TEST REPORT
UL 61010-1
Safety requirements for electrical equipment for measurement, control, and laboratory use
Part 1: General requirements

Report Number.....:	LTR2601031TH01
Tested By (+signature).....:	Alma Xu Test Engineer
Witnessed by(+ signature).....:	Mia Wu Project Engineer
Approved By (+signature).....:	Maarten Hou Designated Reviewer
Date of issue.....:	2026-01-28
Total number of pages.....:	81

Guangdong Lintek Certification Group Co., Ltd. Approved

Name of Testing Laboratory preparing the Report.....:	Guangdong Lintek Certification Group Co., Ltd.
Applicant's name.....:	Shenzhen Xinglian Technology Research & Development Co., Ltd.
Address.....:	4A702, No. 4 Factory Building, No. 7, Ganli Sixth Road, Gankeng Community, Jihua Street, Longgang District, Shenzhen, China
Manufacturer's name.....:	Shenzhen Xinglian Technology Research & Development Co., Ltd.
Address.....:	4A702, No. 4 Factory Building, No. 7, Ganli Sixth Road, Gankeng Community, Jihua Street, Longgang District, Shenzhen, China
Test specification:	
Standard.....:	UL 61010-1:2024
Test procedure.....:	Test Report
Test Report Form No.....:	IEC61010_1P
Master TRF.....:	Dated 2021-04-12
Test item description.....:	Air Quality Monitor
Trade Mark(s).....:	N/A
Model/Type reference.....:	DA10
Ratings.....:	DC 5V, 0.5A

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

- Attachment 1: US NATIONAL DIFFERENCES.
- Attachment 2: Photo documentation.

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
See Report for details.	Guangdong Lintek Certification Group Co., Ltd. 101 building A, No.4 Changrong Street, Tongxin Community, Baolong Street, Longgang District, Shenzhen, China

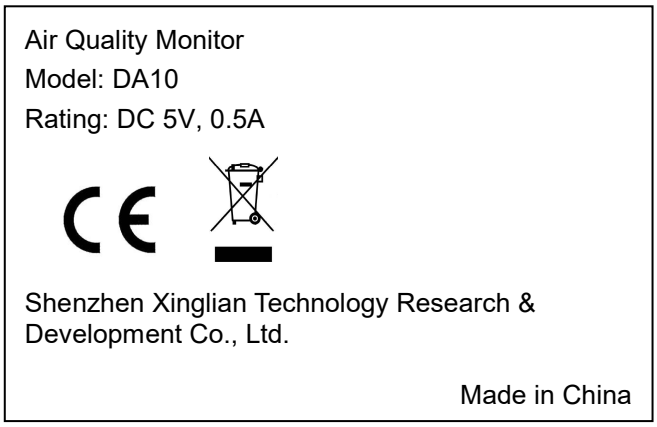
Summary of compliance with National Differences (List of countries addressed):

US NATIONAL DIFFERENCES

☒ T**he product fulfils the requirements of UL 61010-1:2024.**

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.



Note:

1. The above label is draft of the artwork for marking plate pending approval by National Certification Bodies and they shall not be affixed to products prior to such approvals.

Possible test case verdicts:	
- test case does not apply to the test object.... :	N/A or N
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement.... :	F (Fail)
Testing:	
Date of receipt of test item..... :	2026-01-20
Date (s) of performance of tests.....:	2026-01-20 to 2026-01-28
Test item particulars:	
Type of item ..... :	Measurement
Description of equipment function..... :	Measure the temperature, humidity and so on
Connection to MAINS supply..... :	Not connected to the mains directly
Installation category ..... :	N/A
Pollution degree ..... :	Pollution degree 2
Protection class..... :	Class III
Environmental rating..... :	Standard
Equipment mobility..... :	Portable
Operating conditions ..... :	Continuous
Mass of equipment (g) ..... :	137.9g
Marked degree of protection to IEC 60529..... :	IP20

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 Form A.xx)" refers to a table appended to the report.

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

General disclaimer:

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.

This report is invalid if it is arbitrarily altered. The report shall be invalid without the signature of the approve. The report without the official seal or special testing seal of Guangdong Lintek Certification Group Co., Ltd. (hereinafter referred to as the unit) is invalid.

The applicant and manufacturer information, product name, model, trademark and other information in the report are provided by the applicant, and the laboratory is not responsible for verifying their authenticity.

The authenticity of this Test Report and its contents can be verified by contacting the Testing Laboratory, responsible for this Test Report.

General product information and other remarks:

1. The product is a Air Quality Monitor which belongs to the electrical equipment for Electrical test and measurement equipment.

Model Difference:
The applicable product has only one model, but has three different color appearance.

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

4	**TESTS**		P
4.4	Testing in SINGLE FAULT CONDITIONS		P
4.4.1	Fault tests	(see Form A.1)	P
4.4.2	Application of SINGLE FAULT CONDITIONS		P
4.4.2.1	SINGLE FAULT CONDITIONS not covered by 4.4.2.2 to 4.4.2.14	(see Form A.1)	P
4.4.2.2	PROTECTIVE IMPEDANCE		N/A
4.4.2.3	PROTECTIVE CONDUCTOR	(see Form A.6)	N/A
4.4.2.4	Equipment or parts for short-term or intermittent operation		N/A
4.4.2.5	Motors		—
	– stopped while fully energized		N/A
	– prevented from starting		N/A
	– one phase interrupted (multi-phase)		N/A
4.4.2.6	Capacitors		N/A
4.4.2.7	MAINS transformers		N/A
4.4.2.7.2	Short circuit	(see Form A.39)	N/A
4.4.2.7.3	Overload	(see Forms A.26B and A.40)	N/A
4.4.2.8	Outputs		N/A
4.4.2.9	Equipment for more than one supply		N/A
4.4.2.10	Cooling	(see Form A.26A)	—
	– air holes closed		N/A
	– fans stopped		N/A
	– coolant stopped		N/A
	– loss of cooling liquid		N/A
4.4.2.11	Heating devices		—
	– timer overridden		N/A
	– temperature controller overridden		N/A
4.4.2.12	Insulation between circuits and parts		P
4.4.2.13	Interlocks		N/A
4.4.2.14	Voltage selectors		N/A
4.4.3	Duration of tests	(see Form A.1)	—
4.4.4	Conformity after application of fault conditions	(see Forms A.1, A.6 and A.18)	P

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
5	**MARKING AND DOCUMENTATION**		P
5.1	**Marking**		P
5.1.1	General		P
	Required equipment markings		—
	– Visible from the exterior; or		P
	– Visible after removing cover or opening door		N/A
	– Visible after removal from a rack or panel		N/A
	Not put on parts which can be removed by an operator		P
	Letter symbols (IEC 60027) used		P
	Graphic symbols of Table 1 used		P
5.1.2	Identification		P
	Equipment is identified by:		—
	a) Manufacturer's or supplier's name or Brand Name	See marking plate	P
	b) Model number, name or other means	See marking plate	P
	Manufacturing location identified	See marking plate	P
5.1.3	MAINS supply		P
	Equipment is marked as follows:		—
	a) Nature of supply:		—
	1) a.c. RATED MAINS frequency or range of frequencies..... :		—
	2) d.c. with symbol 1.....:	⎓	—
	b) RATED supply voltage(s) or range..... :	See marking plate	—
	c) Max. RATED power (W or VA) or input current..... :	See marking plate	—
	The marked value not less than 90 % of the maximum value	(see Form A.2)	N/A
	If more than one voltage range:		—
	Separate values marked; or		N/A
	Values differ by less than 20 %	(see Form A.2)	N/A
	d) OPERATOR-set for different RATED supply voltages:		—
	Indicates the equipment set voltage		N/A
	PORTABLE EQUIPMENT indication is visible from the exterior		N/A
	Changing the setting changes the indication		N/A
	e) Accessory MAINS socket-outlets accepting standard MAINS plugs are marked:		—
	With the voltage if it is different from the MAINS supply voltage.....:		—
	For use only with specific equipment		N/A
	If not marked for specific equipment it is marked with:		—

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The maximum RATED current or power; or		N/A
	Symbol 14 with full details in the documentation		N/A
5.1.4	Fuses		N/A
	OPERATOR replaceable fuse marking (see also 5.4.5)..... :		—
5.1.5	TERMINALS, connections and operating devices		N/A
5.1.5.1	General		N/A
	Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators marked		N/A
	If insufficient space, symbol 14 used		N/A
	Push-buttons and actuators of emergency stop devices and indicators:		—
	– used only to indicate a warning of danger; or		N/A
	– the need for urgent action		N/A
	– coloured red		N/A
	– coded as specified in IEC 60073		N/A
	Supplementary means of coding provided, if meaning of colour relates (see IEC 60073):		—
	– to safety of persons; or		N/A
	– safety of the environment		N/A
5.1.5.2	TERMINALS		—
	MAINS supply TERMINAL identified		N/A
	Other TERMINAL marking:		—
	a) FUNCTIONAL EARTH TERMINALS marked with symbol 5		N/A
	b) PROTECTIVE CONDUCTOR TERMINALS:		—
	Symbol 6 is placed close to or on the TERMINAL;or		N/A
	Part of appliance inlet		N/A
	c) TERMINALS of circuits (symbol 7 used)		N/A
	d) HAZARDOUS LIVE TERMINALS supplied from the interior		N/A
	Standard MAINS socket outlet used; or		N/A
	RATINGS marked; or		N/A
	Symbol 14 used		N/A
5.1.6	Switches and circuit-breakers		N/A
	If disconnecting device, off position clearly marked		N/A
	If push-button used as power supply switch:		—
	– Symbol 9 and 15 used for on-position		N/A
	– Symbol 10 and 16 used for off-position		N/A
	– Pair of symbols 9, 15 and 10, 16 close together		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.1.7	Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION		N/A
	Protected throughout (symbol 11 used)		N/A
	Only partially protected (symbol 11 not used)		N/A
5.1.8	Field-wiring TERMINAL boxes		N/A
	If TERMINAL or ENCLOSURE exceeds 60 C:	(see Form A.26A)	—
	Cable temperature RATING marked.....:		—
	Marking visible before and during connection or beside TERMINAL		N/A
5.2	**Warning markings**		N/A
	Visible when ready for NORMAL USE		N/A
	Are near or on applicable parts		N/A
	Symbols and text correct dimensions and colour:		—
	a) Symbols min 2,75 mm and text 1,5 mm high and contrasting in colour with background		N/A
	b) Symbols and text moulded, stamped or engraved in material min. 2,0 mm high and		N/A
	0,5 mm depth or raised if not contrasting in colour		N/A
	If necessary marked with symbol 14, or		N/A
	Additional symbols such as symbol 12, 13 or 17 used to indicate the nature of HAZARD		N/A
	Statement to place equipment in a safe state before access by using a tool to HAZARDOUS parts is permitted		N/A
5.3	**Durability of markings**		P
	The required markings remain clear and legible in NORMAL USE	(see Form A.3)	P
5.4	**Documentation**		P
5.4.1	General		P
	Equipment is accompanied by documentation for safety purposes for OPERATOR or RESPONSIBLE BODY		P
	Safety documentation for service personnel authorized by the manufacturer		P
	Documentation necessary for safe operation is provided in printed media or		P
	in electronic media if available at any time		N/A
	Documentation includes:		—
	a) Intended use		P
	b) Technical specification		P
	c) Name and address of manufacturer or supplier		P
	d) Information specified in 5.4.2 to 5.4.6		P
	e) Information to mitigate residual RISK (see also subclause 17)		P
	f) Accessories for safe operation of the equipment specified		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	g) Guidance provided to check correct function of the equipment, if incorrect reading may cause a HAZARD from harmful or corrosive substances of HAZARDOUS live parts		N/A
	h) Instructions for lifting and carrying		N/A
	Warning statements and a clear explanation of warning symbols:		—
	– provided in the documentation; or		N/A
	– information is marked on the equipment		N/A
5.4.2	Equipment RATINGS		P
	Documentation includes:		—
	a) Supply voltage or voltage range..... :	See marking plate	—
	Frequency or frequency range.....:	DC	—
	Power or current rating.....:	See marking plate	—
	b) Description of all input and output connections in accordance to 6.6.1 a)		N/A
	c) RATING of insulation of external circuits in accordance to 6.6.1 b)		N/A
	d) Statement of the range of environmental conditions (refer to 1.4):		—
	1) indoor or outdoor use,	indoor use	P
	2) altitude,	≤ 2000m	P
	3) temperature,	5-40℃	P
	4) relative humidity,	0-80%	P
	5) MAINS supply voltage fluctuations,	DC	N/A
	6) OVERVOLTAGE CATEGORY,	II	N/A
	7) WET LOCATION, if applicable,		N/A
	8) POLLUTION DEGREE of the intended environment	2	P
	e) Degree of ingress protection (IEC 60529)	IP20	P
	f) If impact rating less than 5 J:		—
	IK code in accordance to IEC 62262 marked; or		N/A
	symbol 14 of Table 1 marked, with		N/A
	RATED energy level and test method stated		N/A
5.4.3	Equipment installation		N/A
	Documentation includes instructions for:		—
	a) Assembly, location and mounting requirements		
	b) Instructions for protective earthing		N/A
	c) Connections to supply		N/A
	d) PERMANENTLY CONNECTED EQUIPMENT:		—
	1) Supply wiring requirements		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	2) If external switch or circuit-breaker, requirements and location recommendation		N/A
	e) Ventilation requirements		N/A
	f)Safety characteristics for special external services (e. g. maximum and minimum temperature, pressure, flow of air, cooling liquid)		N/A
	g) Instructions relating to sound level		N/A
5.4.4	Equipment operation		P
	Instructions for use include:		—
	a) Identification and description of operating controls		P
	b) Positioning for disconnection		N/A
	c) Instructions for interconnection to accessories or other equipment		P
	d) Specification of intermittent operation limits		N/A
	e) Explanation of symbols used		P
	f) Replacement of consumable materials		P
	g) Cleaning and decontamination		P
	h) Listing of any poisonous or injurious gases and quantities		N/A
	i) RISK reduction procedures relating to flammable liquids (see 9.5 c)		N/A
	j) RISK reduction procedures relating burn from surfaces permitted to exceed limits of 10.1		N/A
	Additional precautions for IEC 60950 conforming equipment in regard to moistures and liquids		N/A
	A statement about protection impairment if used in a manner not specified by the manufacturer		P
5.4.5	Equipment maintenance and service		P
	Instructions for RESPONSIBLE BODY include:		—
	Instructions sufficient in detail permitting safe maintenance and inspection and continued safety:		—
	Instruction against the use of detachable MAINS supply cord with inadequate RATING		N/A
	Specific battery type of user replaceable batteries		P
	Any manufacturer specified parts		N/A
	RATING and characteristics of fuses		N/A
	Instructions include following subjects permitting safe servicing and continued safety:		—
	a) Product specific RISKS may affect service personnel		N/A
	b) Protective measures for these RISKS		N/A
	c) Verification of the safe state after repair		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.6	Integration into systems or effects resulting from special conditions		N/A
	Aspects described in documentation		N/A
6	**PROTECTION AGAINST ELECTRIC SHOCK**		P
6.1	**General**	(see Forms A.14 and A.15)	N/A
6.1.1	Requirements		N/A
	Protection against electric shock maintained in NORMAL CONDITION and SINGLE FAULT CONDITION		N/A
	ACCESSIBLE parts not HAZARDOUS LIVE		N/A
	Voltage, current, charge or energy below the limits in NORMAL CONDITION and in SINGLE FAULT CONDITION between:		—
	ACCESSIBLE parts and earth		N/A
	two ACCESSIBLE parts on same piece of the equipment within a distance of 1,8 m		N/A
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.11		N/A
6.1.2	Exceptions		N/A
	Following HAZARDOUS LIVE parts may be ACCESSIBLE to an OPERATOR:		—
	a) parts of lamps and lamp sockets after lamp removal		N/A
	b) parts to be replaced by OPERATOR only by the use of tool and warning marking		N/A
	Those parts not HAZARDOUS LIVE 10 s after interruption of supply	(see Form A.5)	N/A
	Capacitance test if charge is received from internal capacitor	(see Forms A.4 and A.5)	N/A
6.2	**Determination of ACCESSIBLE parts**	(see Form A.4)	N/A
6.2.1	General		N/A
	Unless obviously determination of ACCESSIBLE parts as specified in 6.2.2 to 6.2.4		N/A
6.2.2	Examination		N/A
	– with jointed test finger (as specified B.2)		N/A
	– with rigid test finger (as specified B.1) and a force of 10 N		N/A
6.2.3	Openings above parts that are HAZARDOUS LIVE		N/A
	– test pin with length of 100 mm and 4 mm in diameter applied		N/A
6.2.4	Openings for pre-set controls		N/A
	– test pin with length of 100 mm and 3 mm in diameter applied		N/A
6.3	**Limit values for ACCESSIBLE parts**		P
6.3.1	Levels in NORMAL CONDITION	(see Form A.5)	P

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Voltage limits less than 30 V r.m.s. and 42,4 V peak or 60 V d.c.	5VDC	P
	for WET LOCATIONS voltage limits less than 16 V r.m.s. and 22,6 V peak or 35 V d.c.		N/A
	Voltages are not HAZARDOUS LIVE the levels of:		—
	b) Current less than 0,5 mA r.m.s. for sinusoidal, 0,7 mA peak non-sinusoidal or mixed frequencies or 2 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz		N/A
	for WET LOCATIONS measuring circuit A.4 used		N/A
	70 mA r.m.s. when measured with circuit A.3 for higher frequencies		N/A
	c) Levels of capacitive charge or energy less:		—
	1) 45 µC for voltages up to 15 kV peak or d.c. or line A of Figure 3		N/A
	2) 350 mJ stored energy for voltages above 15 kV peak or d.c.		N/A
6.3.2	Levels in SINGLE FAULT CONDITION	(see Form A.6)	N/A
	a) Voltage limits less than 50 V r.m.s. and 70 V peak or 120 V d.c.		N/A
	for WET LOCATIONS voltage limits less than 33 V r.m.s. and 46,7 V peak or 70 V d.c.		N/A
	Voltages are not HAZARDOUS LIVE the levels of:		—
	b) Current less than 3,5 mA r.m.s. for sinusoidal, 5 mA peak non-sinusoidal or mixed frequencies or 15 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz		N/A
	for WET LOCATIONS measuring circuit A.4 used		N/A
	500 mA r.m.s. when measured with circuit A.3 for higher frequencies		N/A
	c) Levels of capacitive charge or energy less line B of Figure 3		N/A
6.4	**Primary means of protection**		N/A
6.4.1	General		N/A
	ACCESSIBLE parts prevented from being HAZARDOUS LIVE by one or more of following means:		—
	a) ENCLOSURES or PROTECTIVE BARRIERS (see 6.4.2)		N/A
	b) BASIC INSULATION (see 6.4.3)		N/A
	c) Impedance (see 6.4.4)		N/A
6.4.2	ENCLOSURES or PROTECTIVE BARRIERS	(see Forms A.15 and A.16)	N/A
	– meet rigidity requirements of 8.1		N/A
	– meet requirements for BASIC INSULATION, if protection is provided by insulation		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	– meet requirements of 6.7 for CREEPAGE and – CLEARANCES between ACCESSIBLE parts and – HAZARDOUS live parts, if protection is provided by – limited access		N/A
6.4.3	BASIC INSULATION	(see Forms A.15 and A.16)	N/A
	– meet CLEARANCE, CREEPAGE DISTANCE and solid insulation requirements of 6.7		N/A
6.4.4	Impedance	(see Forms A.12 and A.15)	N/A
	Impedance used as primary means of protection meets all the following requirements:		—
	a) limits current or voltage to level of 6.3.2	(see Form A.6)	N/A
	b) RATED for maximum WORKING VOLTAGE and the amount of power it will dissipate		N/A
	c) CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of BASIC INSULATION of 6.7	(see Form A.15)	N/A
6.5	**Additional means of protection in case of SINGLE FAULT CONDITION**		N/A
6.5.1	General		N/A
	ACCESSIBLE parts are prevented from becoming HAZARDOUS live by the primary means of protection and supplemented by one of:		—
	a) PROTECTIVE BONDING (see 6.5.2)		N/A
	b) SUPPLEMENTARY INSULATION (see 6.5.3)		N/A
	c) automatic disconnection of the supply (see 6.5.5)		N/A
	d) current- or voltage-limiting device (see 6.5.6)		N/A
	Alternatively one of the single means of protection is used:		—
	e) REINFORCED INSULATION (see 6.5.3)		N/A
	f) PROTECTIVE IMPEDANCE (see 6.5.4)		N/A
6.5.2	PROTECTIVE BONDING	(see Forms A.7, A.8, A.9, A.10 or A.11)	N/A
6.5.2.1	General		N/A
	ACCESSIBLE conductive parts, may become HAZARDOUS LIVE in SINGLE FAULT CONDITION:		—
	Bonded to the PROTECTIVE CONDUCTOR TERMINAL; or		
	Separated by conductive screen or barrier bonded to PROTECTIVE CONDUCTOR TERMINAL		N/A
6.5.2.2	Integrity of PROTECTIVE BONDING		—
	A) PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamicstresses		N/A
	b) Soldered connections:		—
	Independently secured against loosening		N/A
	Not used for other purposes		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	c) Screw connections are secured		N/A
	D) PROTECTIVE BONDING not interrupted; or		N/A
	except as removable part that carries MAINS SUPPLY input connection to the whole equipment		N/A
	e) Any movable PROTECTIVE BONDING connection specifically designed, and meets 6.5.2.4		N/A
	f) No external metal braid of cables used (not regarded as PROTECTIVE BONDING)		N/A
	G) IF MAINS SUPPLY passes through:		—
	Means provided for passing protective conductor;		N/A
	Impedance meets 6.5.2.4		N/A
	H) Protective conductors bare or insulated, if insulated, green/yellow		N/A
	Exceptions:		—
	1) earthing braids;		N/A
	2) internal protective conductors etc.;		N/A
	Green/yellow not used for other purposes		N/A
	TERMINAL suitable for connection of a PROTECTIVE CONDUCTOR, and meets 6.5.2.3		N/A
6.5.2.3	PROTECTIVE CONDUCTOR TERMINAL		—
	a) Contact surfaces are metal		N/A
	b) Appliance inlet used		N/A
	C) For rewirable cords and PERMANENTLY CONNECTED EQUIPMENT, PROTECTIVE CONDUCTOR TERMINAL is close to MAINS supply TERMINALS		N/A
	d) If no MAINS supply is required, any PROTECTIVE CONDUCTOR TERMINAL:		—
	Is near terminals of circuit for which protective earthing is necessary		N/A
	External if other terminals external		N/A
	e) Equivalent current-carrying capacity to MAINS supply TERMINALS	(see Form A.7)	N/A
	f) If plug-in, makes first and breaks last		N/A
	g) If also used for other bonding purposes, PROTECTIVE CONDUCTOR:		—
	Applied first;		N/A
	Secured independently;		N/A
	Unlikely to be removed by servicing		N/A
	h) PROTECTIVE CONDUCTOR of measuring circuit:		—
	1) Current RATING equivalent to measuring circuit TERMINAL;		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	2) PROTECTIVE BONDING: not interrupted by any switch or interrupting device		N/A
	i) FUNCTIONAL EARTH TERMINALS allow independent connection		N/A
	j) If a binding screw used for PROTECTIVE CONDUCTOR TERMINAL:		—
	Suitable size for bond wire		N/A
	Not smaller than M 4		N/A
	At least 3 turns of screw engaged		N/A
	Passes tightening torque test	(see Form A.8)	N/A
	k) Contact pressure not capable being reduced by deformation of materials		N/A
6.5.2.4	Impedance of PROTECTIVE BONDING of plug-connected equipment	(see Form A.9)	N/A
	Impedance between PROTECTIVE CONDUCTOR TERMINAL and each ACCESSIBLE part where PROTECTIVE BONDING is specified, is:		—
	– less than 0,1 Ohm; or		N/A
	– less than 0,2 Ohm if equipment is provided with non-detachable cord		N/A
6.5.2.5	Impedance of PROTECTIVE BONDING of PERMANENTLY CONNECTED EQUIPMENT	(see Form A.10)	N/A
6.5.2.6	Transformer PROTECTIVE BONDING screen	(see Form A.11)	N/A
	Transformer provided with screen for PROTECTIVE BONDING:		—
	screen bonding consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses (see 6.5.2.2 a)		N/A
	screen bonding with soldered connection (see 6.5.2.2 b) is:		—
	– Independently secured against loosening		N/A
	– Not used for other purposes		N/A
6.5.3	SUPPLEMENTARY and REINFORCED INSULATION		N/A
	Meet CLEARANCE, CREEPAGE DISTANCE and solid insulation requirements of 6.7		N/A
6.5.4	PROTECTIVE IMPEDANCE	(see Form A.12)	N/A
	Limits current or voltage to level of 6.3.1 in NORMAL and to level of 6.3.2 in SINGLE FAULT CONDITION		N/A
	CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of DOUBLE or REINFORCED INSULATION of 6.7	(see Form A.15)	N/A
	The PROTECTIVE IMPEDANCE consists of one or more of the following:	(see TABLE 1.A and Form A.12)	—
	a) appropriate single component suitable for safety and reliability for protection, it is:		—

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	1) RATED twice the maximum WORKING VOLTAGE		N/A
	2) resistor RATED for twice the power dissipation for maximum WORKING VOLTAGE		N/A
	b) combination of components		N/A
	Single electronic device not used as PROTECTIVE IMPEDANCE		N/A
6.5.5	Automatic disconnection of the supply		N/A
	a) RATED to disconnect the load within time specified in Figure 2		N/A
	b) RATED for the maximum load conditions of the equipment		N/A
6.5.6	Current- or voltage-limiting devices	(see Form A.13)	N/A
	Device complies with all of:		—
	a) RATED to limit the current or voltage to the level of 6.3.2	(see Form A.6)	N/A
	b) RATED for the maximum WORKING VOLTAGE; and		N/A
	RATED for the maximum operational current if applicable		N/A
	c) CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of SUPPLEMENTARY INSULATION of 6.7	(see Forms A.14 and A.15)	N/A
6.6	**Connections to external circuits**		N/A
6.6.1	General		N/A
	Connections do not cause ACCESSIBLE parts of the following to become HAZARDOUS LIVE in NORMAL CONDITION or SINGLE FAULT CONDITION:		—
	– the external circuits		N/A
	– the equipment		N/A
	Protection achieved by separation of circuits; or		N/A
	short circuit of separation does not cause a HAZARD		N/A
	Instructions or markings for each terminal include:		—
	A) RATED conditions for TERMINAL		N/A
	B) Required RATING of external circuit insulation		N/A
6.6.2	TERMINALS for external circuits		N/A
	TERMINALS which receive a charge from an internal capacitor are not HAZARDOUS LIVE after 10 s of interrupting supply connection	(see Form A.5)	N/A
6.6.3	Circuits with terminals which are HAZARDOUS LIVE		N/A
	These circuits are:		—
	Not connected to ACCESSIBLE conductive parts; or		N/A
	Connected to ACCESSIBLE conductive parts, but are not MAINS CIRCUITS and have one TERMINAL contact at earth potential		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	No ACCESSIBLE conductive parts are HAZARDOUS LIVE		N/A
6.6.4	Terminals for stranded conductors		N/A
	No RISK of accidental contact because:		—
	– Located or shielded		N/A
	– Self-evident or marked whether or not connected to ACCESSIBLE conductive parts		N/A
	Complies as applicable:		—
	a) Manufacturer's specified maximum length of removed insulation, or		N/A
	b) 8 mm length of insulation removed		N/A
6.7	**Insulation requirements**	(see Form A.14)	N/A
6.7.1	The nature of insulation		N/A
6.7.1.1	General		N/A
	Insulation between ACCESSIBLE parts or between separate circuits consist of CLEARANCES, CREEPAGE DISTANCES and solid insulation if provided as protection against a HAZARD		N/A
6.7.1.2	CLEARANCES		N/A
	Required CLEARANCES reflecting factors of 6.7.1.1	(see Forms A.14 and A.15)	N/A
	Equipment rated for operating altitude greater than 2000 m correction factor of Table 3 of 61010-1 applied		N/A
6.7.1.3	CREEPAGE DISTANCES		N/A
	Required CREEPAGE DISTANCES reflecting factors of 6.7.1.1 a) to d)	(see Forms A.14 and A.15)	N/A
	CTI material group reflected by requirements		N/A
	CTI test performed		N/A
6.7.1.4	Solid insulation		N/A
	Required solid insulation reflecting factors of 6.7.1.1 a) to d)	(see Forms A.14 and A.15)	N/A
6.7.1.5	Requirements for insulation according to type of circuit	(see Forms A.14 and A.15)	N/A
	A) 6.7.2 MAINS circuits of OVERVOLTAGE CATEGORY II up to nominal supply voltage of 300 V		N/A
	B) 6.7.3 secondary circuits separated from circuits defined in a) by transformer		N/A
	C) K.1 MAINS circuits of OVERVOLTAGE CATEGORY III and IV or OVERVOLTAGE CATEGORY II over 300 V		N/A
	D) K.2 secondary circuits separated from circuits defined in c) by transformer		N/A
	E) K.3 circuits having one or more of:		—
	1) maximum TRANSIENT OVERVOLTAGE is limited to known level below the level of MAINS CIRCUIT		N/A
	2) maximum TRANSIENT OVERVOLTAGE above the level of MAINS CIRCUIT		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	3) WORKING VOLTAGE is the sum of more than one circuit or a mixed voltage		N/A
	4) WORKING VOLTAGE includes recurring peak voltage, may include non-sinusoidal or non-periodic waveform		N/A
	5) WORKING VOLTAGE with a frequency above 30 kHz		N/A
6.7.2	Insulation for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II with a nominal supply voltage up to 300 V		N/A
6.7.2.1	CLEARANCES and CREEPAGE DISTANCES	(see Forms A.14 and A.15)	—
	Values for MAINS CIRCUITS of Table 4 are met		N/A
	Coatings to achieve reduction to POLLUTION DEGREE 1 comply with requirements of Annex H		N/A
6.7.2.2	Solid insulation		N/A
6.7.2.2.1	General		N/A
	Withstands electrical and mechanical stresses in normal use and all RATED environmental conditions of 1.4		N/A
	Equipment passed voltage tests of 6.8.3 with values of Table 5	(see Form A.18)	N/A
	Complies as applicable:		—
	A) ENCLOSURE or PROTECTIVE BARRIER of Clause 8		N/A
	b) moulded and potted parts requirements of 6.7.2.2.2		N/A
	C) inner layers of printed wiring boards requirements of 6.7.2.2.3		N/A
	D) thin-film insulation requirements of 6.7.2.2.4		N/A
6.7.2.2.2	Moulded and potted parts		—
	Conductors between same two layers are separated by at least 0,4 mm after moulding is completed		N/A
6.7.2.2.3	Inner insulating layers of printed wiring boards		—
	Separated by at least 0,4 mm between same two layers		N/A
	REINFORCED INSULATION have adequate electric strength; one of following methods used:		—
	a) thickness of insulation is at least 0,4 mm		N/A
	b) insulation is assembled of minimum two separate layers, each RATED for test voltage of Table 5 for BASIC INSULATION		N/A
	C) insulation is assembled of minimum two separate layers, where the combination is rated for test voltage of Table 5 for REINFORCED INSULATION		N/A
6.7.2.2.4	Thin-film insulation		—
	Conductors between same two layers are separated by applicable CLEARANCES and CREEPAGE DISTANCE of 6.7.2.1		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	REINFORCED INSULATION have adequate electric strength; one of the following methods used:		—
	a) thickness through the insulation at least 0,4 mm		N/A
	b) insulation is assembled of min. two separate layers, each RATED for test voltage of Table 5 for BASIC INSULATION	(see Form A.18)	N/A
	C) insulation is assembled of min. three separate layers, where the combination of two layers passed voltage tests of 6.8.3 with values of Table 5 for REINFORCED INSULATION	(see Form A.18)	N/A
6.7.3	Insulation for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V		N/A
6.7.3.1	General		N/A
	Secondary circuits where separation from MAINS CIRCUITS is achieved by a transformer providing:		—
	– REINFORCED INSULATION		N/A
	– DOUBLE INSULATION		N/A
	– screen connected to the PROTECTIVE CONDUCTOR TERMINAL		N/A
6.7.3.2	CLEARANCES	(see Forms A.14 and A.15)	N/A
	a) meet the values of Table 6 for BASIC INSULATION and SUPPLEMENTARY INSULATION; or		N/A
	twice the values of Table 6 for REINFORCED INSULATION; or		N/A
	B) pass the voltage tests of 6.8 with values of Table 6;	(see Form A.18)	N/A
	with following adjustments:		—
	1) values for reinforced insulation are 1,6 times the values for basic insulation		N/A
	2) if operating altitude is greater than 2000 m values of CLEARANCES multiplied with factor of Table 3		N/A
	3) minimum CLEARANCE is 0,2 mm for POLLUTION DEGREE 2 and 0,8 mm for POLLUTION DEGREE 3		N/A
6.7.3.3	CREEPAGE DISTANCES	(see Forms A.14 and A.15)	N/A
	Based on WORKING VOLTAGE meets the values of Table 7 for BASIC and SUPPLEMENTARY INSULATION		N/A
	Values for REINFORCED INSULATION are twice the values of BASIC INSULATION		N/A
	Coatings to achieve reduction to POLLUTION DEGREE 1 comply with requirements of Annex H		N/A
6.7.3.4	Solid insulation		N/A
6.7.3.4.1	General		N/A
	Withstands electrical and mechanical stresses in normal use and all RATED environmental conditions of 1.4		—

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Equipment passed voltage test of 6.8.3.1 for 5 s with VALUES of Table 6 for BASIC and SUPPLEMENTARY INSULATION	(see Form A.18)	N/A
	values for REINFORCED INSULATION are 1,6 times the values of BASIC INSULATION		N/A
	b) if WORKING VOLTAGE exceeds 300 V, equipment passed voltage test of 6.8.3.1 for 1 min with a test voltage of 1,5 times working voltage for BASIC or SUPPLEMENTARY INSULATION	(see Form A.18)	N/A
	value for REINFORCED INSULATION are twice the WORKING VOLTAGE		N/A
	Complies as applicable:		—
	1) ENCLOSURE or PROTECTIVE BARRIER of Clause 8		N/A
	2) moulded and potted parts requirements of 6.7.3.4.2		N/A
	3) inner layers of printed wiring boards requirements of 6.7.3.4.3		N/A
	4) thin-film insulation requirements of 6.7.3.4.4		N/A
6.7.3.4.2	Moulded and potted parts		—
	Conductors between same two layers are separated by applicable distances of Table 8		N/A
6.7.3.4.3	Inner insulation layers of printed wiring boards		—
	Separated by at least the applicable distances of Table 8 between same two layers		N/A
	REINFORCED INSULATION have adequate electric strength; one of following methods used:		—
	a) thickness at least applicable distance of Table 8		N/A
	b) insulation is assembled of minimum two separate layers, each RATED for test voltage of Table 6 for BASIC INSULATION	(see Form A.18)	N/A
	C) insulation is assembled of min. two separate layers, where the combination is RATED for 1,6 times the test voltage of Table 6	(see Form A.18)	N/A
6.7.3.4.4	Thin-film insulation		—
	Conductors between same two layers are separated by applicable CLEARANCES and CREEPAGE DISTANCE of 6.7.3.2 and 6.7.3.3		N/A
	REINFORCED INSULATION have adequate electric strength; one of following methods used:		—
	a) thickness at least applicable distance of Table 8		N/A
	b) insulation is assembled of min. two separate layers, each RATED for test voltage of Table 6 for BASIC INSULATION	(see Form A.18)	N/A
	C) insulation is assembled of min. three separate layers, where the combination of two layers passed voltage tests with 1,6 time values of Table 6:	(see Form A.18)	—

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	a.c. test of 6.8.3.1; or		N/A
	d.c. test of 6.8.3.2 for circuits stressed only by d.c. voltages		N/A
6.8	**Procedure for voltage tests**	(see Forms A.14 and A.18)	N/A
6.9	**Constructional requirements for protection against electric shock**		N/A
6.9.1	General		N/A
	If a failure could cause a HAZARD:		—
	a) security of wiring connections		N/A
	b) screws securing removable covers		N/A
	c) accidental loosening		N/A
	d) CLEARANCES and CREEPAGE DISTANCES not reduced below the values of basic insulation by loosening of parts or wires		N/A
6.9.2	Insulating materials		N/A
	Material not to be used for safety relevant insulation:		—
	a) easily damaged materials not used		N/A
	b) non-impregnated hygroscopic materials not used		N/A
6.9.3	Colour coding		N/A
	Green-and-yellow insulation shall not be used except:		—
	a) protective earth conductors;		N/A
	b) PROTECTIVE BONDING conductors;		N/A
	c) potential equalization conductors;		N/A
	d) functional earth conductors		N/A
6.10	**Connection to MAINS supply source and connections between parts of equipment**		N/A
6.10.1	MAINS supply cords		N/A
	RATED for maximum equipment current (see 5.1.3 c)		N/A
	Cable complies with IEC 60227 or IEC 60245		N/A
	Heat-resistant if likely to contact hot parts		N/A
	Temperature RATING (cord and inlet)..... :		—
	Green/yellow used only for connection to PROTECTIVE CONDUCTOR TERMINALS		N/A
	Detachable cords with IEC 60320 MAINS connectors:		—
	Conform to IEC 60799; or		N/A
	Have the current RATING of the MAINS connector		N/A
6.10.2	Fitting of non-detachable MAINS supply cords		N/A
6.10.2.1	Cord entry		—
	a) inlet or bushing with a smoothly rounded opening; or		N/A
	b) insulated cord guard protruding >5 D (diameter)		N/A
6.10.2.2	Cord anchorage		—

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Protective earth conductor is the last to take the strain		N/A
	a) cord is not clamped by direct pressure from a screw		N/A
	b) knots are not used		N/A
	c) cannot push the cord into the equipment to cause a HAZARD		N/A
	d) no failure of cord insulation in anchorage with metal parts		N/A
	e) not to be loosened without a tool		N/A
	f) cord replacement does not cause a HAZARD and method of strain relief is clear		N/A
	Push-pull and or torque test	(see Form A.19)	N/A
6.10.3	Plugs and connectors		N/A
	MAINS supply plugs, connectors etc., conform with relevant specifications		N/A
	If equipment supplied at voltages below 6.3.2.a) or from a sole source:		—
	Plugs of supply cords do not fit MAINS sockets above rated SUPPLY voltage		N/A
	MAINS type plugs used only for connection to MAINS supply		N/A
	Plug pins which receive a charge from an internal capacitor	(see Form A.5)	N/A
	Accessory MAINS socket outlets:		—
	a) marking if accepts a standard MAINS supply plug (see 5.1.3e)		N/A
	b) input has a protective earth conductor if outlet has EARTH TERMINAL CONTACT		N/A
6.11	**Disconnection from supply source**		N/A
6.11.1	Disconnects all current-carrying conductors		N/A
6.11.2	Exceptions		N/A
6.11.3	Requirements according to type of equipment		N/A
6.11.3.1	PERMANENTLY CONNECTED EQUIPMENT and multi-phase equipment		N/A
	Employs switch or circuit-breaker		N/A
	If switch or circuit-breaker is not part of the equipment, documentation requires:		—
	a) switch or circuit-breaker to be included in building installation		N/A
	b) suitable location easily reached		N/A
	c) marking as disconnecting for the equipment		N/A
6.11.3.2	Single-phase cord-connected equipment		N/A
	Equipment is provided with one of the following:		—
	a) switch or circuit-breaker		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) appliance coupler (disconnectable without tool)		N/A
	c) separable plug (without locking device)		N/A
6.11.4	Disconnecting devices		N/A
6.11.4.1	General		N/A
	Disconnecting device part of equipment		N/A
	Electrically close to the SUPPLY		N/A
	Power-consuming components not electrically located between the supply source and the disconnecting device		N/A
	Except electromagnetic interference suppression circuits permitted to be located on the supply side of the disconnecting device		N/A
6.11.4.2	Switches and circuit-breakers		N/A
	When used as disconnection device:		—
	Circuit breaker meets the relevant requirements IEC 60947-2 and is suitable for the application		N/A
	Switch meets the relevant requirements IEC 60947-3 and is suitable for the application		—
	Marked to indicate function.....:		—
	Not incorporated in MAINS cord		N/A
	Does not interrupt PROTECTIVE EARTH CONDUCTOR		N/A
6.11.4.3	Appliance couplers and plugs		N/A
	Where an appliance coupler or separable plug is used as the disconnecting device (see 6.11.3.2):		—
	Readily identifiable and easily reached by the operator		N/A
	Single-phase portable equipment cord length not more than 3 m		N/A
	PROTECTIVE EARTH CONDUCTOR connected first and disconnected last		N/A
7	**PROTECTION AGAINST MECHANICAL HAZARDS**		P
7.1	**General**		P
	Equipment does not cause a mechanical HAZARD in NORMAL nor in SINGLE FAULT CONDITION		P
	Conformity is checked by 7.2 to 7.7		P
7.2	**Sharp edges**		P
	Easily-touched parts are smooth and rounded		P
	Do not cause injury during NORMAL USE and		P
	Do not cause injury during SINGLE FAULT CONDITION		P
7.3	**Moving parts**	No moving parts	N/A
7.3.1	General		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	HAZARDS from moving parts limited to a tolerable level with the conditions specified in 7.3.2 and 7.3.5		N/A
	RISK assessment in accordance with 7.3.3 carried out		N/A
7.3.2	Exceptions		N/A
	Access to HAZARDOUS moving parts permitted under following circumstances:		—
	a) obviously intended to operate on parts or materials external of the equipment		N/A
	inadvertent touching of moving parts minimized b y equipment design (e .g. guards or handles)		N/A
	b) If OPERATOR access is unavoidable outside NORMAL USE following precautions have been taken:		—
	1) access requires TOOL		N/A
	2) statement about training in the instructions		N/A
	3) warning markings on covers prohibiting access by untrained OPERATORS		N/A
	or symbol 14 with full details in documentation		N/A
7.3.3	RISK assessment for mechanical HAZARDS to body parts		N/A
	RISK is reduced to a tolerable level by protective measures as specified in Table 12		N/A
	Minimum protective measures:		—
	A. Low level measures		N/A
	B. Moderate measures		N/A
	C. Stringent measures		N/A
7.3.4	Limitation of force and pressure	(see Form A.20)	N/A
	Following levels are met in NORMAL and SINGLE FAULT CONDITION:		—
	Continuous contact pressure below 50 N / cm² with force below 150 N		N/A
	Temporary force below 250 N for an area at least of 3 cm² for a maximum duration of 0,75 s		N/A
7.3.5	Gap limitations between moving parts	(see Form A.20)	N/A
7.3.5.1	Access normally allowed		—
	If levels of 7.3.4 exceeded and a body part may be inserted minimum gap as specified in Table 13 assured in NORMAL and in SINGLE FAULT CONDITION		N/A
7.3.5.2	Access normally prevented		—
	Maximum gap as specified in Table 14 assured in NORMAL and in SINGLE FAULT CONDITION		N/A
7.4	**Stability**		N/A
	Equipment not secured to building structure is physical stable		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Stability maintained after opening of drawers etc. by automatic means, or		N/A
	warning marking requires the application of means		N/A
	Compliance checked by following tests as applicable:	(see Form A.20A)	—
	a) 10° tilt test for other than handheld equipment		N/A
	b) multi-directional force test for equipment exceeds height of 1 m and mass of 25 kg		N/A
	c) downward force test for floor-standing equipment		N/A
	d) overload test with 4 times maximum load for castor or support foot that supports greatest load, or		N/A
	e) castor or support foot that supports greatest load removed from equipment		N/A
7.5	**Provisions for lifting and carrying**		N/A
7.5.1	General		N/A
	Equipment more than 18 kg..... :	<18kg	N/A
	Has means for lifting or carrying; or		N/A
	Directions are given in documentation		N/A
7.5.2	Handles and grips		N/A
	Handles or grips withstand four times weight		N/A
7.5.3	Lifting devices and supporting parts		N/A
	RATED for maximum load; or		N/A
	Tested with four times maximum static load		N/A
7.6	**Wall mounting**		N/A
	Mounting brackets withstand four times weight	(see Form A.20B)	N/A
	One fastner removed and test repeated with two times weight	(see Form A.20B)	N/A
7.7	**Expelled parts**		N/A
	Equipment contains or limits the energy		N/A
	Protection not removable without the aid of a tool		N/A

8	**RESISTANCE TO MECHANICAL STRESSES**		P
8.1	**General**		P
	Equipment does not cause a HAZARD when subjected to mechanical stresses in NORMAL USE		P
	Normal protection level is 5 J		P
	Levels below 5 J but not less than 1 J are acceptable if all of the following criteria are met:		—
	a) Lower level justified by RISK assessment of manufacturer		N/A
	b) Equipment installed in its intended application is not easily touched		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	c) Only occasional access during NORMAL USE		N/A
	d) IK code in accordance to IEC 62262 marked or symbol 14 used with full information in the documentation		N/A
	for non-metallic ENCLOSURES rated below 2 °C ambient temperature value chosen for minimum RATED temperature		N/A
	impact energies between IK values, the IK code marked for nearest lower value		N/A
	Conformity is checked by performing following tests:	(see Form A.16)	—
	1) Static test of 8.2.1		P
	2) Impact test of 8.2.2 with 5 J except for HAND-HELD EQUIPMENT		N/A
	if specified impact energy is not 5 J alternate method of IEC 62262 used		N/A
	3) Drop test of 8.3.1 or 8.3.2 except for FIXED EQUIPMENT and equipment with mass over 100 kg		P
	Equipment RATED with an impact rating of IK 08 that obviously meets the criteria		N/A
	After the tests inspection with following results:		—
	– HAZARDOUS LIVE parts above the limits of 6.3.2 not ACCESSIBLE		N/A
	– insulation pass the voltage tests of 6.8	(see Form A.30)	N/A
	i) No leaks of corrosive and harmful substances		N/A
	ii) ENCLOSURE shows no cracks resulting in a HAZARD		P
	iii) CLEARANCES not less than their permitted values		N/A
	iv) Insulation of internal wiring remains undamaged		N/A
	v) PROTECTIVE BARRIERS not damaged or loosened		N/A
	vi) No moving parts exposed, except permitted by 7.3		N/A
	vii) No damage which could cause spread of fire		P
8.2	**ENCLOSURE rigidity test**		P
8.2.1	Static test	(see Form A.21A)	P
	– 30 N with 12 mm rod applied to each part of ENCLOSURE		P
	– in case of doubt test conducted at maximum RATED ambient temperature		P
8.2.2	Impact test	(see Form A.21A)	P
	Impact applied to any part of ENCLOSURE causing a HAZARD if damaged		P
	Impact energy level and corresponding IK code.....:	5J	—
	Non-metallic ENCLOSURES cooled to minimum RATED ambient temperature if below 2 °C		N/A
8.3	**Drop test**	(see Form A.21B)	P

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.1	Other than HAND-HELD and DIRECT-PLUG-IN EQUIPMENT		P
	Tests conducted with a drop height or angle of..... :	100mm	—
8.3.2	HAND-HELD and DIRECT-PLUG-IN EQUIPMENT		N/A
	Non-metallic ENCLOSURES cooled to minimum RATED ambient temperature if below 2 °C		N/A
	Drop test conducted with an height of 1 m		N/A
9	**PROTECTION AGAINST THE SPREAD OF FIRE**		P
9.1	**General**		P
	No spread of fire in NORMAL and SINGLE FAULT CONDITION		P
	MAINS supplied equipment meets requirements of 9.6 additionally		N/A
	Conformity is checked by minimum one or a combination of the following (see Figure 11):	(see Form A.22)	—
	a) SINGLE FAULT test of 4.4; or	(see Form A.1)	P
	b) Application of 9.2 (eliminating or reducing the sources of ignition); or		N/A
	c) Application of 9.3 (containment of fire within the equipment)		P
9.2	**Eliminating or reducing the sources of ignition within the equipment**		N/A
	a) 1) Limited-energy circuit (see 9.4); or		N/A
	2) BASIC INSULATION provided for parts of different potential; or	(see Forms A.14 and A.18)	N/A
	Bridging the insulation does not cause ignition	(see Form A.1)	N/A
	b) Surface temperature of liquids and parts (see 9.5)		N/A
	c) No ignition in circuits designed to produce heat	(see Form A.1)	N/A
9.3	**Containment of the fire within the equipment, should it occur**		P
9.3.1	General		P
	Spread of fire outside equipment reduced to a tolerable level if:		—
	a) Energizing of the equipment is controlled by an OPERATOR held switch		N/A
	b) ENCLOSURE is conform with constructional requirements of 9.3.2; and		P
	Requirements of 9.5 are met		N/A
9.3.2	Constructional requirements		P
	a) Connectors and insulating material have flammability classification V-2 or better	(see TABLE 1.A or Form A.23)	P
	b) Insulated wires and cables are flame retardant (VW- 1 or equivalent)	(see TABLE 1.A or Form A.23)	P
	c) ENCLOSURE meets following requirements:	(see Form A.22)	—

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	1) Bottom and sides in arc of 5 ° (see Figure 13) to non- limited circuits (9.4) meets:		—
	i) no openings; or		P
	ii) perforated as specified in Table 16; or		N/A
	iii) metal screen with a mesh; or		N/A
	iv) baffles as specified in Figure 12		N/A
	2) Material of ENCLOSURE and any baffle or flame barrier is made of:		—
	Metal (except magnesium); or		N/A
	Non-metallic materials have flammability classification V-1 or better	(see TABLE 1.A or Form A.22)	P
	3) ENCLOSURE and any baffle or flame barrier have adequate rigidity		P
9.4	**Limited-energy circuit**	(see Form A.24)	N/A
	a) Potential not more than 30 r.m.s. and 42,4 V peak, or 60 V d.c.		N/A
	b) Current limited by one of following means:		—
	1) Inherently or by impedance (see Table 17); or		N/A
	2) Overcurrent protective device (see Table 18); or		N/A
	3) A regulating network limits also in SINGLE FAULT CONDITION (see Table 17)		N/A
	c) Is separated by at least BASIC INSULATION		N/A
	Fuse or a nonadjustable electromechanical device is used		N/A
9.5	**Requirements for equipment containing or using flammable liquids**		N/A
	Flammable liquids contained in or specified for use with equipment do not cause spread of fire	(see Form A.25)	N/A
	RISK is reduced to a tolerable level:		—
	a) The temperature of surface or parts in contact with flammable liquids is 25 °C below fire point		N/A
	b) The quantity of liquid is limited		N/A
	c) Flames are contained within the equipment		N/A
	Detailed instructions for RISK-reduction provided		N/A
9.6	**Overcurrent protection**		N/A
9.6.1	General		N/A
	MAINS supplied equipment protected		N/A
	BASIC INSULATION between MAINS parts of opposite polarity provided	(see Forms A.14 and A.15)	N/A
	Overcurrent protection devices not fitted in the protective conductor		N/A
	Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase equipment)		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
9.6.2	PERMANENTLY CONNECTED EQUIPMENT		N/A
	Overcurrent protection device:		—
	Fitted within the equipment; or		N/A
	Specified in manufacturer's instructions		N/A
9.6.3	Other equipment		N/A
	Protection within the equipment		N/A

10	**EQUIPMENT TEMPERATURE LIMITS AND RESISTANCE TO HEAT**		P
10.1	**Surface temperature limits for protection against burns**		P
	Easily touched surfaces within the limits in NORMAL and in SINGLE FAULT CONDITION:	(see Form A.26A)	—
	– at an specified ambient temperature of 40 °C		P
	– for equipment rated above 40 °C ambient temperature limits not exceeded raised by the difference to 40 °C		N/A
	Heated surfaces necessary for functional reasons exceeding specified values:		—
	– Are recognizable as such by appearance or function; or		N/A
	– Are marked with symbol 13		N/A
	– Guards are not removable without tool		N/A
10.2	**Temperatures of windings**		N/A
	Limits not exceeded in:	(see Form A.26B)	—
	NORMAL CONDITION		N/A
	SINGLE FAULT CONDITION		N/A
10.3	**Other temperature measurements**		P
	Following measurements conducted if applicable:	(see Form A.26A)	—
	a) Value of 60 °C of field-wiring terminal box not exceeded		N/A
	b) Surface of flammable liquids and parts in contact with this liquids		N/A
	c) Surface of non-metallic ENCLOSURES		P
	d) Parts made of insulating material supporting parts connected to MAINS supply		N/A
	e) Terminals carrying a current more than 0,5 A		N/A
10.4	**Conduct of temperature tests**		P
10.4.1	General		P
	Tests conducted under reference test conditions and manufacturer's instructions	(see Form A.26A)	P

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Tests alternatively conducted at the least favourable ambient temperature within the RATED ambient temperature..... :		—
10.4.2	Temperature measurement of heating equipment	No heating equipment	N/A
	Tests conducted in test corner	(see Form A.26A)	N/A
10.4.3	Equipment intended for installation in a cabinet or wall		N/A
	Equipment built in as specified in installation instructions	(see Form A.26A)	N/A
10.5	**Resistance to heat**		P
10.5.1	Integrity of CLEARANCE and CREEPAGE DISTANCES	(see Form A.16)	N/A
10.5.2	Non-metallic ENCLOSURES	(see Form A.27)	P
	Within 10 min after treatment:		—
	Equipment subjected to suitable stresses of 8.2 and 8.3 complying with criteria of 8.1		P
10.5.3	Insulating material		N/A
	a) Parts supporting parts connected to MAINS supply		N/A
	b) TERMINALS carrying a current more than 0,5 A		N/A
	Examination of material data; or		N/A
	in case of doubt:		N/A
	1) Ball pressure test; or	(see Form A.28)	N/A
	2) Vicat softening test of ISO 306	(see Form A.29)	N/A
11	**PROTECTION AGAINST HAZARDS FROM FLUIDS AND SOLID FOREIGN OBJECTS**		N/A
11.1	**General**		N/A
	Protection to OPERATORS and surrounding area provided by EQUIPMENT		N/A
	All fluids specified by manufacturer considered		N/A
11.2	**Cleaning**	(see Form A.30)	N/A
11.3	**Spillage**	(see Form A.30)	N/A
11.4	**Overflow**	(see Form A.30)	N/A
11.5	**Battery electrolyte**		N/A
	Battery electrolyte leakage presents no HAZARD		N/A
11.6	**Equipment RATED with a degree of ingress protection (IP code)**	(see Form A.30)	N/A
11.6.1	General		N/A
	Equipment marked with IP code..... :		—
	Conditions specified in the documentation		N/A
11.6.2	Conditions for testing		N/A
	Equipment in clean and new condition, all parts in place and mounted as specified by manufacturer		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Complete equipment tested, or		N/A
	representative parts tested		N/A
	HAND-HELD EQUIPMENT and PORTABLE EQUIPMENT placed in least favourable position of NORMAL use		N/A
	Other equipment positioned or installed as specified		N/A
	TERMINALS provided with protective cap or cover, are installed as specified by manufacturer		N/A
	The equipment is operating (energized) during the treatment except:		—
	a) If manufacturer specifies degrees of protection for non-operating (de-energized) equipment, or		N/A
	b) Equipment is operating or non-operating during the treatment with does not affect the test results		N/A
11.6.3	Protection against solid foreign objects (including dust)		N/A
	Applicable test of IEC 60529 for protection against solid foreign objects conducted		N/A
	Additionally inspection of equipment resulted:		—
	a) No deposit on insulation parts that could lead to a HAZARD		N/A
	b) No created accumulations that have the potential to cause spread of fire		N/A
11.6.4	Protection against water		N/A
	Applicable test of IEC 60529 for protection against water conducted		N/A
	If any water has entered, safety is not impaired, inspection of equipment resulted:		—
	a) No deposit on insulation parts that could lead to a HAZARD		N/A
	b) Water has not reached hazardous live parts or windings which are not designed to operate when wet		N/A
	c) No accumulations near the end of cable nor enter the cable where it could cause a HAZARD		N/A
	d) No accumulations where it could lead to a HAZARD taking in consideration movement of the equipment		N/A
11.7	**Fluid pressure and leakage**		N/A
11.7.1	Maximum pressure..... :	(see Form A.31)	—
	Maximum pressure of any part does not exceed P_{RATED}		N/A
11.7.2	Leakage and rupture at high pressure		N/A
	Fluid-containing parts checked by inspection or if a HAZARD could arise subjected to hydraulic test, if:	(see Form A.31)	—
	a) product of pressure and volume > 200 kPa·l; and		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) pressure > 50 kPa		N/A
	Safety evidence established by calculation in acc. to national authorities (e.g. Pressure Equipment Directive 2014/68/EU)		N/A
	Parts of refrigerating systems meets pressure-related requirements of EN 378-2 or IEC 60335-2-89 as applicable		N/A
11.7.3	Leakage from low-pressure parts	(see Form A.32)	N/A
11.7.4	Overpressure safety device		N/A
	Does not operate in NORMAL USE		N/A
	a) Connected as close as possible to parts intended to be protected		N/A
	b) Easy access for inspection, maintenance and repair		N/A
	c) Adjustment only with TOOL		N/A
	d) No discharge towards person		N/A
	e) No HAZARD from deposit of discharged material		N/A
	f) Adequate discharge capacity		N/A
	No shut-off valve between overpressure safety device and protected parts		N/A
12	**PROTECTION AGAINST RADIATION, INCLUDING LASER SOURCES, AND AGAINST SONIC AND ULTRASONIC PRESSURE**		N/A
12.1	**General**		N/A
	Equipment provides protection		N/A
12.2	**Equipment producing ionizing radiation**		N/A
12.2.1	Ionizing radiation	(see Form A.33)	N/A
12.2.1.1	General		N/A
	Equipment meets the following requirements:		—
	a) if intended to emit radiation meets requirements of 12.2.1.2; or		N/A
	tested, classified and marked in accordance to IEC 62598		N/A
	b) if only emits stray radiation meets requirements of 12.2.1.3		N/A
12.2.1.2	Equipment intended to emit radiation		—
	Effective dose rate of radiation measured..... :		—
	If dose rate exceeds 5 µSv/h marked with the following:		—
	a) symbol 17 (ISO 361)		N/A
	b) abbreviations of the radionuclides.....:		—
	c) with maximum dose at 1 m; or.....:		—
	with dose rate value between 1 µSv/h and 5 µSv/h in		—

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	m..... :		
12.2.1.3	Equipment not intended to emit radiation	(see Form A.34)	—
	Limit for unintended stray radiation of 1 µSv/h at any easily reached point kept ..... :		N/A
12.2.2	Accelerated electrons		N/A
	Compartments opened only by the use of a TOOL		N/A
12.3	**Optical radiation**		N/A
	No unintentional HAZARDOUS escape of optical radiation as ultraviolet, visible or infrared radiation, including light emitting diodes:		—
	– Checked by inspection; and		N/A
	– Radiation sources assessed in acc. to the requirements of IEC 62471, except for sources considered to be safe (Table 22) or conditionally safe (Table 23).		N/A
	– Lamp and lamp systems assessed to Risk Groups 1, 2, or 3 of IEC 62471 are labelled in acc. to IEC 62471-2		N/A
	– If labelling impractical, lamp or lamp systems marked with symbol 14		N/A
	– Protective measures, restrictions on use, and operating instructions that may be necessary are provided, including the applicable conditions of use of Table 23.		N/A
12.4	**Microwave radiation**		N/A
	Power density does not exceed 10 W/m^2..... :		N/A
12.5	**Sonic and ultrasonic pressure**		N/A
12.5.1	Sound level	(see Form A.35)	N/A
	No HAZARDOUS sound emission		N/A
	Maximum sound pressure level measured and calculated for maximum sound power level as specified in ISO 3746 or ISO 9614-1		N/A
	Instruction describes measures for protection		N/A
12.5.2	Ultrasonic pressure	(see Form A.36)	N/A
	Equipment not intended to emit ultrasound does not exceed limit of 110 dB between 20 kHz and 100 kHz		N/A
	Equipment intended to emit ultrasound:		N/A
	Outside useful beam does not exceed limit of 110 dB between 20 kHz and 100 kHz		N/A
	If inside useful beam above values exceeded:		—
	Marked with Symbol 14 of Table 1		N/A
	and following information in the documentation:		—

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	a) dimensions of useful beam		N/A
	b) area where ultrasonic pressure exceed 110 dB		N/A
	c) maximum sound pressure inside beam area		N/A
12.6	**Laser sources**		N/A
	Equipment meets requirements of IEC 60825-1		N/A
13	**PROTECTION AGAINST LIBERATED GASES AND SUBSTANCES, EXPLOSION AND IMPLOSION**		P
13.1	**Poisonous and injurious gases and substances**		P
	No hazardous substances liberated in NORMAL CONDITION and in SINGLE FAULT CONDITION		P
	If potentially-hazardous substances are liberated:		—
	Operator is not directly exposed to a quantity of the substance that could cause harm		N/A
	Requirements to discharge of hazardous substances during NORMAL operation in accordance to manufacturer's instructions not considered as liberation		N/A
	Attached data/test reports demonstrate conformity		N/A
13.2	**Explosion and implosion**		P
13.2.1	Components		N/A
	Components liable to explode:		—
	Pressure release device provided; or		N/A
	Apparatus incorporates operator protection (see also 7.7)		N/A
	Pressure release device:		—
	Discharge without danger		N/A
	Cannot be obstructed		N/A
13.2.2	Batteries and battery charging	(see Form A.37)	P
	If explosion or fire HAZARD could occur:		—
	Protection incorporated in the equipment; or		N/A
	Instructions specify batteries with built-in protection		N/A
	In case of wrong type of battery used:		—
	No HAZARD; or		N/A
	Warning by marking and within instructions		N/A
	Equipment with means to charge rechargeable batteries:		—
	Warning against the charging of non-rechargeable batteries; and		N/A
	Type of rechargeable battery indicated; or		P
	Symbol 14 used		P
	Battery compartment design		P

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Single component failure		P
	Polarity reversal test		N/A
13.2.3	Implosion of cathode ray tubes		N/A
	If maximum face dimensions > 160 mm..... :		—
	Intrinsically protected and correctly mounted; or		N/A
	ENCLOSURE provides protection:		N/A
	If non-intrinsically protected:		—
	Screen not removable without TOOL		N/A
	If glass screen, not in contact with surface of tube		N/A
14	**COMPONENTS AND SUBASSEMBLIES**		P
14.1	**General**		P
	Where safety is involved, components and subassemblies meet relevant requirements	(see TABLE 1.A)	P
14.2	**Motors**		N/A
14.2.1	Motor temperatures		N/A
	Does not present a HAZARD when stopped or prevented from starting; or	(see Forms A.1 and A.26B)	N/A
	Protected by over-temperature or thermal protection device conform with 14.3		N/A
14.2.2	Series excitation motors		N/A
	Connected direct to device, if overspeeding causes a HAZARD		N/A
14.3	**Overtemperature protection devices**		N/A
	Devices operating in a SINGLE FAULT CONDITION	(see Form A.38)	N/A
	a) Reliable function is ensured		N/A
	B) RATED to interrupt maximum current and voltage		N/A
	c) Does not operate in NORMAL USE		N/A
	If self-resetting device used to prevent a HAZARD, protected part requires intervention before restarting		N/A
14.4	**Fuse holders**		N/A
	No access to HAZARDOUS LIVE parts		N/A
14.5	**MAINS voltage selecting devices**		N/A
	Accidental change not possible		N/A
14.6	**MAINS transformers tested outside equipment**	(see Forms A.39 and A.40)	N/A
14.7	**Printed wiring boards**		P
	Data shows conformity with V-1 of IEC 60695-11-10 or better; or		P
	Test shows conformity with V-1 of IEC 60695-11-10 or better	(see Form A.23)	N/A
	Not applicable for printed wiring boards with limited-energy circuits (9.4)		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
14.8	**Circuits used to limit TRANSIENT OVERVOLTAGES**		N/A
	Test conducted between each pair of MAINS SUPPLY TERMINALS	(see Form A.41)	N/A
	No ignition or overheating of other materials :		—
	– no ignition		N/A
	– no heat to other parts above the self-ignition points		N/A
	Safely suppressing and properly functional after applied tests		N/A
15	**PROTECTION BY INTERLOCKS**		N/A
15.1	**General**		N/A
	Interlocks are designed to remove a HAZARD before OPERATOR exposed		N/A
15.2	**Prevention of reactivation**		N/A
15.3	**Reliability**		N/A
	Single fault unlikely to occur; or		N/A
	Cannot cause a HAZARD		N/A
16	**HAZARDS RESULTING FROM APPLICATION**		N/A
16.1	**REASONABLY FORESEEABLE MISUSE**		N/A
	No HAZARDS arising from settings not intended and not described in the instructions		N/A
	Other cases of REASONABLY FORESEEABLE MISUSE addressed by RISK assessment		N/A
16.2	**Ergonomic aspects**		N/A
	Factors giving rise to a HAZARD the RISK assessment is reflecting those aspects:		—
	a) limitation of body dimensions		N/A
	b) displays and indicators		N/A
	c) accessibility and conventions of controls		N/A
	d) arrangement of TERMINALS		N/A
17	**RISK ASSESSMENT**		P
	RISK assessment conducted, if HAZARD might arise and not covered by Clauses 6 to 16		P
	TOLERABLE RISK achieved by iterative documented process covering the following:		—
	a) RISK analysis		P
	Identifies HAZARDS and estimates RISK		P
	b) RISK evaluation		P

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Plan to judge acceptability of resulting RISK level based on the estimated severity and likelihood of a RISK		P
	c) RISK reduction		P
	Initial RISK reduced by counter measures;		P
	Repeated RISK evaluation without new RISKS introduced		P
	RISKS remaining after RISK assessment addressed in instructions to RESPONSIBLE BODY:		—
	Information contained how to mitigate these RISKS		P
	Following principles in methods of RISK reduction applied by manufacturer in given order:		—
	1) RISKS eliminated or reduced as far as possible		P
	2) Protective measures taken for RISKS that cannot be eliminated		P
	3) User information about residual RISK due to any defect of the protective measures		P
	Indication of particular training is required		P
	Specification of the need for personal protective equipment		P
	Conformity checked by evaluation of the RISK assessment documentation		P

ANNEX F	**ROUTINE TESTS**		N/A
	Manufacturer ´s declaration		N/A

ANNEX H	**QUALIFICATION OF CONFORMAL COATINGS FOR PROTECTION AGAINST POLLUTION**		N/A
H.1	**General**		N/A
	Conformal coatings meet the requirements of Clause H.2 and H.3.		N/A
H.2	**Technical properties**		N/A
	Technical properties of conformal coatings are suitable for the intended application. In particular:		—
	a) Manufacturer indicate that it is a coating for PWBs;		N/A
	b) RATED operating temperature include the temperature range of the indicated application;		N/A
	c) CTI, insulation resistance and dielectric strength are suitable for the intended application;		N/A
	d) Coating have adequate UV resistance, if it is exposed to sunlight;		N/A
	e) Flammability RATING of the coating is at least the required flammability RATING of the applied PWB.		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
H.3	**Qualification of coatings**	(see Form A.42)	N/A
	Coating complies with the conformity requirements.		N/A
ANNEX K	**INSULATION REQUIREMENTS NOT COVERED BY CLAUSE 6.7**	(see Forms A.15 and A.18)	N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.4	**TABLE: Testing in SINGLE FAULT CONDITION – Results**			**Form A.1**	P
Test subclause	Fault No.	Fault description	Td 4.4.3 (NOTE)	How was test terminated Comments	Meets 4.4.4
4.4.2.12	C1	Short circuit	10mins	Unit shut down immediately. Recoverable when the fault remove, no hazard.	P
4.4.2.12	U1 pin 1-5	Short circuit	10mins	Unit shut down immediately. Recoverable when the fault remove, no hazard.	P

NOTE Td = Test duration in hh:mm:ss
Record dielectric strength test on Form A.18 and temperature tests on Forms A.26A and / or A.26B.
Record in the comments column for each test whether carried out during or after SINGLE FAULT CONDITION.

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.1.3c)	**TABLE: MAINS supply**		**Form A.2**	P
	Marked rating..... :	5V		—
	Phase..... :	--		—
	Frequency .....:	--Hz		—
	Current ..... :	0.5A		—
	Power ..... :	--W		—
	Power ..... :	--VA		—

Test No.	Voltage [V]	Frequency [Hz]	Current [mA]	Power [W]	Power [VA]	Comments
1	DC5V	--	0.32	--	1.60	Normal operation

NOTE – Measurements are only required for marked ratings. Initial inrush currents are not regarded.

Supplementary information:

5.3	**TABLE: Durability of markings**	**Form A.3**	P

Marking method (see NOTE)	Agent
1) Adhesive label	A Isopropyl alcohol
2) Ink printed	B (specify agent)
3) Laser marked	C (specify agent)
4) Film-coated (plastic foil control panel)	D (specify agent)
5) Imprinted on plastic (moulded in)	E (specify agent)

NOTE – Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.

Marking location	Marking method (see above)
Identification (5.1.2)	1)
MAINS supply (5.1.3)	1)
Fuses (5.1.4)	--
Terminals and operating devices (5.1.5.2)	--
Switches and circuit breakers (5.1.6)	--
Double/reinforced equipment (5.1.7)	--
Field wiring Terminal boxes (5.1.8)	--
Warning marking (5.2)	--
Battery charging (13.2.2)	1)

Method	Test agent	Remains legible	Label loose	Curled edges	Comments
		Verdict	Verdict	Verdict	
1) Adhesive label				A Isopropyl alcohol	
2) Ink printed				B (specify agent)	

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

3) Laser marked	C (specify agent)
4) Film-coated (plastic foil control panel)	D (specify agent)
5) Imprinted on plastic (moulded in)	E (specify agent)

NOTE – Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.

Marking location			Marking method (see above)		
1)	A	Yes	No	No	P

Supplementary information:

6.2	**TABLE: List of ACCESSIBLE parts**	**Form A.4**	N/A
6.1.2	Exceptions		—
6.2	Determination of ACCESSIBLE parts		—

Item	Description	Determination method (NOTE 5)	Exception under 6.1.2 (NOTE 4)

NOTE 1 – Test fingers and pins are to be applied without force unless a force is specified (see 6.2.2)
NOTE 2 – Special consideration should be given to inadequate insulation and high voltage parts (see 6.2)
NOTE 3 – Parts are considered to be ACCESSIBLE if they could be touched in the absence of any covering which is not considered to provide suitable insulation (see 6.4).
NOTE 4 – Capacitance test may be required (see Form A.5).
NOTE 5 – The determination methods are:
V = visual; R = rigid test finger; J = jointed test finger; P3 = pin 3 mm diameter; P4 = pin 4 mm diameter.

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6	**TABLE: Values in NORMAL CONDITION**													**Form A.5**	N/A
6.1.2	Exceptions							11.2 Cleaning and decontamination							—
6.3.1	Values in NORMAL CONDITION (see NOTE 1)							11.3 Spillage							—
6.6.2	Terminals for external circuit							11.4 Overflow							—
6.10.3	Plugs and connections														—

Item (see Form A.4)	Voltage			Current				Capacitance		10 s / 5 s test (NOTE)			Comments
	V r.m.s.	V peak	V d.c.	Test circuit A1/A2/A3	mA r.m.s.	mA peak	mA d.c.	C	mJ	V	C	mJ	

NOTE – A 10 s test is specified in 6.1.2 a) b). A. 5 s test is specified in 6.10.3. The capacitance level versus voltage below the limits given from figure 3 of IEC 61010-1.

Supplementary information:

6.3.2	**TABLE: Values in SINGLE FAULT CONDITION**												**Form A.6**	N/A

Item (see Form A.4)	Subclause and fault No. (see Form A.1)	Voltage			Transient (see NOTE)		Current				Capacitance	Comments
		V r.m.s.	V peak	V d.c.	V	s	Test circuit A1/A2/A3	mA r.m.s.	mA peak	mA d.c.	F (see NOTE)	

NOTE – Transient voltages must be below the limits given from Figure 2 and the capacitance below the limits from figure 3 of IEC 61010-1.

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.5.2.2	**TABLE: Cross-sectional area of bonding conductors**	**Form A.7**	N/A

Conductor location	CROSS-SECTIONAL AREA [mm²]	Verdict

Supplementary information:

6.5.2.3	**TABLE: Tightening torque test**	**Form A.8**	N/A

Conductor location	Size of screw	Tightening torque [Nm]	Verdict

Supplementary information:

6.5.2.4	**TABLE: BONDING impedance of plug-connected equipment**	**Form A.9**	N/A

ACCESSIBLE part under test	Test current [A]	Voltage attained after 1 min [V]	Calculated resistance (Maximum 0,1 or 0,2) [ ] (NOTE 1)	Verdict

NOTE 1 – For none-detachable power cord the impedance between protective conductor plug pin of MAINS cord and each ACCESSIBLE part shall not exceed 0,2 Ohm.

Supplementary information:

6.5.2.5	**TABLE: BONDING impedance of PERMANENTLY CONNECTED EQUIPMENT**	**Form A.10**	N/A

ACCESSIBLE part under test	Test current [A]	Voltage attained after 1 min (maximum 10 V) [V]	Verdict

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.5.2.6	TABLE: Transformer PROTECIVE BONDING screen			Form A.11	N/A
ACCESSIBLE part under test		Test current (see NOTE) [A]	Voltage attained after 1 min (maximum 10 V) [V]	Calculated resistance (maximum 0,1) [ ]	Verdict

NOTE – Test current must be twice the value of the overcurrent protection means of the winding. Test is specified in 6.5.2.6 a) or b).

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.5.4	**TABLE: PROTECTIVE IMPEDANCE**	**Form A.12**	N/A

A single component

Component	Location	Measured		Calculated	Rated		Verdict	Comments
		Working voltage [V]	Current [A]	Power dissipation [W]	Working voltage [V]	Power dissipation [W]		

A combination of components

Component	Location	Comments

NOTE – A PROTECTIVE IMPEDANCE shall not be a single electronic device that employs electron conduction in a vacuum, gas or semiconductor.

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.5.6	TABLE: Current- or voltage-limiting device					Form A.13	N/A
Component	Location	Measured		Rated		Verdict	Comments
		Working voltage [V]	Current [A]	Working voltage [V]	Current [A]		
Supplementary information:							

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.7	**TABLE: Insulation requirements - Block diagram of system**	**Form A.14**	N/A

Pollution degree..... : Overvoltage category..... :

Area	Location	Insulation type (NOTE 1)	WORKING VOLTAGE			CLEARANCE (NOTE 3)	CREEPAGE DISTANCE (NOTE 3)				Test voltage (NOTE 2)	Comments (NOTE 3)
			RMS [V]	Peak [V]	Freq. [kHz]	[mm]	PWB [mm]	CTI	Other [mm]	CTI	[V]	
A												
B												
C												
D												
E												
F												

NOTE 1 – Type of insulation:
BI = BASIC INSULATION
DI = DOUBLE INSULATION
"Comments" PI = PROTECTIVE IMPEDANCE
RI = Reinforced INSULATION

ak SI = Supplementary INSULATION
see also Form A.15 for further details

NOTE 2 - Types of voltage
Peak impulse test voltage (pulse)
r.m.s.

pe

NOTE 3 - OVERVOLTAGE CATEGORIES or POLLUTION DEGREES which differ should be shown under
d.c.

Supplementary Information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.7	**TABLE: Insulation requirements - CLEARANCES and CREEPAGES**			**Form A.15**	N/A
6.2.2	Examination	6.5.4	Protective impedance		—
6.4.2	ENCLOSURES and protective barriers	6.5.6	Current- or voltage-limiting device		—
6.4.4	Impedance	9.6.1	BASIC INSULATION between opposite polarity		—

Area	Location (See Form A.14)	Insulation type (NOTE 1)	WORKING VOLTAGE (NOTE 2)			CLEARANCE		CREEPAGE DISTANCE		CTI	Verdict	Comments
			RMS [V]	Peak [V]	Frequency [kHz]	Required [mm]	Measured [mm]	Required [mm]	Measured [mm]			
A												
B												
C												
D												
E												
F												

NOTE 1 – refer to Form A.14 for type of insulation shown in the insulation diagram NOTE 2 - to be used for definition of required insulation (see Form A.14)

Input supply voltage…….:		V		Hz

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.7	**TABLE: Insulation requirements - CLEARANCES and CREEPAGES**			**Form A.16**	N/A
6.4.2	ENCLOSURES or PROTECTIVE BARRIERS	9.6.1	Overcurrent protection basic insulation between MAINS parts		—
8	Mechanical resistance to shock and impact	10.5.1	Integrity of CLEARANCES and CREEPAGE DISTANCES		—

Area	Location (See Form A.14)	Insulation type	Mechanical tests (NOTE)					Test at max.	Measured after test (if required)		Verdict	Comments
			Applied force	Rigidity (8.2)		Drop (8.3)		RATED ambient	CLEARANCE	CREEPAGE DISTANCE		
			[N]	Static (8.2.1)	Impact (8.2.2)	Normal (8.3.1)	Hand-held/ Plug-in	(10.5.1)	[mm]	[mm]		
A												
B												
C												
D												
E												
F												

NOTE – Refer to Form A.18 for dielectric strength tests following the above tests.

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.7.2.2.2	**TABLE: Reliability of potted components**	**Form A.17 (optional)**	N/A
14.1 b)	**Components and subassemblies**		N/A

Temperature Cycling Test	
Manufacturer.....:	
Type..... :	
Construction.....:	
Potting compound..... :	
CREEPAGE DISTANCES measured..... :	
CLEARANCES measured..... :	
Thickness through insulation..... :	
Adhesive test Pass/Fail.....:	
Test temperature T °C.....:	

Cycles at U= AC 500 V				Leakage current (at AC 500 V) mA			
Number of cycles	Date			68 h / 125 °C	1 h / 25 °C	2 h / 0 °C	1 h / 25 °C
1. Cycle from		to					
2. Cycle from		to					
3. Cycle from		to					
4. Cycle from		to					
5. Cycle from		to					
6. Cycle from		to					
7. Cycle from		to					
8. Cycle from		to					
9. Cycle from		to					
10. Cycle from		to					

After Cycling Test :		
Humidity conditioning	48 h	
Requirements for dielectric strength (s. insulation diagram)	Test voltage V r.m.s.	Verdict
Basic insulation _____V r.m.s.		
Supplementary insulation_____V r.m.s.		
Reinforced insulation _____V r.m.s.		

NOTE - to be used for evaluation of components containing insulation through solid insulation, when the component standard require thermal cycling test. Ref Clause 14.1 and Figure 15, option b)

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.8	**TABLE: Dielectric strength tests**	**Form A.18**	N/A
4.4.4.1 b)	Conformity after application of SINGLE FAULT CONDITIONS[1]		N/A
6.4	Primary means of protection[2]		N/A
6.6	Connections to external circuits		N/A
6.7	Insulation requirements[2] (see Annex K)		N/A
6.10.2	Fitting of non-detachable MAINS supply cords[1]		N/A
9.2 a) 2)	Eliminating or reducing the sources of ignition within the equipment		N/A
9.4 c)	Limited-energy circuit		N/A
9.6.1	Overcurrent protection basic insulation between MAINS - parts		N/A
	Test site altitude..... ..... :	m	—
	Test voltage correction factor (see table 10)..... :		—

Location or references from Forms A.1 and A.14	Clause or sub-clause	Humidity	Working voltage	Test voltage	Comments (NOTE)	Verdict
		Yes/No	[r.m.s./d.c.]	[r.m.s./peak/d.c.]		

[1] Record the fault, test or treatment applied before the dielectric strength test. [2] Humidity preconditioning required.
NOTE: Test duration may be recorded.

Supplementary information:

6.10.2	**TABLE: Cord anchorage**	**Form A.19**	N/A

Location	Mass [kg]	Pull [N]	Verdict	Torque [Nm]	Verdict	Comment

Dielectric strength test for 1 min. (6.8.3.1).....:		V r.m.s.	

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

7.	**TABLE: Protection against mechanical HAZARDS** **Form A.20**	N/A
7.3.4	Limitati on of force and pressure	—
7.3.5	Gap limitations between moving parts	—

Part / Location	Clause 7.3.4		Clause 7.3.5.1								Clause 7.3.5.2			Verdict	Comments
	Continuous	Temporary	Minimum gaps [mm]								Maximum gaps [mm]				
	Contact pressure max. 50 N /cm² @ max. 150 N	max. 250 N / 3 cm² @ max. 0,75 s	Torso 500	Head 300	Leg 180	Foot 120	Toes 50	Arm 120	Hand 100	Finger 25	Head 120	Foot 35	Finger 4		

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

7.4	**TABLE: Stability**			**Form A.20A**	N/A
	Equipment height / mass.....:	mm	kg		—
	Equipment (Containers) loaded..... :	[~~yes~~ / no]			—
	Castors at unfavourable position..... :	[~~yes~~ / no]			—
	Doors, drawers and movable arms closed..... :	[~~yes~~ / no]			—
	Doors and drawers at unfavourable position..... :	[~~yes~~ / no]			—

Location	Tilt angle	Applied force				Comments	Verdict
	10°	250 N	20% [N]	800 N	4 times load [N]		
Front side				—			
Left side				—			
Rear side				—			
Right side				—			
Top side							
Working surface		—	—			No overbalance	N/A
Ledge	—	—	—				
Castor / support foot							
Castor / support foot removed							

Supplementary information:

7.6	**TABLE: Wall mounting**		**Form A.20B**	N/A
	Equipment weight..... :	kg		—
	Equipment mounted as specified by manufacturer...:	[yes / ~~no~~]		—
	Equipment mounted at plasterboard (drywall)..... :	[yes / ~~no~~]		—
	More than one fastener used.....:	[~~yes~~ / no]		—
	Test maintained (after 5 s to 10 s to full load).....:	1 min		—

Location	Applied weight		Comments	Verdict
	4 times weight [kg]	2 times weight [kg]		
Mounting brackets				

Supplementary information:

8.2	**TABLE: ENCLOSURE rigidity test**	**Form A.21A**	P

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

8.2.1	Static test			P
	Material of enclosure..... :	~~Metal~~ / non-metallic		—
	Preparation for the test:	30N		—
	Operated at ambient temperature..... :	40 °C	2 h	—
Location		Comments		Verdict
1) Top		No damage, no hazard		P
2) Side left / right		No damage, no hazard		P
3) Bottom		No damage, no hazard		P
4)				
Supplementary information:				
8.2.2	**TABLE: Impact test**			P
	Material of enclosure..... :	~~Metal~~ / non-metallic		—
	Corresponding IK-code..... :	IK08		—
	Preparation for the test:	5J		—
	Cooled to (temperature)..... :	2°C		—
Location		Comments		Verdict
1) Top		No damage, no hazard		P
2) Side left / right		No damage, no hazard		P
3) Bottom		No damage, no hazard		P
Supplementary information:				

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

8.3	**TABLE: Drop test**			**Form A.21B**	P
8.3.1	Other equipment				P
Location		Raised up to		Comments	—
		[mm]	30 °		
1) Side		100	--	No damage, no hazard	P
2) Edge		100	--	No damage, no hazard	P
4) Corner		100	--	No damage, no hazard	P
4)					
Supplementary information:					
8.3.2	HAND-HELD EQUIPMENT and DIRECT PLUG-IN EQUIPMENT				N/A
	Material of enclosure..... :			~~Metal~~ / non-metallic	—
	Preparation for the test:			Cooled	—
	Cooled to (temperature)..... :			0°C	—
Location				Comments	Verdict
1) Side				No damage, no hazard	N/A
2) Edge				No damage, no hazard	N/A
3) Corner				No damage, no hazard	N/A
Supplementary information:					

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

9	**TABLE: Protection against the spread of fire**		**Form A.22**	P
Item	Source of HAZARD or area of the equipment considered (circuit, component, liquid etc.)	Protection Method (9.1 a, b or c)	Protection details	Verdict
9.3	Component	c	PCB have flammability classification V-0. Internal wire have flammability classification VW-1. Non-metallic materials having a flammability classification of V-1 or Better.	P
Supplementary information:				

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.3.2	**TABLE: Constructional requirements**	**Form A.23**	N/A
14.7	Printed wiring boards		N/A
Material tested..... :			—
Generic name..... :			—
Material manufacturer.....:			—
Type.....:			—
Colour..... :			—
Conditioning details.....:			—

		Sample					
		1	2	3	4	5	6
Thickness of specimen	mm						
Duration of flaming after first Application	s						
Duration of flaming plus glowing After second application	s						
Specimen burns to holding clamp	Yes/No						
Cotton ignited	Yes/No						
Sample result	Pass/Fail						
Supplementary information:							

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.4	TABLE: Limited-energy circuit				Form A.24	N/A
Item or Location (see Form A.22)	9.4 a)	9.4 b) Current limitation (NOTE)		9.4 c)	Decision	Comments
	Maximum potential in circuit voltage r.m.s./d.c. [V]	Maximum available current [A]	Overload protection after 120 s [A]	Circuit separation	Yes/No	

NOTE – Maximum values see Tables 17 and 18 of IEC 61010-1

Supplementary information:

9.5	TABLE: Requirements for equipment containing or using flammable liquids		Form A.25	N/A
Type of liquid	9.5 Flammable liquids			Verdict
	b) Quantity	c) Containment		

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

10.	**TABLE: Temperature Measurements** **Form A.26A**	P
10.1	Surface temperature limits – NORMAL CONDITION and / or SINGLE FAULT CONDITION	P
10.2	Temperature of windings – NORMAL CONDITION and / or SINGLE FAULT CONDITION	N/A
10.3	Other temperature measurements	P

Operating conditions:	Normal conditions(Charge)		
Frequency..... :	-- Hz	Test room ambient temperature (ta)....:	23.4°C
Voltage.....:	5V	Test duration..... :	1h35min

Part / Location	t_m [°C]	t_c [°C]	t_{max} [°C]	Verdict	Comments
Internal wire	28.2	44.0	105	P	--
PCB near U1	32.8	48.6	130	P	--
Battery body	35.8	51.6	Ref.	--	--
Plastic enclosure inside	27.4	43.2	Ref.	--	--
Plastic enclosure outside	26.5	42.3	80	P	--
Ambient	24.2	40.0	--	P	--

Operating conditions:	Normal conditions(Full battery discharge)		
Frequency..... :	-- Hz	Test room ambient temperature (ta)....:	23.4°C
Voltage.....:	4.2V	Test duration..... :	1h32min

Part / Location	t_m [°C]	t_c [°C]	t_{max} [°C]	Verdict	Comments
Internal wire	28.5	44.3	105	P	--
PCB near U1	33.3	49.1	130	P	--
Battery body	36.8	52.6	Ref.	--	--
Plastic enclosure inside	28.2	44.0	Ref.	--	--
Plastic enclosure outside	27.4	43.2	80	P	--
Ambient	24.2	40	--	P	--

NOTE 1 - t_m = measured temperature
t_c = t_m corrected (t_m–t_a+ **40** **C** or max. RATED ambient)
t_{max} = maximum permitted temperature
NOTE 2 - see also 14.1 with reference to component operating conditions
NOTE 3 - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary
NOTE 4 - see Form A.26B for details of winding temperature measurements

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

10.2	**TABLE: Temperature of windings** **Form A.26B Resistance method Temperature Measurements**	N/A
4.4.2.7	MAINS transformers	N/A
14.2.1	Motor temperatures	N/A

Operating conditions.. :								
Frequency..... :	Hz	Test room ambient temperature (ta1/ta2). :					25.0 / 25.0 °C (initial / final)	
Voltage..... :	V	Test duration..... :					h min	
Part / Designation	Rcold [ ]	Rwarm [ ]	Current [A]	t_r [K]	t_c [C]	t_{max} [C]	Verdict	Comments

NOTE 1- R_{cold} = initial resistance R_{warm} = final resistance
t_r = temperature rise $t_c = t_r$ corrected ($t_c = t_r$ + [40 C or max RATED ambient])
t_{max} = maximum permitted temperature
NOTE 2 - Indicate insulation class (IEC 60085) under comments (optional)
NOTE 3 - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

10.5.2	**TABLE: Resistance to heat of non-metallic ENCLOSURES**			**Form A.27**	P
	Test method used:				—
	Non-operative treatment..... :	[√]			P
	Empty ENCLOSURE.....:	[ ]			N/A
	Operative treatment.....:	[ ]			N/A
	Temperature during tests..... :	70°C			—

Description	Material	Comments	Verdict
A non-operative treatment, in which the equipment, not energized, is stored for 7 h at 70 °C	Plastic	No damage, no hazard	P

Dielectric strength test (6.8)..... :		V	[r.m.s./peak/d.c.]	

NOTE – Within 10 minutes of the end of treatment suitable tests in acc. to 8.2 and 8.3 must be conducted and pass criteria of 8.1.

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

10.5.3	**TABLE: Insulating material**	**Form A.28**	N/A
10.5.3 1)	Ball-pressure test		N/A
	Max. allowed impression diameter.....:	2 mm	—

Part	Test temperature [°C]	Impression diameter [mm]	Verdict

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

8	**TABLE: Mechanical resistance to shock and impact** **Form A.30**	P
11	**Protection against HAZARDS from fluids and solid foreign objects**	N/A

Voltage tests can be carried out once after performing the tests of clause **8** and clause **11**. However, if voltage tests are carried out separately after each set of tests, two forms can be used.

Location (see Form A.14)	Clause 8 tests				Clause 11 tests				Working voltage [r.m.s./d.c.]	Test voltage [r.m.s./peak/d.c.]	Verdict	Comments
	Static (8.2.1) 30 N	Impact (8.2.2)	Normal (8.3.1)	Handheld Plug-in (8.3.2)	Cleaning (11.2)	Spillage (11.3)	Overflow (11.4)	IEC 60529 (11.6)				
1) Top	30N	5J	100mm	--	--	--	--	--	--	--	P	No damage, no hazard
2) Side left / right	30N	5J	100mm	--	--	--	--	--	--	--	P	No damage, no hazard
3) Bottom	30N	5J	100mm	--	--	--	--	--	--	--	P	No damage, no hazard

NOTE – Use r.m.s., d.c. or peak to indicate the used test voltage.

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

11.7.2	TABLE: Leakage and rupture at high pressure	Form A.31	N/A

Part	Maximum permissible working pressure [MPa]	Test pressure [MPa]	Leakage Yes / No	Deformation Yes / No	Burst Yes / No	Comments

NOTE – see also Annex G with requirements for USA and Canada.

Supplementary information:

11.7.3	TABLE: Leakage from low-pressure parts	Form A.32	N/A

Part	Test pressure [MPa]	Leakage Yes / No	Comments

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

12.2.1	**TABLE: Ionizing radiation**	**Form A.33**	N/A
12.2.1.2	Equipment intended to emit radiation		

Locations tested	Measured values [µSv/h]	Verdict	Comments

Supplementary information:

12.2.1.3	**Equipment not intended to emit radiation**	**Form A.34**	N/A
	Max. allowed effective dose rate at 100 mm……:	1 µSv/h	—

Locations tested	Measured values [µSv/h]	Verdict	Comments

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

12.5.1	**TABLE: Sound level**	**Form A.35**	N/A

Locations tested	Measured maximum sound pressure level dB(A)	Calculated maximum sound power level
At operator's normal position and at bystanders' positions		
a)		
b)		
c)		
d)		
e)		
f)		

Supplementary information:

12.5.2	**TABLE: Ultrasonic pressure**	**Form A.36**	N/A

Locations tested	Measured values		Comments
	[dB]	[kHz]	
At operator's normal position			
At 1 m from the ENCLOSURE			
a)			
b)			
c)			
d)			
e)			

NOTE – No limit is specified at present, but a limit of 110 dB above the reference pressure value of 20 Pa is under consideration for applicable frequencies between 20 kHz and 100 kHz.

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

13.2.2	**TABLE: Batteries and battery charging**	**Form A.37**	P
	Battery load and charging circuit diagram:		
	Battery type.....:	See table 14.1	—
	Battery manufacturer/model/catalogue No.....:	See table 14.1	—
	Battery ratings..... :	See table 14.1	—
	Reverse polarity instalment test	--	N/A

Single component failures	Verdict	
Component	Open circuit	Short circuit
U1 pin 5-1(No damage, no hazard)		P
Supplementary information:		

14.3	**TABLE: Overtemperature protection devices**	**Form A.38**	N/A

Reliability test			
Component	Type (NOTE)	Verdict	Comments

NOTE:
NSR = non-self-resetting (10 times)
NR = non-resetting (1 time)
SR = self-resetting (200 times)

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.4.2.7	**TABLE: MAINS transformer**				**Form A.39**	**N/A**
4.4.2.7.2	Short circuit					
14.6	MAINS transformers tested outside equipment					
Type.....:						—
Manufacturer..... :						—
Test in equipment						
Test on bench						
Test repeated inside equipment (see 14.6)						
Optional – Insulation class (IEC 60085) of the lowest rated winding..... :						—
Winding identification						
Type of Protector for winding (NOTE 1)						
Elapsed time						
Current, A primary						
secondary						
Winding temperature, °C primary						
(see NOTE 2) secondary						
Tissue paper / cheesecloth OK ? (Pass / Fail)						
Voltage tests (see NOTE 3)						
Primary to secondary	_____ V_____					
Primary to core	_____ V_____					
Secondary to secondary	_____ V_____					
Secondary to core	_____ V_____					
Verdict						

NOTE 1: Primary fuse - PF / ( ) A Secondary fuse - SF / ( ) A
Overtemperature protection - OP / ( ) °C
Impedance protection - Z

NOTE 2: Indicate method of measurement - TC = with thermocouple
- R = resistance method
If resistance method is used, record resistance in cold and warm condition in Form A.26B.

NOTE 3: Record the voltage applied and the type of voltage (r.m.s. / d.c. / peak) and for results use NB = no breakdown or B = breakdown

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.4.2.7	**TABLE: MAINS transformer**				**Form A.40**	N/A
4.4.2.7.3	Overload tests (for MAINS transformers)					
14.6	MAINS transformers tested outside equipment					
Type..... :						—
Manufacturer..... :						—
Test in equipment						
Test on bench						
Test repeated inside equipment (see 14.6)						
Optional – Insulation class (IEC 60085) of the lowest rated winding ..... :						—
Winding identification						
Type of Protector for winding (NOTE 1)						
Elapsed time						
Current, A primary						
secondary						
Winding temperature, °C primary						
(see NOTE 2) secondary						
Tissue paper / cheesecloth OK ? (Pass / Fail)						
Voltage tests (see NOTE 3)						
Primary to secondary	_____ V ____					
Primary to core	_____ V ____					
Secondary to secondary	_____ V ____					
Secondary to core	_____ V ____					
Verdict						

NOTE 1: Primary fuse - PF / ( ) A
Secondary fuse - SF / ( ) A
Overtemperature protection - OP / ( ) °C
Impedance protection - Z

NOTE 2: Indicate method of measurement TC = with thermocouple
R = resistance method
If resistance method is used, record resistance in cold and warm condition in Form A.26B.

NOTE 3: Record the voltage applied and the type of voltage (r.m.s. / d.c. / peak) and for results use NB = no breakdown or B = breakdown

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

14.8	**TABLE: Circuits used to limit TRANSIENT OVERVOLTAGES**									**Form A.41**	N/A
Circuit / Designation	Overvoltage Category	MAINS voltage [V r.m.s.]	Test voltage [V]	t_m [C]	t_c [C]	t_{max} [C]	Ignited Yes / No	Safely suppressed Yes / No	Properly functional Yes / No	Verdict	Comments
Test room ambient temperature:		°C									

NOTE - t_m = measured temperature
t_c = t_m corrected (t_m–t_a+ **40** **C** or max. RATED ambient)
t_{max} = maximum permitted temperature
Conformity is checked by applying 5 positive and 5 negative impulses with the applicable impulse withstand voltage, spaced up to 1 min apart, from a hybrid impulse generator (see IEC 61180-1).

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

Annex H	**TABLE: Qualification of conformal coating** **Form A.42 for protection against pollution**		N/A
Technical properties			
Manufacturer			—
Type			—
Meet requirements of ANSI / UL 746E		[yes / no]	
Manufacturer declaration of coating material		[yes / no]	
Operating temperature of coating		[ ] °C	
Comparative tracking index (CTI)		[ ]	
Insulation resistance		[ ] MΩ	
Dielectric strength		[ ] V	
UV resistance (if required)		[yes / no]	
Flammability rating			
Preparation of the test specimens conducted		[yes / no]	

			h	1	2	3	4	5	6		
1	Cold		24								
2	Dry heat		48								
3	Rapid temp. change										
4	Damp heat		24								
5	Adhesion of coating	5 N									
	Visual inspection										
6	Humidity		48								
7	Insulation resistance	≥ 100 MΩ									
	Visual inspection										

NOTE Td = Test duration time

Supplementary information:

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Additional or special tests conducted	Form A.43	N/A
Clause and name of test	Test type and condition	Observed results	—
Supplementary information:			

14.1	TABLE 10: List of components and circuits relied on for safety					P
No	object/part No.	manufacturer/ Brand Name	type/model	technical data	standard	mark(s) of conformity
1	Plastic enclosure	Interchangeable	Interchangeable	V-0, min. thickness: 1.7mm, 120°C	UL 94	UL
2	Internal Li-ion battery	Interchangeable	IMR18650	3.7V, 1500mAh, 5.55Wh	UL 2054	UL approved
3	PCB	Interchangeable	Interchangeable	V-0, 130°C	UL 796	UL
4	Internal wire	Interchangeable	Interchangeable	Min. 300V, min. 80°C, VW-1, min. 30AWG	UL758	UL

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT 1 to TRF IEC61010_1P
ATTACHMENT TO TEST REPORT **IEC61010-1:2010+AMD1:2016** **US NATIONAL DIFFERENCES** (ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE; PART1: GENERAL REQUIREMENTS)
Differences according to.....: UL 61010-1 (3rd Ed.); Am. 1 Rev. Nov. 15, 2024
TRF template used:.....: IECEE OD-2020-F3:2024, Ed. 1.3
Attachment Form No..... : US_ND_IEC61010_1P **Attachment Originator**.....: UL Solutions (US) **Master Attachment**..... : Dated 2025-05-08

	National Differences		--
1.1.4	Equipment installation complies with the National Electrical Code (NEC), ANSI/NFPA 70 and the Canadian Electrical Code (CEC) CAN/CSA C22.2 No. 0 and Part 1, CSA C22.1		P
1.1.5	Gas, vapor and voltage detector or sensor		P
	The equipment measures, senses or detects one or more electrical or physical quantities that identify an imminent hazard and used for signaling are not to be evaluated to UL 61010-1 when another standard applies.		P
5.1.3	Measurement of maximum input power or current with all accessories and plug-in modules connected during a 10 second period complies with the marked mains supply rating requirements.		P
5.4.4	Additional precautions for IEC 60950 or IEC 62368-1 conforming equipment in regard to moistures and liquids		N/A
6.5.2.4	Impedance of PROTECTIVE BONDING of plug-connected equipment		N/A
	The impedance does not cause a potential drop of more than 4V.		N/A
	Test current is twice the rating of the plug, not less than 40A, twice the rating of the internal overcurrent protection or complies with CAN/CSA-C22.2 No 0.4. with the duration specified in Table 6.5.2.4 DV.1		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.5.2.5	Impedance of PROTECTIVE BONDING of PERMANENTLY CONNECTED EQUIPMENT		N/A
	Test duration specified in Table 6.5.3.4DV.1		N/A
	Voltage drop does not exceed 4V		N/A
6.7.3.4.1	For solid insulation the equivalent d.c. voltage test values for an a.c. circuit was used		N/A
6.7.3.4.4	For thin film insulation the equivalent d.c. voltage test values for an a.c. circuit was used		N/A
6.10.1	MAINS supply cords		N/A
	MAINS supply cords or cord sets comply with ANSI/UL 817 and CSA C22.2. No.1		N/A
	General use receptacles, attachment plugs and similar wiring devices comply with ANSI/UL 498 and CSA C22.2 No. 42, CSA C22.2 No. 182.1, CSA C22.2 No. 182.2 and CSA C22.2 No. 182.3		N/A
	Green covered conductors (with or without yellow stripes) used only for PROTECTIVE CONDUCTOR TERMINALS		N/A
6.10.3	Plugs of MAINS cords comply with ANSI/UL 498 and CSA C22.2 No. 42, CSA C22.2 No. 182.1, CSA C22.2 No. 182.2 and CSA C22.2 No. 182.3		N/A
6.10.4	PERMANENTLY CONNECTED EQUIPMENT		N/A
	Equipment intended for permanent connection complies with Annex DVD and DVE		N/A
6.11.5	Polarity of MAINS circuits for line-connected single-pole switch, center contact of a lampholder and any automatic control with a marked off position connected to ungrounded conductor.		N/A
8.1	PERMANENTLY CONNECTED EQUIPMENT and floor-standing equipment complies with 6.8J energy protection level		N/A
	All other equipment complies with 5J energy protection level		P
9.3.2	Flammability RATINGS of ANSI/UL94, V-0, V-1, V-2 and VW-1 of ANSI/UL 1581 are considered equivalent to IEC classifications. Flammability rating FT-1 and CSA C22.2. No. 0.3 and VW-1 or ANSI/UL 1581 are considered acceptable for wire and cable.		P
	Enclosure complied with UL 50 and UL 50E or CSA C22.2 No. 94.1 and CSA C22.2 No. 94.2 for intended application, other than Type 1 consider to meet 9.3.2, Item c		P

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Flammability ratings V-0, V-1, V-2 of UL 94 or CSA C22.2 No. 0.17 or end product flame test (12 mm or 15 mm) of UL 746C considered equivalent to IEC classification to IEC 60695-11-10 of 9.3.2, item c) 2).		P
9.6.1	Overcurrent protection		N/A
	Single-pole circuit breaker connected in the ungrounded supply conductor.		N/A
	Multiple-pole circuit breaker interrupt all neutral (grounded) and ungrounded conductors simultaneously.		N/A
	A single fuse used connected in the ungrounded supply conductor.		N/A
	Fuses connected in both the neutral (grounded) and ungrounded supply conductors are mounted adjacent to each other and have the same RATING.		N/A
	The screw shell of a plug fuseholder and the ACCESSIBLE contact of an extractor fuseholder connected to the ungrounded supply is connected towards the load. The ACCESSIBLE contact or screw shell of fuseholder connected in the neutral (grounded) conductor is connected towards the grounded supply line.		N/A
10.4.4	OPEN EQUIPMENT tested per installation instructions or referenced test ambient condition		N/A
	Wiring for connection to the field-wiring terminal min. 1.22 m (4 ft) long and sized per Table 310-15(B), column 60˚C or 75˚C for greater than 100 A.		N/A
11.6	Replace IP code with IP code and Type rating specified in UL 50E and CSA C22.2 No. 94.2.		N/A
11.6.1	IEC 60529 rating, and marking replaced by CSA C22.2 No. 60529, IEC 60529, UL 50E or CSA C22.2 No. 94.2		N/A
11.6.3	Protection against solid foreign objects, IEC 60529 replaced by CSA C22.2 No. 60529, IEC 60529, UL 50E or CSA C22.2 No. 94.2.		N/A
11.6.4	Protection against water, IEC 60529 replaced by CSA C22.2 No. 60529, IEC 60529, UL 50E or CSA C22.2 No. 94.2		N/A
11.7.1	Laboratory Equipment and testing and measuring equipment having both a pressure volume greater than 200 kPa l and pressure greater than 50kPa meets 11.7.2 and Annex G.5		N/A
	Laboratory Equipment and testing and measuring equipment that does not meet above complies with 11.7.3 and 11.7.4.		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Other equipment complies with Annex G.		N/A
12.1	X-ray equipment complies with 21 CFR 1020 and laser equipment complies with 21 CFR 1040		N/A
14.1	Components meet applicable ANSI/UL, CAN, CSA requirements		N/A
14.9	Nonmetallic enclosure for outdoor use comply with UV requirements in ANSI/UL746C or CSA C22.2 No.0.17 as applicable		N/A
	Permanent installed equipment for outdoor use meets relevant Type rated for the intended use per CSA C22.1 CEC, Part 1 and/or NFPA, NEC as applicable……..:		N/A
14.10	Conductive coatings if peeling or flaking would reduce spacings or bridge live part comply with ANSI/UL 746C or CSA C22.2 No.0.17 as applicable		N/A
14.11	Direct plug-in transformer units comply with ANSI/UL1310, CAN/CSA C22.2 No.223, ANSI/UL 60950-1, ANSI/UL 62368-1, CAN/CSA C22.2 No.60950-1 or CAN/CSA C22.2 No. 62368-1		N/A
Annex DVC	Addition: UV radiation limits comply with the ACGIH requirements		N/A
Annex DVD	Addition: Permanent connection to MAINS		N/A
DVD.1.1	Equipment has provision for connection of a wiring system according to ANSI/NFPA 70, NEC or CSA C22.2, CEC, Part I as applicable		N/A
DVD.2.1.1	Equipment provided with TERMINALS or internal leads for connection and sized per the NEC or CEC		N/A
DVD2.1.2	Equipment provided with a TERMINAL or splice compartment is complete		N/A
DVD.2.1.3	TERMINAL or splice compartment not exposed to damage or strain and able to be inspected after installation		N/A
DVD.2.2	Wiring TERMINALS provide effective connection device or sufficient wire binding screw		N/A
DVD.2.3	Leads used for field wiring minimum 6 inches long		N/A
DVD.2.4.1	TERMINALS and lead identified for their intend use		N/A
DVD.2.4.2	Polarized convenience receptacle or polarized lamp socket identifies the neutral (grounded) conductor		N/A
DVD.2.4.3	TERMINAL intended for neutral (grounded) conductor identified		N/A
DVD.2.4.4	Neutral (grounded) field wiring lead white or gray color		N/A
DVD.2.4.5	Protective earth TERMINAL marked per 5.1.5.2 or “G”, “GR”, “GND”, “GROUND”, or “GROUNDING” or green colored screwhead		N/A

UL 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
DVD.2.4.6	Protective grounding conductor green color with or without yellow stripes		N/A
DVD.2.4.6A	Field-wiring terminal markings		N/A
DVD.2.4.6A.1	Field-wiring terminals marked for the type of wire intended for connection.		N/A
DVD.2.4.6A.2	Alternative field-wiring terminal abbreviation used to note the wire intended for connection.		N/A
DVD.2.4.6A.3	Markings required in DVD.2.4.6A.1 to DVD.2.4.6A.2 use a coded correlation marking or Table 1, symbol 14 to information in installation instructions.		N/A
DVD.3.1	ENCLOSURE complies with the pulling, torque and bending test		N/A
DVD.3.2	Metallic ENCLOSURE meet minimum thickness		N/A
DVD.3.3	Bonding between all metallic conduits entering the ENCLOSURE provided		N/A
DVD.4.1	ENCLOSURE complies with the Conduit pull-out test		N/A
DVD.4.2	ENCLOSURE complies with the Conduit torque test		N/A
DVD.4.3	ENCLOSURE complies with the Conduit bending test		N/A
DVD.4.4	ENCLOSURE complies with the Knockout test		N/A
DVD.5	Neutral conductors are evaluated as hazardous live MAINS circuit		N/A
DVE	Addition: Permanently installed equipment		N/A
DVE.1.2	Metering equipment intended for aftermarket kit for installation additionally complies with ANSI/CAN/UL 2808		N/A
	Open-type current sensors intended for aftermarket kit for installation additionally complies with ANSI/CAN/UL 2808		N/A
DVE.1.2A	Metering equipment and open-type current sensors marked either:		N/A
	“Field Installable Accessory” or “Kit Evaluated for Field Installation”		N/A
	or equivalent……..……:		N/A
	Or Symbol 14 of Table 1 used with details included in the documentation.		N/A
DVE.8.1	Current transformers comply with ANSI/CAN/UL 2808		N/A

Photo 1 Appearance of EUT

Photo 2 Appearance of EUT

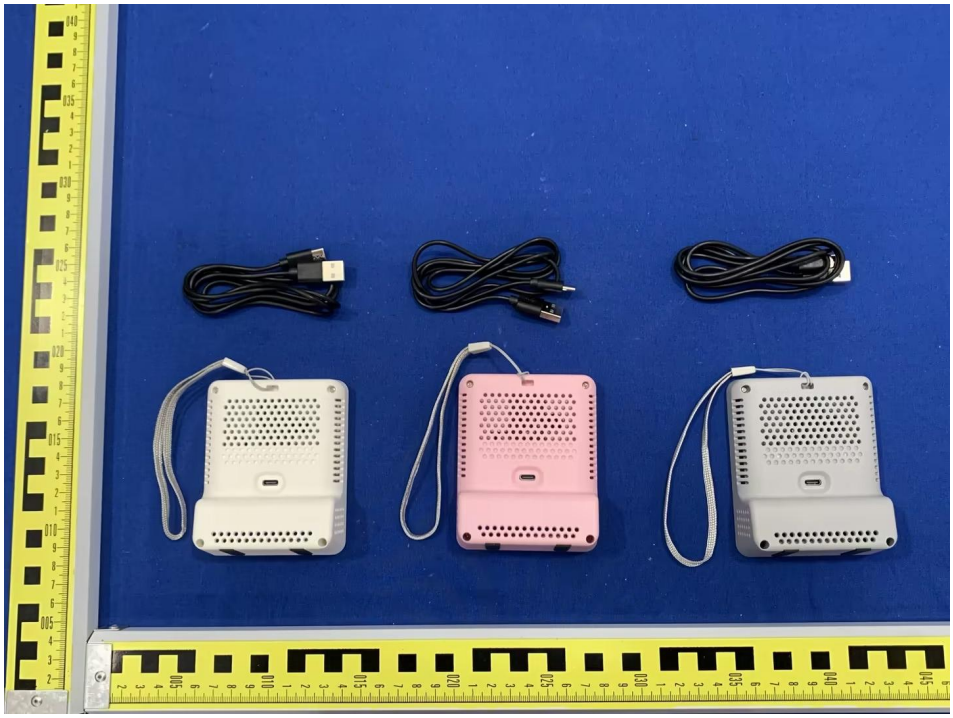


Photo 3 Appearance of EUT

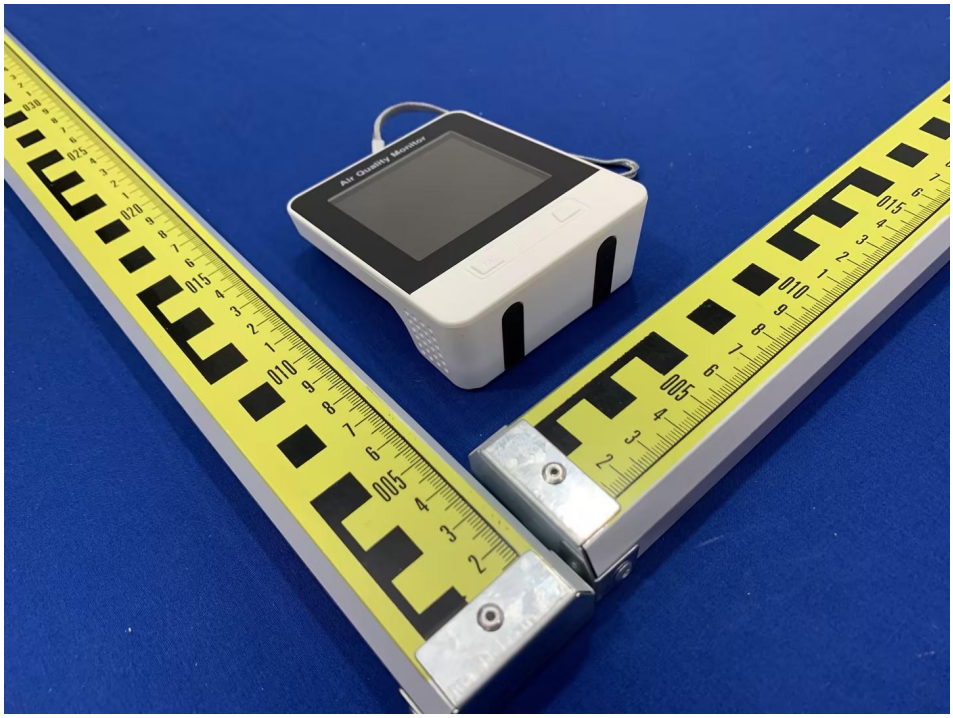


Photo 4 Appearance of EUT

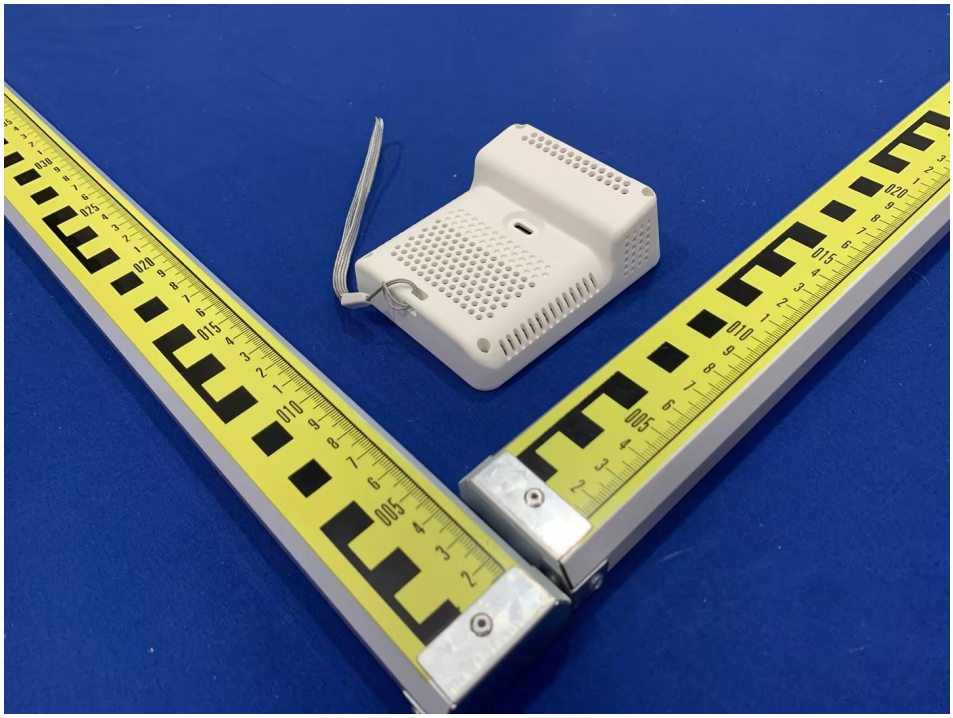


Photo 5 Appearance of EUT

Photo 6 Inside of EUT

Photo 7 Appearance of PCB

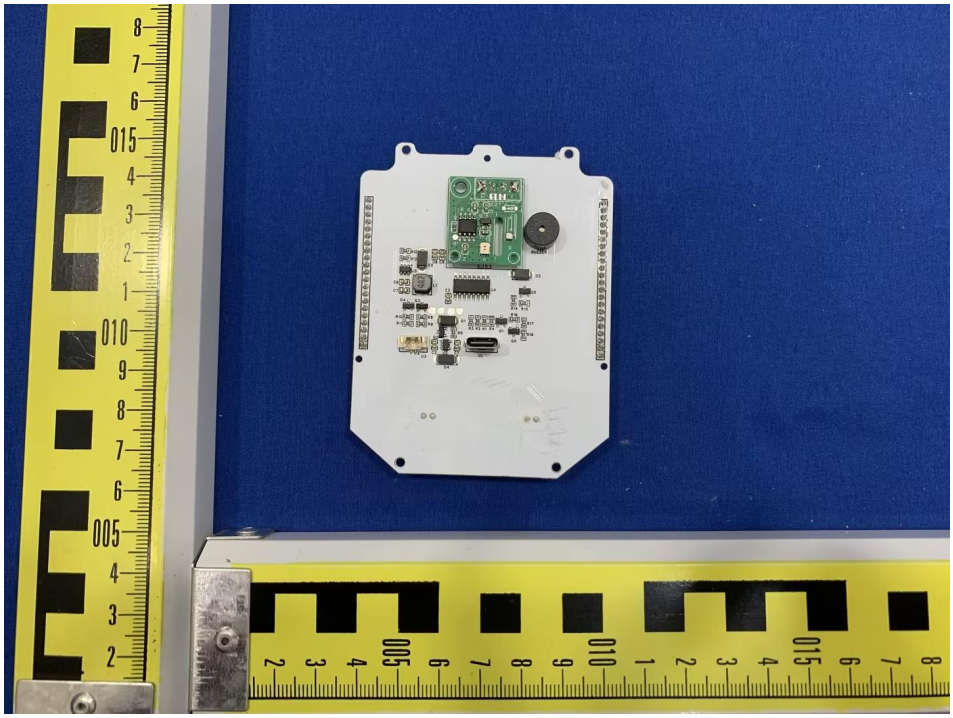
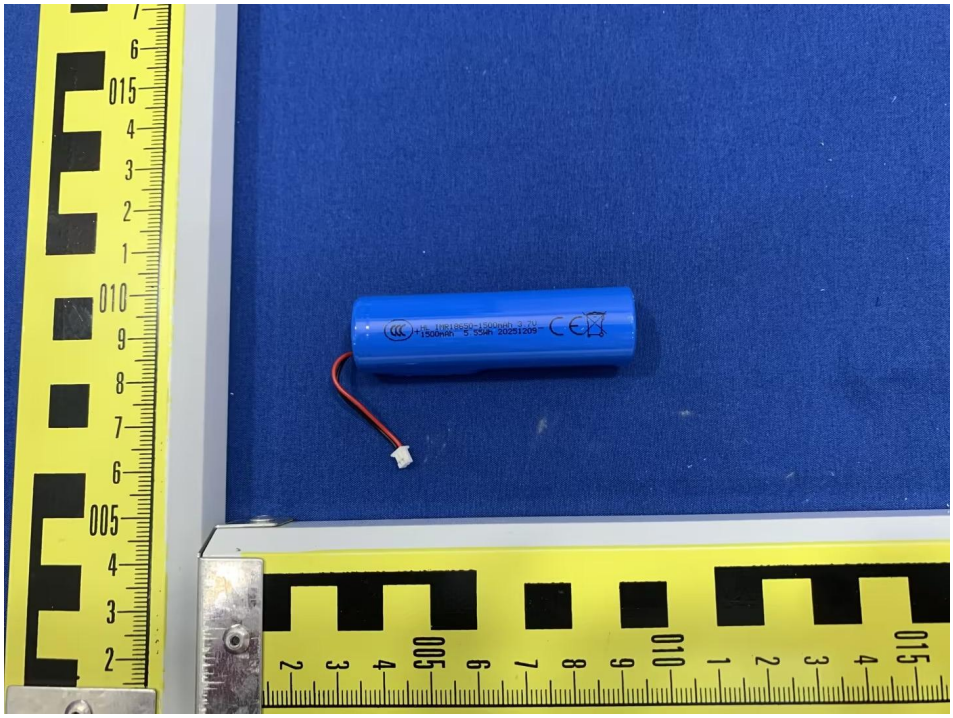


Photo 8 Appearance of PCB

Photo 9 Appearance of Battery



END OF REPORT