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TEST REPORT

IEC 60529

Degrees of protection provided by enclosures (IP Code)

Report Number..... :	231212005GZU-002
Date of issue ..... :	7 Mar 2024
Total number of pages ..... :	16
Name of Testing Laboratory preparing the Report ..... :	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Applicant's name ..... :	Uni-Trend Technology(China) Co.,Ltd
Address..... :	No.6, Gong Ye Bei 1st Road, Songshan Lake National High-Tech Industrial Development Zone, Dongguan, Guangdong Province, 523808, CHINA
Test specification:	
Standard ..... :	IEC 60529:1989+A1:1999+A2:2013
Test procedure..... :	Test report
Non-standard test method..... :	N/A
Test Report Form No. ..... :	IEC 60529_2013a
Test Report Form(s) Originator.... :	Intertek © 2019
Dated ..... :	2019-8

General disclaimer:

The test results presented in this report relate only to the object tested.
Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

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The test report only allows to be revised only within the report defined retention period unless standard or regulation was withdrawn or invalid.

Test item description .....:	Micro Ohm Meter
Trade Mark .....:	UNI-T
Manufacturer.....:	Same as applicant
Model/Type reference.....:	UT620C+
Ratings.....:	Powered: 1 x 3.7V, 3200mAh Li-ion battery, IP54

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch	
Testing location/ address ..... :		Room101/301/401/102/202/302/402/502/602/702/802, No. 7-2, Caipin Road, Huangpu District, Guangzhou, Guangdong, China	
Tested by (name, function, signature) ..... :		Eric Deng / Engineer	
Approved by (name, function, signature) .. :		Justin He / Manager	

List of Attachments (including a total number of pages in each attachment):

Appendix 1 - Product photos 3 pages

Summary of testing:

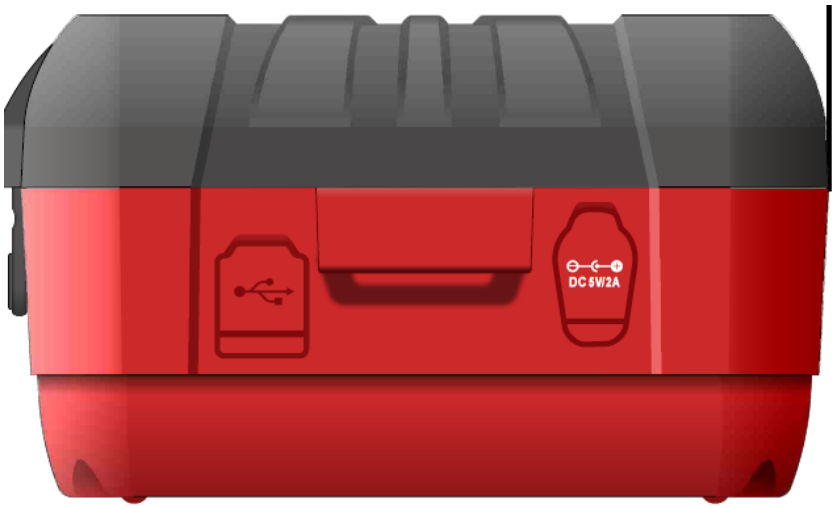
This product under test complied with IEC 60529:1989+A1:1999+A2:2013 and EN 60529:1991/A2:2013/AC:2019-02.

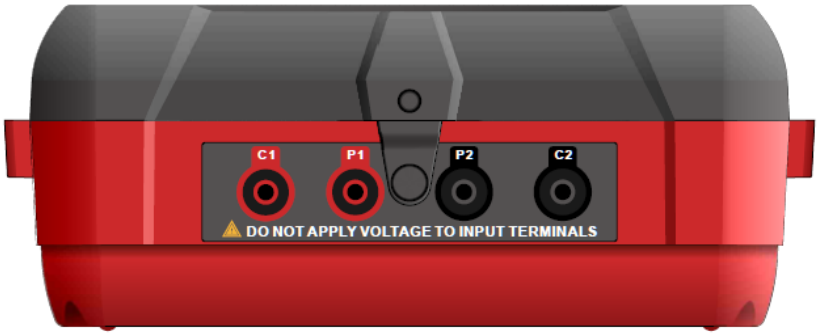
Tests performed (name of test and test clause):	**Testing location:**
All applicable clauses performed	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch Room101/301/401/102/202/302/402/502/602/702/802, No. 7-2, Caipin Road, Huangpu District, Guangzhou, Guangdong, China

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.


WARNING
TO AVOID ELECTRICAL SHOCK REMOVE
TEST LEADS BEFORE OPENING CASE.
3.7V / 3200mAh Li-ion battery
IP54


DC 5V/2A


C1
P1
P2
C2
DO NOT APPLY VOLTAGE TO INPUT TERMINALS

Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- compliance with the requirement not evaluated..:	N/E (Not Evaluated)
- test object does not meet the requirement ..... :	F (Fail)
Testing ..... :	
Date of receipt of test item ..... :	12 Dec 2023
Date (s) of performance of tests..... :	12 Dec 2023 – 7 Mar 2024

General remarks:

Throughout this report a point is used as the decimal separator.

Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

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

General product information:

The Meter is mainly used to measure the conductor resistance of cable; the contact resistance of switch, connector, and relay; the riveting resistance of metal, and to test the connection resistance between metallic components; the low resistance, the resistance of connection conductors between the ground poles of grounding grid; the contact resistance; etc..

IEC 60529			
Clause	Requirement + Test	Result - Remark	Verdict

11	General requirements for tests		P
11.1	Atmospheric conditions for water or dust tests		P
	Temperature range: 15 °C to 35 °C	23.0°C	--
	Relative humidity: 25 % to 75 %	60.2%	--
	Air pressure: 86 kPa to 106 kPa	101kPa	--
11.2	Test samples		P
	the number of samples to be tested	Two	P
	conditions for mounting,		P
	the pre-conditioning, if necessary	Not pre-conditioning	P
	whether to be tested energized or not;	Not energized	N/A
	whether to be tested with its parts in motion or not.		N/A
11.3	Application of test requirements and interpretation of test results	This standard applied	P
11.4	Combination of test conditions for the first characteristic numeral		P
	access to hazardous parts	No hazardous parts within enclosure	N/A
	solid foreign objects	Dust-tight	P
11.5	Empty enclosures	Integrity unit	N/A
12	Tests for protection against access to hazardous parts indicated by the first characteristic numeral		N/A
12.1, 12.2	Access probes, Test conditions	IP54	P
	First numeral 1, or additional letter A Sphere 50 mm diameter, test force 50 N ± 10 %		N/A
	First numeral 2, or additional letter B Jointed test finger, test force 10 N ± 10 %		N/A
	First numeral 3, or additional letter C Test rod 2,5 mm diameter, 100 mm long, test force 3 N ± 10 %		N/A
	First numeral 4,5,6, or additional letter D Test wire 1,0 mm diameter, 100 mm long, test force 1 N ± 10 %		P
12.3	Acceptance conditions		N/A
12.3.1	For low-voltage equipment (rated voltages not exceeding 1 000 V a.c. and 1 500 V d.c.), the access probe shall not touch hazardous live parts.	SELV equipment	N/A

IEC 60529			
Clause	Requirement + Test	Result - Remark	Verdict
12.3.2	For high-voltage equipment (rated voltages exceeding 1 000 V a.c. and 1 500 V d.c.), when the access probe is placed in the most unfavourable position(s), the equipment shall be capable of withstanding the dielectric tests as specified in the relevant product standard applicable to the equipment.		N/A
12.3.3	For equipment with hazardous mechanical parts, the access probe shall not touch hazardous mechanical parts.	No such part	N/A
13	Tests for protection against solid foreign objects indicated by the first characteristic numeral		P
13.1	Test means		P
13.2	Test conditions for first characteristic numerals 1, 2, 3, 4	IP5X	N/A
	First characteristic numeral 1, with rigid sphere without handle or guard 50 0 mm diameter, force 50 N ± 10 %		N/A
	First characteristic numeral 2, with rigid sphere without handle or guard 12,5 mm diameter, force 30 N ± 10 %		N/A
	First characteristic numeral 3, with rigid steel rod 2,5 mm diameter with edges free from burrs, force 3 N ± 10 %		N/A
	First characteristic numeral 4, with rigid steel rod 1,0 mm diameter with edges free from burrs, force 1 N ± 10 %		N/A
13.3	Acceptance conditions for first characteristic numerals 1, 2, 3, 4, the protection is satisfactory if the full diameter of the probe specified does not pass through any opening.		N/A
13.4	Dust test for first characteristic numerals 5 and 6	IP5X	P
	The test is made using a dust chamber incorporating the basic principles shown in figure 2 whereby the powder circulation pump may be replaced by other means suitable to maintain the talcum powder in suspension in a closed test chamber. The talcum powder used shall be able to pass through a square-meshed sieve the nominal wire diameter of which is 50 um and the nominal width of a gap between wires 75 um. The amount of talcum powder to be used is 2 kg per cubic meter of the test chamber volume. It shall not have been used for more than 20 tests.		P

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Clause	Requirement + Test	Result - Remark	Verdict

Category 1:	Enclosures where the normal working cycle of the equipment causes reductions in air pressure within the enclosure below that of the surrounding air, for example, due to thermal cycling effects. The enclosure under test is supported inside the test chamber and the pressure inside the enclosure is maintained below the surrounding atmospheric pressure by a vacuum pump. The object of the test is to draw into the enclosure, by means of depression, a volume of air 80 times the volume of the sample enclosure tested without exceeding the extraction rate of 60 volumes per hour. In no event shall the depression exceed 2 kPa (20 mbar) on the manometer	Category 2 used	N/A
	If an extraction rate of 40 to 60 volumes per hour is obtained the duration of the test is 2 h.		P
	If, with a maximum depression of 2 kPa (20 mbar), the extraction rate is less than 40 volumes per hour, the test is continued until 80 volumes have been drawn through, or a period of 8 h has elapsed.		N/A
Category 2:	Enclosures where no pressure difference relative to the surrounding air is present. The enclosure under test is supported in its normal operating position inside the test chamber but is not connected to a vacuum pump. Any drain-hole normally open shall be left open for the duration of the test. The test shall be continued for a period of 8 h.		P
13.5	Special conditions for first characteristic numeral 5	IP5X	P
13.5.1	The enclosure shall be deemed category 1 unless the relevant product standard for the equipment specifies that the enclosure is category 2.	category 2 used due to no pressure is generated whether the product works or not.	P
13.5.2	The protection is satisfactory if, on inspection, talcum powder has not accumulated in a quantity or location such that, as with any other kind of dust, it could interfere with the correct operation of the equipment or impair safety.	No dust ingress	P
13.6	Special conditions for first characteristic numeral 6	IP5X	N/A
13.6.1	The enclosure shall be deemed category 1, whether reductions in pressure below the atmospheric pressure are present or not.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

13.6.2	The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of the test.		N/A
14	Tests for protection against water indicated by the second characteristic numeral		P
14.1	Test means		P
14.2	Test condition		P
	The tests are conducted with fresh water.		P
	During the tests for IPX1 to IPX6 the water temperature should not differ by more than 5 K from the temperature of the specimen under test.	Water :22.7℃ Equipment: 23.0℃	P
	For IPX7 and IPX9 details of the water temperature are given in 14.2.7 and 14.2.9 respectively.	IPX4	N/A
	During the test, the moisture contained inside the enclosure may partly condense. The dew which may thus deposit shall not be mistaken for an ingress of water		P
	For the purpose of the tests, the surface area of the enclosure is calculated with a tolerance of 10 %.		P
	Adequate safety precautions should be taken when testing the equipment in the energized condition.	Not energized	N/A
14.2.1	Test for second characteristic numeral 1 with the drip box	IPX4	N/A
	The turntable on which the enclosure is placed has a rotation speed of 1 r/min and the eccentricity (distance between turntable axis and specimen axis) is approximately 100 mm.		N/A
	An enclosure normally fixed to a wall or ceiling is fixed in its normal position of use to a wooden board		N/A
	The enclosure under test is placed in its normal operating position under the drip box,		N/A
	Water flow rate 1 mm/min. The duration of test is 10 min.		N/A
14.2.2	Test for second characteristic numeral 2 with the drip box	IPX4	N/A
	The table on which the enclosure is placed does not turn. These positions are 15° on either side of the vertical in two mutually perpendicular planes		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Water flow rate 1 mm/min. The enclosure is tested for 2,5 min in each of four fixed positions of tilt. The total duration of the test is 10 min.		N/A
14.2.3	Test for second characteristic numeral 3 with oscillating tube or spray nozzle	IPX4	N/A
a) oscillating tube	Water flow rate 0,07 l/min ± 5 % per hole, multiplied by number of holes		N/A
	Spray ± 60° from vertical, distance max. 200 mm		N/A
	The enclosure to be tested is placed at the centre point of the semicircle. The tube is caused to oscillate through an angle of 120°, 60° on either side of the vertical, the time for one complete oscillation (2 × 120°) being about 4 s and the test duration being 5 min.		N/A
	The enclosure is then turned through a horizontal angle of 90° and the test is continued for a further 5 min.		N/A
b) spray nozzle	Water flow rate 10 l/min ± 5 %		N/A
	Spray ± 60° from vertical		N/A
	The test duration is 1 min/m2 of the calculated surface area of the enclosure (excluding any mounting surface), with a minimum duration of 5 min.		N/A
14.2.4	Test for second characteristic numeral 4 with oscillating tube or spray nozzle		P
a) oscillating tube	Water flow rate 0,07 l/min ± 5 % per hole, multiplied by number of holes		P
	The oscillating tube has spray holes over the whole 180” of the semicircle.		P
	The tube is caused to oscillate through an angle of almost 360°, 180° on either side of the vertical, the time for one complete oscillation (2 × 360°) being about 12 s.		P
	The duration of the test is 10 min.		P
b) spray nozzle	Water flow rate 10 l/min ± 5 %	Oscillating tube used	N/A
	Spray ± 180° from vertical		N/A
	The test duration is 1 min/m2 of the calculated surface area of the enclosure (excluding any mounting surface), with a minimum duration of 5 min.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
14.2.5	Test for second characteristic numeral 5 with the 6,3 mm nozzle	IPX4	N/A
	delivery rate: 12,5 l/min ± 5 %;		N/A
	core of the substantial stream: circle of approximately 40 mm diameter at 2,5 m distance from nozzle;		N/A
	test duration per square metre of enclosure surface area likely to be sprayed: 1 min; minimum test duration: 3 min;		N/A
	distance from nozzle to enclosure surface: between 2,5 m and 3 m.		N/A
14.2.6	Test for second characteristic numeral 6 with the 12,5 mm nozzle	IPX4	N/A
	delivery rate: 100 l/min ± 5 %;		N/A
	core of the substantial stream: circle of approximately 120 mm diameter at 2,5 m distance from nozzle;		N/A
	test duration per square metre of enclosure surface area likely to be sprayed: 1 min; minimum test duration: 3 min;		N/A
	distance from nozzle to enclosure surface: between 2,5 m and 3 m.		N/A
14.2.7	Test for second characteristic numeral 7: temporary immersion between 0,15 m and 1 m	IPX4	N/A
	the lowest point of enclosures with a height less than 850 mm is located 1 000 mm below the surface of the water		N/A
	the highest point of enclosures with a height equal to or greater than 850 mm is located 150 mm below the surface of the water;		N/A
	the duration of the test is 30 min;		N/A
	the water temperature does not differ from that of the equipment by more than 5 K.		N/A
14.2.8	Test for second characteristic numeral 8: continuous immersion subject to agreement	IPX4	N/A
	the test conditions are subject to agreement between manufacturer and user, but they shall be more severe than those prescribed in 14.2.7		N/A
14.2.9	Test for second characteristic numeral 9 by high pressure and temperature water jetting	IPX4	N/A

IEC 60529			
Clause	Requirement + Test	Result - Remark	Verdict

	a) For small enclosures (largest dimension less than 250 mm), the enclosure shall be mounted on the test device shown in Figure 12. – turntable speed: 5 r/min ± 1 r/min – spray positions: 0°, 30°, 60°, 90° The test duration is 30 s per position.		N/A
	b) For large enclosures (largest dimension greater than or equal to 250 mm), the enclosure shall be mounted as per intended use. The entire exposed surface area of the enclosure shall be subjected to the spray at some point during the test procedure. – spray positions: the enclosure shall be sprayed from all practical directions covering the entire surface area and the spray shall be, as far as possible, perpendicular to the sprayed surface. – distance between nozzle and sample under test shall be 175 ± 25 mm. The test duration is 1 min/m_2 of the calculated surface area of the enclosure (excluding any mounting surface), with a minimum duration of 3 min.		N/A
14.3	Acceptance conditions		P
	In general, if any water has entered, it shall not: – be sufficient to interfere with the correct operation of the equipment or impair safety; – deposit on insulation parts where it could lead to tracking along the creepage distances; – reach live parts or windings not designed to operate when wet; – accumulate near the cable end or enter the cable if any.	No water entered. SELV no electric shock risk Limited-energy circuit no fire risk	P
	If the enclosure is provided with drain-holes, it should be proved by inspection that any water which enters does not accumulate and that it drains away without doing any harm to the equipment.	No such part	N/A

Appendix 1 - Product photos

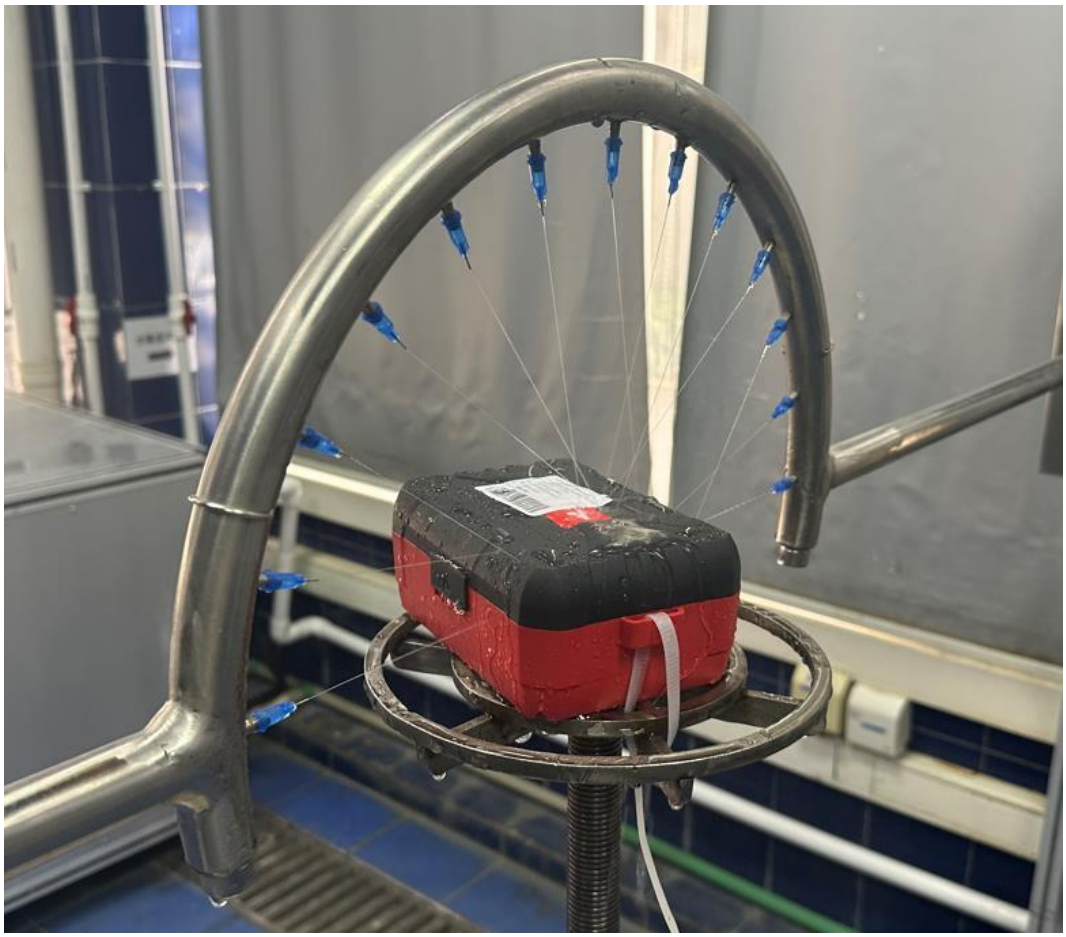

Photo 1 – IPX4 testing

Photo 2 – IP5X testing

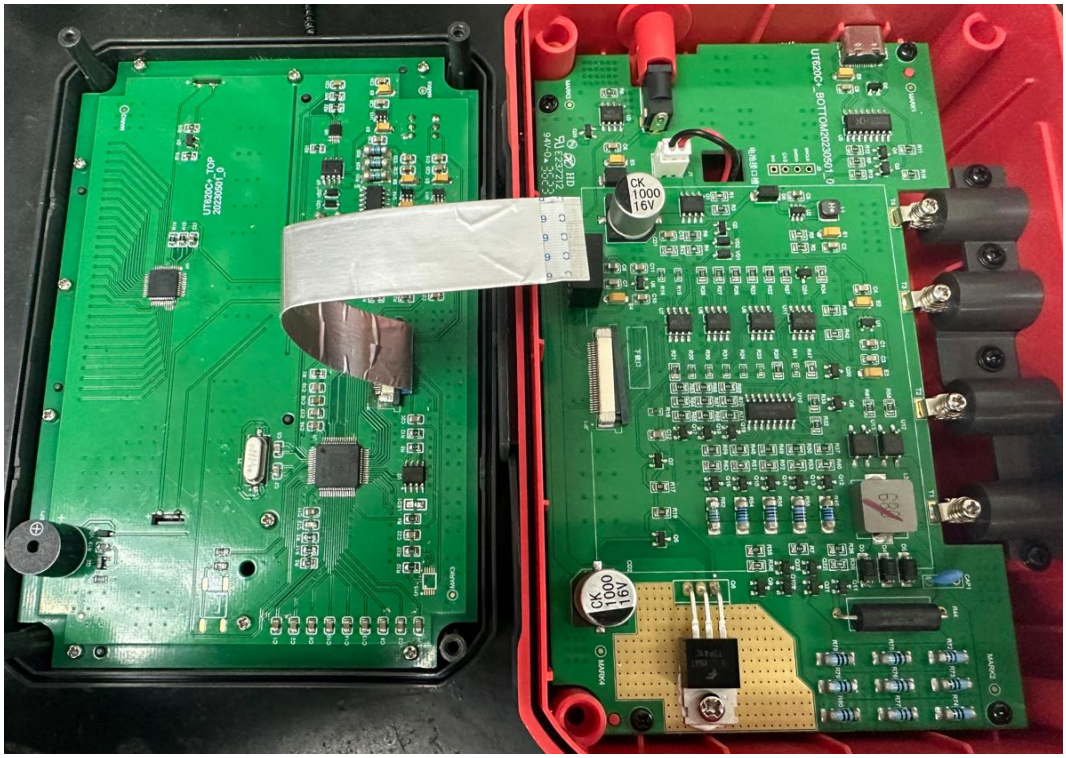

Photo 3 - Internal view after IPX4 test

Photo 4 - Internal view after IPX4 test

Photo 5 - Internal view after IP5X test

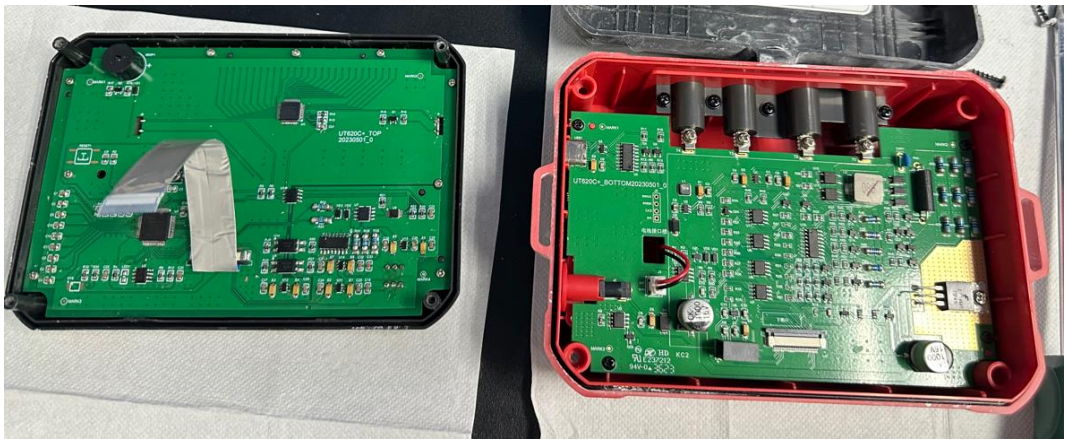

Photo 6 - Internal view after IP5X test

END OF REPORT