



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** .....: E220248-A6010-CB-1  
**Date of issue**.....: 2019-11-25  
**Total number of pages** .....: 59

**Applicant's name**.....: **TDK-LAMBDA AMERICAS INC**  
**Address** .....: **SUITE 100**  
**3320 MATRIX DR**  
**RICHARDSON TX 75082**  
**UNITED STATES**

**Name of Test Laboratory** .....: UL RTP  
**preparing the Report** .....: 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA



**Test specification:**  
**Standard** .....: IEC 62368-1:2014 (Second Edition)  
**Test procedure** .....: CB Scheme  
**Non-standard test method**.....: N/A


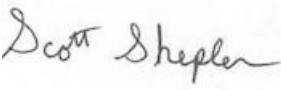
**Test Report Form No.**.....: IEC62368\_1B  
**Test Report Form(s) Originator** .....: UL(US)  
**Master TRF**.....: 2014-03

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



Test Item description	: DC-To-DC Converters
Trade Mark .....	: TDK or TDK-Lambda  
Manufacturer .....	: TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES
Model/Type reference .....	: GQA24***A%%V-xxx -R, (PR); -R indicating RoHS compliance, or -(007) for unpotted or (-0P7) for potted.  Where:  - 24 represents nominal input voltage, with a 18-36 Vdc input, Max Input Current 9 A dc; - *** represents rated output current between 0 A - 2.5 A, *** maybe 1 to 3 digits, note that last digit is preceded by decimal point. - %%% represents rated output voltage, 48 Vdc nominal, Note that the third digit is preceded by a decimal point. Example 120 implies 12.0 Volts. with Max Output Power of 120 W - xxx represents alphanumeric characters which indicates non safety related feature set options - Optional -R indicating RoHS compliance, or (-007) for unpotted, or (-0P7) for potted)  GQA2W***A%%V-xxx-R, (PR); -R indicating RoHS compliance, or -(007) for unpotted or (-0P7) for potted.  Where:  - 2W represents nominal input voltage, with a 9 36 Vdc input, with a Max Input Current of 23 A - *** represents rated output current between 4.28 A - 28 A; *** maybe 1 to 3 digits, note that last digit is preceded by decimal point. - %%% represents rated output voltage between, 5 Vdc -28 Vdc, with Max Output Power of 150 W. Note that the third digit is preceded by a decimal point. Example 120 implies 12.0 Volts. with Max Output Power of 120 W. - xxx represents alphanumeric characters which indicates non safety related feature set options - Optional -R indicating RoHS compliance, or (-007) for unpotted, or (-0P7) for potted)
Ratings .....	: Optional

		Rated Input: 36 VDC Max, 23 A Max Rated output: 48 VDC Max, 28 A Max, 150 W Max.	
Testing procedure and testing location:			
<input checked="" type="checkbox"/>	CB Testing Laboratory:		
Testing location/ address .....		UL RTP, 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA	
Tested by (name + signature).....		Mengis Tesfay / Project Handler	
Approved by (name + signature) .....		Scott Shepler / Reviewer	
<input type="checkbox"/>	Testing procedure: CTF Stage 1		
Testing location/ address.....			
Tested by (name + signature).....			
Approved by (name + signature) .....			
<input checked="" type="checkbox"/>	Testing procedure: CTF Stage 2		
Testing location/ address.....		TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES	
Tested by (name + signature).....		See previously issued VDE CBTR for names, functions, and signatures / --	See previously issued VDE CBTR for names, functions, and signatures
Witnessed by (name + signature).....		See previously issued VDE CBTR for names, functions, and signatures / --	See previously issued VDE CBTR for names, functions, and signatures
Approved by (name + signature) .....		See previously issued VDE CBTR for names, functions, and signatures / --	See previously issued VDE CBTR for names, functions, and signatures
<input type="checkbox"/>	Testing procedure: CTF Stage 3		
<input type="checkbox"/>	Testing procedure: CTF Stage 4		
Testing location/ address.....			
Tested by (name + signature).....			
Witnessed by (name + signature).....			

Approved by (name + signature) .....		
Supervised by (name + signature) .....		

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

National Differences (30 pages)

Enclosures (66 pages)

**Summary of testing:**

**Tests performed (name of test and test clause):**

DETERMINATION OF WORKING VOLTAGE (5.4.1.8)

TESTS FOR SEMICONDUCTOR COMPONENTS AND CEMENTED JOINTS (5.4.7, 5.4.1.5.3)

ELECTRIC STRENGTH TEST (5.4.9)

INPUT TEST: SINGLE PHASE (B.2.5)

NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT (B.2.6)

**Testing Location:**

**CTF Stage 2: TDK-LAMBDA AMERICAS INC  
SUITE 100  
3320 MATRIX DR  
RICHARDSON TX 75082  
UNITED STATES**

Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.

Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.

Testing was conducted per 62368-1. Furthermore tests conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.

Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.

Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No.

SIMULATED ABNORMAL OPERATING  
CONDITIONS (B.3)

60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.

Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.

**Summary of compliance with National Differences:**

**List of countries addressed:** Australia / New Zealand, EU Group and National Differences, Japan, USA / Canada

EU Group and National Differences applies to CENELEC member countries: Austria, Belgium, Bulgaria, Belarus, Switzerland, Serbia, Czech Republic, Germany, Denmark, Spain, Finland, France, United Kingdom, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Sweden, Slovenia, Slovakia, Turkey, Ukraine

**The product fulfils the requirements of:** EN 62368-1:2014 + A11:2017

**Copy of marking plate:**

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



Note: The above markings are the minimum requirements required by the safety lab. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

<b>TEST ITEM PARTICULARS:</b>	
Classification of use by	Instructed person
Supply Connection	External Circuit - not Mains connected ES1
Supply % Tolerance	None
Supply Connection – Type	No direct connection to Mains
Considered current rating of protective device as part of building or equipment installation	N/A, No direct connection to Mains A; N/A
Equipment mobility	for building-in
Over voltage category (OVC)	OVC I
Class of equipment	Not classified
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer’s specified maximum operating ambient (°C)	25
IP protection class	IPX0
Power Systems	N/A
Altitude during operation (m)	2000 m or less
Altitude of test laboratory (m)	App 105 m
Mass of equipment (kg)	0.088
<b>POSSIBLE TEST CASE VERDICTS:</b>	
- 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)
<b>TESTING:</b>	
Date of receipt of test item.....:	2016-08-01, 2019-11-13
Date (s) of performance of tests.....:	2016-08-01 to 2016-09-05, 2019-11-13
<b>GENERAL REMARKS:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.                      "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
<b>Manufacturer’s Declaration per sub-clause 4.2.5 of IEC 60335-1:</b>	



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 ..... :	<input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>
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**When differences exist; they shall be identified in the General product information section.**

<b>Name and address of factory (ies) .....</b> :	TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES  TDK-LAMBDA MALAYSIA SDN BHD PLO33 KAWASAN PERINDUSTRIAN SENAI 81400 SENAI JOHOR MALAYSIA
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**GENERAL PRODUCT INFORMATION:**

**Report Summary**

All applicable tests according to the referenced standard(s) have been carried out.

**Product Description**

The product is a component type DC to DC power module with a planar power transformer. The converter is provided with input terminal pins for factory installation onto a printed wiring board with a connection to a dc source of supply and output terminal pins. The product employs a multilayer PWB planar transformer.

**Model Differences**

The GQA product is available in four mechanical configurations that both use the same transformer core set and output filter inductor core set except for the air gap and number of turns embedded in the pcb. The four mechanical configurations use the same pcb and part set, the difference between them is the physical size of the base plate that is mounted on the unit. One house-keeping transformer is used in GQA platform. The house keep magnetic is used to deliver the drive pulses and bias power across the isolation boundary from secondary to the primary side.

All models are similar except for input rating, output rating, and number of turns for the power transformer.

**Additional application considerations – (Considerations used to test a component or sub-assembly) -**

This report is based on VDE CB report 228393-CI3-1, and its amendments 1, and 2, 242708-CI3-1, 242708-TL4-1 and CB Test Certificate Ref. CB: DE1-57533, DE1-57533/A1, and DE1-57533/A2 respectively which was previously evaluated to UL/CSA/IEC 60950-1, 2nd edition, + Amendment 1, and Amendment 2. Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.

All original sample and test dates are noted in the testing portion of this report. Only Electric Strength test (5.4.9) was repeated to 62368-1 on 2019-11-13.

The nameplate included in the report is representative of all models covered under this report.

### **Technical Considerations**

- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of : 25°C
- The product is intended for use on the following power systems : No direct connection
- Considered current rating of protective device as part of the building installation (A) : N/A. For building in.
- Mains supply tolerance (%) or absolute mains supply values : No direct connection
- The equipment disconnect device is considered to be : N/A
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standards : EN 62368-1:2014 + A11:2017

### **Engineering Conditions of Acceptability**

When installed in an end-product, consideration must be given to the following:

- The following product-line tests are conducted for this product : Electric Strength
- The following output circuits are at ES1 energy levels : All
- The following output circuits are at PS3 energy levels : Output Terminal
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Electrical, Fire
- The output circuit is considered PS3
- Heating Test shall be evaluated in end product.
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/resistive PIS.
- Unit intended for building-in and supplied power from secondary circuit which is isolated from primary circuit by double or reinforced insulation.

<b>ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:</b>	
(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.) (Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.)	
<b>Electrically-caused injury (Clause 5):</b> (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification) Example: +5 V dc input <span style="float: right;">ES1</span>	
Source of electrical energy	Corresponding classification (ES)
Input circuits	ES1
Internal Circuits	ES2
Output circuits	ES1
<b>Electrically-caused fire (Clause 6):</b> (Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts): <span style="float: right;">PS2</span>	
Source of power or PIS	Corresponding classification (PS)
All circuits	PS3 (declared)
<b>Injury caused by hazardous substances (Clause 7)</b> (Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.) Example: Liquid in filled component <span style="float: right;">Glycol</span>	
Source of hazardous substances	Corresponding chemical
N/A	-
<b>Mechanically-caused injury (Clause 8)</b> (Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.) Example: Wall mount unit <span style="float: right;">MS2</span>	
Source of kinetic/mechanical energy	Corresponding classification (MS)
N/A	-
<b>Thermal burn injury (Clause 9)</b> (Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.) Example: Hand-held scanner – thermoplastic enclosure <span style="float: right;">TS1</span>	
Source of thermal energy	Corresponding classification (TS)
All circuits	TS3
<b>Radiation (Clause 10)</b> (Note: List the types of radiation present in the product and the corresponding energy source classification.) Example: DVD – Class 1 Laser Product <span style="float: right;">RS1</span>	
Type of radiation	Corresponding classification (RS)
N/A	-

**ENERGY SOURCE DIAGRAM**

Indicate which energy sources are included in the energy source diagram. Insert diagram below

**ES**     **PS**     **MS**     **TS**     **RS**

<b>OVERVIEW OF EMPLOYED SAFEGUARDS</b>				
<b>Clause</b>	<b>Possible Hazard</b>			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Instructed Person	ES1: Input and Output	N/A	N/A	N/A
Instructed Person	ES2: Internal	Spacing	N/A	Enclosure to be provided in end product
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
All parts of the unit	PS3: All circuits of the unit	Not overheat	PWB rated V-0,	Suitable material Fire Enclosure in the end product
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
N/A	N/A	N/A	N/A	N/A
9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
Instructed person	TS3	N/A	N/A	Suitable material Fire Enclosure to be provided in the end product
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced

N/A	N/A	N/A	N/A	N/A
Supplementary Information:				
(1) See attached energy source diagram for additional details.				
(2) "N" – Normal Condition; "A" – Abnormal Condition; "S" Single Fault				

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>4</b>	<b>GENERAL REQUIREMENTS</b>		Pass
4.1.1	Acceptance of materials, components and subassemblies		Pass
4.1.2	Use of components		Pass
4.1.3	Equipment design and construction		Pass
4.1.15	Markings and instructions .....	(See Annex F)	Pass
4.4.4	Safeguard robustness	Unit is for building in. Additional safeguards to be considered in end product.	Pass
4.4.4.2	Steady force tests .....		N/A
4.4.4.3	Drop tests .....		N/A
4.4.4.4	Impact tests.....		N/A
4.4.4.5	Internal accessible safeguard enclosure and barrier tests .....		N/A
4.4.4.6	Glass Impact tests.....		N/A
4.4.4.7	Thermoplastic material tests .....		N/A
4.4.4.8	Air comprising a safeguard .....		N/A
4.4.4.9	Accessibility and safeguard effectiveness		N/A
4.5	Explosion		N/A
4.6	Fixing of conductors		N/A
4.6.1	Fix conductors not to defeat a safeguard		N/A
4.6.2	10 N force test applied to .....		N/A
4.7	Equipment for direct insertion into mains socket - outlets	Not a direct plug in.	N/A
4.7.2	Mains plug part complies with the relevant standard .....		N/A
4.7.3	Torque (Nm).....		N/A
4.8	Products containing coin/button cell batteries	Product does not contain lithium coin / button cell batteries.	N/A
4.8.2	Instructional safeguard		N/A
4.8.3	Battery Compartment Construction		N/A
	Means to reduce the possibility of children removing the battery .....		—
4.8.4	Battery Compartment Mechanical Tests.....		N/A
4.8.5	Battery Accessibility		N/A
4.9	Likelihood of fire or shock due to entry of conductive object .....	EUT is for building in.	N/A

<b>IEC 62368-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
<b>5</b>	<b>ELECTRICALLY-CAUSED INJURY</b>		Pass
5.2.1	Electrical energy source classifications .....	(See appended table 5.2)	Pass
5.2.2	ES1, ES2 and ES3 limits	Output circuit is classified as ES1.	Pass
5.2.2.2	Steady-state voltage and current.....	See appended table 5.2)	Pass
5.2.2.3	Capacitance limits .....		N/A
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	See overview of employed safeguards table. Unit is for building in. Additional safeguards to be considered in end product.	Pass
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons		Pass
5.3.2.1	Accessibility to electrical energy sources and safeguards	Unit is for building in. Additional safeguards to be considered in end product.	Pass
5.3.2.2	Contact requirements		N/A
	a) Test with test probe from Annex V .....		N/A
	b) Electric strength test potential (V).....		N/A
	c) Air gap (mm) .....		N/A
5.3.2.4	Terminals for connecting stripped wire		N/A
5.4	Insulation materials and requirements		Pass
5.4.1.2	Properties of insulating material	Natural rubber, asbestos or hygroscopic materials are not used.	Pass
5.4.1.3	Humidity conditioning .....		N/A
5.4.1.4	Maximum operating temperature for insulating materials .....	(See appended table 5.4.1.4)	Pass
5.4.1.5	Pollution degree.....	2	—



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
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	See 5.4.7	Pass
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		Pass
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 softening temperature .....		N/A
5.4.1.10.3	Ball pressure .....		N/A
5.4.2	Clearances		Pass
5.4.2.2	Determining clearance using peak working voltage		Pass
5.4.2.3	Determining clearance using required withstand voltage .....	Not connected to Mains, 5.4.2.2 was applicable.	N/A
	a) a.c. mains transient voltage .....		—
	b) d.c. mains transient voltage .....		—
	c) external circuit transient voltage .....		—
	d) transient voltage determined by measurement... : .....		—
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.....		N/A
5.4.3	Creepage distances .....	See table	Pass
5.4.3.1	General		Pass
5.4.3.3	Material Group .....	Material Group IIIb	—
5.4.4	Solid insulation		Pass
5.4.4.2	Minimum distance through insulation .....	Working voltage does not exceed ES2	Pass
5.4.4.3	Insulation compound forming solid insulation		Pass
5.4.4.4	Solid insulation in semiconductor devices		Pass
5.4.4.5	Cemented joints		Pass
5.4.4.6	Thin sheet material	Thin sheet material is not employed	N/A
5.4.4.6.1	General requirements		N/A
5.4.4.6.2	Separable thin sheet material		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Number of layers (pcs) .....		N/A
5.4.4.6.3	Non-separable thin sheet material		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		Pass
5.4.4.9	Solid insulation at frequencies >30 kHz..... :		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
	Insulation resistance (MΩ) .....		—
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		Pass
5.4.8	Humidity conditioning	Hygroscopic material are not used.	N/A
	Relative humidity (%) .....		—
	Temperature (°C) .....		—
	Duration (h) .....		—
5.4.9	Electric strength test..... :	(See appended table 5.4.9)	Pass
5.4.9.1	Test procedure for a solid insulation type test		Pass
5.4.9.2	Test procedure for routine tests		N/A
5.4.10	Protection against transient voltages between external circuit		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
5.4.11	Insulation between external circuits and earthed circuitry .....		N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A
5.4.11.2	Requirements		N/A
	Rated operating voltage $U_{op}$ (V) .....		—
	Nominal voltage $U_{peak}$ (V) .....		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Max increase due to variation $U_{sp}$ .....		—
	Max increase due to ageing $\Delta U_{sa}$ .....		—
	$U_{op} = U_{peak} + \Delta U_{sp} + \Delta U_{sa}$ .....		—
5.5	Components as safeguards		Pass
5.5.1	General		Pass
5.5.2	Capacitors and RC units		Pass
5.5.2.1	General requirement		Pass
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector .....		N/A
5.5.3	Transformers	See G.5.3	Pass
5.5.4	Optocouplers		N/A
5.5.5	Relays		N/A
5.5.6	Resistors		N/A
5.5.7	SPD's		N/A
5.5.7.1	Use of an SPD connected to reliable earthing		N/A
5.5.7.2	Use of an SPD between mains and protective earth		N/A
5.5.8	Insulation between the mains and external circuit consisting of a coaxial cable .....		N/A
5.6	Protective conductor		N/A
5.6.2	Requirement 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	Requirement for protective earthing conductors		N/A
	Protective earthing conductor size ( $mm^2$ ) .....		—
5.6.4	Requirement for protective bonding conductors		N/A
5.6.4.1	Protective bonding conductors		N/A
	Protective bonding conductor size ( $mm^2$ ).....		—
	Protective current rating (A) .....		—
5.6.4.3	Current limiting and overcurrent protective devices		N/A
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Requirement		N/A
	Conductor size ( $mm^2$ ), nominal thread diameter (mm).....		N/A
5.6.5.2	Corrosion		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.6.6	Resistance of the protective system		N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method Resistance ( $\Omega$ ) .....		N/A
5.6.7	Reliable earthing		N/A
5.7	Prospective touch voltage, touch current and protective conductor current		Pass
5.7.2	Measuring devices and networks		Pass
5.7.2.1	Measurement of touch current .....		N/A
5.7.2.2	Measurement of prospective touch voltage	Outputs meet ES1 based on Voltages	Pass
5.7.3	Equipment set-up, supply connections and earth connections		N/A
	System of interconnected equipment (separate connections/single connection) .....		—
	Multiple connections to mains (one connection at a time/simultaneous connections) .....		—
5.7.4	Earthed conductive accessible parts .....		N/A
5.7.5	Protective conductor current		N/A
	Supply Voltage (V) .....		—
	Measured current (mA) .....		—
	Instructional Safeguard .....		N/A
5.7.6	Prospective touch voltage and touch current due to external circuits		N/A
5.7.6.1	Touch current from coaxial cables		N/A
5.7.6.2	Prospective touch voltage and touch current from external circuits		N/A
5.7.7	Summation of touch currents from external circuits		N/A
	a) Equipment with earthed external circuits Measured current (mA) .....		N/A
	b) Equipment whose external circuits are not referenced to earth. Measured current (mA) .....		N/A

<b>6</b>	<b>ELECTRICALLY- CAUSED FIRE</b>		Pass
6.2	Classification of power sources (PS) and potential ignition sources (PIS)		Pass
6.2.2	Power source circuit classifications	All circuits are assumed PS3.	Pass
6.2.2.1	General	(See appended table 6.2.2)	Pass
6.2.2.2	Power measurement for worst-case load fault.....	(See appended table 6.2.2)	Pass

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Clause	Requirement + Test	Result - Remark	Verdict
6.2.2.3	Power measurement for worst-case power source fault .....	(See appended table 6.2.2)	Pass
6.2.2.4	PS1 .....		N/A
6.2.2.5	PS2 .....		N/A
6.2.2.6	PS3 .....	Input, internal and outputs are PS3	Pass
6.2.3	Classification of potential ignition sources	All parts in the internal circuits were considered as Arcing PIS and Resistive PIS.	Pass
6.2.3.1	Arcing PIS .....	All parts in the internal circuits were considered as Arcing PIS and Resistive PIS.	Pass
6.2.3.2	Resistive PIS .....	All parts in the internal circuits were considered as Arcing PIS and Resistive PIS.	Pass
6.3	Safeguards against fire under normal operating and abnormal operating conditions		Pass
6.3.1 (a)	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials .....	(See appended table 5.4.1.5, 6.3.2, 9.0, B.2.6)	Pass
6.3.1 (b)	Combustible materials outside fire enclosure	No combustible material.	N/A
6.4	Safeguards against fire under single fault conditions		Pass
6.4.1	Safeguard Method	“Control fire spread” method applied. The suitability of a fire enclosure should be considered in the end-product.	Pass
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	Additional testing may be considered in an end product.	Pass
6.4.3.1	General		Pass
6.4.3.2	Supplementary Safeguards	Fire enclosure to be provided in the end product.	N/A
	Special conditions if conductors on printed boards are opened or peeled		N/A
6.4.3.3	Single Fault Conditions .....	See B.2	Pass
	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 circuit	The PWB was rated V-1 or better.	Pass
6.4.7	Separation of combustible materials from a PIS		Pass

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Clause	Requirement + Test	Result - Remark	Verdict
6.4.7.1	General .....	PWB min. V-1. Fire enclosure should be considered in the end-product.	Pass
6.4.7.2	Separation by distance		Pass
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers	To be considered in the end application. EUT is for building in	N/A
6.4.8.1	Fire enclosure and fire barrier material properties		N/A
6.4.8.2.1	Requirements for a fire barrier	Provided in the end-product	N/A
6.4.8.2.2	Requirements for a fire enclosure		N/A
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 in Fire Enclosure: dimensions (mm) .....		N/A
	Needle Flame test		N/A
6.4.8.3.4	Bottom Openings in Fire Enclosure, condition met a), b) and/or c) dimensions (mm) .....		N/A
	Flammability tests for the bottom of a fire enclosure .....		N/A
6.4.8.3.5	Integrity of the fire enclosure, condition met: a), b) or c) .....		N/A
6.4.8.4	Separation of PIS from fire enclosure and fire barrier distance (mm) or flammability rating .....		N/A
6.5	Internal and external wiring		N/A
6.5.1	Requirements		N/A
6.5.2	Cross-sectional area (mm <sup>2</sup> ) .....		—
6.5.3	Requirements for interconnection to building wiring .....		N/A
6.6	Safeguards against fire due to connection to additional equipment		N/A
	External port limited to PS2 or complies with Clause Q.1		N/A
<b>7</b>	<b>INJURY CAUSED BY HAZARDOUS SUBSTANCES</b>		N/A
7.2	Reduction of exposure to hazardous substances		N/A
7.3	Ozone exposure		N/A
7.4	Use of personal safeguards (PPE)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Personal safeguards and instructions..... :		—
7.5	Use of instructional safeguards and instructions		N/A
	Instructional safeguard (ISO 7010) ..... :		—
7.6	Batteries ..... :		N/A
<b>8</b>	<b>MECHANICALLY-CAUSED INJURY</b>		N/A
8.1	General		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	Safeguards		N/A
8.5	Safeguards against moving parts		N/A
8.5.1	MS2 or MS3 part required to be accessible for the function of the equipment		N/A
8.5.2	Instructional Safeguard ..... :		—
8.5.4	Special categories of equipment comprising moving parts		N/A
8.5.4.1	Large data storage equipment		N/A
8.5.4.2	Equipment having electromechanical device for destruction of media		N/A
8.5.4.2.1	Safeguards and Safety Interlocks..... :		N/A
8.5.4.2.2	Instructional safeguards against moving parts		N/A
	Instructional Safeguard ..... :		—
8.5.4.2.3	Disconnection from the supply		N/A
8.5.4.2.4	Probe type and force (N)..... :		N/A
8.5.5	High Pressure Lamps		N/A
8.5.5.1	Energy Source Classification		N/A
8.5.5.2	High Pressure Lamp Explosion Test ..... :		N/A
8.6	Stability		N/A
8.6.1	Product classification		N/A
	Instructional Safeguard ..... :		—
8.6.2	Static stability		N/A
8.6.2.2	Static stability test		N/A
	Applied Force..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
8.6.2.3	Downward Force Test		N/A
8.6.3	Relocation stability test		N/A
	Unit configuration during 10° tilt ..... :		—
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test (Applied Force) ..... :		N/A
	Position of feet or movable parts ..... :		—
8.7	Equipment mounted to wall or ceiling		N/A
8.7.1	Mounting Means (Length of screws (mm) and mounting surface) ..... :		N/A
8.7.2	Direction and applied force ..... :		N/A
8.8	Handles strength		N/A
8.8.1	Classification		N/A
8.8.2	Applied Force ..... :		N/A
8.9	Wheels or casters attachment requirements		N/A
8.9.1	Classification		N/A
8.9.2	Applied force..... :		—
8.10	Carts, stands and similar carriers		N/A
8.10.1	General		N/A
8.10.2	Marking and instructions		N/A
	Instructional Safeguard ..... :		—
8.10.3	Cart, stand or carrier loading test and compliance		N/A
	Applied force..... :		—
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Applied horizontal force (N)..... :		—
8.10.6	Thermoplastic temperature stability (°C) ..... :		N/A
8.11	Mounting means for rack mounted equipment		N/A
8.11.1	General		N/A
8.11.2	Product Classification		N/A
8.11.3	Mechanical strength test, variable N ..... :		N/A
8.11.4	Mechanical strength test 250N, including end stops		N/A
8.12	Telescoping or rod antennas ..... :		N/A
	Button/Ball diameter (mm) ..... :		—



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Clause	Requirement + Test	Result - Remark	Verdict
<b>9</b>	<b>THERMAL BURN INJURY</b>		Pass
9.2	Thermal energy source classifications	TS3	Pass
9.3	Safeguard against thermal energy sources	Unit is for building-in - shall be considered in the final end-use	N/A
9.4	Requirements for safeguards		N/A
9.4.1	Equipment safeguard		N/A
9.4.2	Instructional safeguard .....		N/A
<b>10</b>	<b>RADIATION</b>		N/A
10.2	Radiation energy source classification		N/A
10.2.1	General classification		N/A
10.3	Protection against laser radiation		N/A
	Laser radiation that exists in the equipment:		—
	Normal, abnormal, single-fault .....		N/A
	Instructional safeguard.....		—
	Tool .....		—
10.4	Protection against visible, infrared, and UV radiation		N/A
10.4.1	General		N/A
10.4.1.a)	RS3 for Ordinary and instructed persons .....		N/A
10.4.1.b)	RS3 accessible to a skilled person .....		N/A
	Personal safeguard (PPE) instructional safeguard .....		—
10.4.1.c)	Equipment visible, IR, UV does not exceed RS1 .....		N/A
10.4.1.d)	Normal, abnormal, single-fault conditions .....		N/A
10.4.1.e)	Enclosure material employed as safeguard is opaque .....		N/A
10.4.1.f)	UV attenuation .....		N/A
10.4.1.g)	Materials resistant to degradation UV.....		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
10.4.1.h)	Enclosure containment of optical radiation ..... :		N/A
10.4.1.i)	Exempt Group under normal operating conditions ..... :		N/A
10.4.2	Instructional safeguard ..... :		N/A
10.5	Protection against x-radiation		N/A
10.5.1	X- radiation energy source that exists equipment :		N/A
	Normal, abnormal, single fault conditions		N/A
	Equipment safeguards ..... :		N/A
	Instructional safeguard for skilled person ..... :		N/A
10.5.3	Most unfavourable supply voltage to give maximum radiation..... :		—
	Abnormal and single-fault condition..... :		N/A
	Maximum radiation (pA/kg) ..... :		N/A
10.6	Protection against acoustic energy sources		N/A
10.6.1	General		N/A
10.6.2	Classification		N/A
	Acoustic output, dB(A) ..... :		N/A
	Output voltage, unweighted r.m.s. .... :		N/A
10.6.4	Protection of persons		N/A
	Instructional safeguards ..... :		N/A
	Equipment safeguard prevent ordinary person to RS2 ..... :		—
	Means to actively inform user of increase sound pressure ..... :		—
	Equipment safeguard prevent ordinary person to RS2 ..... :		—
10.6.5	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.5.1	Corded passive listening devices with analog input		N/A
	Input voltage with 94 dB(A) $L_{Aeq}$ acoustic pressure output ..... :		—
10.6.5.2	Corded listening devices with digital input		N/A
	Maximum dB(A) ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
10.6.5.3	Cordless listening device		N/A
	Maximum dB(A) .....		—
<b>B</b>	<b>NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS</b>		Pass
B.2	Normal Operating Conditions		Pass
B.2.1	General requirements .....	(See Test Item Particulars and appended test tables)	Pass
	Audio Amplifiers and equipment with audio amplifiers .....		N/A
B.2.3	Supply voltage and tolerances		N/A
B.2.5	Input test .....	(See appended table B.2.5)	Pass
B.3	Simulated abnormal operating conditions		Pass
B.3.1	General requirements .....	(See appended table B.3)	Pass
B.3.2	Covering of ventilation openings	No ventilation openings.	N/A
B.3.3	D.C. mains polarity test	Not DC mains.	N/A
B.3.4	Setting of voltage selector .....		N/A
B.3.5	Maximum load at output terminals .....	See Table B.3	Pass
B.3.6	Reverse battery polarity	No batteries.	N/A
B.3.7	Abnormal operating conditions as specified in Clause E.2.		N/A
B.3.8	Safeguards functional during and after abnormal operating conditions		N/A
B.4	Simulated single fault conditions		Pass
B.4.2	Temperature controlling device open or short-circuited .....		N/A
B.4.3	Motor tests		N/A
B.4.3.1	Motor blocked or rotor locked increasing the internal ambient temperature .....		N/A
B.4.4	Short circuit of functional insulation		Pass
B.4.4.1	Short circuit of clearances for functional insulation		Pass
B.4.4.2	Short circuit of creepage distances for functional insulation		Pass
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 disconnect of passive components		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.4.7	Continuous operation of components		N/A
B.4.8	Class 1 and Class 2 energy sources within limits during and after single fault conditions		N/A
B.4.9	Battery charging under single fault conditions ....:		N/A
<b>C</b>	<b>UV RADIATION</b>		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		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 apparatus		N/A
C.2.4	Xenon-arc light exposure apparatus		N/A
<b>D</b>	<b>TEST GENERATORS</b>		N/A
D.1	Impulse test generators		N/A
D.2	Antenna interface test generator		N/A
D.3	Electronic pulse generator		N/A
<b>E</b>	<b>TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS</b>		N/A
E.1	Audio amplifier normal operating conditions		N/A
	Audio signal voltage (V) ..... :		—
	Rated load impedance ( $\Omega$ ) ..... :		—
E.2	Audio amplifier abnormal operating conditions		N/A
<b>F</b>	<b>EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS</b>		Pass
F.1	General requirements		Pass
	Instructions – Language ..... :	Only English reviewed. EUT is for building in	—
F.2	Letter symbols and graphical symbols		N/A
F.2.1	Letter symbols according to IEC60027-1		N/A
F.2.2	Graphic symbols IEC, ISO or manufacturer specific		N/A
F.3	Equipment markings		Pass
F.3.1	Equipment marking locations		Pass
F.3.2	Equipment identification markings		Pass
F.3.2.1	Manufacturer identification ..... :	Refer to the Model information at the beginning of this Test Report.	—

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.2.2	Model identification .....	Refer to the Rating information at the beginning of this Test Report.	—
F.3.3	Equipment rating markings	Unit intended for building-in. No marking on unit.	N/A
F.3.3.1	Equipment with direct connection to mains		N/A
F.3.3.2	Equipment without direct connection to mains		N/A
F.3.3.3	Nature of supply voltage .....		—
F.3.3.4	Rated voltage .....		—
F.3.3.5	Rated frequency .....		—
F.3.3.6	Rated current or rated power .....	Unit intended for building-in. No marking on unit.	—
F.3.3.7	Equipment with multiple supply connections		N/A
F.3.4	Voltage setting device		N/A
F.3.5	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
F.3.5.4	Replacement battery identification marking .....		N/A
F.3.5.5	Terminal marking location		N/A
F.3.6	Equipment markings related to equipment classification		N/A
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	Neutral conductor terminal		N/A
F.3.6.1.3	Protective bonding conductor terminals		N/A
F.3.6.2	Class II equipment (IEC60417-5172)		N/A
F.3.6.2.1	Class II equipment with or without functional earth		N/A
F.3.6.2.2	Class II equipment with functional earth terminal marking		N/A
F.3.7	Equipment IP rating marking .....		—
F.3.8	External power supply output marking		N/A
F.3.9	Durability, legibility and permanence of marking		N/A
F.3.10	Test for permanence of markings		N/A
F.4	Instructions		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	a) Equipment for use in locations where children not likely to be present - marking		N/A
	b) Instructions given for installation or initial use		N/A
	c) Equipment intended to be fastened in place		N/A
	d) Equipment intended for use only in restricted access area		N/A
	e) Audio equipment terminals classified as ES3 and other equipment with terminals marked in accordance F.3.6.1		N/A
	f) Protective earthing employed as safeguard		N/A
	g) Protective earthing conductor current exceeding ES 2 limits		N/A
	h) Symbols used on equipment		N/A
	i) Permanently connected equipment not provided with all-pole mains switch		N/A
	j) Replaceable components or modules providing safeguard function		N/A
F.5	Instructional safeguards		N/A
	Where "instructional safeguard" is referenced in the test report it specifies the required elements, location of marking and/or instruction		N/A
<b>G</b>	<b>COMPONENTS</b>		Pass
<b>G.1</b>	<b>Switches</b>		N/A
G.1.1	General requirements		N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A
<b>G.2</b>	<b>Relays</b>		N/A
G.2.1	General requirements		N/A
G.2.2	Overload test		N/A
G.2.3	Relay controlling connectors supply power		N/A
G.2.4	Mains relay, modified as stated in G.2		N/A
<b>G.3</b>	<b>Protection Devices</b>		Pass
G.3.1	Thermal cut-offs		N/A
G.3.1.1a) &b)	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)		N/A
G.3.1.1c)	Thermal cut-outs tested as part of the equipment as indicated in c)		N/A
G.3.1.2	Thermal cut-off connections maintained and secure		N/A
G.3.2	Thermal links		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.3.2.1a)	Thermal links separately tested with IEC 60691		N/A
G.3.2.1b)	Thermal links tested as part of the equipment		N/A
	Aging hours (H).....:		—
	Single Fault Condition.....:		—
	Test Voltage (V) and Insulation Resistance (Ω) .:		—
G.3.3	PTC Thermistors		Pass
G.3.4	Overcurrent protection devices		N/A
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.5		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
<b>G.4</b>	<b>Connectors</b>		N/A
G.4.1	Spacings		N/A
G.4.2	Mains connector configuration .....		N/A
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely		N/A
<b>G.5</b>	<b>Wound Components</b>		Pass
G.5.1	Wire insulation in wound components .....		N/A
G.5.1.2 a)	Two wires in contact inside wound component, angle between 45° and 90°		N/A
G.5.1.2 b)	Construction subject to routine testing		N/A
G.5.2	Endurance test on wound components		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Time (s).....:		—
	Temperature (°C) .....		—
G.5.2.3	Wound Components supplied by mains		N/A
<b>G.5.3</b>	<b>Transformers</b>		Pass
G.5.3.1	Requirements applied (IEC61204-7, IEC61558-1/-2, and/or IEC62368-1) .....		N/A
	Position .....		—
	Method of protection .....		—
G.5.3.2	Insulation		N/A
	Protection from displacement of windings .....		—
G.5.3.3	Overload test.....:	(See appended table B.3)	Pass
G.5.3.3.1	Test conditions		Pass

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.5.3.3.2	Winding Temperatures testing in the unit		Pass
G.5.3.3.3	Winding Temperatures - Alternative test method		N/A
<b>G.5.4</b>	<b>Motors</b>		N/A
G.5.4.1	General requirements		N/A
	Position .....		—
G.5.4.2	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) .....		—
G.5.4.5	Running overload test for d.c. motors in secondary circuits		N/A
G.5.4.5.2	Tested in the unit		N/A
	Electric strength test (V).....		—
G.5.4.5.3	Tested on the Bench - Alternative test method; test time (h) .....		N/A
	Electric strength test (V).....		—
G.5.4.6	Locked-rotor overload test for d.c. motors in secondary circuits		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature .....		N/A
	Electric strength test (V) .....		N/A
G.5.4.6.3	Tested on the bench - Alternative test method; test time (h) .....		N/A
	Electric strength test (V).....		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 .....		—
<b>G.6</b>	<b>Wire Insulation</b>		N/A
G.6.1	General		N/A
G.6.2	Solvent-based enamel wiring insulation		N/A
<b>G.7</b>	<b>Mains supply cords</b>		N/A
G.7.1	General requirements		N/A
	Type .....		—
	Rated current (A) .....		—
	Cross-sectional area (mm <sup>2</sup> ), (AWG) .....		—



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Clause	Requirement + Test	Result - Remark	Verdict
G.7.2	Compliance and test method		N/A
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		N/A
G.7.3.2	Cord strain relief		N/A
G.7.3.2.1	Requirements		N/A
	Strain relief test force (N) ..... :		—
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm) ... :		—
G.7.3.2.4	Strain relief comprised of polymeric 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	Mass (g) ..... :		—
	Diameter (m) ..... :		—
	Temperature (°C) ..... :		—
G.7.6	Supply wiring space		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Test with 8 mm strand		N/A
<b>G.8</b>	<b>Varistors</b>		N/A
G.8.1	General requirements		N/A
G.8.2	Safeguard against shock		N/A
G.8.3	Safeguard against fire		N/A
G.8.3.2	Varistor overload test ..... :		N/A
G.8.3.3	Temporary overvoltage ..... :		N/A
<b>G.9</b>	<b>Integrated Circuit (IC) Current Limiters</b>		N/A
G.9.1 a)	Manufacturer defines limit at max. 5A.		N/A
G.9.1 b)	Limiters do not have manual operator or reset		N/A
G.9.1 c)	Supply source does not exceed 250 VA ..... :		—
G.9.1 d)	IC limiter output current (max. 5A) ..... :		—
G.9.1 e)	Manufacturers' defined drift ..... :		—
G.9.2	Test Program 1		N/A
G.9.3	Test Program 2		N/A
G.9.4	Test Program 3		N/A
<b>G.10</b>	<b>Resistors</b>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.10.1	General requirements		N/A
G.10.2	Resistor test		N/A
G.10.3	Test for resistors serving as safeguards between the mains and an external circuit consisting of a coaxial cable		N/A
G.10.3.1	General requirements		N/A
G.10.3.2	Voltage surge test		N/A
G.10.3.3	Impulse test		N/A
<b>G.11</b>	<b>Capacitor and RC units</b>		Pass
G.11.1	General requirements		Pass
G.11.2	Conditioning of capacitors and RC units		N/A
G.11.3	Rules for selecting capacitors		N/A
<b>G.12</b>	<b>Optocouplers</b>		N/A
	Optocouplers comply with IEC 60747-5-5:2007 Spacing or Electric Strength Test (specify option and test results) .....		N/A
	Type test voltage $V_{ini}$ .....		—
	Routine test voltage, $V_{ini,b}$ .....		—
<b>G.13</b>	<b>Printed boards</b>		Pass
G.13.1	General requirements		Pass
G.13.2	Uncoated printed boards		Pass
G.13.3	Coated printed boards		N/A
G.13.4	Insulation between conductors on the same inner surface		Pass
	Compliance with cemented joint requirements (Specify construction) .....	Traces of the input circuit and secondary output circuit on the same inner surface of the PWB have been evaluated to the requirement of cemented joint.	—
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.13.6.2a)	Thermal conditioning		N/A
G.13.6.2b)	Electric strength test		N/A
G.13.6.2c)	Abrasion resistance test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
<b>G.14</b>	<b>Coating on components terminals</b>		N/A
G.14.1	Requirements .....		N/A
<b>G.15</b>	<b>Liquid filled components</b>		N/A
G.15.1	General requirements		N/A
G.15.2	Requirements		N/A
G.15.3	Compliance and test methods		N/A
G.15.3.1	Hydrostatic pressure test		N/A
G.15.3.2	Creep resistance test		N/A
G.15.3.3	Tubing and fittings compatibility test		N/A
G.15.3.4	Vibration test		N/A
G.15.3.5	Thermal cycling test		N/A
G.15.3.6	Force test		N/A
G.15.4	Compliance		N/A
<b>G.16</b>	<b>IC including capacitor discharge function (ICX)</b>		N/A
G.16 a)	Humidity treatment in accordance with sc 5.4.8 – 120 hours		N/A
G.16 b)	Impulse test using circuit 2 with $U_c =$ to transient voltage .....		N/A
G.16 C1)	Application of ac voltage at 110% of rated voltage for 2.5 minutes		N/A
G.16 C2)	Test voltage .....		—
G.16 D1)	10,000 cycles on and off using capacitor with smallest capacitance resistor with largest resistance specified by manufacturer		N/A
G.16 D2)	Capacitance .....		—
G.16 D3)	Resistance .....		—
<b>H</b>	<b>CRITERIA FOR TELEPHONE RINGING SIGNALS</b>		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 current (mA): .....		—
H.3.2	Tripping device and monitoring voltage .....		N/A

<b>IEC 62368-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
H.3.2.1	Conditions for use of a tripping device or a monitoring voltage complied with		N/A
H.3.2.2	Tripping device		N/A
H.3.2.3	Monitoring voltage (V).....:		—
<b>J</b>	<b>INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION</b>		N/A
	General requirements		N/A
<b>K</b>	<b>SAFETY INTERLOCKS</b>		N/A
K.1	General requirements		N/A
K.2	Components of safety interlock safeguard mechanism .....		N/A
K.3	Inadvertent change of operating mode		N/A
K.4	Interlock safeguard override		N/A
K.5	Fail-safe		N/A
	Compliance .....		N/A
K.6	Mechanically operated safety interlocks		N/A
K.6.1	Endurance requirement		N/A
K.6.2	Compliance and Test method.....:		N/A
K.7	Interlock circuit isolation		N/A
K.7.1	Separation distance for contact gaps & interlock circuit elements (type and circuit location) .....		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
<b>L</b>	<b>DISCONNECT DEVICES</b>		N/A
L.1	General requirements		N/A
L.2	Permanently connected equipment		N/A
L.3	Parts that remain energized		N/A
L.4	Single phase equipment		N/A
L.5	Three-phase equipment		N/A
L.6	Switches as disconnect devices		N/A
L.7	Plugs as disconnect devices		N/A
L.8	Multiple power sources		N/A
<b>M</b>	<b>EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS</b>		N/A
M.1	General requirements		N/A
M.2	Safety of batteries and their cells		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
M.2.1	Requirements		N/A
M.2.2	Compliance and test method (identify method) .. :		N/A
M.3	Protection circuits		N/A
M.3.1	Requirements		N/A
M.3.2	Tests		N/A
	- Overcharging of a rechargeable battery		N/A
	- Unintentional charging of a non-rechargeable battery		N/A
	- Reverse charging of a rechargeable battery		N/A
	- Excessive discharging rate for any battery		N/A
M.3.3	Compliance .....		N/A
M.4	Additional safeguards for equipment containing secondary lithium battery		N/A
M.4.1	General		N/A
M.4.2	Charging safeguards		N/A
M.4.2.1	Charging operating limits		N/A
M.4.2.2a)	Charging voltage, current and temperature .....		—
M.4.2.2 b)	Single faults in charging circuitry .....		—
M.4.3	Fire Enclosure		N/A
M.4.4	Endurance of equipment containing a secondary lithium battery		N/A
M.4.4.2	Preparation		N/A
M.4.4.3	Drop and charge/discharge function tests		N/A
	Drop		N/A
	Charge		N/A
	Discharge		N/A
M.4.4.4	Charge-discharge cycle test		N/A
M.4.4.5	Result of charge-discharge cycle test		N/A
M.5	Risk of burn due to short circuit during carrying		N/A
M.5.1	Requirement		N/A
M.5.2	Compliance and Test Method (Test of P.2.3)		N/A
M.6	Prevention of short circuits and protection from other effects of electric current		N/A
M.6.1	Short circuits		N/A
M.6.1.1	General requirements		N/A
M.6.1.2	Test method to simulate an internal fault		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
M.6.1.3	Compliance (Specify M.6.1.2 or alternative method) .....		N/A
M.6.2	Leakage current (mA) .....		N/A
M.7	Risk of explosion from lead acid and NiCd batteries		N/A
M.7.1	Ventilation preventing explosive gas concentration		N/A
M.7.2	Compliance and test method		N/A
M.8	Protection against internal ignition from external spark sources of lead acid batteries		N/A
M.8.1	General requirements		N/A
M.8.2	Test method		N/A
M.8.2.1	General requirements		N/A
M.8.2.2	Estimation of hypothetical volume $V_z$ (m <sup>3</sup> /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 (Determination of compliance: inspection, data review; or abnormal testing) .....		N/A
<b>N</b>	<b>ELECTROCHEMICAL POTENTIALS</b>		N/A
	Metal(s) used .....		—
<b>O</b>	<b>MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES</b>		N/A
	Figures O.1 to O.20 of this Annex applied.....		—
<b>P</b>	<b>SAFEGUARDS AGAINST ENTRY OF FOREIGN OBJECTS AND SPILLAGE OF INTERNAL LIQUIDS</b>		N/A
P.1	General requirements		N/A
P.2.2	Safeguards against entry of foreign object		N/A
	Location and Dimensions (mm) .....		—
P.2.3	Safeguard against the consequences of entry of foreign object		N/A
P.2.3.1	Safeguards against the entry of a foreign object		N/A
	Openings in transportable equipment		N/A
	Transportable equipment with metalized plastic parts .....		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
P.2.3.2	Openings in transportable equipment in relation to metallized parts of a barrier or enclosure (identification of supplementary safeguard) ..... :		N/A
P.3	Safeguards against spillage of internal liquids		N/A
P.3.1	General requirements		N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Safeguards effectiveness		N/A
P.4	Metallized coatings and adhesive securing parts		N/A
P.4.2 a)	Conditioning testing		N/A
	Tc (°C)..... :		—
	Tr (°C) ..... :		—
	Ta (°C) ..... :		—
P.4.2 b)	Abrasion testing ..... :		N/A
P.4.2 c)	Mechanical strength testing ..... :		N/A
<b>Q</b>	<b>CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING</b>		N/A
Q.1	Limited power sources		N/A
Q.1.1 a)	Inherently limited output		N/A
Q.1.1 b)	Impedance limited output		N/A
	- Regulating network limited output under normal operating and simulated single fault condition		N/A
Q.1.1 c)	Overcurrent protective device limited output		N/A
Q.1.1 d)	IC current limiter complying with G.9		N/A
Q.1.2	Compliance and test method		N/A
Q.2	Test for external circuits – paired conductor cable		N/A
	Maximum output current (A) ..... :		—
	Current limiting method..... :		—
<b>R</b>	<b>LIMITED SHORT CIRCUIT TEST</b>		N/A
R.1	General requirements		N/A
R.2	Determination of the overcurrent protective device and circuit		N/A
R.3	Test method Supply voltage (V) and short-circuit current (A). ..... :		N/A
<b>S</b>	<b>TESTS FOR RESISTANCE TO HEAT AND FIRE</b>		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

<b>IEC 62368-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	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) .....		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	Test specimen does not show any additional hole		N/A
S.3	Flammability test for the bottom of a fire enclosure		N/A
	Samples, material .....		—
	Wall thickness (mm) .....		—
	Cheesecloth did not ignite		N/A
S.4	Flammability classification of materials		N/A
S.5	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material .....		—
	Wall thickness (mm) .....		—
	Conditioning (test condition), (°C).....		—
	Test flame according to IEC 60695-11-20 with conditions as set out		N/A
	After every test specimen was not consumed completely		N/A
	After fifth flame application, flame extinguished within 1 min		N/A
<b>T</b>	<b>MECHANICAL STRENGTH TESTS</b>		N/A
T.1	General requirements		N/A
T.2	Steady force test, 10 N .....		N/A



<b>IEC 62368-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
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	Impact Test (glass)		N/A
T.9.1	General requirements		N/A
T.9.2	Impact test and compliance		N/A
	Impact energy (J) .....		—
	Height (m).....		—
T.10	Glass fragmentation test.....		N/A
T.11	Test for telescoping or rod antennas		N/A
	Torque value (Nm) .....		—
<b>U</b>	<b>MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION</b>		N/A
U.1	General requirements		N/A
U.2	Compliance and test method for non-intrinsically protected CRTs		N/A
U.3	Protective Screen .....		N/A
<b>V</b>	<b>DETERMINATION OF ACCESSIBLE PARTS (FINGERS, PROBES AND WEDGES)</b>		N/A
V.1	Accessible parts of equipment		N/A
V.2	Accessible part criterion		N/A

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

4.1.2	TABLE: List of critical components					Pass
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>	
Printed Wiring Board	First Hi Tec Enterprise Co. Ltd	HL11-V0	PWB rated V-0, 130 C, Multiple layered PWB. (Subjected to Cemented Joint Test)	UL 796, UL/CUL/IEC 62368-1	UL , --	
Alternate Printed Wiring Board	Interchangeable	Interchangeable	Rated minimum V-0, 130°C. Multiple layered PWB.	UL 796, UL/CUL/IEC 62368-1	UL , --	
Main Isolation transformer (Mech 10) PWB Planar type	Interchangeable	Interchangeable	Rated minimum V-0, 130°C.	UL 796, UL/CUL/IEC 62368-1	UL , --	
Label	Identco International Corp	TTL139-401-10	10 Max temperature 175°C, Indoor use only	UL 969, IEC 62368-1. Evaluated under this investigation under E220248-A6002	UL , --	
Bias Transformer (T1)	Pulse	PA3493NL	Rated 130°C.	Evaluated under this component evaluation. UL/CSA/IEC 60950-1, UL/CUL/IEC 62368-1	-- , --	
Bias Transformer (T1) - Alternate	Interchangeable	Interchangeable	Rated 130°C.	Evaluated under this component evaluation. UL/CSA/IEC 60950-1, UL/CUL/IEC 62368-1	-- , --	
PTC Thermistor (RT1)	Murata	PRF15BA471+ ++++ (+ - can be any letter or number)	Rated 32 Vdc, 125°C.	UL 1434, EN 60738-1:2006+A1	UL , TUV (R 50201054)	

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

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>
05a. PTC Thermistor (RT1) - Alternate	Interchangeable	Interchangeable	Rated 32 Vdc, 125°C.	UL 1434, EN 60738-1:2006+A1	UL , Any NCB
06. Capacitor (C555) (optional)	Kemet	C1812C103K GRACTU	Rated 2000 V min.	Evaluated under this component evaluation. UL/CSA/IEC 60950-1, UL/CUL/IEC 62368-1	-- , --
06a. Capacitor (C555) (optional) - Alternate	Interchangeable	Interchangeable	Rated 2000 V min.	Evaluated under this component evaluation. UL/CSA/IEC 60950-1, UL/CUL/IEC 62368-1	-- , --
07. Capacitor (C566)	Kemet	C1808C102K HRACTU	Rated 3000 V min.	Evaluated under this component evaluation. UL/CSA/IEC 60950-1, UL/CUL/IEC 62368-1	-- , --
07a. Capacitor (C566) - Alternate	Interchangeable	Interchangeable	Rated 3000 V min.	Evaluated under this component evaluation. UL/CSA/IEC 60950-1, UL/CUL/IEC 62368-1	-- , --
08. Baseplate (Heatsink)	Interchangeable	Interchangeable	Aluminium. See Enclosure	Evaluated under this component evaluation. UL/CSA/IEC 60950-1, UL/CUL/IEC 62368-1	-- , --

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

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>
09. Case (optional)	Interchangeable	Interchangeable	Rated min. V-2 at min thickness. See Enclosure	Evaluated under this component evaluation. UL/CSA/IEC 60950-1, UL/CUL/IEC 62368-1	UL , --
10. Potting Compound (optional)	Interchangeable	Interchangeable	Rated min. V-2, minimum 105°C.	Evaluated under this component evaluation. UL/CSA/IEC 60950-1, UL/CUL/IEC 62368-1	UL , --

Supplementary information:

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

4.8.4, 4.8.5	<b>TABLE: Lithium coin/button cell batteries mechanical tests</b>		N/A
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**(The following mechanical tests are conducted in the sequence noted.)**

4.8.4.2	<b>TABLE: Stress Relief test</b>		—
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Part	Material	Oven Temperature (°C)	Comments

4.8.4.3	<b>TABLE: Battery replacement test</b>		—
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Battery part no. .... :			
-------------------------	--	--	--

Battery Installation/withdrawal	Battery Installation/Removal Cycle	Comments
	1	
	2	
	3	
	4	
	5	
	6	
	8	
	9	
	10	

4.8.4.4	<b>TABLE: Drop test</b>		—
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Impact Area	Drop Distance	Drop No.	Observations
		1	
		2	
		3	

4.8.4.5	<b>TABLE: Impact</b>		—
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Impacts per surface	Surface tested	Impact energy (Nm)	Comments

4.8.4.6	<b>TABLE: Crush test</b>		—
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Test position	Surface tested	Crushing Force (N)	Duration force applied (s)

Supplementary information:

4.8.5	<b>TABLE: Lithium coin/button cell batteries mechanical test result</b>		N/A
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IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
Test position	Surface tested	Force (N)	Duration force applied (s)
Supplementary information:			

<b>5.2</b>	<b>Table: Classification of electrical energy sources</b>	Pass
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5.2.2.2 – Steady State Voltage and Current conditions

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				U (Vrms or Vpk)	I (A <sub>pk</sub> or A <sub>rms</sub> )	Hz	
1, All Models	36 VDC	Input	Normal	36 VDC	23 A	DC	ES1
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	
2, All Models	36 VDC	Output	Normal	48 VDC	28 A	DC	ES1
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

5.2.2.3 - Capacitance Limits

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters		ES Class
				Capacitance, nF	Upk (V)	
			Normal			
			Abnormal			
			Single fault – SC/OC			

5.2.2.4 - Single Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Duration (ms)	Upk (V)	Ip <sub>k</sub> (mA)	
			Normal				
			Abnormal				
			Single fault – SC/OC				

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

<b>5.2</b>	<b>Table: Classification of electrical energy sources</b>	Pass
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5.2.2.5 - Repetitive Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Off time (ms)	Upk (V)	l <sub>pk</sub> (mA)	
			Normal				
			Abnormal				
			Single fault – SC/OC				

Test Conditions:  
 Normal –  
 Abnormal -  
 Supplementary information: SC=Short Circuit, OC=Open Circuit

IEC 62368-1						
Clause	Requirement + Test	Result - Remark			Verdict	
<b>5.4.1.4, 6.3.2, 9.0, B.2.6</b>	<b>TABLE: Temperature measurements</b>					Pass
	Supply voltage (V) .....	9.0 VDC	28.0 VDC	36.0 VDC	--	—
	Ambient T <sub>min</sub> (°C) .....	22.5	23.7	22.1	--	—
	Ambient T <sub>max</sub> (°C) .....	23.7	24.2	22.8	--	—
	T <sub>ma</sub> (°C) .....	25.0	25.0	25.0	--	—
Maximum measured temperature T of part/at:		T (°C)				Allowed T <sub>max</sub> (°C)
RT1 Pin 2		75.8	73.2	84.3	--	125
C555 Body		53.5	54.7	59.4	--	120
MECH 10 core		69.9	71.5	77.5	--	125
MECH 11 core		65.7	71.5	79.5	--	125
IC2 Body		55.1	56.4	61.4	--	120
C566 body		51.2	54.6	59.6	--	120
L2 Core		75.9	69.1	78.0	--	125
Q15 Drain		87.4	89.9	104.8	--	130
Q17 Drain		73.6	74.1	85.5	--	130
C558 Body		76.4	77.4	89.4	--	120
T1 Body		51.6	48.2	57.3	--	120
Q2 Drain		74.7	73.3	82.8	--	130
Q3 Drain		73.1	76.8	86.5	--	130
CR2 body		62.0	69.1	76.8	--	125
PB Primary side		69.3	69.9	79.7	--	130
MECH 10 Winding (PWB)		74.3	72.7	85.0	--	130
--		--	--	--	--	--
		Overload	Short Circuit	--	--	--
Supply Voltage		36.0 VDC(*)	36.0 VDC	--	--	--
Ambient T min		23.2	23.5	--	--	--
Ambinet T max		24.8	24.6	--	--	--
RT1 Pin 2		128.8	24.9	--	--	--
C555 Body		86.9	24.4	--	--	--
MECH 10 core		120.5	24.6	--	--	--
MECH 11 core		119.7	24.7	--	--	--
IC2 Body		83.2	24.5	--	--	--



IEC 62368-1							
Clause	Requirement + Test			Result - Remark			Verdict
C566 body	85.4	24.7	--	--	--	--	--
L2 Core	118	25.0	--	--	--	--	--
Q15 Drain	172.2	25.2	--	--	--	--	--
Q17 Drain	129.4	25.1	--	--	--	--	--
C558 Body	138.1	25.0	--	--	--	--	--
T1 Body	76.8	24.5	--	--	--	--	--
Q2 Drain	124.6	25.0	--	--	--	--	--
Q3 Drain	134.2	25.1	--	--	--	--	--
CR2 body	114.4	24.7	--	--	--	--	--
PB Primary side	118.9	24.8	--	--	--	--	--
MECH 10 Winding (PWB)	129.7	24.7	--	--	--	--	--
Supplementary information:							
(*) Oerload test was conducted at 15.0 VDC, 13.7 A output load. Full load is at 10.0 A (150 W power ratings.							
Temperature T of winding:	t <sub>1</sub> (°C)	R <sub>1</sub> (Ω)	t <sub>2</sub> (°C)	R <sub>2</sub> (Ω)	T (°C)	Allowed T <sub>max</sub> (°C)	Insulation class
Supplementary information:							
Note 1: Tma should be considered as directed by applicable requirement							
Note 2: Tma is not included in assessment of Touch Temperatures (Clause 9)							

5.4.1.10.2	TABLE: Vicat softening temperature of thermoplastics						N/A
Penetration (mm).....:							—
Object/ Part No./Material	Manufacturer/t rademark		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	Test temperature (°C)	Impression diameter (mm)		
Supplementary information:					

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

<b>5.4.2.2, 5.4.2.4 and 5.4.3</b>	<b>TABLE: Minimum Clearances/Creepage distance</b>						Pass
Clearance (cl) and creepage distance (cr) at/of/between:	Up (V)	U r.m.s. (V)	Frequency (kHz) <sup>1</sup>	Required cl (mm)	cl (mm) <sup>2</sup>	Required <sup>3</sup> cr (mm)	cr (mm)
Primary to Secondary	178.1	52.03	<30 KHz	0.2	2.03	1.25	2.03
Supplementary information:							
Note 1: Only for frequency above 30 kHz							
Note 2: See table 5.4.2.4 if this is based on electric strength test							
Note 3: Provide Material Group							

<b>5.4.2.3</b>	<b>TABLE: Minimum Clearances distances using required withstand voltage</b>						N/A
<b>Overvoltage Category (OV):</b>							
<b>Pollution Degree:</b>							
Clearance distanced between:	Required withstand voltage	Required cl (mm)	Measured cl (mm)				
Supplementary information:							

<b>5.4.2.4</b>	<b>TABLE: Clearances based on electric strength test</b>						N/A
Test voltage applied between:	Required cl (mm)	Test voltage (kV) peak/ r.m.s. / d.c.	Breakdown Yes / No				
Supplementary information:							

<b>5.4.4.2, 5.4.4.5 c) 5.4.4.9</b>	<b>TABLE: Distance through insulation measurements</b>						Pass
Distance through insulation di at/of:	Peak voltage (V)	Frequency (kHz)	Material	Required DTI (mm)	DTI (mm)		
Multi-layer planar transformer		<30 KHz	PWB	--	--		
Supplementary information:							
Basic Insulation Provided. No minimum distance through insulation specified.							

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

5.4.9	TABLE: Electric strength tests			Pass
Test voltage applied between:	Voltage shape (AC, DC)	Test voltage (V)	Breakdown Yes / No	
Functional:				
Basic/supplementary:				
Input Pins 1-3 to Output Pins 4-8, Potted unit (sample P0014)	DC	3000	NO	
Input Pins 1-3, Output Pins 4-8, to base plate Potted unit (sample P0014)	DC	2250	NO	
Input Pins 1-3 to Output Pins 4-8, Un-Potted unit (sample P0012)	DC	2250	NO	
Input Pins 1-3, Output Pins 4-8, to base plate Un-Potted unit (sample P0012)	DC	1500	NO	
Input Pins 1-3 to Output Pins 4-8, Un-Potted unit, GQA2W010A120V-007-R) (Per 62368-1)	DC	2250	NO	
Input Pins 1-3 to Output Pins 4-8, Un-Potted unit Reverse polarity. GQA2W010A120V-007-R) (Per 62368-1)	DC	2250	NO	
Reinforced:				
Routine Tests:				
Supplementary information:				
2250 DC potential is applied per client request which is higher than 430 VDC per table 27, of 62368-1.				

5.5.2.2	TABLE: Stored discharge on capacitors					N/A
Supply Voltage (V), Hz	Test Location	Operating Condition (N, S)	Switch position On or off	Measured Voltage (after 2 seconds)	ES Classification	
Supplementary information:						

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

X-capacitors installed for testing are:

bleeding resistor rating:

ICX:

Notes:

A. Test Location:

Phase to Neutral; Phase to Phase; Phase to Earth; and/or Neutral to Earth

B. Operating condition abbreviations:

N – Normal operating condition (e.g., normal operation, or open fuse); S –Single fault condition

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

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

<b>5.7.2.2, 5.7.4</b>	<b>TABLE: Earthed accessible conductive part</b>		N/A
Supply voltage .....			—
Location	Test conditions specified in 6.1 of IEC 60990 or Fault Condition No in IEC 60990 clause 6.2.2.1 through 6.2.2.8, except for 6.2.2.7		Touch current (mA)
	1		
	2*		
	3		
	4		
	5		
	6		
	8		
Supplementary Information:			
Notes:			
[1] Supply voltage is the anticipated maximum Touch Voltage			
[2] Earthed neutral conductor [Voltage differences less than 1% or more]			
[3] Specify method used for measurement as described in IEC 60990 sub-clause 4.3			
[4] IEC60990, sub-clause 6.2.2.7, Fault 7 not applicable.			
[5] (*) IEC60990, sub-clause 6.2.2.2 is not applicable if switch or disconnect device (e.g., appliance coupler) provided.			

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

6.2.2	Table: Electrical power sources (PS) measurements for classification					Pass
Source	Description	Measurement	Max Power after 3 s	Max Power after 5 s <sup>*</sup>	PS Classification	
All circuits	--	Power (W) :	--	--	PS3 (To be employed in an end product)	
		V <sub>A</sub> (V) :	--	--		
		I <sub>A</sub> (A) :	--	--		
Supplementary Information:						
(*) Measurement taken only when limits at 3 seconds exceed PS1 limits						

6.2.3.1	Table: Determination of Potential Ignition Sources (Arcing PIS)				Pass
Location	Open circuit voltage After 3 s (V <sub>p</sub> )	Measured r.m.s current (I <sub>rms</sub> )	Calculated value (V <sub>p</sub> x I <sub>rms</sub> )	Arcing PIS? Yes / No	
All circuits	--	--	--	Yes. To be addressed in the end product	
Supplementary information:					
An Arcing PIS requires a minimum of 50 V (peak) a.c. or d.c. An Arcing PIS is established when the product of the open circuit voltage (V <sub>p</sub> ) and normal operating condition rms current (I <sub>rms</sub> ) is greater than 15.					

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

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

8.5.5	TABLE: High Pressure Lamp			N/A
Description	Values	Energy Source Classification		
Lamp type .....		—		
Manufacturer .....		—		
Cat no. ....		—		
Pressure (cold) (MPa) .....		MS_		
Pressure (operating) (MPa) .....		MS_		
Operating time (minutes) .....		—		
Explosion method .....		—		
Max particle length escaping enclosure (mm) .:		MS_		
Max particle length beyond 1 m (mm).....:		MS_		
Overall result .....				
Supplementary information:				

B.2.5	TABLE: Input test								Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status	
9.0 V	DC	18.5	23.0	166.2	--	N/A	N/A	MNL = 10 A, 15 VDC	
28.0 V	DC	6.0	23.0	167.1	--	N/A	N/A	MNL = 10 A, 15 VDC	
36.0 V	DC	4.7	23.0	169.5	--	N/A	N/A	MNL = 10 A, 15 VDC	
Supplementary information:									
Equipment may be have rated current or rated power or both. Both should be measured									

B.3	TABLE: Abnormal operating condition tests								Pass
Ambient temperature (°C) .....						26.6		—	
Power source for EUT: Manufacturer, model/type, output rating ..:						--		—	
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation	
Output Pins 4 to Pin 8	Short	36 VDC	62 min	--	--	--	--	Unit is functional. And no protection model is activated, NB, NC	

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

B.3		TABLE: Abnormal operating condition tests						Pass
Ambient temperature (°C) .....		26.6						—
Power source for EUT: Manufacturer, model/type, output rating ..:		--						—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Outputs Pins 4 to 8	Over Load	36 VDC	32 min	--	--	--	--	Unit goes to no output current instantly, and back up once short is released. NC, CT, NB
Supplementary information:								
Tests are conducted in a wind tunnel with forced air flow at 22 LFM. No thermal protection. Unit is operated with baseplate Test table is provided to record abnormal and fault conditions for all applicable energy sources including Thermal burn injury. Column "Abnormal/Fault." Specify if test condition by indicating "Abnormal" then the condition for a Clause B.3 test or "Single Fault" then the condition for Clause B.4.								

B.4		TABLE: Fault condition tests						Pass
Ambient temperature (°C) .....		--						—
Power source for EUT: Manufacturer, model/type, output rating ..:		--						—
Component No.	Fault Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
--	--	--	--	--	--	--	--	--
Supplementary information:								
No fault testing was considered necessary.								



<b>IEC 62368-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict

<b>Annex M</b>	<b>TABLE: Batteries</b>								N/A
The tests of Annex M are applicable only when appropriate battery data is not available									
Is it possible to install the battery in a reverse polarity position? .....									
	Non-rechargeable batteries			Rechargeable batteries					
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging	
	Meas. current	Manuf. Specs.		Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.
Max. current during normal condition									
Max. current during fault condition									
Test results:									
- Chemical leaks									
- Explosion of the battery									
- Emission of flame or expulsion of molten metal									
- Electric strength tests of equipment after completion of tests									
Supplementary information:									

<b>Annex M.4</b>	<b>Table: Additional safeguards for equipment containing secondary lithium batteries</b>						N/A
Battery/Cell No.	Test conditions	Measurements			Observation		
		U	I (A)	Temp (°C)			
	Normal						
	Abnormal						
	Single fault –SC/OC						
Supplementary Information:							
Battery identification	Charging at T <sub>lowest</sub> (°C)	Observation	Charging at T <sub>highest</sub> (°C)	Observation			
Supplementary Information:							

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

<b>Annex Q.1</b>	<b>TABLE: Circuits intended for interconnection with building wiring (LPS)</b>		N/A
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Note: Measured UOC (V) with all load circuits disconnected:

Output Circuit	Components	U <sub>oc</sub> (V)	I <sub>sc</sub> (A)		S (VA)	
			Meas.	Limit	Meas.	Limit

Supplementary Information:

SC=Short circuit, OC=Open circuit

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

Supplementary information:

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

Supplementary information:

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

Supplementary information:

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

Supplementary information:

**List of test equipment used:**

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to CTF stage 1 or CTF stage 2 procedure has been used.

Clause	Measurement / testing	Testing / measuring equipment / material used	Range used	Calibration date
Test equipment list attached as part of enclosure under Miscellaneous.				

**Enclosure**  
**National Differences**

Australia / New Zealand

EU Group and National Differences

Japan

USA / Canada

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62368-1 (AUSTRALIA / NEW ZEALAND) NATIONAL DIFFERENCES (Audio/video, information and communication technology equipment)	
Differences according to	AS/NZS 62368.1:2018
Attachment Form No.	AU_NZ_ND_IEC62368_1B
Attachment Originator	JAS-ANZ
Master Attachment	2019-02-04
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NATIONAL DIFFERENCES		Pass
Appendix ZZ	Variations to IEC 62368-1:2014 (ED. 2.0) for Australia and New Zealand	Pass
ZZ1 Scope	This Appendix lists the normative variations to IEC 62368-1:2014 (ED. 2.0)	Pass
ZZ2 Variations	The following modifications are required for Australian/New Zealand conditions:	Pass
2	Add the following to the list of normative references: The following normative documents are referenced in Appendix ZZ: -AS/NZS 3112, <i>Approval and test specification—Plugs and socket-outlets</i> -AS/NZS 3123, <i>Approval and test specification—Plugs, socket-outlets and couplers for general industrial application</i> -AS/NZS 3191, <i>Electric flexible cords</i> -AS/NZS 60065, <i>Audio, video and similar electronic apparatus—Safety requirements (IEC 60065:2015 (ED.8.0) MOD)</i> -AS/NZS 60320.1, <i>Appliance couplers for household and similar general purposes, Part 1: General requirements (IEC 60320-1, Ed.2.1 (2007) MOD)</i> -AS/NZS 60320.2.2, <i>Appliance couplers for household and similar general purposes Part 2.2: Interconnection couplers for household and similar equipment (IEC 60320-2-2, Ed.2.0 (1998) MOD)</i> -AS/NZS 60695.2.11, <i>Fire hazard testing, Part 2.11: Glowing/hot wire based test methods—Glow-wire flammability test method for end-products</i> -AS/NZS 60695.11.5, <i>Fire hazard testing, Part 11.5: Test flames—Needle-flame test method—</i>	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p><i>Apparatus, confirmatory test arrangement and guidance</i></p> <p>-AS/NZS 60695.11.10, <i>Fire hazard testing, Part 11.10: Test flames—50 W horizontal and vertical flame test methods</i></p> <p>-AS/NZS 60884.1, <i>Plugs and socket-outlets for household and similar purposes, Part 1: General requirements</i></p> <p>-AS/NZS 60950.1:2015, <i>Information technology equipment—Safety, Part 1: General requirements (IEC 60950-1, Ed.2.2 (2013), MOD)</i></p> <p><i>IEC 61032:1997, Protection of persons and equipment by enclosures—Probes for verification</i></p> <p>-AS/NZS 61558.1:2008 (including Amendment 2:2015), <i>Safety of Power Transformers, Power Supplies, Reactors and Similar Products, Part 1: General requirements and tests (IEC 61558-1 Ed 2.1, MOD)</i></p> <p>-AS/NZS 61558.2.16, <i>Safety of transformers, reactors, power supply units and similar products for voltages up to 1 100 V, Part 2.16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units.</i></p>		
4.1.1	<p><b>Application of requirements and acceptance of materials, components and subassemblies</b></p> <p>1 Replace the text 'IEC 60950-1' with 'AS/NZS 60950.1:2015'.</p> <p>2 Replace the text 'IEC 60065' with 'AS/NZS 60065'.</p>		Pass
4.7	<b>Equipment for direct insertion into mains socket-outlets</b>		N/A
4.7.2	<p><b>Requirements</b></p> <p>Delete the text of the second paragraph and replace with the following:</p> <p>Equipment with a plug portion, suitable for insertion into a 10 A 3-pin flat-pin socket-outlet complying with AS/NZS 3112 shall comply with the requirements in AS/NZS 3112 for equipment with integral pins for insertion into socket-outlets.</p>		N/A
4.7.3	<p><b>Compliance Criteria</b></p> <p>Delete the first paragraph and Note 1 and Note 2 and replace with the following:</p> <p>Compliance is checked by inspection and, if necessary, by the tests in AS/NZS 3112.</p>		N/A

IEC62368_1B - ATTACHMENT																						
Clause	Requirement + Test	Result - Remark	Verdict																			
4.8	Delete existing clause title and replace with the following: <b>4.8 Products containing coin/button cell batteries</b>		N/A																			
4.8.1	<b>General</b> 1 Second dashed point, delete the text and replace with the following: – include coin/button cell batteries with a diameter of 32 mm or less. 2 After the second dashed point, insert the following Note: NOTE 1: Batteries are specified in IEC 60086-2. 3 After the third dashed point, renumber the existing Note as 'NOTE 2'. 4 Fifth dashed point, delete the word 'lithium'.		N/A																			
4.8.2	<b>Instructional Safeguard</b> First line, delete the word 'lithium'.		N/A																			
4.8.3	<b>Construction</b> First line, after the word 'Equipment' insert the words 'containing one or more coin/button batteries and'		N/A																			
4.8.5	<b>Compliance criteria</b> Delete the first paragraph and replace with the following: Compliance is checked by applying a force of 30 N +/- 1 N for 10 s to the battery compartment door/cover by a rigid test finger according to test probe 11 of IEC 61032:1997 at the most unfavourable place and in the most unfavourable direction. The force shall be applied in one direction at a time.		N/A																			
5.4.10.2	<b>Test Methods</b>		N/A																			
5.4.10.2.1	<b>General</b> Delete the first paragraph and replace with the following: In Australia only, the separation is checked by the test of both Clause 5.4.10.2.2 and Clause 5.4.10.2.3. In New Zealand, the separation is checked by the test of either Clause 5.4.10.2.2 or Clause 5.4.10.2.3.		N/A																			
Table 29	Replace the table with the following: <table border="1" data-bbox="536 1872 1123 2065"> <thead> <tr> <th rowspan="2">Parts</th> <th colspan="2">Impulse test</th> <th colspan="2">Steady state test</th> </tr> <tr> <th>New Zealand</th> <th>Australia</th> <th>New Zealand</th> <th>Australia</th> </tr> </thead> <tbody> <tr> <td>Parts indicated in Clause 5.4.10.1 a) *</td> <td>2.5 kV 10/700 µs</td> <td>7.0 kV for hand-held telephones and headsets, 2.5 kV for other equipment. 10/700 µs</td> <td>1.5 kV</td> <td>3 kV</td> </tr> <tr> <td>Parts indicated in Clause 5.4.10.1 b) and c) *</td> <td colspan="2">1.5 kV 10/700 µs †</td> <td>1.0 kV</td> <td>1.5 kV</td> </tr> </tbody> </table> <small>                     * Surge suppressors shall not be removed.                      † Surge suppressors may be removed, provided that such devices pass the impulse test of Clause 5.4.10.2.2 when tested as components outside the equipment.                      ‡ During this test, it is allowed for a surge suppressor to operate and for a sparkover to occur in a GDT.                 </small>	Parts	Impulse test		Steady state test		New Zealand	Australia	New Zealand	Australia	Parts indicated in Clause 5.4.10.1 a) *	2.5 kV 10/700 µs	7.0 kV for hand-held telephones and headsets, 2.5 kV for other equipment. 10/700 µs	1.5 kV	3 kV	Parts indicated in Clause 5.4.10.1 b) and c) *	1.5 kV 10/700 µs †		1.0 kV	1.5 kV		N/A
Parts	Impulse test		Steady state test																			
	New Zealand	Australia	New Zealand	Australia																		
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Parts indicated in Clause 5.4.10.1 b) and c) *	1.5 kV 10/700 µs †		1.0 kV	1.5 kV																		

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.10.2.2	After the first paragraph, <i>insert</i> new Notes 201 and 202 as follows: NOTE 201 For Australia, the 7 kV impulse simulates lightning surges on typical rural and semi-rural network lines. NOTE 202 For Australia, the value of 2.5 kV for Clause 5.4.10.1 a) was chosen to ensure the adequacy of the insulation concerned and does not necessarily simulate likely overvoltages.		N/A
5.4.10.2.3	After the first paragraph, <i>insert</i> new Notes 201 and 202 as follows: NOTE 201 For Australia, where there are capacitors across the insulation under test, it is recommended that d.c. test voltages are used. NOTE 202 The 3 kV and 1.5 kV values for Australia have been determined considering the low frequency induced voltages from the power supply distribution system.		N/A
6	<b>Electrically-caused fire</b>		Pass
6.1	General After the first paragraph, <i>insert</i> the following new paragraph: Alternatively, the requirements of Clauses 6.2 to 6.5.2 are considered to be fulfilled if the equipment complies with the requirements of Clause 6.202		Pass
6.6	After Clause 6.6, add the new Clauses 6.201 and 6.202 as follows: <b>6.201 External power supplies, docking stations and other similar devices and</b> <b>6.202 Resistance to fire—Alternative tests</b> (see special national conditions)		N/A
8.5.4	<b>Special categories of equipment comprising moving parts</b>		N/A
8.5.4.1	<b>Large data storage equipment</b> In the first dashed row and the second dashed rows replace 'IEC 60950-1:2005' with 'AS/NZS 60950.1:2015'.		N/A
8.6	<b>Stability of equipment</b>		N/A
8.6.1 and Table 36	<b>Requirements</b> 1. Table 36, <i>insert</i> Footnote c at the end of the 'Glass slide' heading, and add a new Footnote c after the text of Footnote b in the last row of Table 36 as follows: c The glass slide test is not applicable to floor standing equipment, even though the equipment may have controls or a display.		N/A



IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>2. Table 36, fifth row, <i>insert</i> '201' at the end of 'No stability requirements'</p> <p>3. Table 36, ninth row, <i>insert</i> '201' at the end of 'No stability requirements'</p> <p>4. Table 36, add the following new footnote: 201 MS2 and MS3 television sets and display devices, designed only for fixing to a wall, ceiling or equipment rack, are not subjected to stability requirements only if the instructional safeguard of Clause 8.6.1.201 is provided. Otherwise, the glass slide requirements of Clause 8.6.4 and horizontal force requirements of Clause 8.6.5 apply.</p> <p>5. Second paragraph beneath Table 36, delete the words 'MS2 and MS3 television sets' and replace with 'MS2 and MS3 television sets and display devices'</p>		
8.6.1	<p>After Clause 8.6.1 <i>add</i> the following new clauses: <b>8.6.1.201 Instructional safeguard for fixed-mount television sets</b> (see special national conditions)</p>		N/A
Annex F Paragraph F.3.5.1	<p><b>Mains appliance outlet and socket-outlet markings</b> <i>Replace</i> 'IEC 60320-2-2' with 'AS/NZS 60320.2.2'.</p>		N/A
Annex G Paragraph G.4.2	<p><b>Mains connectors</b></p> <p>1 In the second line <i>insert</i> 'or AS/NZS 3123' after 'IEC 60906-1'.</p> <p>2 In the second line <i>insert</i> 'or AS/NZS 60320 series' after 'IEC 60320 series'</p> <p>3 <i>Add</i> the following new paragraph: 10 A or 15 A 250 V flat pin plugs for the connection of equipment to mains-powered socket-outlets for household or similar general use shall comply with AS/NZS 3112 or AS/NZS 60884.1.</p>		N/A
Paragraph G.5.3.1	<p><b>Transformers, General</b></p> <p>1 In the third dashed point replace 'IEC 61558-1 and the relevant parts of IEC 61558-2' with 'AS/NZS 61558-1 and the relevant parts of AS/NZS 61558.2'</p> <p>2 In the fourth dashed point <i>replace</i> 'IEC 61558-2-16' with 'AS/NZS 61558.2.16'.</p>		N/A
Paragraph G.7.1	<p><b>Mains supply cords, General</b></p> <p>In the fourth dashed paragraph, <i>replace</i> 'IEC 60320-1' with 'AS/NZS 60320.1'</p>		N/A
Table G.5	<b>Sizes of conductors</b>		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>1 In the second row, first column, <i>delete</i> '6' and <i>replace</i> with '7.5'</p> <p>2 In the second row, second column, <i>delete</i> '0,75' and <i>replace</i> with '0.75<sup>b</sup>'</p> <p>3 <i>Delete</i> Note 1.</p> <p>4 <i>Replace</i> 'NOTE 2' with 'NOTE:'.</p> <p>5 <i>Delete</i> the text of 'Footnote b' and <i>replace</i> with the following:  <sup>b</sup> This nominal cross-sectional area is only allowed for Class II appliances if the length of the power supply cord, measured between the point where the cord, or cord guard, enters the appliance, and the entry to the plug does not exceed 2 m (0.5 mm<sup>2</sup> three-core supply flexible cords are not permitted; see AS/NZS 3191).</p> <p>6 In Footnote c <i>replace</i> 'IEC 60320-1' with 'AS/NZS 60320.1'</p> <p>7 In Footnote d <i>replace</i> 'IEC 60320-1' with 'AS/NZS 60320.1'</p>		
Annex M Paragraph M.3.2	<p><b>Protection circuits for batteries provided within the equipment, Test method</b></p> <p>After the first dashed point add the following Note:            NOTE 201: In cases where the voltage source is provided by power from an unassociated power source, consideration should be given to the effects of possible single fault conditions in the unassociated equipment. If the power source is unknown then it should be assumed that the maximum limit of SELV may be applied to the source input under assumed single fault conditions in the source when assessing the charging circuit in the equipment under test.</p>		N/A
	<b>Special national conditions (if any)</b>		Pass
6.201	<p><b>External power supplies, docking stations and other similar devices</b></p> <p>For external power supplies, docking stations and other similar devices, during and after abnormal operating conditions and during single fault conditions the output voltage—</p> <ul style="list-style-type: none"> <li>– at all ES1 outlets or connectors shall not increase by more than 10% of its rated output voltage under normal operating condition; and</li> <li>– of a USB outlet or connector shall not increase by more than 3 V or 10% of its rated output voltage under normal operating conditions, whichever is higher.</li> </ul>		N/A

<b>IEC62368_1B - ATTACHMENT</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>For equipment with multiple rated output voltages, the requirements apply with the equipment configured for each rated output voltage in turn.</p> <p>NOTE: This is intended to reduce the possibility of battery fire or explosion in attached equipment or accessories when charging secondary lithium batteries.</p> <p>Compliance shall be checked by measurement, taking into account the abnormal operating conditions of Annex B.3 and the simulated single-fault conditions of Annex B.4</p>		
6.202	<b>Resistance to fire - Alternative tests</b>		N/A
6.202.1	<p><b>General</b></p> <p>Parts of non-metallic material shall be resistant to ignition and spread of fire.</p> <p>This requirement does not apply to decorative trims, knobs and other parts unlikely to be ignited or to propagate flames from inside the equipment, or the following:</p> <p>a) Components that are contained in an enclosure having a flammability category of V-0 according to AS/NZS 60695.11.10 and having openings only for the connecting wires filling the openings completely, and for ventilation not exceeding 1 mm in width regardless of length.</p> <p>b) The following parts which would contribute negligible fuel to a fire:</p> <ul style="list-style-type: none"> <li>– small mechanical parts, the mass of which does not exceed 4 g, such as mounting parts, gears, cams, belts and bearings;</li> <li>– small electrical components, such as capacitors with a volume not exceeding 1 750 mm<sup>3</sup>, integrated circuits, transistors and optocoupler packages, if these components are mounted on material of flammability category V-1, or better, according to AS/NZS 60695.11.10.</li> </ul> <p>NOTE: In considering how to minimize propagation of fire and what ‘small parts’ are, account should be taken of the cumulative effect of small parts adjacent to each other for the possible effect of propagating the fire from one part to another.</p> <p><i>Compliance shall be checked by the tests of Clauses 6.202.2, 6.202.3 and 6.202.4.</i></p> <p>For the base material of printed boards, compliance shall be checked by the test of Clause 6.202.5.</p>		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>The tests shall be carried out on parts of non-metallic material which have been removed from the equipment. When the glow-wire test is carried out, the parts shall be placed in the same orientation as they would be in normal use.</p> <p>These tests are not carried out on internal wiring.</p>		
6.202.2	<p><b>Testing of non-metallic materials</b></p> <p>Parts of non-metallic material shall be subject to the glow-wire test of AS/NZS 60695.2.11 which shall be carried out at 550°C.</p> <p>Parts for which the glow-wire test cannot be carried out, such as those made of soft or foamy material, shall meet the requirements specified in ISO 9772 for category FH-3 material. The glow-wire test shall be not carried out on parts of material classified at least FH-3 according to ISO 9772 provided that the relevant part is not thinner than the sample tested.</p>		N/A
6.202.3	<p><b>Testing of insulating materials</b></p> <p>Parts of insulating material supporting Potential Ignition Sources shall be subject to the glow-wire test of AS/NZS 60695.2.11 which shall be carried out at 750°C.</p> <p>The test shall be also carried out on other parts of insulating material which are within a distance of 3 mm of the connection.</p> <p>NOTE: Contacts in components such as switch contacts are considered to be connections</p>		N/A
	<p>For parts which withstand the glow-wire test but produce a flame, other parts above the connection within the envelope of a vertical cylinder having a diameter of 20 mm and a height of 50 mm shall be subjected to the needle-flame test.</p> <p>However, parts shielded by a barrier which meets the needle-flame test need not be tested</p>		N/A
	<p>The needle-flame test shall be made in accordance with AS/NZS 60695.11.5 with the following modifications</p>		N/A

IEC62368_1B - ATTACHMENT													
Clause	Requirement + Test		Result - Remark	Verdict									
	<table border="1"> <tr> <td>Clause of AS/NZS 60695.11.5</td> <td>Change</td> </tr> <tr> <td>9 Test procedure</td> <td></td> </tr> <tr> <td>9.2 Application of needle-flame</td> <td> <p>Delete the first and second paragraphs and <i>replace</i> with the following:                      The specimen shall be arranged so that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1. If possible the flame shall be applied at least 10 mm from a corner.                      The duration of application of the test flame shall be 30 s +1 s.</p> </td> </tr> <tr> <td>9.3 Number of test specimens</td> <td> <p>Replace with the following:                      The test shall be made on one specimen. If the specimen does not withstand the test, the test may be repeated on two further specimens, both of which shall withstand the test.</p> </td> </tr> <tr> <td>11 Evaluation of test results</td> <td> <p>Replace with the following:                      The duration of burning (tb) shall not exceed 30 s. However, for printed circuit boards, it shall not exceed 15 s.</p> </td> </tr> </table> <p><b>The needle-flame test shall not be carried out on parts of material classified as V-0 or V-1 according to AS/NZS 60695.11.10, provided that the relevant part is not thinner than the sample tested.</b></p>	Clause of AS/NZS 60695.11.5	Change	9 Test procedure		9.2 Application of needle-flame	<p>Delete the first and second paragraphs and <i>replace</i> with the following:                      The specimen shall be arranged so that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1. If possible the flame shall be applied at least 10 mm from a corner.                      The duration of application of the test flame shall be 30 s +1 s.</p>	9.3 Number of test specimens	<p>Replace with the following:                      The test shall be made on one specimen. If the specimen does not withstand the test, the test may be repeated on two further specimens, both of which shall withstand the test.</p>	11 Evaluation of test results	<p>Replace with the following:                      The duration of burning (tb) shall not exceed 30 s. However, for printed circuit boards, it shall not exceed 15 s.</p>		
Clause of AS/NZS 60695.11.5	Change												
9 Test procedure													
9.2 Application of needle-flame	<p>Delete the first and second paragraphs and <i>replace</i> with the following:                      The specimen shall be arranged so that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1. If possible the flame shall be applied at least 10 mm from a corner.                      The duration of application of the test flame shall be 30 s +1 s.</p>												
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11 Evaluation of test results	<p>Replace with the following:                      The duration of burning (tb) shall not exceed 30 s. However, for printed circuit boards, it shall not exceed 15 s.</p>												
6.202.4	<p><b>Testing in the event of non-extinguishing material</b></p> <p>If parts, other than enclosures, do not withstand the glow wire tests of Clause 6.202.3, by failure to extinguish within 30 s after the removal of the glow wire tip, the needle-flame test detailed in Clause 6.202.3 shall be made on all parts of non-metallic material which are within a distance of 50 mm or which are likely to be impinged upon by flame during the tests of Clause 6.202.3. Parts shielded by a separate barrier which meets the needle-flame test need not be tested.</p> <p>NOTE 1: If the enclosure does not withstand the glow-wire test the equipment is considered to have failed to meet the requirements of Clause 6.202 without the need for consequential testing.</p> <p>NOTE 2: If other parts do not withstand the glow-wire test due to ignition of the tissue paper and if this indicates that burning or glowing particles can fall onto an external surface underneath the equipment, the equipment is considered to have failed to meet the requirements of Clause 6.202 without the need for consequential testing.</p> <p>NOTE 3: Parts likely to be impinged upon by the flame are considered to be those within the envelope of a vertical cylinder having a radius of 10 mm and a height equal to the height of the flame, positioned above the point of the material supporting, in contact with, or in close proximity to, connections.</p>			N/A									
6.202.5	<p><b>Testing of printed boards</b></p> <p>The base material of printed boards shall be subjected to the needle-flame test of Clause</p>			N/A									

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>6.202.3. The flame shall be applied to the edge of the board where the heat sink effect is lowest when the board is positioned as in normal use. The flame shall not be applied to an edge, consisting of broken perforations, unless the edge is less than 3 mm from a potential ignition source.</p> <p>The test is not carried out if—</p> <ul style="list-style-type: none"> <li>– the printed board does not carry any potential ignition source;</li> <li>– the base material of printed boards, on which the available apparent power at a connection exceeds 15 VA operating at a voltage exceeding 50 V and equal or less than 400 V (peak) a.c. or d.c. under normal operating conditions, is of flammability category V-1 or better according to AS/NZS 60695.11.10, or the printed boards are protected by an enclosure meeting the flammability category V-0 according to AS/NZS 60695.11.10, or made of metal, having openings only for connecting wires which fill the openings completely; or</li> <li>– the base material of printed boards, on which the available equipment power at a connection exceeds 15 VA operating at a voltage exceeding 400 V (peak) a.c. or d.c. under normal operating conditions, and base material of printed boards supporting spark gaps which provides protection against overvoltages, is of flammability category V-0 according to AS/NZS 60695.11.10 or the printed boards are contained in a metal enclosure, having openings only for connecting wires which fill the openings completely.</li> </ul> <p><i>Conformance</i> shall be determined using the smallest thickness of the material.</p> <p>NOTE: Available apparent power is the maximum apparent power which can be drawn from the supplying circuit through a resistive load whose value is chosen to maximize the apparent power for more than 2 min when the circuit supplied is disconnected.</p>		
6.202.6	<p><b>For open circuit voltages greater than 4 kV</b></p> <p>Potential ignition sources with open circuit voltages exceeding 4 kV (peak) a.c. or d.c. under normal operating conditions shall be contained in a FIRE ENCLOSURE which shall comply with flammability category V-1 or better according to AS/NZS 60695.11.10.</p>		N/A

<b>IEC62368_1B - ATTACHMENT</b>			
Clause	Requirement + Test	Result - Remark	Verdict
8.6.1.201	<p><b>8.6.1.201 Instructional safeguard for fixed-mount television sets</b></p> <p>MS2 and MS3 television sets and display devices designed only for fixed mounting to a wall or ceiling or equipment rack shall, where required in Table 36, footnote 201, have an instructional safeguard in accordance with Clause F.5</p> <p>which may be on the equipment or included in the installation instructions or equivalent document accompanying the equipment.</p> <p>The elements of the instructional safeguard shall be as follows:</p> <ul style="list-style-type: none"> <li>– element 1a: not available;</li> <li>– element 2: 'Stability Hazard' or equivalent wording;</li> <li>– element 3: 'The television set may fall, causing serious personal injury or death' or equivalent text;</li> <li>– element 4: the following or equivalent text: To prevent injury, this television set must be securely attached to the floor/wall in accordance with the installation instructions</li> </ul>		N/A
8.6.1.202	<p><b>Restraining device</b></p> <p>MS2 and MS3 television sets and display devices that are not solely fixed-mounted should be provided with a restraining device such as a fixing point to facilitate restraining the equipment from toppling forward. The restraining device shall be capable of withstanding a pull of 100 N in all directions without damage.</p> <p>Where a restraining device is provided, instructions shall be provided in the instructions for installation or instructions for use to ensure correct and safe installation.</p>		N/A

IEC62368_1B - 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 62368-1:2014+A11:2017
Attachment Form No.	EU_GD_IEC62368_1B_II
Attachment Originator	Nemko AS
Master Attachment	9/22/2017
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	<b>CENELEC COMMON MODIFICATIONS (EN)</b>	Pass																																				
	Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2014 are prefixed "Z".	Pass																																				
CONTENT S	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	Pass																																				
	Delete all the "country" notes in the reference document (IEC 62368-1:2014) according to the following list: <table border="1" data-bbox="539 1283 1126 1556"> <tbody> <tr> <td>0.2.1</td> <td>Note</td> <td>1</td> <td>Note 3</td> <td>4.1.15</td> <td>Note</td> </tr> <tr> <td>4.7.3</td> <td>Note 1 and 2</td> <td>5.2.2.2</td> <td>Note</td> <td>5.4.2.3.2.2 Table 13</td> <td>Note c</td> </tr> <tr> <td>5.4.2.3.2.4</td> <td>Note 1 and 3</td> <td>5.4.2.5</td> <td>Note 2</td> <td>5.4.5.1</td> <td>Note</td> </tr> <tr> <td>5.5.2.1</td> <td>Note</td> <td>5.5.6</td> <td>Note</td> <td>5.6.4.2.1</td> <td>Note 2 and 3</td> </tr> <tr> <td>5.7.5</td> <td>Note</td> <td>5.7.6.1</td> <td>Note 1 and 2</td> <td>10.2.1 Table 39</td> <td>Note 2, 3 and 4</td> </tr> <tr> <td>10.5.3</td> <td>Note 2</td> <td>10.6.2.1</td> <td>Note 3</td> <td>F.3.3.6</td> <td>Note 3</td> </tr> </tbody> </table>	0.2.1	Note	1	Note 3	4.1.15	Note	4.7.3	Note 1 and 2	5.2.2.2	Note	5.4.2.3.2.2 Table 13	Note c	5.4.2.3.2.4	Note 1 and 3	5.4.2.5	Note 2	5.4.5.1	Note	5.5.2.1	Note	5.5.6	Note	5.6.4.2.1	Note 2 and 3	5.7.5	Note	5.7.6.1	Note 1 and 2	10.2.1 Table 39	Note 2, 3 and 4	10.5.3	Note 2	10.6.2.1	Note 3	F.3.3.6	Note 3	Pass
0.2.1	Note	1	Note 3	4.1.15	Note																																	
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10.5.3	Note 2	10.6.2.1	Note 3	F.3.3.6	Note 3																																	
	For special national conditions, see Annex ZB.	Pass																																				
1	Add the following note: NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.	Pass																																				
4.Z1	Protective devices included as integral parts of the equipment or as parts of the building installation:	N/A																																				
	a) Included as parts of the equipment	N/A																																				
	b) For components in series with the mains; by devices in the building installation	N/A																																				
	c) For pluggable type B or permanently connected; by devices in the building installation	N/A																																				



IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.2.3.2.4	<b>Add</b> the following to the end of this subclause: The requirement for interconnection with <b>external circuit</b> is in addition given in EN 50491-3:2009.		N/A
10.2.1	<b>Add</b> the following to c) and d) in table 39: For additional requirements, see 10.5.1.		N/A
10.5.1	<b>Add</b> the following after the first paragraph: For RS 1 compliance is checked by measurement under the following conditions: In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those internal adjustments or presets 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 cm <sup>2</sup> , at any point 10 cm from the outer surface of the apparatus. 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 96/29/Euratom of 13 May 1996.		N/A
10.6.1	<b>Add</b> the following paragraph to the end of the subclause: EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.		N/A
10.Z1	<b>Add</b> the following new subclause after 10.6.5. <b>10.Z1 Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz</b> The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz). For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body-mounted devices, attention is drawn to EN 50360 and EN 50566		N/A
G.7.1	<b>Add</b> the following note: NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Bibliography	<p><b>Add</b> the following standards:  <b>Add</b> the following notes for the standards indicated:</p> <p>IEC 60130-9 NOTE Harmonized as EN 60130-9.  IEC 60269-2 NOTE Harmonized as HD 60269-2.  IEC 60309-1 NOTE Harmonized as EN 60309-1.  IEC 60364 NOTE some parts harmonized in HD 384/HD 60364 series.  IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4.  IEC 60664-5 NOTE Harmonized as EN 60664-5.  IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified).  IEC 61508-1 NOTE Harmonized as EN 61508-1.  IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1.  IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4.  IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6.  IEC 61643-1 NOTE Harmonized as EN 61643-1.  IEC 61643-21 NOTE Harmonized as EN 61643-21.  IEC 61643-311 NOTE Harmonized as EN 61643-311.  IEC 61643-321 NOTE Harmonized as EN 61643-321.  IEC 61643-331 NOTE Harmonized as EN 61643-331.</p>		Pass
<b>ZB</b>	<b>ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)</b>		Pass
4.1.15	<p><b>Denmark, Finland, Norway and Sweden</b>  To the end of the subclause the following is added:  <b>Class I pluggable equipment type A</b> 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 <b>accessible</b> parts, have a marking stating that the equipment shall be connected to an earthed <b>mains</b> socket-outlet.  The marking text in the applicable countries shall be as follows:  In <b>Denmark</b>: "Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord."  In <b>Finland</b>: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"  In <b>Norway</b>: "Apparatet må tilkoples jordet stikkontakt"  In <b>Sweden</b>: "Apparaten skall anslutas till jordat uttag"</p>	Not a Class I unit.	N/A
4.7.3	<p><b>United Kingdom</b>  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</p>		N/A
5.2.2.2	<p><b>Denmark</b>  After the 2nd paragraph add the following:  A warning (marking <b>safeguard</b>) for high <b>touch current</b> is required if the <b>touch current</b> exceeds the limits of 3,5 mA a.c. or 10 mA d.c.</p>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.11.1 and Annex G	<p><b>Finland and Sweden</b></p> <p>To the end of the subclause the following is added:</p> <p>For separation of the telecommunication network from earth the following is applicable:</p> <p>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either</p> <ul style="list-style-type: none"> <li>• two layers of thin sheet material, each of which shall pass the electric strength test below, or</li> <li>• one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below.</li> </ul> <p>If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition</p> <ul style="list-style-type: none"> <li>• passes the tests and inspection criteria of 5.4.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 5.4.9 shall be performed using 1,5 kV), and</li> <li>• is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5kV.</li> </ul> <p>It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2.</p> <p>A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions:</p> <ul style="list-style-type: none"> <li>• the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in 5.4.11;</li> <li>• 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.</li> </ul>		N/A
5.5.2.1	<p><b>Norway</b></p> <p>After the 3rd paragraph the following is added:</p> <p>Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).</p>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.5.6	<p><b>Finland, Norway and Sweden</b> To the end of the subclause the following is added: Resistors used as <b>basic safeguard</b> or bridging <b>basic insulation</b> in <b>class I pluggable equipment type A</b> shall comply with G.10.1 and the test of G.10.2.</p>		N/A
5.6.1	<p><b>Denmark</b> <b>Add</b> to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. <i>Justification:</i> In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.</p>		N/A
5.6.4.2.1	<p><b>Ireland and United Kingdom</b> After the indent for <b>pluggable equipment type A</b>, the following is added: – the <b>protective current rating</b> is taken to be 13 A, this being the largest rating of fuse used in the <b>mains</b> plug.</p>		N/A
5.6.5.1	<p><b>Ireland and United Kingdom</b> 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<sup>2</sup> to 1,5 mm<sup>2</sup> in cross-sectional area.</p>		N/A
5.7.5	<p><b>Denmark</b> To the end of the subclause the following is added: The installation instruction shall be affixed to the equipment if the <b>protective conductor current</b> exceeds the limits of 3,5 mA a.c. or 10 mA d.c.</p>		N/A
5.7.6.1	<p><b>Norway and Sweden</b> 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. 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</p>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	<p>of the building installation through the mains connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)”</p> <p>NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min.</p> <p>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.”</p> <p>Translation to Swedish:  ”Apparater som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet.”.</p>		
5.7.6.2	<p><b>Denmark</b>  To the end of the subclause the following is added:  The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA .</p>		N/A
B.3.1 and B.4	<p><b>Ireland and United Kingdom</b>  The following is applicable:  To protect against excessive currents and short-circuits in the primary circuit of <b>direct plug-in equipment</b>, 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 <b>direct plug-in equipment</b>, until the requirements of Annexes B.3.1 and B.4 are met</p>		N/A
G.4.2	<p><b>Denmark:</b>  Appliances rated ≤13 A provided with a plug according to DS 60884-2-D1:2011.</p>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	<p>Class I equipment provided with socket-outlets provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p> <p>If a single-phase equipment having rated &gt;13 A or poly-phase equipment provided with a supply cord with a plug, plug in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2.</p> <p>Mains socket outlets intended for providing power to Class II apparatus rated 2,5 A in accordance with DS 60884-2-D1:2011 standard sheet DKA 1-4a.</p> <p>Other current rating socket outlets in compliance with Standard Sheet DKA 1-3a or DKA 1-1c.</p> <p>Mains socket-outlets with earth in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a</p>		
G.4.2	<p><b>United Kingdom</b></p> <p>To the end of the subclause the following is added:</p> <p>The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.</p>		N/A
G.7.1	<p><b>United Kingdom</b></p> <p>To the first paragraph the following is added:</p> <p>Equipment which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord shall be fitted with a 'standard plug' in accordance with the Plugs and Sockets etc (Safety) Regulations 1994, Statutory Instrument 1994 No. 1768, unless exempted by those regulations.</p> <p>NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.</p>		N/A
G.7.1	<p><b>Ireland</b></p> <p>To the first paragraph the following is added:</p> <p>Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, "13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. S.I. 525 provides for the recognition of a standard of another Member State which is equivalent to the relevant Irish Standard</p>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.7.2	<p><b>Ireland and United Kingdom</b> To the first paragraph the following is added: A power supply cord with a conductor of 1,25 mm<sup>2</sup> is allowed for equipment which is rated over 10 A and up to and including 13 A.</p>		N/A
<b>ZC</b>	<b>ANNEX ZC, NATIONAL DEVIATIONS (EN)</b>		Pass
10.5.2	<p><b>Germany</b> 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. <b>NOTE</b> Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int +49-531-592-6320, Internet: <a href="http://www.ptb.de">http://www.ptb.de</a></p>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

<b>ATTACHMENT TO TEST REPORT</b> <b>IEC 62368-1</b> <b>(JAPAN) NATIONAL DIFFERENCES</b> (Audio/video, information and communication technology equipment – Part 1: Safety requirements)	
<b>Differences according to</b> .....	J62368-1 (H30)
<b>Attachment Form No.</b> .....	JP_ND_IEC62368_1B
<b>Attachment Originator</b> .....	UL (JP)
<b>Master Attachment</b> .....	Date 2018-11-22
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	National Differences		—
4.1.2	Where the component, or a characteristic of a component, is a safeguard or a part of a safeguard, components shall comply with the requirements of this standard or, where specified in a requirements clause, with the safety aspects of the relevant JIS component standards or IEC component standards, or components shall have properties equivalent to or better than these.		Pass
5.6.1	Mains socket-outlet and appliance outlet shall comply with Clause G.4.2A if they are incorporated as part of the equipment.		N/A
5.6.2.1	Mains connection of class 0I equipment: Instructional safeguard in accordance with Clause F.3.6.1A;  Mains plug having a lead wire for protective earthing connection of class 0I equipment;  Independent main protective earthing terminal installed by ordinary person.		N/A
5.6.2.2	This requirement does not apply to internal conductor of the cord set that is covered by the sheath of mains cord and is formed together with mains plug and appliance connector.		N/A
5.6.3	In case of class 0I equipment using power supply cord having two conductors (no earthing conductor), the conductor of protective earthing lead wire shall comply with either of the following:		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	<p>– use of annealed copper wire with 1.6 mm diameter or corrosion-inhibiting metal wire having size and strength that are equivalent to or more than the above copper wire</p> <p>– single core cord or single core cab tire cable with 1.25 mm<sup>2</sup> or more cross-sectional area</p>		
5.7.3	For class 0I equipment that is provided with mains socket-outlet in the configuration as specified in JIS C 8282 series or JIS C 8303, or otherwise being considered to comply with relevant regulations, or that is provided with mains appliance outlet as specified in JIS C 8283-2-2 for the purpose of interconnection, the measurement is conducted on the system of the interconnected equipment having a single connection to the mains.		N/A
5.7.4	In case of class 0I equipment, touch current shall not exceed 1.41 mA peak or for sinusoidal wave, 1.0 mA r.m.s. when measured using the network specified in Figure 4 of IEC 60990.		N/A
6.4.3.3	<p>A fuse complying with JIS C 6575 series or a fuse having equivalent characteristics shall open within 1 s.</p> <p>For Class A fuse of JIS C 6575, replace “2.1 times” by “1.35 times” and in case of Class B fuse of JIS C 6575, replace “2.1 times” by “1.6 times”. A fuse not complying with JIS C 6575 series shall be tested with the breaking capacity taken into account.</p>		N/A
8.5.4.2.1	Only three-phase stationary equipment rated more than 200 V ac can be considered as being for use in locations where children are not likely to be present, when complying with Clause F.4.		N/A
8.5.4.2.2	For equipment installed where children may be present, an instructional safeguard shall be provided by easily understandable wording in accordance with Clause F.5, except that element 3 is optional.		N/A
8.5.4.2.4	The media destruction device is tested according to Clause V.1.2 with applicable jointed test probes		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	to the opening. And then the wedge probe per Figure V.4 shall not contact any moving part.		
8.5.4.2.5	The wedge probe of Figure V.4 and applicable jointed test probes specified in Clause V.1.2 shall not contact any moving part. Instructional safeguard shall not be used instead of equipment safeguard for preventing access to hazardous moving parts.		N/A
9.2.6, Table 38	Handles, Knobs, grips, etc. and external surfaces either held, touched or worn against the body in normal use (> 1 min) <sup>b,c</sup>		N/A
F.3.5.1	Instructional safeguard of class 0I equipment in accordance with Clause F.5 when a mains socket-outlet as specified in JIS C 8282 series, JIS C 8303 or relevant regulation to which class I equipment can be connected is provided in accordance with Clause G.4.2A except for the cases where the socket-outlet is accessible only to skilled persons.		N/A
F.3.5.3	If the fuse is necessary for the safeguard function, the symbols indicating pre-arcing time-current characteristic.		N/A
F.3.6.1A	Marking for class 0I equipment  The requirements of Clauses F.3.6.1.1 and F.3.6.1.3 shall be applied to class 0I equipment.  For class 0I equipment, a marking of instructions and instructional safeguard shall be provided regarding the earthing connection.		N/A
F.3.6.2.1	Symbols, IEC 60417-5172 (2003-02) or IEC 60417-6092 (2011-10), shall not be used for class I equipment or class 0I equipment.		N/A
F.4	Instruction for audio equipment with terminals classified as ES3 in accordance with Table E.1, and for other equipment with terminals marked in accordance with F.3.6.1 and F.3.6.1A.  Installation instruction for the protective earthing connection for class 0I equipment provided with independent main protective earthing terminal, where the cord for the protective earthing		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	connection is not provided within the package for the equipment.		
G.3.2.1	The thermal link when tested as a separate component, shall comply with the requirements of JIS C 6691 or have properties equivalent to or better than that.		N/A
G.3.4	<p>Except for devices covered by Clause G.3.5, overcurrent protective devices used as a safeguard shall comply with the relevant part of JIS C 6575 (corresponding to IEC60127) or shall have equivalent characteristics.</p> <p>If there are no applicable IEC standards, overcurrent protective devices used as a safeguard shall comply with their applicable IEC standards.</p>		N/A
G.4.1	This requirement is not applicable to Clauses G.4.2 and G.4.2A.		N/A
G.4.2	<p>Mains connector shall comply with JIS C 8282 series, JIS C 8283 series, JIS C 8285, JIS C 8303 or IEC 60309 series.</p> <p>Mains plugs and socket-outlets shall comply with JIS C 8282 series, JIS C 8303, IEC 60309 series, or have equivalent or better performance.</p> <p>A power supply cord set provided with appliance connector that can fit appliance inlet complying with JIS C 8283-1 shall comply with JIS C 8286.</p> <p>Construction preventing mechanical stress not to transmit to the soldering part of inlet terminal. Consideration for an equipment rated not more than 125 V provided with Type C14 and C18 appliance coupler complying with JIS C 8283 series.</p>		N/A
G.4.2A	Mains socket-outlet and interconnection coupler provided with the class II, class I and class 0I equipment respectively.		N/A
G.7.1	A mains supply cord need not include the protective earthing conductor for class 0I		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	equipment provided with independent protective earthing conductor.		
G.8.3.3	Withstand $1,71 \times 1.1 \times U_0$ for 5 s.		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

<b>ATTACHMENT TO TEST REPORT IEC 62368-1 2th Ed.</b> <b>U.S.A. NATIONAL DIFFERENCES</b> Audio/video, information and communication technology equipment – Part 1: Safety requirements	
<b>Differences according to</b>	CSA/UL 62368-1:2014
<b>Attachment Form No.</b>	US&CA_ND_IEC623681B
<b>Attachment Originator</b>	UL(US)
<b>Master Attachment</b>	Date 2015-06
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<b>IEC 62368-1 - US and Canadian National Differences</b> <b>Special National Conditions based on Regulations and Other National Differences</b>			
1.1	All equipment is to be designed to allow installation according to the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part I, 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.	Noted	Pass
1.4	Additional requirements apply to some forms of power distribution equipment, including sub-assemblies.		N/A
4.1.17	For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g., DP, CL2) specified in the NEC.	No external Interconnection	N/A
	For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies that are not types specified in the NEC generally are required to have special construction features and identification markings.		N/A
4.8	Lithium coin / button cell batteries have modified special construction and performance requirements.		N/A
5.6.3	Protective earthing conductors comply with the minimum conductor sizes in Table G.5, except as required by Table G.7ADV.1 for cord connected equipment, or Annex DVH for permanently connected equipment		N/A
5.7.7	Equipment intended to receive telecommunication ringing signals complies with a special touch current measurement tests.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
6.5.1	PS3 wiring outside a fire enclosure complies with single fault testing in B.4, or be current limited per one of the permitted methods.		N/A
Annex F (F.3.3.8)	Output terminals provided for supply of other equipment, except mains, supply are marked with a maximum rating or references to which equipment it is permitted to be connected.		N/A
Annex G (G.7.1)	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.		N/A
Annex G (G.7.3)	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.		N/A
	Flexible power supply cords are required to be compatible with Article 400 of the NEC, and Tables 11 and 12 of the CEC.		N/A
Annex G (G.7.5)	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.		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.		N/A
Annex H.4	For circuits with other than ringing signals and with voltages exceeding 42.4 V <sub>peak</sub> 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.		N/A
Annex M	Battery packs for stationary applications comply with special component requirements.		N/A
Annex DVA (1)	Equipment intended for use in spaces used for environmental air are subjected to special flammability requirements for heat and visible smoke release.		N/A
	For ITE room applications, automated information storage systems with combustible media greater than 0.76 m <sup>3</sup> (27 cu ft) have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.		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. & Canadian Regulations.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Baby monitors additionally comply with ASTM F2951, Consumer Safety Specification for Baby Monitors.		N/A
Annex DVA (5.6.3)	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A.		N/A
Annex DVA (6.3)	The maximum quantity of flammable liquid stored in equipment complies with NFPA 30.		N/A
Annex DVA (6.4.8)	For ITE room applications, enclosures with combustible material measuring greater than 0.9 m <sup>2</sup> (10 sq ft) or a single dimension greater than 1.8 m (6 ft) 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 min. flammability classification of V-1.		N/A
Annex DVA (10.3.1)	Equipment with lasers meets the U.S. Code of Federal Regulations 21 CFR 1040 (and the Canadian Radiation Emitting Devices Act, REDR C1370).		N/A
Annex DVA (10.5.1)	Equipment that produces ionizing radiation complies with the U.S. Code of Federal Regulations, 21 CFR 1020 (and the Canadian Radiation Emitting Devices Act, REDR C1370).		N/A
Annex DVA (F.3.3.3)	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 are lower than the "Normal Operating Condition" in Table 2 of CAN/CSA C22.2 No. 235."		N/A
Annex DVA (F.3.3.5)	Equipment identified for ITE (computer) room installation is marked with the rated current		N/A
Annex DVA (G.1)	Vertically-mounted disconnect switches and circuit breakers have the "on" position indicated by the handle in the up position		N/A
Annex DVA (G.3.4)	Suitable NEC/CEC branch circuit protection rated at the maximum circuit rating is required for all standard supply outlets and receptacles (such as supplied in power distribution units) if the supply branch circuit protection is not suitable.		N/A
Annex DVA (G.4.2)	Equipment with isolated ground (earthing) receptacles complies with NEC 250.146(D) and CEC 10-112 and 10-906(8).		N/A
Annex DVA (G.4.3)	Where a fuse is used to provide Class 2 or Class 3 current limiting, it is not operator-accessible unless it is non- interchangeable.		N/A

<b>IEC62368_1B - ATTACHMENT</b>			
Clause	Requirement + Test	Result - Remark	Verdict
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.		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).		N/A
Annex DVA (Annex M)	For ITE room applications, equipment with battery systems capable of supplying 750 VA for five minutes have a battery disconnect means that may be connected to the ITE room remote power-off circuit.		N/A
Annex DVA (Q)	Wiring terminals intended to supply Class 2 outputs according to the NEC or CEC Part 1 are marked with the voltage rating and "Class 2" or equivalent; marking is located adjacent to the terminals and visible during wiring.		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.		N/A
Annex DVC (1)	Additional requirements apply for equipment intended for mounting under kitchen cabinets.		N/A
Annex DVE (4.1.1)	Some equipment, components, sub-assemblies and materials associated with the risk of fire, electric shock, or personal injury have component or material ratings in accordance with the applicable national (U.S. and Canadian) component or material requirements. Components required to comply include: appliance couplers, attachment plugs, battery back-up systems, battery packs, circuit breakers, communication circuit accessories, connectors (used for current interruption of non-LPS circuits), power supply cords, direct plug-in equipment, electrochemical capacitor modules (energy storage modules with ultra-capacitors), enclosures (outdoor), flexible cords and cables, fuses (branch circuit), ground-fault current interrupters, interconnecting cables, data storage equipment, printed wiring, protectors for communications circuits, receptacles, surge protective devices, vehicle battery adapters, wire connectors, and wire and cables.		Pass
Annex DVH	Equipment for permanent connection to the mains supply is subjected to additional requirements.		N/A



IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVH (DVH.1)	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains are in accordance with the NEC/CEC.		N/A
Annex DVH (DVH.3.2)	Terminals for permanent wiring, including protective earthing terminals, are suitable for U.S./Canadian wire gauge sizes, rated 125 percent of the equipment rating, and are specially marked when specified.		N/A
Annex DVH (DVH.3.2)	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm <sup>2</sup> ).		N/A
Annex DVH (DVH.4)	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.		N/A
Annex DVH (DVH 5.5)	Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment, complies with special earthing, wiring, marking and installation instruction requirements.		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.		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.		N/A

## Enclosures

**Enclosures**

<b>Type</b>	<b>Supplement Id</b>	<b>Description</b>
Photographs	03-01	View 1
Photographs	03-02	View 2
Photographs	03-03	View 3
Photographs	03-04	View 4
Diagrams	04-01	Base Plate
Diagrams	04-02	Case
Schematics + PWB	05-01	PWB and Schematics
Miscellaneous	07-01	Model Matrix
Miscellaneous	07-02	Test Equipment
Miscellaneous	07-03	Manufacturer letter of assurance
Miscellaneous	07-04	Test correlation

Enclosures

Miscellaneous ID 07-01

GQA Initial Letter to Safety Agency

**Product Overview:**

The GQA product family consists of high density DC-DC power converter modules intended to be purchased and used as a component in an end-user's power system. The input operating voltage ranges are from 9V – 36Vdc. The output voltage range will be between 5V and 48V depending upon the model number.

The GQA product is available in four mechanical configurations that both use the same transformer core set and output filter inductor core set except for the air gap and number of turns embedded in the pcb. The four mechanical configurations use the same pcb and part set, the difference between them is the physical size of the base plate that is mounted on the unit. One house-keeping transformer is used in GQA platform. The house keep magnetic is used to deliver the drive pulses and bias power across the isolation boundary from secondary to the primary side.

**Models:**

GQA24\*\*\*A%%V-xxx(-R), or -(007) for unpotted or (-0P7) for potted  
 where 24 represents nominal input voltage, with a 18-36Vdc input, Max Input Current 9Adc  
 \*\*\* represents rated output current between 0A – 2.5A,  
 %%V represents rated output voltage ,48Vdc nominal, with Max Output Power of 120W  
 and xxx indicates a number or alphanumeric characters which indicate a feature set.. Optional (-R) indicating RoHS compliance, or -(007) for unpotted or (-0P7) for potted, -R indicates RoHS compliance)

GQA2W\*\*\*A%%V-xxx(-R), or -(007) for unpotted or (-0P7) for potted  
 where 2W represents nominal input voltage, with a 9-36Vdc input, with a Max Input Current of 23A  
 \*\*\* represents rated output current between 4.28A – 20A, %%V represents rated output voltage between, 5Vdc - 28Vdc,  
 with Max Output Power of 150W and xxx indicates a number or alphanumeric characters which indicate a feature set.  
 Optional (-R) indicating RoHS compliance, or -(007) for unpotted or (-0P7) for potted, -R indicates RoHS compliance)

The matrix below (Table 1) indicates various GQA **Example** model numbers with the output power levels up to 150W. **Table 1**

MODEL No.	Input Voltage	Max Input Current (1)	Output Voltage (2)	Output Current	Max. Output Power
GQA24002A480V-xxx(-R), (PR)	18-36V	9	48V	2.5A	120W
GQA2W004A280V-xxx(-R), (PR)	9-36V	16	28V	4.28A	120W
GQA2W005A240V-xxx(-R), (PR)	9-36V	16	24V	5A	120W
GQA2W008A150V-xxx(-R), (PR)	9-36V	16	15V	8A	120W
GQA2W010A150V-xxx(-R), (PR)	9-36V	23	15	10A	150W
GQA2W010A120V-xxx(-R), (PR)	9-36V	16	12V	10A	120W
GQA2W020A050V-xxx(-R), (PR)	9-36V	16	5V	20A	100W

(1) Maximum input current will be a data sheet parameter telling the customer the maximum current the power module will draw from 0Vin to Vin,max. The typical current draw will be lower. GQA power modules **are not internally fused**. An external input line fast-acting fuse with a maximum value of **30A** is required.

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 TRF No. IEC60950\_1F

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(2) The output voltage can be externally adjusted for GQA products, adjustment range will be +10% or – 10% or less.

**Naming Convention:**

The first three letters indicate the package size and the platform name. The second alpha identifies the package size.

The following two numbers indicate the nominal input voltage, followed by three numbers that indicate the maximum output power. The three numbers are followed by an W indicating the unit for the power is watts.

The next three numbers indicate the nominal output voltage; the next character - V for volts, indicates the unit for the voltage. Note that the third digit is preceded by a decimal point, so 120V implies 12 Volts.

The part number is completed with a -xxx where the three digits indicate the feature set. The second two characters of the feature set are considered to be non-safety affecting changes. Changes to the feature set could be mechanical changes such as modifying the pin length or could be electrical changes such as adding or modifying a control function e.g. modifying the logic for the customer on/off interface. The next character is Optional –S indicating standard, or –M indicating enhanced The last optional character is a -? indicating Non safety related option.

**GQA Product Family Similarities:**

The design intention is that the modules within a platform consist of a family of units with similar form, fit and function with the exception of the output voltage and current. The major differences between the modules will be as follows.

The main PWB, which houses the transformer windings, may need to be changed to modify the number of turns of the power transformer as the output voltage changes. The core material and the structure of the power transformers will remain same. The output inductor core gap and the number of turns for the output inductor may also be changed according to the output current variation, but the core material and structure will stay same.

The power semiconductor devices such as the secondary power FETs, and primary side power FETs, will be in the same physical package but with different voltage rating depending upon the specific input voltage range or output voltage and current stresses in the various power module designs. The output filter capacitors will also be in the same packages but may be different values and voltage ratings depending upon the specific voltage and current stresses in the various module designs.

Control circuits will have value changes to scale the typical circuit parameters such as output voltage and output current limit set point as required for the different designs. Other control circuits such as the feedback compensation may have value changes as required for each specific design.

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**GQA Family:**

The GQA product line provides a single regulated dc output voltage that is electrically isolated from the input. The GQA series power module is a roughly 2.4" x 2.2" x 0.5" encapsulated (potted) single board design that is available with through-hole I/O pins and includes a base-plate for better heat transfer. Both the power components including the power FETs, power transformers, inductors, and filtering capacitors and the control electronic circuits are located on a multi-layer FR-4 board. The over-temperature sensing device, is mounted on the PWB board. Once the temperature of the board area reaches the preset temperature, the protection circuit will shut the power module in an auto-recovery fashion. The GQA series module offers output over-current protection circuit to protect against both the overload and the short circuit. The input under-voltage is also included in GQA series module design.

**Isolation Transformers:**

Only two (2) transformers are used in this design. One is the main power transformer that provides primary and secondary isolation and energy transfer, and the other is a bias transformer that provides gate drive information and the on-board house-keeping power for various control circuitry and drivers.

**Testing Plan:**

Our intention is to approve the entire power module platform as Models listed above and **examples** listed in Table 1 by testing a minimal number of products. For safety testing, we intend to provide samples of the **GQA2W10A150V**. Our expectation is that testing of this highest output power should provide safety approval for the generic product codes listed under **Models** and **Examples** listed above in Table 1.

Some testing will be based on HQA UL section A35, as the product series uses same pwb, schematics, baseplate, same critical component list.

We would like to obtain approval to the following standards: **UL60950 Edition 2** AM2, (US & Canada) We would like to have an approval for our product as a **basic insulation** device with 2250Vdc isolation for unpotted units and 3000Vdc isolation for potted units.

**Manufacturing:**

The GQA product family will be manufactured by TDK-Lambda (M) Sdn. Bhd. PLO 33, Kawasan Perindustrian Senai, Locked Bag No. 110, 81400 Senai, Johor, Malaysia and/or TDK Lambda Americas –Dallas Technical Center, 3320 Matrix Drive, Suite 100, Richardson, TX 75082.

The facilities are **UL, CSA and VDE** approved manufacturing facility with **ISO9002** certified.

**Product Directory Entry:**

**TDK Lambda Americas – Dallas Technical Center (formerly known as TDK Innoveta Inc.)** located at 3320 Matrix Drive, Suite 100, Richardson, Texas 75082 will market and sell the GQA series products.

Enclosures

Miscellaneous ID 07-03



TDK-Lambda Americas Inc.  
3320 Matrix Dr., Ste. 100, Richardson, TX 75082  
Phone: 214.239.3100 Fax: 214.239.3102

UL LLC  
12 Laboratory Drive  
Research Triangle Park, NC 27709

Subject: Letter of Assurance - National Differences

This document confirms that TDK-Lambda Americas Inc., will provide the following items needed to the accepting National Certification Bodies (NCBs) along with the CB test report.

**Markings and Safety Instructions** – Safety instructions and markings in the language suitable for the countries listed in the attached reports will be provided at the same time the CB test report is submitted to the NCB.


**EMC Test Report** – Where detailed in the National Differences, an EMC test report or Declaration of Conformity will accompany this product when sent to countries that require EMC test results as part of their certification process.

**Power Supply Cords and Plugs** – All power cords and plug assemblies provided with the unit will be certified and suitable for use in the countries listed in the attached CB test report.

**Multiple Factories** - This confirms that samples submitted for certification are representative of the products from each factory. The factories are as noted in this CB Test Report.

**Batteries** – Upon shipment of products to Switzerland, the requirements of the most up-to-date Swiss Ordinance Annex 2.15, Batteries of SR 814.81 will be met including provision of the necessary markings, documents, and annual reports relative to the disposal of the batteries to the Swiss Authorities.

**ROHS Directive** – We have been advised that we will need to provide evidence that our product complies with ROHS Directive 2011/65/EU. The accepting NCB may obtain this information from TDK-Lambda Americas Inc by part number upon request.

	2019-10-25
<i>Signature</i>	Date
Steven F. McKitrick Engineer	2019-10-25

## Enclosures

## Miscellaneous ID 07-04

Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014.

IEC 62368-1, Second Edition Test	Equivalent IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013
Determination of Working Voltage (5.4.1.8)	Determination of Working Voltage; Working Voltage Measurement (2.10.2)
Test for semiconductor components and cemented joints (5.4.7)	Semiconductor Devices and Cemented Joints (2.10.11, 2.10.9)
Electric Strength (5.4.9)	Electric Strength (5.2.2)
NORMAL OPERATING CONDITION TEMPERATURE (6.3, ANNEX B.2.6)	HEATING TEST (4.5)
INPUT TEST (ANNEX B.2.5)	INPUT TEST (1.6.2)
SIMULATED ABNORMAL OPERATING CONDITIONS (ANNEX B.3)	Abnormal Operation (5.3.1 - 5.3.9)
SINGLE FAULT CONDITIONS (6.4.2, ANNEX B.4)	FAULT CONDITION TEST (5.3); Power Supply Output Short-Circuit/Overload (5.3.7) Component Failure (5.3.1, 5.3.4, 5.3.7)