

Test Report

EN 60950-1

Information technology equipment – Safety – Part 1: General requirements

Report Number. : CstarUI28C01L

Date of issue : 2020-09-28

Total number of pages : 36

Testing Laboratory..... : Shenzhen C-Star Test Co., Ltd.

Address : 2F Building A3 Guigudongli Qinghu , Longhua District, Shenzhen

Applicant's name : Shenzhen Elegoo Technology Co.,Ltd

Address : 101, No.30, Dahe Industrial Zone, Guancheng Community, Guanhu
Street, Longhua District, Shenzhen

Test specification:

Standard..... : EN60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013

Test procedure : CE-LVD

Non-standard test method : N/A

Test item description : UV Photocuring 3D Printer

Trade Mark : ELEGOO

Manufacturer : Shenzhen Elegoo Technology Co.,Ltd

Address : 101, No.30, Dahe Industrial Zone, Guancheng Community, Guanhu
Street, Longhua District, Shenzhen

Model/Type reference : MARS 2 PRO

Ratings : DC adaptor, Input:100-240V~, 50/60Hz, 2A Output: DC12V, 4A
UV Photocuring 3D Printer: DC12V, 4A

Testing procedure and testing location:	
Testing Laboratory:	Shenzhen C-Star Test Co., Ltd.
Testing location/ address	: 2F Building A3 Guigudongli • Qinghu , Longhua District, Shenzhen
☐ Associated Testing Laboratory:	
Testing location/ address	:
Tested by (name + signature)	: Jesse Fu
Approved by (name + signature)	: Jason Zhang
	
☐ Testing procedure: TMP/CTF Stage 1:	
Testing location/ address	:
Tested by (name + signature)	:
Approved by (name + signature)	:
☐ Testing procedure: WMT/CTF Stage 2:	
Testing location/ address	:
Tested by (name + signature)	:
Witnessed by (name + signature)	:
Approved by (name + signature)	:
☐ Testing procedure: SMT/CTF Stage 3 or 4:	
Testing location/ address	:
Tested by (name + signature)	:
Witnessed by (name + signature)	:
Approved by (name + signature)	:
Supervised by (name + signature)	:

List of Attachments:

Appendix 1: 4 pages of Photo Documentation

Summary of testing:

Tests performed (name of test and test clause):

All clauses.

Testing location:

Shenzhen C-Star Test Co., Ltd.

Copy of marking plate

The artwork below may be only a draft.

 ELEGOO

WWW.ELEGOO.COM

Model No: MARS 2 Pro

Machine size:200*200*410mm

Input rating:110/220V AC 50/60Hz

Net weight:6.2kg



FC

CE



RoHS

Test item particulars

Equipment mobility..... :

Connection to the mains..... : detachable power supply cord

Operating condition..... : continuous

Access location : operator accessible

Over voltage category (OVC) : OVC II

Mains supply tolerance (%) or absolute mains supply values : N/A

Tested for IT power systems : No

IT testing, phase-phase voltage (V) : N.A.

Class of equipment : Class II

Considered current rating (A) : N.A.

Pollution degree (PD) : PD 2

Altitude during operation (m) : <2000m

Altitude of test laboratory (m) : <500m

Mass of equipment (kg/g) :

Possible test case verdicts:

- test case does not apply to the test object..... : N (N/A)

- test object does meet the requirement..... : P (Pass)

- test object does not meet the requirement..... : F (Fail)

Testing

Date of receipt of test item..... : Sept. 18, 2020

Date(s) of performance of tests..... : Sept. 18, 2020 – Sept. 28, 2020

General remarks:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Name and address of factory (ies) : Same as applicant

General product information:

1. The product is Class III and powered by an approved adapter.

EN 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

1	GENERAL		P
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1.5	Components		P
1.5.1	General		P
	Comply with EN 60950-1 or relevant component standard	(see appended table 1.5.1)	P
1.5.2	Evaluation and testing of components	Components which are certified to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions presented in the equipment.	P
1.5.3	Thermal controls	No such component.	N
1.5.4	Transformers	No such component.	P
1.5.5	Interconnecting cables		P
1.5.6	Capacitors bridging insulation	No such component.	N
1.5.7	Resistors bridging insulation	No such components.	N
1.5.7.1	Resistors bridging functional, basic or supplementary insulation		N
1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits		N
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		N
1.5.8	Components in equipment for IT power systems		N
1.5.9	Surge suppressors	No such components.	N
1.5.9.1	General		N
1.5.9.2	Protection of VDRs		N
1.5.9.3	Bridging of functional insulation by a VDR		N
1.5.9.4	Bridging of basic insulation by a VDR		N
1.5.9.5	Bridging of supplementary, double or reinforced insulation by a VDR		N

1.6	Power interface		P
1.6.1	AC power distribution systems	See appended table 1.6.2	P
1.6.2	Input current	See appended table 1.6.2	P
1.6.3	Voltage limit of hand-held equipment		N
1.6.4	Neutral conductor	No neutral conductor.	N

1.7	Marking and instructions		P
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Clause	Requirement + Test	Result - Remark	Verdict
1.7.1	Power rating	See copy of marking plate	P
	Rated voltage(s) or voltage range(s) (V)		N
	Symbol for nature of supply, for d.c. only.....		N
	Rated frequency or rated frequency range (Hz) ..		N
	Rated current (mA or A)		N
	Manufacturer's name or trademark or identification mark	See copy of marking plate	P
	Type/model or type reference	See copy of marking plate	--
	Symbol for Class II equipment only	Class III equipment	--
	Other marking and symbols	See copy of marking plate	--
1.7.2	Safety instructions and marking	See the user manual	P
1.7.2.1	General		P
1.7.2.2	Disconnect devices	No such devices	N
1.7.2.3	Overcurrent protective device	No such device	N
1.7.2.4	IT power distribution systems		N
1.7.2.5	Operator access with a tool		N
1.7.2.6	Ozone	No ozone emitted.	N
1.7.3	Short duty cycles	Equipment is designed for continuous operation.	N
1.7.4	Supply voltage adjustment	No such devices used.	N
	Methods and means of adjustment; reference to installation instructions		N
1.7.5	Power outlets on the equipment	No power outlets used.	N
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference)	No such component.	N
1.7.7	Wiring terminals		N
1.7.7.1	Protective earthing and bonding terminals	No such component.	N
1.7.7.2	Terminals for a.c. mains supply conductors	No such component.	N
1.7.7.3	Terminals for d.c. mains supply conductors	No such component.	N
1.7.8	Controls and indicators		P
1.7.8.1	Identification, location and marking		N
1.7.8.2	Colours :	The colours used for LED are indicating function. No safety consideration.	P
1.7.8.3	Symbols according to IEC 60417.....		N
1.7.8.4	Markings using figures		N
1.7.9	Isolation of multiple power sources		N
1.7.10	Thermostats and other regulating devices ..	No thermostats or other	N

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Clause	Requirement + Test	Result - Remark	Verdict
		regulating devices used inside battery pack are not adjustable during normal use.	
1.7.11	Durability	Rubbing the marking by hand for 15 s with piece of cloth soaked with water and, at a different place for on a second sample. For 15 s with a piece of cloth soaked with petroleum spirit .after this test, marking is legible and can not be easily possible to remove marking and show no curling .	P
1.7.12	Removable parts	No such parts.	N
1.7.13	Replaceable batteries	No such parts.	N
	Language(s)		---
1.7.14	Equipment for restricted access locations.....		N

2	PROTECTION FROM HAZARDS		P
2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas	No hazardous parts in operator access areas.	P
2.1.1.1	Access to energized parts	No energized parts.	N
	Test by inspection		N
	Test with test finger (Figure 2A)		N
	Test with test pin (Figure 2B)		N
	Test with test probe (Figure 2C)		N
2.1.1.2	Battery compartments	No battery compartments and not connect to TNV circuit.	N
2.1.1.3	Access to ELV wiring Working voltage (V_{peak} or V_{rms}); minimum distance through insulation (mm)		N ---
2.1.1.4	Access to hazardous voltage circuit wiring		N
2.1.1.5	Energy hazards	No energy hazard in operator access area.	P
2.1.1.6	Manual controls	No such part.	N
2.1.1.7	Discharge of capacitors in equipment	Class III equipment. Not intended to connect to mains supply directly.	N

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Clause	Requirement + Test	Result - Remark	Verdict
	Measured voltage (V); time-constant (s)..... :		—
2.1.1.8	Energy hazards – d.c. mains supply		N
	a) Capacitor connected to the d.c. mains supply ... :		N
	b) Internal battery connected to the d.c. mains supply :		N
2.1.1.9	Audio amplifiers :	No audio amplifier.	N
2.1.2	Protection in service access areas	No hazardous voltage or energy levels exist.	N
2.1.3	Protection in restricted access locations	Not intended to be used in RAL.	N

2.2	SELV circuits		P
2.2.1	General requirements	See below.	P
2.2.2	Voltages under normal conditions (V) :	Class III equipment, supplied by SELV and there is no hazardous voltage generated inside the EUT.	P
2.2.3	Voltages under fault conditions (V) :	Class III equipment, supplied by SELV and there is no hazardous voltage generated inside the EUT.	P
2.2.4	Connection of SELV circuits to other circuits :	SELV circuit is only connected to SELV circuit and limited current circuits.	P
2.3	TNV circuits		N
2.3.1	Limits	No TNV circuits.	N
	Type of TNV circuits..... :		N
2.3.2	Separation from other circuits and from accessible parts		N
2.3.2.1	General requirements		N
2.3.2.2	Protection by basic insulation		N
2.3.2.3	Protection by earthing		N
2.3.2.4	Protection by other constructions :		N
2.3.3	Separation from hazardous voltages		N
	Insulation employed..... :		N
2.3.4	Connection of TNV circuits to other circuits		N
	Insulation employed..... :		N
2.3.5	Test for operating voltages generated externally		N

2.4	Limited current circuits		N
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Clause	Requirement + Test	Result - Remark	Verdict
2.4.1	General requirements	No limited current circuits to be evaluated.	N
2.4.2	Limit values		N
	Frequency (Hz).....:		--
	Measured current (mA).....:		--
	Measured voltage (V).....:		--
	Measured circuit capacitance (nF or μ F).....:		--
2.4.3	Connection of limited current circuits to other circuits		N

2.5	Limited power sources		P
	a) Inherently limited output		N
	b) Impedance limited output		N
	c) Regulating network limited output under normal operating and single fault condition		P
	d) Overcurrent protective device limited output		N
	Max. output voltage (V), max. output current (A), max. apparent power (VA).....:		—
	Current rating of overcurrent protective device (A) ..:		N
	Use of integrated circuit (IC) current limiters		P

2.6	Provisions for earthing and bonding		N
2.6.1	Protective earthing	Class III equipment.	N
2.6.2	Functional earthing		N
2.6.3	Protective earthing and protective bonding conductors		N
2.6.3.1	General		N
2.6.3.2	Size of protective earthing conductors		N
	Rated current (A), cross-sectional area (mm^2), AWG.....:		N
2.6.3.3	Size of protective bonding conductors		N
	Rated current (A), cross-sectional area (mm^2), AWG.....:		N
	Protective current rating (A), cross-sectional area (mm^2), AWG.....:		N
2.6.3.4	Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min).....:		N
2.6.3.5	Colour of insulation.....:		N
2.6.4	Terminals		N

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Clause	Requirement + Test	Result - Remark	Verdict
2.6.4.1	General		N
2.6.4.2	Protective earthing and bonding terminals		N
	Rated current (A), type, nominal thread diameter (mm)..... : .		N
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N
2.6.5	Integrity of protective earthing		N
2.6.5.1	Interconnection of equipment		N
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		N
2.6.5.3	Disconnection of protective earth		N
2.6.5.4	Parts that can be removed by an operator		N
2.6.5.5	Parts removed during servicing		N
2.6.5.6	Corrosion resistance		N
2.6.5.7	Screws for protective bonding		N
2.6.5.8	Reliance on telecommunication network or cable distribution system		N

2.7	Overcurrent and earth fault protection in primary circuits		N
2.7.1	Basic requirements		N
	Instructions when protection relies on building installation		N
2.7.2	Faults not simulated in 5.3.7		N
2.7.3	Short-circuit backup protection		N
2.7.4	Number and location of protective devices :		N
2.7.5	Protection by several devices		N
2.7.6	Warning to service personnel..... :		N

2.8	Safety interlocks		N
2.8.1	General principles	No safety interlocks used.	N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
	Protection against extreme hazard		N
2.8.5	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches, relays and their related circuits		N
2.8.7.1	Separation distances for contact gaps and their		N

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Clause	Requirement + Test	Result - Remark	Verdict

	related circuits (mm)	:	
2.8.7.2	Overload test		N
2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test		N
2.8.8	Mechanical actuators		N

2.9	Electrical insulation		N
2.9.1	Properties of insulating materials		N
2.9.2	Humidity conditioning		N
	Relative humidity (%), temperature (°C)	--	N
2.9.3	Grade of insulation		N
2.9.4	Separation from hazardous voltages		N
	Method(s) used	--	--

2.10	Clearances, creepage distances and distances through insulation		N
2.10.1	General	See below.	N
2.10.1.1	Frequency	Class III equipment.	N
2.10.1.2	Pollution degrees	This report considered the pollution degree II.	N
2.10.1.3	Reduced values for functional insulation	The functional insulation comply with 5.3.4 c)	N
2.10.1.4	Intervening unconnected conductive parts		N
2.10.1.5	Insulation with varying dimensions		N
2.10.1.6	Special separation requirements		N
2.10.1.7	Insulation in circuits generating starting pulses		N
2.10.2	Determination of working voltage		N
2.10.2.1	General		N
2.10.2.2	RMS working voltage		N
2.10.2.3	Peak working voltage		N
2.10.3	Clearances		N
2.10.3.1	General		N
2.10.3.2	Mains transient voltages		N
	a) AC mains supply	:	N
	b) Earthed d.c. mains supplies	:	N
	c) Unearthed d.c. mains supplies	:	N
	d) Battery operation	:	N
2.10.3.3	Clearances in primary circuits		N
2.10.3.4	Clearances in secondary circuits		N

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Clause	Requirement + Test	Result - Remark	Verdict
2.10.3.5	Clearances in circuits having starting pulses		N
2.10.3.6	Transients from a.c. mains supply		N
2.10.3.7	Transients from d.c. mains supply		N
2.10.3.8	Transients from telecommunication networks and cable distribution systems		N
2.10.3.9	Measurement of transient voltage levels	See below.	N
	a) Transients from a mains supply		N
	For an a.c. mains supply		N
	For a d.c. mains supply		N
	b) Transients from a telecommunication network :		N
2.10.4	Creepage distances		N
2.10.4.1	General		N
2.10.4.2	Material group and comparative tracking index		N
	CTI tests.....		—
2.10.4.3	Minimum creepage distances		N
2.10.5	Solid insulation		N
2.10.5.1	General		N
2.10.5.2	Distances through insulation		N
2.10.5.3	Insulating compound as solid insulation		N
2.10.5.4	Semiconductor devices		N
2.10.5.5	Cemented joints		N
2.10.5.6	Thin sheet material – General		N
2.10.5.7	Separable thin sheet material		N
	Number of layers (pcs).....		—
2.10.5.8	Non-separable thin sheet material		N
2.10.5.9	Thin sheet material – standard test procedure		N
	Electric strength test		—
2.10.5.10	Thin sheet material – alternative test procedure		N
	Electric strength test		—
2.10.5.11	Insulation in wound components		N
2.10.5.12	Wire in wound components		N
	Working voltage		N
	a) Basic insulation not under stress		N
	b) Basic, supplementary, reinforced insulation		N
	c) Compliance with Annex U		N
	Two wires in contact inside wound component; angle between 45° and 90°		N

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Clause	Requirement + Test	Result - Remark	Verdict
2.10.5.13	Wire with solvent-based enamel in wound components		N
	Electric strength test	--	—
	Routine test		N
2.10.5.14	Additional insulation in wound components		N
	Working voltage		N
	- Basic insulation not under stress		N
	- Supplementary, reinforced insulation		N
2.10.6	Construction of printed boards		N
2.10.6.1	Uncoated printed boards		N
2.10.6.2	Coated printed boards		N
2.10.6.3	Insulation between conductors on the same inner surface of a printed board		N
2.10.6.4	Insulation between conductors on different layers of a printed board		N
	Distance through insulation		N
	Number of insulation layers (pcs).....		N
2.10.7	Component external terminations		N
2.10.8	Tests on coated printed boards and coated components		N
2.10.8.1	Sample preparation and preliminary inspection		N
2.10.8.2	Thermal conditioning		N
2.10.8.3	Electric strength test		N
2.10.8.4	Abrasion resistance test		N
2.10.9	Thermal cycling		N
2.10.10	Test for Pollution Degree 1 environment and insulating compound		N
2.10.11	Tests for semiconductor devices and cemented joints		N
2.10.12	Enclosed and sealed parts		N

3	WIRING, CONNECTIONS AND SUPPLY		P
3.1	General		P
3.1.1	Current rating and overcurrent protection	Adequate cross sectional areas on internal wiring.	P
3.1.2	Protection against mechanical damage	Wires do not touch sharp edges that could damage the insulation and cause hazard.	P

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Clause	Requirement + Test	Result - Remark	Verdict
3.1.3	Securing of internal wiring	Internal wiring is reliable secured	P
3.1.4	Insulation of conductors	The insulation of the individual conductors is suitable for the application and the working voltage.	P
3.1.5	Beads and ceramic insulators	No such component.	N
3.1.6	Screws for electrical contact pressure	No electrical screw connections.	N
3.1.7	Insulating materials in electrical connections	Class III equipment.	N
3.1.8	Self-tapping and spaced thread screws	Thread-cutting or space thread screws are not used for electrical connections.	N
3.1.9	Termination of conductors	Class III equipment.	N
	10 N pull test		N
3.1.10	Sleeving on wiring	No safety relevant sleeve external to power supply unit.	N

3.2	Connection to a mains supply		N
3.2.1	Means of connection	Not connect to the mains directly.	N
3.2.1.1	Connection to an a.c. mains supply		N
3.2.1.2	Connection to a d.c. mains supply		N
3.2.2	Multiple supply connections		N
3.2.3	Permanently connected equipment		N
	Number of conductors, diameter of cable and conduits (mm)		—
3.2.4	Appliance inlets		N
3.2.5	Power supply cords		N
3.2.5.1	AC power supply cords		N
	Type		—
	Rated current (A), cross-sectional area (mm ²), AWG		—
3.2.5.2	DC power supply cords		N
3.2.6	Cord anchorages and strain relief		N
	Mass of equipment (kg), pull (N)		—
	Longitudinal displacement (mm)		—
3.2.7	Protection against mechanical damage		N
3.2.8	Cord guards		N

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Clause	Requirement + Test	Result - Remark	Verdict

	Diameter or minor dimension D (mm); test mass (g)		—
	Radius of curvature of cord (mm)..... :		—
3.2.9	Supply wiring space		N

3.3	Wiring terminals for connection of external conductors		N
3.3.1	Wiring terminals	Class III equipment. The EUT is supplied by USB port and internal battery.	N
3.3.2	Connection of non-detachable power supply cords		N
3.3.3	Screw terminals		N
3.3.4	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross-sectional area (mm ²)..... :		—
3.3.5	Wiring terminal sizes		N
	Rated current (A), type, nominal thread diameter (mm)		—
3.3.6	Wiring terminal design		N
3.3.7	Grouping of wiring terminals		N
3.3.8	Stranded wire		N

3.4	Disconnection from the mains supply		N
3.4.1	General requirement	Not connected to the mains directly.	N
3.4.2	Disconnect devices		N
3.4.3	Permanently connected equipment		N
3.4.4	Parts which remain energized		N
3.4.5	Switches in flexible cords		N
3.4.6	Number of poles - single-phase and d.c. equipment		N
3.4.7	Number of poles - three-phase equipment		N
3.4.8	Switches as disconnect devices		N
3.4.9	Plugs as disconnect devices		N
3.4.10	Interconnected equipment		N
3.4.11	Multiple power sources		N

3.5	Interconnection of equipment		P
3.5.1	General requirements		P
3.5.2	Types of interconnection circuits	SELV circuit only.	P
3.5.3	ELV circuits as interconnection circuits	No ELV interconnection.	N

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Clause	Requirement + Test	Result - Remark	Verdict

3.5.4	Data ports for additional equipment		N
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4	PHYSICAL REQUIREMENTS		P
4.1	Stability		N
	Angle of 10°	Mass of the equipment < 7 kg.	N
	Test force (N)	Not floor-standing equipment.	N

4.2	Mechanical strength		P
4.2.1	General		P
	Rack-mounted equipment	Not rack-mounted equipment used.	N
4.2.2	Steady force test, 10 N	No hazard.	P
4.2.3	Steady force test, 30 N	Class III equipment, no hazardous part inside.	N
4.2.4	Steady force test, 250 N	250N applied to outer enclosure. No energy or other hazards.	P
4.2.5	Impact test		N
	Fall test		N
	Swing test		N
4.2.6	Drop test; height (mm)	1m; No damage of the enclosure, no energy hazards or damage to enclosure integration after the test.	P
4.2.7	Stress relief test	Metal enclosure	N
4.2.8	Cathode ray tubes	No cathode ray tube.	N
	Picture tube separately certified		N
4.2.9	High pressure lamps	No high pressure lamp.	N
4.2.10	Wall or ceiling mounted equipment; force (N)	Not intended to be mounted on a wall or ceiling.	N
4.2.11	Rotating solid media		N
	Test to cover on the door.....		N

4.3	Design and construction		P
4.3.1	Edges and corners	All edges and corners are rounded and smoothed.	P
4.3.2	Handles and manual controls; force (N).....		N
4.3.3	Adjustable controls	No adjustable control.	N
4.3.4	Securing of parts		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.5	Connection by plugs and sockets		N
4.3.6	Direct plug-in equipment	Not direct plug-in equipment.	N
	Torque		N
	Compliance with the relevant mains plug standard:		N
4.3.7	Heating elements in earthed equipment	No heating elements.	N
4.3.8	Batteries	See below.	P
	- Overcharging of a rechargeable battery	(see appended tables 4.3.8)	P
	- Unintentional charging of a non-rechargeable battery	Rechargeable battery.	N
	- Reverse charging of a rechargeable battery	Battery cannot be reverse charging due to connector and enclosure design.	P
	- Excessive discharging rate for any battery	(see appended tables 4.3.8)	P
4.3.9	Oil and grease	No oil and grease.	N
4.3.10	Dust, powders, liquids and gases	Not intend to product dust, or using powders, liquids and gases.	N
4.3.11	Containers for liquids or gases	No such containers used.	N
4.3.12	Flammable liquids	No flammable liquids.	N
	Quantity of liquid (l)		N
	Flash point (°C)		N
4.3.13	Radiation		N
4.3.13.1	General		N
4.3.13.2	Ionizing radiation	No ionizing radiation.	N
	Measured radiation (pA/kg)		—
	Measured high-voltage (kV)		—
	Measured focus voltage (kV)		—
	CRT markings		—
4.3.13.3	Effect of ultraviolet (UV) radiation on materials	No UV lamp used.	N
	Part, property, retention after test, flammability classification		N
4.3.13.4	Human exposure to ultraviolet (UV) radiation	No UV radiation.	N
4.3.13.5	Laser (including LEDs)		P
4.3.13.5.1	Lasers (including laser diodes)		N
	Laser class		—
4.3.13.5.2	Light emitting diodes (LEDs)	LEDs are indicating lights.	P
4.3.13.6	Other types		N

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Clause	Requirement + Test	Result - Remark	Verdict

4.4	Protection against hazardous moving parts		N
4.4.1	General	No hazardous moving parts.	N
4.4.2	Protection in operator access areas		N
	Household and home/office document/media shredders		N
4.4.3	Protection in restricted access locations		N
4.4.4	Protection in service access areas		N
4.4.5	Protection against moving fan blades		N
4.4.5.1	General		N
	Not considered to cause pain or injury. a).....:		N
	Is considered to cause pain, not injury. b)		N
	Considered to cause injury. c)		N
4.4.5.2	Protection for users		N
	Use of symbol or warning		N
4.4.5.3	Protection for service persons		N
	Use of symbol or warning		N

4.5	Thermal requirements		P
4.5.1	General		P
4.5.2	Temperature tests	(see appended table 4.5)	P
	Normal load condition per Annex L		—
4.5.3	Temperature limits for materials	(see appended table 4.5)	P
4.5.4	Touch temperature limits	(see appended table 4.5)	P
4.5.5	Resistance to abnormal heat		N

4.6	Openings in enclosures		N
4.6.1	Top and side openings	No openings.	N
	Dimensions (mm)		—
4.6.2	Bottoms of fire enclosures	No fire enclosure required.	N
	Construction of the bottom, dimensions (mm) ...		—
4.6.3	Doors or covers in fire enclosures	No doors and covers	N
4.6.4	Openings in transportable equipment	Not transportable equipment.	N
4.6.4.1	Constructional design measures		N
	Dimensions (mm)		—
4.6.4.2	Evaluation measures for larger openings		N
4.6.4.3	Use of metallized parts		N

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Clause	Requirement + Test	Result - Remark	Verdict

4.6.5	Adhesives for constructional purposes	No adhesives for constructional purpose.	N
	Conditioning temperature (°C), time (weeks)..... :		—

4.7	Resistance to fire		P
4.7.1	Reducing the risk of ignition and spread of flame	Use of plastic enclosure with the required flammability classes.	P
	Method 1, selection and application of components wiring and materials	Method 1 used	P
	Method 2, application of all of simulated fault condition tests		N
4.7.2	Conditions for a fire enclosure	Metal enclosure	N
4.7.2.1	Parts requiring a fire enclosure	Metal enclosure	N
4.7.2.2	Parts not requiring a fire enclosure		P
4.7.3	Materials		P
4.7.3.1	General		P
4.7.3.2	Materials for fire enclosures		N
4.7.3.3	Materials for components and other parts outside fire enclosures		N
4.7.3.4	Materials for components and other parts inside fire enclosures		P
4.7.3.5	Materials for air filter assemblies	No air filter assemblies	N
4.7.3.6	Materials used in high-voltage components	No high voltage components.	N

5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
5.1	Touch current and protective conductor current		N
5.1.1	General	Class III equipment, not connected to a.c. mains directly.	N
5.1.2	Configuration of equipment under test (EUT)		N
5.1.2.1	Single connection to an a.c. mains supply		N
5.1.2.2	Redundant multiple connections to an a.c. mains supply		N
5.1.2.3	Simultaneous multiple connections to an a.c. mains supply		N
5.1.3	Test circuit		N
5.1.4	Application of measuring instrument		N
5.1.5	Test procedure		N

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Clause	Requirement + Test	Result - Remark	Verdict
5.1.6	Test measurements		N
	Supply voltage (V)		N
	Measured touch current (mA)		N
	Max. allowed touch current (mA)		N
	Measured protective conductor current (mA)		N
	Max. allowed protective conductor current (mA)...		N
5.1.7	Equipment with touch current exceeding 3,5 mA		N
5.1.7.1	General		N
5.1.7.2	Simultaneous multiple connections to the supply		N
5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks	No TNV.	N
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system		N
	Supply voltage (V)		N
	Measured touch current (mA)		N
	Max. allowed touch current (mA)		N
5.1.8.2	Summation of touch currents from telecommunication networks		N
	a) EUT with earthed telecommunication ports		N
	b) EUT whose telecommunication ports have no reference to protective earth		N

5.2	Electric strength		N
5.2.1	General		N
5.2.2	Test procedure		N

5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors	No such component.	N
5.3.3	Transformers	No such component.	N
5.3.4	Functional insulation.....	See appended table 5.3. Complies with c)	P
5.3.5	Electromechanical components		N
5.3.6	Audio amplifiers in ITE		N
5.3.7	Simulation of faults	(see appended table 5.3)	P
5.3.8	Unattended equipment	No thermostats, temperature limiters or thermal cut-outs.	N

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Clause	Requirement + Test	Result - Remark	Verdict

5.3.9	Compliance criteria for abnormal operating and fault conditions	No fire or molten metal occurred and no deformation of enclosure during the tests.	P
5.3.9.1	During the tests	No fire or molten metal occurred and no deformation of enclosure during the tests.	P
5.3.9.2	After the tests	No fire, no danger.	P

6	CONNECTION TO TELECOMMUNICATION NETWORKS		N
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1	Protection from hazardous voltages		N
6.1.2	Separation of the telecommunication network from earth		N
6.1.2.1	Requirements		N
	Supply voltage (V)		—
	Current in the test circuit (mA)		—
6.1.2.2	Exclusions		N
6.2	Protection of equipment users from overvoltages on telecommunication networks		N
6.2.1	Separation requirements	No TNV circuit.	N
6.2.2	Electric strength test procedure		N
6.2.2.1	Impulse test		N
6.2.2.2	Steady-state test		N
6.2.2.3	Compliance criteria	Compliance	N

6.3	Protection of the telecommunication wiring system from overheating		N
	Max. output current (A)		—
	Current limiting method		—

7	CONNECTION TO CABLE DISTRIBUTION SYSTEMS		N
7.1	General	Not connected to cable distribution system.	N
7.2	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N
7.3	Protection of equipment users from overvoltages on the cable distribution system		N
7.4	Insulation between primary circuits and cable distribution systems		N

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Clause	Requirement + Test	Result - Remark	Verdict
7.4.1	General		N
7.4.2	Voltage surge test		N
7.4.3	Impulse test		N
A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE (UL Recognized material used)		N
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)		N
A.1.1	Samples..... :		—
	Wall thickness (mm)..... :		—
A.1.2	Conditioning of samples; temperature (°C) :		N
A.1.3	Mounting of samples :		N
A.1.4	Test flame (see IEC 60695-11-3)		N
	Flame A, B, C or D :		—
A.1.5	Test procedure		N
A.1.6	Compliance criteria		N
	Sample 1 burning time (s)..... :		—
	Sample 2 burning time (s)..... :		—
	Sample 3 burning time (s)..... :		—
A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		N
A.2.1	Samples, material..... :		—
	Wall thickness (mm)..... :		—
A.2.2	Conditioning of samples; temperature (°C) :		N
A.2.3	Mounting of samples :		N
A.2.4	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C :		—
A.2.5	Test procedure		N
A.2.6	Compliance criteria		N
	Sample 1 burning time (s)..... :		—
	Sample 2 burning time (s)..... :		—
	Sample 3 burning time (s)..... :		—
A.2.7	Alternative test acc. to IEC 60695-11-5, cl. 5 and 9		N
	Sample 1 burning time (s)..... :		—
	Sample 2 burning time (s)..... :		—
	Sample 3 burning time (s)..... :		—
A.3	Hot flaming oil test (see 4.6.2)		N

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Clause	Requirement + Test	Result - Remark	Verdict

A.3.1	Mounting of samples		N
A.3.2	Test procedure		N
A.3.3	Compliance criterion		N

B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		N
B.1	General requirements		N
	Position	:	—
	Manufacturer	:	—
	Type	:	—
	Rated values	:	—
B.2	Test conditions		N
B.3	Maximum temperatures		N
B.4	Running overload test		N
B.5	Locked-rotor overload test		N
	Test duration (days)	:	—
	Electric strength test: test voltage (V)	:	—
B.6	Running overload test for d.c. motors in secondary circuits		N
B.6.1	General		N
B.6.2	Test procedure		N
B.6.3	Alternative test procedure		N
B.6.4	Electric strength test; test voltage (V)	:	N
B.7	Locked-rotor overload test for d.c. motors in secondary circuits		N
B.7.1	General		N
B.7.2	Test procedure		N
B.7.3	Alternative test procedure		N
B.7.4	Electric strength test; test voltage (V)	:	N
B.8	Test for motors with capacitors		N
B.9	Test for three-phase motors		N
B.10	Test for series motors		N
	Operating voltage (V)	:	—

C	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		N
	Position	No transformer.	—
	Manufacturer		—

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Clause	Requirement + Test	Result - Remark	Verdict

	Type		---
	Rated values		---
	Method of protection.....		---
C.1	Overload test		N
C.2	Insulation		N
	Protection from displacement of windings.....		N

D	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)		N
D.1	Measuring instrument		N
D.2	Alternative measuring instrument		N

E	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13)		N
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F	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10 and Annex G)		N
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G	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N
G.1	Summary of the procedure for determining minimum clearances		N
G.2	Determination of mains transient voltage (V)		N
G.2.1	AC mains supply		N
G.2.2	DC mains supply		N
G.3	Determination of telecommunication network transient voltage(V).....		N
G.4	Determination of required withstand voltage (V) ..		N
G.5	Measurement of transient levels (V)		N
G.6	Determination of minimum clearances		N

H	ANNEX H, IONIZING RADIATION (see 4.3.13)		N
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J	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		N
	Metal(s) used		---
K	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.8)		N
K.1	Making and breaking capacity		N
K.2	Thermostat reliability; operating voltage (V)		N
K.3	Thermostat endurance test; operating voltage (V)		N

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Clause	Requirement + Test	Result - Remark	Verdict
	..		
K.4	Temperature limiter endurance; operating voltage (V)		N
K.5	Thermal cut-out reliability		N
K.6	Stability of operation		N
L	ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.2)		P
L.1	Typewriters		N
L.2	Adding machines and cash registers		N
L.3	Erasers		N
L.4	Pencil sharpeners		N
L.5	Duplicators and copy machines		N
L.6	Motor-operated files		N
L.7	Other business equipment		P
M	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		N
M.1	Introduction	No telephone ringing signal.	N
M.2	Method A		N
M.3	Method B		N
M.3.1	Ringing signal		N
M.3.1.1	Frequency (Hz)		—
M.3.1.2	Voltage (V)		—
M.3.1.3	Cadence; time (s), voltage (V)		—
M.3.1.4	Single fault current (mA)		—
M.3.2	Tripping device and monitoring voltage		N
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2	Tripping device		N
M.3.2.3	Monitoring voltage (V)		N
N	ANNEX N, IMPULSE TEST GENERATORS (see 1.5.7.2, 1.5.7.3, 2.10.3.9, 6.2.2.1, 7.3.2, 7.4.3 and Clause G.5)		N
N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N
P	ANNEX P, NORMATIVE REFERENCES		N

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Clause	Requirement + Test		Verdict
Q	ANNEX Q, Voltage dependent resistors (VDRs) (see 1.5.9.1)		N
	a) Preferred climatic categories	:	N
	b) Maximum continuous voltage	:	N
	c) Pulse current	:	N
R	ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES		N
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6.2)		N
R.2	Reduced clearances (see 2.10.3)		N
S	ANNEX S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)		N
S.1	Test equipment		N
S.2	Test procedure		N
S.3	Examples of waveforms during impulse testing		N
T	ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)		N
			—
U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		N
			—
V	ANNEX V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1)		N
V.1	Introduction		N
V.2	TN power distribution systems		N
V.3	TT power systems		N
V.4	IT power systems		N
W	ANNEX W, SUMMATION OF TOUCH CURRENTS		N
W.1	Touch current from electronic circuits		N
W.1.1	Earthed circuits		N
W.2	Interconnection of several equipments		N
W.2.1	Isolation		N
W.2.2	Common return, isolated from earth		N
W.2.3	Common return, connected to protective earth		N
X	ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS		N

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Clause	Requirement + Test		Verdict
	(see clause C.1)		
X.1	Determination of maximum input current		N
X.2	Overload test procedure		N
Y	ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3) <i>(no UV Light)</i>		N
Y.1	Test apparatus	:	N
Y.2	Mounting of test samples	:	N
Y.3	Carbon-arc light-exposure apparatus	:	N
Y.4	Xenon-arc light exposure apparatus	:	N
Z	ANNEX Z, OVERVOLTAGE CATEGORIES (see 2.10.3.2 and Clause G.2)		N
AA	ANNEX AA, MANDREL TEST (see 2.10.5.8)		N
BB	ANNEX BB, CHANGES IN THE SECOND EDITION		—
CC	ANNEX CC, Evaluation of integrated circuit (IC) current limiters		N
CC.1	General		N
CC.2	Test program 1.....	:	N
CC.3	Test program 2.....	:	N
DD	ANNEX DD, Requirements for the mounting means of rack-mounted equipment		N
DD.1	General		N
DD.2	Mechanical strength test, variable N.....	:	N
DD.3	Mechanical strength test, 250N, including end stops.....	:	N
DD.4	Compliance.....	:	N
EE	ANNEX EE, Household and home/office document/media shredders		N
EE.1	General		N
EE.2	Marking and instructions		N
	Compliance	:	N
	Use of markings or symbols.....	:	N
	Information of user instructions, maintenance and/or servicing instructions.....	:	N
EE.3	Compliance	:	N
EE.4	Disconnection of power to hazardous moving parts	:	N

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Clause	Requirement + Test	Result - Remark	Verdict

	Use of markings or symbols..... :		N
EE.5	Protection against hazardous moving parts		N
	Test with test finger (Figure 2A):		N
	Test with wedge probe (Figure EE1 and EE2):		N

1.5.1	TABLE: List of critical components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition/ year)	Mark(s) of conformity ¹⁾	
Adapter	ShengZhenTengDa Xing Electron Co.,Ltd	TDX-2404000	INPUT:100-240V ~50/60HZ OUTPUT:12VDC 4A	EN62368 EN60950 IEC60950 EN55032	AE50456643000 1	
Motor	DONGGUAN MOTION CONTROL TECHNOLOGY CO.,LTD	42HD	DC 2.7V	IEC60950	Test with appliance	
Motherboard	Shenzhen CBD Technology Co.,Ltd	Chi Tu L V2	/	IEC60950	Test with appliance	
Power cord	Shenzhen Linyun Times Technology Co., Ltd.	SVT 18AWG/3C BLACK	H05RR-F 60245 IEC 53	EN 50525-2-21	VDE 40016778	
Plug	Shenzhen Linyun Times Technology Co., Ltd.	TJ-128	AC 250V 13A	DIN VDE 0620-1	VDE 40010620	
1) An asterisk indicates a mark which assures the agreed level of surveillance						

1.6.2	TABLE: electrical data (in normal conditions)					P
Fuse #	Irated (A)	U (V)	P (W)	I (mA)	Ifuse (A)	Condition/status
--	--	5	18.31	--	--	

2.1.1.5 c) 1)	TABLE: max. V, A, VA test				N
Voltage (rated) (V)	Current (rated) (A)	Voltage (max.) (V)	Current (max.) (A)	VA (max.) (VA)	
---	---	---	---	---	
Note(s): Test bases on battery.					
2.1.1.5 c) 2)	TABLE: stored energy				N
Capacitance C (μF)	Voltage U (V)		Energy E (J)		
---	---		---		
supplementary information:					

2.2	TABLE: evaluation of voltage limiting components in SELV circuits				N		
Component (measured between)		Max. Voltage (V) (normal operation)		Voltage Limiting Components			
		V peak	V d.c.				
---		---	---	---			
Fault test performed on voltage limiting components		Voltage measured (V) in SELV circuits (V _{peak} or V d.c.)					
---		---					
supplementary information:							
SELV circuits, supplied by limited power source							
2.5	TABLE: limited power source measurement				P		
Measured U _{oc} (V) with all load circuits disconnected:		I _{sc} (A)		VA			
		Meas.	Limit	Meas.	Limit		
USB terminal		3.4	8	13.6	100		
USB terminal short		0	8	0	100		
Note(s): --							
2.10.3 and 2.10.4	TABLE: clearance and creepage distance measurements				N		
Clearance cl and creepage distance dcr at/of:		U _p (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required dcr (mm)	dcr (mm)
---		---	---	---	---	---	---
Supplementary information:							
SELV circuits, supplied by limited power source							
2.10.5	TABLE: distance through insulation measurements					N	
Distance through insulation (DTI) at/of:		U peak (V)	U rms (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)	
---		---	---	---	---	---	
Supplementary information:							
* See appended table 1.5.1							

4.5	TABLE: thermal requirements						P	
	Supply voltage (V)		5Vd.c.				—	
	Ambient Tmin (C)		--		--		—	
	Ambient Tmax (C)		24.5				—	
Maximum measured temperature T of part/at::			T (°C)				T (°C)	
DC connector			35.2				Ref.	
PCB near U1			32.4				130	
PCB near U8			31.7				130	
Adaptor			29.4				60	
Internal wire			27.6				75	
Internal enclosure			28.2				95	
Ambient			24.5				--	
Temperature T of winding		t ₁ (°C)	R ₁ (Ω)	t ₂ (°C)	R ₂ (Ω)	T (°C)	Allowed T _{max} (°C)	Insulation Class
--		--	--	--	--	--	--	--

4.5.5	TABLE: ball pressure test of thermoplastic parts			N
	Allowed impression diameter (mm)			—
Part		Test temperature (°C)	Impression diameter (mm)	
---		---	---	
Supplementary information: SELV circuits, supplied by limited power source				

5.1	TABLE: touch current measurement				N
Condition	L terminal A (mA)	N terminal A (mA)	Limit (Peak mA)	Comments	
---	---	---	---	---	
Supplementary information: SELV circuits, supplied by limited power source					

5.2	TABLE: electric strength tests, impulse tests and voltage surge tests			N
Test voltage applied between:		Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Breakdown Yes / No
---		---	---	---
Supplementary information: SELV circuits, supplied by limited power source				

5.3	TABLE: fault condition tests				P
	Ambient temperature (°C).....:			23.7	—
	Power source for EUT: Manufacturer, model/type, output rating			--	—
Component no.	Fault	Test voltage (V)	Test time	Fuse no.	Result
USB	S-C	5Vdc	7h	--	The unit shutdown immediately, recoverable after the fault removed. No hazard, no excessive temperature rise.
USB	O-L	5Vdc	7h	--	The unit worked normally, no hazards, no damage. When USB load to 2.5A, USB output shut down. No higher temperature rise exceeding its limit..
USB	O-L (overdischarging mode)	4.2 Vdc	30 min	--	When USB load to 3.3A, USB output shut down. No higher temperature rise exceeding its limit.
Fault: S-C = short circuit, O-C = open circuit					
Note: --					

Appendix 1: Photo Documentation

Photo 1:



Photo 2:



Photo 3:



Photo 4:

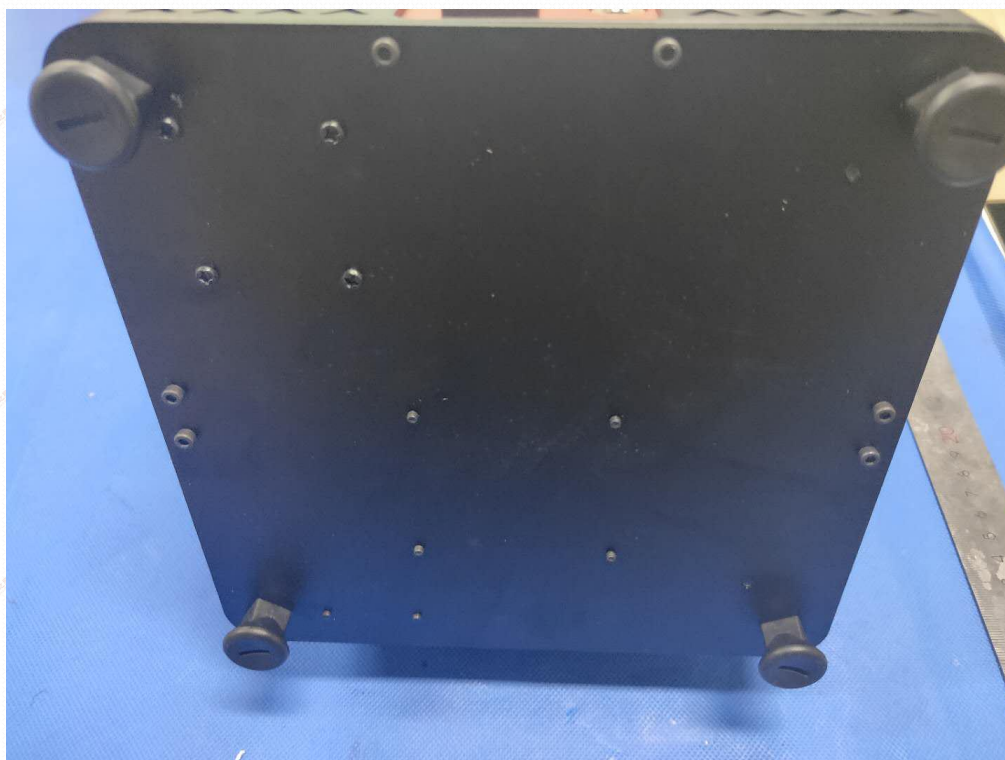


Photo 5:

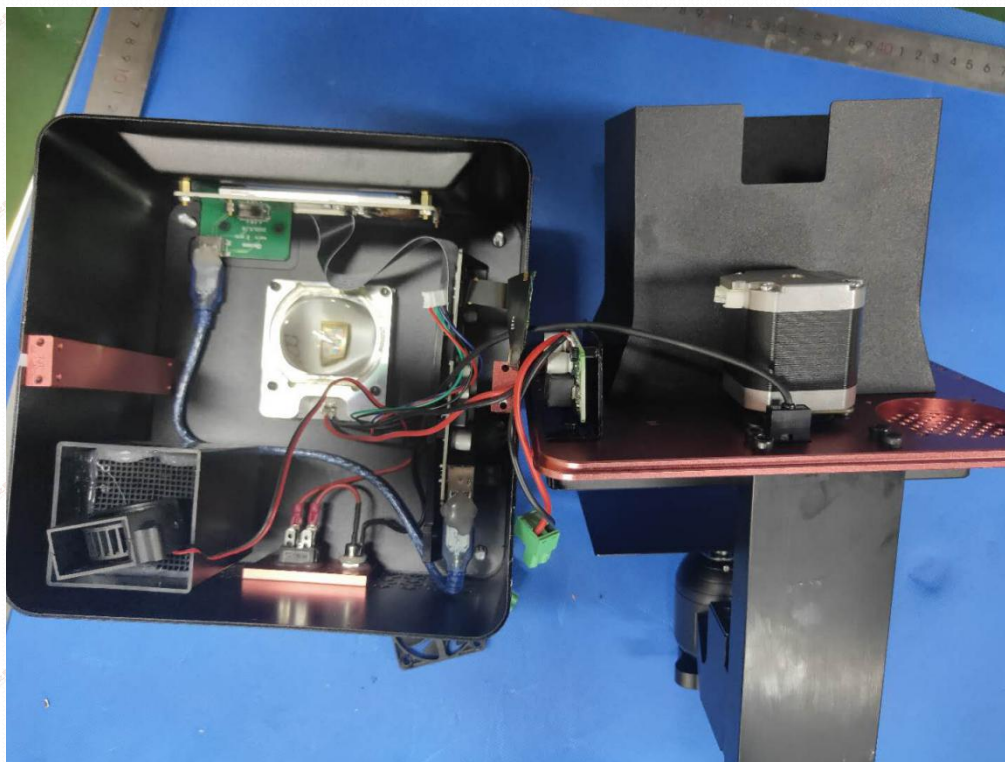


Photo 6:

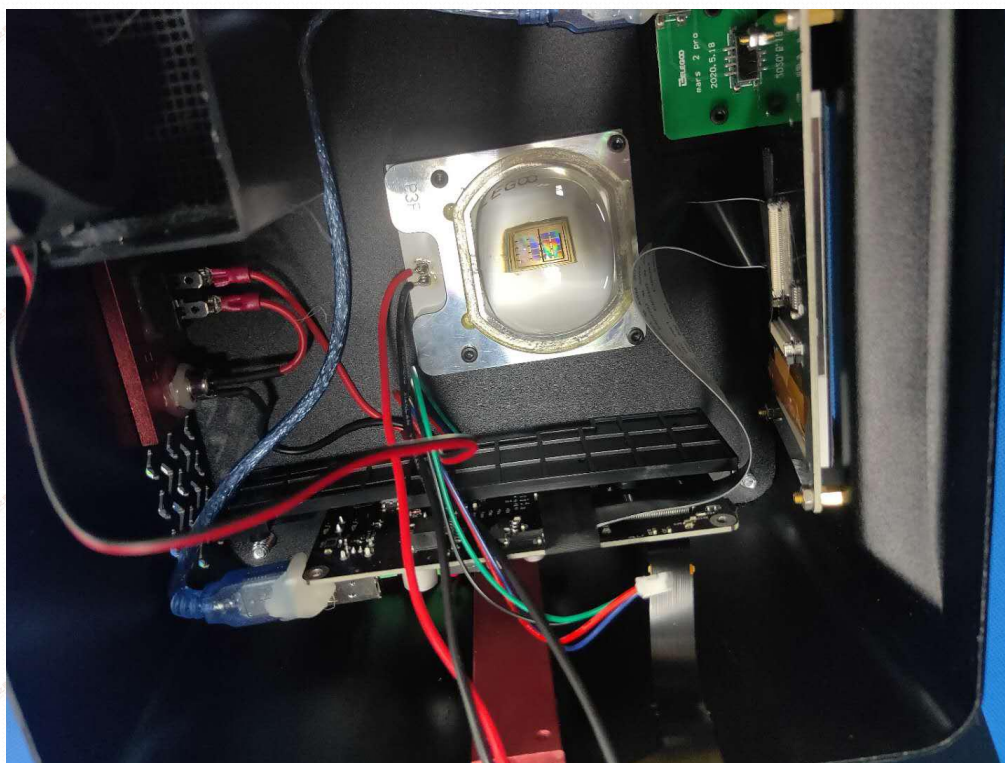


Photo 7:



---End of Test Report---