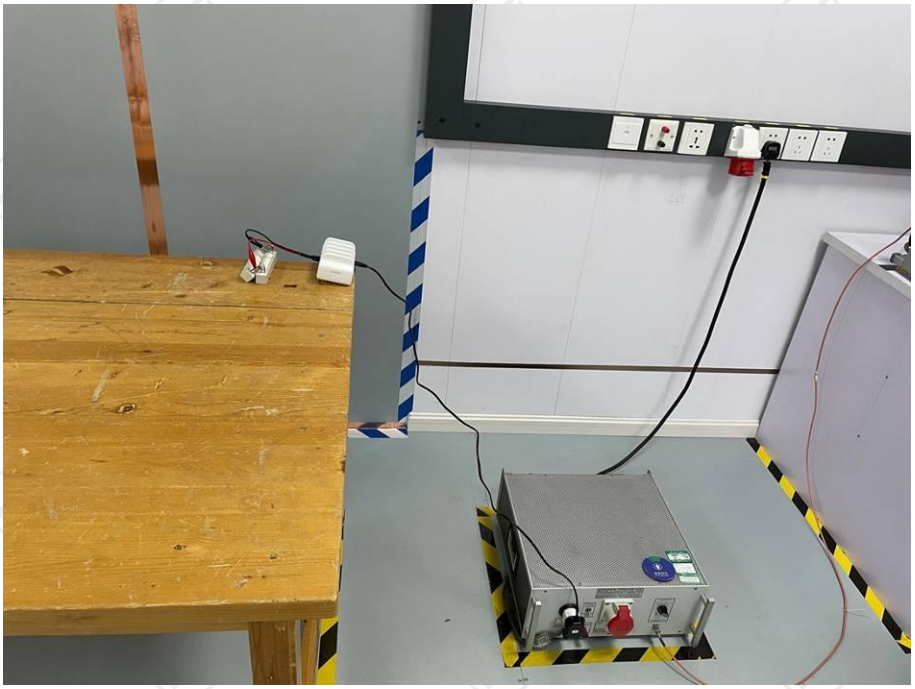
| % of $U_T$ | Frequency | Duration in cycles | Sync Angle | Observation | Results |
|---|---|---|---|---|---|
| 0 | 50 Hz | 250 | 0° | ☐1 ☒2 ☐3 | Pass |

### 6.9.3. Test results of observations description

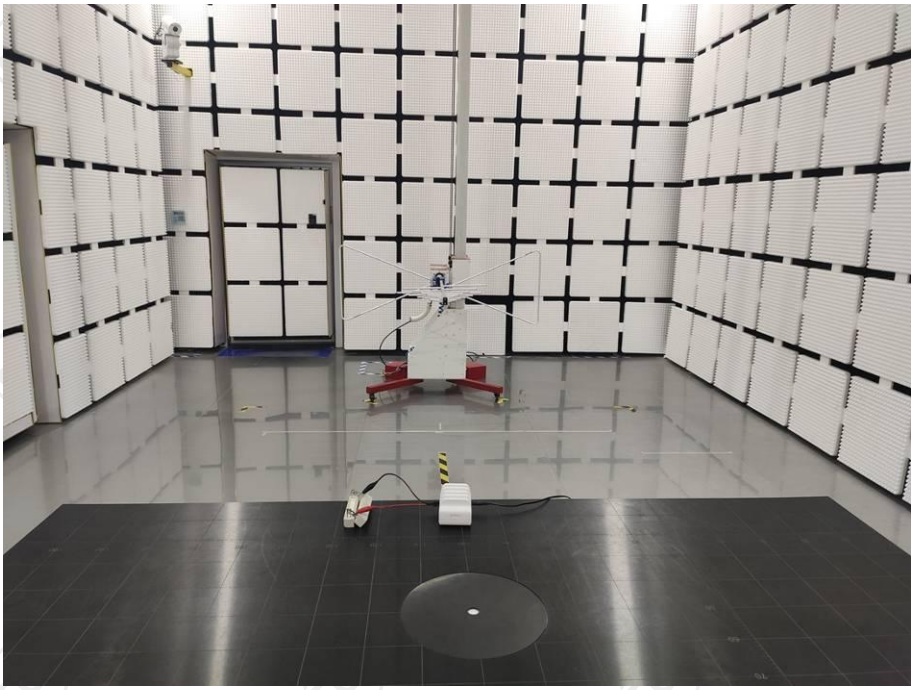
| |
|---|
| / - Not performed or not required. |
| 1 –No obvious change of function was found after the test. |
| 2 –The function stopped during the test, but can be recoverable by itself operation after the test. |
| 3 –The function stopped during the test, but can be recoverable manually after the test. |

# 7. Test set-up photo

**Disturbance voltage at mains terminals test view**

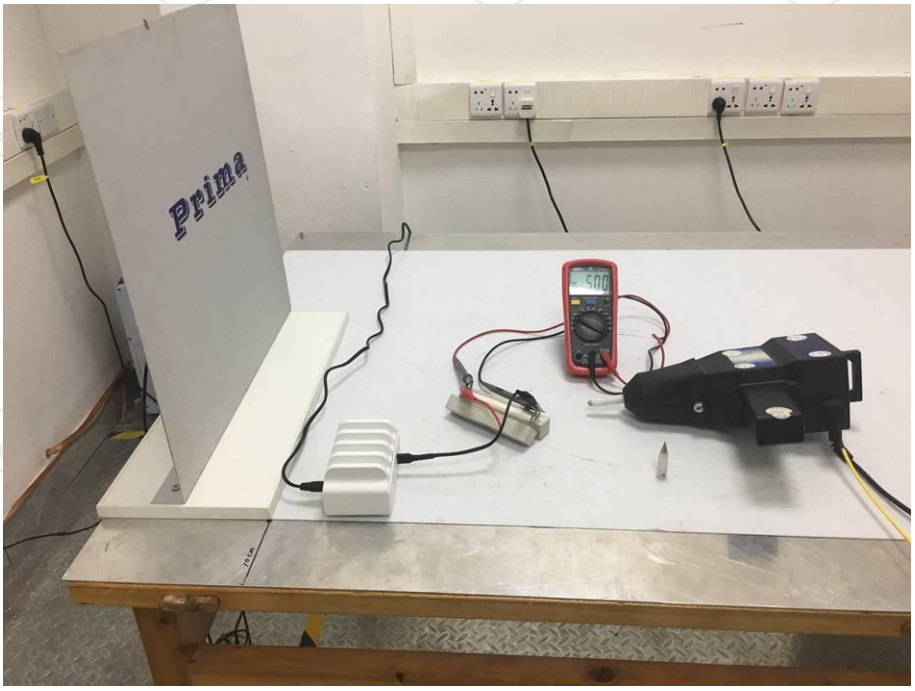


**Radiated emission (30 MHz-1 GHz) test view**

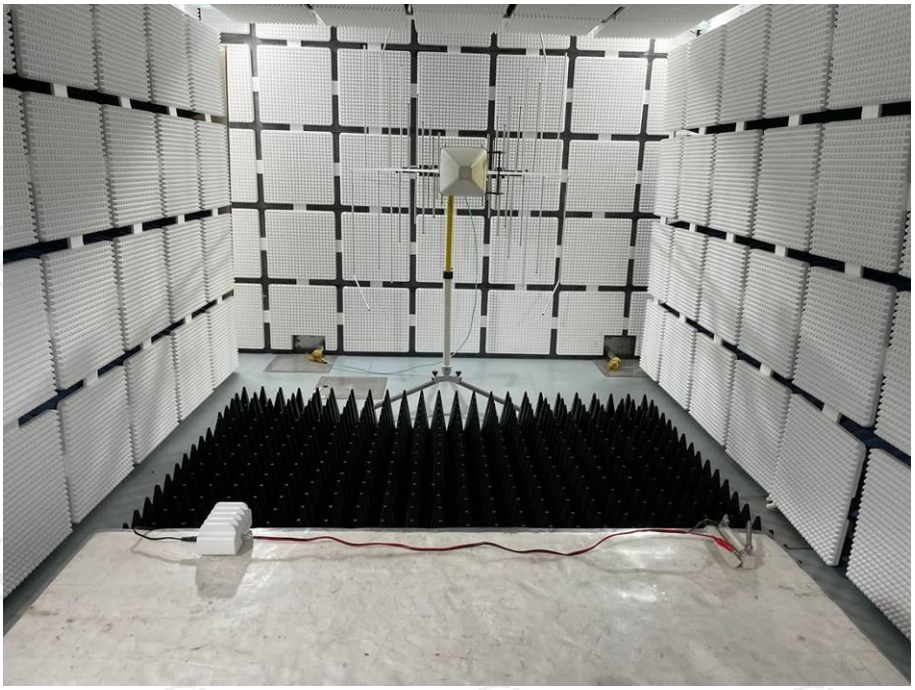


**Voltage changes, voltage fluctuations and flicker test view**

**Electrostatic discharge immunity (ESD) test view**

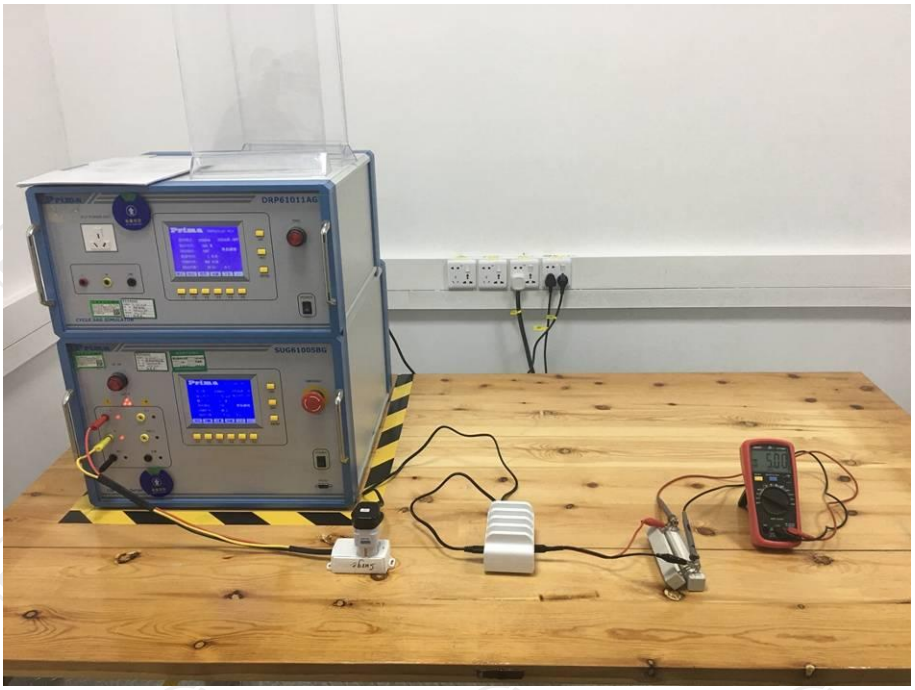


**Radiated, radio-frequency, electromagnetic field immunity (RS) test view**



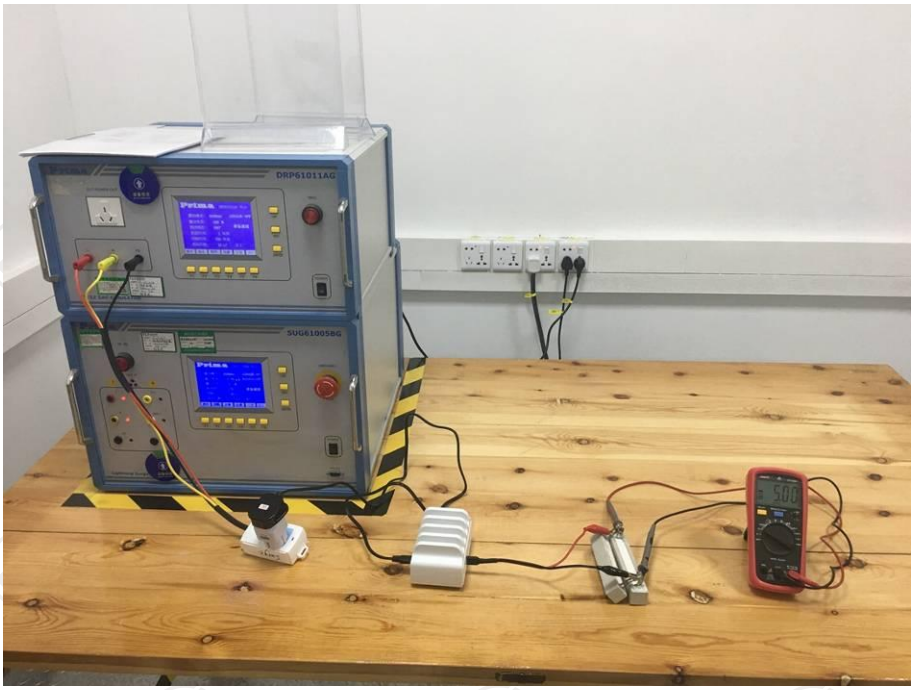
**Electrical fast transient/burst immunity (EFT/B) test view**

**Surge immunity test view**

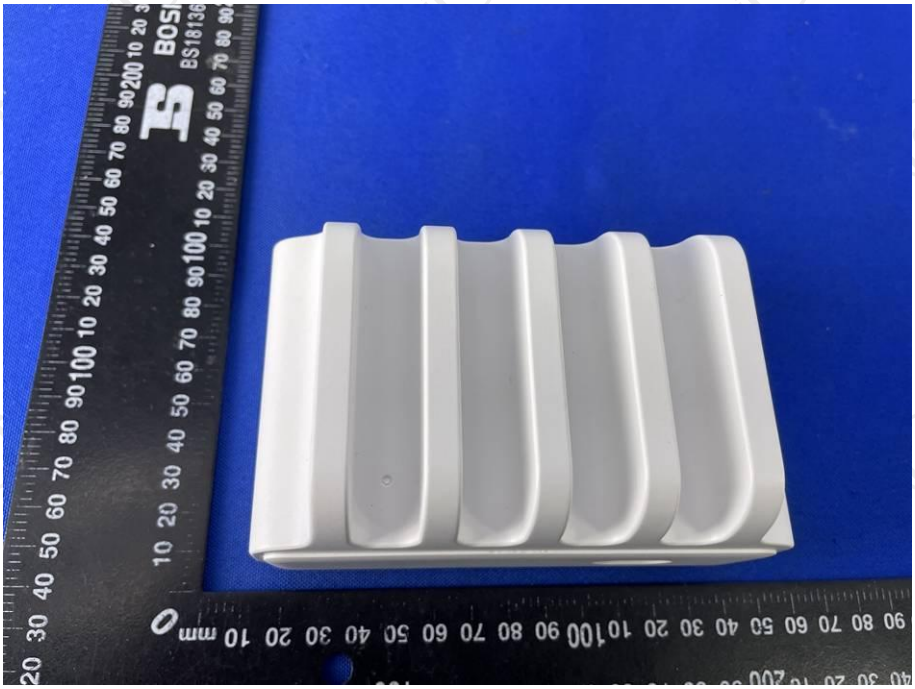


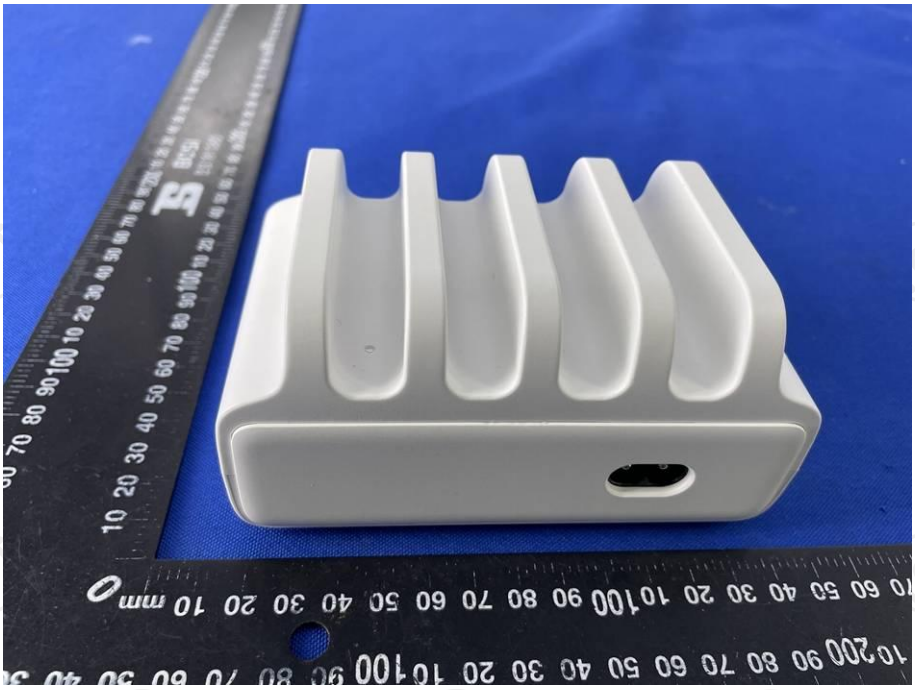
**Immunity to conducted disturbances, induced by radio-frequency fields (CS) test view**

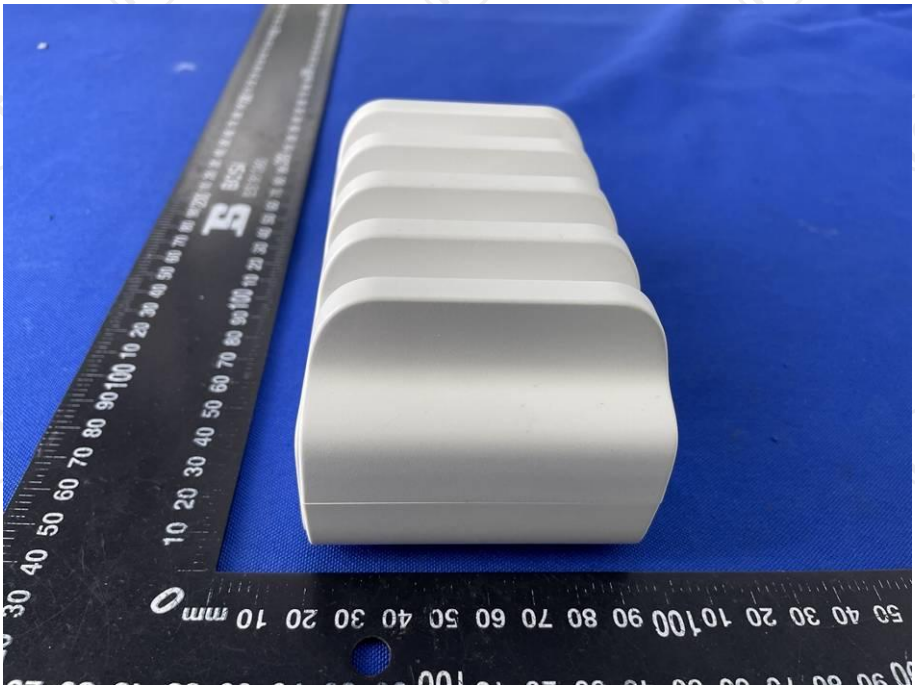
**Voltage dips, short interruptions and voltage variations immunity (DIPS) test view**

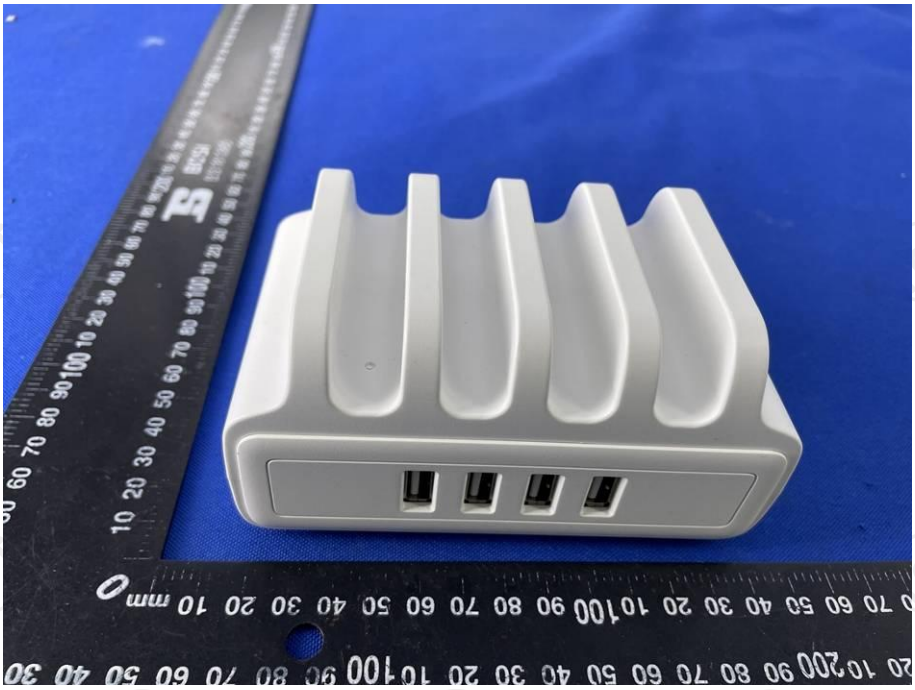


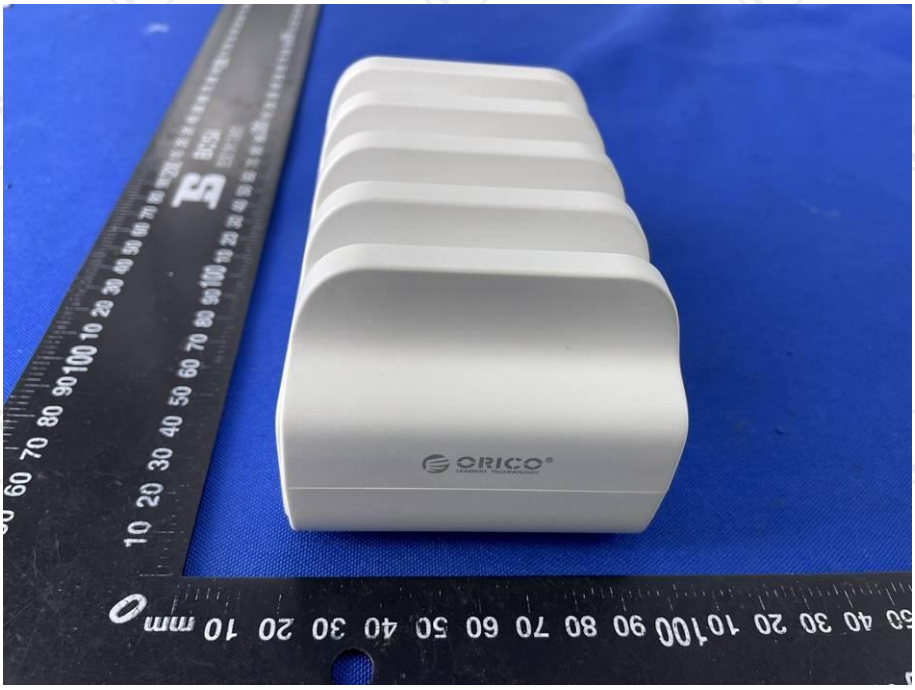
# 8. Photo of the EUT



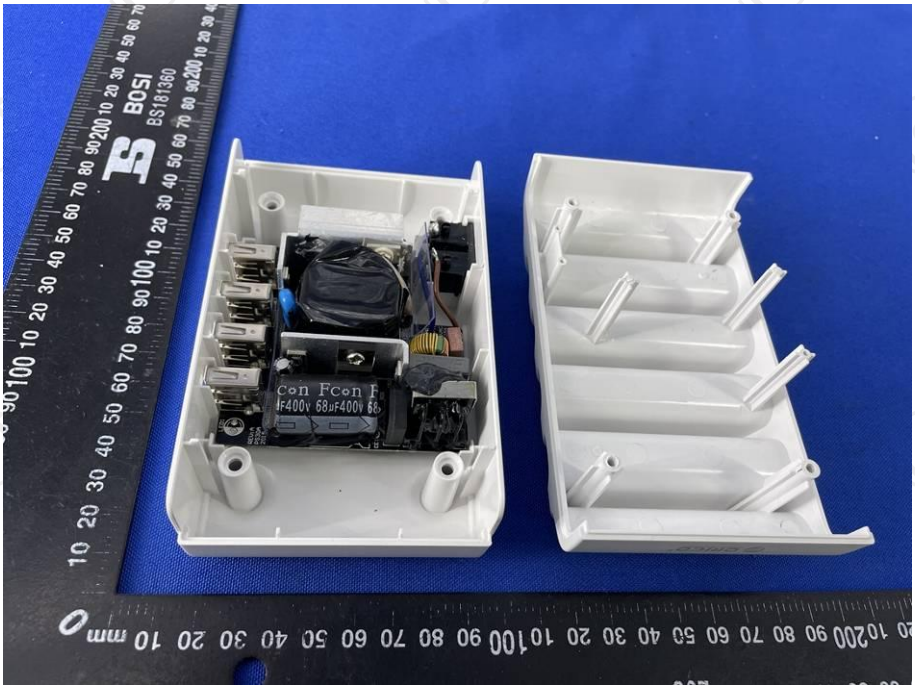


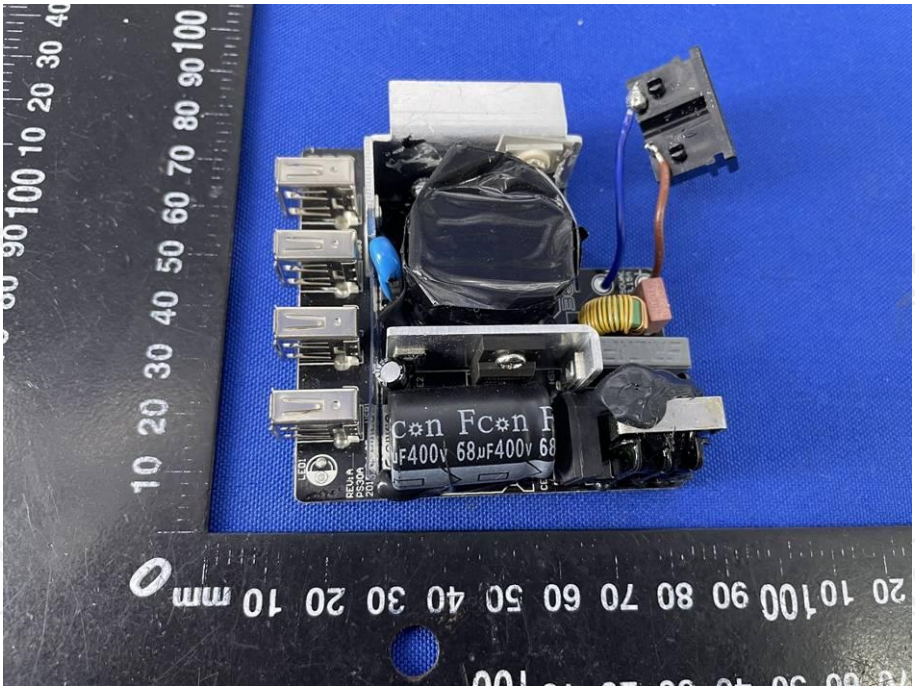


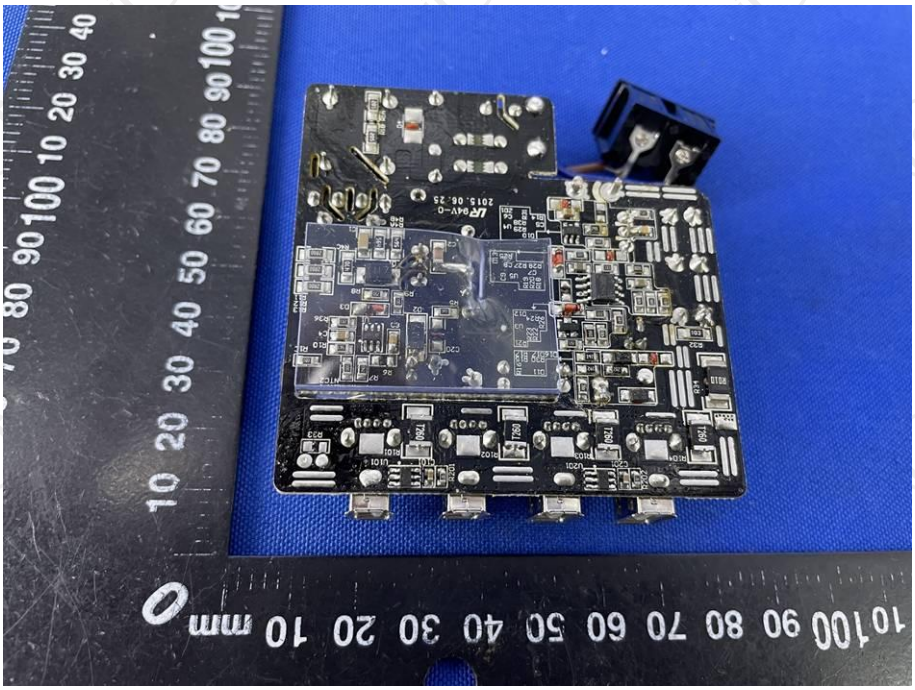



ORICO


Charger/充电器
Model/型号:DUK-4P
Input/输入:AC 100-240V 50/60Hz 0.8A Max
Output/输出:单口智能识别5.0V⎓2.4A
Total/总输出:5.0V⎓6.0A 30.0W Max
制造商:深圳市元创时代科技有限公司
ORICO Technologies Co.,Ltd
MADE IN CHINA


BOSI
BS181360





********End of report********