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Ref. Certif. No.

JPTUV-116246

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT  
(IECEE) CB SCHEME

## CB TEST CERTIFICATE

Product	DC-DC Power Modules
Name and address of the applicant	ABB Power Electronics (Shanghai) Co., Ltd Floor 1, Building #58, 461 Hongcao Road, Shanghai, P.R. China
Name and address of the manufacturer	ABB Power Electronics Inc. 601 Shiloh Road Plano, Texas 75074, USA
Name and address of the factory	Lineage Power China Co., Ltd. 1353 Chenqiao Road Fengpu Industrial Park, Fengxian, 201401 Shanghai, P.R. China
Ratings and principal characteristics	Rated Input: 40-60Vdc, 27A Max. Rated Output: 12Vdc, 84A, 1000W Max Protection Class: Not classified
Trademark (if any)	GE (Optional)
Customer's Testing Facility (CTF) Stage used	CTF Stage 2
Model / Type Ref.	QBDE084A0BX (X maybe 0-9, A-Z, -, _, or blank for market purposes)
Additional information (if necessary may also be reported on page 2)	For model differences, refer to the test report.
A sample of the product was tested and found to be in conformity with	IEC 62368-1:2014 See Test Report for National Differences
As shown in the Test Report Ref. No. which forms part of this Certificate	CN20W4KH 001

This CB Test Certificate is issued by the National Certification Body



**TÜVRheinland**®

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Date: 2021-02-07

Signature:


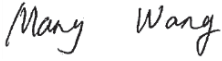


Mark Chen



Test Report issued under the responsibility of:



<b>TEST REPOR0054</b> <b>IEC 62368-1</b> <b>Audio/video, information and communication technology equipment</b> <b>Part 1: Safety requirements</b>	
<b>Report Number</b> .....	<b>CN20W4KH 001</b>
Date of issue .....	2021.02.02
Total number of pages .....	64 (excluding attachments, refer to page 3)
<b>Applicant's name</b> .....	ABB Power Electronics (Shanghai) Co., Ltd.
Address .....	Floor 1, Building #58, 461 Hongcao Road, Shanghai, P. R. China
<b>Test specification:</b>	
Standard .....	IEC 62368-1:2014 (Second Edition)
Test procedure.....	CB Scheme
Non-standard test method.....	N/A
<b>Test Report Form No.</b> .....	IEC62368_1B
Test Report Form(s) Originator .....	UL(US)
Master TRF .....	2014-03
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<b>General disclaimer:</b>	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

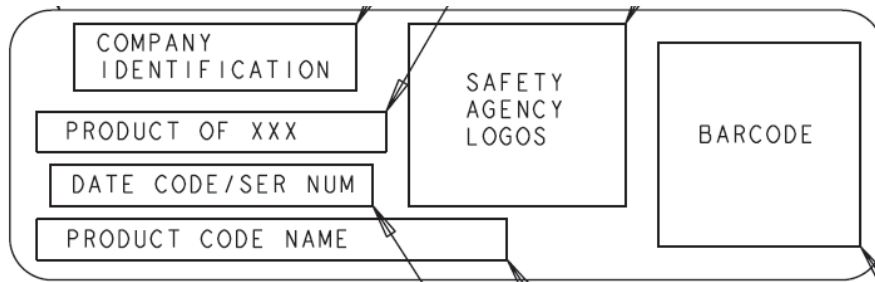
Test Item description .....	DC-DC Power Modules	
Trade Mark .....	 or GE (Optional)	
Manufacturer.....	ABB Power Electronics Inc. 601 Shiloh Road, Plano, Texas 75074, USA	
Model/Type reference .....	QBDE084A0BX (X maybe 0-9, A-Z, -, _, or blank for market purposes)	
Ratings .....	Input: 40-60Vdc, 27A Max. Output: 12Vdc, 84A, 1000W Max	
Testing procedure and testing location:		
<input checked="" type="checkbox"/> CB Testing Laboratory:	TÜV Rheinland Shanghai Co. Ltd.	
Testing location/ address .....	No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China	
<input type="checkbox"/> Associated CB Testing Laboratory:		
Testing location/ address .....		
Tested by (name + signature) .....		
Approved by (name + signature).....		
<input type="checkbox"/> Testing procedure: TMP/CTF Stage 1		
Testing location/ address .....		
Tested by (name + signature) .....		
Approved by (name + signature).....		
<input checked="" type="checkbox"/> Testing procedure: WMT/CTF Stage 2	ABB Power Electronics (Shanghai) Co., Ltd.	
Testing location/ address .....	Floor 1, Building #58, 461 Hongcao Road, Shanghai, China	
Tested by (name + signature) .....	Mary Wang	
Witnessed by (name + signature) .....	Damon Zhou / Expert	
Approved by (name + signature).....	Sunny Sun / Reviewer	
<input type="checkbox"/> Testing procedure: SMT/CTF Stage 3 or 4		
Testing location/ address .....		
Tested by (name + signature) .....		
Approved by (name + signature).....		
Supervised by (name + signature) .....		

<p><b>List of Attachments (including a total number of pages in each attachment):</b></p> <ul style="list-style-type: none"> <li>- ATTACHMENT – National Differences (19 pages)</li> <li>- ATTACHMENT – Technical Documentation (5 pages)</li> <li>- ATTACHMENT – Photo Documentation (2 pages)</li> </ul> <p>Note: Total number of pages in each attachment is indicated in individual attachment.</p>	
<p><b>Summary of testing:</b></p>	
<p><b>Tests performed (name of test and test clause):</b></p> <p>This report is based on original CBTR 50209449 001 with following changes:</p> <ul style="list-style-type: none"> <li>- Change standard to "IEC 62368-1:2014 (Second Edition)".</li> </ul> <p>No technical changes in between as declared by the manufacturer, the EUT was evaluated and a sample of the equipment was subject of a construction check. Following additional tests and evaluations per the requirements of the new standard and/or considered necessary were conducted in this report:</p> <ul style="list-style-type: none"> <li>- Check and update certificate validity of critical components (Cl.4.1.2),</li> <li>- Steady State Voltage and Current conditions (Cl. 5.2.2.2),</li> <li>- Electrical power source (PS) measurements for classification (Cl. 6.2.2)</li> </ul> <p>Except stated above, all test data are derived from original CB test report.</p> <p>All applicable tests as described in test cases and appended tables were performed on model QBDE084A0B to represent others.</p> <p>See test case and appended table for details.</p> <p>Engineering sample without serial number.</p>	<p><b>Testing location:</b></p> <p>ABB Power Electronics (Shanghai) Co., Ltd. Floor 1, Building #58, 461 Hongcao Road, Shanghai, P. R. China</p>
<p><b>Summary of compliance with National Differences:</b></p> <p><b>List of countries addressed</b></p> <p>EU Group Differences, EU Special National Conditions, DK, US, CA.</p> <p>Explanation of used codes: DK=Denmark, US=United States of America, CA=Canada.</p> <p><input checked="" type="checkbox"/> <b>The product fulfils the requirements of</b> IEC 62368-1:2014 EN 62368-1:2014+A11:2017</p>	

**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.

<Representative>



Note: the above labels are draft of artwork for marking plates pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.

<b>TEST ITEM PARTICULARS:</b>	
Classification of use by .....	<input type="checkbox"/> Ordinary person <input checked="" type="checkbox"/> Instructed person <input type="checkbox"/> Skilled person <input type="checkbox"/> Children likely to be present
Supply Connection .....	<input type="checkbox"/> AC Mains <input type="checkbox"/> DC Mains <input checked="" type="checkbox"/> External Circuit - not Mains connected - <input checked="" type="checkbox"/> ES1 <input type="checkbox"/> ES2 <input type="checkbox"/> ES3
Supply % Tolerance .....	<input type="checkbox"/> +10%/-10% <input type="checkbox"/> +20%/-15% <input type="checkbox"/> + ___%/-___% <input checked="" type="checkbox"/> None
Supply Connection – Type .....	<input type="checkbox"/> pluggable equipment type A - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> direct plug-in <input type="checkbox"/> mating connector <input type="checkbox"/> pluggable equipment type B - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> permanent connection <input type="checkbox"/> mating connector <input checked="" type="checkbox"/> other: not directly connected to the mains
Considered current rating of protective device as part of building or equipment installation .....	N/A Installation location: <input type="checkbox"/> building; <input type="checkbox"/> equipment
Equipment mobility .....	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in <input type="checkbox"/> rack-mounting <input type="checkbox"/> wall-mounted
Over voltage category (OVC) .....	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input checked="" type="checkbox"/> other: DC Supplied
Class of equipment .....	<input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input checked="" type="checkbox"/> Not classified <input type="checkbox"/>
Access location .....	<input type="checkbox"/> restricted access location <input checked="" type="checkbox"/> N/A
Pollution degree (PD) .....	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
Manufacturer's specified maximum operating ambient:	Up to 85 °C
IP protection class .....	<input checked="" type="checkbox"/> IPX0 <input type="checkbox"/> IP___
Power Systems .....	<input type="checkbox"/> TN <input type="checkbox"/> TT <input type="checkbox"/> IT - 230 V <sub>L-L</sub>
Altitude during operation (m) .....	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> 5000 m
Altitude of test laboratory (m) .....	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> ___50___ m
Mass of equipment (kg) .....	Approx. 0.1 kg
<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.....:	2018.12.12 (for original report 50209449 001) 2020.09.24(for this report CN20W4KH 001)
Date (s) of performance of tests .....	2018.12.12 to 2018.12.27 (for original report 50209449 001) 2020.09.24 to 2020.11.09 (for this report CN20W4KH 001)
<b>GENERAL REMARKS:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.          "(See ATTACHMENT #)" 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 IEC60950-1:</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 type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies) .....</b>	Lineage Power China Co., Ltd. 1353 Chenqiao Road, Fengpu Industrial Park, 201401, Fengxian, Shanghai, P. R. China
<b>GENERAL PRODUCT INFORMATION:</b>	
<b>General product information:</b>	
<p>The product covered by this report is DC-DC Power Modules (building-in type) intend for incorporation in information technology equipment.</p> <p>The power supply module has been evaluated to the spacing requirements for basic insulation between input and output circuits.</p> <p>Optional conformal coating, R/C (QMJU2), rated V-0, manufactured by Humiseal, part number 1A33 or UV40, minimum 0.0254mm, and 0.0508mm respectively, may be provided on the printed circuit board to add additional product robustness with functional insulation. The coating has not been evaluated to reduce pollution Degree from a safety spacing perspectives.</p>	
<b>Additional Information:</b>	
<ul style="list-style-type: none"> <li>- The product is component type Board Mounted Power Supply intended for incorporation in information technology equipment, the overall compliance shall be investigated in the complete end system/equipment, in particular as:           <ul style="list-style-type: none"> <li>- Fire enclosure</li> <li>- Mechanical enclosure</li> <li>- Electrical enclosure</li> </ul> </li> <li>• Some components are <b>pre-certified</b>, which have been evaluated according to the relevant requirements of IEC 62368-1, are employed in this product. Their suitability of use has been checked according to subclause 4.1.1 and 4.1.2.</li> <li>• The label is draft of artwork for marking plates pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.</li> </ul>	

**Markings and Instructions:**

- Fuse Identification (See subclause F.3.5.3): DC-DC power module, no fuse used.

**Definition of variable(s):**

QBDE084A0BX (X maybe 0-9, A-Z, -, \_, or blank for market purposes)

Variable:	Range of variable:	Content:
X	0-9, A-Z, -, _, or blank	Indicate the different code of the client or the different sales market.

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

The equipment is a component intended for incorporation in audio/video, information and communication technology equipment, the overall compliance shall be investigated in the complete audio/video, information and communication technology equipment.



<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>	
<b>Source of electrical energy</b>	<b>Corresponding classification (ES)</b>
All input and output circuit	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>	
<b>Source of power or PIS</b>	<b>Corresponding classification (PS)</b>
All input and output circuit	PS3
<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>	
<b>Source of hazardous substances</b>	<b>Corresponding chemical</b>
N/A	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>	
<b>Source of kinetic/mechanical energy</b>	<b>Corresponding classification (MS)</b>
Equipment mass	MS1
<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>	
<b>Source of thermal energy</b>	<b>Corresponding classification (TS)</b>
To be determined by end-product use	To be determined by end-product use
<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>	
<b>Type of radiation</b>	<b>Corresponding classification (RS)</b>
-	-

<b>ENERGY SOURCE DIAGRAM</b>
Indicate which energy sources are included in the energy source diagram. Insert diagram below
<input checked="" type="checkbox"/> <b>ES</b> <input checked="" type="checkbox"/> <b>PS</b> <input checked="" type="checkbox"/> <b>MS</b> <input type="checkbox"/> <b>TS</b> <input type="checkbox"/> <b>RS</b> "SEE OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS"

<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
Instructed person	ES1: All input and output circuit	--	--	--
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
Combustible materials without enclosure	PS3: > 100 Watt circuit (All input and output circuit)	See 6.3.1 (a) (N)	See 6.4.5 and 6.4.6 (N, A, S)	--
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementary	Reinforced
--	--	--	--	--
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementary	Reinforced
Instructed person	MS1: Equipment mass – mass $0.1 \text{ kg} \leq 7 \text{ kg}$	--	--	--
9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
To be determined by end-product use	--	--	--	--
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
--	--	--	--	--
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>		P
4.1.1	Acceptance of materials, components and subassemblies	See appended tables 4.1.2	P
4.1.2	Use of components	Components which are certified to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment. See also Annex G	P
4.1.3	Equipment design and construction	No accessible part which could cause injury. However, the equipment is a building-in type and evaluation is also to be made during the final system approval.	P
4.1.15	Markings and instructions .....	See Annex F	P
4.4.4	Safeguard robustness	Shall be investigated in the end system/equipment	N/A
4.4.4.2	Steady force tests.....	Shall be investigated in the end system/equipment	N/A
4.4.4.3	Drop tests.....	Shall be investigated in the end system/equipment	N/A
4.4.4.4	Impact tests .....	Shall be investigated in the end system/equipment	N/A
4.4.4.5	Internal accessible safeguard enclosure and barrier tests .....	Shall be investigated in the end system/equipment	N/A
4.4.4.6	Glass Impact tests .....	No such glass used.	N/A
4.4.4.7	Thermoplastic material tests.....	No thermoplastic material used as a safeguard.	N/A
4.4.4.8	Air comprising a safeguard.....	Shall be investigated in the end system/equipment	N/A
4.4.4.9	Accessibility and safeguard effectiveness	Shall be investigated in the end system/equipment	N/A
4.5	Explosion	No explosion occurs during normal/abnormal operation and single fault conditions	P
4.6	Fixing of conductors		P
4.6.1	Fix conductors not to defeat a safeguard	Compliance checked.	P
4.6.2	10 N force test applied to .....	ES1 circuit, no safety insulation required	N/A
4.7	Equipment for direct insertion into mains socket - outlets	The equipment is not for direct insertion into mains socket-outlets	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	No coin/button batteries used.	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
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.....:		N/A

<b>5</b>	<b>ELECTRICALLY-CAUSED INJURY</b>		P
5.2.1	Electrical energy source classifications .....	See appended table 5.2	P
5.2.2	ES1, ES2 and ES3 limits		P
5.2.2.2	Steady-state voltage and current .....	See appended table 5.2	P
5.2.2.3	Capacitance limits.....:	not directly connected to the mains	N/A
5.2.2.4	Single pulse limits.....:	No such single pulse	N/A
5.2.2.5	Limits for repetitive pulses .....	No such repetitive pulse	N/A
5.2.2.6	Ringing signals .....	No such ringing signal	N/A
5.2.2.7	Audio signals .....	No such audio signal	N/A
5.3	Protection against electrical energy sources	See below	P
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons	See only 4.3 and 5.3 to 5.6 which applies to protection between the accessible parts and hazardous parts of other circuits.	P
5.3.2.1	Accessibility to electrical energy sources and safeguards	ES1 circuit. However, the equipment is a building-in type and evaluation is also to be made during the end system/equipment.	P
5.3.2.2	Contact requirements	Shall be investigated in the end system/equipment	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	No such terminals intended to be used by ordinary person.	N/A
5.4	Insulation materials and requirements		P
5.4.1.2	Properties of insulating material	The choice and application have taken into account as specified in this Clause 5 and Annex T except natural rubber, hygroscopic materials or asbestos are not used as insulation.	P
5.4.1.3	Humidity conditioning.....:	No hygroscopic material used.	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.1.4	Maximum operating temperature for insulating materials .....	See appended table 5.4.1.4	P
5.4.1.5	Pollution degree .....	2	—
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		N/A
5.4.1.6	Insulation in transformers with varying dimensions		N/A
5.4.1.7	Insulation in circuits generating starting pulses		N/A
5.4.1.8	Determination of working voltage	See appended tables 5.4.2.2, 5.4.2.4 and 5.4.3	P
5.4.1.9	Insulating surfaces	Considered	P
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	See below	P
5.4.2.2	Determining clearance using peak working voltage	See appended tables 5.4.2.2, 5.4.2.4 and 5.4.3	P
5.4.2.3	Determining clearance using required withstand voltage .....	See appended table 5.4.2.3	P
	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 .....	Specified the equipment to be operated up to 5000 m above sea level. Multiplication factor 1.48 applied for clearances according to Table 17.	P
5.4.3	Creepage distances .....	See appended tables 5.4.2.2, 5.4.2.4 and 5.4.3	P
5.4.3.1	General	See below	P
5.4.3.3	Material Group .....	Material group IIIb assumed.	—
5.4.4	Solid insulation	See below	P
5.4.4.2	Minimum distance through insulation .....	See appended table 5.4.4.2	P
5.4.4.3	Insulation compound forming solid insulation	See only 5.4.4.4 for optocoupler	P
5.4.4.4	Solid insulation in semiconductor devices	Approved optocoupler used. See appended table 4.1.2	P
5.4.4.5	Cemented joints		N/A
5.4.4.6	Thin sheet material	See below	P

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.4.6.1	General requirements		P
5.4.4.6.2	Separable thin sheet material		N/A
	Number of layers (pcs) .....		N/A
5.4.4.6.3	Non-separable thin sheet material		N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material .....		N/A
5.4.4.6.5	Mandrel test		N/A
5.4.4.7	Solid insulation in wound components		N/A
5.4.4.9	Solid insulation at frequencies >30 kHz .....	Basic insulation only, no solid insulation required	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		N/A
5.4.8	Humidity conditioning	See below	P
	Relative humidity (%).....	93%	—
	Temperature (°C) .....	40.0 °C	—
	Duration (h) .....	120 h	—
5.4.9	Electric strength test .....	See appended table 5.4.9	P
5.4.9.1	Test procedure for a solid insulation type test	Compliance was checked immediately following temperature test in 5.4.1.4 and on a sample of the transformer raised to the relevant temperature as measured during that test. Also following test of 5.4.8	P
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.....	Shall be investigated in the end system/equipment	N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.11.2	Requirements		N/A
	Rated operating voltage $U_{op}$ (V)..... :		—
	Nominal voltage $U_{peak}$ (V) ..... :		—
	Max increase due to variation $U_{sp}$ ..... :		—
	Max increase due to ageing $\square U_{sa}$ ..... :		—
	$U_{op} = U_{peak} + \square U_{sp} + \square U_{sa}$ ..... :		—
5.5	Components as safeguards		
5.5.1	General		N/A
5.5.2	Capacitors and RC units		N/A
5.5.2.1	General requirement		N/A
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector..... :		N/A
5.5.3	Transformers		N/A
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 <sup>2</sup> ) .....:		—
5.6.4	Requirement for protective bonding conductors		N/A
5.6.4.1	Protective bonding conductors		N/A
	Protective bonding conductor size (mm <sup>2</sup> ). .....:		—
	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 <sup>2</sup> ), 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		N/A
5.7.2	Measuring devices and networks		N/A
5.7.2.1	Measurement of touch current .....		N/A
5.7.2.2	Measurement of prospective touch voltage		N/A
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>		P
6.2	Classification of power sources (PS) and potential ignition sources (PIS)		P
6.2.2	Power source circuit classifications	PS (power source) classification determined by measuring the maximum power in Figures 34 and 35 for load and power source circuits.	P
6.2.2.1	General	See below	P
6.2.2.2	Power measurement for worst-case load fault.. :	See appended table 6.2.2	P
6.2.2.3	Power measurement for worst-case power source fault .....	See appended table 6.2.2	P

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Clause	Requirement + Test	Result - Remark	Verdict
6.2.2.4	PS1 .....		N/A
6.2.2.5	PS2 .....		N/A
6.2.2.6	PS3 .....	See appended table 6.2.2	P
6.2.3	Classification of potential ignition sources	See below	P
6.2.3.1	Arcing PIS .....	See appended table 6.2.3.1	P
6.2.3.2	Resistive PIS .....	The available power exceeding 15 W and no further test considered necessary. See appended table 6.2.3.2.	P
6.3	Safeguards against fire under normal operating and abnormal operating conditions		P
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 .....	No ignition and no such temperature attained within the equipment. See appended tables 5.4.1.4, 6.3.2, 9.0, B.2.6.	P
6.3.1 (b)	Combustible materials outside fire enclosure	Shall be investigated in the end system/equipment	N/A
6.4	Safeguards against fire under single fault conditions		P
6.4.1	Safeguard Method	Method by control of fire spread. However, the equipment is a building-in type and evaluation is to be made during the final system approval.	P
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits	See above.	N/A
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits	See above.	N/A
6.4.3.1	General	See above.	N/A
6.4.3.2	Supplementary Safeguards		N/A
	Special conditions if conductors on printed boards are opened or peeled		N/A
6.4.3.3	Single Fault Conditions .....		N/A
	Special conditions for temperature limited by fuse	No such consideration.	N/A
6.4.4	Control of fire spread in PS1 circuits	All circuits are classified as PS3 circuits.	N/A
6.4.5	Control of fire spread in PS2 circuits	All circuits are classified as PS3 circuits.	N/A
6.4.5.2	Supplementary safeguards .....		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
6.4.6	Control of fire spread in PS3 circuit	Compliance detailed as follows: – <u>Printed board</u> : Min. V-0 – <u>All other components</u> : At least V-2 except for parts mounted on min. V-1 material or small parts of combustible material (with mass less than 4g) or components complying to relevant IEC standard.  The equipment is a building-in type and evaluation is to be made during the final system approval.	P
6.4.7	Separation of combustible materials from a PIS	V-0 PCB used. However, the equipment is a building-in type and evaluation is to be made during the final system approval.	P
6.4.7.1	General..... :	See tables 6.2.3.1 and 6.2.3.2	P
6.4.7.2	Separation by distance		N/A
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers	The equipment is a building-in type and evaluation is to be made during the final system approval.	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		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

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Clause	Requirement + Test	Result - Remark	Verdict
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

7 INJURY CAUSED BY HAZARDOUS SUBSTANCES			N/A
7.2	Reduction of exposure to hazardous substances	No hazardous chemical within the equipment.	N/A
7.3	Ozone exposure	No ozone production within the equipment.	N/A
7.4	Use of personal safeguards (PPE)	The equipment is a building-in type and evaluation is to be made during the end system/equipment.	N/A
	Personal safeguards and instructions .....		—
7.5	Use of instructional safeguards and instructions		N/A
	Instructional safeguard (ISO 7010) .....		—
7.6	Batteries.....	No batteries used.	N/A

8 MECHANICALLY-CAUSED INJURY			P
8.1	General		P
8.2	Mechanical energy source classifications	Line 5) Equipment mass: $0.1 \text{ kg} \leq 7 \text{ kg}$ , classified as MS1. However, the equipment is a building-in type and evaluation is also to be made during the final system approval.	P
8.3	Safeguards against mechanical energy sources		N/A
8.4	Safeguards against parts with sharp edges and corners	Shall be investigated in the end system/equipment	N/A
8.4.1	Safeguards		N/A
8.5	Safeguards against moving parts	No moving part	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.....		—

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Clause	Requirement + Test	Result - Remark	Verdict
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	Shall be investigated in the end system/equipment	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 .....		—
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	The equipment is not intended to be 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	No handles provided.	N/A
8.8.1	Classification		N/A
8.8.2	Applied Force .....		N/A
8.9	Wheels or casters attachment requirements	No wheels or casters.	N/A
8.9.1	Classification		N/A
8.9.2	Applied force .....		—
8.10	Carts, stands and similar carriers	No carts, stands or 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

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Clause	Requirement + Test	Result - Remark	Verdict
	Applied horizontal force (N) .....		—
8.10.6	Thermoplastic temperature stability (°C) .....		N/A
8.11	Mounting means for rack mounted equipment	The equipment is not for the slide-rail mounting.	N/A
8.11.1	General		N/A
8.11.2	Product Classification		N/A
8.11.3	Mechanical strength test, variable <i>N</i> .....		N/A
8.11.4	Mechanical strength test 250N, including end stops		N/A
8.12	Telescoping or rod antennas .....	No such parts.	N/A
	Button/Ball diameter (mm).....		—

9	THERMAL BURN INJURY		N/A
9.2	Thermal energy source classifications	The equipment is a building-in type and evaluation is to be made during the end system/equipment.	N/A
9.3	Safeguard against thermal energy sources		N/A
9.4	Requirements for safeguards		N/A
9.4.1	Equipment safeguard		N/A
9.4.2	Instructional safeguard .....	Element 1a and 2 used on marking label as instructional safeguard.	N/A

10	RADIATION		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 equipment:		—
	Normal, abnormal, single-fault.....		N/A
	Instructional safeguard .....		—
	Tool.....		—
10.4	Protection against visible, infrared, and UV radiation	No such radiation generated from the equipment.	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

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Clause	Requirement + Test	Result - Remark	Verdict
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
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:	No such x-radiation generated from the 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	No such 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).....		—
10.6.5.3	Cordless listening device		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Maximum dB(A).....:		—

<b>B</b>	<b>NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS</b>		P
B.2	Normal Operating Conditions	See below	P
B.2.1	General requirements .....	See Test Item Particulars and appended test tables	P
	Audio Amplifiers and equipment with audio amplifiers .....	Not such equipment.	N/A
B.2.3	Supply voltage and tolerances	40 to 60Vdc as declared by manufacturer.	P
B.2.5	Input test .....	See appended table B.2.5.	P
B.3	Simulated abnormal operating conditions		P
B.3.1	General requirements .....	See appended table B.3 & B.4.	P
B.3.2	Covering of ventilation openings		N/A
B.3.3	D.C. mains polarity test		N/A
B.3.4	Setting of voltage selector.....	No setting of voltage selector within the EUT	N/A
B.3.5	Maximum load at output terminals .....	See appended table B.3 & B.4.	P
B.3.6	Reverse battery polarity	No battery within the EUT.	N/A
B.3.7	Abnormal operating conditions as specified in Clause E.2.	Not such equipment.	N/A
B.3.8	Safeguards functional during and after abnormal operating conditions		N/A
B.4	Simulated single fault conditions		P
B.4.2	Temperature controlling device open or short-circuited.....	No such device used.	N/A
B.4.3	Motor tests	No motors used.	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		N/A
B.4.4.1	Short circuit of clearances for functional insulation		N/A
B.4.4.2	Short circuit of creepage distances for functional insulation		N/A
B.4.4.3	Short circuit of functional insulation on coated printed boards		N/A
B.4.5	Short circuit and interruption of electrodes in tubes and semiconductors		N/A
B.4.6	Short circuit or disconnect of passive components	See appended table B.3 & B.4	P



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Clause	Requirement + Test	Result - Remark	Verdict
B.4.7	Continuous operation of components	The EUT is continuous operating type and no such components intended for short time operation or intermittent operation.	N/A
B.4.8	Class 1 and Class 2 energy sources within limits during and after single fault conditions	No change to circuits classified in 5.3.	P
B.4.9	Battery charging under single fault conditions .. :	No battery involved in the EUT	N/A
<b>C</b>	<b>UV RADIATION</b>		N/A
C.1	Protection of materials in equipment from UV radiation	No UV radiation generated from the equipment.	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	No such device.	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	No audio amplifier	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>		P
F.1	General requirements	See below	P
	Instructions – Language .....	English instruction check. Other languages will be evaluated during national approval.	—
F.2	Letter symbols and graphical symbols	Built-in DC-DC power module	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		P
F.3.1	Equipment marking locations	Equipment marking is located on the side surface of the moduel and is easily visible.	P
F.3.2	Equipment identification markings	See below	P
F.3.2.1	Manufacturer identification .....	See copy of marking plate	—

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.2.2	Model identification .....	See copy of marking plate	—
F.3.3	Equipment rating markings	Class III equipment	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.3.3.4	Rated frequency .....		—
F.3.3.6	Rated current or rated power .....		—
F.3.3.7	Equipment with multiple supply connections	Single supply connection	N/A
F.3.4	Voltage setting device	No voltage selector	N/A
F.3.5	Terminals and operating devices		N/A
F.3.5.1	Mains appliance outlet and socket-outlet markings .....	No such device	N/A
F.3.5.2	Switch position identification marking .....	No such switch	N/A
F.3.5.3	Replacement fuse identification and rating markings .....	Class III equipment, no fuse used	N/A
F.3.5.4	Replacement battery identification marking .....	No replacement battery used.	N/A
F.3.5.5	Terminal marking location		N/A
F.3.6	Equipment markings related to equipment classification	Shall be investigated in the end system/equipment	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 .....	Shall be investigated in the end system/equipment	—
F.3.8	External power supply output marking		N/A
F.3.9	Durability, legibility and permanence of marking		P
F.3.10	Test for permanence of markings		P
F.4	Instructions		P
	a) Equipment for use in locations where children not likely to be present - marking		N/A
	b) Instructions given for installation or initial use		P
	c) Equipment intended to be fastened in place		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	d) Equipment intended for use only in restricted access area	Shall be investigated in the end system/equipment	N/A
	e) Audio equipment terminals classified as ES3 and other equipment with terminals marked in accordance F.3.6.1	No such terminals provided.	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>		P
<b>G.1</b>	<b>Switches</b>		N/A
G.1.1	General requirements	No switch located in PS3.	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	No relay located in PS3.	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>		N/A
G.3.1	Thermal cut-offs	No thermal cut-off used as a safeguard.	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
G.3.2.1a)	Thermal links separately tested with IEC 60691	No thermal link used as a safeguard.	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 ( $\Omega$ ) :		—

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Clause	Requirement + Test	Result - Remark	Verdict
G.3.3	PTC Thermistors		N/A
G.3.4	Overcurrent protection devices		N/A
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.5		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 .....	No such connector used.	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>		N/A
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>		N/A
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 .....		N/A
G.5.3.3.1	Test conditions		N/A
G.5.3.3.2	Winding Temperatures testing in the unit		N/A
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	No such motor used.	N/A
	Position .....		—
G.5.4.2	Test conditions		N/A
G.5.4.3	Running overload test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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	No power supply cord provided	N/A
	Type .....		—
	Rated current (A) .....		—
	Cross-sectional area (mm <sup>2</sup> ), (AWG) .....		—
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

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Clause	Requirement + Test	Result - Remark	Verdict
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.	No such IC used.	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
G.10.1	General requirements	Not applicable	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	No such resistor used	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>		N/A
G.11.1	General requirements		N/A
G.11.2	Conditioning of capacitors and RC units		N/A
G.11.3	Rules for selecting capacitors		N/A
<b>G.12</b>	<b>Optocouplers</b>		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Optocouplers comply with IEC 60747-5-5:2007 Spacing or Electric Strength Test (specify option and test results) .....		N/A
	Type test voltage Vini .....		—
	Routine test voltage, Vini,b .....		—
<b>G.13</b>	<b>Printed boards</b>		N/A
G.13.1	General requirements		N/A
G.13.2	Uncoated printed boards		N/A
G.13.3	Coated printed boards		N/A
G.13.4	Insulation between conductors on the same inner surface		N/A
	Compliance with cemented joint requirements (Specify construction) .....		—
G.13.5	Insulation between conductors on different surfaces	Single layer	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
<b>G.14</b>	<b>Coating on components terminals</b>		N/A
G.14.1	Requirements .....	No coating on component terminals considered to affect creepage or clearances.	N/A
<b>G.15</b>	<b>Liquid filled components</b>		N/A
G.15.1	General requirements	No pressurized liquid filled components used.	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

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Clause	Requirement + Test	Result - Remark	Verdict
a)	Humidity treatment in accordance with sc5.4.8 – 120 hours	No such ICX used.	N/A
b)	Impulse test using circuit 2 with $U_c =$ to transient voltage .....		N/A
C1)	Application of ac voltage at 110% of rated voltage for 2.5 minutes		N/A
C2)	Test voltage .....		—
D1)	10,000 cycles on and off using capacitor with smallest capacitance resistor with largest resistance specified by manufacturer		N/A
D2)	Capacitance .....		—
D3)	Resistance .....		—
<b>H</b>	<b>CRITERIA FOR TELEPHONE RINGING SIGNALS</b>		N/A
H.1	General	No telephone ringing signal	N/A
H.2	Method A		N/A
H.3	Method B		N/A
H.3.1	Ringing 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
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	No safety interlock provided.	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



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Clause	Requirement + Test	Result - Remark	Verdict
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	Shall be investigated in the end system/equipment	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	No batteries used.	N/A
M.2	Safety of batteries and their cells		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
<b>N</b>	<b>ELECTROCHEMICAL POTENTIALS</b>		P
	Metal(s) used .....	Complied, the combined electrochemical potential < 0.6 V.	—
<b>O</b>	<b>MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES</b>		N/A
	Figures O.1 to O.20 of this Annex applied .....	Considered.	—
<b>P</b>	<b>SAFEGUARDS AGAINST ENTRY OF FOREIGN OBJECTS AND SPILLAGE OF INTERNAL LIQUIDS</b>		N/A
P.1	General requirements	Shall be investigated in the end system/equipment	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
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	No such 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	No such construction.	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	Not 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

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Clause	Requirement + Test	Result - Remark	Verdict
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	Shall be investigated in the end system/equipment	N/A
	Samples, material.....		—
	Wall thickness (mm).....		—
	Conditioning (°C).....		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	- Material not consumed completely		N/A
	- Material extinguishes within 30s		N/A
	- No burning of layer or wrapping tissue		N/A
S.2	Flammability test for fire enclosure and fire barrier integrity		N/A
	Samples, material.....		—
	Wall thickness (mm).....		—
	Conditioning (°C).....		—
	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.....		—

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Clause	Requirement + Test	Result - Remark	Verdict
	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	Shall be investigated in the end system/equipment	N/A
T.2	Steady force test, 10 N .....		N/A
T.3	Steady force test, 30 N .....		N/A
T.4	Steady force test, 100 N .....	Shall be investigated in the end system/equipment	N/A
T.5	Steady force test, 250 N .....	Shall be investigated in the end system/equipment	N/A
T.6	Enclosure impact test	Shall be investigated in the end system/equipment	N/A
	Fall test		N/A
	Swing test		N/A
T.7	Drop test .....	Shall be investigated in the end system/equipment	N/A
T.8	Stress relief test.....	Shall be investigated in the end system/equipment	N/A
T.9	Impact Test (glass)	No glass used	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 .....	No glass used	N/A
T.11	Test for telescoping or rod antennas	No telescoping or rod antennas used.	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	No CRT provided within the equipment.	N/A
U.2	Compliance and test method for non-intrinsically protected CRTs		N/A
U.3	Protective Screen .....		N/A

<b>IEC 62368-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
<b>V</b>	<b>DETERMINATION OF ACCESSIBLE PARTS (FINGERS, PROBES AND WEDGES)</b>		N/A
V.1	Accessible parts of equipment	Shall be investigated in the end system/equipment	N/A
V.2	Accessible part criterion		N/A

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Clause	Requirement + Test		Result - Remark		Verdict
<b>4.1.2</b>	<b>TABLE: List of critical components</b>				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>
PWB	TTM TECHNOLOGIE S TRADING (ASIA) CO LTD	45	V-0, 130 °C	UL 94 UL 746	UL E72464
Alternative	Interchangeable	--	V-0, 130 °C	UL 94 UL 746	UL
Conformal coating (Optional)	HUMISEAL, DIV OF CHASE CORP	1A33 or UV40	Min.V-1, Min.100°C Min.1500V	UL 746E, UL 94 IEC/EN/UL/CSA 62368-1	UL E105698 Test with appliance
Transformer T300	ABB Power	Planar of PWB	130 °C	IEC/EN 62368-1	Tested with appliance
Transformer T200	ABB Power	3665 Series	130 °C	IEC/EN 62368-1	Tested with appliance
Inductor L300	CYNTEC	CMME064T Series	130 °C	IEC/EN 62368-1	Tested with appliance
Inductor L301	ABB Power	13237 Series	130 °C	IEC/EN 62368-1	Tested with appliance
Optocoupler U400	Interchangeable	--	300 V, 125 °C	UL 1577	UL
Supplementary information: <sup>1)</sup> Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

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Clause	Requirement + Test	Result - Remark	Verdict
4.8.4, 4.8.5	<b>TABLE: Lithium coin/button cell batteries mechanical tests</b>		N/A
(The following mechanical tests are conducted in the sequence noted.)			
4.8.4.2	<b>TABLE: Stress Relief test</b>		—
	<b>Part</b>	<b>Material</b>	<b>Oven Temperature (°C)</b>
4.8.4.3	<b>TABLE: Battery replacement test</b>		—
	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>		—
	<b>Impact Area</b>	<b>Drop Distance</b>	<b>Drop No.</b>
			1
			2
			3
4.8.4.5	<b>TABLE: Impact</b>		—
	<b>Impacts per surface</b>	<b>Surface tested</b>	<b>Impact energy (Nm)</b>
4.8.4.6	<b>TABLE: Crush test</b>		—
	<b>Test position</b>	<b>Surface tested</b>	<b>Crushing Force (N)</b>
			<b>Duration force applied (s)</b>
Supplementary information:			



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

5.2	<b>Table: Classification of electrical energy sources</b>						P
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	60 VDC	Input terminal	Normal	60 VDC	--	--	ES1
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	
2	60 VDC	Output V+ to V-	Normal	12.3 VDC	--	--	ES1
			Abnormal	11.7 VDC	--	--	
			Single fault –SC Q300 D to S	0	--	--	
5.2.2.3 - Capacitance Limits							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters		ES Class	
				Capacitance, nF	Upk (V)		
1	--	--	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)	I <sub>pk</sub> (mA)	
--	--	--	Normal	--	--	--	--
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

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

## 5.2.2.5 - Repetitive Pulses

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

## Test Conditions:

Normal – See Annex B.2

Abnormal – See Annex B.3

Supplementary information: SC=Short Circuit, OC=Open Circuit

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

5.4.1.4, 6.3.2, 9.0, B.2.6	TABLE: Temperature measurements					P
Test condition .....	Test A	Test B	Test C	Test D	---	
Supply voltage (V) .....	40 Vdc	60 Vdc	40 Vdc	60 Vdc	---	
Frequency (Hz) .....	--	--	--		---	
Ambient T <sub>min</sub> (°C) .....	--	--	--		---	
Ambient T <sub>max</sub> (°C) .....	--	--	--		---	
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)	
Ambient	30.7	82.6	54.4	44.7	--	
Q301(Hotspot)	124.9	124.9	122.1	115.8	130	
Q304	98.0	114.4	94.2	87.7	130	
Q305	82.4	108.0	85.9	79.5	130	
Q307	90.2	110.1	92.1	83.5	130	
Q308	122.9	124.4	120.5	113.8	130	
Q311	123.3	124.2	117.5	112.2	130	
Q313	99.6	113.3	96.6	88.6	130	
T200	119.1	124.2	111.5	105.2	130	
T300C	122.8	127.1	116.6	112.2	130	
T300W	127.5	125.6	121.7	115.4	130	
L300	105.0	113.1	103.6	93.6	130	
L301C	83.7	111.0	83.1	80.1	130	
L301W	87.2	111.1	86.5	79.1	130	
IC200	117.0	121.5	111.2	104.3	125	
IC601	126.3	127.6	120.4	115.8	130	
IC403	78.3	107.4	82.7	74.2	125	
CR300	97.0	115.3	93.4	86.3	125	
HP	116.3	121.5	109.7	103.1	-	
U400	77.6	105.1	82.1	73.6	125	
PWB	127.5	125.6	121.7	115.4	130	
Vin	40.2 V	60.0 V	40.2 V	60.0 V	--	
Iin	25.6 A	6.1 A	25.5 A	17.3 A	--	
Vout	11.7 V	12.1 V	11.7 V	11.7 V	--	
Iout	84.0 A	29.17 A	84.0 A	84.0 A	--	

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Clause	Requirement + Test		Result - Remark		Verdict
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Pout	1000 W	347 W	1000 W	1000 W	--
Airflow	200 LFM	200 LFM	400 LFM	400 LFM	--

	Test condition .....	Test E	Test F	Test G	Test H	---
	Supply voltage (V) .....	40 Vdc	60 Vdc	50 Vdc	50 Vdc	---
	Frequence (Hz) .....	--	--	--		---
	Ambient T <sub>min</sub> (°C) .....	--	--	--		---
	Ambient T <sub>max</sub> (°C) .....	--	--	--		---

Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Ambient	61.5	54.8	53.0	83.9	--
Q301(Hotspot)	124.9	124.4	124.9	123.3	130
Q304	98.2	96.5	111.0	117.3	130
Q305	90.0	88.6	100.1	111.8	130
Q307	95.9	92.5	102.5	111.4	130
Q308	123.5	122.3	124.5	123.6	130
Q311	121.0	120.6	122.6	122.7	130
Q313	100.0	97.1	112.4	116.6	130
T200	114.2	113.1	121.0	122.7	130
T300C	119.6	120.7	121.4	123.2	130
T300W	124.5	123.9	124.6	123.7	130
L300	107.0	102.2	112.1	116.0	130
L301C	86.9	88.0	98.4	109.2	130
L301W	90.5	88.2	103.0	111.7	130
IC200	112.9	112.1	117.2	119.1	125
IC601	123.3	124.3	126.2	125.4	130
IC403	87.5	83.6	94.9	108.3	125
CR300	96.8	94.4	108.5	115.7	125
HP	112.4	111.3	115.3	118.2	-
U400	86.2	82.9	88.5	103.6	125
PWB	124.5	123.9	124.6	123.7	130
Vin	40.2 V	60.0 V	50.1 V	50.1 V	--
Iin	25.3 A	17.3 A	20.4 A	13.3 A	--

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Vout	11.7 V	11.7 V	11.8 V	11.9 V	--
Iout	84.0 A	84.0 A	84.0 A	54.0 A	--
Pout	1000 W	1000 W	1000 W	594 W	--
Airflow	600 LFM	600 LFM	200 LFM	200 LFM	--

Test condition .....	Test I	Test J	Test K	Test L	---
Supply voltage (V) .....	50 Vdc	50 Vdc	50 Vdc	50 Vdc	---
Frequency (Hz) .....	--	--	--		---
Ambient T <sub>min</sub> (°C) .....	--	--	--		---
Ambient T <sub>max</sub> (°C) .....	--	--	--		---

Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Ambient	68.0	83.3	75.0	83.2	--
Q301(Hotspot)	121.3	123.3	123.0	124.0	130
Q304	106.6	112.8	108.7	112.3	130
Q305	99.9	107.8	102.9	107.4	130
Q307	102.0	108.6	105.3	109.0	130
Q308	121.1	123.6	123.0	124.1	130
Q311	119.6	122.3	121.3	122.6	130
Q313	107.6	112.9	109.9	112.9	130
T200	116.6	120.5	117.5	120.0	130
T300C	117.6	121.4	119.0	121.2	130
T300W	120.8	123.3	122.5	123.8	130
L300	111.1	115.5	113.2	115.8	130
L301C	95.5	103.6	98.5	103.1	130
L301W	99.9	107.1	102.5	106.7	130
IC200	113.8	117.6	115.5	117.7	125
IC601	122.5	125.0	124.1	125.3	130
IC403	95.7	104.0	99.2	104.1	125
CR300	106.3	112.6	108.3	111.9	125
HP	111.1	115.6	112.5	115.2	-
U400	92.0	100.5	95.7	101.0	125
PWB	120.8	123.3	122.5	123.8	130

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Vin	50.1 V	50.1 V	50.1 V	50.0 V	--
Iin	20.5 A	17.0 A	20.4 A	18.4 A	--
Vout	11.8 V	11.8 V	11.8 V	11.8 V	--
Iout	84.1 A	70.0 A	84.0 A	75.0 A	--
Pout	1000 W	799 W	1000 W	853 W	--
Airflow	400 LFM	400 LFM	600 LFM	600 LFM	--

	Test condition .....	Test M	Test N	Test O	--	---
	Supply voltage (V) .....	50 Vdc	50 Vdc	50 Vdc	--	---
	Frequency (Hz) .....	--	--	--	--	---
	Ambient T <sub>min</sub> (°C) .....	--	--	--	--	---
	Ambient T <sub>max</sub> (°C) .....	--	--	--	--	---

Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Ambient	69.7	84.9	84.9	--	--
Q301(Hotspot)	124.9	117.9	124.9	--	130
Q304	116.5	113.5	115.1	--	130
Q305	109.1	108.3	110.5	--	130
Q307	109.9	107.8	111.6	--	130
Q308	123.5	117.3	123.6	--	130
Q311	121.7	116.3	121.6	--	130
Q313	116.7	112.8	115.6	--	130
T200	120.9	116.5	120.1	--	130
T300C	120.6	116.3	120.5	--	130
T300W	124.0	117.6	124.0	--	130
L300	117.3	112.6	119.2	--	130
L301C	106.9	106.8	105.9	--	130
L301W	109.1	107.6	109.3	--	130
IC200	118.0	113.6	118.4	--	125
IC601	125.5	119.1	125.3	--	130
IC403	104.5	104.9	106.6	--	125
CR300	113.6	111.2	113.5	--	125
HP	113.5	110.9	113.5	--	-

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
U400	101.7	101.9	104.9	--	125
PWB	124.0	117.6	124.0	--	130
V <sub>in</sub>	50.1 V	50.2 V	50.1 V	--	--
I <sub>in</sub>	20.3 A	15.1 A	20.3 A	--	--
V <sub>out</sub>	11.8 V	11.9 V	11.8 V	--	--
I <sub>out</sub>	84.0 A	62.0 A	84.0 A	--	--
P <sub>out</sub>	1000 W	728 W	1000 W	--	--
Airflow	200 LFM	200 LFM	400 LFM	--	--

Test condition .....	Test AA	Test BB	Test CC	Test DD	---
Supply voltage (V) .....	40 Vdc	60 Vdc	40 Vdc	60 Vdc	---
Frequency (Hz) .....	--	--	--	--	---
Ambient T <sub>min</sub> (°C) .....	--	--	--	--	---
Ambient T <sub>max</sub> (°C) .....	--	--	--	--	---

Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Ambient	29.0	84.7	39.6	28.5	--
Q301(Hotspot)	125.0	111.5	116.6	113.8	130
Q304	115.7	110.2	110.4	119.1	130
Q305	102.5	105.8	91.4	97.8	130
Q307	115.2	110.1	105.9	111.1	130
Q308	125.0	113.7	120.1	117.2	130
Q311	124.8	113.6	117.3	115.6	130
Q313	114.7	110.5	107.1	114.4	130
T200	109.2	107.8	92.4	97.1	130
T300C	122.7	115.9	113.2	122.2	130
T300W	126.9	113.0	117.8	116.2	130
L300	98.8	101.2	88.1	89.2	130
L301C	87.9	106.8	83.5	94.3	130
L301W	106.6	110.5	99.8	107.7	130
IC200	109.6	107.3	98.3	103.3	125
IC601	127.0	116.4	118.4	118.7	130
IC403	113.3	112.5	103.4	110.0	125

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
CR300	116.4	111.8	107.0	114.1	125
HP	114.8	109.9	104.6	110.8	-
U400	90.9	99.8	79.2	82.4	125
PWB	126.9	113.0	117.8	116.2	130
Vin	40.2 V	60.0 V	40.2 V	60.0 V	--
Iin	24.8 A	2.7 A	25.4 A	17.3 A	--
Vout	11.8 V	12.2 V	11.7 V	11.7 V	--
Iout	80.1 A	12.0 A	84.0 A	84.0 A	--
Pout	960 W	146 W	1000 W	1000 W	--
Airflow	200 LFM	200 LFM	400 LFM	400 LFM	--

Test condition .....	Test EE	Test FF	Test GG	Test HH	---
Supply voltage (V) .....	40 Vdc	60 Vdc	50 Vdc	50 Vdc	---
Frequency (Hz) .....	--	--	--	--	---
Ambient T <sub>min</sub> (°C) .....	--	--	--	--	---
Ambient T <sub>max</sub> (°C) .....	--	--	--	--	---

Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Ambient	50.6	38.1	38.9	83.5	--
Q301(Hotspot)	119.9	108.5	124.0	119.9	130
Q304	114.3	103.9	121.6	120.2	130
Q305	94.4	83.7	106.4	113.6	130
Q307	108.7	96.3	119.3	118.3	130
Q308	123.6	111.9	125.0	121.1	130
Q311	120.4	110.5	123.9	120.2	130
Q313	110.9	100.0	121.0	118.7	130
T200	95.8	83.5	109.4	114.2	130
T300C	116.2	106.2	122.7	121.1	130
T300W	121.1	109.6	125.6	120.7	130
L300	93.5	78.9	98.7	108.7	130
L301C	88.3	82.8	99.5	109.7	130
L301W	103.7	93.6	113.2	116.3	130
IC200	102.0	89.9	111.1	114.3	125



IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
IC601	121.6	111.8	127.9	122.7	130
IC403	109.7	98.6	116.9	118.8	125
CR300	109.9	98.8	119.8	119.7	125
HP	107.5	95.9	117.0	116.8	-
U400	84.9	72.8	87.5	104.8	125
PWB	121.1	109.6	125.6	120.7	130
Vin	40.2 V	59.99 V	49.87 V	50.1 V	--
Iin	25.4 A	17.3 A	20.6 A	10.4 A	--
Vout	11.7 V	11.7 V	11.7 V	12.0 V	--
Iout	84.0 A	84.0 A	84.1 A	42.0 A	--
Pout	1000 W	1000 W	1000 W	496 W	--
Airflow	600 LFM	600 LFM	200 LFM	200 LFM	--

Test condition .....	Test II	Test JJ	Test KK	Test LL	---
Supply voltage (V) .....	50 Vdc	50 Vdc	50 Vdc	50 Vdc	---
Frequency (Hz) .....	--	--	--	--	---
Ambient T <sub>min</sub> (°C) .....	--	--	--	--	---
Ambient T <sub>max</sub> (°C) .....	--	--	--	--	---

Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Ambient	53.8	83.2	64.9	83.1	--
Q301(Hotspot)	116.7	116.6	121.1	116.9	130
Q304	117.4	119.1	123.3	119.8	130
Q305	98.9	108.3	104.6	108.0	130
Q307	111.8	114.5	116.8	114.9	130
Q308	118.8	118.2	123.3	118.6	130
Q311	116.4	116.9	120.8	117.0	130
Q313	114.5	115.9	120.1	116.6	130
T200	99.8	108.0	104.8	107.5	130
T300C	113.6	116.4	117.7	116.0	130
T300W	116.8	117.1	121.1	117.2	130
L300	96.8	104.9	103.8	105.7	130
L301C	96.2	105.5	102.2	105.3	130

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
L301W	108.0	112.8	113.9	113.2	130
IC200	103.7	109.5	108.8	109.4	125
IC601	119.1	119.2	123.4	119.3	130
IC403	109.8	114.6	115.1	114.5	125
CR300	111.8	115.4	116.8	115.3	125
HP	107.5	111.7	111.3	111.0	-
U400	86.8	99.4	94.7	100.0	125
PWB	116.8	117.1	121.1	117.2	130
V <sub>in</sub>	49.9 V	50.1 V	49.9 V	50.1 V	--
I <sub>in</sub>	20.5 A	13.7 A	20.5 A	14.9 A	--
V <sub>out</sub>	11.7 V	11.9 V	11.7 V	11.9 V	--
I <sub>out</sub>	84.0 A	56.0 A	84.1 A	61.0 A	--
P <sub>out</sub>	1000 W	654 W	1000 W	701 W	--
Airflow	400 LFM	400 LFM	600 LFM	600 LFM	--

Test condition .....	Test MM	Test NN	Test OO	Test PP	---
Supply voltage (V) .....	50 Vdc	50 Vdc	50 Vdc	50 Vdc	---
Frequency (Hz) .....	--	--	--	--	---
Ambient T <sub>min</sub> (°C) .....	--	--	--	--	---
Ambient T <sub>max</sub> (°C) .....	--	--	--	--	---

Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Ambient	68.4	82.4	70.9	82.4	--
Q301(Hotspot)	120.9	119.0	113.9	118.8	130
Q304	123.7	123.9	120.9	124.9	130
Q305	121.2	116.4	106.5	113.2	130
Q307	119.0	120.7	114.7	120.0	130
Q308	122.3	120.7	116.3	120.2	130
Q311	108.7	119.2	114.1	118.8	130
Q313	108.6	122.3	118.7	122.4	130
T200	116.4	113.0	100.9	108.3	130
T300C	120.8	118.3	110.0	116.4	130
T300W	118.5	119.6	114.0	119.2	130

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
L300	110.8	110.7	102.3	108.8	130
L301C	121.0	108.9	99.1	106.5	130
L301W	116.8	119.6	112.7	118.5	130
IC200	116.8	112.3	102.6	109.4	125
IC601	122.3	121.8	116.5	121.7	130
IC403	121.2	121.4	113.5	119.5	125
CR300	112.2	121.1	114.1	119.8	125
HP	102.1	112.0	102.4	109.3	-
U400	106.8	105.4	94.6	102.3	125
PWB	118.5	119.6	114.0	119.2	130
Vin	49.9 V	50.1 V	49.9 V	49.9 V	--
Iin	20.6 A	14.7 A	20.5 A	18.4 A	--
Vout	11.7 V	11.9 V	11.7 V	11.8 V	--
Iout	84.1 A	60.0 A	84.0 A	75.0 A	--
Pout	1000 W	704 W	1000 W	860 W	--
Airflow	200 LFM	200 LFM	400 LFM	400 LFM	--

	Test condition .....	<b>Test QQ</b>	<b>Test RR</b>	--	--	---
	Supply voltage (V) .....	50 Vdc	50 Vdc	--	--	---
	Frequence (Hz) .....	--	--	--	--	---
	Ambient T <sub>min</sub> (°C) .....	--	--	--	--	---
	Ambient T <sub>max</sub> (°C) .....	--	--	--	--	---

Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
Ambient	75.9	82.8	--	--	--
Q301(Hotspot)	113.6	117.0	--	--	130
Q304	120.4	124.0	--	--	130
Q305	105.9	110.7	--	--	130
Q307	114.0	117.9	--	--	130
Q308	116.2	119.5	--	--	130
Q311	113.4	117.1	--	--	130
Q313	117.2	120.8	--	--	130

IEC 62368-1					
Clause	Requirement + Test		Result - Remark		Verdict
Maximum measured temperature T of part/at.....:	T (°C)				Allowed T <sub>max</sub> (°C)
T200	100.6	105.6	--	--	130
T300C	109.5	113.9	--	--	130
T300W	113.7	117.3	--	--	130
L300	102.8	107.2	--	--	130
L301C	100.4	105.3	--	--	130
L301W	112.2	116.3	--	--	130
IC200	102.9	107.5	--	--	125
IC601	116.0	119.7	--	--	130
IC403	114.5	118.8	--	--	125
CR300	113.3	117.4	--	--	125
HP	102.3	107.0	--	--	-
U400	95.9	100.9	--	--	125
PWB	113.7	117.3	--	--	130
Vin	49.8 V	49.9 V	--	--	--
Iin	20.5 A	19.0 A	--	--	--
Vout	11.7 V	11.8 V	--	--	--
Iout	84.1 A	78.1 A	--	--	--
Pout	1000 W	889 W	--	--	--
Airflow	600 LFM	600 LFM	--	--	--

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

**Supplementary information:**

1) The temperatures were measured under worst normal mode defined in 3.3.7.4 and as described in subclause B.2.5 and at voltages as described above.

2) The load conditions used during testing: Maximum normal load according to Annex B.2 for this equipment is the operation with the maximum specified DC-load with maximum power condition according to the manufacturer specified. Derating for operation temperature and load derating refer to **"Summary of testing"** on page 3.

3) Explain of test condition from A to O and AA to RR as following:

For condition A to O, Airflow is from Vin- to Vin+:

Test	Input V, Hz, A	Test Condition	Internal Airflow	Ambient Temp. (°C)
A	40.2 Vdc, 25.6 A	11.7 V/84.0 A, 1000 W	200 LFM	30°C
B	60.0 Vdc, 6.1 A	12.1 V/29.1 A, 347 W	200 LFM	82°C
C	40.2 Vdc, 25.5 A	11.7 V/84.0 A, 1000 W	400 LFM	54°C
D	60 Vdc, 17.3 A	11.7 V/84.0 A, 1000 W	400 LFM	45°C
E	40.2 Vdc, 25.3 A	11.7 V/84.0 A, 1000 W	600 LFM	62°C
F	60.0 Vdc, 17.3 A	11.7 V/84.0 A, 1000 W	600 LFM	55°C
G	50.1 Vdc, 20.4 A	11.8 V/84.0 A, 1000 W	200LFM	53°C
H	50.1 Vdc, 13.3 A	11.9 V/54.0 A, 594 W	200LFM	84°C
I	50.1 Vdc, 20.5 A	11.8 V/84.1 A, 1000 W	400LFM	68°C
J	50.1 Vdc, 17.0 A	11.8 V/70.0 A, 799 W	400LFM	83°C
K	50.1 Vdc, 20.4 A	11.8 V/84.0 A, 1000 W	600LFM	75°C
L	50.0 Vdc, 18.4 A	11.8 V/75.0 A, 853 W	600LFM	83°C
M	50.1 Vdc, 20.3 A	11.8 V/84.0 A, 1000 W	200LFM	70°C
N	50.2 Vdc, 15.1 A	11.9 V/62.0 A, 728 W	200LFM	85°C
O	50.1 Vdc, 20.3 A	11.8 V/84.0 A, 1000 W	400LFM	85°C

For condition AA to RR, Airflow is from Vin to Vout:

AA	40.2 Vdc, 24.8 A	11.8 V/80.1 A, 960 W	200 LFM	31°C
BB	60.0 Vdc, 2.7 A	12.2 V/12.0 A, 146 W	200 LFM	85°C
CC	40.2 Vdc, 25.4 A	11.7 V/84.0 A, 1000 W	400 LFM	40°C
DD	60.0 Vdc, 17.3 A	11.7 V/84.0 A, 1000 W	400 LFM	28°C
EE	40.2 Vdc, 25.4 A	11.7 V/84.0 A, 1000 W	600 LFM	50°C

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Clause	Requirement + Test	Result - Remark	Verdict	
<b>FF</b>	60.0 Vdc, 17.3 A	11.7 V/84.0 A, 1000 W	600 LFM	38°C
<b>GG</b>	49.9 Vdc, 20.6 A	11.7 V/84.1 A, 1000 W	200LFM	39°C
<b>HH</b>	50.1 Vdc, 10.4 A	12.0 V/42.0 A, 496 W	200LFM	84°C
<b>II</b>	49.9 Vdc, 20.4 A	11.7 V/84.0 A, 1000 W	400LFM	53°C
<b>JJ</b>	50.1 Vdc, 13.7 A	11.9 V/56.0 A, 654 W	400LFM	83°C
<b>KK</b>	49.9 Vdc, 20.5 A	11.7 V/84.1 A, 1000 W	600LFM	65°C
<b>LL</b>	50.1 Vdc, 14.9 A	11.9 V/61.0 A, 701 W	600LFM	83°C
<b>MM</b>	49.9 Vdc, 20.6 A	11.7 V/84.1 A, 1000 W	200LFM	60°C
<b>NN</b>	50.1 Vdc, 14.7 A	11.9 V/60.0 A, 704 W	200LFM	82°C
<b>OO</b>	49.9 Vdc, 20.5 A	11.7 V/84.0 A, 1000 W	400LFM	73°C
<b>PP</b>	49.9 Vdc, 18.4 A	11.8 V/75.0 A, 860 W	400LFM	82°C
<b>QQ</b>	49.8 Vdc, 20.5 A	11.7 V/84.1 A, 1000 W	600LFM	77°C
<b>RR</b>	49.9 Vdc, 19.0 A	11.8 V/78.1 A, 889 W	600LFM	82°C

3) Sample was operated at the ambient temperature of 60°C, at 1000W with 200LFM for 1'Heatsink version, for 2 hours prior to the start of thermal testing.

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Clause	Requirement + Test	Result - Remark	Verdict

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

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

5.4.2.2, 5.4.2.4 and 5.4.3	TABLE: Minimum Clearances/Creepage distance						P
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)
T200 input to output B/I	152	≤70	-	0.3	4.5	1.3	4.5
T300 input to output B/I	152	≤70	-	0.3	1.5	1.3	1.5
U400 input to output B/I	≤140	≤70	-	0.3	3.1	1.3	3.1
Supplementary information: - BI: Basic insulation; RI: Reinforced insulation. 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 * PWB material CTI ≥ 600, Material Group I applied for Table 18 The product is to be operated up to 5000 m above sea level, the minimum clearances were multiplied by the factor given in Table A.2 of IEC 60664-1: 1.48.							

5.4.2.3	TABLE: Minimum Clearances distances using required withstand voltage			P
	Overvoltage Category (OV):		DC supplied	
	Pollution Degree:		2	
Clearance distanced between:	Required withstand voltage	Required cl (mm)	Measured cl (mm)	
T200 Input to output	2000Vdc	0.3	4.5	
T300 Input to output	2000Vdc	0.3	1.5	
Supplementary information:				

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Clause	Requirement + Test	Result - Remark	Verdict
Clearance distanced between:	Required withstand voltage	Required cl (mm)	Measured cl (mm)
The product is to be operated up to 5000 m above sea level, the minimum clearances were multiplied by the factor given in Table A.2 of IEC 60664-1: 1.48.			

5.4.2.4	TABLE: Clearances based on electric strength test			N/A
Test voltage applied between:	Required cl (mm)	Test voltage (kV) peak/ r.m.s. / d.c.	Breakdown Yes / No	
-	-	-	-	
Supplementary information: 1, Using procedure 2 to determine the clearance. 2, The product is to be operated up to 5000 m above sea level, the minimum clearances were multiplied by the factor given in Table A.2 of IEC 60664-1: 1.48.				

5.4.4.2, 5.4.4.5 c) 5.4.4.9	TABLE: Distance through insulation measurements					N/A
Distance through insulation di at/of:	Peak voltage (V)	Frequency (kHz)	Material	Required DTI (mm)	DTI (mm)	
--	--	--	--	--	--	
Supplementary information:						

5.4.9	TABLE: Electric strength tests			P
Test voltage applied between:	Voltage shape (AC, DC)	Test voltage (V)	Breakdown Yes / No	
DC input to SELV secondary	DC	750	No	
Supplementary information:				

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: X-capacitors installed for testing are: <input type="checkbox"/> bleeding resistor rating: <input type="checkbox"/> 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						



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Clause	Requirement + Test	Result - Remark	Verdict

5.6.6.2	TABLE: Resistance of protective conductors and terminations				N/A
Accessible part	Test current (A)	Duration (min)	Voltage drop (V)	Resistance ( $\Omega$ )	
--	--	--	--	--	
--	--	--	--	--	

Supplementary information:

5.7.2.2, 5.7.4	TABLE: Earthed accessible conductive part		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.

6.2.2	Table: Electrical power sources (PS) measurements for classification				P
Source	Description	Measurement	Max Power after 3 s	Max Power after 5 s <sup>*</sup>	PS Classification
60 VDC	Input terminal	Power (W) :	>15	>100	PS3
		V <sub>A</sub> (V) :	--	--	
		I <sub>A</sub> (A) :	--	--	
60 VDC	Output terminal	Power (W) :	>15	>100	PS3
		V <sub>A</sub> (V) :	--	--	
		I <sub>A</sub> (A) :	--	--	

Supplementary Information:

(\*) Measurement taken only when limits at 3 seconds exceed PS1 limits

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

Note: The worst case is considered at the power measurement for worst-case fault.

6.2.3.1	Table: Determination of Potential Ignition Sources (Arcing PIS)				P
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 components located within the equipment are considered as arcing PIS.	--	--	--	--	
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)					P
Circuit Location (x-y)	Operating Condition (Normal / Describe Single Fault)	Measured wattage or VA During first 30 s (W / VA)	Measured wattage or VA After 30 s (W / VA)	Protective Circuit, Regulator, or PTC Operated? Yes / No (Comment)	Resistive PIS? Yes/No	
All components located within the equipment are considered as resistive PIS.	--	--	--	--	--	
Supplementary Information: A combination of voltmeter, VA and ammeter IA may be used instead of a wattmeter. If a separate voltmeter and ammeter are used, the product of (VA x IA) is used to determine Resistive PIS classification. A Resistive PIS: (a) dissipates more than 15 W, measured after 30 s of normal operation, <u>or</u> (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.						

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_	

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Clause	Requirement + Test	Result - Remark	Verdict
Overall result .....			
Supplementary information:			

B.2.5	TABLE: Input test						P
U (Vdc)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
40.0	25.5	27	225	--	--	25.5	Maximum Normal Load
49.8	20.5	27	225	--	--	20.5	Maximum Normal Load
60.0	17.0	27	225	--	--	17.0	Maximum Normal Load
Supplementary information: The measured steady state input current or input power did not exceed the rated current or rated power at the rated voltage by more than 10%.							

B.3	TABLE: Abnormal operating condition tests							P
Ambient temperature (°C) .....					18 °C / 55% R.H.			—
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
Airflow from Vin- to Vin+								
12V output with 600LFM, Unit 2	o-l	60VDC	3.5 hrs	Ext.	17.73A→ 18.29A→ 0.00A	Type K	--	Unit normal operation until output current overloads to 88.53 A, Unit recovered to normal operation with fault removed and auto reset. NH, NC, NT, NB, CT Max. Temperature of key components at ambient 28 °C. T300 winding: 109.3 °C T200 winding: 104.5 °C L301 winding: 77.6 °C L300 winding: 85.8 °C

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Clause	Requirement + Test					Result - Remark		Verdict
12V output with 1" Heatsink and 200LFM Unit 2	o-l	60VDC	3.5 hrs	Ext.	17.73A→ 18.27A→ 0.00A	Type K	--	Unit normal operation until output current overloads to 88.53 A, Unit recovered to normal operation with fault removed and auto reset. NH, NC, NT, NB, CT Max. Temperature of key components at ambient 28 °C. T300 winding: 119.0 °C T200 winding: 116.7 °C L301 winding: 98.3 °C L300 winding: 91.8 °C
12V Output, Vo (+) to Vo (-), with 400LFM, Unit 2	s-c	60VDC	1.5 hrs	Ext.	17.21A→ 0.00A	Type K	--	Unit shut down immediately, Unit recovered to normal operation with fault removed and auto reset. Test three times with the same phenomena. NH, NC, NT, NB, CT. Max. Temperature of key components at ambient 26.0 °C. T300 winding: 27.3 °C T200 winding: 28.1 °C L301 winding: 26.7 °C L300 winding: 27.0 °C
12V Output, Vo (+) to Vo (-), with 1" Heatsink and 200LFM, Unit 2	s-c	60VDC	1.5 hrs	Ext.	17.21A→ 0.00A	Type K	--	Unit shut down immediately, Unit recovered to normal operation with fault removed and auto reset. Test three times with the same phenomena. NH, NC, NT, NB, CT. Max. Temperature of key components at ambient 28.0 °C. T300 winding: 29.2 °C T200 winding: 30.2 °C L301 winding: 29.0 °C L300 winding: 29.1 °C

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
Airflow from Vin to Vout								
12V output with 600LFM, Unit 2	o-l	60VDC	3.5 hrs	Ext.	17.73A→ 18.27A→ 0.00A	Type K	--	Unit normal operation until output current overloads to 88.53 A, Unit recovered to normal operation with fault removed and auto reset. NH, NC, NT, NB, CT Max. Temperature of key components at ambient 29 °C. T300 winding: 122.9 °C T200 winding: 105.2 °C L301 winding: 94.1 °C L300 winding: 72.8 °C
12V output with 1" Heatsink and 200LFM Unit 2	o-l	60VDC	3.5 hrs	Ext.	17.73A→ 18.27A→ 0.00A	Type K	--	Unit normal operation until output current overloads to 88.53 A, Unit recovered to normal operation with fault removed and auto reset. NH, NC, NT, NB, CT Max. Temperature of key components at ambient 29 °C. T300 winding: 119.0 °C T200 winding: 116.7 °C L301 winding: 91.8 °C L300 winding: 98.3 °C
12V Output, Vo (+) to Vo (-), with 400LFM, Unit 2	s-c	60VDC	1.5 hrs	Ext.	17.21A→ 0.00A	Type K	--	Unit shut down immediately, Unit recovered to normal operation with fault removed and auto reset. Test three times with the same phenomena. NH, NC, NT, NB, CT. Max. Temperature of key components at ambient 26.0 °C. T300 winding: 27.4 °C T200 winding: 27.6 °C L301 winding: 27.2 °C L300 winding: 27.0 °C

IEC 62368-1								
Clause	Requirement + Test					Result - Remark		Verdict
12V Output, Vo (+) to Vo (-), with 1" Heatsink and 200LFM, Unit 2	s-c	60VDC	1.5 hrs	Ext.	17.21A→ 0.00A	Type K	--	Unit shut down immediately, Unit recovered to normal operation with fault removed and auto reset. Test three times with the same phenomena. NH, NC, NT, NB, CT. Max. Temperature of key components at ambient 28.0 °C. T300 winding: 29.6 °C T200 winding: 30.0 °C L301 winding: 29.5 °C L300 winding: 29.3 °C
<p>Supplementary information: s-c=short-circuited, o-c=open-circuited, o-l=over-loaded.</p> <p>In Observation column, NB - No indication of dielectric breakdown; NC - Cheesecloth remained intact; NT - Tissue paper remained intact; NH – No hazard; CT - Constant temperatures were obtained.</p> <p>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.</p>								

B.4								TABLE: Fault condition tests	P
Ambient temperature (°C) .....								25.3 °C / 23.1% R.H.	—
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	
Q300 D to S Unit 5	s-c	60VDC	10 mins	Ext.	17.29A→ 0.00A	--	--	Unit shut down immediately, Q300, Q301, Q303 damage, NC, NT, NB.	
Q300 G to S Unit 3	s-c	60VDC	10 mins	Ext.	17.10A→ 0.00A	--	--	Unit shut down immediately, Q302, Q303 damage, NC, NT, NB.	
<p>Supplementary information:</p> <ol style="list-style-type: none"> <li>In fault column, s-c=short-circuited, o-c=open-circuited, o-l=over-loaded.</li> <li>NB - No indication of dielectric breakdown; NC - Cheesecloth remained intact; NT - Tissue paper remained intact; NH – No hazard; CT - Constant temperatures were obtained.</li> <li>The test result shown all safeguards remained effective, all safeguards complied with applicable requirements in this standard after restoration of normal operating conditions.</li> <li>The test result shown no Class 1 or 2 energy source become Class 3 level during or after single fault condition.</li> </ol>									

IEC 62368-1									
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:									Verdict
- 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							
	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:								

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Clause	Requirement + Test			Result - Remark		Verdict
<b>Annex Q.1</b>	<b>TABLE: Circuits intended for interconnection with building wiring (LPS)</b>					N/A
Note: Measured UOC (V) with all load circuits disconnected: see below.						
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
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
Part/Location	Material	Thickness (mm)	Vertical distance (mm)	Observation	
Supplementary information:					

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

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



**List of test equipment used:**

<b>Manufacturer</b>	<b>Instr. No. (Bar Code)</b>	<b>Instrument Type</b>	<b>Make &amp; Model</b>	<b>Calibration date</b>
EXTECH	1290427	Withstand Voltage/Insulation Tester	7430	12/27/2021
EXTECH	1331756	Touch Current Tester	7630	08/20/2021
Agilent	MY53008185	Digital Multimeter	34401A	12/27/2021
Chroma	62050PA01073	DC Power Supply	62050P-100-100	12/27/2021
Chroma	632010001960	DC Electronic Load	63201	12/27/2021
Chroma	6314A0004271	DC Electronic Load	6314A	12/27/2021
Chroma	62050PA01069	DC Power Supply	62050P-100-100	12/27/2021
Chroma	632010001959	DC Electronic Load	63201	12/27/2021
Chroma	646038000281	Programmable AC Source	6460	12/27/2021
Tektronix	C070499	High Voltage Probe	P6015A	12/27/2021
Chroma	662023001329	Digital Power Meter	66202	12/27/2021
Chroma	662023001327	Digital Power Meter	66202	12/27/2021
EXTECH	140502410	Clamp Meter	MA1500	12/27/2021
Fluke	28630874WS	Multimeter	117C	12/27/2021
Keysight	MY56311348	Oscilloscope	DSOX3024T	03/14/2021
Cybertek	D1760000141	High Voltage Differential Probe	DP6150	03/14/2021
BYXAS	--	Digital Stop Watch	WDC-100	01/01/2022
Cybertek	D1760000196	High Voltage Differential Probe	DP6150	03/14/2021
SATA	--	Tapeline	3m	--
Omega	2-11	Thermocouple	Type T	12/27/2021
TSI	90830054	Anemoscope (Airflow meter)	8710	09/20/2021

-- End of Main Test Report --

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

<b>ATTACHMENT TO TEST REPORT</b> <b>IEC 62368-1</b> <b>EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES</b> <b>(Audio/video, information and communication technology equipment - Part 1: Safety requirements)</b>	
<b>Differences according to</b> ..... :	EN 62368-1:2014+A11:2017
<b>Attachment Form No.</b> .... :	EU_GD_IEC62368_1B_II
<b>Attachment Originator</b> ..... :	Nemko AS
<b>Master Attachment</b> ..... :	Date 2017-09-22
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	<b>CENELEC COMMON MODIFICATIONS (EN)</b>	P																																				
	Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2014 are prefixed "Z".	P																																				
CONTENTS	<b>Add</b> 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	P																																				
	<b>Delete</b> all the "country" notes in the reference document (IEC 62368-1:2014) according to the following list: <table border="1" data-bbox="457 1243 1372 1675"> <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	P
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	For special national conditions, see Annex ZB.	P																																				

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
1	<p><b>Add</b> the following note:</p> <p>NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.</p>		N/A
4.Z1	<p><b>Add</b> the following new subclause after 4.9:</p> <p>To protect against excessive current, short-circuits and earth faults in circuits connected to an a.c. <b>mains</b>, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c):</p> <p>a) except as detailed in b) and c), protective devices necessary to comply with the requirements of B.3.1 and B.4 shall be included as parts of the equipment;</p> <p>b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation;</p> <p>c) it is permitted for <b>pluggable equipment type B</b> or <b>permanently connected equipment</b>, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions.</p> <p>If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for <b>pluggable equipment type A</b> the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.</p>	Shall be also investigated in the end system/equipment	N/A
5.4.2.3.2.4	<p><b>Add</b> the following to the end of this subclause:</p> <p>The requirement for interconnection with <b>external circuit</b> is in addition given in EN 50491-3:2009.</p>	No external circuits.	N/A
10.2.1	<p>Add the following to <sup>c)</sup> and <sup>d)</sup> in table 39:</p> <p>For additional requirements, see 10.5.1.</p>	No such radiation from the equipment.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.5.1	<p><b>Add</b> the following after the first paragraph:  <i>For RS 1 compliance is checked by measurement under the following conditions:</i>  <i>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.</i></p> <p>NOTE Z1 Soldered joints and paint lockings are examples of adequate locking.</p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>For RS1, the dose-rate shall not exceed 1 μSv/h taking account of the background level.</i></p> <p>NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.</p>	No such x-radiation generated from the equipment.	N/A
10.6.1	<p><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.</p>	No such x-radiation generated from the equipment.	N/A
10.Z1	<p><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></p> <p>The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz).</p> <p>For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body-mounted devices, attention is drawn to EN 50360 and EN 50566</p>	No such consideration for the purpose of personal music players.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
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
Bibliography	<b>Add</b> the following standards: <b>Add</b> the following notes for the standards indicated: 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.		N/A
<b>ZB</b>	<b>ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)</b>		<b>P</b>
4.1.15	<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"	The marking text must be provided when marketed in applicable countries.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
4.7.3	<p><b>United Kingdom</b></p> <p>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>	The equipment is not direct plug-in equipment.	N/A
5.2.2.2	<p><b>Denmark</b></p> <p>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>	No high touch current.	N/A

IEC62368_1B - ATTACHMENT			
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>	No TNV circuits.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.5.2.1	<b>Norway</b> After the 3rd paragraph the following is added: Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).	Considered.	P
5.5.6	<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.	No such resistors.	N/A
5.6.1	<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.	Considered.	P
5.6.4.2.1	<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.	Considered.	N/A
5.6.5.1	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.	See above.	N/A
5.7.5	<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.	No high protective conductor current.	N/A



IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.7.6.1	<p><b>Norway and Sweden</b></p> <p>To the end of the subclause the following is added:</p> <p>The screen of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system.</p> <p>It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example.</p> <p>The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in:</p> <p>“Apparatus connected to the protective earthing of the building installation through the mains connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)”</p> <p>NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min.</p> <p>Translation to Norwegian (the Swedish text will also be accepted in Norway):</p> <p>“Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet 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>	Not such system.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.7.6.1	<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>	Not such system.	N/A
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>	No external circuits.	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>	The equipment is not direct plug-in equipment.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
G.4.2	<p><b>Denmark</b></p> <p>To the end of the subclause the following is added:</p> <p>Supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1:2011.</p> <p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p> <p>If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2.</p> <p>Mains socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance DS 60884-2-D1:2011 standard sheet DKA 1-4a.</p> <p>Other current rating socket outlets shall be in compliance with Standard Sheet DKA 1-3a or DKA 1-1c.</p> <p>Mains socket-outlets with earth shall be in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a</p> <p><i>Justification:</i> Heavy Current Regulations, Section 6c</p>	No socket-outlets used.	N/A
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>	The equipment is not direct plug-in equipment.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
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
G.7.2	<p><b>Ireland and United Kingdom</b></p> <p>To the first paragraph the following is added:</p> <p>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>		<b>N/A</b>
10.5.2	<p><b>Germany</b></p> <p>The following requirement applies:</p> <p>For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking.</p> <p><i>Justification:</i></p> <p>German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM.</p> <p><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>	No CRT within the equipment.	N/A

## IEC62368\_1B - ATTACHMENT

Clause	Requirement + Test	Result - Remark	Verdict
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**ATTACHMENT TO TEST REPORT IEC 62368-1  
DENMARK NATIONAL DIFFERENCES**

Audio/video, information and communication technology equipment –  
Part 1: Safety requirements

**Differences according to**..... : DS/EN 62368-1:2014

**Attachment Form No.** .... : DK\_ND\_IEC62368\_1B

**Attachment Originator**..... : UL (Demko)

**Master Attachment**..... : 2014-10

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	National Differences		P
4.1.15	To the end of the subclause the following is added: Class I pluggable equipment type A intended for connection to other equipment or a network shall, if safety relies on connection to reliable earthing or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment shall be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: "Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord."	Added. The marking text must be provided when marketed in Denmark.	N/A
5.2.2.2	After the 2nd paragraph add the following: A warning (marking safeguard) for high touch current is required if the touch current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.	Added.	N/A
5.6.1	Add to the end of the subclause: Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. Justification: In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.	Added. No socket outlet provided.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.7.5	To the end of the subclause the following is added: The installation instruction shall be affixed to the equipment if the protective conductor current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.	Added. No protective conductor current exceeded.	N/A
5.7.6.2	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.	Added. No protective current exceeded.	N/A
G.4.2	To the end of the subclause the following is added: Supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1:2011. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a. If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2. Mains socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance DS 60884-2-D1:2011 standard sheet DKA 1-4a. Other current rating socket outlets shall be in compliance with Standard Sheet DKA 1-3a or DKA 1-1c. Mains socket-outlets with earth shall be in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a Justification: Heavy Current Regulations, Section 6c	Added.	N/A

## IEC62368\_1B - ATTACHMENT

Clause	Requirement + Test	Result - Remark	Verdict
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**ATTACHMENT TO TEST REPORT IEC 62368-1 2<sup>th</sup> Ed.  
U.S.A NATIONAL DIFFERENCES**

Audio/video, information and communication technology equipment – Part 1: Safety requirements

**Differences according to**..... : CSA/UL 62368-1:2014

**Attachment Form No.** .... : US&CA\_ND\_IEC623681B

**Attachment Originator**..... : UL(US)

**Master Attachment**..... : Date 2015-06

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**IEC 62368-1 - US and Canadian National Differences  
Special National Conditions based on Regulations and Other National Differences**

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.	In accordance with the National Electrical Code (NEC) and the Canadian Electrical Code (CEC) part 1 CAN/CSA C22.1, ANSI/NFPA 70, and unless marked or otherwise identified, the Standard for Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75.	P
1.4	Additional requirements apply to some forms of power distribution equipment, including sub-assemblies.	Considered.	P
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.	The equipment is a building-in type and evaluation is to be made during the final system approval.	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.	See above.	N/A
4.8	Lithium coin / button cell batteries have modified special construction and performance requirements.	No such batteries.	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	The equipment is a building-in type and evaluation is to be made during the final system approval.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.7.7	Equipment intended to receive telecommunication ringing signals complies with a special touch current measurement tests.	No TNV circuits within the equipment.	N/A
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.	No such parts.	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.	DC output connector is provided. See copy of marking plate.	P
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.	No power supply cord provided	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.	No power supply cord provided	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.	See above.	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.	See above.	N/A
Annex H.2	Continuous ringing signals under normal operating conditions up to 16 mA only are permitted if the equipment is subjected to special installation and performance restrictions.	No ringing signal	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.	No ringing signal	N/A
Annex M	Battery packs for stationary applications comply with special component requirements.	No such parts.	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.	The equipment not intended to be used within such environments.	N/A



IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	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.	Not such equipment.	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.	The equipment is not for children used.	N/A
	Baby monitors additionally comply with ASTM F2951, Consumer Safety Specification for Baby Monitors.	Not a baby monitors.	N/A
Annex DVA (5.6.3)	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A.	Considered.	P
Annex DVA (6.3)	The maximum quantity of flammable liquid stored in equipment complies with NFPA 30.	No flammable liquids within the equipment.	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.	No such application.	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).	No such parts.	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).	No such parts.	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."	Single phase only.	N/A
Annex DVA (F.3.3.5)	Equipment identified for ITE (computer) room installation is marked with the rated current	Not such application.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVA (G.1)	Vertically-mounted disconnect switches and circuit breakers have the "on" position indicated by the handle in the up position	No such parts.	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.	No standard supply outlets, receptacles, medium-base or smaller lamp holders provided.	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).	No such parts.	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.	No such parts.	N/A
Annex DVA (G.5.3)	Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require special transformer overcurrent protection.	No such parts.	N/A
Annex DVA (G.5.4)	Motor control devices are required for cord-connected equipment with a mains-connected motor if the equipment is rated more than 12 A, or if the equipment has a nominal voltage rating greater than 120 V, or if the motor is rated more than 1/3 hp (locked rotor current over 43 A).	No such parts.	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.	Not such application.	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.	Not applicable for the equipment.	N/A
Annex DVB (1)	Additional requirements apply for equipment used for entertainment purposes intended for installation in general patient care areas of health care facilities.	Not such application.	N/A
Annex DVC (1)	Additional requirements apply for equipment intended for mounting under kitchen cabinets.	Not such application.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
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.	UL approved components used. Refer to table 4.1.2 of IEC 62368-1 test report for details.	P
Annex DVH	Equipment for permanent connection to the mains supply is subjected to additional requirements.	The equipment is a building-in type and evaluation is to be made during the final system approval.	N/A
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.	See above	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.	See above	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> ).	No wire binding screws.	N/A
Annex DVH (DVH.4)	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.	The equipment is a building-in type and evaluation is to be made during the final system approval.	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.	The equipment not connected to a centralized d.c. power system.	N/A

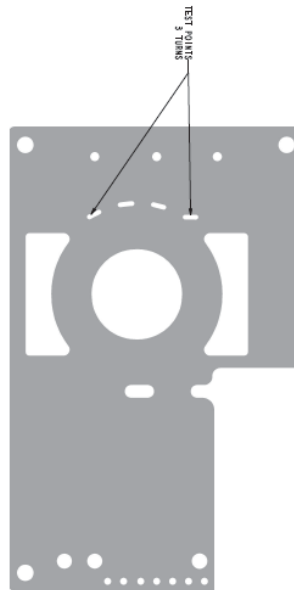
IEC62368\_1B - ATTACHMENT

Clause	Requirement + Test	Result - Remark	Verdict
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.	No TNV circuits within the equipment.	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



Description ..... : Transformers T300

08D084-PWB TOP SIDE

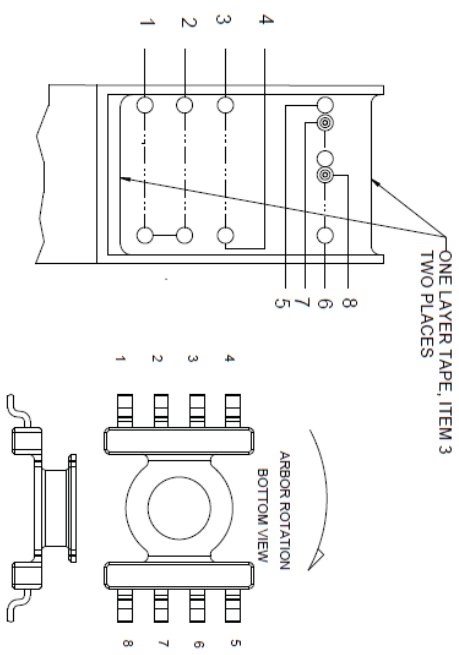


<p>CONTRACT NO. 08D084-115                  AFFILIATE: TÜVRheinland AG                  PROJECT: Transformer T300                  DRAWING: 08D084-PWB TOP SIDE                  DATE: 08/2015</p>		<p>DATE: 08/2015                  PROJECT: Transformer T300                  DRAWING: 08D084-PWB TOP SIDE                  DATE: 08/2015</p>		<p>DE 79091 ICDOR INFORMATION                  DE CLASS 11 INTERNAL CONTROL</p>	
<p>TOLERANCES ON:                  DIMENSIONS: AS 10                  ANGLES: AS 10                  HOLE DIA: AS 10                  HOLE POS: AS 10                  HOLE DRILL: AS 10                  HOLE TAP: AS 10                  HOLE THREAD: AS 10                  HOLE FINISH: AS 10                  HOLE TREATMENT: AS 10                  HOLE COATING: AS 10                  HOLE PLATING: AS 10                  HOLE SOLDER: AS 10                  HOLE SOLDER MASK: AS 10                  HOLE SOLDER MASK REMOVAL: AS 10                  HOLE SOLDER MASK REPAIR: AS 10                  HOLE SOLDER MASK REPAIR METHOD: AS 10                  HOLE SOLDER MASK REPAIR MATERIAL: AS 10                  HOLE SOLDER MASK REPAIR THICKNESS: AS 10                  HOLE SOLDER MASK REPAIR ADHESION: AS 10                  HOLE SOLDER MASK REPAIR DURABILITY: AS 10                  HOLE SOLDER MASK REPAIR INSULATION: AS 10                  HOLE SOLDER MASK REPAIR ELECTRICAL PROPERTIES: AS 10                  HOLE SOLDER MASK REPAIR MECHANICAL PROPERTIES: AS 10                  HOLE SOLDER MASK REPAIR ENVIRONMENTAL RESISTANCE: AS 10                  HOLE SOLDER MASK REPAIR COMPLIANCE: AS 10</p>		<p>DATE: 08/2015                  PROJECT: Transformer T300                  DRAWING: 08D084-PWB TOP SIDE                  DATE: 08/2015</p>		<p>DATE: 08/2015                  PROJECT: Transformer T300                  DRAWING: 08D084-PWB TOP SIDE                  DATE: 08/2015</p>	
<p>DATE: 08/2015                  PROJECT: Transformer T300                  DRAWING: 08D084-PWB TOP SIDE                  DATE: 08/2015</p>		<p>DATE: 08/2015                  PROJECT: Transformer T300                  DRAWING: 08D084-PWB TOP SIDE                  DATE: 08/2015</p>		<p>DATE: 08/2015                  PROJECT: Transformer T300                  DRAWING: 08D084-PWB TOP SIDE                  DATE: 08/2015</p>	



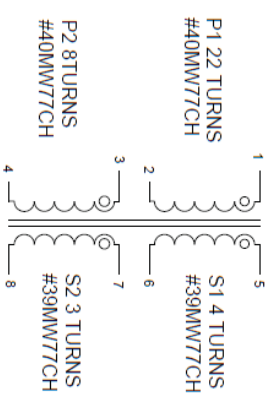
Description ..... : Transformers T200

A	B	C	D	E	F	G	H
ITEM	CODE	DRAWING	DESCRIPTION	REF	REV	DATE	LINE #
0	1 FC	88025847	ROBBIN/TBI PART NO. TBI-12-0701.1103				
1	019 004		WIRE #40MW77CH (P#18)				
2	002 004		WIRE #39MW77CH (P#18)				
4	22MM		TYPE P, LEO (003), 1.15MM WIDE				
5							



WDG	IN	OUT	TURNS	WIRE	LAYERS	COMMENTS
1 LAYER TAPE, ITEM 3						
P <sub>1</sub>	1	2	22	#40MW77CH	2	TWO EVEN LAYERS
P <sub>2</sub>	3	4	8	#40M77CH	1	ONE LAYER EVENLY DISTRIBUTED
S <sub>1</sub>	5	6	4	#39M77CH	1	WIND AS PARALLEL PAIR IN 1 EVENLY DISTRIBUTED LAYER BREAKING OUT
S <sub>2</sub>	7	8	3	#39MW77CH	1	THE (7-8) WINDING AFTER 3 TURNS
1 LAYER TAPE, ITEM 3						

1. THIS TRANSFORMER IS DESIGNED TO BE BUILT IN COMPLIANCE WITH UL P, LEO F91 INSULATION SYSTEMS (E200050). NO MATERIALS MAY BE SUBSTITUTED WITHOUT AN UPDATED TRANSFORMER SPECIFICATION.
2. TRANSFORMER IS DESIGN TO BE COMPLIANT WITH THR FOLLOWING SAFETY AGENCY REQUIREMENTS:  
-UL60950-1  
-CSA222 NO 60950  
-IEC60950
3. TRANSFORMER IS DESIGNED TO BE ROHS-6 COMPLIANT
4. WRAP LEADS AROUND POSTS AND TIN MATING SURFACES WITH AN ROHS-6 COMPLIANT SOLDER (EXAMPLES INCLUDE 100% MATTIE TIN, SN97.3/AG3.7, AND SN99.3/CU0.7)



JUN13	MODEL	PTC WINDING ASSEMBLY
REVISION	DRAWING	2
FILE NAME	FILE TYPE	WOLVER

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MM

DEPARTMENT: DE  
REVISION: 1  
DATE: 11/11/11  
DRAWN BY: J. J. J.  
CHECKED BY: J. J. J.  
APPROVED BY: J. J. J.  
DATE: 11/11/11

PROPERTY INFORMATION: 38555 TRANSF

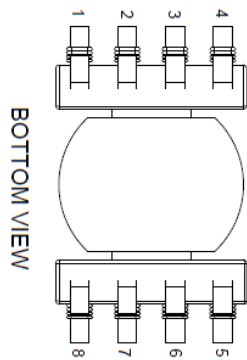
DEPARTMENT: DE  
REVISION: 1  
DATE: 11/11/11  
DRAWN BY: J. J. J.  
CHECKED BY: J. J. J.  
APPROVED BY: J. J. J.  
DATE: 11/11/11

PROPERTY INFORMATION: 38555 TRANSF



Description ..... : Transformers T200

TEST	CONDITIONS		REQUIREMENTS			WINDING	COMMENTS
	VOLTS (Vrms)	FREQ (Hz)	MIN	NOM	MAX		
INDUCTANCE (MICROHENRIES)	0.06	100	42.6	48.6	54.2	1-2	100% TESTING
			0.915	1.40	(1-2) STRAP 3-4		
LEAKAGE INDUCTANCE (MICROHENRIES)	0.05	500	0.925	1.40	1.40	3-4 STRAP 5,6,7,8	100% TESTING
			0.30	0.35	(1-2) : (5-6)		
RATIO OF TRANSFORMATION	.06	100	2.89	2.75	2.80	(1-2) : (3-4)	100% TESTING
			5.39	5.50	5.61		
			7.18	7.33	7.48		
			0.94	1.05	(1-2)		
DC RESISTANCE (OHM)			0.40	0.45	0.45	(3-4)	10% PROCESS TEST
			0.18	0.20	0.20		
			0.125	0.15	0.15		
DIELECTRIC WITHSTANDING (ACFT) 2 TO 5 SECONDS	800 VRMS 250 VRMS	60HZ				2,3 TO 6,7 CORE 1 TO 4 5 TO 8	100% TESTING SAFETY / CONCY REQUIREMENT



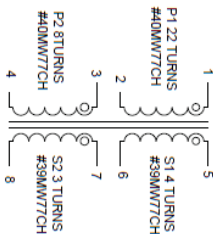
BOTTOM VIEW

1. ALL RESISTANCE TESTING, SUBSEQUENT TO INITIAL TEST SHALL BE REDUCED TO 75% OF THE INITIAL TEST VOLTAGE VALUE

2. INDIVIDUAL LEAKAGE CURRENT TEST LIMITS RELATIVE TO DIELECTRIC TEST VOLTAGE:

1000 VRMS 1.15 MILLIAMPS  
 1500 VRMS 1.15 MILLIAMPS  
 1800 VRMS 1.15 MILLIAMPS  
 1200 VRMS 1.15 MILLIAMPS  
 600 VRMS 0.231 MILLIAMPS  
 500 VRMS 0.231 MILLIAMPS  
 300 VRMS 0.231 MILLIAMPS  
 200 VRMS 0.231 MILLIAMPS  
 100 VRMS 0.231 MILLIAMPS

3. RATIO LIMITS ARE BASED ON CALCULATED VALUES. ACTUAL VALUES MAY BE LOWER BECAUSE OF ROOM COOLING AND CORE BRIND USED. THE SUPPLIER MAY ADJUST THE LIMITS ACCORDING TO THE DESIGN CONSIDERATIONS. THESE LIMITS TO FOUNTAIN ARE UNLIMITED.



**KONTAKTPUNKT BEI DER MONTAGE:**  
 Die Kontaktierung ist durch die Angabe der Kontaktierung in der Tabelle "KONTAKTPUNKT BEI DER MONTAGE" zu definieren. Die Kontaktierung ist durch die Angabe der Kontaktierung in der Tabelle "KONTAKTPUNKT BEI DER MONTAGE" zu definieren. Die Kontaktierung ist durch die Angabe der Kontaktierung in der Tabelle "KONTAKTPUNKT BEI DER MONTAGE" zu definieren.

**UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MM**

**TOLERANCES ON:**  
 1. HOLE DIMENSIONS ± 0.10  
 2. HOLE DIMENSIONS ± 0.05  
 3. HOLE DIMENSIONS ± 0.02  
 4. HOLE DIMENSIONS ± 0.01

**DE PROJEKTANT INFORMATION**

**DE CLASSIFICATION (INTERNAL CONTROL)**

**DE ENERGY**

**PLANO TX**

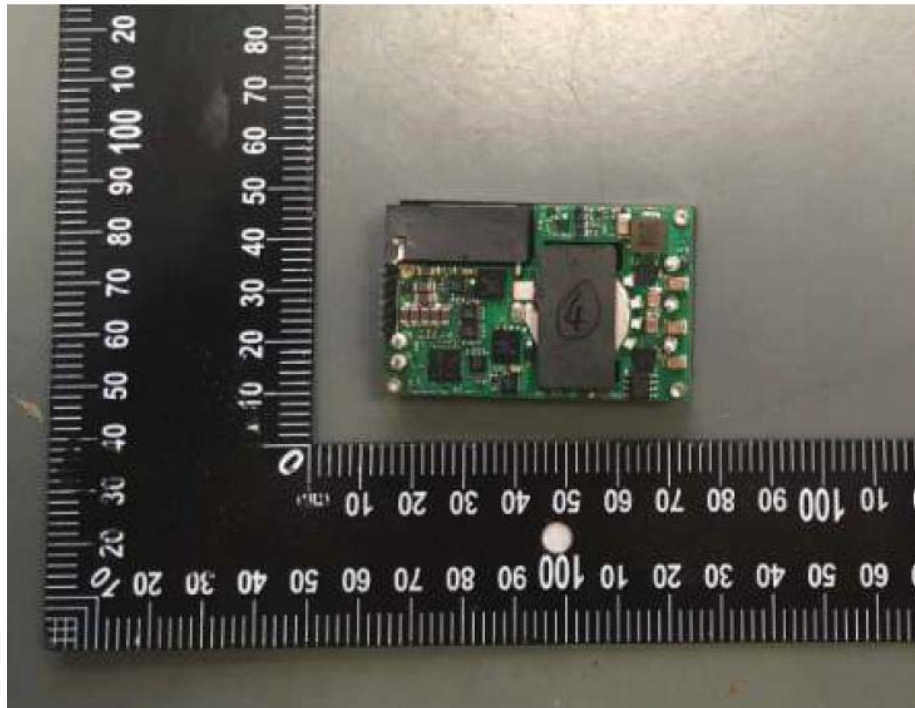
**35555 TRANSFORMER WTS**

**35555-TRANSF 2**

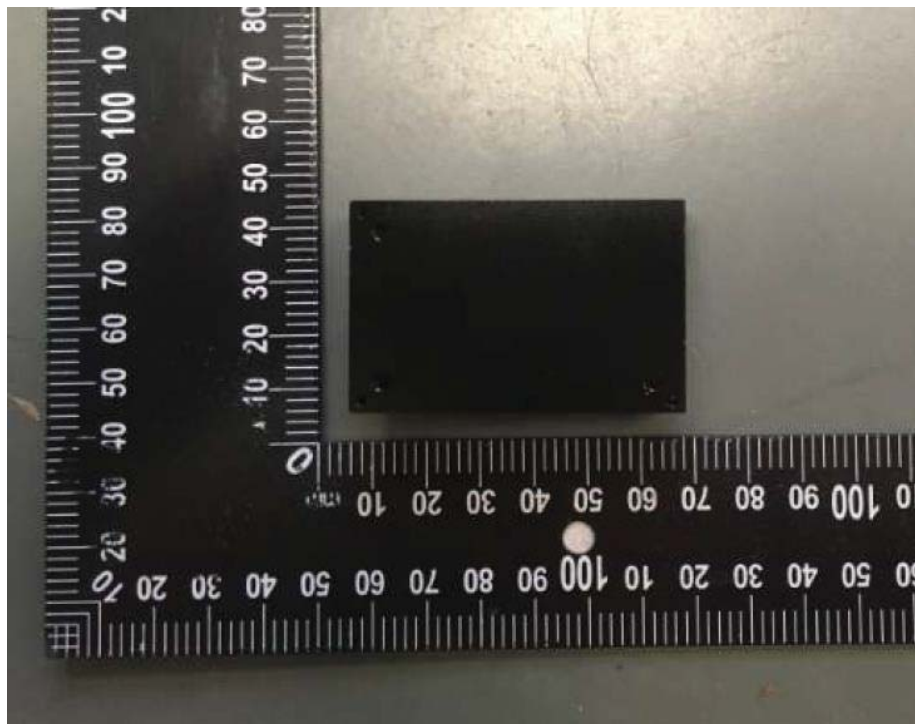
**ATTACHMENT Photo Documentation**

Report No.: CN20W4KH 001

Type Designation: See main test report



Picture 1 – Overview of Switching Power Supply

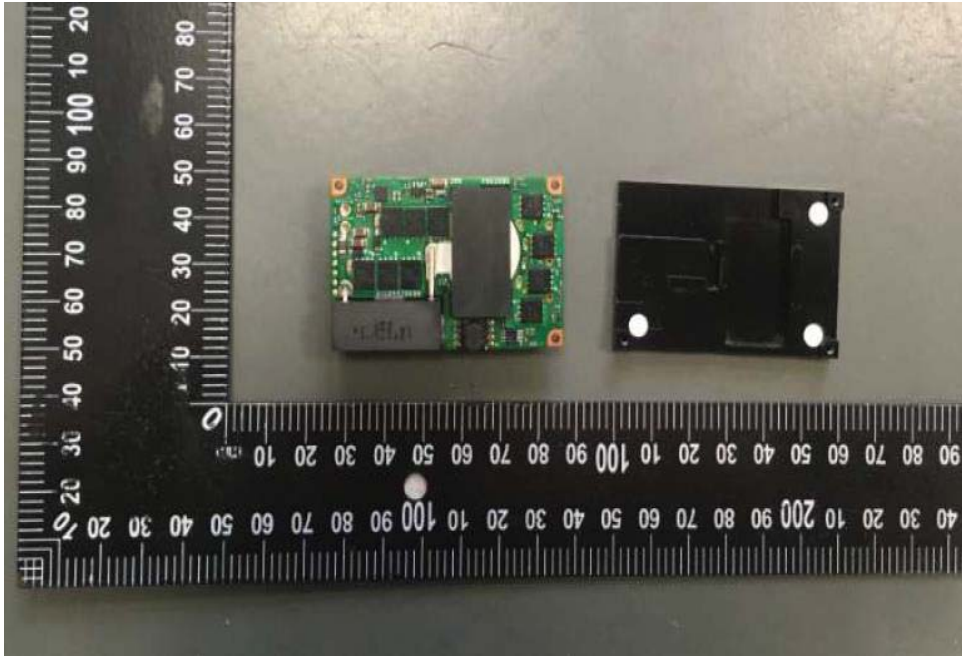


Picture 2 – Overview of Switching Power Supply

**ATTACHMENT      Photo Documentation**

Report No.:      CN20W4KH 001

Type Designation:    See main test report



Picture 3 – PWB view