



Test Report issued under the responsibility of:



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

Report Number. : **REP136682**

Date of issue : **2025-12-01**

Total number of pages : **58**

Name of CB Testing Laboratory
preparing the Report : **Nemko Scandinavia AS**

Applicant's name : **Power Integrations, Inc**
Address : **5245 Hellyer Avenue,**
San Jose CA 95138,
United States

Test specification:

Standard : **IEC 62368-1:2023**

Test procedure : **CB Scheme**

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

TRF template used : **IECEE OD-2020-F1:2024, Ed.1.7**

Test Report Form No. : **IEC62368_1F**

Test Report Form(s) Originator : **UL Solutions (US)**

Master TRF : **Dated 2025-06-13**

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General disclaimer:

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

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Test item description	IC including capacitor discharge function (ICX)	
Trademark(s)		
Manufacturer	Same as applicant	
Model/Type reference	CAP400DG SC150xDG ZN115xDG (See page 9 for explanation of models)	
Ratings	240V AC, 50-60Hz nominal	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	Nemko Scandinavia AS
Testing location/ address.....		Philip Pedersens vei 11, NO-1366 Lysaker, Norway
Tested by (name, function, signature)		Nicolai Narvesen (Project Handler)  Digitally signed by Nicolai Narvesen DN: cn=Nicolai Narvesen, c=NO, o=Nemko Scandinavia AS, ou=Project Engineer, email=Nicolai.Narvesen@nemko.com Reason: I am the author of this document
Approved by (name, function, signature)...		Ole Morten Aaslund (Reviewer)  Digitally signed by Ole Morten Aaslund DN: cn=Ole Morten Aaslund, c=NO, o=Nemko Scandinavia AS, ou=Senior Engineer, email=olemorten.aaslund@nemko.com Reason: I am approving this document
☐	Testing procedure: CTF Stage 1:	
Testing location/ address.....		
Tested by (name, function, signature)		
Approved by (name, function, signature)...		
☐	Testing procedure: CTF Stage 2:	
Testing location/ address.....		
Tested by (name + signature)		
Witnessed by (name, function, signature) ..		
Approved by (name, function, signature)...		
☐	Testing procedure: CTF Stage 3:	
☐	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):

- 1) Photographs (2 pages)
- 2) European group differences and national differences (25 pages)
- 3) USA and Canada national differences (13 pages)
- 4) Manufacturer declaration (1 page)
- 5) Data sheet (7 pages)

Summary of testing:

Equipment under test (EUT) is an Integrated Circuit including capacitor discharge function (ICX). Requirements for such a component are covered by Annex G.16.

Compliance was checked by evaluation of the available data and by conducting tests required by G.16. After tests described in G.16 the capacitor discharge tests were performed according to clause 5.5.2.2. The circuit tested continued to comply with 5.5.2.2. Refer clause 5.5.2.2 for details. All testing have been performed on the same 3 ICX samples and the capacitors have been switched accordingly.

Note that compliance with 5.5.2.2 must also be checked when the ICX forms part of an end product.

In addition to tests of G.16, evaluation of available data from the manufacturer have been made to prove that the discharge function of the ICX remains the same also during single fault conditions: If one pin (D1 or D2) is physically disconnected from the device or PCB, the behaviour is similar to one of the discharge resistors being disconnected, i.e. equivalent to a system without the ICX. During a short-circuit the outcome is the same as if the ICX had not been used and results in the discharge resistors being connected in series continuously. Refer also "Product Description" and "Additional application considerations".

Tests performed (name of test, test clause and date test performed):

5.4.8 Humidity condition
 5.5.2.2 Safeguard against capacitor discharge after disconnection of a connector
 D.1 Impulse test
 G.16 IC that includes a capacitor discharge function (ICX)

Testing location: (CBTL, SPTL, CTF, Subcontractor)

Nemko Scandinavia AS
 Philip Pedersens vei 11,
 NO-1366 Lysaker,
 Norway

Summary of compliance with National Differences

- IECCE Member countries that are also CENELEC members
 Compliance with Group Differences evaluated ☒ **yes** ☐ **No** ☐ N/A
- IECCE Member countries with published National Differences which were evaluated:
 Canada, USA and Europe
- IECCE Member countries that did not publish any National Differences:

To support compliance with published National Differences, attach a compilation of relevant ND and/or GD TRFs to the CB Test Report

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other: ... (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

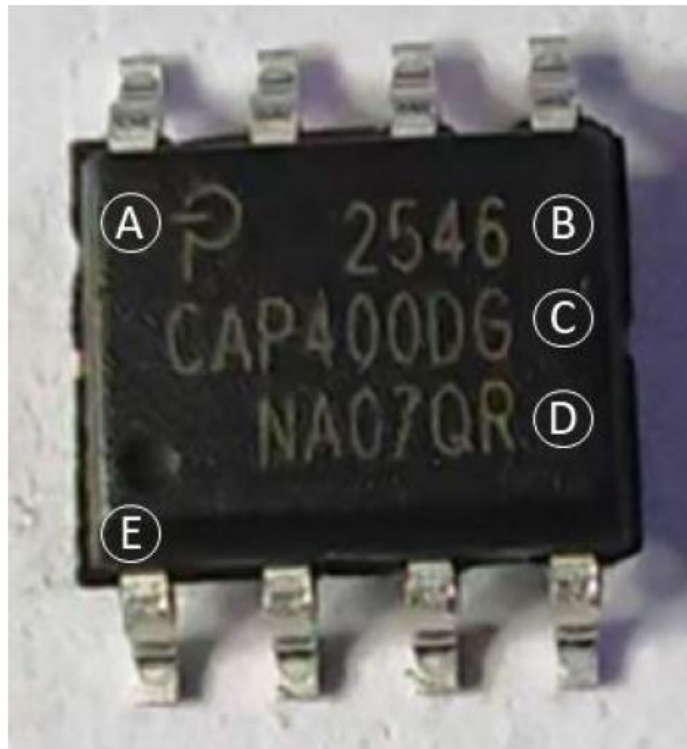
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:

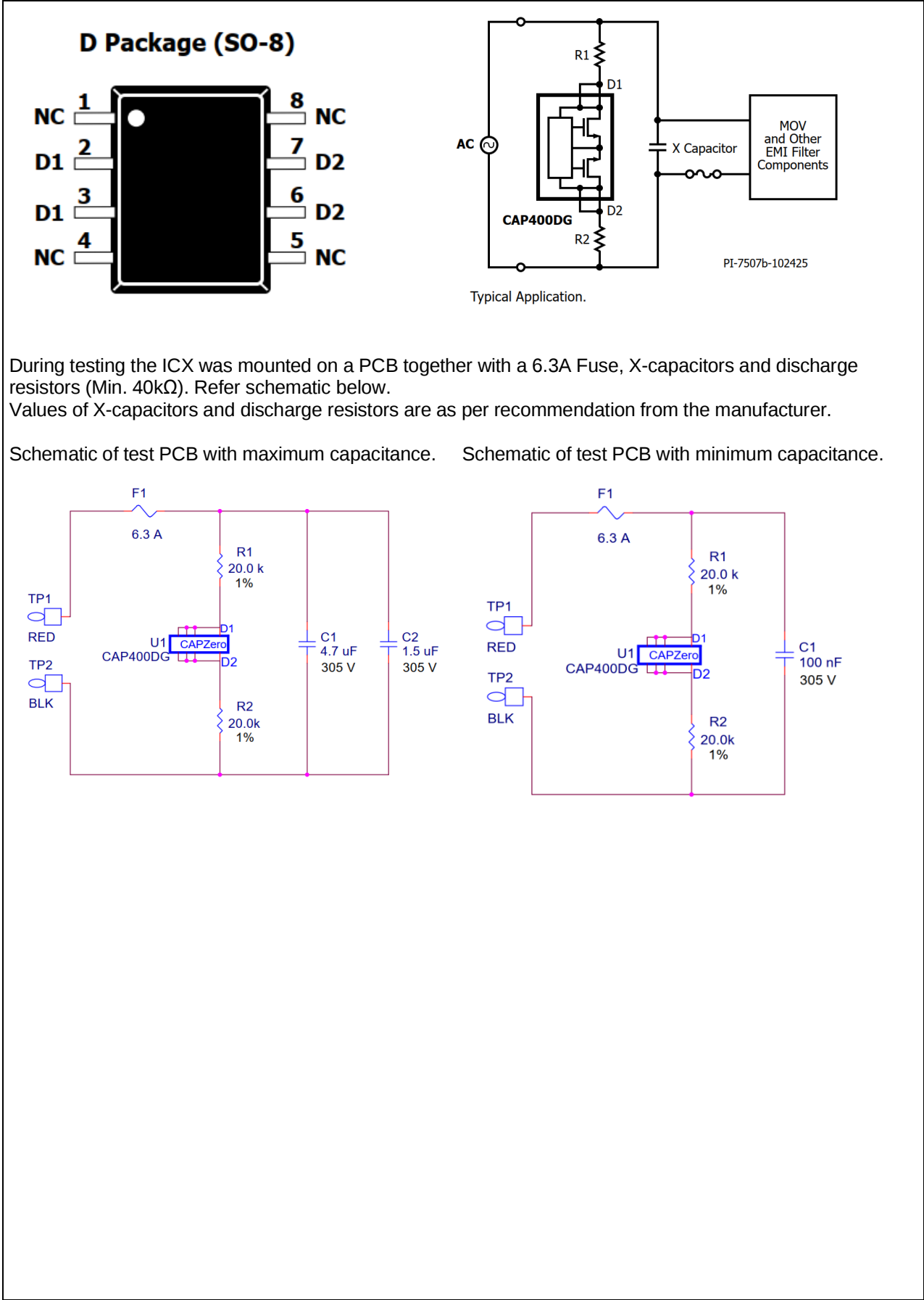
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



- A. Power Integrations Registered Trademark
- B. Assembly Date Code (last two digits of year YY followed by 2-digit work week WW)
- C. Product Identification (Part Number/Package Type)
- D. Lot Information Code
- E. Pin 1 Indicator

Test item particulars:	
Product group	end product / [X] built-in component
Classification of use by	[X] Ordinary person / Children likely present / [X] Instructed person / [X] Skilled person
Supply connection.....	[X] AC mains / DC mains not mains connected: ES1 / ES2 / ES3
Supply tolerance	[X] +10%/-10% +20%/-15% + ____ % / - ____ % None
Supply connection – type	pluggable equipment type A non-detachable supply cord / appliance coupler / direct plug-in pluggable equipment type B non-detachable supply cord / appliance coupler permanent connection / mating connector [X] other: Component for building-in
Considered current rating of protective device... :	____ A; Location: building / equipment [X] N/A
Equipment mobility.....	Movable / hand-held / transportable / direct plug-in / stationary / [X] for building-in / wall/ceiling-mounted / SRME/rack-mounted / other: ____
Overvoltage category (OVC)	OVC I / [X] OVC II / OVC III / OVC IV / ____
Class of equipment	Class I / Class II / Class II with functional earthing / Class III / [X] Not classified / ____
Special installation location	[X] N/A / restricted access area / outdoor location / ____
Pollution degree (PD)	PD 1 / [X] PD 2 / PD 3
Manufacturer's specified T_{ma}.....	125 °C / Outdoor: minimum ____ °C
IP protection class	IPX0 / IP ____ Not applicable, component for building-in
Power systems	TN / TT / IT - ____ V _{L-L} not AC mains Not applicable, component for building-in
Altitude during operation (m)	[X] 5000 m or less / ____ m
Altitude of test laboratory (m)	[X] 2000 m or less (20m) / ____ m
Mass of equipment (kg)	<10 g

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 : 2025-11-14 Date (s) of performance of tests : 2025-11-19 to 2025-11-27	
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) : Factory 1: Tianshui Huatian Technology Co., Ltd 88 Chi Yu Rd Qinzhou District, Tianshui City Gansu Province 741000, China Factory 2: Hefei Tongfu Microelectronics Co., Ltd 578 Weixing Road, Hefei Anhui 230601, China	
General product information and other remarks: The equipment under test (EUT) is an IC including discharge function (ICX). It is used to cope with environmental issues, as it limits the power consumption in standby conditions. The ICX blocks current through X-capacitor discharge resistor when AC voltage is connected, and it automatically discharges X-capacitor through discharge resistors when AC is disconnected. Figures below show a typical application of the ICX, the pin layout and the functional block diagram of ICX pins	



Model differences:

CAP400DG (Base model)

SC150xDG

'x' can be 1 to 5 indicating no difference in the products construction. Each number will be used to indicate what customer is using this product in the future.

ZN115xDG

'x' can be 1 to 5 indicating no difference in the products construction. Each number will be used to indicate part number for one specific customer.

All models may be followed by an additional non-safety-related suffix consisting of alphanumeric characters, with or without a preceding hyphen

Absolute Maximum Ratings ⁽⁴⁾		
DRAIN Pin Voltage ⁽¹⁾	900 V	Notes: 1. Voltage of D1 pin relative to D2 pin in either polarity. 2. The peak DRAIN current is allowed while the DRAIN voltage is simultaneously less than 400 V. 3. 1/16 in. from case for 5 seconds. 4. The Absolute Maximum Ratings specified may be applied one at a time without causing permanent damage to the product. Exposure to Absolute Maximum Rating conditions for extended periods of time may affect product reliability.
DRAIN Peak Current ⁽²⁾	TBD mA	
Storage Temperature	-65 °C to 150 °C	
Lead Temperature ⁽³⁾	260 °C	
Operating Ambient Temperature	-40 °C to 125 °C	
Maximum Junction Temperature	-40 °C to 125 °C	

Additional application considerations			
Evaluation of single fault conditions:			
Safety The CAPZero™-4 IC meets safety requirements even if placed before the system input fuse. If a short-circuit occurs between D1 and D2, the system behaves in the same way as conventional discharge circuits.			
It is not possible to create an open circuit fault condition through a single pin fault (such as created during the lifted-pin test) since two pins connected to each of D1 and D2. If several pins are lifted to create an open circuit, the condition is identical to conventional X-capacitor discharge circuits. If redundancy against open circuit faults is required, two CAP400DG ICs and R1 / R2 circuits can be placed in parallel.			
Test	Test With Existing System	CAPZero Equivalent	Comments
Open Circuit: Disconnect one pin of any device to see effect on system			Open Circuit: Lifting any one pin of D1 and D2 pins has no effect as 2 pins are connected to each drain terminal. The only way to create an open circuit is by lifting the leads of one of the discharge resistor. This is therefore equivalent to existing system without the X capacitor discharge function.
Short-Circuit: Short any two adjacent pins to see effect on system			Short-Circuit: Shorting D1 and D2 pins creates a condition equivalent to an existing system not use X capacitor discharge function.

Evaluation of maximum temperature:

Extended tests performed by the manufacturer to prove that the ICX is also reliable at the maximum specified ambient temperature (125°C).

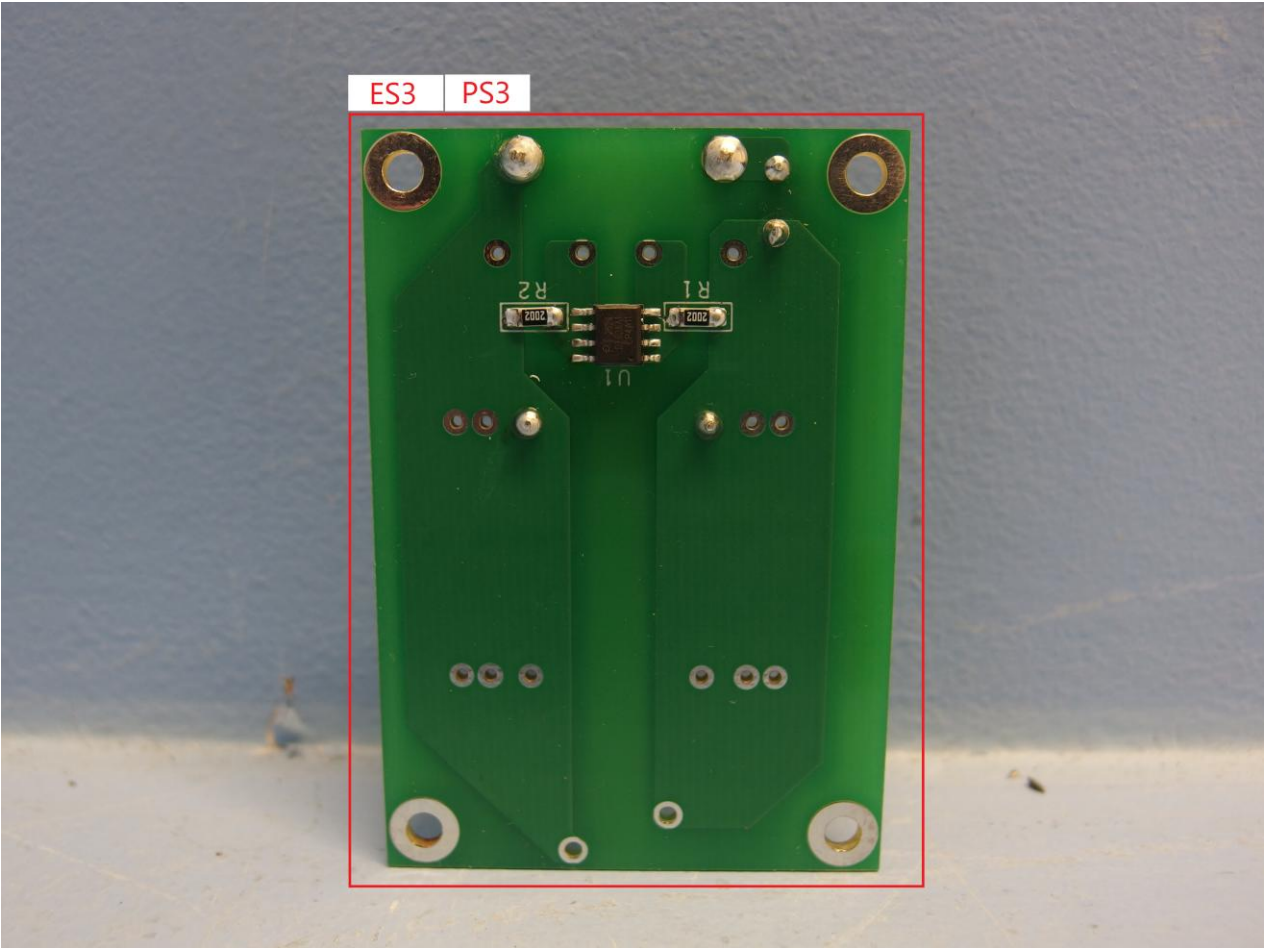
Refer also attached Data sheet from the manufacturer for further details.

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
ES3, but ES1 after 1 and 2 sec (ICX will be located in a circuit classified as ES3, however it serves as a safeguard against capacitor discharge after disconnection of a connector, and therefor considered as ES1 after 1 and 2 sec)	Ordinary, Instructed, Skilled	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
PS3 (ICX will be located in a circuit intended to be supplied from PS3)	Component for building-in must be evaluated as part of an end product	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
None	N/A	N/A	N/A	N/A
8	Mechanically-caused injury			
Class and Energy Source (e.g. MS3: Plastic fan blades)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
None	N/A	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
None	N/A	N/A	N/A	N/A
10	Radiation			
Class and Energy Source (e.g. RS1: PMP sound output)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
None	N/A	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



☒ ES ☒ PS ☐ MS ☐ TS ☐ RS

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL REQUIREMENTS		P
4.1.1	Acceptance of materials, components and subassemblies	Considered.	P
4.1.2	Use of components	Refer to table 4.1.2	P
4.1.3	Equipment design and construction	Evaluated to comply with the requirements.	N/A
4.1.4	Specified ambient temperature for outdoor use (°C) :	Component for building-in. Must be evaluated as part of an end product.	N/A
4.1.5	Constructions and components not specifically covered	-	N/A
4.1.8	Liquids, refrigerants and liquid filled components (LFCs)	-	N/A
4.1.15	Markings and instructions	(See Annex F)	P
4.4.3	Safeguard robustness	-	N/A
4.4.3.1	General	-	N/A
4.4.3.2	Steady force tests	-	N/A
4.4.3.3	Drop tests	-	N/A
4.4.3.4	Impact tests	-	N/A
4.4.3.5	Internal accessible safeguard tests	-	N/A
4.4.3.6	Glass impact tests	-	N/A
4.4.3.7	Glass fixation test	-	N/A
	Glass impact test (1J)	-	N/A
	Push/pull test (10 N)	-	N/A
4.4.3.8	Thermoplastic material tests	-	N/A
4.4.3.9	Air comprising a safeguard	-	N/A
4.4.3.10	Accessibility, glass, safeguard effectiveness	-	N/A
4.4.4	Displacement of a safeguard by an insulating liquid	Component for building-in. Must be evaluated as part of an end product.	N/A
4.4.5	Safety interlocks	Component for building-in. Must be evaluated as part of an end product.	N/A
4.5	Explosion		N/A
4.5.1	General	Component for building-in. Must be evaluated as part of an end product.	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.5.2	No explosion during normal/abnormal operating conditions	-	N/A
	No harm by explosion during single fault conditions	-	N/A
4.6	Fixing of conductors and conductive parts		N/A
	Fix conductors and conductive parts not to defeat a safeguard	Component for building-in. Must be evaluated as part of an end product.	N/A
	Compliance is checked by test :	-	N/A
4.7	Equipment for direct insertion into mains socket-outlets		N/A
4.7.2	Mains plug part complies with relevant standard ... :	Component for building-in. Must be evaluated as part of an end product.	N/A
4.7.3	Torque (Nm) :	-	N/A
4.8	Equipment containing coin or button cell batteries		N/A
4.8.1	General	Component for building-in. Must be evaluated as part of an end product.	N/A
4.8.2	Instructional safeguard :	-	N/A
4.8.3	Coin or button cell battery compartment, door or cover construction	-	N/A
	Open torque test	-	N/A
4.8.4.2	Stress relief test	-	N/A
4.8.4.3	Battery replacement test	-	N/A
4.8.4.4	Drop test	-	N/A
4.8.4.5	Impact test	-	N/A
4.8.4.6	Crush test	-	N/A
4.8.5	Compliance	-	N/A
	30N force test with test probe	-	N/A
	20N force test with test hook	-	N/A
4.9	Likelihood of fire or shock due to entry of conductive object		N/A
4.10	Component requirements		N/A
4.10.1	Disconnect device	Component for building-in. Must be evaluated as part of an end product.	N/A
4.10.2	Switches and relays	Component for building-in. Must be evaluated as part of an end product.	N/A
4.10.3	Mains power supply cords	-	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.10.4	Batteries and their protection circuits	-	N/A

5	ELECTRICALLY-CAUSED INJURY		P
5.2	Classification and limits of electrical energy sources		P
5.2.2	ES1 and ES2 limits	Component is intended to be located areas with ES3	P
5.2.2.2	Steady-state voltage and current limits	-	N/A
5.2.2.3	Capacitance limits	The electrical energy source is considered to be the X-capacitor(s). Values of X-capacitors covered are min. 100nF and max. 6μF. ES1 limit is 60Vp for 6μF, and 75Vp for 100nF.	P
5.2.2.4	Single pulse limits	-	N/A
5.2.2.5	Limits for repetitive pulses	-	N/A
5.2.2.6	Ringing signals	-	N/A
5.2.2.7	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	Component for building-in. Must be evaluated as part of an end product.	N/A
5.3.1 a)	ES2/ES3 circuits that are not ES2/ES3 mains	-	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
5.4	Insulation materials and requirements		N/A
5.4.1.2	Properties of insulating material	-	N/A
5.4.1.3	Compliance	-	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Non-hygroscopic materials	-	N/A
5.4.1.4	Maximum operating temperature for insulating materials	-	N/A
5.4.1.5	Pollution degrees	-	—
5.4.1.5.2	Test for pollution degree 1 environment and for an insulating compound	-	N/A
5.4.1.5.3	Thermal cycling test	-	N/A
5.4.1.6	Insulation in transformers with varying dimensions	-	N/A
5.4.1.7	Insulation in circuits generating starting pulses	-	N/A
5.4.1.8	Determination of working voltage	-	N/A
5.4.1.9	Insulating surfaces	-	N/A
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted	-	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	-	N/A
5.4.2.1	General requirements	-	N/A
	Clearances in circuits connected to AC Mains, Alternative method	-	N/A
5.4.2.2	Procedure 1 for determining clearance	-	N/A
	Temporary overvoltage	-	—
5.4.2.3	Procedure 2 for determining clearance	-	N/A
5.4.2.3.2.2	AC mains transient voltages	-	—
5.4.2.3.2.3	DC mains transient voltages	-	—
5.4.2.3.2.4	External circuit transient voltages	-	—
5.4.2.3.2.5	Transient voltage determined by measurement.....	-	—
5.4.2.3.3	Exceptions of determining required withstand voltage	-	N/A
5.4.2.3.4	Determining clearances using required withstand voltage	-	N/A
5.4.2.4	Determining the adequacy of a clearance using an electric strength test	-	N/A
5.4.2.5	Multiplication factors for clearances and test voltages.....	-	—
5.4.2.6	Clearance measurement.....	-	N/A
5.4.3	Creepage distances	-	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.3.1	General	-	N/A
5.4.3.3	Material group and CTI..... :	-	—
5.4.3.4	Creepage distances measurement..... :	-	N/A
5.4.4	Solid insulation	-	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	-	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
5.4.5	Antenna terminal insulation	-	N/A
5.4.5.1	General	-	N/A
5.4.5.2	Voltage surge test	-	N/A
5.4.5.3	Insulation resistance ($M\Omega$) :	-	N/A
	Electric strength test..... :	-	N/A
5.4.6	Insulation of internal wire as part of supplementary safeguard	-	N/A
5.4.7	Tests for semiconductor components and for cemented joints	-	N/A
5.4.8	Humidity conditioning	Refer also clause G.16.2	P
	Relative humidity (%), temperature ($^{\circ}C$), duration (h) :	(93 $\pm$ 3)%, (40 $\pm$ 2) $^{\circ}C$, 120h	—

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.9	Electric strength test	Component for building-in. Must be evaluated as part of an end product.	N/A
5.4.10	Safeguards against transient voltages from 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.....	-	N/A
5.4.11	Separation between external circuits and earth	-	N/A
5.4.11.1	Exceptions to separation between external circuits and earth	-	N/A
5.4.11.2	Requirements	-	N/A
	Surge suppressors bridge separation between external circuit and earth	-	N/A
	Rated operating voltage U_{op} (V).....	-	—
	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
	Test voltage (V) of additional test.....	-	—
	Measured current (mA) of additional test	-	N/A
5.4.12	Insulating liquid	-	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
	Thermal classification of IEC 60085.....	-	—
5.4.12.4	Container for insulating liquid	-	N/A
5.5	Components as safeguards		P
5.5.1	General	Considered	P
5.5.2	Capacitors and RC units	ICX is tested and complies with Annex G.16	P
5.5.2.1	General requirement	ICX is tested and complies with Annex G.16	P

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Clause	Requirement + Test	Result - Remark	Verdict
5.5.2.2	Capacitor discharge after disconnection of a connector	(See appended table 5.5.2.2)	P
5.5.3	Transformers	-	N/A
5.5.4	Optocouplers	-	N/A
5.5.5	Relays	-	N/A
5.5.6	Resistors	-	N/A
	Application type of resistors	-	—
5.5.7	Surge suppressors	-	N/A
	GDT.....	-	N/A
5.5.8	Insulation between the mains and an external circuit consisting of a coaxial cable	-	N/A
	Insulation resistance (MΩ)	-	N/A
	Electric strength test.....	-	N/A
5.5.9	Safeguards for socket-outlets in outdoor equipment	-	N/A
	RCD rated residual operating current (mA).....	-	—
5.6	Protective conductor		N/A
5.6.2	Requirements for protective conductors	-	N/A
5.6.2.1	General requirements	-	N/A
5.6.2.2	Colour of insulation	-	N/A
5.6.3	Requirements for protective earthing conductors	-	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	-	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)	-	—
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
	Relevant IEC standard	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.6.5.2	Corrosion	-	N/A
5.6.6	Resistance of the protective bonding system	-	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	-	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	-	N/A
5.7.2.1	Measurement of touch current	-	N/A
5.7.2.2	Measurement of voltage	-	N/A
5.7.3	Equipment set-up, supply connections and earth connections	-	N/A
5.7.4	Unearthed accessible parts..... :	-	N/A
5.7.5	Earthed accessible conductive parts..... :	-	N/A
5.7.6	Requirements when touch current exceeds ES2 limits	-	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	-	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 an earthed external circuit, current (mA) :	-	N/A
	b) Equipment connected to an unearthed external circuit, current (mA) :	-	N/A
5.8	Backfeed safeguard in battery backed up supplies		N/A
	Mains terminal ES :	-	N/A
	Air gap (mm) :	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

6	ELECTRICALLY- CAUSED FIRE		N/A
6.2	Classification of power sources and potential ignition sources		N/A
6.2.2	Power source circuit classifications	Assumed to be PS3 but must be evaluated in the end product.	N/A
6.2.3	Classification of potential ignition sources	-	N/A
6.2.3.1	Arcing PIS	-	N/A
6.2.3.2	Resistive PIS	-	N/A
6.3	Safeguards against fire under normal operating and abnormal operating conditions		N/A
6.3.1	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials	-	N/A
	Combustible materials not inside a fire enclosure....	-	N/A
6.4	Safeguards against fire under single fault conditions		N/A
6.4.1	Safeguard method	-	—
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits	-	N/A
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits	-	N/A
6.4.3.1	Supplementary safeguards	-	N/A
6.4.3.2	Single fault conditions	-	N/A
	Special conditions for temperature limited by fuse	-	N/A
6.4.4	Control of fire spread in PS1 circuits	-	N/A
6.4.5	Control of fire spread in PS2 circuits	-	N/A
6.4.5.2	Supplementary safeguards	-	N/A
6.4.6	Control of fire spread in PS3 circuits	-	N/A
6.4.7	Separation of combustible materials from a PIS	-	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	-	N/A
6.4.8.2	Fire enclosure and fire barrier material properties	-	N/A
6.4.8.2.1	Requirements for a fire barrier	-	N/A
6.4.8.2.2	Requirements for a fire enclosure	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
6.4.8.3	Constructional requirements for a fire enclosure and a fire barrier	-	N/A
6.4.8.3.1	Fire enclosure and fire barrier openings	-	N/A
6.4.8.3.2	Fire barrier dimensions	-	N/A
6.4.8.3.3	Top openings and properties	-	N/A
	Openings dimensions (mm) :	-	N/A
	Flammability tests for the top of a fire enclosure	-	N/A
6.4.8.3.4	Bottom openings and properties	-	N/A
	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	-	N/A
	Openings dimensions (mm) :	-	N/A
6.4.8.3.6	Integrity of a fire enclosure, condition met: a), b) or c)..... :	-	N/A
6.4.8.4	Separation of a PIS from a fire enclosure and a fire barrier distance (mm) or flammability rating :	-	N/A
6.4.9	Flammability of insulating liquid	-	N/A
	Auto ignition temperature (°C)..... :	-	N/A
	Flashpoint temperature (°C) :	-	N/A
6.5	Internal and external wiring	-	N/A
6.5.1	General requirements	-	N/A
6.5.2	Requirements for interconnection to building wiring :	-	N/A
6.5.3	Internal wiring size (mm ²) for socket-outlets :	-	N/A
6.6	Safeguards against fire due to the connection to additional equipment	-	N/A

7	INJURY CAUSED BY HAZARDOUS SUBSTANCES	-	N/A
7.2	Reduction of exposure to hazardous substances	-	N/A
7.3	Ozone exposure	-	N/A
7.4	Use of personal safeguards or personal protective equipment (PPE)	-	N/A
	Personal safeguards and instructions :	-	—
7.5	Use of instructional safeguards and instructions	-	N/A
	Instructional safeguard (ISO 7010) :	-	—

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Clause	Requirement + Test	Result - Remark	Verdict
8	MECHANICALLY-CAUSED INJURY		N/A
8.2	Mechanical energy source classifications		N/A
8.3	Safeguards against mechanical energy sources		N/A
8.4	Safeguards against parts with sharp edges and corners		N/A
8.4.1	Requirements	Component for building-in. Must be evaluated as part of an end product	N/A
	Instructional Safeguard :	-	N/A
8.4.2	Compliance criteria	-	N/A
8.5	Safeguards against moving parts		N/A
8.5.1	Requirements	-	N/A
	Fingers, jewellery, clothing, hair, etc., contact with MS2 or MS3 parts	-	N/A
	MS2 or MS3 part required to be accessible for the function of the equipment	-	N/A
	A manually activated stopping device for moving MS3	-	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	-	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	-	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

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Clause	Requirement + Test	Result - Remark	Verdict
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	-	N/A
	Explosion test :	-	N/A
8.5.5.3	Glass particles dimensions (mm)..... :	-	N/A
8.6	Stability of equipment		N/A
8.6.1	Requirements	-	N/A
	Instructional safeguard for MS2 and MS3 television sets..... :	-	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	Requirements	-	N/A
	Mount means type :	-	N/A
8.7.2	Test methods	-	N/A
	Test 1, additional downwards force (N) :	-	N/A
	Horizontal force to a wall or another structure	-	N/A
	Test 2, number of attachment points and test force (N) :	-	N/A
	Test 3, nominal diameter (mm) and applied torque (Nm) :	-	N/A
8.8	Handles strength		N/A
8.8.1	General	-	N/A
8.8.2	Handle strength test	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Number of handles :	-	—
	Weight applied (kg)..... :	-	—
8.9	Wheels or casters attachment requirements		N/A
8.9.2	Pull test	-	N/A
8.10	Carts, stands and similar carriers		N/A
8.10.1	General	-	N/A
8.10.2	Marking and instructions :	-	N/A
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
	Loading force applied (N) on each supporting surface :	-	N/A
8.10.5	Mechanical stability	-	N/A
	Force applied (N) :	-	N/A
8.10.6	Thermoplastic temperature stability	-	N/A
8.11	Mounting means for slide-rail mounted equipment (SRME)		N/A
8.11.1	General	-	N/A
8.11.2	Requirements	-	N/A
	Instructional Safeguard :	-	N/A
8.11.3	Mechanical strength test	-	N/A
8.11.3.1	Downward force test, force applied (N) :	-	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 criteria	-	N/A
8.12	Telescoping or rod antennas		N/A
	No sharp edges or points	-	N/A
	Button/ball diameter (mm)..... :	-	N/A

9	THERMAL BURN INJURY		N/A
9.2	Thermal energy source classifications		N/A
9.3	Touch temperature limits		N/A
9.3.1	Touch temperatures of accessible parts..... :	Component for building-in. Must be evaluated as part of an end product.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
9.3.2	Test method and compliance	-	N/A
9.4	Safeguards against thermal energy sources		N/A
9.5	Requirements for safeguards		N/A
9.5.1	Equipment safeguard	-	N/A
9.5.2	Instructional safeguard :	-	N/A
9.6	Requirements for wireless power transmitters		N/A
9.6.1	General	-	N/A
9.6.2	Specification of the foreign objects	-	N/A
9.6.3	Test method and compliance criteria..... :	-	N/A

10	RADIATION		N/A
10.2	Radiation energy source classifications		N/A
10.2.1	General classification	Component for building-in. Must be evaluated as part of an end product.	N/A
	Lasers..... :	-	—
	Lamps and lamp systems..... :	-	—
	Image projectors..... :	-	—
	X-Ray..... :	-	—
	Personal music player :	-	—
10.3	Safeguards against laser radiation		N/A
	The standard(s) equipment containing laser(s) comply..... :	-	N/A
10.4	Safeguards against optical radiation from lamps and lamp systems (including LED types)		N/A
10.4.1	General requirements	-	N/A
	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 equipment safeguards	-	N/A
	UV radiation exposure..... :	-	N/A
10.4.3	Instructional safeguard :	-	N/A
10.5	Safeguards against X-radiation		N/A
10.5.1	Requirements	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Instructional safeguard for skilled persons..... :	-	N/A
10.5.3	Maximum radiation (pA/kg)	-	N/A
10.6	Safeguards against acoustic energy sources		N/A
10.6.1	General	-	N/A
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 ≥ 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	Component for building-in. Must be evaluated as part of an end product	N/A
B.1.6	Specific output conditions	-	N/A
B.2	Normal operating conditions		P

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Clause	Requirement + Test	Result - Remark	Verdict
B.2.1	General requirements..... :	Tested according to the requirements of Annex G.16)	P
	Audio Amplifiers and equipment containing an audio amplifiers :	-	N/A
B.2.3	Supply voltage and tolerances	-	N/A
B.2.5	Input test..... :	-	N/A
B.2.6.4	Equipment intended for building-in or rack-mounting	-	N/A
B.3	Simulated abnormal operating conditions		N/A
B.3.1	General	-	N/A
B.3.2	Covering of ventilation openings	-	N/A
	Instructional safeguard :	-	N/A
B.3.3	DC mains polarity test	-	N/A
B.3.4	Setting of voltage selector	-	N/A
B.3.5	Maximum load at output terminals	-	N/A
B.3.6	Reverse battery polarity	-	N/A
B.3.7	Audio amplifier abnormal operating conditions	-	N/A
B.3.8	Safeguards functional during and after abnormal operating conditions :	-	N/A
B.4	Simulated single fault conditions		N/A
B.4.1	General	-	N/A
B.4.2	Temperature controlling device	-	N/A
B.4.3	Blocked motor test	-	N/A
B.4.4	Functional insulation	-	N/A
B.4.4.1	Short circuit of clearances for functional insulation	-	N/A
B.4.4.2	Short circuit of creepage distances for functional insulation	-	N/A
B.4.4.3	Short circuit of functional insulation on coated printed boards	-	N/A
B.4.5	Short-circuit and interruption of electrodes in tubes and semiconductors	-	N/A
B.4.6	Short circuit or disconnection of passive components	-	N/A
B.4.7	Continuous operation of components	-	N/A
B.4.8	Compliance criteria during and after single fault conditions :	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.4.9	Battery charging and discharging under single fault conditions	-	N/A
C	UV RADIATION		N/A
C.1	Protection of materials in equipment from UV radiation		N/A
C.1.2	Requirements	-	N/A
C.1.3	Test method and compliance criteria	-	N/A
C.2	UV light conditioning test		N/A
C.2.1	Test apparatus..... :	-	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		P
D.1	Impulse test generators		P
D.2	Antenna interface test generator		N/A
D.3	Electronic pulse generator		N/A
E	TEST CONDITIONS FOR EQUIPMENT INTENDED TO AMPLIFY AUDIO SIGNALS		N/A
E.1	Electrical energy source classification for audio signals		N/A
	Maximum non-clipped output power (W) :	-	—
	Rated load impedance (Ω) :	-	—
	Open-circuit output voltage (V)..... :	-	—
	Instructional safeguard :	-	—
E.2	Audio signals used during test		N/A
E.2.1	Pink noise test signal	-	N/A
E.2.2	Sine-wave signal	-	N/A
E.3	Operating conditions of equipment containing an audio amplifier		N/A
E.3.1	Normal operating conditions	-	N/A
E.3.2	Abnormal operating conditions	-	N/A
E.3.3	Audio equipment temperature measurement conditions.....:	-	N/A
F	EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS		P
F.1	General		P
	Language :	English	—
F.2	Letter symbols and graphical symbols-		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
F.2.1	Letter symbols according to IEC 60027-1	-	N/A
F.2.2	Graphic symbols according to IEC, ISO or manufacturer specific	-	N/A
F.3	Equipment markings		P
F.3.1	Equipment marking locations	On the body of the ICX.	P
F.3.2	Equipment identification markings	Refer below.	P
F.3.2.1	Manufacturer identification	The logo of power integrations applied. 	P
F.3.2.2	Model identification	See page 9 for model differences.	P
F.3.3	Equipment rating markings	Not a direct connection to the mains. No ratings marked on the component itself.	N/A
F.3.3.1	Equipment with direct connection to mains	-	N/A
F.3.3.2	Equipment without direct connection to mains	See F.3.3.	P
F.3.3.3	Nature of the supply voltage.....	Intended for AC but not marked.	N/A
F.3.3.4	Rated voltage	Rated Nominal voltage is declared in data sheet to be 230V AC	P
F.3.3.5	Rated frequency	50-60Hz nominal.	P
F.3.3.6	Rated current or rated power	Not rated.	N/A
F.3.3.7	Equipment with multiple supply connections	No such.	N/A
F.3.4	Voltage setting device	-	N/A
F.3.5	Markings on terminals and operating devices	-	N/A
F.3.5.1	Mains appliance outlet and socket-outlet markings :	-	N/A
F.3.5.2	Switch position identification marking.....	-	N/A
F.3.5.3	Replacement fuse identification and rating markings	-	N/A
	Instructional safeguards for neutral fuse	-	N/A
F.3.5.4	Replacement battery identification marking	-	N/A
F.3.5.5	Neutral conductor terminal	-	N/A
F.3.5.6	Terminal marking location	-	N/A
F.3.6	Equipment markings related to equipment classification	Component for building-in. Must be evaluated as part of an end product.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.6.1	Class I equipment	-	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 :	-	N/A
F.3.6.3	Functional earthing terminal marking :	-	N/A
F.3.7	Equipment IP rating marking :	-	N/A
F.3.8	External power supply unit output marking :	-	N/A
F.3.9	Durability, legibility and permanence of markings	Laser engraved.	N/A
F.3.10	Test for permanence of markings	-	N/A
F.4	Instructions		N/A
	– Information prior to installation and initial use	-	N/A
	– Equipment for use in locations where children not likely to be present	-	N/A
	– Instructions for installation and interconnection	-	N/A
	– Equipment intended for use only in restricted access area	-	N/A
	– Equipment intended to be fastened in place	-	N/A
	– Instructions for audio equipment terminals	-	N/A
	– Protective earthing used as a safeguard	-	N/A
	– Protective conductor current exceeding ES2 limits	-	N/A
	– Graphic symbols used on equipment	-	N/A
	– Permanently connected equipment not provided with all-pole mains switch	-	N/A
	– Replaceable components or modules providing safeguard function	-	N/A
	– Equipment containing insulating liquid	-	N/A
	– Installation instructions for outdoor equipment	-	N/A
F.5	Instructional safeguards		N/A
G	COMPONENTS		P
G.1	Switches		N/A
G.1.1	General	-	N/A
G.1.2	Ratings, endurance, spacing, maximum load	-	N/A
G.1.3	Test method and compliance criteria	-	N/A
G.2	Relays		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.2.1	Requirements and compliance criteria	-	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 criteria	-	N/A
G.3	Protective devices		N/A
G.3.1	Thermal cut-offs	-	N/A
	Thermal cut-outs separately approved according to IEC 60730-1 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 criteria	-	N/A
G.3.2	Thermal links	-	N/A
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 criteria	-	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	-	N/A
G.4.2	Mains connectors configuration..... :	-	N/A
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely	-	N/A
G.5	Wound components		N/A
G.5.1	Wire insulation in wound components	-	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) :	-	—

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Clause	Requirement + Test	Result - Remark	Verdict
	Test temperature (°C)..... :	-	—
G.5.2.3	Wound components supplied from the mains	-	N/A
G.5.2.4	Compliance criteria	-	N/A
G.5.3	Transformers	-	N/A
G.5.3.1	General	-	N/A
	Compliance method..... :	-	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
	Position..... :	-	N/A
	Method of protection..... :	-	N/A
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.5.4	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	Locked-rotor overload test	-	N/A
	Test duration (days)	-	—
	Electric strength test..... :	-	N/A
G.5.4.5	Running overload test for DC motors	-	N/A
G.5.4.5.2	Tested in the unit	-	N/A
	Electric strength test..... :	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.5.4.5.3	Alternative method	-	N/A
	Electric strength test..... :	-	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 (°C)..... :	-	N/A
	Electric strength test..... :	-	N/A
G.5.4.6.3	Alternative method	-	N/A
	Electric strength test..... :	-	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 (V) :	-	—
G.6	Wire Insulation		N/A
G.6.1	General	-	N/A
G.6.2	Enamelled winding wire insulation	-	N/A
G.7	Mains power supply cords and interconnection cables		N/A
G.7.1	General requirements	-	N/A
	Type..... :	-	—
G.7.2	Cross sectional area (mm ² or AWG) :	-	N/A
G.7.3	Cord anchorages and strain relief	-	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 criteria	-	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

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Clause	Requirement + Test	Result - Remark	Verdict
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	-	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	-	N/A
	IC limiter output current (max. 5A) :	-	—
	Manufacturers' defined drift :	-	—
G.9.2	Test Program	-	N/A
G.9.3	Compliance criteria	-	N/A
G.10	Resistors		N/A
G.10.1	General	-	N/A
G.10.2	Conditioning	-	N/A
G.10.3	Resistor test	-	N/A
	Changes of resistance (%) :	-	N/A
	Measured current with the lowest resistance value :	-	N/A
G.10.4	Voltage surge test	-	N/A
	Changes of resistance (%) :	-	N/A
G.10.5	Impulse test	-	N/A
	Changes of resistance (%) :	-	N/A
G.10.6	Overload test	-	N/A
	Changes of resistance (%) :	-	N/A
G.11	Capacitors and RC units		N/A
G.11.1	General requirements	-	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

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Clause	Requirement + Test	Result - Remark	Verdict
	Optocouplers comply with IEC 60747-5-5 with specifics	-	N/A
	Type test voltage $V_{ini,a}$	-	—
	Routine test voltage, $V_{ini,b}$	-	—
G.13	Printed boards		N/A
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	-	N/A
G.13.6.1	Sample preparation and preliminary inspection	-	N/A
G.13.6.2	Test method and compliance criteria	-	N/A
G.14	Coating on components terminals		N/A
G.14.1	Requirements	-	N/A
G.15	Pressurized liquid filled components or LFC assemblies		N/A
G.15.1	Requirements	-	N/A
G.15.2	Test methods and compliance criteria for self-contained LFC	-	N/A
G.15.2.1	Hydrostatic pressure test, applied test pressure	-	N/A
G.15.2.2	Creep resistance test	-	N/A
G.15.2.3	Tubing and fittings compatibility test, the change of tensile strength (%).....	-	N/A
G.15.2.4	Vibration test	-	N/A
G.15.2.5	Thermal cycling test, test temperature (°C).....	-	N/A
G.15.2.6	Force test	-	N/A
G.15.2.7	Compliance criteria	-	N/A
G.15.3	Test methods and compliance for a modular LFC	-	N/A
G.15.3.2	Hydrostatic pressure test, applied test pressure	-	N/A
G.15.3.3	Creep resistance test	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.15.3.4	Tubing and fittings compatibility test, the change of tensile strength (%)..... :	-	N/A
G.15.3.5	Thermal cycle test, test temperature (°C) :	-	N/A
G.15.3.6	Force test	-	N/A
G.15.3.7	Compliance criteria	-	N/A
G.16	IC including capacitor discharge function (ICX)		P
G.16.1	Condition for fault tested is not required	Refer below:	P
	ICX with associated circuitry tested in equipment	-	N/A
	ICX tested separately	ICX with external discharge components tested as specified in G.16.2. Test boards for the ICX model with associated circuitry including discharge components were provided (3 of each ICX component combination provided).	P
G.16.2	Tests	Tested as follows: - Humidity treatment as specified in clause 5.4.8. Performed on all test boards received. - Impulse test as specified in clause G.16.2 (see details below). Performed on test boards with smallest capacitance and smallest resistance. - Overvoltage test (1.2x240Vac=288Vac) for 2.5 minutes. Performed on all test boards received. - 10 000 cycles of connection and disconnection of the mains. Performed on test boards with the largest capacitance and the smallest resistance.	P
	Smallest capacitance and smallest resistance specified by ICX manufacturer for impulse test..... :	Test boards with capacitance min. 100nF and resistance min. 40kΩ.	—
	Mains voltage that impulses to be superimposed on..... :	Max. 240Vac as specified by manufacturer. Mains transient voltage Uc=2500Vp	—

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Clause	Requirement + Test	Result - Remark	Verdict
	Largest capacitance and smallest resistance for ICX tested by itself for 10000 cycles test	Test boards with capacitance max. 6 μ F and resistance min. 40k Ω	—
G.16.3	Capacitor discharge test.....	ICX complied with the tests specified in clause G.16.2 and continued to provide the safeguard function, ref. table 5.5.2.2. Test was performed on all test boards received.	P
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	-	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 condition 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
J	INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION		N/A
J.1	General		N/A
	Winding wire insulation.....	-	—
	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	-	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

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Clause	Requirement + Test	Result - Remark	Verdict
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.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
L	DISCONNECT DEVICES		N/A
L.1	General requirements	-	N/A
L.2	Permanently connected equipment	-	N/A
	Instructions for permanently connected equipment	-	N/A
L.3	Parts that remain energized	-	N/A
L.4	Single-phase equipment	-	N/A
	Instructions for single pole disconnect device	-	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
	Instructions for pluggable equipment	-	—
L.8	Multiple power sources	-	N/A
	Instructional safeguard :	-	N/A
M	EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS		N/A
M.1	General requirements		N/A
M.2	Safety of batteries and their cells		N/A
M.2.1	Batteries and their cells comply with relevant IEC standards :	-	N/A
M.3	Protection circuits for batteries provided within the equipment		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
M.3.1	Requirements	-	N/A
M.3.2	Test method	-	N/A
	Overcharging of a 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
M.3.3	Compliance criteria	-	N/A
M.4	Additional safeguards for equipment containing a secondary lithium battery		N/A
M.4.1	General	-	N/A
	IEC 62133-2 batteries used for sub-system power powering application..... :	-	N/A
M.4.2	Charging safeguards	-	N/A
M.4.2.1	Requirements	-	N/A
M.4.2.2	Test	-	N/A
M.4.2.2.1	General	-	N/A
M.4.2.2.2	Abnormal operating conditions	-	N/A
M.4.2.2.3	Single fault conditions	-	N/A
M.4.2.3	Compliance criteria..... :	-	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 criteria	-	N/A
M.5	Risk of burn due to short-circuit during carrying		N/A
M.5.1	Requirement	-	N/A
M.5.2	Test method and compliance criteria	-	N/A
M.6	Safeguards against short-circuits		N/A
M.6.1	External and internal faults	-	N/A
M.6.2	Compliance criteria	-	N/A
M.7	Risk of explosion from lead acid and NiCd batteries		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
M.7.1	Ventilation preventing explosive gas concentration	-	N/A
	Calculated hydrogen generation rate :	-	N/A
M.7.2	Test method and compliance criteria	-	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
	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 rechargeable batteries with aqueous electrolyte		N/A
M.8.1	General	-	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	-	N/A
M.9.2	Tray for preventing electrolyte spillage	-	N/A
M.10	Instructions to prevent reasonably foreseeable misuse		N/A
	Instructional safeguard :	-	N/A
N	ELECTROCHEMICAL POTENTIALS		N/A
	Material(s) used..... :	-	—
O	MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES		N/A
	Value of X (mm)..... :	-	—
P	SAFEGUARDS AGAINST CONDUCTIVE OBJECTS		N/A
P.1	General		N/A
P.2	Safeguards against entry or consequences of entry of a foreign object		N/A
P.2.1	General	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Location and Dimensions (mm) :	-	—
P.2.2	Safeguard requirements	-	N/A
	The ES3 and PS3 keep-out volume in Figure P.4 not applicable to transportable equipment	-	N/A
	Transportable equipment with metalized plastic parts..... :	-	N/A
P.2.3	Consequence of entry test :	-	N/A
P.3	Safeguards against spillage of internal liquids		N/A
P.3.1	General	-	N/A
P.3.2	Determination of spillage consequences	-	N/A
P.3.3	Spillage safeguards	-	N/A
P.3.4	Compliance criteria	-	N/A
P.4	Metallized coatings and adhesives securing parts		N/A
P.4.1	General	-	N/A
P.4.2	Tests	-	N/A
	Conditioning, T _c (°C) :	-	—
	Duration (weeks) :	-	—
Q	CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING		N/A
Q.1	Limited power sources		N/A
Q.1.1	Requirements	-	N/A
	a) Inherently limited output	-	N/A
	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 criteria :	-	N/A
	Current rating of overcurrent protective device (A) :	-	N/A
Q.2	Test for external circuits – paired conductor cable		N/A
	Maximum output current (A) :	-	N/A
	Current limiting method :	-	—
R	LIMITED SHORT CIRCUIT TEST		N/A
R.1	General	-	N/A
R.2	Test setup	-	N/A
	Overcurrent protective device for test :	-	—

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Clause	Requirement + Test	Result - Remark	Verdict
R.3	Test method	-	N/A
	Cord/cable used for test	-	—
R.4	Compliance criteria	-	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	-	—
	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)	-	—
	- Material did not show any additional holes for combustible materials	-	N/A
	- Cheesecloth did not ignite for top openings	-	N/A
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 criteria	-	N/A
	Mounting of samples	-	—
	Wall thickness (mm)	-	—
	Cheesecloth did not ignite	-	N/A
S.4	Flammability classification of materials		N/A
S.5	Flammability test for fire enclosure materials of equipment with a steady state power exceeding 4 000 W		N/A
	Samples, material	-	—
	Wall thickness (mm)	-	—
	Conditioning (°C)	-	—
S.6	Grille covering material, cloth, and reticulated foam		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Samples, material..... :	-	—
	Measured distance from the centre of the fuel tablet (mm).....:	-	N/A
T	MECHANICAL STRENGTH TESTS		N/A
T.1	General		N/A
T.2	Steady force test, 10 N :	-	N/A
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)	-	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	-	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	-	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
V.1.5	Slot openings tested with wedge probe	-	N/A
V.1.6	Terminals tested with rigid test wire	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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..... :	-	N/A
Y	CONSTRUCTION REQUIREMENTS FOR OUTDOOR ENCLOSURES		N/A
Y.1	General	-	N/A
Y.2	Resistance to UV radiation	-	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 criteria	-	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, changes of tensile strength and elongation :	-	N/A
	Alternative test methods..... :	-	N/A
Y.4.4	Compression test	-	N/A
Y.4.5	Oil resistance, change of swell / shrink (%)..... :	-	N/A
Y.4.6	Securing means	-	N/A
Y.5	Protection of equipment within an outdoor enclosure		N/A
Y.5.1	General	-	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
	Relevant tests of IEC 60529 or Y.5.5.2 or Y.5.5.3 . :	-	N/A
Y.5.5.2	IP5X equipment	-	N/A
Y.5.5.3	IP6X equipment	-	N/A

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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

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Clause	Requirement + Test	Result - Remark	Verdict

5.2	TABLE: Classification of electrical energy sources						N/A
Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters				ES Class
			U (V)	I (mA)	Type ¹⁾	Additional Info ²⁾	
-	-	-	-	-	-	-	-
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.							

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

5.4.1.10.2	TABLE: Vicat softening temperature of thermoplastics			N/A
Method		:	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:					

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
5.4.2, 5.4.3	TABLE: Minimum Clearances/Creepage distance							N/A
Clearance (cl) and creepage distance (cr) at/of/between:	U _p (V)	U _{rms} (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)								

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, etc.)	Test voltage (V)	Breakdown Yes / No
-		-	-	-
Supplementary information:				

IEC 62368-1					
Clause	Requirement + Test			Result - Remark	Verdict
5.5.2.2	TABLE: Stored discharge on capacitors				P
Location	Supply voltage (V)	Operating and fault condition ¹⁾	Switch position	Measured voltage (V _{pk})	ES Class
Measured Voltage (V_{pk}) after 1 second:					
Phase to Phase	Supply: 264/60Hz V _{peak} : 382.1*)	Normal	No switch	2.031 ²⁾	ES1
Phase to Phase	Supply: 264/60Hz V _{peak} : 381.1**)	Normal	No switch	21.78 ²⁾	ES1
Measured Voltage (V_{pk}) after 2 seconds:					
Phase to Phase	Supply: 264/60Hz V _{peak} : 382.1*)	Normal	No switch	1.766 ²⁾	ES1
Phase to Phase	Supply: 264/60Hz V _{peak} : 382.1**)	Normal	No switch	8.859 ²⁾	ES1
Supplementary information:					
X-capacitors installed for testing: C1 (100nF) or C1 (4.7μF) + C2 (1.5μF)					
*) 100nF, **) 6.2μF					
[X] bleeding resistor rating: R1: 20.0kΩ and R2: 20.0kΩ					
[X] ICX: Equipment under test is an ICX component.					
1) Normal operating condition (e.g., normal operation, or open fuse), SC= short circuit, OC= open circuit					
2) Same results for all test boards.					

5.6.6	TABLE: Resistance of protective conductors and terminations				N/A
Location	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						

IEC 62368-1				
Clause	Requirement + Test		Result - Remark	Verdict
5.7.5	TABLE: Earthed accessible conductive part			N/A
Supply voltage (V).....:				—
Phase(s)		[] Single Phase; [] Three Phase: [] Delta [] Wye		
Power Distribution System		[] TN [] TT [] IT		
Location		Fault Condition No in IEC 60990 clause 6.2.2	Touch current (mA)	Comment
-		-	-	-
Supplementary Information:				

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					N/A
Location	Operating and fault condition	Voltage (V)	Current (A)	Max. Power ¹⁾ (W)	Time (S)	PS class
-	-	-	-	-	-	-
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.						

6.2.3.1	TABLE: Determination of Arcing PIS				N/A
Location	Open circuit voltage after 3 s (Vpk)	Measured r.m.s current (A)	Calculated value	Arcing PIS? Yes / No	
-	-	-	-	-	
Supplementary information:					

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.2.3.2	TABLE: Determination of resistive PIS		N/A
Location	Operating and fault condition	Dissipate power (W)	Resistive PIS? Yes / No
-	-	-	-
Supplementary information:			
Abbreviation: SC= short circuit; OC= open circuit			

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:					

IEC 62368-1									
Clause	Requirement + Test					Result - Remark		Verdict	
9.6	TABLE: Temperature measurements for wireless power transmitters								N/A
Supply voltage (V)								—	
Max. transmitting power (W).....								—	
Part A ¹⁾									
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)	
Steel disc									
Aluminium ring									
Aluminium foil									
Measurement temperature T of part/at:	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		
	T (°C)	Ambient (°C)	T (°C)	Ambient (°C)	T (°C)	Ambient (°C)	T (°C)	Ambient (°C)	
Part B ²⁾									
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)	
Steel disc									
Aluminium ring									
Aluminium foil									
Measurement temperature T of part/at:	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		
	T (°C)	Ambient (°C)	T (°C)	Ambient (°C)	T (°C)	Ambient (°C)	T (°C)	Ambient (°C)	
Supplementary information:									
1) The test is performed by powering up the transmitter and then placing each of the foreign objects specified in 9.6.2 in direct contact with the transmitter. 2) The test is performed by first placing each of the foreign objects specified in 9.6.2 in direct contact with the transmitter and then powering up transmitter.									

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

5.4.1.4, 9.3, B.1.5, B.2.6	TABLE: Temperature measurements						N/A
Supply voltage (V)		-	-	-	-	—	
Ambient temperature during test T_{amb} (°C)		-	-	-	-	—	
Maximum measured temperature T of part/at:		T (°C)					Allowed T_{max} (°C)
-		-	-	-	-	-	-
Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
Supplementary information:							

B.2.5	TABLE: Input test							N/A
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
-	-	-	-	-	-	-	-	-
Supplementary information:								

IEC 62368-1												
Clause		Requirement + Test							Result - Remark			Verdict
B.2.5, E.3.1		TABLE: Input test for equipment containing audio amplifiers										N/A
Operation Condition:		Signal type		Frequency (Hz)		Output loads (Ω)		Load setup				
A1		Sine wave input		1000				All channels driven, (maximum) non-clipped output power				
A2		Peak response frequency						All channels driven, (maximum) non-clipped output power				
B1		Sine wave input		1000				All channels driven, 1/8 non-clipped output power				
B2		Peak response frequency						All channels driven, 1/8 non-clipped output power				
C		Band-limited pink noise signal		N/A				All channels driven, 1/8 non-clipped output power				
D												
Input									Amplifier Output			
Cond.	U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Ch.	U (V)	P (W)	Load (Ω)
Supplementary information:												

B.3, B.4		TABLE: Abnormal operating and fault condition tests					N/A	
Ambient temperature T _{amb} (°C)							—	
Power source for EUT: Manufacturer, model/type, outputrating ..							—	
Component No.		Condition	Supply voltage (V)	Test time	Fuse no.	Fuse current (A)	Observation	
-		-	-	-	-	-	-	
Supplementary information:								

IEC 62368-1							
Clause	Requirement + Test				Result - Remark		Verdict
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?.....:							—
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
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						

IEC 62368-1							
Clause	Requirement + Test			Result - Remark			Verdict
Q.1	TABLE: Circuits intended for interconnection with building wiring (LPS)						N/A
Output Circuit	Condition	U _{oc} (V)	Time (s)	I _{sc} (A)		S (VA)	
				Meas.	Limit	Meas.	Limit
-	-	-	-	-	-	-	-
Supplementary Information:							

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

T.6, T.9	TABLE: Impact test				N/A
Location/Part	Material	Thickness (mm)	Height (mm)	Observation	
-	-	-	-	-	
Supplementary information:					

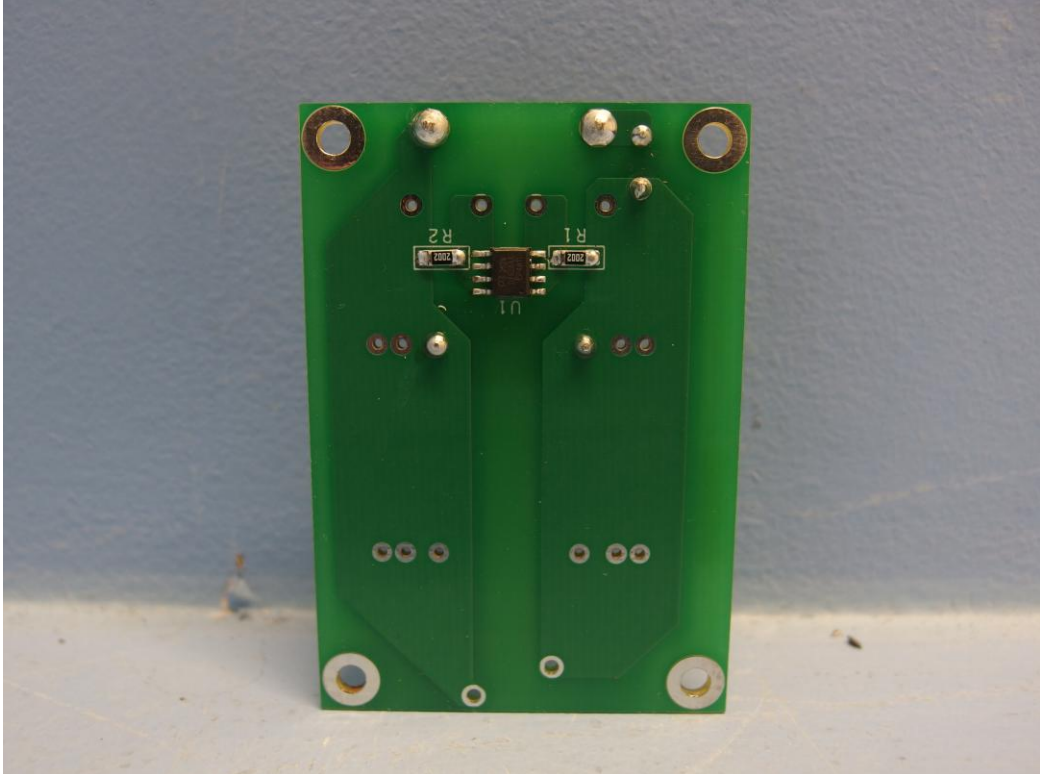
T.7	TABLE: Drop test					N/A
Location/Part	Material	Thickness (mm)	Height (mm)	Observation		
-	-	-	-	-		
Supplementary information:						

IEC 62368-1					
Clause	Requirement + Test			Result - Remark	Verdict
T.8	TABLE: Stress relief test				N/A
Location/Part	Material	Thickness (mm)	Oven Temperature (°C)	Duration (h)	Observation
-	-	-	-	-	-
Supplementary information:					

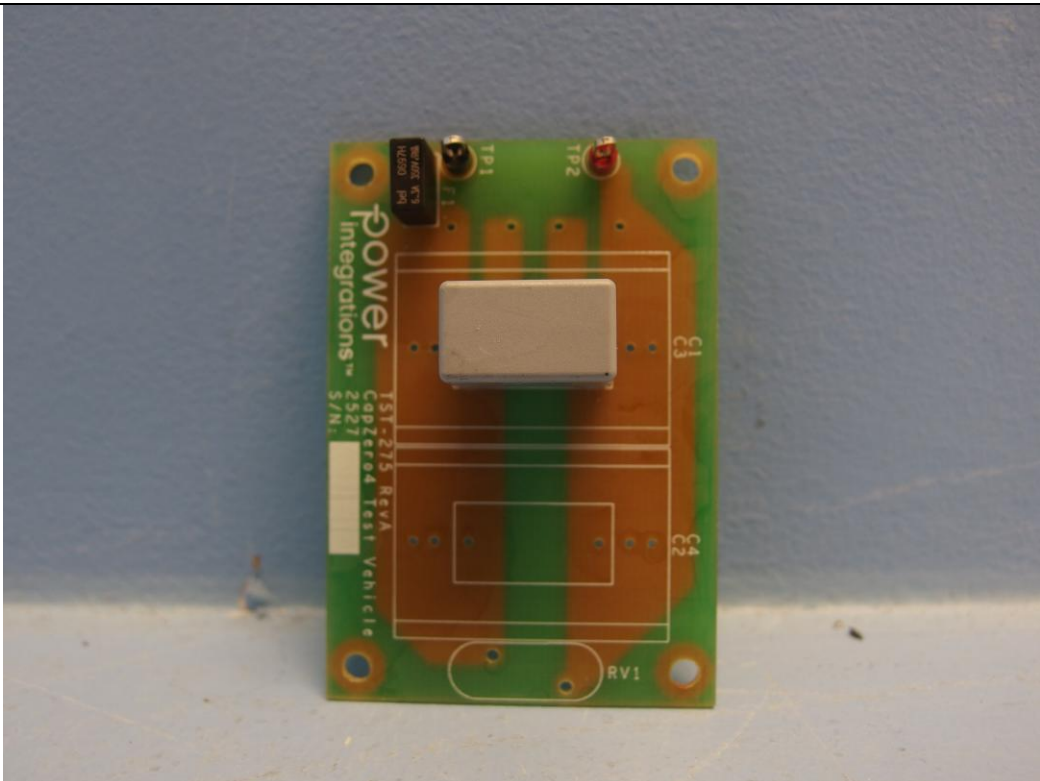
X	TABLE: Alternative method for determining minimum clearances distances				N/A
Clearance distanced between:		Peak of working voltage (V)	Required cl (mm)	Measured cl (mm)	
-		-	-	-	
Supplementary information:					

IEC 62368-1					
Clause	Requirement + Test			Result - Remark	Verdict
4.1.2	TABLE: Critical components information				N/A
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
-	-	-	-	-	-
Supplementary information:					
¹⁾ Provided evidence ensures the agreed level of compliance. See OD-2039.					

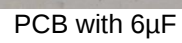
Attachment: Photographs



ICX and lowest resistors visible



PCB with 100nF



IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 62368-1 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES (Audio/video, information and communication technology equipment Part 1: Safety requirements)			
Differences according to : EN IEC 62368-1:2024 + A11:2024			
TRF template used : IECEE OD-2020-F2:2022, Ed. 1.2			
Attachment Form No..... : EU_GD_IEC 62368_1F			
Attachment Originator : UL Solutions (Demko)			
Master Attachment..... : 2024-05-16			
Copyright © 2024 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
	CENELEC COMMON MODIFICATIONS (EN)		-
	Clause numbers in the cells that are shaded light grey are clause references in EN IEC 62368-1:2024+A11:2024. All other clause numbers in that column, except for those in the paragraph below, refers to IEC 62368-1:2023. Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2023 are prefixed “Z”.		-
	Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions Annex ZC (informative) A-deviations Annex ZD (informative) IEC and CENELEC code designations for flexible cords		-

IEC62368_1F ATTACHMENT						
Clause	Requirement + Test			Result - Remark		Verdict
1	MODIFICATION to the whole document					
	Delete all the "country" notes in the reference document according to the following list:					-
	0.2.1	Note 1 and Note 2	1	Note 4 and Note 5	3.3.8.1	Note 2
	3.3.8.3	Note 1	4.1.15	Note	4.7.3	Note 1 and Note 2
	5.4.2.3.2.2 Table 12	Note c	5.4.2.3.2.4	Note 1 and Note 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 Note 3 and Note 4
	5.6.8	Note 2	5.7.7.1	Note 1 and Note 2	8.5.4.2.3	Note
	10.2.1 Table 39	Note 3 and Note 4 and Note 5	10.5.3	Note 2	10.6.1	Note 3
	F.3.3.4	Note 2	F.3.3.6	Note 3	Y.4.1	Note
	Y.4.5	Note				
2	Modification to Clause 1					
1	Add the following note at the end of Clause 1: "NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU." Add the following paragraph and note after Note 5: "This document is a type test standard." NOTE Z2 Routine tests of complete equipment, sub-assemblies or components are covered by EN 62911."			Compliance with RoHS Directive 2011/65/EU must be Considered.		-
3	Modification to Clause 2					

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
2	Add the following references: <i>EN 71-1:2014+A1:2018, Safety of toys - Part 1: Mechanical and physical properties</i> <i>EN 50332-1:2013, Sound system equipment: Headphones and earphones associated with personal music players - Maximum sound pressure level measurement methodology - Part 1: General method for "one package equipment"</i> <i>EN 50332-2:2013, Sound system equipment: Headphones and earphones associated with personal music players - Maximum sound pressure level measurement methodology - Part 2: Matching of sets with headphones if either or both are offered separately, or are offered as one package equipment but with standardised connectors between the two allowing to combine components of different manufacturers or different design</i> <i>EN 50332-3:2017, Sound system equipment: headphones and earphones associated with personal music players - Maximum sound pressure level measurement methodology - Part 3: Measurement method for sound dose management</i> <i>IEC/TR 62471-2, Photobiological safety of lamps and lamp systems - Part 2: Guidance on manufacturing requirements relating to non-laser optical radiation safety</i>	No such equipment.	N/A
4	Modification to Clause 4		
4	Add the following new subclause 4.Z1 after subclause 4.9: "For compliance with B.3 and B.4 in circuits connected to an AC mains, protective devices shall be provided, subject to the following: - for pluggable equipment type A, the protective devices shall be included as parts of the equipment, with the exception of components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, for which the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet;	Component for building-in. Must be evaluated as part of end product.	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	- for pluggable equipment type B or permanently connected equipment, the protection may be the dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, for example a fuse or circuit breaker, is fully specified in the installation instructions. Where protective devices are required within the equipment, the protective devices within the equipment shall operate before or at the same time the expected building installation protection will operate. For earth faults in single-phase equipment, it is not necessary to provide 2 protective devices. It is expected that the building installation will protect against earth faults. This applies also in countries where an IT power distribution system is used."	Component for building-in. Must be evaluated as part of end product.	N/A
5	Modification to subclause 4.1.9		
4.1.9	Add the following paragraph at the end of this subclause: "Products need to comply with the requirements of this document with appropriate measurement uncertainty. NOTE Z1 See also the RED ADCO position on 'Measurement uncertainty in published harmonized standards'."	Considered.	P
6	Modification to subclause 5.4.9.1		
5.4.9.1	Add the following note after the 5th paragraph: "NOTE Z1 For guidance on the use of high voltage source, see IEC 60060-1, Clause 8 of IEC 60243-1 and IEC 61180."	-	N/A
7	Modification to subclause 5.4.2.3.2.4		
5.4.2.3.2.4	Add the following at the end of this subclause: "The requirement for interconnection with external circuit in a HBES/BACS network is in addition given in EN IEC 63044-3:2018."	-	N/A
8	Modification to subclause 5.6.6.2		
5.6.6.2	Replace item d) with the following: "d) For equipment powered from a DC mains, if the protective current rating of the circuit under test exceeds 25 A, the test current shall be minimum as required in item a), unless the manufacturer specifies a higher value."	-	N/A
9	Modification to subclause 9.3.1		

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
9.3.1	Replace the second paragraph with the following: “An accessible part that, while in contact with the body, is likely to drop in temperature upon touch can be evaluated under the limits of Annex A of IEC Guide 117:2010 using the test method of 4.5 of IEC Guide 117.”	-	N/A
10	Modification to subclause 10.2.1		
10.2.1	Add the following to ^{c)} and ^{d)} in Table 38: “For additional requirements, see 10.5.1.”	-	N/A
11	Modification to subclause 10.4.1		
10.4.1	Replace the second paragraph of 10.4.1 with: “Electronic light effect equipment does not have to comply with the requirements of 10.4. However, 114 IEC/TR 62471-2 shall be considered and proper installation instructions shall be provided. Replace the ninth paragraph of 10.4.1 with: The following information shall be provided in the user manual for safe operation and installation. This information shall also be provided for safe operation by a skilled person who may be exposed to Risk Group 3 energy levels. Adequate instructions for proper assembly, installation, maintenance and safe use, including clear warnings concerning precautions to avoid possible exposure to hazardous optical radiation; and Advice on safe operating procedures and warnings concerning reasonably foreseeable misuse, malfunctions and hazardous failure modes. Where servicing and maintenance procedures are detailed, they shall include explicit instructions on safe procedures to be followed; and The marking on the equipment shall be reproduced in the user manual. A yellow background is not required in the user manual.	Component for building-in. Must be evaluated as part of end product.	N/A
12	Modification to subclause 10.4.4		
10.4.4	Replace the last paragraph of 10.4.4 with: “Compliance against material degradation from UV radiation is checked by the applicable tests of Annex C.”	-	N/A
13	Modification to subclause 10.5.1		

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.5.1	Add the following after the first paragraph: “For RS1 compliance is checked by measurement under the following conditions: In addition to the normal operating conditions, all controls adjustable from the outside of the equipment 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. NOTE Z1 Soldered joints and paint lockings are examples of adequate locking. The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm², at any point at a distance of 10 cm from the outer surface of the equipment. 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. For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level. NOTE Z2 These values appear in Directive 2013/59/Euratom of 5 December 2013.”	-	N/A
14	Modification to subclause 10.5.3		
10.5.3	Replace the second paragraph of 10.5.3 with: “The amount of radiation is determined by means of a radiation monitor of the ionizing chamber type with an effective area of 1 000 mm² ± 10 mm² or by measuring equipment of other types giving equivalent results.”	-	N/A
15	Modification to Clause 10		
	Replace 10.6 with the following:	-	-
10.6	Safeguards against acoustic energy sources	No such.	N/A
10.6.1	General	-	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.1.1	Introduction 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: - 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.). EXAMPLES Portable CD players, MP3 audio players, mobile phones with MP3 type features, PDAs or similar equipment. Personal music players shall comply with the requirements of either 10.6.2 or 10.6.3. NOTE 1 Protection against acoustic energy sources from telecom applications is referenced to ITU-T P.360. 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.	The EUT is not a PMP	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	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: - professional equipment; NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores or general public sales channels are considered not to be professional equipment. - hearing aid equipment and other devices for assistive listening; - the following type of analogue personal music players: - long distance radio receiver (for example, a multiband radio receiver or world band radio receiver, an AM radio receiver), and - cassette player/recorder; 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. - a player while connected to an external amplifier that does not allow the user to walk around while in use; - hearing protection devices (HPD) that comply with EN 352-8 For equipment that is clearly designed or intended primarily for use by children, the limits of the relevant toy standards may apply. The relevant requirements are given in EN 71-1:2014+A1:2018, 4.20 and the related tests methods and measurement distances apply.	-	N/A
10.6.2	Classification of devices without the capacity to estimate sound dose		

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.2.1	General This standard is transitioning from short-term based (30 s) requirements to long-term based (40 h) requirements. These clauses remain in effect only for devices that do not comply with sound dose estimation as stipulated in EN 50332-3:2017. For classifying the acoustic output $L_{Aeq,T}$, measurements are based on the A-weighted equivalent sound pressure level over a 30 s period. 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. 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. 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.	-	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.2.2	RS1 limits (to be superseded, see 10.6.3.2) 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 ≤ 85 dB when playing the fixed "programme simulation noise" described in EN 50332-1:2013. for equipment provided with a standardized connector (for example, a 3,5 mm headphone/earphone 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 214 "programme simulation noise" described in EN 50332-1:2013. The RS1 limits will be updated for all devices as per 10.6.3.2.	-	N/A
10.6.2.3	RS2 limits (to be superseded, see 10.6.3.3) 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 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 50332-1:2013. 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 226 EN 50332-1:2013.	-	N/A
10.6.2.4	RS3 limits RS3 is a class 3 acoustic energy source that exceeds RS2 limits.	-	N/A
10.6.3	Classification of devices (new)	-	-

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
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 2009/490/EC of 23 June 2009, are given below.	-	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 LAeq,T acoustic output shall be ≤ 80 dB when playing the fixed "programme simulation noise" described in EN 50332-1:2013. 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 50332-1:2013.	-	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 50332-3:2017, shall be ≤ 80 dB when playing the fixed "programme simulation noise" described in 249 EN 50332-1:2013. 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 EN 50332-3:2017, shall be ≤ 15 mV (analogue interface) or -30 dBFS	-	N/A
10.6.4	Requirements for maximum sound exposure	-	-

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.4.1	Measurement methods All volume controls shall be turned to maximum during tests. Measurements shall be made in accordance with EN 50332-1:2013 or EN 50332-2:2013 as applicable.	-	N/A
10.6.4.2	Protection of persons Except as given below, protection requirements for parts accessible to ordinary persons, instructed persons and skilled persons are given in 4.3. NOTE 1 Volume control is not considered to be a safeguard . 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. Alternatively, the instructional safeguard may be given through the equipment display during use. The elements of the instructional safeguard shall be as follows:  - element 1a: the symbol , IEC 60417-6044 (2011-01) - element 2: "High sound pressure" or equivalent text - element 3: "Hearing damage risk" or equivalent text - element 4: "Do not listen at high volume levels for long periods." or equivalent text 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. The equipment shall provide a means to actively inform the user of the increased sound level when the equipment is operated with an output level exceeding RS1 limits. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an output level exceeding RS1 limits. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time.	-	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	NOTE 2 Examples of means include visual or audible signals. Action from the user is always needed. 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. A skilled person shall not be unintentionally exposed to RS3.	-	
10.6.5	Requirements for dose-based systems	-	-
10.6.5.1	General requirements Personal music players shall give the warnings as provided below when tested according to 281 EN 50332-3:2017, using the limits from this clause. 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. 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.	-	N/A
10.6.5.2	Dose-based warning and requirements When a dose of 100 % CSD is reached, and at least at every 100 % further increase of CSD, the device shall warn the user and require an acknowledgement. In case the user does not acknowledge, the output level shall automatically decrease to a level in compliance with class RS1 limits. The warning shall at least clearly indicate that listening above 100 % CSD leads to the risk of hearing damage or loss.	-	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.5.3	Exposure-based requirements 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. 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 50332-3:2017. The EL settling time (time from starting level reduction to reaching target output level) shall be 10 s or less. Test of EL functionality is conducted according to EN 50332-3:2017, 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 un-weighted 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. In case the source is known not to be music (or test signal), the EL may be disabled.	-	N/A
10.6.6	Requirements for listening devices (headphones, earphones, etc.)	-	-
10.6.6.1	Corded listening devices with analogue input With 94 dB LAeq 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 maximizes the measured acoustic output level, the input voltage of the listening device when playing the fixed "programme simulation noise" as described in EN 50332-1:2013 shall be ≥ 75 mV. NOTE The values of 94 dB and 75 mV correspond with 85 dB and 27 mV in 10.6.2.2. or 100 dB and 150 mV in 10.6.2.3.	-	N/A
10.6.6.2	Corded listening devices with digital input With any playing device playing the fixed "programme simulation noise" described in EN 50332-1:2013, 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 LAeq,T acoustic output of the listening device shall be ≤ 100 dB with an input signal of -10 dBFS.	-	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.6.6.3	Cordless listening devices In cordless mode, with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1:2013; 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.	-	N/A
10.6.6.4	Measurement method Measurements shall be made in accordance with EN 50332-2:2013 as applicable."	-	N/A
16	Modification to subclause G.3.1.2		
	Add the following note after the first paragraph: "NOTE Z1 An IEC 60730 series standard is considered relevant if the component in question falls within its scope."	-	N/A
17	Modification to subclause G.7.1		
	Add the following note at the end of the subclause: "NOTE Z1 The harmonized code designations corresponding to the IEC cable types are given in Annex ZD."	Component for building-in. Must be evaluated as part of end product.	N/A
18	Modification to subclause M.2		

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	Add the following paragraph after the first paragraph: “The size of the battery compartment shall be designed taking into account the battery compartment recommendations of the relevant battery standard. NOTE For general guidance on the design of the battery compartment, see Clause 8 of IEC 62485-4.”	-	N/A
19	Modification to Bibliography		

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	Add the following notes for the standards indicated: IEC 60060-1 NOTE Harmonized as EN 60060-1. IEC 60130-9 NOTE Harmonized as EN 60130-9. IEC 60204-1 NOTE Harmonized as EN IEC 60204-1. IEC 60204-11 NOTE Harmonized as EN IEC 60204-11. IEC 60243-1 NOTE Harmonized as EN 60243-1. 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 60664-5:2005 NOTE Harmonized as EN 60664-5:2007. IEC 60721-3-4 NOTE Harmonized as EN IEC 60721-3-4. IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified). IEC 61180 NOTE Harmonized as EN 61180. 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 61643-21 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 IEC 61643-331. IEC 61140:2016 NOTE Harmonized as EN 61140:2016. IEC 61439-5:2014 NOTE Harmonized as EN 61439-5:2015. IEC 61969-3 NOTE Harmonized as EN 61969-3. IEC 62040:2017 NOTE Harmonized as EN IEC 62040:2019. IEC 62305-1 NOTE Harmonized as EN 62305-1. IEC 62368-3 NOTE Harmonized as EN 62368-3. IEC 62485-4 NOTE Harmonized as EN IEC 62485-4. ISO 10218-1 NOTE Harmonized as EN ISO 10218-1. ISO 10218-2 NOTE Harmonized as EN ISO 10218-2. ISO 13482 NOTE Harmonized as EN ISO 13482. ISO 13850 NOTE Harmonized as EN ISO 13850.		-
20	Addition of annexes		
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		-

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
4.1.15	Finland, Norway and Sweden 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. The marking text in the applicable countries shall be as follows: In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag"	Component for building-in. Must be evaluated as part of end product.	N/A
4.7.3	United Kingdom To the end of the subclause the following is added: 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.	Component for building-in. Must be evaluated as part of end product.	N/A
5.4.11.1 and Annex G	Finland and Sweden To the end of the subclause the following is added: For separation of the telecommunication network from earth the following is applicable: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either - 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.	Component for building-in. Must be evaluated as part of end product.	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	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 - passes the tests and inspection criteria of 5.4.7 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), and - is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV. It is permitted to bridge this insulation with a capacitor complying with EN 60384-14, subclass Y2. A capacitor classified Y3 according to EN 60384-14, may bridge this insulation under the following conditions: - 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 5.4.10; - the additional testing shall be performed on all the test specimens as described in EN 60384-14; - 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.		
5.5.2.1	Norway After the 3rd paragraph the following is added: Due to the IT power distribution system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).	Component for building-in. Must be evaluated as part of end product.	N/A
5.5.6	Finland, Norway and Sweden To the end of the subclause the following is added: 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.10.3.	Component for building-in. Must be evaluated as part of end product.	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.6.4.2.1	Ireland and United Kingdom 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.	Component for building-in. Must be evaluated as part of end product.	N/A
5.6.4.2.1	France 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. <i>Justification:</i> In France, according to NF C15-100 standard, in certain cases, the maximum rated current of the protective device circuit-breaker is 20 A.	Component for building-in. Must be evaluated as part of end product.	N/A
5.6.5.1	Ireland and United Kingdom To the second paragraph the following is added: 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 mm ² to 1,5 mm ² in cross-sectional area.	Component for building-in. Must be evaluated as part of end product.	N/A
5.6.8	Norway 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.	Component for building-in. Must be evaluated as part of end product.	N/A
5.7.7.1	Norway and Sweden To the end of the subclause the following is added: 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. Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system.	-	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	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. 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: "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)" 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 RMS, 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): "Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet 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." 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."		

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
8.5.4.2.3	United Kingdom Add the following after the 2nd dash bullet in 3rd paragraph: An emergency stop system complying with the requirements of EN IEC 60204-1 and EN ISO 13850 is required where there is a risk of personal injury.	-	N/A
B.3.1 and B.4	Ireland and United Kingdom The following is applicable: 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	Component for building-in. Must be evaluated as part of end product.	N/A
G.4.2	United Kingdom To the end of the subclause the following is added: 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.	Component for building-in. Must be evaluated as part of end product.	N/A
G.7.1	United Kingdom To the first paragraph the following is added: 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. NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.	Component for building-in. Must be evaluated as part of end product.	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
G.7.1	Ireland To the first paragraph the following is added: 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	Component for building-in. Must be evaluated as part of end product.	N/A
G.7.2	Ireland and United Kingdom To the first paragraph the following is added: 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.	Component for building-in. Must be evaluated as part of end product.	N/A

IEC62368_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		
10.5.2	Germany The following requirement applies: 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. <i>Justification:</i> German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM. NOTE Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int+49-531-592-6320, Internet: http://www.ptb.de	Component for building-in. Must be evaluated as part of end product.	N/A
ZD	IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS		

IEC62368_1F ATTACHMENT																																																								
Clause	Requirement + Test	Result - Remark	Verdict																																																					
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ATTACHMENT to TRF IEC62368_1F			
ATTACHMENT TO TEST REPORT IEC 62368-1:2023 CANADA and US NATIONAL DIFFERENCES (Audio/Video, information and communication technology equipment – Part 1:Safety requirements)			
Differences according to : CSA UL 62368-1:2025 issued July 31, 2025			
TRF template used: : IECEE OD-2020-F3:2024, Ed. 1.3			
Attachment Form No. : CA_US_ND_IEC62368_1F			
Attachment Originator..... : UL Solutions (US)			
Master Attachment : Dated 2025-08-25			
Copyright © 2025 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
Clause	Requirement + Test	Result - Remark	Verdict
	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 (CE Code), 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.	Component for building-in. Must be evaluated as part of an end product	N/A
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.	Component for building-in. Must be evaluated as part of an end product	N/A
1 (1DV.2.2)	This standard includes additional requirements for equipment intended for mounting under cabinets. See Annex DVC.	Component for building-in. Must be evaluated as part of an end product	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 C22.2 No. 60950-21/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).	Component for building-in. Must be evaluated as part of an end product	N/A

Clause	Requirement + Test	Result - Remark	Verdict
1(1DV2.4)	This standard does not cover Modular Data Centers (MDCs), only the information and communication technology equipment contained within.	Component for building-in. Must be evaluated as part of an end product	N/A
1 (1DV.2.5)	For industrial Additive Manufacturing Equipment (industrial 3D printers), refer to UL 2011, CSA C22.2 No. 301.	Component for building-in. Must be evaluated as part of an end product	N/A
1 (1DV.3)	For protection against direct lightning strikes, reference is made to NFPA 780 and CAN/CSA-B72 for additional requirements.	Component for building-in. Must be evaluated as part of an end product	N/A
1 (1DV.4)	For Battery Backup Systems in separate cabinets, refer to ANSI/CAN/UL 1973.	Component for building-in. Must be evaluated as part of an end product	N/A
	For Stationary Standby Batteries covered in Article 480 of the NEC, refer to UL 1989.	Component for building-in. Must be evaluated as part of an end product	N/A
	For Energy Storage Systems (ESS) covered in Article 706 of the NEC, refer to ANSI/CAN/UL 9540.	Component for building-in. Must be evaluated as part of an end product	N/A
1 (DV.5)	Additional requirements apply to some forms of power distribution equipment, including sub-assemblies.	Component for building-in. Must be evaluated as part of an end product	N/A
1 (1DV.6)	Fault-Managed (Class 4) Power Systems covered in Article 726 of the NEC are required to comply with UL 1400-1.	Component for building-in. Must be evaluated as part of an end product	N/A
4.1 (4.1.8)	For equipment using refrigerants, refer to CSA C22.2 No. 60335-2-40/UL 60335-2-40, CSA C22.2 No. 61010-2-011, and UL 61010-2-011.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
	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.	Component for building-in. Must be evaluated as part of an end product	N/A
4.6 (4.6.2)	Wire-wrap terminals have special construction and performance requirements.	Component for building-in. Must be evaluated as part of an end product	N/A
4.8 (4.8.1, 4.8.5)	Equipment likely to be accessible to children with coin or button cell batteries is required to comply with UL 4200A. This requirement applies whether the coin or button cell battery is replaceable or non-replaceable. This requirement does not apply to professional equipment. Note: additional UL 4200A TRF attachment is appended to end of this ND TRF.	Component for building-in. Must be evaluated as part of an end product	N/A

Clause	Requirement + Test	Result - Remark	Verdict
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 CE Code requirements.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
5.7.8 (5.7.8.1, 5.7.9.1)	Equipment intended to receive telecommunication ringing signals is required to comply with a special touch current measurement tests.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.	Component for building-in. Must be evaluated as part of an end product	N/A
	Flexible power supply cords are required to be compatible with Article 400 of the NEC and associated requirements of the CE Code.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
	Power supply cords for outdoor equipment are required to be suitable outdoor use type as required by Article 400.4 of the NEC and Rule 4-012 of the CE Code, i.e., marked "W."	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A

Clause	Requirement + Test	Result - Remark	Verdict
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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
	Baby monitors are required to additionally comply with ASTM F2951, Consumer Safety Specification for Baby Monitors.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
	Non-Industrial Additive Manufacturing Equipment (non-Industrial 3D Printers) have special limitations in accordance with NFPA 1 and the International Code Council (ICC) International Fire Code (IFC).	Component for building-in. Must be evaluated as part of an end product	N/A

Clause	Requirement + Test	Result - Remark	Verdict
	Network Connected Life Safety Equipment AV/ICT equipment used in life safety applications shall incorporate cybersecurity safeguards establishing its ability to withstand unauthorized updates and malicious attacks while continuing to perform its intended safety functionality.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVA (4.8)	See 4.8.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVA (5.6)	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVA (6.3)	The maximum quantity of flammable liquid stored in equipment is required to comply with NFPA 30.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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).	Component for building-in. Must be evaluated as part of an end product	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).	Component for building-in. Must be evaluated as part of an end product	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."	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVA (F.3.3.6)	Equipment identified for ITE (computer) room installation is required to be marked with the rated current.	Component for building-in. Must be evaluated as part of an end product	N/A
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.	Component for building-in. Must be evaluated as part of an end product	N/A

Clause	Requirement + Test	Result - Remark	Verdict
Annex DVA (G.3.4)	Suitable NEC/CE Code 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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVA (G.4.2)	Equipment with isolated ground (earthing) receptacles is required to comply with NEC 250.146(D) and CE Code 10-400 and 10-614.	Component for building-in. Must be evaluated as part of an end product	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/CE Code 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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	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).	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVA (G.7)	Flexible cords used outdoors are required to have the suffix "W" marked on the flexible cord.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVA (G.8)	Safety circuits for personnel protection that are subject to damage from surge events shall have surge protection installed within or immediately adjacent to the control panel.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVA (Q)	If applicable per NEC 725.60(C) and CE Code 16-350, 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.	Component for building-in. Must be evaluated as part of an end product	N/A
	Wiring terminals intended to supply Class 2 outputs in accordance with the NEC or CE Code 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.	Component for building-in. Must be evaluated as part of an end product	N/A

Clause	Requirement + Test	Result - Remark	Verdict
	Applicable parts of Chapter 8 of the NEC, and Rules 54 and 60 of the CE Code, may be applicable to ITE installed outdoors with connections to communication systems.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVC (1)	Additional requirements apply for equipment intended for mounting under kitchen cabinets.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH	Equipment for permanent connection to the mains supply is subjected to additional requirements.	Component for building-in. Must be evaluated as part of an end product	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/CE Code.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.2.1)	For safe and reliable connection to a mains, permanently connected equipment is to be provided.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.2.2)	Additional considerations are applicable for D.C. mains.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.3.2.3)	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm ²).	Component for building-in. Must be evaluated as part of an end product	N/A

Clause	Requirement + Test	Result - Remark	Verdict
Annex DVH (DVH.3.2.4)	All associated mains supply terminals are to be located in proximity to each other and to the main protective earthing terminal, if any.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.3.2.5)	Terminals are required to be 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.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.3.3)	When field connection to an external circuit is via wires (example, free conductors), the wires are required to be not smaller than 18 AWG (0.82 mm ²) and the free length of the wire inside an outlet box or wiring compartment is required to be 150 mm or more.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.3.4)	Size of protective earthing conductors and terminals are required to comply with specified national conditions.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.4)	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.4.1)	Wire bending space are required to comply with specified national conditions.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.4.2)	Volume of wiring compartment is required to comply with specified national conditions.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.4.3)	Separation of circuits is required to comply with specified national conditions.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.5)	Equipment markings and instructional safeguards are required to comply with specified national conditions.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.5.1)	Identification of protective earthing terminal required to comply with specified national conditions.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.5.2)	Identification of terminal for earthed conductor (neutral) is required to comply with specified national conditions.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.5.3)	Identification of terminals for aluminium conductors is required to comply with specified national conditions.	Component for building-in. Must be evaluated as part of an end product	N/A
Annex DVH (DVH.5.4)	Wire temperature ratings are required to comply with specified national conditions.	Component for building-in. Must be evaluated as part of an end product	N/A

Clause	Requirement + Test	Result - Remark	Verdict
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.	Component for building-in. Must be evaluated as part of an end product	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.	Component for building-in. Must be evaluated as part of an end product	N/A
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.	Component for building-in. Must be evaluated as part of an end product	N/A

ATTACHMENT – UL 4200A			
ATTACHMENT TO TEST REPORT			
UL 4200A			
US NATIONAL DIFFERENCES			
(Approval and test specification—Products Incorporating Button Batteries or Coin Cell Batteries)			
Differences according to : US UL 4200A:2023-08-30			
TRF template used:..... : IECEE OD-2020-F3:2024, Ed. 1.3			
Attachment Form No. : CA_US ND Attachment			
Attachment Originator : UL Solutions (US)			
Master Attachment..... : Dated 2025-08-25			
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Note: UL 4200A:2023 is NOT covered by IECEE Accreditation for Testing / Reporting Please state Laboratory Accreditation for this Standard.			
Clause	Requirement + Test	Result - Remark	Verdict
5	CONSTRUCTION		-
5.1	Products that use button/coin cell batteries designed to minimize the risk of children removing and ingesting the batteries.	Component for building-in. Must be evaluated as part of an end product	N/A
	Products that allow user removal or replacement of button/coin cells shall comply with requirements 5.2 – 5.6; OR	-	N/A
	Products with button/coin cells that are not intended to allow user removal/replacement shall comply with 5.7.	-	N/A
5.2	Products with removable or replaceable button/coin cell batteries shall not allow the button/coin cell to be contacted by Test Probe.	-	N/A
5.3	Probe applied to any depth permitted via openings and rotated or angled throughout insertion to examine the enclosure.	-	N/A
5.4	Parts of the enclosure that may be opened or removed by the user without using a tool or with less effort that two independent and simultaneous movements by hand is to be opened and removed.	-	N/A
5.4A	Tension Test for part of the battery compartment enclosure is protected by pliable material, to determine whether the battery compartment enclosure can become exposed or accessible, using a force of at least 70.0 N (15.7 lbf).	-	N/A
	If a new part of the battery compartment enclosure becomes exposed or accessible, repeat the examination of 5.4 and remove any further pliable material that is then exposed until no new part of the battery compartment enclosure becomes exposed or accessible, and then conduct the test in 5.3.	-	N/A

Clause	Requirement + Test	Result - Remark	Verdict
5.5	Products with removeable or replaceable button/coin cell battery inside a battery compartment shall be designed to prevent child by one of the following methods:	-	N/A
5.5 a)	A tool is required to open the battery compartment. For a battery compartment secured by a screw or a twist-on access cover, a minimum torque of 0.5 Nm and a minimum angle of 90 degrees of rotation is required to open the compartment or	-	N/A
	The fastener shall engage a minimum of two full threads.	-	N/A
5.5 b)	The battery compartment door or cover requires the application of a minimum of two independent and simultaneous movements to open by hand.	-	N/A
5.6	If screws or similar fasteners are used to secure the door or cover, the fasteners shall be captive to the door, cover or device.	-	N/A
5.7	Products incorporating button/coin cells not intended for user removal or replacement shall effectively prevent remove of the battery. The button/coin cell shall be:	-	N/A
5.7 a)	Made inaccessible by an enclosure or similar means which passes tests of 6.2 and 6.3; or	-	N/A
5.7 b)	Held fully captive by the use of soldering, fasteners or equivalent means and shall pass test 6.4.	-	N/A
6	PERFORMANCE		N/A
	Protection from Ingestion or Aspiration of Button/Coin Cell Batteries		N/A
6.1	GENERAL	-	N/A
6.1.1	Button/coin cell batteries shall not be accessible or liberated from the product as a result of mechanical abuse tests in applicable safety standards for the product.	-	N/A
	Products with button/coin cells shall comply with the tests in 6.2 – 6.4.	-	N/A
6.2	PRE-CONDITIONING	-	N/A
6.2.1 a)	Stress Relief Test	-	N/A
6.2.1 b)	Battery Replacement Test	-	N/A
	Battery replaced a total of ten times, adhering to manufacturer's instructions.	-	N/A
6.3	ABUSE TESTS		N/A
6.3.1	GENERAL	-	N/A
6.3.2	Drop test for portable devices and hand-held products	-	N/A
6.3.3	Impact test	-	N/A
6.3.4	Crush test	-	N/A
6.3.4A	Torque test	-	N/A
6.3.4B	Tension test	-	N/A

Clause	Requirement + Test	Result - Remark	Verdict
6.3.4C	Compression test	-	N/A
6.3.5	Compliance test	-	N/A
6.4	Secureness test	-	N/A
7	MARKINGS		N/A
7A	GENERAL	-	N/A
7A.1	All warning statements or icons shall be prominent, legible, easily discernable under normal lighting conditions, and permanently marked.	-	N/A
7A.2	If an instructional safeguard is present in more than one color to indicate hazard severity, the color shall be in accordance with the ISO 3864 series.	-	N/A
7A.3	Printed or screened markings shall also be permanent.	-	N/A
7A.4	Legibility of markings is determined by inspection. Permanency is determined by the tests of Permanence of Markings.	-	N/A
7A.5	Language	-	N/A
7A.6	Safety alert symbol	-	N/A
7A.7	Text in the message panel	-	N/A
7A.8	Labels consideration that are provided on a sticker, hang tag, instructions or manual.	-	N/A
7A.9	Labels consideration that are required to be on the packaging of consumer products and directly on consumer products.	-	N/A
7B	Packaging Markings	-	N/A
7B.1	Principal display panel contains the warning label.	-	N/A
7B.2	Consumer products that are not contained in packaging.	-	N/A
7B.3	Limited space on principal display panel of the consumer product packaging.	-	N/A
7B.4	Additional text consideration for principal display panel or secondary display panel of the consumer product packaging, or accompanying hang tag or sticker label.	-	N/A
7C	Product Markings	-	N/A
7C.1	Consumer products marked with a warning label on the product display panel.	-	N/A
7C.2	Limited space on the product.	-	N/A
7C.3	Product is too small to include the warning with text in Figure 7C.1 or the icon in Figure 7C.2.	-	N/A
7D	Test for permanence of markings.	-	N/A
9	INSTRUCTIONS		N/A

Clause	Requirement + Test	Result - Remark	Verdict
9.1	Instructions and manuals, if provided, shall include all of the applicable markings and the applicable statements.	-	N/A
	If instructions and manuals are not provided, the statements shall be present on the principal display panel or secondary display panel of the consumer product packaging, or if there is no consumer product packaging, the accompanying hang tag or sticker label.	-	N/A
9.2	Products with replaceable button/coin cell batteries.	-	N/A
9.3	Products with non-replaceable button/coin cell batteries.	-	N/A

27 November 2025

NEMKO Scandinavia AS
Philip Pedersens vei 11, 1366 Lysaker, Norway

Subject: Manufacturer's Declaration

Dear Sir or Madam,

For the purpose of the application for obtaining a NEMKO Certificate, Power Integrations, Inc. hereby that the sample submitted for evaluation is representative of the products from each factory, as detailed below.

Model(s):

CAP400DG
SC1501DG ; SC1502DG ; SC1503DG ; SC1504DG ; SC1505DG
ZN1151DG ; ZN1152DG ; ZN1153DG ; ZN1154DG ; ZN1155DG

All models may be followed by an additional non-safety-related suffix consisting of alphanumeric characters, with or without preceding hyphen.

Factory(s):

Tianshui Huatian Technology Co., Ltd. No. 88 Chiyu Road Tianshui, Gansu Province 741000 China	Hefei Tongfu Microelectronics Co., Ltd. No. 578, Weixing Road, Hefei, Anhui Province 230601 China
--	--

Respectfully yours,



Neil Barté Jr.
Product Safety Engineer – Applications Engineering
Contact No.: +632 82463454



Mark Batulan
Safety Engineering Team Leader – Applications Engineering
Contact No.: +632 82463448

CAP400DG CAPZero-4

Zero Loss Automatic X Capacitor Rapid Discharge IC

PRELIMINARY

Product Highlights

- Meets IEC 60335 X capacitor discharge to less than 34 V in less than 1 second
- Single part supports X capacitor values up to 6 μ F
- Blocks current through X capacitor discharge resistors when AC voltage is connected
- Automatically discharges X capacitors through discharge resistors when AC is disconnected
- Simplifies EMI filter design – larger X capacitor allows smaller inductive components
- Meets safety standards for use before or after system input fuse
- >4 mm creepage on package and Printed Circuit Board (PCB)
- Self supplied – no external bias required
- High common mode surge immunity – no external ground connection
- High differential surge withstand – 900 V internal MOSFETs
- EN/IEC 62368-1 (NEMKO), UL 62368-1 (UL), and GB 4943.1 (CQC) certification

EcoSmart– Energy Efficient

- <0.75 mW consumption at 230 VAC for all X capacitor values

Applications

- All AC-DC converters with X capacitors between 100 nF and 6 μ F
- Appliances requiring ErP Lot 6 compliance
- Adapters requiring ultra low no-load consumption
- All converters requiring very low standby power

Description

When AC voltage is applied, CAP400DG IC blocks current flow in the X capacitor safety discharge resistors, reducing the power loss to less than 0.75 mW, at 230 VAC. When AC voltage is disconnected, CAP400DG IC automatically discharges the X capacitor by connecting the series discharge resistors. This operation allows flexibility in the choice of the X capacitor to optimize differential mode EMI filtering and reduce inductor cost.

Designing with CAP400DG IC is simply a matter of selecting the appropriate external resistor values to meet the necessary X-capacitor discharge time.

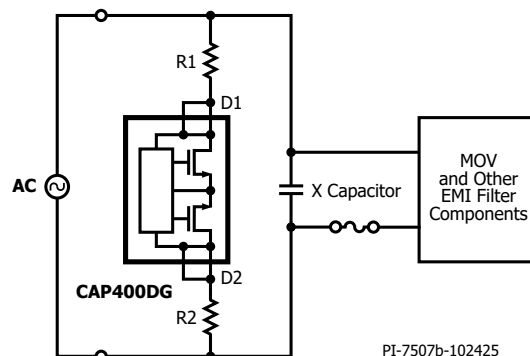


Figure 1. Typical Application.

Component Table

Product ²	BV _{DSS}	Total X Capacitance	Total Series Resistance ¹ (R1 + R2)
CAP400DG	900 V	100 nF to 6 μ F	50 k Ω Minimum 100 k Ω Maximum

Table 1. Component Table.

Notes:

1. Values are nominal.
2. Package: D: SO-8.

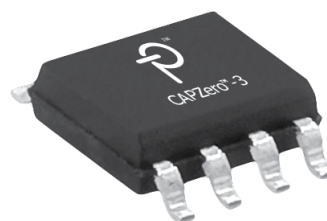


Figure 2. SO-8 D Package.

Pin Functional Description

The pin configuration shown in Figure 4 ensures that the width of the SO-8 package is used to provide creepage and clearance distance of greater than 4 mm.

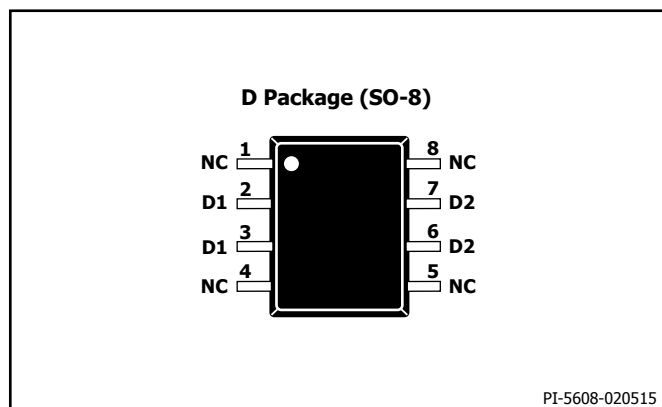


Figure 3. Pin Configuration.

Although electrical connections are only made to pins 2, 3, 6 and 7, it is recommended that pins 1-4 and pins 5-8 are coupled together on the PCB – see Key Applications Section.

Key Application Considerations

Breakdown Voltage Selection

The system configuration variables include the placement of the system MOV and X capacitor(s) as well as the differential surge voltage specification for the application.

As shown in Table 1, the CAP400DG device has a breakdown voltage of 900 V. For applications where the system MOV is placed in position 1 (MOV_{POS1} in Figure 5), the CAP400DG device will provide adequate voltage withstand for surge requirements of 3 kV or higher.

When the MOV is not placed directly across the X Capacitor 1 (MOV_{POS2} in Figure 5) the CAP400DG device can support a surge specification of up to 1.5 kV. For differential surge voltage specifications of greater than 1.5 kV it is recommended that the MOV be placed in the location shown in Figure 5 (MOV_{POS1}).

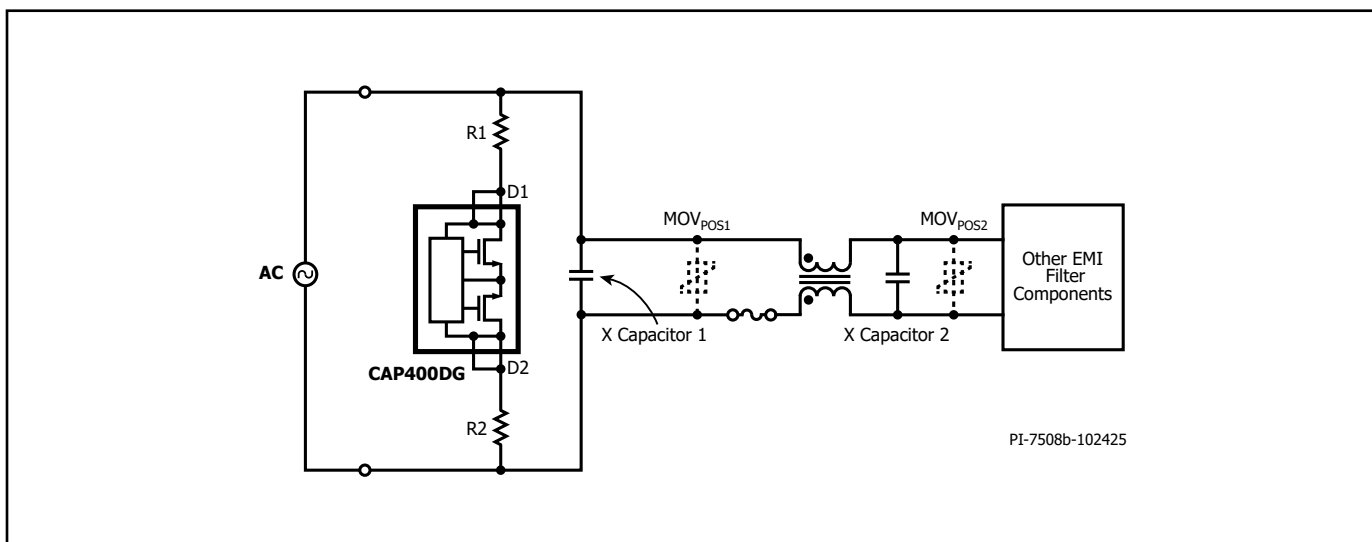


Figure 4. Placement Options for the MOV.

PCB Layout and External Resistor Selection

Figure 6 shows a typical layout to use with a CAP400DG IC. The discharge resistance is provided by R1 and R2 which share the discharge energy, distributing losses during fault conditions (such as a short between D1 and D2).

Resistors R1 and R2 are each rated for 50% of the system input voltage to ensure safe operation during single fault testing.

If lower dissipation or lower voltage across each resistor is required during fault tests, the total external resistance can be divided between additional resistors.

Safety

The CAPZero™-4 IC meets safety requirements even if placed before the system input fuse. If a short-circuit occurs between D1 and D2, the system behaves in the same way as conventional discharge circuits.

It is not possible to create an open circuit fault condition through a single pin fault (such as created during the lifted-pin test) since two pins connected to each of D1 and D2. If several pins are lifted to create an open circuit, the condition is identical to conventional X-capacitor discharge circuits. If redundancy against open circuit faults is required, two CAP400DG ICs and R1 / R2 circuits can be placed in parallel.

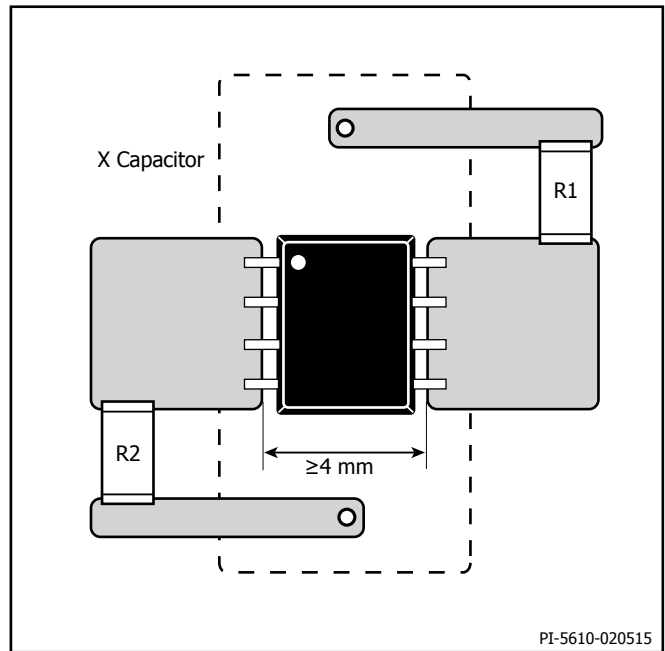


Figure 5. Typical PCB Layout.

Absolute Maximum Ratings⁽⁴⁾

DRAIN Pin Voltage ⁽¹⁾	900 V
DRAIN Peak Current ⁽²⁾	TBD mA
Storage Temperature	-65 °C to 150 °C
Lead Temperature ⁽³⁾	260 °C
Operating Ambient Temperature.....	-40 °C to 125 °C
Maximum Junction Temperature.....	-40 °C to 125 °C

Notes:

1. Voltage of D1 pin relative to D2 pin in either polarity.
2. The peak DRAIN current is allowed while the DRAIN voltage is simultaneously less than 400 V.
3. 1/16 in. from case for 5 seconds.
4. The Absolute Maximum Ratings specified may be applied one at a time without causing permanent damage to the product. Exposure to Absolute Maximum Rating conditions for extended periods of time may affect product reliability.

Thermal ResistanceThermal Resistance: D Package⁽¹⁾:

(θ_{JA}).....	160 °C/W (Single layer JEDEC PCB)
(θ_{JC}).....	40 °C/W (Bottom)
(θ_{JC}).....	75 °C/W (Top)

Notes:

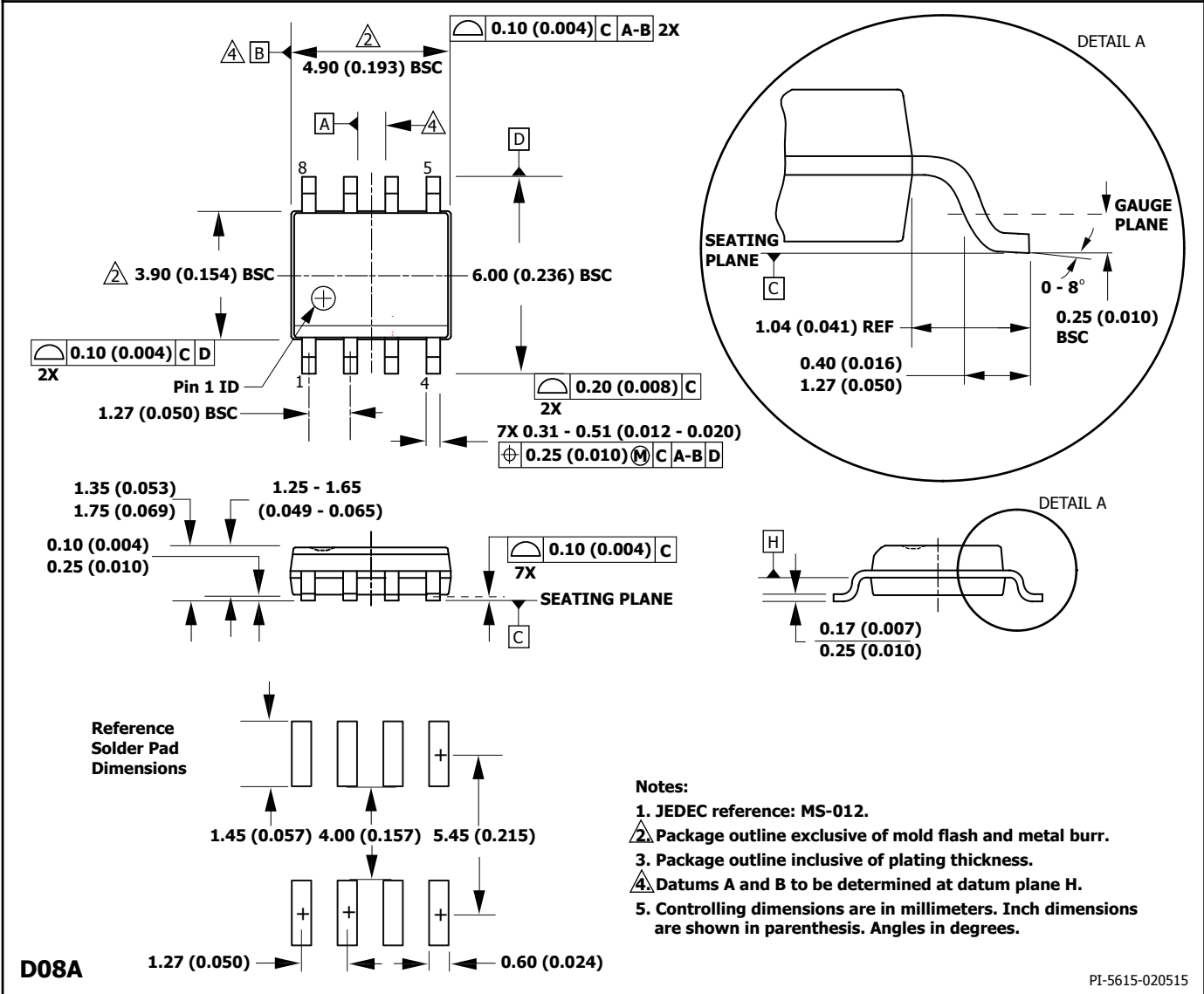
1. Reference thermal resistance test conditions: JEDEC JESD51-3, SEMI Test Method #G43-87, and MIL-STD-883 Method 10121.1.

Parameter	Symbol	Conditions $T_A = -10$ to 125 °C (Unless Otherwise Specified)	Min	Typ	Max	Units
Control Functions						
AC Removal Detection Time	t_{DETECT}	Line Cycle Frequency 47 - 63 Hz		22	TBD	ms
Drain Saturation Current^{A,B}	I_{DSAT}	CAP400DG	5			mA
Supply Current	I_{SUPPLY}	$T_A = 25$ °C		2.5	TBD	μA
Power Consumption	Pin	$T_A = 25$ °C		750		μW

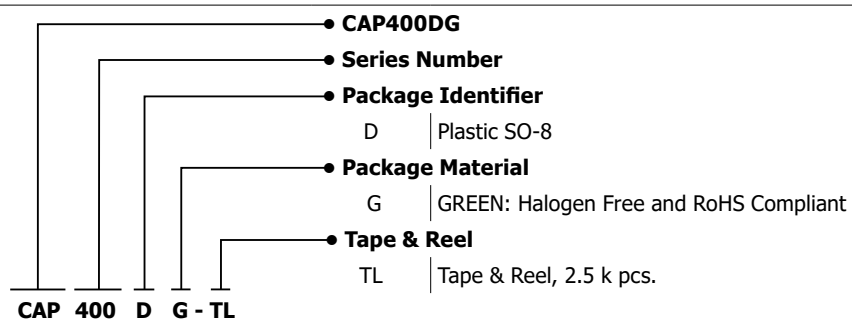
NOTES:

- A. Saturation current specification ensures a RC discharge characteristic at all voltages up to 265 VAC with the external resistor values specified in Table 1.
- B. Specifications are guaranteed by characterization and design.

SO-8 (D Package)



Part Ordering Information



Revision	Notes	Date
1	Preliminary release.	11/25

For the latest updates, visit our website: www.power.com

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