



HERMON LABORATORIES



ELECTRICAL TESTING
839.01

Hermon Laboratories Ltd.
P.O.Box 23
Binyamina 30500, Israel
Tel.+972 4 628 8001
Fax.+972 4 628 8277
e-mail: mail@hermonlabs.com

TEST REPORT
IEC 62368-1
Audio/video, information and communication technology equipment
Part 1: Safety requirements

Report Number..... : COMSAF_EN.49723

Date of issue : July 06, 2023

Total number of pages : 87

Name of Testing Laboratory
preparing the Report : Hermon Laboratories Ltd.

Applicant's name : CompuLab Ltd.

Address : 17 HaYetzira St.,Mordot HaCarmel Industrial Park,
Yokneam Elite 20692, Israel

Test specification:

Standard : IEC 62368-1: 2018 (Ed. 3)
EN 62368-1:2020+A11:2020
UL 62368-1:2019
CSA C22.2 No. 62368-1:19

Non-standard test method..... : N/A

TRF template used. : IECEE OD-2020-F1:2020, Ed.1.4

Test Report Form No..... : IEC62368_1E (modified)

Test Report Form(s) Originator.... : UL(US)

Master TRF : Dated 2022-04-14

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Test item description	Configurable fanless industrial computer	
Trade Mark		
Manufacturer	CompuLab Ltd.	
Model/Type reference	Tensor-I22	
Ratings	12Vdc, 5A from external power adapter	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	Hermon Laboratories Ltd.
Testing location/ address	HaTachana road, P. O. Box 23, Binyamina 30500, Israel	
Tested by (name, function, signature)	Mr. Arthur Poliakov Project Manager, Product Safety	
Reviewed by (name, function, signature)...	Mr. Ilan Benihias Head of Department, Product safety	
Approved by (name, function, signature) ..	Mr. Ilan Benihias Head of Department, Product safety	
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature) ..		
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) .		
Approved by (name, function, signature) ..		
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	
Testing location/ address		
Tested by (name, function, signature)		
Witnessed by (name, function, signature) .		
Approved by (name, function, signature) ..		
Supervised by (name, function, signature) :		



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

- Appendix A** – Equipment used for testing (2 pages)
- Appendix B** – Photo Documentation (2 pages)

Summary of testing:

Tests performed (name of test and test clause):

Name of test:	Test clause:
Classification and limits of electrical energy sources	5.2
Temperature measurements	5.4.1.4
Electrical power sources (PS) measurements for classification	6.2.2
Input test	B.2.5
Simulated single fault condition	B.4
Test for the permanence of markings	F.3.10
Circuits intended for interconnection with building wiring (LPS)	Q.1

Testing location:

Hermon Laboratories Ltd.
HaTachana road, P. O. Box 23, Binyamina
30500, Israel

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

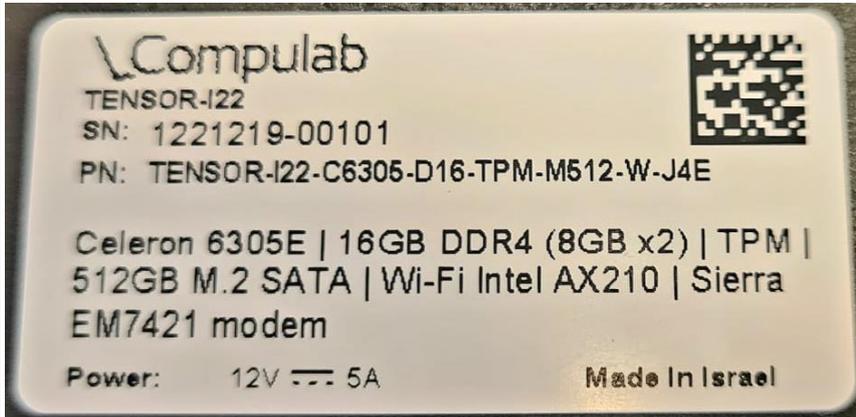
EU Group differences, Canada (CA), United States (US).

The product fulfils the requirements of EN 62368-1:2020+A11:2020, UL 62368-1:2018 (Ed.3), CAN/CSA-C22.2 No.62368-1:2018 (Ed.3)



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.





Test item particulars:	
Product group	<input checked="" type="checkbox"/> end product <input type="checkbox"/> built-in component
Classification of use by	<input checked="" type="checkbox"/> Ordinary person <input type="checkbox"/> Children likely present <input checked="" type="checkbox"/> Instructed person <input checked="" type="checkbox"/> Skilled person
Supply connection	<input type="checkbox"/> AC mains <input type="checkbox"/> DC mains <input checked="" type="checkbox"/> not mains connected: <input checked="" type="checkbox"/> ES1 <input type="checkbox"/> ES2 <input type="checkbox"/> ES3
Supply tolerance	<input type="checkbox"/> +10%/-10% <input type="checkbox"/> +20%/-15% <input type="checkbox"/> + %/ - % <input checked="" type="checkbox"/> None
Supply connection – type	<input type="checkbox"/> pluggable equipment type A - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> direct plug-in <input type="checkbox"/> pluggable equipment type B - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> permanent connection <input type="checkbox"/> mating connector <input checked="" type="checkbox"/> other: DC powered
Considered current rating of protective device	<input checked="" type="checkbox"/> Limited by external certified AC/DC adapter Location: <input type="checkbox"/> building <input type="checkbox"/> equipment <input checked="" type="checkbox"/> N/A
Equipment mobility	<input checked="" type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> direct plug-in <input type="checkbox"/> stationary <input type="checkbox"/> for building-in <input type="checkbox"/> wall/ceiling-mounted <input type="checkbox"/> SRME/rack-mounted <input type="checkbox"/> other:
Overvoltage category (OVC)	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input checked="" type="checkbox"/> other: DC powered
Class of equipment	<input type="checkbox"/> Class I <input type="checkbox"/> Class II <input checked="" type="checkbox"/> Class III <input type="checkbox"/> Not classified <input type="checkbox"/>
Special installation location	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> restricted access area <input type="checkbox"/> outdoor location <input type="checkbox"/>
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
Manufacturer's specified T_{ma}	65°C <input type="checkbox"/> Outdoor: minimum °C
IP protection class	<input checked="" type="checkbox"/> IPX0 <input type="checkbox"/> IP__
Power systems	<input type="checkbox"/> TN <input type="checkbox"/> TT <input type="checkbox"/> IT - V _{L-L} <input checked="" type="checkbox"/> not AC mains
Altitude during operation (m)	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> 5000 m
Altitude of test laboratory (m)	<input checked="" type="checkbox"/> 2000 m or less <input type="checkbox"/> 5000 m
Mass of equipment (kg)	1.3 kg



Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing:	
Date of receipt of test item	March 29, 2023
Date (s) of performance of tests	March 30, 2023

General remarks:

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

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

Manufacturer's Declaration per sub-clause 4.2.5 of IEC62368-1:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided

Yes
 Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) : As applicant

General product information and other remarks:

The EUT, model Tensor-I22, is Industrial IoT Gateway computer for indoor use.

The EUT is safety class III equipment powered by external safety approved LPS AC/DC adapter, which provides 12Vdc/5A maximum to internal ES1 (SELV) circuits and considered as LPS.

In addition, the EUT includes CPU clock backup, achieved by internal 3Vdc/ 120mAh safety approved, non-rechargeable and non-replaceable by user, lithium coin cell.

The EUT is enclosed inside metal enclosure intended for indoor use with the ambient of up to 65°C, functions as mechanical protection and include circuits which classified as ES1 (Not exceed ES1 limits of 60Vdc, 42.4VPeak under normal and fault conditions).

Product details:

Model name	Serial number	Hardware version	Software release
Tensor-I22	1221219-00101	1.0	N/A



OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS				
Clause	Possible Hazard			
5	Electrically-caused injury			
Class and Energy Source (e.g. ES3: Primary circuit)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
Ordinary person /instructed person/ skilled person	ES1: internal secondary circuits powered by 12VDC from external AC/DC adapter	N/A	N/A	N/A
Ordinary person /instructed person/ skilled person	ES1: Internal coin battery which provides 3VDC/120mAh to CPU clock	N/A	N/A	N/A
Ordinary person /instructed person/ skilled person	ES1: Signal I/O ports	N/A	N/A	N/A
6	Electrically-caused fire			
Class and Energy Source (e.g. PS2: 100 Watt circuit)	Material part (e.g. Printed board)	Safeguards		
		B	1 st S	2 nd S
PS2: External AC/DC adapter 12Vdc/5A max	Enclosure and internal components	Normal temperatures below ignition temperatures	Metal fire enclosure	N/A
PS1: Internal coin battery 3Vdc, 120mAh	Enclosure and internal components	N/A	N/A	N/A
PS1: Signal I/O ports	Enclosure and internal components	N/A	N/A	N/A
7	Injury caused by hazardous substances			
Class and Energy Source (e.g. Ozone)	Body Part (e.g., Skilled)	Safeguards		
		B	S	R
Internal coin battery	Ordinary person /instructed person/ skilled person	Protection circuit	-	Fire enclosure
8	Mechanically-caused injury			
Class and Energy Source (e.g. MS3: Plastic fan blades)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
MS1: Equipment mass (less than 7kg)	Ordinary person /instructed person/ skilled person	N/A	N/A	N/A
MS1: sharp edges and corners	Ordinary person /instructed person/ skilled person	N/A	N/A	N/A
9	Thermal burn			
Class and Energy Source (e.g. TS1: Keyboard caps)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
Ordinary person /instructed person/ skilled person	TS1: accessible enclosure surfaces, which are used as	N/A	N/A	N/A



	heatsink			
10	Radiation			
Class and Energy Source (e.g. RS1: PMP sound output)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
Ordinary person /instructed person/ skilled person	RS1: LED indicator	N/A	N/A	N/A
Supplementary Information: "B" – Basic Safeguard; "S" – Supplementary Safeguard; "R" – Reinforced Safeguard				

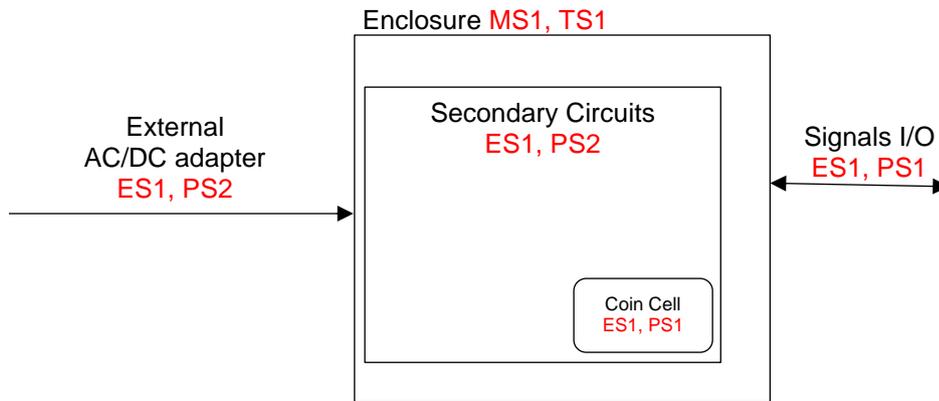


ENERGY SOURCE DIAGRAM

Optional. Manufacturers are to provide the energy sources diagram identify declared energy sources and identifying the demarcations are between power sources. Recommend diagram be provided included in power supply and multipart systems.

Insert diagram below. Example diagram designs are; Block diagrams; image(s) with layered data; mechanical drawings

X ES X PS X MS X TS X RS





IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL REQUIREMENTS		P
4.1.1	Acceptance of materials, components and subassemblies	See appended table 4.1.2	P
4.1.2	Use of components	All safety critical components are certified or were tested according to this standard. Certified components are used in accordance with their ratings certifications, and they comply with applicable parts of this standard.	P
4.1.3	Equipment design and construction	Considered	P
4.1.4	Specified ambient temperature for outdoor use (°C) :	Not for outdoor use	N/A
4.1.5	Constructions and components not specifically covered	Considered	P
4.1.8	Liquids and liquid filled components (LFC)	No Liquid filled components	N/A
4.1.15	Markings and instructions	See Annex F	P
4.4.3	Safeguard robustness	EUT is class III equipment powered by 12Vdc, 5A max from external safety approved AC/DC adapter, considered as ES1/PS2. Internal coin battery 3Vdc/120mAh is ES1/PS1 – no hazards voltages safeguards are not necessary Rigid metal enclosure provides adequate mechanical strength - robustness tests were waived by engineering considerations	P
4.4.3.1	General	As above	P
4.4.3.2	Steady force tests	As above	P
4.4.3.3	Drop tests	As above	P
4.4.3.4	Impact tests	As above	P
4.4.3.5	Internal accessible safeguard tests	No such safeguards	N/A
4.4.3.6	Glass impact tests	No glass parts	N/A
4.4.3.7	Glass fixation tests	As above	N/A
	Glass impact test (1J)		N/A
	Push/pull test (10 N)		N/A
4.4.3.8	Thermoplastic material tests	No such parts	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.4.3.9	Air comprising a safeguard	As above	N/A
4.4.3.10	Accessibility, glass, safeguard effectiveness	Safeguard remain effective	P
4.4.4	Displacement of a safeguard by an insulating liquid	As above	N/A
4.4.5	Safety interlocks	No safety interlocks	N/A
4.5	Explosion		P
4.5.1	General	No explosion occurs during normal /abnormal operation and single fault conditions	P
4.5.2	No explosion during normal/abnormal operating condition	As above	P
	No harm by explosion during single fault conditions	As above	P
4.6	Fixing of conductors		P
	Fix conductors not to defeat a safeguard	All the conductors are adequate terminated	P
	Compliance is checked by test..... :	A force of 10 N in the most unfavourable direction was applied	P
4.7	Equipment for direct insertion into mains socket-outlets		N/A
4.7.2	Mains plug part complies with relevant standard .. :	Not a direct plug-in equipment	N/A
4.7.3	Torque (Nm)	As above	N/A
4.8	Equipment containing coin/button cell batteries		P
4.8.1	General	Professional equipment for locations where it is unlikely that children will be present. Appropriate statement in the user manual.	N/A
4.8.2	Instructional safeguard	As above	N/A
4.8.3	Battery compartment door/cover construction	As above	N/A
	Open torque test	As above	N/A
4.8.4.2	Stress relief test	As above	N/A
4.8.4.3	Battery replacement test	As above	N/A
4.8.4.4	Drop test	As above	N/A
4.8.4.5	Impact test	As above	N/A
4.8.4.6	Crush test	As above	N/A
4.8.5	Compliance	As above	N/A
	30N force test with test probe	As above	N/A
	20N force test with test hook	As above	N/A
4.9	Likelihood of fire or shock due to entry of conductive object		P



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.10	Component requirements		N/A
4.10.1	Disconnect Device	EUT is Class III. No disconnect device required	N/A
4.10.2	Switches and relays	No such components which affect safety	N/A

5	ELECTRICALLY-CAUSED INJURY		P
5.2	Classification and limits of electrical energy sources		P
5.2.2	ES1, ES2 and ES3 limits	See appended table 5.2	P
5.2.2.2	Steady-state voltage and current limits	See appended table 5.2	P
5.2.2.3	Capacitance limits	Electrical energy source is not a capacitor	N/A
5.2.2.4	Single pulse limits	Electrical energy source is not a single pulse	N/A
5.2.2.5	Limits for repetitive pulses	Electrical energy source is not a repetitive pulse	N/A
5.2.2.6	Ringing signals	Electrical energy source is not an analogue telephone ringing signal	N/A
5.2.2.7	Audio signals	Electrical energy source is not comprised of audio signals	N/A
5.3	Protection against electrical energy sources		N/A
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons	Powered by a 12Vdc from external safety approved AC/DC adapter (LPS), considered as ES1. Safeguards are not required	N/A
5.3.1 a)	Accessible ES1/ES2 derived from ES2/ES3 circuits	No ES2 and ES3 circuits	N/A
5.3.1 b)	Skilled persons not unintentional contact ES3 bare conductors		N/A
5.3.2.1	Accessibility to electrical energy sources and safeguards		N/A
	Accessibility to outdoor equipment bare parts		N/A
5.3.2.2	Contact requirements		N/A
	Test with test probe from Annex V		—
5.3.2.2 a)	Air gap – electric strength test potential (V)		N/A
5.3.2.2 b)	Air gap – distance (mm)		N/A
5.3.2.3	Compliance		N/A
5.3.2.4	Terminals for connecting stripped wire		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4	Insulation materials and requirements		N/A
5.4.1.2	Properties of insulating material	Electrical energy source classified as ES1 – safeguards are not required. Functional insulation only provided in EUT	N/A
5.4.1.3	Material is non-hygroscopic	Hygroscopic materials are not used as insulation	N/A
5.4.1.4	Maximum operating temperature for insulating materials	Insulation materials not in use	N/A
5.4.1.5	Pollution degrees	Pollution degree 2	N/A
5.4.1.5.2	Test for pollution degree 1 environment and for an insulating compound	Pollution degree 2 applied	N/A
5.4.1.5.3	Thermal cycling test	As above	N/A
5.4.1.6	Insulation in transformers with varying dimensions	No transformers	N/A
5.4.1.7	Insulation in circuits generating starting pulses	No such circuits	N/A
5.4.1.8	Determination of working voltage	12Vdc Max	N/A
5.4.1.9	Insulating surfaces	No insulating surfaces which accessible	N/A
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted	Mo such parts	N/A
5.4.1.10.2	Vicat test.....		N/A
5.4.1.10.3	Ball pressure test		N/A
5.4.2	Clearances	Electrical energy source classified as ES1 – safeguards are not required All circuits are secondary, provided with functional insulation No special requirements for clearances at functional insulation	N/A
5.4.2.1	General requirements	The equipment is not intended for outdoor use	N/A
	Clearances in circuits connected to AC Mains, Alternative method	As above	N/A
5.4.2.2	Procedure 1 for determining clearance	As above	N/A
	Temporary overvoltage		—
5.4.2.3	Procedure 2 for determining clearance		N/A
5.4.2.3.2.2	a.c. mains transient voltage		—



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.2.3.2.3	d.c. mains transient voltage		—
5.4.2.3.2.4	External circuit transient voltage.....		—
5.4.2.3.2.5	Transient voltage determined by measurement		—
5.4.2.4	Determining the adequacy of a clearance using an electric strength test	As above	N/A
5.4.2.5	Multiplication factors for clearances and test voltages	< 2000m	N/A
5.4.2.6	Clearance measurement		N/A
5.4.3	Creepage distances	Same as clearance above	N/A
5.4.3.1	General		N/A
5.4.3.3	Material group	Material group IIIb is assumed to be used	—
5.4.3.4	Creepage distances measurement		N/A
5.4.4	Solid insulation	Electrical energy source classified as ES1 – safeguards are not required. Functional insulation only provided in EUT	N/A
5.4.4.1	General requirements		N/A
5.4.4.2	Minimum distance through insulation		N/A
5.4.4.3	Insulating compound forming solid insulation		N/A
5.4.4.4	Solid insulation in semiconductor devices		N/A
5.4.4.5	Insulating compound forming cemented joints		N/A
5.4.4.6	Thin sheet material		N/A
5.4.4.6.1	General requirements		N/A
5.4.4.6.2	Separable thin sheet material		N/A
	Number of layers (pcs)		N/A
5.4.4.6.3	Non-separable thin sheet material		N/A
	Number of layers (pcs)		N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material		N/A
5.4.4.6.5	Mandrel test		N/A
5.4.4.7	Solid insulation in wound components	No such components	N/A
5.4.4.9	Solid insulation at frequencies >30 kHz, E_P , K_R , d , V_{PW} (V)		N/A
	Alternative by electric strength test, tested voltage (V), K_R		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.5	Antenna terminal insulation	Equipment is considered as indoor, and its antenna terminals are not exposed to external transients	N/A
5.4.5.1	General		N/A
5.4.5.2	Voltage surge test		N/A
5.4.5.3	Insulation resistance (MΩ)..... :		N/A
	Electric strength test :		N/A
5.4.6	Insulation of internal wire as part of supplementary safeguard	No supplementary safeguards are in use	N/A
5.4.7	Tests for semiconductor components and for cemented joints	No such devices or cemented joints	N/A
5.4.8	Humidity conditioning	Hygroscopic materials are not used as insulation	N/A
	Relative humidity (%), temperature (°C), duration (h) :		—
5.4.9	Electric strength test	Electrical energy source classified as ES1 – safeguards are not required. functional insulation only provided in EUT	N/A
5.4.9.1	Test procedure for type test of solid insulation..... :		N/A
5.4.9.2	Test procedure for routine test		N/A
5.4.10	Safeguards against transient voltages from external circuits	EUT is an indoor equipment which is not connected to telecommunication networks (external circuits)	N/A
5.4.10.1	Parts and circuits separated from external circuits		N/A
5.4.10.2	Test methods		N/A
5.4.10.2.1	General		N/A
5.4.10.2.2	Impulse test :		N/A
5.4.10.2.3	Steady-state test..... :		N/A
5.4.10.3	Verification for insulation breakdown for impulse test :		N/A
5.4.11	Separation between external circuits and earth	No such parts	N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A
5.4.11.2	Requirements		N/A
	SPDs bridge separation between external circuit and earth		N/A
	Rated operating voltage U _{op} (V)..... :		—



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Nominal voltage U_{peak} (V)..... :		—
	Max increase due to variation ΔU_{sp} :		—
	Max increase due to ageing ΔU_{sa} :		—
5.4.11.3	Test method and compliance :		N/A
5.4.12	Insulating liquid	No insulating liquid use in the EUT	N/A
5.4.12.1	General requirements		N/A
5.4.12.2	Electric strength of an insulating liquid :		N/A
5.4.12.3	Compatibility of an insulating liquid :		N/A
5.4.12.4	Container for insulating liquid :		N/A
5.5	Components as safeguards		N/A
5.5.1	General	Electrical energy source classified as ES1- safeguards are not required Functional insulation only provided in EUT	N/A
5.5.2	Capacitors and RC units		N/A
5.5.2.1	General requirement		N/A
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector :		N/A
5.5.3	Transformers	No such components which used as safeguards	N/A
5.5.4	Optocouplers	As above	N/A
5.5.5	Relays	As above	N/A
5.5.6	Resistors	As above	N/A
5.5.7	SPDs	As above	N/A
5.5.8	Insulation between the mains and an external circuit consisting of a coaxial cable :	EUT is not connected to mains or to external circuit consisting of a coaxial cable	N/A
5.5.9	Safeguards for socket-outlets in outdoor equipment	Indoor equipment	N/A
	RCD rated residual operating current (mA) :		—
5.6	Protective conductor		N/A
5.6.2	Requirement for protective conductors	No use of protective conductor as a safeguard. Electrical energy source classified as ES1- safe guards not required	N/A
5.6.2.1	General requirements		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.6.2.2	Colour of insulation		N/A
5.6.3	Requirement for protective earthing conductors	Protective earth conductor is not required. No provision for earthing. Electrical energy source classified as ES1 – safeguards not required	N/A
	Protective earthing conductor size (mm ²) :		—
	Protective earthing conductor serving as a reinforced safeguard		N/A
	Protective earthing conductor serving as a double safeguard		N/A
5.6.4	Requirements for protective bonding conductors	No use of protective bonding	N/A
5.6.4.1	Protective bonding conductors		N/A
	Protective bonding conductor size (mm ²). :		—
5.6.4.2	Protective current rating (A)..... :		N/A
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Terminal size for connecting protective earthing conductors (mm)..... :		N/A
	Terminal size for connecting protective bonding conductors (mm) :		N/A
5.6.5.2	Corrosion		N/A
5.6.6	Resistance of the protective bonding system	No protective earth and bonding	N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method..... :		N/A
5.6.6.3	Resistance (Ω) or voltage drop..... :		N/A
5.6.7	Reliable connection of a protective earthing conductor	No earthing requirement	N/A
5.6.8	Functional earthing		N/A
	Conductor size (mm ²)..... :		N/A
	Class II with functional earthing marking :		N/A
	Appliance inlet cl & cr (mm) :		N/A
5.7	Prospective touch voltage, touch current and protective conductor current		N/A
5.7.2	Measuring devices and networks	DC powered, no connection to the mains supply, no earth connection, and no connection to external circuits from coaxial cables	N/A
5.7.2.1	Measurement of touch current		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.7.2.2	Measurement of voltage		N/A
5.7.3	Equipment set-up, supply connections and earth connections	As above	N/A
5.7.4	Unearthed accessible parts	As above	N/A
5.7.5	Earthed accessible conductive parts	As above	N/A
5.7.6	Requirements when touch current exceeds ES2 limits	As above	N/A
	Protective conductor current (mA)		N/A
	Instructional Safeguard.....		N/A
5.7.7	Prospective touch voltage and touch current associated with external circuits	As above	N/A
5.7.7.1	Touch current from coaxial cables		N/A
5.7.7.2	Prospective touch voltage and touch current associated with paired conductor cables		N/A
5.7.8	Summation of touch currents from external circuits		N/A
	a) Equipment connected to earthed external circuits, current (mA)		N/A
	b) Equipment connected to unearthed external circuits, current (mA)		N/A
5.8	Backfeed safeguard in battery backed up supplies		N/A
	Mains terminal ES	No such batteries	N/A
	Air gap (mm).....		N/A

6	ELECTRICALLY- CAUSED FIRE		P
6.2	Classification of PS and PIS		P
6.2.2	Power source circuit classifications	See appended table 6.2.2	P
6.2.3	Classification of potential ignition sources	See appended table 6.2.2	P
6.2.3.1	Arcing PIS	Less than 50V. No arcing PIS	N/A
6.2.3.2	Resistive PIS	See appended table 6.2.3.2.	P
6.3	Safeguards against fire under normal operating and abnormal operating conditions		P
6.3.1	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials	See appended table 5.4.1.5 ,6.3.2,9.0, B.2.6	P
	Combustible materials outside fire enclosure	No such parts	N/A
6.4	Safeguards against fire under single fault conditions		P
6.4.1	Safeguard method		P



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits	Coin battery assumed as PS1 under fault condition	P
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits	External AC/DC power adapter is certified as PS2 under normal condition and single fault conditions. No PS3 circuits.	P
6.4.3.1	Supplementary safeguards	Selection and application of components and materials which comply with the relevant IEC standards and minimize the possibility of ignition and spread of flame	P
6.4.3.2	Single Fault Conditions :	See appended table B.4	P
	Special conditions for temperature limited by fuse		N/A
6.4.4	Control of fire spread in PS1 circuits	Rigid metal fire enclosure in use	P
6.4.5	Control of fire spread in PS2 circuits	As above	P
6.4.5.2	Supplementary safeguards	All components mounted on V-1 class material. No ignition during single fault conditions.	P
6.4.6	Control of fire spread in PS3 circuits	No PS3 circuits	N/A
6.4.7	Separation of combustible materials from a PIS	Metal enclosure. No combustible materials.	N/A
6.4.7.2	Separation by distance		N/A
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers	Fire enclosure is provided	P
6.4.8.2	Fire enclosure and fire barrier material properties	Rigid metal fire enclosure in use	P
6.4.8.2.1	Requirements for a fire barrier	No fire barriers	N/A
6.4.8.2.2	Requirements for a fire enclosure	Rigid metal fire enclosure in use	P
6.4.8.3	Constructional requirements for a fire enclosure and a fire barrier		P
6.4.8.3.1	Fire enclosure and fire barrier openings	Considered	P
6.4.8.3.2	Fire barrier dimensions	No fire barrier	N/A
6.4.8.3.3	Top openings and properties	No top openings	P
	Openings dimensions (mm)..... :		N/A
6.4.8.3.4	Bottom openings and properties	No bottom openings	P



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Openings dimensions (mm)..... :		N/A
	Flammability tests for the bottom of a fire enclosure		N/A
	Instructional Safeguard..... :		N/A
6.4.8.3.5	Side openings and properties	No side openings	P
	Openings dimensions (mm)..... :		N/A
6.4.8.3.6	Integrity of a fire enclosure, condition met: a), b) or c)..... :	No cover or door that meant to be opened by an ordinary person	N/A
6.4.8.4	Separation of a PIS from a fire enclosure and a fire barrier distance (mm) or flammability rating..... :	Metal fire enclosure is used. The fire enclosure not made of combustible material	N/A
6.4.9	Flammability of insulating liquid..... :	No use of insulating liquid	N/A
6.5	Internal and external wiring		P
6.5.1	General requirements	Internal wiring considered adequate for their application use.	P
6.5.2	Requirements for interconnection to building wiring..... :	The EUT is not intended for providing power to remote equipment over the wiring system	N/A
6.5.3	Internal wiring size (mm ²) for socket-outlets..... :	No socket-outlets	N/A
6.6	Safeguards against fire due to the connection to additional equipment		P

7	INJURY CAUSED BY HAZARDOUS SUBSTANCES		P
7.2	Reduction of exposure to hazardous substances		P
7.3	Ozone exposure		N/A
7.4	Use of personal safeguards or personal protective equipment (PPE)		N/A
	Personal safeguards and instructions..... :	Not required	—
7.5	Use of instructional safeguards and instructions		N/A
	Instructional safeguard (ISO 7010)..... :	Not required	—
7.6	Batteries and their protection circuits		P

8	MECHANICALLY-CAUSED INJURY		P
8.2	Mechanical energy source classifications		P
8.3	Safeguards against mechanical energy sources		P
8.4	Safeguards against parts with sharp edges and corners		P
8.4.1	Safeguards	MS1 classification, safeguards are not required	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Instructional Safeguard.....:	As above	N/A
8.4.2	Sharp edges or corners	All edges and corners are judged to be well rounded and do not present any hazard	P
8.5	Safeguards against moving parts		N/A
8.5.1	Fingers, jewellery, clothing, hair, etc., contact with MS2 or MS3 parts	No moving parts	N/A
	MS2 or MS3 part required to be accessible for the function of the equipment		N/A
	Moving MS3 parts only accessible to skilled person		N/A
8.5.2	Instructional safeguard.....:		N/A
8.5.4	Special categories of equipment containing moving parts	No such equipment	N/A
8.5.4.1	General		N/A
8.5.4.2	Equipment containing work cells with MS3 parts		N/A
8.5.4.2.1	Protection of persons in the work cell		N/A
8.5.4.2.2	Access protection override		N/A
8.5.4.2.2.1	Override system		N/A
8.5.4.2.2.2	Visual indicator		N/A
8.5.4.2.3	Emergency stop system	No emergency stop system	N/A
	Maximum stopping distance from the point of activation (m).....:		N/A
	Space between end point and nearest fixed mechanical part (mm).....:		N/A
8.5.4.2.4	Endurance requirements		N/A
	Mechanical system subjected to 100 000 cycles of operation		N/A
	- Mechanical function check and visual inspection		N/A
	- Cable assembly.....:		N/A
8.5.4.3	Equipment having electromechanical device for destruction of media		N/A
8.5.4.3.1	Equipment safeguards		N/A
8.5.4.3.2	Instructional safeguards against moving parts.....:		N/A
8.5.4.3.3	Disconnection from the supply		N/A
8.5.4.3.4	Cut type and test force (N).....:		N/A
8.5.4.3.5	Compliance		N/A
8.5.5	High pressure lamps	No such lamps	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Explosion test		N/A
8.5.5.3	Glass particles dimensions (mm)		N/A
8.6	Stability of equipment		N/A
8.6.1	General	Mass of EUT is less than 7kg classified as MS1. No stability requirements	N/A
	Instructional safeguard		N/A
8.6.2	Static stability		N/A
8.6.2.2	Static stability test		N/A
8.6.2.3	Downward force test		N/A
8.6.3	Relocation stability		N/A
	Wheels diameter (mm)		—
	Tilt test		N/A
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test		N/A
8.7	Equipment mounted to wall, ceiling or other structure		N/A
8.7.1	Mount means type	Not meant for wall or ceiling installation	N/A
8.7.2	Test methods	As above	N/A
	Test 1, additional downwards force (N).....	As above	N/A
	Test 2, number of attachment points and test force (N).....	As above	N/A
	Test 3 Nominal diameter (mm) and applied torque (Nm).....	As above	N/A
8.8	Handles strength		N/A
8.8.1	General	Unit not intended to be carried by handles	N/A
8.8.2	Handle strength test		N/A
	Number of handles.....		—
	Force applied (N)		—
8.9	Wheels or casters attachment requirements		N/A
8.9.2	Pull test	No wheels or casters	N/A
8.10	Carts, stands and similar carriers		N/A
8.10.1	General	No carts, stands and similar carriers	N/A
8.10.2	Marking and instructions		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.10.3	Cart, stand or carrier loading test		N/A
	Loading force applied (N)		N/A
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Force applied (N)		—
8.10.6	Thermoplastic temperature stability		N/A
8.11	Mounting means for slide-rail mounted equipment (SRME)		N/A
8.11.1	General	Not intended for rack mounting	N/A
8.11.2	Requirements for slide rails		N/A
	Instructional Safeguard		N/A
8.11.3	Mechanical strength test		N/A
8.11.3.1	Downward force test, force (N) applied		N/A
8.11.3.2	Lateral push force test		N/A
8.11.3.3	Integrity of slide rail end stops		N/A
8.11.4	Compliance		N/A
8.12	Telescoping or rod antennas		N/A
	Button/ball diameter (mm)	No telescoping or rod antennas	—

9	THERMAL BURN INJURY		P
9.2	Thermal energy source classifications		P
9.3	Touch temperature limits		P
9.3.1	Touch temperatures of accessible parts	Classified as TS1 for external surfaces that not need to be touched to operate the equipment.	P
9.3.2	Test method and compliance	See appended 5.4.1.4, 6.3.2, 9.0, B.2.6	P
9.4	Safeguards against thermal energy sources		N/A
9.5	Requirements for safeguards		N/A
9.5.1	Equipment safeguard	Classified as TS1. Safeguards are not required	N/A
9.5.2	Instructional safeguard	As above	N/A
9.6	Requirements for wireless power transmitters		N/A
9.6.1	General	No wireless power transmitters	N/A
9.6.2	Specification of the foreign objects		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.6.3	Test method and compliance		N/A
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10	RADIATION		P
10.2	Radiation energy source classification		P
10.2.1	General classification	The EUT does not include laser, visible, infra-red, ultraviolet, x-ray. LED used for indicating only. Classified as RS1.	P
	Lasers	No lasers	—
	Lamps and lamp systems	LEDs are used for indication only	—
	Image projectors	No image projectors	—
	X-Ray	No X-Ray	—
	Personal music player	Not a personal music player	—
10.3	Safeguards against laser radiation		N/A
	The standard(s) equipment containing laser(s) comply	No lasers	N/A
10.4	Safeguards against optical radiation from lamps and lamp systems (including LED types)		P
10.4.1	General requirements	Low power LEDs are used for indication only. Classified as Exempt Group	P
	Instructional safeguard provided for accessible radiation level needs to exceed		N/A
	Risk group marking and location		N/A
	Information for safe operation and installation		N/A
10.4.2	Requirements for enclosures		N/A
	UV radiation exposure	No UV radiation exposure	N/A
10.4.3	Instructional safeguard		N/A
10.5	Safeguards against X-radiation		N/A
10.5.1	Requirements	No X-Ray radiation	N/A
	Instructional safeguard for skilled persons		—
10.5.3	Maximum radiation (pA/kg).....		—
10.6	Safeguards against acoustic energy sources		N/A
10.6.1	General	The EUT is not defined as personal music player and not closely coupled to the ear or	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
		earphones and headphones intended for use with personal music players	
10.6.2	Classification		N/A
	Acoustic output $L_{Aeq,T}$, dB(A)..... :		N/A
	Unweighted RMS output voltage (mV)..... :		N/A
	Digital output signal (dBFS)..... :		N/A
10.6.3	Requirements for dose-based systems		N/A
10.6.3.1	General requirements		N/A
10.6.3.2	Dose-based warning and automatic decrease		N/A
10.6.3.3	Exposure-based warning and requirements		N/A
	30 s integrated exposure level (MEL30)..... :		N/A
	Warning for MEL \geq 100 dB(A)..... :		N/A
10.6.4	Measurement methods		N/A
10.6.5	Protection of persons		N/A
	Instructional safeguards..... :		N/A
10.6.6	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.6.1	Corded listening devices with analogue input		N/A
	Listening device input voltage (mV)..... :		N/A
10.6.6.2	Corded listening devices with digital input		N/A
	Max. acoustic output $L_{Aeq,T}$, dB(A)..... :		N/A
10.6.6.3	Cordless listening devices		N/A
	Max. acoustic output $L_{Aeq,T}$, dB(A)..... :		N/A
B	NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS		P
B.1	General		P
B.1.5	Temperature measurement conditions	See appended table 5.4.1.4, 6.3.2, 9.0, B.2.6	P
B.2	Normal operating conditions		P
B.2.1	General requirements..... :	See Test Item Particulars and appended test tables	P
	Audio Amplifiers and equipment with audio amplifiers..... :	No Audio amplifiers in use at EUT	N/A
B.2.3	Supply voltage and tolerances	Considered	P



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
B.2.5	Input test	Not connected to the mains, however test performed since rating is declared on EUT. See appended table B.2.5	P
B.3	Simulated abnormal operating conditions		P
B.3.1	General		P
B.3.2	Covering of ventilation openings	No ventilation openings	N/A
	Instructional safeguard		N/A
B.3.3	DC mains polarity test	Not connect to mains	N/A
B.3.4	Setting of voltage selector	As above	N/A
B.3.5	Maximum load at output terminals	No such output terminals that supply voltage to other equipment	N/A
B.3.6	Reverse battery polarity	Impossible due to the design of battery connector	P
B.3.7	Audio amplifier abnormal operating conditions	No audio amplifier	N/A
B.3.8	Safeguards functional during and after abnormal operating conditions	Safeguards remain effective	P
B.4	Simulated single fault conditions		P
B.4.1	General	See appended table B.4	P
B.4.2	Temperature controlling device	No such device	N/A
B.4.3	Blocked motor test	No motors	N/A
B.4.4	Functional insulation	See appended table B.4	P
B.4.4.1	Short circuit of clearances for functional insulation		P
B.4.4.2	Short circuit of creepage distances for functional insulation		P
B.4.4.3	Short circuit of functional insulation on coated printed boards	Uncoated	N/A
B.4.5	Short-circuit and interruption of electrodes in tubes and semiconductors	No such components	N/A
B.4.6	Short circuit or disconnection of passive components	See appended table B.4	P
B.4.7	Continuous operation of components	No such components	N/A
B.4.8	Compliance during and after single fault conditions	See appended table B.4	P
B.4.9	Battery charging and discharging under single fault conditions	Comply with annex M requirements	P
C	UV RADIATION		N/A
C.1	Protection of materials in equipment from UV radiation		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
C.1.2	Requirements	EUT not producing UV radiation	N/A
C.1.3	Test method		N/A
C.2	UV light conditioning test		N/A
C.2.1	Test apparatus..... :	As above	N/A
C.2.2	Mounting of test samples		N/A
C.2.3	Carbon-arc light-exposure test		N/A
C.2.4	Xenon-arc light-exposure test		N/A
D	TEST GENERATORS		N/A
D.1	Impulse test generators		N/A
D.2	Antenna interface test generator		N/A
D.3	Electronic pulse generator		N/A
E	TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS		N/A
E.1	Electrical energy source classification for audio signals		N/A
	Maximum non-clipped output power (W)..... :	No audio amplifiers are in use	—
	Rated load impedance (Ω)		—
	Open-circuit output voltage (V)..... :		—
	Instructional safeguard		—
E.2	Audio amplifier normal operating conditions		N/A
	Audio signal source type	As above	—
	Audio output power (W)..... :		—
	Audio output voltage (V)		—
	Rated load impedance (Ω)		—
	Requirements for temperature measurement		N/A
E.3	Audio amplifier abnormal operating conditions		N/A
F	EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS		P
F.1	General		P
	Language	English and French	—
F.2	Letter symbols and graphical symbols		P
F.2.1	Letter symbols according to IEC60027-1	No affecting safety	N/A
F.2.2	Graphic symbols according to IEC, ISO or manufacturer specific		P
F.3	Equipment markings		P
F.3.1	Equipment marking locations	Marking on equipment enclosure	P



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
F.3.2	Equipment identification markings	Provided	P
F.3.2.1	Manufacturer identification	CompuLab	P
F.3.2.2	Model identification	Tensor-I22	P
F.3.3	Equipment rating markings	Provided	P
F.3.3.1	Equipment with direct connection to mains	No direct connection to mains	N/A
F.3.3.2	Equipment without direct connection to mains	External PS rating is marked on the label	P
F.3.3.3	Nature of the supply voltage		N/A
F.3.3.4	Rated voltage.....		N/A
F.3.3.5	Rated frequency		N/A
F.3.3.6	Rated current or rated power.....		N/A
F.3.3.7	Equipment with multiple supply connections	No multiple supply connections	N/A
F.3.4	Voltage setting device	No voltage setting device	N/A
F.3.5	Terminals and operating devices	See below	P
F.3.5.1	Mains appliance outlet and socket-outlet markings	No appliance outlet and socket-outlet	N/A
F.3.5.2	Switch position identification marking.....	The on/off button not used as disconnect device	N/A
F.3.5.3	Replacement fuse identification and rating markings	No replacement fuse	N/A
	Instructional safeguards for neutral fuse	As above	N/A
F.3.5.4	Replacement battery identification marking	No hazards	N/A
F.3.5.5	Neutral conductor terminal	No terminals for mains supply	N/A
F.3.5.6	Terminal marking location	No terminals for mains supply	N/A
F.3.6	Equipment markings related to equipment classification	Class III equipment	N/A
F.3.6.1	Class I equipment	As above	N/A
F.3.6.1.1	Protective earthing conductor terminal.....		N/A
F.3.6.1.2	Protective bonding conductor terminals		N/A
F.3.6.2	Equipment class marking	As above	N/A
F.3.6.3	Functional earthing terminal marking		N/A
F.3.7	Equipment IP rating marking	IPX0 considered	N/A
F.3.8	External power supply output marking	Not such output	N/A
F.3.9	Durability, legibility and permanence of marking	Inspected	P
F.3.10	Test for permanence of markings	Tested	P
F.4	Instructions		P



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Information prior to installation and initial use	Provided	P
	Equipment for use in locations where children not likely to be present	No such locations	N/A
	Instructions for installation and interconnection	Provided	P
	Equipment intended for use only in restricted access area	No intended for restricted access area	N/A
	Equipment intended to be fastened in place	No such equipment	N/A
	Instructions for audio equipment terminals	No such parts	N/A
	Protective earthing used as a safeguard	Class III equipment – no earth	N/A
	Protective conductor current exceeding ES2 limits	As above	N/A
	Graphic symbols used on equipment	Not effecting safety	N/A
	Permanently connected equipment not provided with all-pole mains switch	Not such parts	N/A
	Replaceable components or modules providing safeguard function	Classified as ES1 – Safeguards are not required.	N/A
	Equipment containing insulating liquid	Not such parts	N/A
	Installation instructions for outdoor equipment	Indoor equipment	N/A
F.5	Instructional safeguards		P
G	COMPONENTS		N/A
G.1	Switches		N/A
G.1.1	General	No safety related switches	N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A
G.1.3	Test method and compliance		N/A
G.2	Relays		N/A
G.2.1	Requirements	No relays	N/A
G.2.2	Overload test		N/A
G.2.3	Relay controlling connectors supplying power to other equipment		N/A
G.2.4	Test method and compliance		N/A
G.3	Protective devices		N/A
G.3.1	Thermal cut-offs	No thermal cut-offs	N/A
	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)		N/A
	Thermal cut-outs tested as part of the equipment as indicated in c)		N/A
G.3.1.2	Test method and compliance		N/A
G.3.2	Thermal links	No thermal links	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.3.2.1	a) Thermal links tested separately according to IEC 60691 with specifics		N/A
	b) Thermal links tested as part of the equipment		N/A
G.3.2.2	Test method and compliance		N/A
G.3.3	PTC thermistors		N/A
G.3.4	Overcurrent protection devices		N/A
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.4		N/A
G.3.5.1	Non-resettable devices suitably rated and marking provided		N/A
G.3.5.2	Single faults conditions..... :		N/A
G.4	Connectors		N/A
G.4.1	Spacings	Classified as ES1 No mains	N/A
G.4.2	Mains connector configuration..... :	As above	N/A
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely	As above	N/A
G.5	Wound components		N/A
G.5.1	Wire insulation in wound components	Classified as ES1 No such connectors	N/A
G.5.1.2	Protection against mechanical stress		N/A
G.5.2	Endurance test		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Test time (days per cycle)		—
	Test temperature (°C)..... :		—
G.5.2.3	Wound components supplied from the mains		N/A
G.5.2.4	No insulation breakdown		N/A
G.5.3	Transformers	No transformers	N/A
G.5.3.1	Compliance method..... :		N/A
	Position		N/A
	Method of protection		N/A
G.5.3.2	Insulation		N/A
	Protection from displacement of windings		—
G.5.3.3	Transformer overload tests		N/A
G.5.3.3.1	Test conditions		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.5.3.3.2	Winding temperatures		N/A
G.5.3.3.3	Winding temperatures - alternative test method		N/A
G.5.3.4	Transformers using FIW		N/A
G.5.3.4.1	General		N/A
	FIW wire nominal diameter :		—
G.5.3.4.2	Transformers with basic insulation only		N/A
G.5.3.4.3	Transformers with double insulation or reinforced insulation..... :		N/A
G.5.3.4.4	Transformers with FIW wound on metal or ferrite core		N/A
G.5.3.4.5	Thermal cycling test and compliance		N/A
G.5.3.4.6	Partial discharge test		N/A
G.5.3.4.7	Routine test		N/A
G.5.4	Motors	No motors	N/A
G.5.4.1	General requirements		N/A
G.5.4.2	Motor overload test conditions		N/A
G.5.4.3	Running overload test		N/A
G.5.4.4.2	Locked-rotor overload test		N/A
	Test duration (days) :		—
G.5.4.5	Running overload test for DC motors		N/A
G.5.4.5.2	Tested in the unit		N/A
G.5.4.5.3	Alternative method		N/A
G.5.4.6	Locked-rotor overload test for DC motors		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature :		N/A
G.5.4.6.3	Alternative method		N/A
G.5.4.7	Motors with capacitors		N/A
G.5.4.8	Three-phase motors		N/A
G.5.4.9	Series motors		N/A
	Operating voltage :		—
G.6	Wire Insulation		N/A
G.6.1	General	No such wires	N/A
G.6.2	Enamelled winding wire insulation		N/A
G.7	Mains supply cords		N/A
G.7.1	General requirements	Not connected to mains	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Type..... :		—
G.7.2	Cross sectional area (mm ² or AWG)..... :		N/A
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		N/A
G.7.3.2	Cord strain relief		N/A
G.7.3.2.1	Requirements		N/A
	Strain relief test force (N)..... :		N/A
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm)..... :		N/A
G.7.3.2.4	Strain relief and cord anchorage material		N/A
G.7.4	Cord Entry		N/A
G.7.5	Non-detachable cord bend protection		N/A
G.7.5.1	Requirements		N/A
G.7.5.2	Test method and compliance		N/A
	Overall diameter or minor overall dimension, <i>D</i> (mm)..... :		—
	Radius of curvature after test (mm)..... :		—
G.7.6	Supply wiring space		N/A
G.7.6.1	General requirements		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Requirements		N/A
G.7.6.2.2	Test with 8 mm strand		N/A
G.8	Varistors		N/A
G.8.1	General requirements	No such varistors which used as safeguard	N/A
G.8.2	Safeguards against fire		N/A
G.8.2.1	General		N/A
G.8.2.2	Varistor overload test		N/A
G.8.2.3	Temporary overvoltage test		N/A
G.9	Integrated circuit (IC) current limiters		N/A
G.9.1	Requirements	No Integrated circuit (IC) current limiters	N/A
	IC limiter output current (max. 5A)..... :		—
	Manufacturers' defined drift..... :		—
G.9.2	Test Program		N/A
G.9.3	Compliance		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.10	Resistors		N/A
G.10.1	General	No resistors used as safeguards	N/A
G.10.2	Conditioning		N/A
G.10.3	Resistor test		N/A
G.10.4	Voltage surge test		N/A
G.10.5	Impulse test		N/A
G.10.6	Overload test		N/A
G.11	Capacitors and RC units		N/A
G.11.1	General requirements	No such components used as safeguards	N/A
G.11.2	Conditioning of capacitors and RC units		N/A
G.11.3	Rules for selecting capacitors		N/A
G.12	Optocouplers		N/A
	Optocouplers comply with IEC 60747-5-5 with specifics	No optocouplers	N/A
	Type test voltage $V_{ini,a}$:		—
	Routine test voltage, $V_{ini,b}$:		—
G.13	Printed boards		N/A
		Electrical energy source classified as ES1 – Safeguards not required (no basic, supplementary, or reinforced insulation). Functional insulation only provided in EUT	
G.13.1	General requirements		N/A
G.13.2	Uncoated printed boards		N/A
G.13.3	Coated printed boards		N/A
G.13.4	Insulation between conductors on the same inner surface		N/A
G.13.5	Insulation between conductors on different surfaces		N/A
	Distance through insulation..... :		N/A
	Number of insulation layers (pcs)..... :		—
G.13.6	Tests on coated printed boards	No coated printed boards	N/A
G.13.6.1	Sample preparation and preliminary inspection		N/A
G.13.6.2	Test method and compliance		N/A
G.14	Coating on components terminals		N/A
G.14.1	Requirements..... :	No such terminals	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.15	Pressurized liquid filled components		N/A
G.15.1	Requirements	No such components	N/A
G.15.2	Test methods and compliance		N/A
G.15.2.1	Hydrostatic pressure test		N/A
G.15.2.2	Creep resistance test		N/A
G.15.2.3	Tubing and fittings compatibility test		N/A
G.15.2.4	Vibration test		N/A
G.15.2.5	Thermal cycling test		N/A
G.15.2.6	Force test		N/A
G.15.3	Compliance		N/A
G.16	IC including capacitor discharge function (ICX)		N/A
G.16.1	Condition for fault tested is not required	No such components	N/A
	ICX with associated circuitry tested in equipment		N/A
	ICX tested separately		N/A
G.16.2	Tests		N/A
	Smallest capacitance and smallest resistance specified by ICX manufacturer for impulse test..... :		—
	Mains voltage that impulses to be superimposed on :		—
	Largest capacitance and smallest resistance for ICX tested by itself for 10000 cycles test :		—
G.16.3	Capacitor discharge test..... :		N/A
H	CRITERIA FOR TELEPHONE RINGING SIGNALS		N/A
H.1	General		N/A
H.2	Method A		N/A
H.3	Method B		N/A
H.3.1	Ringling signal	No telephone ringing signals	N/A
H.3.1.1	Frequency (Hz) :		—
H.3.1.2	Voltage (V) :		—
H.3.1.3	Cadence; time (s) and voltage (V) :		—
H.3.1.4	Single fault current (mA):..... :		—
H.3.2	Tripping device and monitoring voltage		N/A
H.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N/A
H.3.2.2	Tripping device		N/A
H.3.2.3	Monitoring voltage (V) :		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
J	INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION		N/A
J.1	General		N/A
	Winding wire insulation	No such windings wires	—
	Solid round winding wire, diameter (mm)		N/A
	Solid square and rectangular (flatwise bending) winding wire, cross-sectional area (mm ²).....		N/A
J.2/J.3	Tests and Manufacturing		—
K	SAFETY INTERLOCKS		N/A
K.1	General requirements		N/A
	Instructional safeguard	No safety interlocks	N/A
K.2	Components of safety interlock safeguard mechanism		N/A
K.3	Inadvertent change of operating mode		N/A
K.4	Interlock safeguard override		N/A
K.5	Fail-safe		N/A
K.5.1	Under single fault condition		N/A
K.6	Mechanically operated safety interlocks		N/A
K.6.1	Endurance requirement		N/A
K.6.2	Test method and compliance		N/A
K.7	Interlock circuit isolation		N/A
K.7.1	Separation distance for contact gaps & interlock circuit elements		N/A
	In circuit connected to mains, separation distance for contact gaps (mm).....		N/A
	In circuit isolated from mains, separation distance for contact gaps (mm).....		N/A
	Electric strength test before and after the test of K.7.2		N/A
K.7.2	Overload test, Current (A)		N/A
K.7.3	Endurance test		N/A
K.7.4	Electric strength test		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
L	DISCONNECT DEVICES		N/A
L.1	General requirements	Safety class III equipment powered by 12VDC from external certified AC/DC adapter which its output evaluated as LPS. Evaluated as ES1/PS2. Safeguards and disconnect device are not required	N/A
L.2	Permanently connected equipment		N/A
L.3	Parts that remain energized		N/A
L.4	Single-phase equipment		N/A
L.5	Three-phase equipment		N/A
L.6	Switches as disconnect devices		N/A
L.7	Plugs as disconnect devices		N/A
L.8	Multiple power sources	Single source	N/A
	Instructional safeguard	Not required	N/A
M	EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS		P
M.1	General requirements		P
M.2	Safety of batteries and their cells		P
M.2.1	Batteries and their cells comply with relevant IEC standards	Safety approved low power, non-rechargeable, not user replaceable coin cell per UL1642 is used inside fire enclosure	P
M.3	Protection circuits for batteries provided within the equipment	Coin battery is protected by a diode and a 1K resistor. Tests were waived by engineering considerations.	P
M.3.1	Requirements	Certified low power coin battery per UL1642 is used inside fire enclosure. Tests were waived by engineering considerations.	P
M.3.2	Test method	As above	N/A
	Overcharging of a rechargeable battery	Not rechargeable battery	N/A
	Excessive discharging		N/A
	Unintentional charging of a non-rechargeable battery		N/A
	Reverse charging of a rechargeable battery		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
M.3.3	Compliance		N/A
M.4	Additional safeguards for equipment containing a portable secondary lithium battery		N/A
M.4.1	General	Coin battery not rechargeable and not considered as portable	N/A
M.4.2	Charging safeguards		N/A
M.4.2.1	Requirements		N/A
M.4.2.2	Compliance..... :		N/A
M.4.3	Fire enclosure :		N/A
M.4.4	Drop test of equipment containing a secondary lithium battery		N/A
M.4.4.2	Preparation and procedure for the drop test		N/A
M.4.4.3	Drop, Voltage on reference and dropped batteries (V); voltage difference during 24 h period (%)..... :		N/A
M.4.4.4	Check of the charge/discharge function		N/A
M.4.4.5	Charge / discharge cycle test		N/A
M.4.4.6	Compliance		N/A
M.5	Risk of burn due to short-circuit during carrying		N/A
M.5.1	Requirement	EUT is not intended for carrying	N/A
M.5.2	Test method and compliance		N/A
M.6	Safeguards against short-circuits		N/A
M.6.1	External and internal faults	Safety approved low power coin cell that enclosed inside metal enclosure. Test was waived by engineering considerations.	N/A
M.6.2	Compliance		N/A
M.7	Risk of explosion from lead acid and NiCd batteries		N/A
M.7.1	Ventilation preventing explosive gas concentration	No lead acid and NiCd batteries	N/A
	Calculated hydrogen generation rate :		N/A
M.7.2	Test method and compliance		N/A
	Minimum air flow rate, Q (m ³ /h)..... :		N/A
M.7.3	Ventilation tests		N/A
M.7.3.1	General		N/A
M.7.3.2	Ventilation test – alternative 1		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Hydrogen gas concentration (%)		N/A
M.7.3.3	Ventilation test – alternative 2		N/A
	Obtained hydrogen generation rate		N/A
M.7.3.4	Ventilation test – alternative 3		N/A
	Hydrogen gas concentration (%)		N/A
M.7.4	Marking		N/A
M.8	Protection against internal ignition from external spark sources of batteries with aqueous electrolyte		N/A
M.8.1	General	No such batteries	N/A
M.8.2	Test method		N/A
M.8.2.1	General		N/A
M.8.2.2	Estimation of hypothetical volume V_z (m ³ /s)		—
M.8.2.3	Correction factors		—
M.8.2.4	Calculation of distance d (mm)		—
M.9	Preventing electrolyte spillage		N/A
M.9.1	Protection from electrolyte spillage	Safety approved low power coin cell that enclosed inside metal enclosure. Test was waived by engineering considerations.	N/A
M.9.2	Tray for preventing electrolyte spillage		N/A
M.10	Instructions to prevent reasonably foreseeable misuse	Safety approved low power coin cell that enclosed inside metal enclosure and not meant to be replaced. Reasonably foreseeable misuse not possible.	N/A
	Instructional safeguard	Not required	N/A
N	ELECTROCHEMICAL POTENTIALS		P
	Material(s) used	Considered for Aluminum and steel	—
O	MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES		N/A
	Value of X (mm).....	Not required	—
P	SAFEGUARDS AGAINST CONDUCTIVE OBJECTS		N/A
P.1	General	No openings in the enclosure	N/A
P.2	Safeguards against entry or consequences of entry of a foreign object		N/A
P.2.1	General	As above	N/A
P.2.2	Safeguards against entry of a foreign object		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Location and Dimensions (mm)		—
P.2.3	Safeguards against the consequences of entry of a foreign object		N/A
P.2.3.1	Safeguard requirements		N/A
	The ES3 and PS3 keep-out volume in Figure P.3 not applicable to transportable equipment		N/A
	Transportable equipment with metalized plastic parts		N/A
P.2.3.2	Consequence of entry test.....		N/A
P.3	Safeguards against spillage of internal liquids		N/A
P.3.1	General	No internal liquid used	N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Compliance		N/A
P.4	Metallized coatings and adhesives securing parts		N/A
P.4.1	General	No such parts	N/A
P.4.2	Tests		N/A
	Conditioning, T _c (°C)		—
	Duration (weeks)		—
Q	CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING		P
Q.1	Limited power sources	EUT is class III equipment powered by external certified AC/DC adapter which its outputs evaluated as LPS.	P
Q.1.1	Requirements	All data ports were tested and evaluated	P
	a) Inherently limited output	See appended table Q.1	P
	b) Impedance limited output		N/A
	c) Regulating network limited output		N/A
	d) Overcurrent protective device limited output		N/A
	e) IC current limiter complying with G.9		N/A
Q.1.2	Test method and compliance		N/A
	Current rating of overcurrent protective device (A)		N/A
Q.2	Test for external circuits – paired conductor cable	EUT is not supplying power to external circuits	N/A
	Maximum output current (A)	As above	N/A
	Current limiting method	As above	—



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
R	LIMITED SHORT CIRCUIT TEST		N/A
R.1	General	No such circuits	N/A
R.2	Test setup		N/A
	Overcurrent protective device for test		—
R.3	Test method		N/A
	Cord/cable used for test		—
R.4	Compliance		N/A
S	TESTS FOR RESISTANCE TO HEAT AND FIRE		N/A
S.1	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material	Metal enclosure	—
	Wall thickness (mm)		—
	Conditioning (°C)		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	- Material not consumed completely		N/A
	- Material extinguishes within 30s		N/A
	- No burning of layer or wrapping tissue		N/A
S.2	Flammability test for fire enclosure and fire barrier integrity		N/A
	Samples, material		—
	Wall thickness (mm)		—
	Conditioning (°C)		—
S.3	Flammability test for the bottom of a fire enclosure		N/A
S.3.1	Mounting of samples		N/A
S.3.2	Test method and compliance		N/A
	Mounting of samples		—
	Wall thickness (mm)		—
S.4	Flammability classification of materials		N/A
S.5	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power exceeding 4 000 W		N/A
	Samples, material		—
	Wall thickness (mm)		—
	Conditioning (°C)		—
T	MECHANICAL STRENGTH TESTS		P
T.1	General		P



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
T.2	Steady force test, 10 N	Safety class III equipment powered by 12VDC, 5A from external certified AC/DC adapter which its output evaluated as LPS. Evaluated as ES1/PS2. No Voltages hazard - safeguards not necessary. Robustness tests were waived by engineering considerations	P
T.3	Steady force test, 30 N		N/A
T.4	Steady force test, 100 N		N/A
T.5	Steady force test, 250 N		N/A
T.6	Enclosure impact test		N/A
	Fall test		N/A
	Swing test		N/A
T.7	Drop test		N/A
T.8	Stress relief test		N/A
T.9	Glass Impact Test		N/A
T.10	Glass fragmentation test		N/A
	Number of particles counted.....		N/A
T.11	Test for telescoping or rod antennas		N/A
	Torque value (Nm)	No telescoping or rod antennas	N/A
U	MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION		N/A
U.1	General		N/A
	Instructional safeguard :	No CRT	N/A
U.2	Test method and compliance for non-intrinsically protected CRTs		N/A
U.3	Protective screen		N/A
V	DETERMINATION OF ACCESSIBLE PARTS		N/A
V.1	Accessible parts of equipment		N/A
V.1.1	General	No openings	N/A
V.1.2	Surfaces and openings tested with jointed test probes		N/A
V.1.3	Openings tested with straight unjointed test probes		N/A
V.1.4	Plugs, jacks, connectors tested with blunt probe		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
V.1.5	Slot openings tested with wedge probe		N/A
V.1.6	Terminals tested with rigid test wire		N/A
V.2	Accessible part criterion		N/A
X	ALTERNATIVE METHOD FOR DETERMINING CLEARANCES FOR INSULATION IN CIRCUITS CONNECTED TO AN AC MAINS NOT EXCEEDING 420 V PEAK (300 V RMS)		N/A
	Clearance :	Not required	N/A
Y	CONSTRUCTION REQUIREMENTS FOR OUTDOOR ENCLOSURES		N/A
Y.1	General	Indoor equipment	N/A
Y.2	Resistance to UV radiation		N/A
Y.3	Resistance to corrosion		N/A
Y.3	Resistance to corrosion		N/A
Y.3.1	Metallic parts of outdoor enclosures are resistant to effects of water-borne contaminants by :		N/A
Y.3.2	Test apparatus		N/A
Y.3.3	Water – saturated sulphur dioxide atmosphere		N/A
Y.3.4	Test procedure :		N/A
Y.3.5	Compliance		N/A
Y.4	Gaskets		N/A
Y.4.1	General		N/A
Y.4.2	Gasket tests		N/A
Y.4.3	Tensile strength and elongation tests		N/A
	Alternative test methods :		N/A
Y.4.4	Compression test		N/A
Y.4.5	Oil resistance		N/A
Y.4.6	Securing means		N/A
Y.5	Protection of equipment within an outdoor enclosure		N/A
Y.5.1	General	Indoor equipment	N/A
Y.5.2	Protection from moisture		N/A
	Relevant tests of IEC 60529 or Y.5.3 :		N/A
Y.5.3	Water spray test		N/A
Y.5.4	Protection from plants and vermin		N/A
Y.5.5	Protection from excessive dust		N/A
Y.5.5.1	General		N/A
Y.5.5.2	IP5X equipment		N/A
Y.5.5.3	IP6X equipment		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
Y.6	Mechanical strength of enclosures		N/A
Y.6.1	General		N/A
Y.6.2	Impact test :		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Summary of Group & National Differences

List of Countries:	Group Differences	National Differences	List of Countries:	Group Differences	National Differences
AU=Australia	--	--	IL=Israel	--	--
AT=Austria	--	--	IS=Iceland	--	--
BE=Belgium	--	--	IT=Italy	--	--
BG=Bulgaria	--	--	JP=Japan	--	--
CA=Canada	--	YES ¹⁾	KR=Korea, Republic	--	--
CH=Switzerland	--	--	LT=Lithuania	--	--
CN=China	--	--	LU=Luxembourg	--	--
CZ=Czech Republic	--	--	LV=Latvia	--	--
DK=Denmark	--	YES ²⁾	MT=Malta	--	--
DE=Germany	--	YES ³⁾	NL=The Netherlands	--	--
EE=Estonia	--	--	NO=Norway	--	YES ⁸⁾
ES=Spain	--	--	NZ=New Zealand	--	--
FI=Finland	--	YES ⁴⁾	PL=Poland	--	--
FR=France	--	YES ⁵⁾	PT=Portugal	--	--
GB=United Kingdom	--	YES ⁶⁾	RO=Romania	--	--
GR=Greece	--	--	SE=Sweden	--	YES ⁹⁾
HU=Hungary	--	--	SK=Slovakia	--	--
HR=Croatia	--	--	SI=Slovenia	--	--
IE=Ireland	--	YES ⁷⁾	US=United States	--	YES ¹⁰⁾

Notes:

- 1) National differences from latest attachment to test report. Canada national standard (CAN/CSA C22.2 No. 62368-1:19)
- 2) National differences from latest attachment to test report. Denmark national standard (DS/EN IEC 62368-1:2020+A11:2020)
- 3) National differences from latest attachment to test report. Germany national standard (EN IEC 62368-1:2020+A11:2020)
- 4) National differences from latest attachment to test report. Finland national standard (EN IEC 62368-1:2020+A11:2020)
- 5) National differences from latest attachment to test report. France national standard (EN IEC 62368-1:2020+A11:2020)
- 6) National differences from latest attachment to test report. United Kingdom national standard (EN IEC 62368-1:2020+A11:2020)
- 7) National differences from latest attachment to test report. Ireland national standard (EN IEC 62368-1:2020+A11:2020)
- 8) National differences from latest attachment to test report. Norway national standard (EN IEC 62368-1:2020+A11:2020)
- 9) National differences from latest attachment to test report. Sweden national standard (EN IEC 62368-1:2020+A11:2020)
- 10) National differences from latest attachment to test report. United States national standard (UL 62368-1:2019)



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
3.3.19.3	<p>sound exposure, E</p> <p>A-weighted sound pressure (p) squared and integrated over a stated period of time, T</p> <p>Note 1 to entry: The SI unit is Pa² s.</p> $E = \int_0^T p(t)^2 dt$	As above	N/A
3.3.19.4	<p>sound exposure level, SEL</p> <p>logarithmic measure of sound exposure relative to a reference value, E_0, typically the 1 kHz threshold of hearing in humans.</p> <p>Note 1 to entry: SEL is measured as A-weighted levels in dB.</p> $SEL = 10 \lg \left(\frac{E}{E_0} \right) \text{ dB}$ <p>Note 2 to entry: See B.4 of EN 50332-3:2017 for additional information.</p>	As above	N/A
3.3.19.5	<p>digital signal level relative to full scale, dBFS</p> <p>levels reported in dBFS are always r.m.s. Full scale level, 0 dBFS, is the level of a dc-free 997-Hz sine wave whose undithered positive peak value is positive digital full scale, leaving the code corresponding to negative digital full scale unused</p> <p>Note 1 to entry: It is invalid to use dBFS for non-r.m.s. levels. Because the definition of full scale is based on a sine wave, the level of signals with a crest factor lower than that of a sine wave may exceed 0 dBFS. In particular, square wave signals may reach +3,01 dBFS.</p>	As above	N/A
2	Modification to Clause 10		N/A
10.6	<p>Safeguards against acoustic energy sources</p> <p>Replace 10.6 of IEC 62368-1 with the following:</p>		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.1.1	<p>Introduction</p> <p>Safeguard requirements for protection against long-term exposure to excessive sound pressure levels from personal music players closely coupled to the ear are specified below. Requirements for earphones and headphones intended for use with personal music players are also covered. A personal music player is a portable equipment intended for use by an ordinary person, that:</p> <ul style="list-style-type: none"> – is designed to allow the user to listen to audio or audiovisual content / material; and – uses a listening device, such as headphones or earphones that can be worn in or on or around the ears; and – has a player that can be body worn (of a size suitable to be carried in a clothing pocket) and is intended for the user to walk around with while in continuous use (for example, on a street, in a subway, at an airport, etc.). <p>EXAMPLES Portable CD players, MP3 audio players, mobile phones with MP3 type features, PDAs or similar equipment.</p> <p>Personal music players shall comply with the requirements of either 10.6.2 or 10.6.3.</p> <p>NOTE 1 Protection against acoustic energy sources from telecom applications is referenced to ITU-T P.360.</p> <p>NOTE 2 It is the intention of the Committee to allow the alternative methods for now, but to only use the dose measurement method as given in 10.6.5 in future. Therefore, manufacturers are encouraged to implement 10.6.5 as soon as possible.</p> <p>Listening devices sold separately shall comply with the requirements of 10.6.6. These requirements are valid for music or video mode only. The requirements do not apply to:</p> <ul style="list-style-type: none"> – professional equipment; <p>NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment.</p> <ul style="list-style-type: none"> – hearing aid equipment and other devices for assistive listening; – the following type of analogue personal music players: <ul style="list-style-type: none"> • long distance radio receiver (for example, a multiband radio receiver or world band radio receiver, an AM radio receiver), and • cassette player/recorder; 	The EUT is not defined as personal music player and not closely coupled to the ear or earphones and headphones intended for use with personal music players	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies.</p> <p>– a player while connected to an external amplifier that does not allow the user to walk around while in use.</p> <p>For equipment that is clearly designed or intended primarily for use by children, the limits of the relevant toy standards may apply.</p> <p>The relevant requirements are given in EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.</p>	As above	N/A
10.6.1.2	<p>Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz</p> <p>The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz). For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body mounted devices, attention is drawn to EN 50360 and EN 50566.</p>	Covered under separate EMC/Radio report	P
10.6.2	<p>Classification of devices without the capacity to estimate sound dose</p>		N/A
10.6.2.1	<p>General</p> <p>This standard is transitioning from short-term based (30 s) requirements to long-term based (40 hour) requirements. These clauses remain in effect only for devices that do not comply with sound dose estimation as stipulated in EN 50332-3.</p> <p>For classifying the acoustic output $L_{Aeq,T}$, measurements are based on the A-weighted equivalent sound pressure level over a 30 s period.</p> <p>For music where the average sound pressure (long term $L_{Aeq,T}$) measured over the duration of the song is lower than the average produced by the programme simulation noise, measurements may be done over the duration of the complete song. In this case, T becomes the duration of the song.</p>	The EUT is not defined as personal music player and not closely coupled to the ear or earphones and headphones intended for use with personal music players	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>NOTE Classical music, acoustic music and broadcast typically has an average sound pressure (long term $L_{Aeq,T}$) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the content and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song does not exceed the required limit.</p> <p>For example, if the player is set with the programme simulation noise to 85 dB, but the average music level of the song is only 65 dB, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dB.</p>	As above	N/A
10.6.2.2	<p>RS1 limits (to be superseded, see 10.6.3.2)</p> <p>RS1 is a class 1 acoustic energy source that does not exceed the following:</p> <ul style="list-style-type: none"> – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 85 dB when playing the fixed “programme simulation noise” described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 27 mV (analogue interface) or -25 dBFS (digital interface) when playing the fixed “programme simulation noise” described in EN 50332-1. – The RS1 limits will be updated for all devices as per 10.6.3.2. 	As above	N/A
10.6.2.3	<p>RS2 limits (to be superseded, see 10.6.3.3)</p> <p>RS2 is a class 2 acoustic energy source that does not exceed the following:</p> <ul style="list-style-type: none"> – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or when the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 100 dB(A) when playing the fixed “programme simulation noise” as described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 150 mV (analogue interface) or -10 dBFS (digital interface) when playing the fixed “programme simulation noise” as described in EN 50332-1. 	As above	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.2.4	RS3 limits RS3 is a class 3 acoustic energy source that exceeds RS2 limits.	As above	N/A
10.6.3	Classification of devices (new)		N/A
10.6.3.1	General Previous limits (10.6.2) created abundant false negative and false positive PMP sound level warnings. New limits, compliant with The Commission Decision of 23 June 2009, are given below.	As above	N/A
10.6.3.2	RS1 limits (new) RS1 is a class 1 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 80 dB when playing the fixed “programme simulation noise” described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 15 mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed “programme simulation noise” described in EN 50332-1.	As above	N/A
10.6.3.3	RS2 limits (new) RS2 is a class 2 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the weekly sound exposure level, as described in EN 50332-3, shall be ≤ 80 dB when playing the fixed "programme simulation noise" described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output level, integrated over one week, as described in EN50332-3, shall be ≤ 15 mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed “programme simulation noise” described in EN 50332-1.	As above	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.4	Requirements for maximum sound exposure		N/A
10.6.4.1	<p>Measurement methods</p> <p>All volume controls shall be turned to maximum during tests.</p> <p>Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable.</p>	As above	N/A
10.6.4.2	<p>Protection of persons</p> <p>Except as given below, protection requirements for parts accessible to ordinary persons, instructed persons and skilled persons are given in 4.3.</p> <p>NOTE 1 Volume control is not considered a safeguard.</p> <p>Between RS2 and an ordinary person, the basic safeguard may be replaced by an instructional safeguard in accordance with Clause F.5, except that the instructional safeguard shall be placed on the equipment, or on the packaging, or in the instruction manual.</p> <p>Alternatively, the instructional safeguard may be given through the equipment display during use.</p> <p>The elements of the instructional safeguard shall be as follows:</p> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> – element 1a: the symbol , IEC 60417-6044 (2011-01) – element 2: “High sound pressure” or equivalent wording – element 3: “Hearing damage risk” or equivalent wording – element 4: “Do not listen at high volume levels for long periods.” or equivalent wording <p>An equipment safeguard shall prevent exposure of an ordinary person to an RS2 source without intentional physical action from the ordinary person and shall automatically return to an output level not exceeding what is specified for an RS1 source when the power is switched off.</p>	As above	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>The equipment shall provide a means to actively inform the user of the increased sound level when the equipment is operated with an output exceeding RS1. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an output exceeding RS1. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time.</p> <p>NOTE 2 Examples of means include visual or audible signals. Action from the user is always needed.</p> <p>NOTE 3 The 20 h listening time is the accumulative listening time, independent of how often and how long the personal music player has been switched off.</p> <p>A skilled person shall not be unintentionally exposed to RS3.</p>	As above	N/A
10.6.5	Requirements for dose-based systems		N/A
10.6.5.1	<p>General requirements</p> <p>Personal music players shall give the warnings as provided below when tested according to EN 50332-3, using the limits from this clause.</p> <p>The manufacturer may offer optional settings to allow the users to modify when and how they wish to receive the notifications and warnings to promote a better user experience without defeating the safeguards. This allows the users to be informed in a method that best meets their physical capabilities and device usage needs. If such optional settings are offered, an administrator (for example, parental restrictions, business/educational administrators, etc.) shall be able to lock any optional settings into a specific configuration.</p> <p>The personal music player shall be supplied with easy to understand explanation to the user of the dose management system, the risks involved, and how to use the system safely. The user shall be made aware that other sources may significantly contribute to their sound exposure, for example work, transportation, concerts, clubs, cinema, car races, etc.</p>	As above	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.5.2	<p>Dose-based warning and requirements</p> <p>When a dose of 100 % <i>CSD</i> is reached, and at least at every 100 % further increase of <i>CSD</i>, the device shall warn the user and require an acknowledgement. In case the user does not acknowledge, the output level shall automatically decrease to compliance with class RS1.</p> <p>The warning shall at least clearly indicate that listening above 100 % <i>CSD</i> leads to the risk of hearing damage or loss.</p>	As above	N/A
10.6.5.3	<p>Exposure-based requirements</p> <p>With only dose-based requirements, cause and effect could be far separated in time, defying the purpose of educating users about safe listening practice. In addition to dose-based requirements, a PMP shall therefore also put a limit to the short-term sound level a user can listen at.</p> <p>The exposure-based limiter (EL) shall automatically reduce the sound level not to exceed 100 dB(A) or 150 mV integrated over the past 180 s, based on methodology defined in EN 50332-3.</p> <p>The EL settling time (time from starting level reduction to reaching target output) shall be 10 s or faster.</p> <p>Test of EL functionality is conducted according to EN 50332-3, using the limits from this clause. For equipment provided as a package (player with its listening device), the level integrated over 180 s shall be 100 dB or lower. For equipment provided with a standardized connector, the unweighted level integrated over 180 s shall be no more than 150 mV for an analogue interface and no more than -10 dBFS for a digital interface.</p> <p>NOTE In case the source is known not to be music (or test signal), the EL may be disabled.</p>	As above	N/A
10.6.6	Requirements for listening devices (headphones, earphones, etc.)		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.6.1	<p>Corded listening devices with analogue input</p> <p>With 94 dB L_{Aeq} acoustic pressure output of the listening device, and with the volume and sound settings in the listening device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the input voltage of the listening device when playing the fixed "programme simulation noise" as described in EN 50332-1 shall be ≥ 75 mV.</p> <p>NOTE The values of 94 dB and 75 mV correspond with 85 dB and 27 mV or 100 dB and 150 mV.</p>	As above	N/A
10.6.6.2	<p>Corded listening devices with digital input</p> <p>With any playing device playing the fixed "programme simulation noise" described in EN 50332-1, and with the volume and sound settings in the listening device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the $L_{Aeq,T}$ acoustic output of the listening device shall be ≤ 100 dB with an input signal of -10 dBFS.</p>	As above	N/A
10.6.6.3	<p>Cordless listening devices</p> <p>In cordless mode,</p> <ul style="list-style-type: none"> – with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and – respecting the cordless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and – with volume and sound settings in the receiving device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the above mentioned programme simulation noise, the $L_{Aeq,T}$ acoustic output of the listening device shall be ≤ 100 dB with an input signal of -10 dBFS. 	As above	N/A
10.6.6.4	<p>Measurement method</p> <p><i>Measurements shall be made in accordance with EN 50332-2 as applicable.</i></p>	As above	N/A
3	Modification to the whole document		P



IEC 62368-1																																																																		
Clause	Requirement + Test				Result - Remark	Verdict																																																												
	<p>Delete all the “country” notes in the reference document according to the following list:</p> <table border="1"> <tr> <td>0.2.1</td> <td>Note 1 and 2</td> <td>1</td> <td>Note 4 and 5</td> <td>3.3.8.1</td> <td>Note 2</td> </tr> <tr> <td>3.3.8.3</td> <td>Note 1</td> <td>4.1.15</td> <td>Note</td> <td>4.7.3</td> <td>Note 1 and 2</td> </tr> <tr> <td>5.2.2.2</td> <td>Note</td> <td>5.4.2.3.2.2 Table 12</td> <td>Note c</td> <td>5.4.2.3.2.4</td> <td>Note 1 and 3</td> </tr> <tr> <td>5.4.2.3.2.4 Table 13</td> <td>Note 2</td> <td>5.4.2.5</td> <td>Note 2</td> <td>5.4.5.1</td> <td>Note</td> </tr> <tr> <td>5.4.10.2.1</td> <td>Note</td> <td>5.4.10.2.2</td> <td>Note</td> <td>5.4.10.2.3</td> <td>Note</td> </tr> <tr> <td>5.5.2.1</td> <td>Note</td> <td>5.5.6</td> <td>Note</td> <td>5.6.4.2.1</td> <td>Note 2 and 3 and 4</td> </tr> <tr> <td>5.6.8</td> <td>Note 2</td> <td>5.7.6</td> <td>Note</td> <td>5.7.7.1</td> <td>Note 1 and Note 2</td> </tr> <tr> <td>8.5.4.2.3</td> <td>Note</td> <td>10.2.1 Table 39</td> <td>Note 3 and 4 and 5</td> <td>10.5.3</td> <td>Note 2</td> </tr> <tr> <td>10.6.4</td> <td>Note 3</td> <td>F.3.3.6</td> <td>Note 3</td> <td>Y.4.1</td> <td>Note</td> </tr> <tr> <td>Y.4.5</td> <td>Note</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					0.2.1	Note 1 and 2	1	Note 4 and 5	3.3.8.1	Note 2	3.3.8.3	Note 1	4.1.15	Note	4.7.3	Note 1 and 2	5.2.2.2	Note	5.4.2.3.2.2 Table 12	Note c	5.4.2.3.2.4	Note 1 and 3	5.4.2.3.2.4 Table 13	Note 2	5.4.2.5	Note 2	5.4.5.1	Note	5.4.10.2.1	Note	5.4.10.2.2	Note	5.4.10.2.3	Note	5.5.2.1	Note	5.5.6	Note	5.6.4.2.1	Note 2 and 3 and 4	5.6.8	Note 2	5.7.6	Note	5.7.7.1	Note 1 and Note 2	8.5.4.2.3	Note	10.2.1 Table 39	Note 3 and 4 and 5	10.5.3	Note 2	10.6.4	Note 3	F.3.3.6	Note 3	Y.4.1	Note	Y.4.5	Note					P
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4	Modification to Clause 1					P																																																												
1	<p>Add the following note:</p> <p><i>NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.</i></p>				Added	P																																																												
5	Modification to 4.Z1					N/A																																																												



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.Z1	<p>Add the following new subclause after 4.9:</p> <p>To protect against excessive current, short-circuits and earth faults in circuits connected to an a.c. mains, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c):</p> <p>a) except as detailed in b) and c), protective devices necessary to comply with the requirements of B.3.1 and B.4 shall be included as parts of the equipment;</p> <p>b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation;</p> <p>c) it is permitted for pluggable equipment type B or permanently connected equipment, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions.</p> <p>If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for pluggable equipment type A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.</p>	<p>Class III equipment.</p> <p>No connection to mains</p>	N/A
6	Modification to 5.4.2.3.2.4		N/A
5.4.2.3.2.4	<p>Add the following to the end of this subclause:</p> <p>The requirement for interconnection with external circuit is in addition given in EN 50491-3:2009.</p>	No external circuits	N/A
7	Modification to 10.2.1		P
10.2.1	<p>Add the following to ^{c)} and ^{d)} in table 39:</p> <p>For additional requirements, see 10.5.1.</p>	Added	P
8	Modification to 10.5.1		N/A
10.5.1	<p>Add the following after the first paragraph:</p> <p>For RS 1 compliance is checked by measurement under the following conditions:</p> <p>In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those internal adjustments or pre-sets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made.</p>	No X Radiation	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>NOTE Z1 Soldered joints and paint lockings are examples of adequate locking.</p> <p>The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm², at any point 10 cm from the outer surface of the apparatus.</p> <p>Moreover, the measurement shall be made under fault conditions causing an increase of the high voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made.</p> <p>For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level.</p> <p>NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.</p>	As above	N/A
9	Modification to G.7.1		P
G.7.1	<p>Add the following note:</p> <p>NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.</p>	Added	P
10	Modification to Bibliography		P
	<p>Add the following notes for the standards indicated:</p> <p>IEC 60130-9 NOTE Harmonized as EN 60130-9. IEC 60269-2 NOTE Harmonized as HD 60269-2. IEC 60309-1 NOTE Harmonized as EN 60309-1. IEC 60364 NOTE some parts harmonized in HD 384/HD 60364 series. IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4. IEC 60664-5 NOTE Harmonized as EN 60664-5. IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified). IEC 61508-1 NOTE Harmonized as EN 61508-1. IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1. IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4. IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6. IEC 61643-1 NOTE Harmonized as EN 61643-1. IEC 61643-21 NOTE Harmonized as EN 61643-21. IEC 61643-311 NOTE Harmonized as EN 61643-311. IEC 61643-321 NOTE Harmonized as EN 61643-321. IEC 61643-331 NOTE Harmonized as EN 61643-331.</p>		P
11	ADDITION OF ANNEXES		N/A
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.1.15	<p>Denmark, Finland, Norway and Sweden</p> <p>To the end of the subclause the following is added: Class I pluggable equipment type A intended for connection to other equipment or a network shall, if safety relies on connection to reliable earthing or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment shall be connected to an earthed mains socket-outlet.</p> <p>The marking text in the applicable countries shall be as follows:</p> <p>In Denmark: "Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord." In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag"</p>	Class III equipment	N/A
4.7.3	<p>United Kingdom</p> <p>To the end of the subclause the following is added:</p> <p>The torque test is performed using a socket-outlet complying with BS 1363, and the plug part shall be assessed to the relevant clauses of BS 1363. Also see Annex G.4.2 of this annex</p>	Not direct plug-in equipment	N/A
5.2.2.2	<p>Denmark</p> <p>After the 2nd paragraph add the following:</p> <p>A warning (marking safeguard) for high touch current is required if the touch current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.</p>	Class III equipment	N/A
5.4.11.1 and Annex G	<p>Finland and Sweden</p> <p>To the end of the subclause the following is added:</p> <p>For separation of the telecommunication network from earth the following is applicable:</p> <p>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either</p> <ul style="list-style-type: none"> • two layers of thin sheet material, each of which shall pass the electric strength test below, or • one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. 	No telecommunication networks	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition</p> <ul style="list-style-type: none"> • passes the tests and inspection criteria of 5.4.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 5.4.9 shall be performed using 1,5 kV), <p>and</p> <ul style="list-style-type: none"> • is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV. <p>It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2.</p> <p>A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions:</p> <ul style="list-style-type: none"> • the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in 5.4.11; • the additional testing shall be performed on all the test specimens as described in EN 60384-14; <p>the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14.</p>	As above	N/A
5.5.2.1	<p>Norway</p> <p>After the 3rd paragraph the following is added:</p> <p>Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).</p>	Class III equipment	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.5.6	<p>Finland, Norway and Sweden</p> <p>To the end of the subclause the following is added:</p> <p>Resistors used as basic safeguard or bridging basic insulation in class I pluggable equipment type A shall comply with G.10.1 and the test of G.10.2.</p>	No such resistors	N/A
5.6.1	<p>Denmark</p> <p>Add to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. <i>Justification:</i> In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.</p>	No socket-outlets	N/A
5.6.4.2.1	<p>Ireland and United Kingdom</p> <p>After the indent for pluggable equipment type A, the following is added: – the protective current rating is taken to be 13 A, this being the largest rating of fuse used in the mains plug.</p>	Class III equipment	N/A
5.6.4.2.1	<p>France</p> <p>After the indent for pluggable equipment type A, the following is added: – in certain cases, the protective current rating of the circuit supplied from the mains is taken as 20 A instead of 16 A.</p>	As above	N/A
5.6.5.1	<p>To the second paragraph the following is added:</p> <p>The range of conductor sizes of flexible cords to be accepted by terminals for equipment with a rated current over 10 A and up to and including 13 A is: 1,25 mm² to 1,5 mm² in cross-sectional area.</p>	As above	N/A
5.6.8	<p>Norway</p> <p>To the end of the subclause the following is added: Equipment connected with an earthed mains plug is classified as class I equipment. See the Norway marking requirement in 4.1.15. The symbol IEC 60417-6092, as specified in F.3.6.2, is accepted.</p>	Not such equipment	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.7.6	<p>Denmark</p> <p>To the end of the subclause the following is added:</p> <p>The installation instruction shall be affixed to the equipment if the protective conductor current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.</p>	Class III equipment	N/A
5.7.6.2	<p>Denmark</p> <p>To the end of the subclause the following is added:</p> <p>The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA .</p>	As above	N/A
5.7.7.1	<p>Norway and Sweden</p> <p>To the end of the subclause the following is added:</p> <p>The screen of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building.</p> <p>Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system.</p> <p>It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example.</p> <p>The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in:</p> <p>“Apparatus connected to the protective earthing of the building installation through the mains connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)”</p> <p>NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min.</p>	Not such equipment	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>Translation to Norwegian (the Swedish text will also be accepted in Norway):</p> <p>“Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplest utstyr – og er tilkoplest et koaksialbasert kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en galvanisk isolator mellom apparatet og kabel-TV nettet.”</p> <p>Translation to Swedish: ”Apparater som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet.”</p>	As above	N/A
8.5.4.2.3	<p>United Kingdom</p> <p>Add the following after the 2nd dash bullet in 3rd paragraph:</p> <p>An emergency stop system complying with the requirements of IEC 60204-1 and ISO 13850 is required where there is a risk of personal injury.</p>	No emergency stop system	N/A
B.3.1 and B.4	<p>Ireland and United Kingdom</p> <p>The following is applicable:</p> <p>To protect against excessive currents and short-circuits in the primary circuit of direct plug-in equipment, tests according to Annexes B.3.1 and B.4 shall be conducted using an external miniature circuit breaker complying with EN 60898-1, Type B, rated 32A. If the equipment does not pass these tests, suitable protective devices shall be included as an integral part of the direct plug-in equipment, until the requirements of Annexes B.3.1 and B.4 are met</p>	Not direct plug-in equipment	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.4.2	<p>Denmark</p> <p>To the end of the subclause the following is added:</p> <p>Supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1:2011.</p> <p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p> <p>If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a polyphase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2.</p> <p>Mains socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance DS 60884-2-D1:2011 standard sheet DKA 1-4a.</p> <p>Other current rating socket outlets shall be in compliance with Standard Sheet DKA 1-3a or DKA 1-1c.</p> <p>Mains socket-outlets with earth shall be in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a</p> <p><i>Justification:</i> Heavy Current Regulations, Section 6c</p>	<p>Class III equipment</p> <p>No socket-outlets</p>	N/A
G.4.2	<p>United Kingdom</p> <p>To the end of the subclause the following is added:</p> <p>The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.</p>	Not direct plug-in equipment	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.7.1	<p>United Kingdom</p> <p>To the first paragraph the following is added:</p> <p>Equipment which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord shall be fitted with a 'standard plug' in accordance with the Plugs and Sockets etc. (Safety) Regulations 1994, Statutory Instrument 1994 No. 1768, unless exempted by those regulations.</p> <p>NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.</p>	Class III equipment	N/A
G.7.1	<p>Ireland</p> <p>To the first paragraph the following is added:</p> <p>Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, "13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. S.I. 525 provides for the recognition of a standard of another Member State which is equivalent to the relevant Irish Standard</p>	As above	N/A
G.7.2	<p>Ireland and United Kingdom</p> <p>To the first paragraph the following is added:</p> <p>A power supply cord with a conductor of 1,25 mm² is allowed for equipment which is rated over 10 A and up to and including 13 A.</p>	Class III equipment	N/A
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		N/A
10.5.2	<p>Germany</p> <p>The following requirement applies:</p> <p>For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking.</p> <p><i>Justification:</i> German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM.</p> <p>NOTE Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int+49-531-592-6320, Internet: http://www.ptb.de</p>	No CRT	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

ZD	IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS (EN)		P					
	<table border="1"> <thead> <tr> <th rowspan="2">Type of flexible cord</th> <th colspan="2">Code designations</th> </tr> <tr> <th>IEC</th> <th>CENELEC</th> </tr> </thead> </table>		Type of flexible cord	Code designations		IEC	CENELEC	P
Type of flexible cord	Code designations							
	IEC	CENELEC						
	PVC insulated cords							
	Flat twin tinsel cord	60227 IEC 41 H03VH-Y						
	Light polyvinyl chloride sheathed flexible cord	60227 IEC 52 H03VV-F H03VVH2-F						
	Ordinary polyvinyl chloride sheathed flexible cord	60227 IEC 53 H05VV-F H05VVH2-F						
	Rubber insulated cords							
	Braided cord	60245 IEC 51 H03RT-F						
	Ordinary tough rubber sheathed flexible cord	60245 IEC 53 H05RR-F						
	Ordinary polychloroprene sheathed flexible cord	60245 IEC 57 H05RN-F						
	Heavy polychloroprene sheathed flexible cord	60245 IEC 66 H07RN-F						
	Cords having high flexibility							
	Rubber insulated and sheathed cord	60245 IEC 86 H03RR-H						
	Rubber insulated, crosslinked PVC sheathed cord	60245 IEC 87 H03RV4-H						
	Crosslinked PVC insulated and sheathed cord	60245 IEC 88 H03V4V4-H						
	Cords insulated and sheathed with halogen-free thermoplastic compounds							
	Light halogen-free thermoplastic insulated and sheathed flexible cords	H03Z1Z1-F H03Z1Z1H2-F						
	Ordinary halogen-free thermoplastic insulated and sheathed flexible cords	H05Z1Z1-F H05Z1Z1H2-F						



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62368-1 3TH ED. U.S.A. AND CANADA NATIONAL DIFFERENCES AUDIO/VIDEO, INFORMATION AND COMMUNICATION TECHNOLOGY EQUIPMENT PART 1: SAFETY REQUIREMENTS			
Differences according to: CSA/UL 62368-1:2019			
Attachment Form No.: US_CA_ND_IEC62368_1E			
Attachment Originator.....: UL(US)			
Master Attachment: Dated 2022-03-04			
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IEC 62368-1 - US and Canadian National Differences Special National Conditions based on Regulations and Other National Differences			
1 (1DV.1) (1.3)	All equipment is to be designed to allow installation in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part 1, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2. Also, for such equipment marked or otherwise identified, installation is allowed per the Standard for the Protection of Information Technology Equipment, ANSI/NFPA 75.	Comply	P
1 (1DV.2.1)	This standard includes additional requirements for equipment used for entertainment purposes intended for installation in general patient care areas of health care facilities. See Annex DVB.	The equipment not intended for entertainment purposes	N/A
1 (1DV.2.2)	This standard includes additional requirements for equipment intended for mounting under cabinets. See Annex DVC.	The equipment not intended to be mounting under cabinets	N/A
1 (1DV.2.3)	IEC 62368-3 clause 5 for DC power transfer at ES1 or ES2 voltage levels is considered informative. IEC 62368-3 clause 6 for remote power feeding telecommunication (RFT) circuits is considered normative (see ITU K.50). Alternatively, equipment with RFT circuits are given in either UL 2391 or CSA/UL 60950-21. RFT-C circuits are not permitted unless the RFT-C circuit complies with RFT-V limits ($\leq 200V$ per conductor to earth).		N/A
1 (1DV.3)	For protection against direct lightning strikes, reference is made to NFPA 780 and CAN/CSA-B72 for additional requirements.	Indoor equipment	N/A
1 (DV.5)	Additional requirements apply to some forms of power distribution equipment, including sub-assemblies.	EUT is not a power distribution equipment or subassemblies	N/A
4.1 (4.1.17)	For lengths exceeding 3.05 m, external interconnecting cable assemblies are required to be a suitable cable type (e.g., DP, CL2) specified in the NEC.	DC powered by external safety approved adapter	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	For lengths 3.05 m or less, external interconnecting cable assemblies that are not types specified in the NEC generally are required to have special construction features and identification markings.	As above	N/A
4.6 (4.6.2)	Wire-wrap terminals have special construction and performance requirements.	No such wire-warp	N/A
4.8 (4.8.3, 4.8.4.5, 4.8.5)	Coin / button cell batteries have modified special construction and performance requirements.	Professional equipment and unlikely to be accessible to children.	N/A
5.4.2.3.2 (5.4.2.3.2.1)	Surge Arrestors and Transient Voltage Surge Suppressors installed external to the equipment are required to comply with the appropriate NEC and CEC requirements.	Class III equipment	N/A
5.5.9	Receptacles, rated 125-V, single phase, 15- or 20-A accessible to either ordinary, instructed, or skilled persons are required to be provided with GFCI Protection for Personnel if the equipment containing the receptacles is installed outdoors. The protection devices are required to comply with UL 943, and CAN/CSA C22.2 No.144.	Class III equipment	N/A
5.6.3	Protective earthing conductors comply with the minimum conductor sizes in Table G.7, except as required by Table G.7ADV.1 for cord connected equipment, or Annex DVH for permanently connected equipment.	Class III equipment. Functional earth only.	N/A
5.7.8 (5.7.8.1)	Equipment intended to receive telecommunication ringing signals is required to comply with a special touch current measurement test.	Not connected to telecommunication networks	N/A
6.5.1	PS3 wiring outside a fire enclosure is required to comply with single fault testing in B.4 or be current limited per one of the permitted methods.	No PS3 circuits	N/A
Annex F (F.3.3.9)	Output terminals provided for supply of other equipment, except mains supply, are required to be marked with a maximum rating or reference to equipment permitted to be connected.	No such terminals	N/A
Annex F (F.3.7)	Outdoor Enclosures are required to be classified and marked in accordance with UL 50 or 50E, or CAN/CSA C22.2 No. 94.1 or 94.2.	Indoor equipment	N/A
Annex G (G.7)	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.	Not connected to the mains	N/A
	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.	As above	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Flexible power supply cords are required to be compatible with Article 400 of the NEC, and Tables 11 and 12 of the CEC.	As above	N/A
	Minimum cord length is required to be 1.5 m, with certain constructions such as external power supplies allowed to consider both input and output cord lengths into the requirement. Power supply cords are required to be no longer than 4.5 m in length if used in ITE Rooms.	As above	N/A
	Power supply cords for outdoor equipment are required to be suitable outdoor use type as required by Section 400.4 of the NEC and Rule 4-012 of the CEC, i.e., marked "W."	As above	N/A
Annex H.2	Continuous ringing signals under normal operating conditions up to 16 mA only are permitted if the equipment is subjected to special installation and performance restrictions.	No such ringing signals	N/A
Annex H.4	For circuits with other than ringing signals and with voltages exceeding 42.4 V _{peak} or 60 V _{d.c.} , the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 mA d.c. under normal operating conditions.	As above	N/A
Annex Q (Q.3)	Equipment with paired conductor and/or coax communications cables/wiring connected to building wiring are required to have special voltage, current, power and marking requirements.	Equipment not intended to provide power over the wiring system to remote equipment	N/A
Annex DVA (1)	Equipment that is designed such that it may be powered from a separate electrical service, is required to meet applicable requirements for service equipment for control and protection of services and their installation and complies with Article 230 of the National Electrical Code (NEC), NFPA 70 and Section 6 of the Canadian Electrical Code, Part I, CSA C22.1.	DC powered by external safety approved adapter	N/A
	Equipment intended for use in spaces used for environmental air (plenums) are subjected to special flammability requirements for heat and visible smoke release.	No such places	N/A
	For ITE room applications, automated information storage systems with combustible media greater than 0.76 m ³ (27 cu ft) are required to have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.	Equipment is not automated information storage systems	N/A
	Consumer products designed or intended primarily for children 12 years of age or younger are subject to additional requirements in accordance with U.S. and Canadian Regulations.	Equipment not intended for children	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Baby monitors are required to additionally comply with ASTM F2951, Consumer Safety Specification for Baby Monitors.	Equipment is not baby monitor	N/A
	Storage batteries and battery management equipment, other than associated with lead-acid batteries, and including battery backup systems that are not an integral part of stationary AV and ICT equipment, such as provided in separate cabinets, are required to be certified (listed) to the appropriate standard(s) for such storage batteries and equipment.	No such batteries	N/A
Annex DVA (5.6)	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A.	No connection to mains	N/A
Annex DVA (6.3)	The maximum quantity of flammable liquid stored in equipment is required to comply with NFPA 30.	No such flammable liquid stored in equipment	N/A
Annex DVA (6.4.8)	For ITE room applications, enclosures with combustible material measuring greater than 0.9 m ² (10 sq ft) or a single dimension greater than 1.8 m (6 ft) are required to have a flame spread rating of 50 or less. For equipment with the same dimensions for other applications, an external surface that is not a fire enclosure requires a minimum flammability classification of V-1.	Enclosure is made by rigid metal.	N/A
Annex DVA (10.3)	Equipment with lasers is required to meet the U.S. Code of Federal Regulations 21 CFR 1040 (and the Canadian Radiation Emitting Devices Act, REDR C1370).	No lasers are use in the EUT	N/A
Annex DVA (10.5)	Equipment that produces ionizing radiation is required to comply with the U.S. Code of Federal Regulations, 21 CFR 1020 (and the Canadian Radiation Emitting Devices Act, REDR C1370).	Equipment does not produce ionizing radiation	N/A
Annex DVA (F.3.3.4)	Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. Additional considerations apply for voltage ratings that exceed the attachment cap rating or that are lower than the "Normal Operating Condition" in Table 2 of CAN/CSA C22.2 No. 235."	Not connected to Mains	N/A
Annex DVA (F.3.3.6)	Equipment identified for ITE (computer) room installation is required to be marked with the rated current.	Comply	P



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVA (G.1)	Vertically-mounted disconnect switches and circuit breakers are required to have the "on" position indicated by the handle in the up position, where mounted in an enclosure, vertically mounted disconnect switches and circuit breakers with vertical operating means extending outside the enclosure are required to indicate in a location visible when accessing the external operating means whether the switch or circuit breaker is in the open (off) or closed (on) position.	Vertically mounted disconnect switches and brakers are not required	N/A
Annex DVA (G.3.4)	Suitable NEC/CEC branch circuit protection rated at the maximum circuit rating is required for all standard supply outlets and receptacles (such as supplied in power distribution units) if the supply branch circuit protection is not suitable.	Class III equipment	N/A
	Where a fuse is used to provide Class 2 or Class 3 current limiting, it is not operator-accessible unless it is non- interchangeable.	No such fuse	N/A
Annex DVA (G.4.2)	Equipment with isolated ground (earthing) receptacles is required to comply with NEC 250.146(D) and CEC 10-400 and 10-612.	DC product. Earthing is not required	N/A
Annex DVA (G.4.3)	Interconnection of units by conductors supplied by a limited power source, or a Class 2 circuit defined in the NEC/CEC may have field wiring connections other than specified in DVH.3, such as wire-wrap and crimp-on types, if the limited power source and Class 2 circuits are separated from all other circuits by barriers, routing or fixing.	Class III equipment	N/A
Annex DVA (G.5.3)	Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require special transformer overcurrent protection.	No transformers	N/A
Annex DVA (G.5.4)	Motor control devices are required for cord-connected equipment with a mains-connected motor if the equipment is rated more than 12 A, or if the equipment has a nominal voltage rating greater than 120 V, or if the motor is rated more than 1/3 hp (locked rotor current over 43 A).	No motors	N/A
Annex DVA (G.7)	Flexible cords used outdoors are required to have the suffix "W" marked on the flexible cord.	Indoor equipment	N/A
Annex DVA (M)	For ITE room applications, equipment with battery systems capable of supplying 750 VA for five minutes are required to have a battery disconnect means that may be connected to the ITE room remote power-off circuit.	Not for ITE room applications	N/A
Annex DVA (Q)	If applicable per NEC 725.121(C), some limited power sources supplied from AV/ICT equipment are required to have a label indicating the maximum voltage and rated current output for per conductor for each connection point. Where multiple connection points have the same rating, a single label is permitted to be used.	No such components	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Wiring terminals intended to supply Class 2 outputs in accordance with the NEC or CEC Part 1 are required to be marked with the voltage rating and "Class 2" or equivalent. The marking is located adjacent to the terminals and visible during wiring.	No such wiring terminals	N/A
	Applicable parts of Chapter 8 of the NEC, and Rules 54 and 60 of the CEC, may be applicable to ITE installed outdoors with connections to communication systems.	Indoor equipment	N/A
Annex DVB (1)	Additional requirements apply for equipment used for entertainment purposes intended for installation in general patient care areas of health care facilities.	Equipment not used for entertainment purposes	N/A
Annex DVC (1)	Additional requirements apply for equipment intended for mounting under kitchen cabinets.	No used for mounting under kitchen cabinets	N/A
Annex DVE (4.1.1)	Some equipment, components, sub-assemblies and materials associated with the risk of fire, electric shock, or personal injury are required to have component or material ratings in accordance with the applicable national (U.S. and Canadian) component or material requirements. These equipment and components include: appliance couplers, attachment plugs, battery backup systems, circuit breakers, communication circuit accessories, connectors (used for current interruption of non-LPS circuits), direct plug-in equipment, electrochemical capacitor modules (energy storage modules with ultracapacitors), enclosures (outdoor), flexible cords and cables, fuses (branch circuit), ground-fault current interrupters, interconnecting cables, modular data centres, power supply cords, some power distribution equipment, printed wiring, protectors for communications circuits, receptacles, surge protective devices, vehicle battery adapters, wire connectors, and wire and cables.	No such components	N/A
Annex DVH	Equipment for permanent connection to the mains supply is subjected to additional requirements.	No such equipment	N/A
Annex DVH (DVH.1)	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains are required to be in accordance with the NEC/CEC.	Not connected to the mains	N/A
Annex DVH (DVH.2.1)	For safe and reliable connection to a mains, permanently connected equipment is to be provided.	As above	N/A
Annex DVH (DVH.2.2)	Additional considerations for D.C. mains.	No D.C. mains	N/A
Annex DVH (DVH.3.2.1)	Terminals for permanent wiring, including protective earthing terminals, are required to be suitable for U.S./Canadian wire gauge sizes, rated 125 percent of the equipment rating, and be specially marked when specified.	No such terminals	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVH (DVH.3.2.3)	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm ²).	Wire binding screws are not used	N/A
Annex DVH (DVH.3.2.4)	All associated mains supply terminals are located in proximity to each other and to the main protective earthing terminal, if any.	The EUT doesn't connect direct to mains	N/A
Annex DVH (DVH.3.2.5)	Terminals are located, guarded or insulated so that, should a strand of a conductor escape when the conductor is fitted, there is no likelihood of accidental contact between such a strand and accessible conductive parts or unearthed conductive parts separated from accessible conductive parts by supplementary insulation only.	No such terminals	N/A
Annex DVH (DVH.3.3)	When field connection to an external circuit is via wires (example, free conductors), the wires are not smaller than 18 AWG (0.82 mm ²) and the free length of the wire inside an outlet box or wiring compartment is 150 mm or more.	EUT doesn't connect to external circuit	N/A
Annex DVH (DVH.3.4)	Size of protective earthing conductors and terminals	Class III equipment – no earth	N/A
Annex DVH (DVH.4)	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.	Not relevant for EUT	N/A
Annex DVH (DVH.4.1)	Wire bending space	As above	N/A
Annex DVH (DVH.4.2)	Volume of wiring compartment	As above	N/A
Annex DVH (DVH.4.3)	Separation of circuits	As above	N/A
Annex DVH (DVH.5)	Equipment markings and instructional safeguards	As above	N/A
Annex DVH (DVH.5.1)	Identification of protective earthing terminal	Class III equipment – no earth	N/A
Annex DVH (DVH.5.2)	Identification of terminal for earthed conductor (neutral)	No connection to mains	N/A
Annex DVH (DVH.5.3)	Identification of terminals for aluminium conductors	As above	N/A
Annex DVH (DVH.5.4)	Wire temperature ratings	As above	N/A
Annex DVH (DVH.5.5)	Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment, is required to comply with special earthing, wiring, marking and installation instruction requirements.	Not connected to DC mains	N/A
Annex DVI (6.7)	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage from power line crosses.	Not intended for connection to telecommunication network	N/A



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVJ (10.6.1)	Equipment connected to a telecommunication and cable distribution networks and supplied with an earphone intended to be held against, or in the ear is required to comply with special acoustic pressure requirements.	As above	N/A



IEC 62368-1					
Clause	Requirement + Test			Result - Remark	Verdict
4.1.2	TABLE: List of critical components				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹
- Description :					
Enclosure	Various	Various	Metal Fire enclosure dimensions: Width: 20cm Depth:20cm Height:3.5cm The enclosure made by 2 mm thickness aluminium The top side is provided with heatsink	IEC/EN/UL/CSA 62368-1	Evaluated and accepted
PCB	Various	Various	Flammability rating V-1 or better	UL 94; UL 796	UL or equivalent
External AC/DC adapter	FSP Or equivalent	FSP060-DHAN3 Or equivalent	Input: 100-240VAC 50/60 Hz 1.8 A Output: 12VDC ,5Amax Operating altitude: 5000 meters above sea level Operating temperature temp:0~70°C	UL 62368-1	UL (E190414) Or equivalent
Internal wiring	Various	Various	Hook-up wire, 16AWG, Silicone, Stranded 105°C	UL 758	UL (E364036) Or equivalent
Internal power connector	Various	Various	Flammability: V-0 Operating temp: -40°C to +105°C	UL 1977, UL 94	UL (E28476) Or equivalent
Coin Cell	Panasonic Or equivalent	BR1632A Or equivalent	Lithium, 3Vdc, 120mAh. Operating temp: -40°C to 125°C	UL 1642	UL (MH12210) Or equivalent
DC Jack	Sinotech Co. Or equivalent	SJDC044-L Or equivalent	Rating: 24Vdc, 5A Operating temp: -40°C to 85°C Flammability: V-0	UL 94	UL or equivalent
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2		TABLE: Classification of electrical energy sources					P
Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters				ES Class
			U (V)	I (mA)	Type ¹⁾	Additional Info ²⁾	
12VDC	Internal secondary circuits powered from external PS	Normal	12V	-	SS	-	ES1
		Abnormal					
		Single fault - SC/OC					
3VDC	CPU clock backup	Normal	3V	-	SS	-	ES1
		Abnormal					
		Single fault - SC/OC					
5VDC	USB ports	Normal	5V	-	SS	-	ES1
		Abnormal					
		Single fault - SC/OC					

Supplementary information:
 1) Type: Steady state (SS), Capacitance (CP), Single pulse (SP), Repetitive pulses (RP), etc.
 2) Additional Info: Frequency, Pulse duration, Pulse off time, Capacitance value, etc.
 Test Conditions:
 Normal, Abnormal, Single fault – SC/OC (SC=Short Circuit, OC=Short Circuit)

5.4.1.4, 6.3.2, 9.0, B.2.6		TABLE: Temperature measurements					P
Supply voltage (V)	12Vdc					—	
Ambient temperature during test T_{amb} (°C)	23°C	Calculated to 65°C				—	
Maximum measured temperature T of part/at:	T (°C)					Allowed T_{max} (°C)	
Top enclosure	41.5	-				70	
Bottom enclosure	40.3	-				70	
Coin cell	47.2	89.2				125	
Power jack	41.1	83.1				85	
Main PCB	47.3	89.3				105	
Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class



IEC 62368-1							
Clause	Requirement + Test				Result - Remark		Verdict
Supplementary information:							

5.4.1.8	TABLE: Working voltage measurement					N/A
Location	RMS voltage (V)	Peak voltage (V)	Frequency (Hz)	Comments		
Supplementary information:						

5.4.1.10.2	TABLE: Vicat softening temperature of thermoplastics				N/A
Penetration (mm).....:				ISO 306 / B50	—
Object/ Part No./Material	Manufacturer/trademark	Thickness (mm)	T softening (°C)		
Supplementary information:					

5.4.1.10.3	TABLE: Ball pressure test of thermoplastics				N/A
Allowed impression diameter (mm) :			≤ 2 mm		—
Object/Part No./Material	Manufacturer/trademark	Thickness (mm)	Test temperature (°C)	Impression diameter (mm)	
Supplementary information:					

5.4.2, 5.4.3	TABLE: Minimum Clearances/Creepage distance							N/A
Clearance (cl) and creepage distance (cr) at/of/between:	Up (V)	U r.m.s. (V)	Freq ¹⁾ (Hz)	Required cl (mm)	cl (mm)	E.S. ²⁾ (V)	Required cr (mm)	cr (mm)
Supplementary information:								
1) Only for frequency above 30 kHz								
2) Complete Electric Strength voltage (E.S. (V) when 5.4.2.4 applied)								



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.4.4.2	TABLE: Minimum distance through insulation				N/A
Distance through insulation (DTI) at/of	Peak voltage (V)	Insulation	Required DTI (mm)	Measured DTI (mm)	
Supplementary information:					

5.4.4.9	TABLE: Solid insulation at frequencies >30 kHz						N/A
Insulation material	E_P	Frequency (kHz)	K_R	Thickness d (mm)	Insulation	V_{PW} (Vpk)	
Supplementary information:							

5.4.9	TABLE: Electric strength tests				N/A
Test voltage applied between:	Voltage shape (Surge, Impulse, AC, DC)		Test voltage (V)	Breakdown Yes / No	
Functional:					
Basic/supplementary:					
Reinforced:					
Routine Tests:					
Supplementary information:					

5.5.2.2	TABLE: Stored discharge on capacitors					N/A
Location	Supply voltage (V)	Operating and fault condition ¹⁾	Switch position	Measured voltage (Vpk)	ES Class	
Supplementary information:						



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

X-capacitors installed for testing:
 bleeding resistor rating:
 ICX:
1) Normal operating condition (e.g., normal operation, or open fuse), SC= short circuit, OC= open circuit

5.6.6.2	TABLE: Resistance of protective conductors and terminations				N/A
Accessible part	Test current (A)	Duration (min)	Voltage drop (V)	Resistance (Ω)	
Supplementary information:					

5.7.4	TABLE: Unearthed accessible parts					N/A
Location	Operating and fault conditions	Supply Voltage (V)	Parameters			ES class
			Voltage (V _{rms} or V _{pk})	Current (A _{rms} or A _{pk})	Freq. (Hz)	
Supplementary information: Abbreviation: SC= short circuit; OC= open circuit						

5.7.5	TABLE: Earthed accessible conductive part			N/A
Supply voltage (V).....:				—
Phase(s)	[] Single Phase; [] Three Phase: [] Delta [] Wye			
Power Distribution System	<input type="checkbox"/> TN <input type="checkbox"/> TT <input type="checkbox"/> IT			
Location	Fault Condition No in IEC 60990 clause 6.2.2	Touch current (mA)	Comment	
Supplementary Information:				



IEC 62368-1						
Clause	Requirement + Test	Result - Remark				Verdict
5.8	TABLE: Backfeed safeguard in battery backed up supplies					N/A
Location	Supply voltage (V)	Operating and fault condition	Time (s)	Open-circuit voltage (V)	Touch current (A)	ES Class
Supplementary information: Abbreviation: SC= short circuit, OC= open circuit						

6.2.2	TABLE: Power source circuit classifications						P
Location	Operating and fault condition	Voltage (V)	Current (A)	Max. Power ¹⁾ (W)	Time (S)	PS class	
Internal secondary circuits, powered by LPS power adapter	Full load –overload	12Vdc	5A	60W	5s	PS2	
Internal coin cell battery on main board	Normal / Fault	3Vdc	120mAh	300mW	3s	PS1	
USB ports	Short Circuit	5Vdc	0A	0W	3S	PS1	
Supplementary information: Abbreviation: SC= short circuit; OC= open circuit 1) Measured after 3 s for PS1 and measured after 5 s for PS2 and PS3. The values represent normal condition at maximum load.							

6.2.3.1	TABLE: Determination of Potential Ignition Sources (Arcing PIS)				N/A
Location	Open circuit voltage after 3s (Vpk)	Measured r.m.s current (A)	Calculated value (V _p x I _{rms})	Arcing PIS? Yes / No	
Supplementary information: An Arcing PIS requires a minimum of 50 V (peak) a.c. or d.c. An Arcing PIS is established when the product of the open circuit voltage (V _p) and normal operating condition rms current (I _{rms}) is greater than 15.					



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.2.3.2	TABLE: Determination of Potential Ignition Sources (Resistive PIS)				P
Circuit Location (x-y)	Operating Condition (Normal / Describe Single Fault)	Measured wattage or VA During first 30 s (W / VA)	Measured wattage or VA After 30 s (W / VA)	Protective Circuit, Regulator, or PTC Operated? Yes / No (Comment)	Resistive PIS? Yes/No
Input circuits	Normal and SC	>15W	>15W	No	Yes
<p>Supplementary Information:</p> <p>A combination of voltmeter, VA and ammeter IA may be used instead of a wattmeter.</p> <p>If a separate voltmeter and ammeter are used, the product of (VA x IA) is used to determine Resistive PIS classification.</p> <p>A Resistive PIS: (a) dissipates more than 15 W, measured after 30 s of normal operation, or (b) under single fault conditions has either a power exceeding 100 W measured immediately after the introduction of the fault if electronic circuits, regulators or PTC devices are used, or has an available power exceeding 15 W measured 30 s after introduction of the fault.</p>					

8.5.5	TABLE: High Pressure Lamp				N/A
Lamp manufacturer	Lamp type	Explosion method	Longest axis of glass particle (mm)	Particle found beyond 1 m Yes / No	
Supplementary information:					

9.6	TABLE: Temperature measurements for wireless power transmitters							N/A
Supply voltage (V)..... :							—	
Max. transmit power of transmitter (W)..... :							—	
Foreign objects	w/o receiver and direct contact		with receiver and direct contact		with receiver and at distance of 2 mm		with receiver and at distance of 5 mm	
	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)
Supplementary information:								

B.2.5	TABLE: Input test							P
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status	
12V	0.6A	5A	7.2W	-	-	-	Normal conditiond	
Supplementary information:								



IEC 62368-1						
Clause	Requirement + Test				Result - Remark	Verdict
B.3, B.4	TABLE: Abnormal operating and fault condition tests					P
Ambient temperature T _{amb} (°C)					23°C	—
Power source for EUT: Manufacturer, model/type, output rating....					FSP, FSP060-DHAN3, 12VDC/5A	—
Component No.	Condition	Supply voltage (V)	Test time	Fuse no.	Fuse current (A)	Observation
C391	Short	12Vdc	1h	-	-	Fault current 5.01A. The unit immediately powered down. No temperature rise observed. No hazards
U4 (Pin 1 to pin 9)	Short	12Vdc	1h	-	-	Fault current 0.24A. The unit powered down without possibility to turn on. No temperature rise observed. No hazards.
USB port	Short	5Vdc	5m	-	-	No hazards.
Supplementary information:						

M.3	TABLE: Protection circuits for batteries provided within the equipment					N/A	
Is it possible to install the battery in a reverse polarity position?					No	—	
Equipment Specification	Charging						
	Voltage (V)			Current (A)			
Manufacturer/type	Battery specification						
	Non-rechargeable batteries			Rechargeable batteries			
	Discharging current (A)	Unintentional charging current (A)	Charging		Discharging current (A)	Reverse charging current (A)	
			Voltage (V)	Current (A)			
Note: The tests of M.3.2 are applicable only when above appropriate data is not available.							
Specified battery temperature (°C).....							
Component No.	Fault condition	Charge/discharge mode	Test time	Temp. (°C)	Current (A)	Voltage (V)	Observation



IEC 62368-1							
Clause	Requirement + Test				Result - Remark		Verdict
Supplementary information: Abbreviation: SC= short circuit; OC= open circuit NL= no chemical leakage; NS= no spillage of liquid; NE= no explosion; NF= no emission of flame or expulsion of molten metal.							

M.4.2	TABLE: Charging safeguards for equipment containing a secondary lithium battery					N/A
Maximum specified charging voltage (V)						—
Maximum specified charging current (A)						—
Highest specified charging temperature (°C)						
Lowest specified charging temperature (°C)						
Battery manufacturer/type	Operating and fault condition	Measurement			Observation	
		Charging voltage (V)	Charging current (A)	Temp. (°C)		
Supplementary information: Abbreviation: SC= short circuit; OC= open circuit; MSCV= maximum specified charging voltage; MSCC= maximum specified charging current; HSCT= highest specified charging temperature; LSCT= lowest specified charging temperature						

Q.1	TABLE: Circuits intended for interconnection with building wiring (LPS)					P
Output Circuit	Components	U _{oc} (V)	I _{sc} (A)		S (VA)	
			Meas.	Limit	Meas.	Limit
-	HDMI	5Vdc	0A	<8A	0VA	<100VA
-	Mini DP	5Vdc	0A	<8A	0VA	<100VA
-	USB	5Vdc	0.7A	<8A	3.5VA	<100VA
-	Ethernet	12Vdc	0A	<8A	0VA	<100VA
Supplementary Information:						

T.2, T.3, T.4, T.5	TABLE: Steady force test					N/A
Part/Location	Material	Thickness (mm)	Force (N)	Test Duration (sec)	Observation	



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

T.6, T.9	TABLE: Impact tests	N/A
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Part/Location	Material	Thickness (mm)	Vertical distance (mm)	Observation

Supplementary information:

T.7	TABLE: Drop tests	N/A
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Part/Location	Material	Thickness (mm)	Drop Height (mm)	Observation

Supplementary information:

T.8	TABLE: Stress relief test	N/A
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Part/Location	Material	Thickness (mm)	Oven Temperature (°C)	Duration (h)	Observation

Supplementary information:

X	TABLE: Alternative method for determining minimum clearances distances	N/A
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Clearance distanced between:	Peak of working voltage (V)	Required cl (mm)	Measured cl (mm)

Supplementary information:



Appendix A – Equipment used for testing

Equipment calibration

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.

HL No	Equipment description	Manufacturer	Model	Ser. No.	Last Cal./Chk.	Next Cal./Chk.
4019	Temp. & Humidity Meter, (-50 - +70) deg, (20 - 99)% RH	Mad Electronics	HTC-1	NA	25-Aug-22	25-Aug-23
3460	Precision Barometer, 870 - 1050 hPa	LUFFT Mess- und Regeltechnik GmbH	DKD-K-26701	100469	17-Jul-22	17-Jul-24
5201	Multimeter, TRUE RMS	Fluke	Fluke 287	33500022	11-May-22	11-May-23
1594	Data Logger Hydra Series II	Fluke	2635A	7710004	24-Jul-22	24-Jul-23
5528	Clamp On Ammeter, 40A DC / AC pk	AMPROBE	LH41A	18090054	10-Jul-22	10-Jul-23
3124	Digital Force Gauges, Capacity 50.00 kg, Resolution 0.01 kg	SHIMPO	FGC-50B	G9506F004	22-Nov-22	22-Nov-23
5413	Digital Stopwatch	Shenzhen Huibo Industrial & Trading Co. Ltd.	PC396	NA	15-Aug-22	15-Aug-23



Measurement uncertainty

Expanded uncertainty at 95% confidence in Hermon Labs safety measurements

Test description	Expanded uncertainty
1. Heating test (TC method)	Option 1 $\pm 1.04\%$ Option 2 $\pm 1.87\%$
2. Leakage current	For Options 1, 2 $\pm 6.2\%$
3. Input test	AC Input test uncertainty: $\pm 3.02\%$ DC Input test uncertainty: $\pm 1.99\%$
4. Bonding impedance (Ground continuity) test	Option 1 test uncertainty: $\pm 2.81\%$ Option 1 test uncertainty: $\pm 1.99\%$
5. Dielectric strength	HYPOTPLUS II, AC/DC Withstand Voltage Tester expanded uncertainty: $\pm 3.55\%$ Electrical Safety Compliance Analyzer expanded uncertainty: $\pm 2.49\%$
6. Cord Test	$\pm 0.98\%$
7. Voltage limitation	$\pm 1.68\%$
8. Transformer abnormal test	Voltage/Current method $\pm 3.9\%$ Temperature (TC method) $\pm 2.6\%$ Temperature (Resistance method) $\pm 1.93\%$
9. Material used in high voltages	Option I uncertainty $\pm 0.98\%$ Option II uncertainty $\pm 0.03\%$
10. Limited Current Circuit	Option 1 $\pm 2.44\%$ Option 2 $\pm 3.31\%$
11. Energy hazard test	Option I uncertainty $\pm 1.82\%$ Option II uncertainty $\pm 0.97\%$
12. Limited power source (2.5)	$\pm 3.9\%$
13. Telecom Steady state test (6.2.2.2)	$\pm 2.8\%$
14. Telecom Impulse test (6.2.2.1)	$\pm 3.75\%$
15. TNV separation from earth (6.1.2)	$\pm 2.8\%$
16. TNV & SELV reliability	$\pm 3.30\%$
17. Ringing signal criteria	Normal test $\pm 1.68\%$ Leakage test $\pm 6.2\%$
18. Component failure	Voltage/ current method $\pm 3.9\%$ Temperature method $\pm 2.6\%$
19. Cable distribution impulses	High voltage impulses expanded uncertainty using 4Kv generator $\pm 3.75\%$. High voltage impulses expanded uncertainty using 10Kv generator $\pm 5\%$

Note: Pass/Fail decision was based on nominal values



Appendix B - Photo Documentation

Photograph №1, 2
General view





Photograph №3
Bottom view



Photograph №4
Internal view



End of Test Report