



# SAFETY TEST REPORT

Report No.: SHE23070128-01AE

Date: 2023-08-04

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**Applicant** : Beijing Hipnuc Electronic Technology Co.,Ltd  
**Address of Applicant** : 121, 1st Floor, Block B, No. 23 Chaoqian Road, Science and Technology Park, Changping District, Beijing

**Product Name** : IMU/VRU/AHRS Module  
**Model Name.** : HI14R3N-232-000

**Brand Name** : /

**Sample No.** : E23070128-01#01

**Sample acquisition Method** : Sent by client

**Standards** : EN IEC 62368-1:2020+A11:2020

**Date of Receipt** : 2023-08-02  
**Date of Test** : 2023-08-02 ~ 2023-08-04  
**Date of Issue** : 2023-08-04

**Remark:**

*This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.*

Prepared by:

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Approved by:

Echo Mu

(Authorized signatory: Echo Mu)





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<b>Test item particulars</b> .....	
Product group .....	<input type="checkbox"/> end product <input checked="" type="checkbox"/> built-in component
Classification of use by .....	<input type="checkbox"/> Ordinary person <input type="checkbox"/> Instructed person <input checked="" 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: <u>not directly connected to the mains</u> ____ A;
Considered current rating of protective device as part of building or equipment installation .....	Installation location: <input type="checkbox"/> building; <input checked="" type="checkbox"/> equipment
Equipment mobility .....	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input checked="" 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: <u>not directly connected to the mains</u>
Class of equipment .....	<input type="checkbox"/> Class I <input type="checkbox"/> Class II <input checked="" type="checkbox"/> Class III
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 maxium operating ambient :	70°C
IP protection class .....	<input type="checkbox"/> IPX0 <input checked="" type="checkbox"/> IP_68 _
Power Systems .....	<input type="checkbox"/> TN <input type="checkbox"/> TT <input type="checkbox"/> IT - ____ V <sub>L-L</sub> <input checked="" type="checkbox"/> N/A
Altitude during operation (m) .....	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> 5000 m
Altitude of test laboratory (m) .....	<input checked="" type="checkbox"/> <500 m or less <input type="checkbox"/> ____ m
Mass of equipment (kg) .....	<input checked="" type="checkbox"/> Approx 0.07kg
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object .....	N/A(Not Applicable)
- test object does meet the requirement .....	P (Pass)
- test object does not meet the requirement .....	F (Fail)





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Applicant's name:	Beijing Hipnuc Electronic Technology Co.,Ltd
Applicant's address:	121, 1st Floor, Block B, No. 23 Chaoqian Road, Science and Technology Park, Changping District, Beijing
Manufacturer's name:	Beijing Hipnuc Electronic Technology Co.,Ltd
Manufacturer's address:	121, 1st Floor, Block B, No. 23 Chaoqian Road, Science and Technology Park, Changping District, Beijing
Product Name :	IMU/VRU/AHRS Module
Model/Type Reference :	HI14R3N-232-000
Ratings:	N/A
Test Standard :	EN IEC 62368-1:2020+A11:2020 Audio/video, information and communication technology equipment –Part 1: Safety requirements
Test Laboratory:	ICAS Testing Technology Service (Shanghai) Co., Ltd.
Test address:	No.1298, Pingan Road, Minhang District, Shanghai, China

**General remarks:**

The test results presented in this report relate only to the object tested.  
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.  
"(See Enclosure #)" refers to additional information appended to the report.  
"(See appended table)" refers to a table appended to the report.  
Throughout this report is used as the decimal separator.

**Comments:**

The test results are true for the test sample(s) only.  
A part of this test report or certificate should not be duplicated in any way however, the duplication of the whole document is allowed.  
This test-report includes the following documents:  
Test report – 68pages  
This test-report includes the following documents:  
Uncertainty:  
When determining for test conclusion, measurement uncertainty of tests has been considered.  
The determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

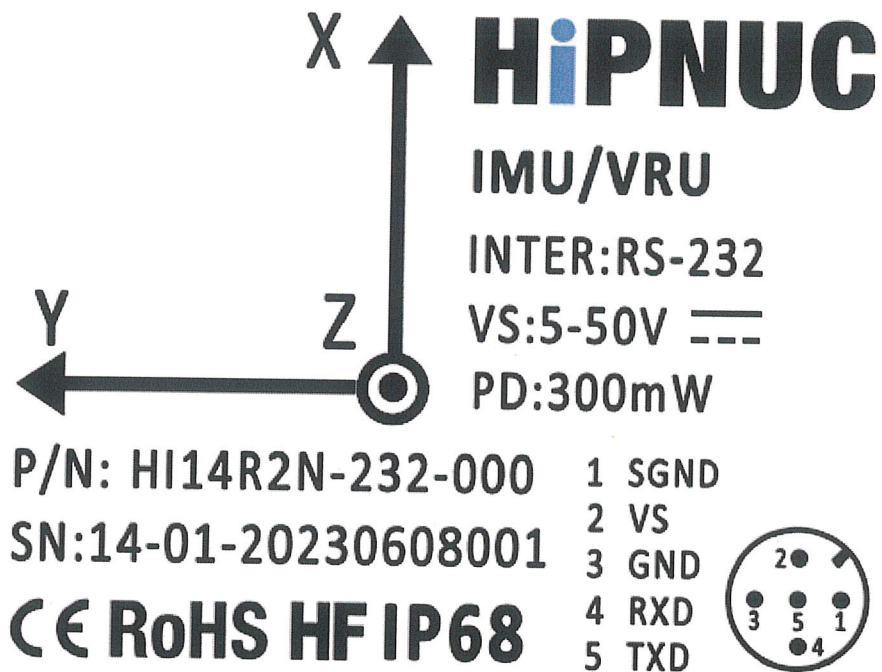
**General product information:**

Product Description –  
The equipment under tests is a Class III IMU/VRU/AHRS Module. It is powered by 5.0-50.0Vdc. All circuit considered to ES1 circuit.  
Model Differences – N/A  
Additional application considerations – (Considerations used to test a component or sub-assembly) – N/A  
The maximum ambient temperature specified by manufacturer is 70°C  
Engineering sample without serial number.



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 Certification Bodies that own these marks.



*Beijing Hipnuc Electronic Technology Co., Ltd*  
*www.hipnuc.com*





OVERVIEW OF EMPLOYED SAFEGUARDS				
Clause	Possible Hazard			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Safeguards		
		Basic	Supplementar y	Reinforced (Enclosure)
Skilled person	ES1: all circuits	N/A	N/A	N/A
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementar y	Reinforced
PCB	PS1: Rate input:5.0-50.0Vdc,300mW	N/A	N/A	N/A
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementar y	Reinforced
--	--	--	--	--
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementar y	Reinforced (Enclosure)
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9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementar y	Reinforced
--	--	--	--	--
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementar y	Reinforced
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Supplementary Information:				
See attached energy source diagram for additional details.				





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### ENERGY SOURCE DIAGRAM

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

☒ ES    ☒ PS    ☐ MS    ☐ TS    ☐ RS

☒ ES

ES1: All circuits in equipment

☒ PS

PS1: All area.

☐ MS

☐ TS

☐ RS



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>4</b>	<b>GENERAL REQUIREMENTS</b>		<b>P</b>
4.1.1	Acceptance of materials, components and subassemblies	See below.	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.  Instructional safeguard (See appended table4.1.2)	P
4.1.3	Equipment design and construction	Considered	P
4.1.4	Specified ambient temperature for outdoor use (°C) ..... :		N/A
4.1.5	Constructions and components not specifically covered	Considered.	P
4.1.8	Liquids and liquid filled components (LFC)		N/A
4.1.15	Markings and instructions	(See Annex F)	P
4.4.3	Safeguard robustness	See below.	P
4.4.3.1	General		P
4.4.3.2	Steady force tests..... :	Class III equipment for building-in	N/A
4.4.3.3	Drop tests.....:		N/A
4.4.3.4	Impact tests.....:		N/A
4.4.3.5	Internal accessible safeguard enclosure and barrier tests.....:		N/A
4.4.3.6	Glass Impact tests.....:		N/A
4.4.3.7	Glass fixation tests.....:		N/A
	Glass impact test (1J)		N/A
	Push/pull test (10 N)		N/A
4.4.3.8	Thermoplastic material tests.....:		N/A
4.4.3.9	Air comprising a safeguard .....:	Class III equipment for building-in	N/A
4.4.3.10	Accessibility and safeguard effectiveness.....:	All safeguards remain effective.	N/A
4.4.4	Displacement of a safeguard by an insulating liquid	No such liquid.	N/A
4.4.5	Safety interlocks	No safety interlock.	N/A
4.5	Explosion:.....:		N/A
4.5.1	General		N/A
4.5.2	No explosion during normal/abnormal operating condition	(See Clause B.2, B.3)	N/A
	No harm by explosion during single fault conditions	No explosion.	N/A
4.6	Fixing of conductors.....:	Class III equipment for building-in.	N/A
	Fix conductors not to defeat a safeguard.....:		N/A



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Clause	Requirement + Test	Result - Remark	Verdict

	Compliance is checked by test.....:		N/A
4.7	Equipment for direct insertion into mains socket – outlets.....:	Class III equipment.	N/A
4.7.2	Mains plug part complies with the relevant standard:		N/A
4.7.3	Torque (Nm).....:		N/A
4.8	Equipment containing coin/button cell batteries.....:	No such battery.	N/A
4.8.1	General		N/A
4.8.2	Instructional safeguard.....:		N/A
4.8.3	Battery Compartment Construction.....:		N/A
	Open torque test..... :		—
4.8.4.2	Stress relief test		N/A
4.8.4.3	Battery replacement test		N/A
4.8.4.4	Drop test		N/A
4.8.4.5	Impact test		N/A
4.8.4.6	Crush test		N/A
4.8.5	Compliance		N/A
	30N force test with test probe		N/A
	20N force test with test hook		N/A
4.9	Likelihood of fire or shock due to entry of conductive object..... :		N/A
4.10	Likelihood of fire or shock due to entry of conductive object..... :		N/A
4.10.1	Disconnect Device.....:	Not directly connected to the mains.	N/A
4.10.2	Switches and relays.....:	No switch and relay.	N/A

<b>5</b>	<b>ELECTRICALLY-CAUSED INJURY</b>		N/A
5.2	Classification and limits of electrical energy sources:	Class III equipment for building-in.	N/A
5.2.2	ES1, ES2 and ES3 limits	ES1	N/A
5.2.2.2	Steady-state voltage and current.....:		N/A
5.2.2.3	Capacitance limits .....		N/A
5.2.2.4	Single pulse limits.....:		N/A
5.2.2.5	Limits for repetitive pulses.....:		N/A
5.2.2.6	Ringling signals .....		N/A
5.2.2.7	Audio signals .....		N/A
5.3	Protection against electrical energy sources		N/A
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons		N/A





IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.3.1 a)	Accessible ES1/ES2 derived from ES2/ES3 circuits		N/A
5.3.1 b)	Skilled persons not unintentional contact ES3 bare conductors		N/A
5.3.2.1	Accessibility to electrical energy sources and safeguards		N/A
	Accessibility to outdoor equipment bare parts		N/A
5.3.2.2	Contact requirements		N/A
	Test with test probe from Annex V .....		N/A
5.3.2.2 a)	Air gap – electric strength test potential (V) .....		N/A
5.3.2.2 b)	Air gap – distance (mm) .....		N/A
5.3.2.3	Compliance		N/A
5.3.2.4	Terminals for connecting stripped wire		N/A
5.4	Insulation materials and requirements		N/A
5.4.1.2	Properties of insulating material		N/A
5.4.1.3	Material is non-hygroscopic .....		N/A
5.4.1.4	Maximum operating temperature for insulating materials :		N/A
5.4.1.5	Pollution degree .....		—
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		N/A
5.4.1.9	Insulating surfaces		N/A
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted		N/A
5.4.1.10.2	Vicat softening temperature .....		N/A
5.4.1.10.3	Ball pressure .....		N/A
5.4.2	Clearances		N/A
5.4.2.1	General requirements		N/A
	Clearances in circuits connected to AC Mains, Alternative method		N/A
5.4.2.2	Procedure 1 for determining clearance		N/A
	Temporary overvoltage .....		N/A
5.4.2.3	Procedure 2 for determining clearance		N/A
5.4.2.3.2.2	a.c. mains transient voltage .....		—
5.4.2.3.2.3	d.c. mains transient voltage .....		—



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Clause	Requirement + Test	Result - Remark	Verdict
5.4.2.3.2.4	External circuit transient voltage .....		—
5.4.2.3.2.5	Transient voltage determined by measurement.. :		—
5.4.2.4	Determining the adequacy of a clearance using an electric strength test		N/A
5.4.2.5	Multiplication factors for clearances and test voltages:		N/A
5.4.2.6	Clearance measurement .....		N/A
5.4.3	Creepage distances .....		N/A
5.4.3.1	General		N/A
5.4.3.3	Material Group .....		—
5.4.4	Solid insulation		N/A
5.4.4.1	General requirements .....		N/A
5.4.4.2	Minimum distance through insulation .....		N/A
5.4.4.3	Insulation compound forming solid insulation		N/A
5.4.4.4	Solid insulation in semiconductor devices		N/A
5.4.4.5	Cemented joints		N/A
5.4.4.6	Thin sheet material		N/A
5.4.4.6.1	General requirements		N/A
5.4.4.6.2	Separable thin sheet material		N/A
	Number of layers (pcs) :		N/A
5.4.4.6.3	Non-separable thin sheet material		N/A
	Number of layers (pcs) :		N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material .....		N/A
5.4.4.6.5	Mandrel test		N/A
5.4.4.7	Solid insulation in wound components		N/A
5.4.4.9	Solid insulation at frequencies >30 kHz, $E_P$ , $K_R$ , $d$ , $V_{PW}$ (V):		N/A
	Alternative by electric strength test, tested voltage (V), $K_R$		N/A
5.4.5	Antenna terminal insulation		N/A
5.4.5.1	General		N/A
5.4.5.2	Voltage surge test		N/A
5.4.5.3	Insulation resistance (M $\Omega$ ) .....		—
	Electric strength test .....		—
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





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Clause	Requirement + Test	Result - Remark	Verdict
5.4.8	Humidity conditioning		N/A
	Relative humidity (%), Temperature (°C), Duration (h):		—
5.4.9	Electric strength test .....		N/A
5.4.9.1	Test procedure for a solid insulation type test		N/A
5.4.9.2	Test procedure for routine tests		N/A
5.4.10	Protection against transient voltages between external circuit		N/A
5.4.10.1	Parts and circuits separated from external circuits		N/A
5.4.10.2	Test methods		N/A
5.4.10.2.1	General		N/A
5.4.10.2.2	Impulse test.....		N/A
5.4.10.2.3	Steady-state test.....		N/A
5.4.11	Insulation between external circuits and earthed circuitry:		N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A
5.4.11.2	Requirements		N/A
	Rated operating voltage U <sub>op</sub> (V) .....		—
	Nominal voltage U <sub>peak</sub> (V) .....		—
	Max increase due to variation ΔU <sub>sp</sub> .....		—
	Max increase due to ageing ΔU <sub>sa</sub> .....		—
5.4.11.3	Test method and compliance		N/A
5.4.12	Insulating liquid		N/A
5.4.12.1	General requirements		N/A
5.4.12.2	Electric strength of an insulating liquid .....		N/A
5.4.12.3	Compatibility of an insulating liquid .....		N/A
5.4.12.4	Container for insulating liquid .....		N/A
5.5	Components as safeguards		N/A
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





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Clause	Requirement + Test	Result - Remark	Verdict
5.5.7	SPD's		N/A
5.5.8	Insulation between the mains and external circuit consisting of a coaxial cable .....	No such devices.	N/A
5.5.9	Safeguards for socket-outlets in outdoor equipment:		N/A
	RCD rated residual operating current (mA) .....		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> ) .....		—
	Protective earthing conductor serving as a reinforced safeguard		—
	Protective earthing conductor serving as a double safeguard		—
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> ). ....		—
5.6.4.2	Protective current rating (A) .....		—
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Terminal size for connecting protective earthing conductors (mm)		N/A
	Terminal size for connecting protective bonding conductors (mm).....		N/A
5.6.5.2	Corrosion		N/A
5.6.6	Resistance of the protective system		N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method .....		N/A
5.6.6.3	Resistance (Ω) or voltage drop .....		N/A
5.6.7	Reliable connection of a protective earthing conductor		N/A
5.6.8	Functional earthing		N/A
	Conductor size (mm <sup>2</sup> ) .....		N/A
	Class II with functional earthing marking .....		N/A
	Appliance inlet cl & cr (mm) .....		N/A
5.7	Prospective touch voltage, touch current and protective conductor current		N/A
5.7.2	Measuring devices and networks		N/A
5.7.2.1	Measurement of touch current.....		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
5.7.2.2	Measurement of prospective touch voltage		N/A
5.7.3	Equipment set-up, supply connections and earth connections		N/A
5.7.4	Unearthed accessible parts .....		N/A
5.7.5	Earthed conductive accessible parts .....		N/A
5.7.6	Requirements when touch current exceeds ES2 limits		N/A
	Protective conductor current (mA) .....		—
	Instructional Safeguard .....		N/A
5.7.7	Prospective touch voltage and touch current due to external circuits		N/A
5.7.7.1	Touch current from coaxial cables		N/A
5.7.7.2	Prospective touch voltage and touch current associated with paired conductor cables		N/A
5.7.8	Summation of touch currents from external circuits		N/A
	a) Equipment with earthed external circuits Measured current (mA) .....		N/A
	b) Equipment whose external circuits are not referenced to earth. Measured current (mA) .....		N/A
5.8	Backfeed safeguard in battery backed up supplies		N/A
	Mains terminal ES .....		N/A
	Air gap (mm).....		N/A

<b>6</b>	<b>ELECTRICALLY- CAUSED FIRE</b>		<b>P</b>
6.2	Classification of power sources (PS) and potential ignition sources (PIS)		<b>P</b>
6.2.2	Power source circuit classifications	(See appended table 6.2.2)	<b>P</b>
6.2.3	Classification of potential ignition sources		<b>P</b>
6.2.3.1	Arcing PIS .....	(See appended table 6.2.3.1)	N/A
6.2.3.2	Resistive PIS .....	(See appended table 6.2.3.2)	N/A
6.3	Safeguards against fire under normal operating and abnormal operating conditions		N/A
6.3.1	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials .....	(See appended table B.1.5 and B.3)	N/A
	Combustible materials outside fire enclosure	No combustible material outside fire enclosure.	N/A
6.4	Safeguards against fire under single fault conditions		N/A
6.4.1	Safeguard Method	Control fire spread was used.	N/A
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits		N/A
6.4.3.1	Supplementary Safeguards		N/A
6.4.3.2	Single Fault Conditions	(See appended table B.4)	N/A
	Special conditions for temperature limited by fuse		N/A
6.4.4	Control of fire spread in PS1 circuits		P
6.4.5	Control of fire spread in PS2 circuits	Class III equipment for building-in.	N/A
6.4.5.2	Supplementary safeguards :	All components are mounted on V-0 PCB.	N/A
6.4.6	Control of fire spread in PS3 circuit		N/A
6.4.7	Separation of combustible materials from a PIS		N/A
6.4.7.1	General:		N/A
6.4.7.2	Separation by distance		N/A
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers		N/A
6.4.8.2	Fire enclosure and fire barrier material properties	Class III equipment for building-in.	N/A
6.4.8.2.1	Requirements for a fire barrier	No 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 and properties:		N/A
	Openings dimensions (mm) ..... :		N/A
6.4.8.3.4	Bottom openings and properties		N/A
	Openings dimensions (mm) ..... :		N/A
	Flammability tests for the bottom of a fire enclosure :		N/A
	Instructional Safeguard ..... :		N/A
6.4.8.3.5	Side openings and properties		N/A
	Openings dimensions (mm) ..... :		N/A
6.4.8.3.6	Integrity of a fire enclosure, condition met: a), b) or c)..... :		N/A
6.4.8.4	Separation of PIS from fire enclosure and fire barrier distance (mm) or flammability rating:		N/A
6.4.9	Flammability of insulating liquid..... :		N/A
6.5	Internal and external wiring		N/A
6.5.1	General requirements		N/A





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6.5.2	Requirements for interconnection to building wiring:		N/A
6.5.3	Internal wiring size (mm <sup>2</sup> ) for socket-outlets ..... :		N/A
6.6	Safeguards against fire due to connection to additional equipment		N/A

<b>7</b>	<b>INJURY CAUSED BY HAZARDOUS SUBSTANCES</b>		N/A
7.2	Reduction of exposure to hazardous substances		N/A
7.3	Ozone exposure		N/A
7.4	Use of personal safeguards (PPE)		N/A
	Personal safeguards and instructions..... :		—
7.5	Use of instructional safeguards and instructions		N/A
	Instructional safeguard (ISO 7010)..... :		—
7.6	Batteries and their protection circuits		N/A

<b>8</b>	<b>MECHANICALLY-CAUSED INJURY</b>		N/A
8.2	Mechanical energy source classifications	EUT is for building-in, the overall compliance shall be investigated in end products.	N/A
8.3	Safeguards against mechanical energy sources		N/A
8.4	Safeguards against parts with sharp edges and corners		N/A
8.4.1	Safeguards		N/A
	Instructional Safeguard ..... :		N/A
8.4.2	Sharp edges or corners	Class III equipment for building-in	N/A
8.5	Safeguards against moving parts		N/A
8.5.1	Fingers, jewellery, clothing, hair, etc., contact with MS2 or MS3 parts		N/A
	MS2 or MS3 part required to be accessible for the function of the equipment		N/A
	Moving MS3 parts only accessible to skilled person		N/A
8.5.2	Instructional Safeguard ..... :		N/A
8.5.4	Special categories of equipment comprising moving parts		N/A
8.5.4.1	General		N/A
8.5.4.2	Equipment containing work cells with MS3 parts		N/A
8.5.4.2.1	Protection of persons in the work cell ..... :		N/A
8.5.4.2.2	Access protection override		N/A
8.5.4.2.2.1	Override system ..... :		N/A



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8.5.4.2.2.2	Visual indicator .....		N/A
8.5.4.2.3	Emergency stop system		N/A
	Maximum stopping distance from the point of activation (m) :		N/A
	Space between end point and nearest fixed mechanical part (mm) :		N/A
8.5.4.2.4	Endurance requirements.....		N/A
	Mechanical system subjected to 100 000 cycles of operation		N/A
	- Mechanical function check and visual inspection		N/A
	-Cable assembly .....		N/A
8.5.4.3	Equipment having electromechanical device for destruction of media		N/A
8.5.4.3.1	Equipment safeguards		N/A
8.5.4.3.2	Instructional safeguards against moving parts .....		N/A
8.5.4.3.3	Disconnection from the supply		N/A
8.5.4.3.4	Cut type and test force (N) .....		N/A
8.5.4.3.5	Compliance		N/A
8.5.5	High Pressure Lamps		N/A
	Explosion test .....		N/A
8.5.5.3	Glass particles dimensions (mm) .....		N/A
8.6	Stability of equipment	MS1	N/A
8.6.1	General		N/A
	Instructional Safeguard .....		—
8.6.2	Static stability		N/A
8.6.2.2	Static stability test		N/A
8.6.2.3	Downward Force Test		N/A
8.6.3	Relocation stability test		N/A
	Wheels diameter (mm).....		—
	Tilt test		N/A
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test .....		N/A
8.7	Equipment mounted to wall, ceiling or other structure		N/A
8.7.1	Mount means type .....		N/A
8.7.2	Test methods .....		N/A
	Test 1, additional downwards force (N) .....		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	Test 2, number of attachment points and test force (N):		N/A
	Test 3 Nominal diameter (mm) and applied torque (Nm):		N/A
8.8	Handles strength		N/A
8.8.1	Classification		N/A
8.8.2	Handle strength test .....		N/A
	Number of handles .....		—
	Force applied (N) .....		—
8.9	Wheels or casters attachment requirements		N/A
8.9.2	Pull test .....		—
8.10	Carts, stands and similar carriers		N/A
8.10.1	General		N/A
8.10.2	Marking and instructions		N/A
8.10.3	Cart, stand or carrier loading test		N/A
	Loading force applied (N) .....		—
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Force applied (N) .....		—
8.10.6	Thermoplastic temperature stability (°C) .....		N/A
8.11	Mounting means for slide-rail mounted equipment (SRME)		N/A
8.11.1	General		N/A
8.11.2	Requirements for slide rails		N/A
	Instructional Safeguard .....		
8.11.3	Mechanical strength test .....		N/A
8.11.3.1	Downward force test, force (N) applied .....		N/A
8.11.3.2	Lateral push force test		N/A
8.11.3.3	Integrity of slide rail end stops		N/A
8.11.4	Compliance		N/A
8.12	Telescoping or rod antennas .....	No rod antennas.	N/A
	Button/Ball diameter (mm) .....		—

<b>9</b>	<b>THERMAL BURN INJURY</b>		<b>P</b>
9.2	Thermal energy source classifications	EUT is for building-in, the overall compliance shall be investigated in end products. (See appended table 5.4.1.4, 6.3.2, 9.0, B.2.6)	<b>P</b>





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

<b>10</b>	<b>RADIATION</b>		N/A
10.2	Radiation energy source classification		N/A
10.2.1	General classification		N/A
	Lasers .....		N/A
	Lamps and lamp systems .....		N/A
	Image projectors .....		N/A
	X-Ray .....		—
	Personal music player .....		—
10.3	Safeguards against laser radiation		N/A
	The standard(s) equipment containing laser(s) comply		—
10.4	Safeguards against optical radiation from lamps and lamp systems (including LED types)		N/A
10.4.1	General requirements		N/A
	Instructional safeguard provided for accessible radiation level needs to exceed .....		N/A
	Risk group marking and location .....		N/A
	Information for safe operation and installation		—
10.4.2	Requirements for enclosures		N/A
	UV radiation exposure .....		N/A
10.4.3	Instructional safeguard .....		N/A
10.5	Safeguards against X-radiation		N/A
10.5.1	Requirements		N/A
	Instructional safeguard for skilled persons .....		N/A



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Clause	Requirement + Test	Result - Remark	Verdict

10.5.3	Maximum radiation (pA/kg).....:		N/A
10.6	Safeguards against acoustic energy sources		N/A
10.6.1	General		N/A
10.6.2	Classification		N/A
	Acoustic output $L_{Aeq,T}$ , dB(A) .....		N/A
	Unweighted RMS output voltage (mV) .....		N/A
	Digital output signal (dBFS).....:		N/A
10.6.3	Requirements for dose-based systems		N/A
10.6.3.1	General requirements		N/A
10.6.3.2	Dose-based warning and automatic decrease		N/A
10.6.3.3	Exposure-based warning and requirements		N/A
	30 s integrated exposure level (MEL30) .....		N/A
	Warning for $MEL \geq 100$ dB(A) .....		N/A
10.6.4	Measurement methods		N/A
10.6.5	Protection of persons		N/A
	Instructional safeguards .....		N/A
10.6.6	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.6.1	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.6.2	Corded listening devices with digital input		N/A
	Max. acoustic output $L_{Aeq,T}$ , dB(A).....:		—
10.6.6.3	Cordless listening device		N/A
	Max. acoustic output $L_{Aeq,T}$ , dB(A).....:		—

B	<b>NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS</b>		P
B.1	General		P
B.1.5	Temperature measurement conditions	(See appended table B.1.5)	P
B.2	Normal operating conditions		P
B.2.1	General requirements .....	(See Test Item Particulars and appended test tables)	P
	Audio Amplifiers and equipment with audio amplifiers:		N/A
B.2.3	Supply voltage and tolerances	Not directly connected to the mains.	N/A
B.2.5	Input test .....	(See appended table B.2.5)	P
B.3	Simulated abnormal operating conditions		P





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B.3.1	General requirements .....	(See appended table B.3&B.4)	P
B.3.2	Covering of ventilation openings	No ventilation openings.	N/A
	Instructional safeguard .....		N/A
B.3.3	D.C. mains polarity test	Not connected to D.C. mains.	N/A
B.3.4	Setting of voltage selector .....	No voltage selector.	N/A
B.3.5	Maximum load at output terminals.....		N/A
B.3.6	Reverse battery polarity		N/A
B.3.7	Audio amplifier abnormal operating conditions		N/A
B.3.8	Safeguards functional during and after abnormal operating conditions		N/A
B.4	Simulated single fault conditions		P
B.4.1	General		P
B.4.2	Temperature controlling device	No such controlling device	N/A
B.4.3	Blocked motor test		N/A
B.4.4	Functional insulation		N/A
B.4.4.1	Short circuit of clearances for functional insulation		N/A
B.4.4.2	Short circuit of creepage distances for functional insulation		N/A
B.4.4.3	Short circuit of functional insulation on coated printed boards		N/A
B.4.5	Short circuit and interruption of electrodes in tubes and semiconductors		N/A
B.4.6	Short circuit or disconnect of passive components	(See appended table B.3 &B.4)	P
B.4.7	Continuous operation of components		N/A
B.4.8	Compliance during and after single fault conditions	(See appended table B.3 &B.4)	P
B.4.9	Battery charging and discharging under single fault conditions.....		N/A

<b>C</b>	<b>*UV RADIATION</b>		N/A
C.1	Protection of materials in equipment from UV radiation		N/A
C.1.2	Requirements		N/A
C.1.3	Test method		N/A
C.2	UV light conditioning test		N/A
C.2.1	Test apparatus		N/A
C.2.2	Mounting of test samples		N/A
C.2.3	Carbon-arc light-exposure apparatus		N/A
C.2.4	Xenon-arc light exposure apparatus		N/A





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<b>D</b>	<b>*TEST GENERATORS</b>		N/A
D.1	Impulse test generators		N/A
D.2	Antenna interface test generator		N/A
D.3	Electronic pulse generator		N/A

<b>E</b>	<b>*TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS</b>		N/A
E.1	Electrical energy source classification for audio signals		N/A
	Maximum non-clipped output power (W) .....		—
	Rated load impedance ( $\Omega$ ) .....		—
	Open-circuit output voltage (V)		—
	Instructional safeguard		—
E.2	Audio amplifier normal operating conditions		N/A
	Audio signal source type .....		—
	Audio output power (W) .....		—
	Audio output voltage (V) .....		—
	Rated load impedance ( $\Omega$ ) .....		—
	Requirements for temperature measurement		N/A
E.3	Audio amplifier abnormal operating conditions		N/A

<b>F</b>	<b>EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS</b>		P
F.1	General requirements		P
	Instructions – Language .....	English	—
F.2	Letter symbols and graphical symbols	See below.	P
F.2.1	Letter symbols according to IEC60027-1		N/A
F.2.2	Graphic symbols IEC, ISO or manufacturer specific		P
F.3	Equipment markings		P
F.3.1	Equipment marking locations		P
F.3.2	Equipment identification markings	See below.	P
F.3.2.1	Manufacturer identification .....	See copy of marking plate	—
F.3.2.2	Model identification .....	See copy of marking plate	—
F.3.3	Equipment rating markings	Class III equipment for building-in	N/A
F.3.3.1	Equipment with direct connection to mains	Not direct connection to mains	N/A



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F.3.3.2	Equipment without direct connection to mains	Equipment without direct connection to mains. No electrical ratings are marked.	P
F.3.3.3	Nature of supply voltage.....:		—
F.3.3.4	Rated voltage .....		N/A
F.3.3.4	Rated frequency .....	DC input	N/A
F.3.3.6	Rated current or rated power .....		N/A
F.3.3.7	Equipment with multiple supply connections		N/A
F.3.4	Voltage setting device	No voltage selector	N/A
F.3.5	Terminals and operating devices	See below.	P
F.3.5.1	Mains appliance outlet and socket-outlet markings:	No mains outlet.	N/A
F.3.5.2	Switch position identification marking .....		N/A
F.3.5.3	Replacement fuse identification and rating markings:		N/A
F.3.5.4	Replacement battery identification marking .....		N/A
F.3.5.5	Terminal marking location	Class III equipment.	N/A
F.3.6	Equipment markings related to equipment classification	Class III 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	Protective bonding conductor terminals		N/A
F.3.6.2	Equipment class marking	Class III equipment.	N/A
F.3.6.3	Functional earthing terminal marking		N/A
F.3.7	Equipment IP rating marking .....		—
F.3.8	External power supply output marking		N/A
F.3.9	Durability, legibility and permanence of marking	Marking comply with the requirements.	P
F.3.10	Test for permanence of markings	Markings withstand the required test.	P
F.4	Instructions		P
	a) Information prior to installation and initial use	Provided in user manual.	P
	b) Equipment for use in locations where children not likely to be present - marking		N/A
	c) Instructions for installation and interconnection		N/A
	d) Equipment intended for use only in restricted access area	Equipment is not intended for use in restricted access area.	N/A
	e) Equipment intended to be fastened in place		N/A
	f) Instructions for audio equipment terminals		N/A
	g) Protective earthing used as a safeguard	Class III equipment.	N/A





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	h) Protective conductor current exceeding ES2 limits	Class III equipment.	N/A
	i) Graphic symbols used on equipment		N/A
	j) Permanently connected equipment not provided with all-pole mains switch		N/A
	k) Replaceable components or modules providing safeguard function	No such part in the equipment.	N/A
	l) Equipment containing insulating liquid		N/A
	m) Installation instructions for outdoor equipment		N/A
F.5	Instructional safeguards	Considered.	P

<b>G</b>	<b>COMPONENTS</b>		N/A
<b>G.1</b>	<b>*Switches</b>		N/A
G.1.1	General requirements		N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A
G.1.3	Test method and compliance		N/A
<b>G.2</b>	<b>*Relays</b>		N/A
G.2.1	General requirements		N/A
G.2.2	Overload test		N/A
G.2.3	Relay controlling connectors supplying power to other equipment		N/A
G.2.4	Test method and compliance		N/A
<b>G.3</b>	<b>*Protection Devices</b>		N/A
G.3.1	Thermal cut-offs		N/A
	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)		N/A
	Thermal cut-outs tested as part of the equipment as indicated in c)		N/A
G.3.1.2	Test method and compliance		N/A
G.3.2	Thermal links	No thermal links in the equipment.	N/A
G.3.2.1	a) Thermal links tested separately according to IEC 60691 with specifics		N/A
	b) Thermal links tested as part of the equipment		N/A
G.3.2.2	Test method and compliance		N/A
G.3.3	PTC Thermistors	No PTC.	N/A
G.3.4	Overcurrent protection devices		N/A
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.4		N/A





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G.3.5.1	Non-resettable devices suitably rated and marking provided	No non-resettable devices in the equipment.	N/A
G.3.5.2	Single faults conditions .....		N/A
<b>G.4</b>	<b>*Connectors</b>		N/A
G.4.1	Spacings	Class III equipment	N/A
G.4.2	Mains connector configuration .....		N/A
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely		N/A
<b>G.5</b>	<b>Wound Components</b>		N/A
G.5.1	Wire insulation in wound components .....		N/A
G.5.1.2	Protection against mechanical stress		N/A
G.5.2	Endurance test		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Test time (days per cycle) .....		—
	Test Temperature (°C).....		—
G.5.2.3	Wound Components supplied by mains		N/A
G.5.2.4	No insulation breakdown		N/A
<b>G.5.3</b>	<b>Transformers</b>		N/A
G.5.3.1	Compliance method .....		N/A
	Position .....		—
	Method of protection .....		—
G.5.3.2	Insulation		N/A
	Protection from displacement of windings .....		—
G.5.3.3	Transformer overload tests .....		N/A
G.5.3.3.1	Test conditions		N/A
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
G.5.3.4	Transformers using FIW		N/A
G.5.3.4.1	General		N/A
	FIW wire nominal diameter		—
G.5.3.4.2	Transformers with basic insulation only		N/A
G.5.3.4.3	Transformers with double insulation or reinforced insulation		N/A
G.5.3.4.4	Transformers with FIW wound on metal or ferrite core		N/A
G.5.3.4.5	Thermal cycling test and compliance		N/A



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G.5.3.4.6	Partial discharge test		N/A
G.5.3.4.7	Routine test		N/A
<b>G.5.4</b>	<b>Motors</b>		N/A
G.5.4.1	General requirements		N/A
G.5.4.2	Motor overload test conditions		N/A
G.5.4.3	Running overload test		N/A
G.5.4.4.2	Locked-rotor overload test		N/A
	Test duration (days) .....		—
G.5.4.5	Running overload test for d.c. motors		N/A
G.5.4.5.2	Tested in the unit		N/A
G.5.4.5.3	Alternative method		N/A
G.5.4.6	Locked-rotor overload test for d.c. motors		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature .....		N/A
G.5.4.6.3	Alternative method		N/A
G.5.4.7	Motors with capacitors		N/A
G.5.4.8	Three-phase motors		N/A
G.5.4.9	Series motors		N/A
	Operating voltage..... :		N/A
<b>G.6</b>	<b>*Wire Insulation</b>		N/A
G.6.1	General	Class III equipment. All circuits or parts are considered as ES1.	N/A
G.6.2	Enamelled winding wire insulation	No such wiring insulation.	N/A
<b>G.7</b>	<b>*Mains supply cords</b>		N/A
G.7.1	General requirements	Class III equipment.	N/A
	Type .....		—
G.7.2	Cross-sectional area (mm <sup>2</sup> ), (AWG)..... :		—
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 and cord anchorage material		N/A



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G.7.4	Cord Entry.....:		N/A
G.7.5	Non-detachable cord bend protection		N/A
G.7.5.1	Requirements		N/A
G.7.5.2	Test method and compliance		—
	Overall diameter or minor overall dimension, $D$ (mm):		—
	Radius of curvature after test (mm):		—
G.7.6	Supply wiring space		N/A
G.7.6.1	General requirements		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Requirements		N/A
G.7.6.2.2	Test with 8 mm strand		N/A
<b>G.8</b>	<b>Varistors</b>		N/A
G.8.1	General requirements	No such component.	N/A
G.8.2	Safeguard against fire		N/A
G.8.2.1	General.....:		N/A
G.8.2.2	Varistor overload test.....:		N/A
G.8.2.3	Temporary overvoltage test.....:		N/A
<b>G.9</b>	<b>*Integrated Circuit (IC) Current Limiters</b>		N/A
G.9.1	Requirements	No such IC used.	N/A
	IC limiter output current (max. 5A).....:		N/A
	Manufacturers' defined drift.....:		—
G.9.2	Test Program		N/A
G.9.3	Compliance		N/A
<b>G.10</b>	<b>Resistors</b>		N/A
G.10.1	General requirements	Class III equipment.	N/A
G.10.2	Conditioning		N/A
G.10.3	Resistor test		N/A
G.10.4	Voltage surge test		N/A
G.10.5	Impulse test		N/A
G.10.6	Overload test		N/A
<b>G.11</b>	<b>*Capacitor and RC units</b>		N/A
G.11.1	General requirements	Class III equipment.	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	Class III equipment.	N/A
	Type test voltage $V_{ini,a}$ .....		—
	Routine test voltage, $V_{ini,b}$ .....		—
<b>G.13</b>	<b>*Printed boards</b>		N/A
G.13.1	General requirements	Class III equipment.	N/A
G.13.2	Uncoated printed boards		N/A
G.13.3	Coated printed boards		N/A
G.13.4	Insulation between conductors on the same inner surface		N/A
G.13.5	Insulation between conductors on different surfaces		N/A
	Distance through insulation .....		N/A
	Number of insulation layers (pcs) .....		—
G.13.6	Tests on coated printed boards		N/A
G.13.6.1	Sample preparation and preliminary inspection		N/A
G.13.6.2	Thermal conditioning		N/A
<b>G.14</b>	<b>*Coating on components terminals</b>		N/A
G.14.1	Requirements .....		N/A
<b>G.15</b>	<b>*Pressurized liquid filled components</b>		N/A
G.15.1	Requirements		N/A
G.15.2	Test methods and compliance		N/A
G.15.2.1	Hydrostatic pressure test		N/A
G.15.2.2	Creep resistance test		N/A
G.15.2.3	Tubing and fittings compatibility test		N/A
G.15.2.4	Vibration test		N/A
G.15.2.5	Thermal cycling test		N/A
G.15.2.6	Force test		N/A
G.15.3	Compliance		N/A
<b>G.16</b>	<b>*IC including capacitor discharge function (ICX)</b>		N/A
G.16.1	Condition for fault tested is not required		N/A
	ICX with associated circuitry tested in equipment		N/A
	ICX tested separately		N/A
G.16.2	Tests .....		N/A
	Smallest capacitance and smallest resistance specified by ICX manufacturer for impulse test .....		—
	Mains voltage that impulses to be superimposed on .....		—



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	Largest capacitance and smallest resistance for ICX tested by itself for 10000 cycles test .....		—
G.16.3	Capacitor discharge test .....		N/A

H	*CRITERIA FOR TELEPHONE RINGING SIGNALS		N/A
H.1	General		N/A
H.2	Method A		N/A
H.3	Method B		N/A
H.3.1	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) .....		—

J	*INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION		N/A
J.1	General		N/A
	Winding wire insulation .....		N/A
	Solid round winding wire, diameter (mm) .....		N/A
	Solid square and rectangular (flatwise bending) winding wire, cross-sectional area (mm <sup>2</sup> ) .....		N/A
J.2/J.3	Tests and Manufacturing		N/A

K	SAFETY INTERLOCKS		N/A
K.1	General requirements		N/A
	Instructional safeguard		N/A
K.2	Components of safety interlock safeguard mechanism		N/A
K.3	Inadvertent change of operating mode		N/A
K.4	Interlock safeguard override		N/A
K.5	Fail-safe		N/A
K.5.1	Under single fault condition:		N/A
K.6	Mechanically operated safety interlocks		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
K.6.1	Endurance requirement		N/A
K.6.2	Test method and compliance .....		N/A
K.7	Interlock circuit isolation		N/A
K.7.1	Separation distance for contact gaps & interlock circuit elements .....		N/A
	In circuit connected to mains, separation distance for contact gaps (mm) .....		N/A
	In circuit isolated from mains, separation distance for contact gaps (mm) .....		N/A
	Electric strength test before and after the test of K.7.2. :		N/A
K.7.2	Overload test, Current (A) .....		N/A
K.7.3	Endurance test		N/A
K.7.4	Electric strength test .....		N/A

<b>L</b>	<b>DISCONNECT DEVICES</b>		N/A
L.1	General requirements	Class III equipment. Not directly connected to the mains.	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
	Instructional safeguard .....		N/A

<b>M</b>	<b>EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS</b>		N/A
M.1	General requirements		N/A
M.2	Safety of batteries and their cells		N/A
M.2.1	Batteries and their cells comply with relevant IEC standards		N/A
M.3	Protection circuits for batteries provided within the equipment		N/A
M.3.1	Requirements		N/A
M.3.2	Test method		N/A
	- Overcharging of a rechargeable battery		N/A
	- Excessive discharging rate for any battery		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	- Unintentional charging of a non-rechargeable battery		N/A
	- Reverse charging of a rechargeable 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	Requirements		N/A
M.4.2.2	Compliance .....		N/A
M.4.3	Fire Enclosure		N/A
M.4.4	Drop test of equipment containing a secondary lithium battery		N/A
M.4.4.2	Preparation and procedure for the drop test		N/A
M.4.4.3	Drop, Voltage on reference and dropped batteries (V); voltage difference during 24 h period (%): .....		N/A
M.4.4.4	Check of the charge/discharge function		N/A
M.4.4.5	Charge / discharge cycle test		N/A
M.4.4.6	Compliance		N/A
M.5	Risk of burn due to short circuit during carrying		N/A
M.5.1	Requirement		N/A
M.5.2	Test method and compliance		N/A
M.6	Safeguards against short-circuits		N/A
M.6.1	External and internal faults		N/A
M.6.2	Compliance		N/A
M.7	*Risk of explosion from lead acid and NiCd batteries		N/A
M.7.1	Ventilation preventing explosive gas concentration		N/A
	Calculated hydrogen generation rate .....		N/A
M.7.2	Test method and compliance		N/A
	Minimum air flow rate, Q (m³/h) .....		N/A
M.7.3	Ventilation tests		N/A
M.7.3.1	General		N/A
M.7.3.2	Ventilation test – alternative 1		N/A
	Hydrogen gas concentration (%) .....		N/A
M.7.3.3	Ventilation test – alternative 2		N/A
	Obtained hydrogen generation rate .....		N/A
M.7.3.4	Ventilation test – alternative 3		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	Hydrogen gas concentration (%) .....		N/A
M.7.4	Marking .....		N/A
M.8	*Protection against internal ignition from external spark sources of lead acid batteries		N/A
M.8.1	General		N/A
M.8.2	Test method		N/A
M.8.2.1	General		N/A
M.8.2.2	Estimation of hypothetical volume $V_z$ (m <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		N/A
	Instructional safeguard .....		N/A

<b>N</b>	<b>*ELECTROCHEMICAL POTENTIALS</b>		N/A
	Metal(s) used .....	Class III equipment.	—

<b>O</b>	<b>MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES</b>		N/A
	Value of X (mm) .....		—

<b>P</b>	<b>SAFEGUARDS AGAINST CONDUCTIVE OBJECTS</b>		N/A
P.1	General		N/A
P.2	Safeguards against entry or consequences of entry of a foreign object	No openings.	N/A
P.2.1	General		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	Safeguard requirements		N/A
	The ES3 and PS3 keep-out volume in Figure P.3 not applicable to transportable equipment		N/A
	Transportable equipment with metalized plastic parts .....		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
P.2.3.2	Consequence of entry test .....		N/A
P.3	Safeguards against spillage of internal liquids		N/A
P.3.1	General		N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Compliance		N/A
P.4	Metallized coatings and adhesive securing parts		N/A
P.4.1	General		N/A
P.4.2	Tests		N/A
	Conditioning, Tc (°C) .....		—
	Duration (weeks).....		—

Q	CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING		N/A
Q.1	Limited power sources		N/A
Q.1.1	Requirements		N/A
	a) Inherently limited output		N/A
	b) Impedance limited output		N/A
	c) Regulating network limited output		N/A
	d) Overcurrent protective device limited output		N/A
	e) IC current limiter complying with G.9		N/A
Q.1.2	Test method and compliance		N/A
	Current rating of overcurrent protective device (A)....		N/A
Q.2	Test for external circuits – paired conductor cable		N/A
	Maximum output current (A) .....		—
	Current limiting method .....		—

R	*LIMITED SHORT CIRCUIT TEST		N/A
R.1	General	Class III equipment.	N/A
R.2	Test setup		N/A
	Overcurrent protective device for test..... ::		N/A
R.3	Test method		N/A
	Cord/cable used for test .....		N/A
R.4	Compliance		N/A





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Clause	Requirement + Test	Result - Remark	Verdict

<b>S</b>	<b>TESTS FOR RESISTANCE TO HEAT AND FIRE</b>		N/A
S.1	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	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) .....		—
S.3	Flammability test for the bottom of a fire enclosure		N/A
S.3.1	Mounting of samples		N/A
S.3.2	Test method and compliance .....		N/A
	Mounting of samples.....		—
	Wall thickness (mm) .....		—
S.4	Flammability classification of materials		N/A
S.5	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material .....		—
	Wall thickness (mm) .....		—
	Conditioning (test condition), (°C).....		—

<b>T</b>	<b>MECHANICAL STRENGTH TESTS</b>		<b>P</b>
T.1	General requirements		P
T.2	Steady force test, 10 N .....		N/A
T.3	Steady force test, 30 N .....		N/A
T.4	Steady force test, 100 N .....		N/A
T.5	Steady force test, 250 N .....	(See appended table T.5)	P
T.6	Enclosure impact test		N/A



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	Fall test		N/A
	Swing test		N/A
T.7	Drop test .....	(See appended table T.7)	P
T.8	Stress relief test.....		N/A
T.9	Glass Impact Test .....		N/A
T.10	*Glass fragmentation test.....		N/A
	Number of particles counted .....		N/A
T.11	*Test for telescoping or rod antennas		N/A
	Torque value (Nm) .....		—

<b>U</b>	<b>*MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION</b>		N/A
U.1	General		N/A
	Instructional safeguard :		N/A
U.2	Test method and compliance for non-intrinsically protected CRTs		N/A
U.3	Protective Screen .....		N/A

<b>V</b>	<b>DETERMINATION OF ACCESSIBLE PARTS (FINGERS, PROBES AND WEDGES)</b>		N/A
V.1	Accessible parts of equipment		N/A
V.1.1	General		N/A
V.1.2	Surfaces and openings tested with jointed test probes		N/A
V.1.3	Openings tested with straight unjointed test probes		N/A
V.1.4	Plugs, jacks, connectors tested with blunt probe		N/A
V.1.5	Slot openings tested with wedge probe		N/A
V.1.6	Accessible part criterion		N/A
V.2	Accessible part criterion		N/A

<b>X</b>	<b>*ALTERNATIVE METHOD FOR DETERMINING CLEARANCES FOR INSULATION IN CIRCUITS CONNECTED TO AN AC MAINS NOT EXCEEDING 420 V PEAK (300 V RMS)</b>		N/A
	Clearance		N/A

<b>Y</b>	<b>*CONSTRUCTION REQUIREMENTS FOR OUTDOOR ENCLOSURES</b>		N/A
Y.1	General		N/A
Y.2	Resistance to UV radiation		N/A



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Y.3	Resistance to corrosion		N/A
Y.3.1	Metallic parts of outdoor enclosures are resistant to effects of water-borne contaminants by ..... :		N/A
Y.3.2	Test apparatus		N/A
Y.3.3	Water – saturated sulphur dioxide atmosphere		N/A
Y.3.4	Test procedure ..... :		N/A
Y.3.5	Compliance		N/A
Y.4	Gaskets		N/A
Y.4.1	General		N/A
Y.4.2	Gasket tests		N/A
Y.4.3	Tensile strength and elongation tests		N/A
	Alternative test methods ..... :		N/A
Y.4.4	Compression test		N/A
Y.4.5	Oil resistance		N/A
Y.4.6	Securing means		N/A
Y.5	Protection of equipment within an outdoor enclosure		N/A
Y.5.1	General		N/A
Y.5.2	Protection from moisture		N/A
	Relevant tests of IEC 60529 or Y.5.3 ..... :		N/A
Y.5.3	Water spray test		N/A
Y.5.4	Protection from plants and vermin		N/A
Y.5.5	Protection from excessive dust		N/A
Y.5.5.1	General		N/A
Y.5.5.2	IP5X equipment		N/A
Y.5.5.3	IP6X equipment		N/A
Y.6	Mechanical strength of enclosures		N/A
Y.6.1	General		N/A
Y.6.2	Impact test ..... :		N/A





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<b>ATTACHMENT TO TEST REPORT</b> <b>IEC 62368-1</b> <b>EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES</b> (Audio/video, information and communication technology equipment - Part 1: Safety requirements)			
Differences according to .....: EN IEC 62368-1:2020+A11:2020			
Attachment Form No. ....: EU_GD_IEC62368_1E			
Attachment Originator .....: UL(Demko)			
Master Attachment .....: 2021-02-04			
Copyright © 2021 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
	<b>CENELEC COMMON MODIFICATIONS (EN)</b>		P
	Clause numbers in the cells that are shaded light grey are clause references in EN IEC 62368-1:2020+A11:2020. All other clause numbers in that column, except for those in the paragraph below, refers to IEC 62368-1:2018.  Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2018 are prefixed "Z".		P
	Add the following annexes:  Annex ZA (normative) Normative references to international publications with their corresponding European publications  Annex ZB (normative) Special national conditions  Annex ZC (informative) A-deviations  Annex ZD (informative) IEC and CENELEC code designations for flexible cords		P
1	<b>Modification to Clause 3 .</b>		P
3.3.19	<b>Sound exposure</b>  <i>Replace 3.3.19 of IEC 62368-1 with the following definitions:</i>		N/A
3.3.19.1	<b>momentary exposure level, MEL</b>  metric for estimating 1 s sound exposure level from the HD 483-1 S2 test signal applied to both channels, based on EN 50332-1:2013, 4.2.  Note 1 to entry: MEL is measured as A-weighted levels in dB. Note 2 to entry: See B.3 of EN 50332-3:2017 for additional information.		N/A
3.3.19.3	<b>sound exposure, E</b>  A-weighted sound pressure ( <i>p</i> ) squared and integrated over a stated period of time, <i>T</i>  Note 1 to entry: The SI unit is Pa <sup>2</sup> s.		N/A



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	$E = \int_0^T p(t)^2 dt$		
3.3.19.4	<p><b>sound exposure level, SEL</b></p> <p>logarithmic measure of sound exposure relative to a reference value, <math>E_0</math>, typically the 1 kHz threshold of hearing in humans.</p> <p>Note 1 to entry: SEL is measured as A-weighted levels in dB.</p> $SEL = 10 \lg \left( \frac{E}{E_0} \right) \text{ dB}$ <p>Note 2 to entry: See B.4 of EN 50332-3:2017 for additional information.</p>		N/A
3.3.19.5	<p><b>digital signal level relative to full scale, dBFS</b></p> <p>levels reported in dBFS are always r.m.s. Full scale level, 0 dBFS, is the level of a dc-free 997-Hz sine wave whose undithered positive peak value is positive digital full scale, leaving the code corresponding to negative digital full scale unused</p> <p>Note 1 to entry: It is invalid to use dBFS for non-r.m.s. levels. Because the definition of full scale is based on a sine wave, the level of signals with a crest factor lower than that of a sine wave may exceed 0 dBFS. In particular, square wave signals may reach +3,01 dBFS.</p>		N/A
2	<b>Modification to Clause 10</b>		N/A
10.6	<p><b>Safeguards against acoustic energy sources</b></p> <p>Replace 10.6 of IEC 62368-1 with the following:</p>		N/A
10.6.1.1	<p><b>Introduction</b></p> <p><b>Safeguard</b> requirements for protection against long-term exposure to excessive sound pressure levels from personal music players closely coupled to the ear are specified below. Requirements for earphones and headphones intended for use with personal music players are also covered. A personal music player is a portable equipment intended for use by an <b>ordinary person</b>, that:</p> <ul style="list-style-type: none"> <li>– is designed to allow the user to listen to audio or audiovisual content / material; and</li> <li>– uses a listening device, such as headphones or earphones that can be worn in or on or around the ears; and</li> <li>– has a player that can be body worn (of a size suitable to be carried in a clothing pocket) and is intended for the user to walk around with while in continuous use (for example, on a street,</li> </ul>		N/A



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	<p>in a subway, at an airport, etc.).</p> <p>EXAMPLES Portable CD players, MP3 audio players, mobile phones with MP3 type features, PDAs or similar equipment.</p> <p>Personal music players shall comply with the requirements of either 10.6.2 or 10.6.3.</p> <p>NOTE 1 Protection against acoustic energy sources from telecom applications is referenced to ITU-T P.360.</p> <p>NOTE 2 It is the intention of the Committee to allow the alternative methods for now, but to only use the dose measurement method as given in 10.6.5 in future. Therefore, manufacturers are encouraged to implement 10.6.5 as soon as possible.</p> <p>Listening devices sold separately shall comply with the requirements of 10.6.6.</p> <p>These requirements are valid for music or video mode only.</p> <p>The requirements do not apply to:</p> <ul style="list-style-type: none"> <li>– professional equipment;</li> </ul> <p>NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment.</p> <ul style="list-style-type: none"> <li>– hearing aid equipment and other devices for assistive listening;</li> <li>– the following type of analogue personal music players: <ul style="list-style-type: none"> <li>• long distance radio receiver (for example, a multiband radio receiver or world band radio receiver, an AM radio receiver), and</li> <li>• cassette player/recorder;</li> </ul> </li> </ul> <p>NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies.</p> <ul style="list-style-type: none"> <li>– a player while connected to an external amplifier that does not allow the user to walk around while in use.</li> </ul> <p>For equipment that is clearly designed or intended primarily for use by children, the limits of the relevant toy standards may apply.</p> <p>The relevant requirements are given in EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.</p>		
10.6.1.2	<p><b>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</p>		N/A





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	GHz). For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body mounted devices, attention is drawn to EN 50360 and EN 50566.		
10.6.2	<b>Classification of devices without the capacity to estimate sound dose</b>		N/A
10.6.2.1	<p><b>General</b></p> <p>This standard is transitioning from short-term based (30 s) requirements to long-term based (40 hour) requirements. These clauses remain in effect only for devices that do not comply with sound dose estimation as stipulated in EN 50332-3.</p> <p>For classifying the acoustic output <math>L_{Aeq,T}</math>, measurements are based on the A-weighted equivalent sound pressure level over a 30 s period.</p> <p>For music where the average sound pressure (long term <math>L_{Aeq,T}</math>) measured over the duration of the song is lower than the average produced by the programme simulation noise, measurements may be done over the duration of the complete song. In this case, <math>T</math> becomes the duration of the song.</p> <p>NOTE Classical music, acoustic music and broadcast typically has an average sound pressure (long term <math>L_{Aeq,T}</math>) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the content and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song does not exceed the required limit.</p> <p>For example, if the player is set with the programme simulation noise to 85 dB, but the average music level of the song is only 65 dB, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dB.</p>		N/A
10.6.2.2	<p><b>RS1 limits (to be superseded, see 10.6.3.2)</b></p> <p>RS1 is a class 1 acoustic energy source that does not exceed the following:</p> <ul style="list-style-type: none"> <li>– for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the <math>L_{Aeq,T}</math> acoustic output shall be <math>\leq 85</math> dB when playing the fixed "programme simulation noise" described in EN 50332-1.</li> <li>– for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be <math>\leq 27</math> mV (analogue interface) or -25 dBFS (digital interface) when playing the fixed "programme simulation noise"</li> </ul>		N/A



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	described in EN 50332-1. – The RS1 limits will be updated for all devices as per 10.6.3.2.		
10.6.2.3	<b>RS2 limits (to be superseded, see 10.6.3.3)</b>  RS2 is a class 2 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or when the combination of player and listening device is known by other means such as setting or automatic 130 detection, the $L_{Aeq,T}$ acoustic output shall be $\leq 100$ dB(A) when playing the fixed "programme simulation noise" as described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be $\leq 150$ mV (analogue interface) or -10 dBFS (digital interface) when playing the fixed "programme simulation noise" as described in EN 50332-1.		N/A
10.6.2.4	<b>RS3 limits</b>  RS3 is a class 3 acoustic energy source that exceeds RS2 limits.		N/A
10.6.3	<b>Classification of devices (new)</b>		N/A
10.6.3.1	<b>General</b>  Previous limits (10.6.2) created abundant false negative and false positive PMP sound level warnings. New limits, compliant with The Commission Decision of 23 June 2009, are given below.		N/A
10.6.3.2	<b>RS1 limits (new)</b>  RS1 is a class 1 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be $\leq 80$ dB when playing the fixed "programme simulation noise" described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be $\leq 15$ mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed "programme simulation noise" described in EN 50332-1.		N/A
10.6.3.3	<b>RS2 limits (new)</b>		N/A







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	<p>RS2 is a class 2 acoustic energy source that does not exceed the following:</p> <ul style="list-style-type: none"> <li>– for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the weekly sound exposure level, as described in EN 50332-3, shall be <math>\leq 80</math> dB when playing the fixed "programme simulation noise" described in EN 50332-1.</li> <li>– for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output level, integrated over one week, as described in EN50332-3, shall be <math>\leq 15</math> mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed "programme simulation noise" described in EN 50332-1.</li> </ul>		
10.6.4	<b>Requirements for maximum sound exposure</b>		N/A
10.6.4.1	<p><b>Measurement methods</b></p> <p>All volume controls shall be turned to maximum during tests.</p> <p>Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable.</p>		N/A
10.6.4.2	<p><b>Protection of persons</b></p> <p>Except as given below, protection requirements for parts <b>accessible to ordinary persons, instructed persons and skilled persons</b> are given in 4.3.</p> <p>NOTE 1 Volume control is not considered a <b>safeguard</b>.</p> <p>Between RS2 and an <b>ordinary person</b>, the <b>basic safeguard</b> may be replaced by an <b>instructional safeguard</b> in accordance with Clause F.5, except that the <b>instructional safeguard</b> shall be placed on the equipment, or on the packaging, or in the instruction manual.</p> <p>Alternatively, the <b>instructional safeguard</b> may be given through the equipment display during use.</p> <p>The elements of the <b>instructional safeguard</b> shall be as follows:</p> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>– element 1a: the symbol , IEC 60417-6044 (2011-01)</li> <li>– element 2: "High sound pressure" or equivalent wording</li> <li>– element 3: "Hearing damage risk" or equivalent wording</li> <li>– element 4: "Do not listen at high volume levels for long periods." or equivalent wording</li> </ul>		N/A





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	<p>An <b>equipment safeguard</b> shall prevent exposure of an <b>ordinary person</b> to an RS2 source without intentional physical action from the <b>ordinary person</b> and shall automatically return to an output level not exceeding what is specified for an RS1 source when the power is switched off.</p> <p>The equipment shall provide a means to actively inform the user of the increased sound level when the equipment is operated with an output exceeding RS1. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an output exceeding RS1. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time.</p> <p>NOTE 2 Examples of means include visual or audible signals. Action from the user is always needed.</p> <p>NOTE 3 The 20 h listening time is the accumulative listening time, independent of how often and how long the personal music player has been switched off.</p> <p>A <b>skilled person</b> shall not be unintentionally exposed to RS3.</p>		
10.6.5	<b>Requirements for dose-based systems</b>		N/A
10.6.5.1	<p><b>General requirements</b></p> <p>Personal music players shall give the warnings as provided below when tested according to EN 50332-3, using the limits from this clause.</p> <p>The manufacturer may offer optional settings to allow the users to modify when and how they wish to receive the notifications and warnings to promote a better user experience without defeating the safeguards. This allows the users to be informed in a method that best meets their physical capabilities and device usage needs. If such optional settings are offered, an administrator (for example, parental restrictions, business/educational administrators, etc.) shall be able to lock any optional settings into a specific configuration.</p> <p>The personal music player shall be supplied with easy to understand explanation to the user of the dose management system, the risks involved, and how to use the system safely. The user shall be made aware that other sources may significantly contribute to their sound exposure, for example work, transportation, concerts, clubs, cinema, car races, etc.</p>		N/A
10.6.5.2	<p><b>Dose-based warning and requirements</b></p> <p>When a dose of 100 % CSD is reached, and at least at every 100 % further increase of CSD, the device shall warn the user and require an acknowledgement. In</p>		N/A



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	<p>case the user does not acknowledge, the output level shall automatically decrease to compliance with class RS1.</p> <p>The warning shall at least clearly indicate that listening above 100 % CSD leads to the risk of hearing damage or loss.</p>		
10.6.5.3	<p><b>Exposure-based requirements</b></p> <p>With only dose-based requirements, cause and effect could be far separated in time, defying the purpose of educating users about safe listening practice. In addition to dose-based requirements, a PMP shall therefore also put a limit to the short-term sound level a user can listen at.</p> <p>The exposure-based limiter (EL) shall automatically reduce the sound level not to exceed 100 dB(A) or 150 mV integrated over the past 180 s, based on methodology defined in EN 50332-3.</p> <p>The EL settling time (time from starting level reduction to reaching target output) shall be 10 s or faster.</p> <p>Test of EL functionality is conducted according to EN 50332-3, using the limits from this clause. For equipment provided as a package (player with its listening device), the level integrated over 180 s shall be 100 dB or lower. For equipment provided with a standardized connector, the unweighted level integrated over 180 s shall be no more than 150 mV for an analogue interface and no more than -10 dBFS for a digital interface.</p> <p>NOTE In case the source is known not to be music (or test signal), the EL may be disabled.</p>		N/A
10.6.6	<b>Requirements for listening devices (headphones, earphones, etc.)</b>		N/A
10.6.6.1	<p><b>Corded listening devices with analogue input</b></p> <p>With 94 dB LAeq acoustic pressure output of the listening device, and with the volume and sound settings in the listening device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the input voltage of the listening device when playing the fixed "programme simulation noise" as described in EN 50332-1 shall be <math>\geq 75</math> mV.</p> <p>NOTE The values of 94 dB and 75 mV correspond with 85 dB and 27 mV or 100 dB and 150 mV.</p>		N/A
10.6.6.2	<p><b>Corded listening devices with digital input</b></p> <p>With any playing device playing the fixed "programme simulation noise" described in EN 50332-1, and with the volume and sound settings in the listening device (for example, built-in volume level control, additional</p>		N/A



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	sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the $L_{Aeq,T}$ acoustic output of the listening device shall be $\leq 100$ dB with an input signal of -10 dBFS.		
10.6.6.3	<b>Cordless listening devices</b>  In cordless mode, – with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and – respecting the cordless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and – with volume and sound settings in the receiving device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the above mentioned programme simulation noise, the $L_{Aeq,T}$ acoustic output of the listening device shall be $\leq 100$ dB with an input signal of -10 dBFS.		N/A
10.6.6.4	<b>Measurement method</b>  <i>Measurements shall be made in accordance with EN 50332-2 as applicable.</i>		N/A
3	<b>Modification to the whole document</b>		N/A





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	<b>Delete</b> all the "country" notes in the reference document according to the following list:					N/A	
	0.2.1	Note 1 and 2	1	Note 4 and 5	3.3.8.1		Note 2
	3.3.8.3	Note 1	4.1.15	Note	4.7.3		Note 1 and 2
	5.2.2.2	Note	5.4.2.3.2.2 Table 12	Note c	5.4.2.3.2.4		Note 1 and 3
	5.4.2.3.2.4 Table 13	Note 2	5.4.2.5	Note 2	5.4.5.1		Note
	5.4.10.2.1	Note	5.4.10.2.2	Note	5.4.10.2.3		Note
	5.5.2.1	Note	5.5.6	Note	5.6.4.2.1		Note 2 and 3 and 4
	5.6.8	Note 2	5.7.6	Note	5.7.7.1		Note 1 and Note 2
	8.5.4.2.3	Note	10.2.1 Table 39	Note 3 and 4 and 5	10.5.3		Note 2
	<del>10.6.4</del>	Note 3	F.3.3.6	Note 3	Y.4.1		Note
	Y.4.5	Note					
4	<b>Modification to Clause 1</b>					N/A	
1	<b>Add the following note:</b>  <i>NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.</i>					N/A	
5	<b>Modification to 4.Z1</b>					N/A	
4.Z1	<b>Add the following new subclause after 4.9:</b>  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): 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; 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; 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					N/A	



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	specified in the installation instructions.  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.		
6	<b>Modification to 5.4.2.3.2.4</b>		N/A
5.4.2.3.2.4	<b>Add the following to the end of this subclause:</b>  The requirement for interconnection with <b>external circuit</b> is in addition given in EN 50491-3:2009.		N/A
7	<b>Modification to 10.2.1</b>		N/A
10.2.1	Add the following to <sup>c)</sup> and <sup>d)</sup> in table 39:  For additional requirements, see 10.5.1.		N/A
8	<b>Modification to 10.5.1</b>		N/A
10.5.1	<b>Add the following after the first paragraph:</b>  For RS 1 compliance is checked by measurement under the following conditions:  In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those internal adjustments or pre-sets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made.  NOTE Z1 Soldered joints and paint lockings are examples of adequate locking.  The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm <sup>2</sup> , at any point 10 cm from the outer surface of the apparatus.  Moreover, the measurement shall be made under fault conditions causing an increase of the high voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made.  For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level.  NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.		N/A
9	<b>Modification to G.7.1</b>		N/A
G.7.1	<b>Add the following note:</b>  NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.		N/A
10	<b>Modification to Bibliography</b>		P





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	<p><b>Add</b> the following notes for the standards indicated:</p> <p>IEC 60130-9 NOTE Harmonized as EN 60130-9.  IEC 60269-2 NOTE Harmonized as HD 60269-2.  IEC 60309-1 NOTE Harmonized as EN 60309-1.  IEC 60364 NOTE some parts harmonized in HD 384/HD 60364 series.  IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4.  IEC 60664-5 NOTE Harmonized as EN 60664-5.  IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified).  IEC 61508-1 NOTE Harmonized as EN 61508-1.  IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1.  IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4.  IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6.  IEC 61643-1 NOTE Harmonized as EN 61643-1.  IEC 61643-21 NOTE Harmonized as EN 61643-21.  IEC 61643-311 NOTE Harmonized as EN 61643-311.  IEC 61643-321 NOTE Harmonized as EN 61643-321.  IEC 61643-331 NOTE Harmonized as EN 61643-331.</p>		P
11	<b>ADDITION OF ANNEXES</b>		N/A
ZB	<b>ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)</b>		N/A
4.1.15	<p><b>Denmark, Finland, Norway and Sweden</b></p> <p>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.</p> <p>The marking text in the applicable countries shall be as follows:</p> <p>In <b>Denmark</b>: "Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord."  In <b>Finland</b>: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"  In <b>Norway</b>: "Apparatet må tilkoples jordet stikkontakt"  In <b>Sweden</b>: "Apparaten skall anslutas till jordat uttag"</p>		N/A
4.7.3	<p><b>United Kingdom</b></p> <p>To the end of the subclause the following is added:</p> <p>The torque test is performed using a socket-outlet complying with BS 1363, and the plug part shall be assessed to the relevant clauses of BS 1363. Also see Annex G.4.2 of this annex</p>		N/A
5.2.2.2	<p><b>Denmark</b></p> <p>After the 2nd paragraph add the following:</p>		N/A





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	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.		
<b>5.4.11.1 and Annex G</b>	<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),</li> </ul> <p>and</p> <ul style="list-style-type: none"> <li>• is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV.</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;</li> </ul>		N/A



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	the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14.		
5.5.2.1	<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).		N/A
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.		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.		N/A
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.		N/A
5.6.4.2.1	<b>France</b>  After the indent for <b>pluggable equipment type A</b> , the following is added: – in certain cases, the <b>protective current rating</b> of the circuit supplied from the mains is taken as 20 A instead of 16 A.		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.		N/A
5.6.8	<b>Norway</b>  To the end of the subclause the following is added: Equipment connected with an earthed mains plug is classified as <b>class I equipment</b> . See the Norway marking requirement in 4.1.15. The symbol IEC 60417-		N/A



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	6092, as specified in F.3.6.2, is accepted.		
5.7.6	<p><b>Denmark</b></p> <p>To the end of the subclause the following is added:</p> <p>The installation instruction shall be affixed to the equipment if the <b>protective conductor current</b> exceeds the limits of 3,5 mA a.c. or 10 mA d.c.</p>		N/A
5.7.6.2	<p><b>Denmark</b></p> <p>To the end of the subclause the following is added:</p> <p>The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA .</p>		N/A
5.7.7.1	<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.</p> <p>Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system.</p> <p>It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example.</p> <p>The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in:</p> <p>"Apparatus connected to the protective earthing of the building installation through the mains connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)"</p> <p>NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min.</p> <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 jordtilkoplede utstyr – og er tilkoplede et koaksialbasert kabel-TV nett,</p>		N/A





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	<p>kan forårsake brannfare. For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en galvanisk isolator mellom apparatet og kabel-TV nettet."</p> <p>Translation to Swedish: "Apparater som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet."</p>		
8.5.4.2.3	<p><b>United Kingdom</b></p> <p>Add the following after the 2<sup>nd</sup> dash bullet in 3<sup>rd</sup> paragraph:</p> <p>An emergency stop system complying with the requirements of IEC 60204-1 and ISO 13850 is required where there is a risk of personal injury.</p>		N/A
B.3.1 and B.4	<p><b>Ireland and United Kingdom</b></p> <p>The following is applicable:</p> <p>To protect against excessive currents and short-circuits in the primary circuit of <b>direct plug-in equipment</b>, tests according to Annexes B.3.1 and B.4 shall be conducted using an external miniature circuit breaker complying with EN 60898-1, Type B, rated 32A. If the equipment does not pass these tests, suitable protective devices shall be included as an integral part of the <b>direct plug-in equipment</b>, until the requirements of Annexes B.3.1 and B.4 are met</p>		N/A
G.4.2	<p><b>Denmark</b></p> <p>To the end of the subclause the following is added:</p> <p>Supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1:2011.</p> <p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p> <p>If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a polyphase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2.</p> <p>Mains socket outlets intended for providing power to</p>		N/A



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	<p>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>		
<b>G.4.2</b>	<p><b>United Kingdom</b></p> <p>To the end of the subclause the following is added:</p> <p>The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.</p>		N/A
<b>G.7.1</b>	<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
<b>G.7.1</b>	<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
<b>G.7.2</b>	<p><b>Ireland and United Kingdom</b></p> <p>To the first paragraph the following is added:</p>		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	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.		
<b>ZC</b>	<b>ANNEX ZC, NATIONAL DEVIATIONS (EN)</b>		N/A
<b>10.5.2</b>	<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> 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>		N/A
<b>ZD</b>	<b>IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS (EN)</b>		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	Type of flexible cord	Code designations	
		IEC	CENELEC
	<b>PVC insulated cords</b>		
	Flat twin tinsel cord	60227 IEC 41	H03VH-Y
	Light polyvinyl chloride sheathed flexible cord	60227 IEC 52	H03VV-F H03VVH2-F
	Ordinary polyvinyl chloride sheathed flexible cord	60227 IEC 53	H05VV-F H05VVH2-F
	<b>Rubber insulated cords</b>		
	Braided cord	60245 IEC 51	H03RT-F
	Ordinary tough rubber sheathed flexible cord	60245 IEC 53	H05RR-F
	Ordinary polychloroprene sheathed flexible cord	60245 IEC 57	H05RN-F
	Heavy polychloroprene sheathed flexible cord	60245 IEC 66	H07RN-F
	<b>Cords having high flexibility</b>		
	Rubber insulated and sheathed cord	60245 IEC 86	H03RR-H
	Rubber insulated, crosslinked PVC sheathed cord	60245 IEC 87	H03RV4-H
	Crosslinked PVC insulated and sheathed cord	60245 IEC 88	H03V4V4-H
	<b>Cords insulated and sheathed with halogen-free thermoplastic compounds</b>		
	Light halogen-free thermoplastic insulated and sheathed flexible cords		H03Z1Z1-F H03Z1Z1H2-F
	Ordinary halogen-free thermoplastic insulated and sheathed flexible cords		H05Z1Z1-F H05Z1Z1H2-F



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Clause	Requirement + Test			Result - Remark	Verdict
<b>4.1.2</b>	<b>TABLE: Critical components information</b>				<b>P</b>
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>
PWB	KINGBOARD LAMINATES HOLDINGS LTD	KB-6160A	V-0,130°C	UL 796	UL E123995
Alt.	Interchangeable	Interchangeable	Rated min.105°C, min. V-1.	UL 796	UL
Supplementary information:					
1) Provided evidence ensures the agreed level of compliance. See OD-2039.					
2) Description line content is optional. Main line description needs to clearly detail the component used for testing.					



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IEC 62368-1				
Clause	Requirement + Test		Result - Remark	Verdict
4.8.4, 4.8.5	TABLE: Lithium coin/button cell batteries mechanical tests			N/A
(The following mechanical tests are conducted in the sequence noted.)				
4.8.4.2	TABLE: Stress Relief test			—
Part		Material	Oven Temperature (°C)	Comments
--		--	--	--
4.8.4.3	TABLE: Battery replacement test			—
Battery part no. .... :		--	—	
Battery Installation/withdrawal		Battery Installation/Removal Cycle		Comments
--		1		--
--		2		--
--		3		--
--		4		--
--		5		--
4.8.4.4	TABLE: Drop test			—
Impact Area		Drop Distance	Drop No.	Observations
--		--	1	--
--		--	2	--
--		--	3	--
4.8.4.5	TABLE: Impact			—
Impacts per surface		Surface tested	Impact energy (Nm)	Comments
--		--	--	--
4.8.4.6	TABLE: Crush test			—
Test position		Surface tested	Crushing Force (N)	Duration force applied (s)
--		--	--	--
Supplementary information:--				
4.8.5	TABLE: Lithium coin/button cell batteries mechanical test result			
Test position		Surface tested	Force (N)	Duration force applied (s)
--		--	--	--
Supplementary information: --				





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Clause	Requirement + Test	Result - Remark	Verdict

5.2		Table: Classification of electrical energy sources						P
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters				ES Class
				U (V)	I (mA)	Type <sup>1)</sup>	Additional Info <sup>2)</sup>	
1	50.0Vdc	All circuits	Normal	N/A	N/A	N/A	N/A	ES1*)
			Abnormal	N/A	N/A	N/A	N/A	
			Single fault –SC/OC	N/A	N/A	N/A	N/A	

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

1) Type: Steady state (SS), Capacitance (CP), Single pulse (SP), Repetitive pulses (RP), etc.

2) Additional Info: Frequency, Pulse duration, Pulse off time, Capacitance value, etc.

\*) : Adapter complied with the requirements of ES1/touch current on IEC 62368-1 (see attached adapter test report).

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

Supplementary information:

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

Supplementary information:--

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

Supplementary information: See table 4.1.2 for details



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5.4.2, 5.4.3 TABLE: Minimum Clearances/Creepage distance								N/A
Clearance (cl) and creepage distance (cr) at/of/between:	Up (V)	U r.m.s. (V)	Frequency (kHz) <sup>1</sup>	Required cl (mm)	cl (mm) <sup>2</sup>	E.S. <sup>2</sup> (V)	Required <sup>3</sup> cr (mm)	cr (mm)
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
Supplementary information:								
Note 1: Only for frequency above 30 kHz								
Note 2: See table 5.4.2.4 if this is based on electric strength test								
Note 3: Provide Material Group IIIb								

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

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

5.4.9 TABLE: Electric strength tests				N/A
Test voltage applied between:	Voltage shape (Surge, Impulse, AC, DC, etc.)	Test voltage (V)	Breakdown Yes / No	
--	--	--	--	
--	--	--	--	
Supplementary information: --				



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

Supplementary information:

X-capacitors installed for testing are: CX1=

☐ bleeding resistor rating: R1=R2=R3=R4=

☐ 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

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

Supplementary information: --

5.7.4	TABLE: Unearthed accessible parts					N/A
Location	Operating and fault conditions	Supply Voltage (V)	Parameters			ES class
			Voltage (Vrms or Vpk)	Current (Arms or Apk)	Freq. (Hz)	
--			--	--	--	--
--			--	--	--	--

Supplementary information:

Abbreviation: SC= short circuit; OC= open circuit





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5.7.5	TABLE: Earthed accessible conductive part			N/A
Supply voltage:				—
Phase(s):	<input type="checkbox"/> Single Phase; <input type="checkbox"/> Three Phase: <input type="checkbox"/> Delta <input type="checkbox"/> Wye			—
Power Distribution System:	<input type="checkbox"/> TN <input type="checkbox"/> TT <input type="checkbox"/> IT			—
Location	Fault Condition No in IEC 60990 clause 6.2.	Touch current (mA)	Comment	
--	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.				

5.8	TABLE: Backfeed safeguard in battery backed up supplies					N/A
Location	Supply voltage (V)	Operating and fault condition	Time (s)	Open-circuit voltage (V)	Touch current (A)	ES Class
--	--		--	--		--
--	--		--	--		--
Supplementary information: --						



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6.2.2	Table: Power source circuit classifications					P
Location	Operating and fault condition	Voltage (V)	Current (A)	Max Power <sup>1)</sup> (W)	Time (S)	PS Class
All circuits	N/A	N/A	N/A	N/A	N/A	PS1 *) (declared)

Supplementary Information:

Abbreviation: SC= short circuit; OC= open circuit.

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

\*) V-0 class material used for enclosure, it complies with fire enclosure requirements according clause 6.4.8.4

6.2.3.1	Table: Determination of Potential Ignition Sources (Arcing PIS)				N/A
Location	Open circuit voltage After 3 s (V <sub>p</sub> )	Measured r.m.s current (A)	Calculated value (V <sub>p</sub> x I <sub>rms</sub> )	Arcing PIS? Yes / No	
--	--	--	--	--	

Supplementary information:

An Arcing PIS requires a minimum of 50 V (peak) a.c. or d.c. An Arcing PIS is established when the product of the open circuit voltage (V<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)			N/A
Circuit Location (x-y)	Operating Condition	Dissipate power (W)	Resistive PIS? Yes/No	
--	--	--	--	

Supplementary Information:

Abbreviation: SC= short circuit; OC= open circuit

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, or (b) under single fault conditions has either a power exceeding 100 W measured immediately after the introduction of the fault if electronic circuits, regulators or PTC devices are used, or has an available power exceeding 15 W measured 30 s after introduction of the fault.



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

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





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5.4.1.4, 6.3.2, 9.0, B.2.6	TABLE: Temperature measurements				P
	Supply voltage (V) .....	5.0Vdc		50.0Vdc	
	Ambient T <sub>min</sub> (°C) .....	--	--	--	--
	Ambient T <sub>max</sub> (°C) .....	--	--	--	--
	T <sub>ma</sub> (°C) .....	--	--	--	--
Maximum measured temperature T of part/at:		T (°C)			
PCB near input		33.4	78.4	34.4	80.1
Internal wire		33.0	78.0	33.9	79.6
PCB near U7		34.2	79.2	35.8	81.5
PCB near C2		32.5	77.5	35.1	80.8
PCB near D3		33.6	78.6	34.6	80.3
Metal enclosure(inside)		32.2	77.2	33.2	78.9
Ambient		25.0	Shift to 70	24.3	Shift to 70
Metal enclosure(outside)		31.4	31.4	31.9	32.6
Ambient		25.0	Shift to 25	24.3	Shift to 25

Supplementary information:--

Temperature T of winding:	t <sub>1</sub> (°C)	R <sub>1</sub> (Ω)	t <sub>2</sub> (°C)	R <sub>2</sub> (Ω)	T (°C)	Allowed T <sub>max</sub> (°C)	Insulation class
--	--	--	--	--	--	--	--

Supplementary information:

Note 1: T<sub>ma</sub> should be considered as directed by applicable requirement.

Note 2: T<sub>ma</sub> is not included in assessment of Touch Temperatures (Clause 9).

Note 3: The maximum ambient temperature specified by manufacturer is 70°C.

Note 4: EUT is for building-in, the overall compliance shall be investigated in end products.

B.2.5	TABLE: Input test						P
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
5.0	0.05	--	0.25	0.3	--	--	Normal work
50.0	0.006	--	0.30	0.3	--	--	Normal work

Supplementary information:

EUT is for building-in, the overall compliance shall be investigated in end products.



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B.3&B.4 TABLE: Abnormal operating and fault condition tests								P
Ambient temperature (°C) :						22.0		—
Power source for EUT: Manufacturer, model/type, output rating :						--		—
Component No.	Fault Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Input + to -	Short Circuit	50.0Vdc	10mins	--	--	K	--	Unit shut down immediately, recoverable when fault condition removed.

Supplementary information:

1. The test result shown all safeguards remained effective, all safeguards complied with applicable requirements in this standard after restoration of normal operating conditions.
2. The test result shown no Class 1 or 2 energy source become Class 3 level during and after single fault condition.
3. Test items where components were damaged were repeated twice with same outcome.
4. No temperature exceed TS2 limited under abnormal and single fault conditions.

Annex M.3	TABLE: Protection circuits for batteries provided within the equipment					N/A	
Is it possible to install the battery in a reverse polarity position?:			impossible.			--	
Equipment Specification	Charging					N/A	
	Voltage (V)			Current (A)			
	N/A			N/A			
Manufacturer/type	Battery specification					N/A	
	Non-rechargeable batteries		Rechargeable batteries				
	Discharging current (A)	Unintentional charging current (A)	Charging		Discharging current (A)		Reverse charging current (A)
			Voltage (V)	Current (A)			
--	--	--	--	--	--	--	

Note: The tests of M.3.2 are applicable only when above appropriate data is not available.

Specified battery temperature (°C) .....				N/A			--
Component No.	Fault condition	Charge/discharge mode	Test time	Temp. (°C)	Current (A)	Voltage (V)	Observation
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--

Supplementary information:

Abbreviation: SC= short circuit; OC= open circuit NL= no chemical leakage; NS= no spillage of liquid; NE= no explosion; NF= no emission of flame or expulsion of molten metal.





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Annex M.4.2		Table: Charging safeguards for equipment containing a secondary lithium battery			N/A
Maximum specified charging voltage (V)..... :					—
Maximum specified charging current (A)..... :					—
Highest specified charging temperature (°C) :					—
Lowest specified charging temperature (°C) :					—
Battery manufacturer/type	Operating and fault condition	Measurements			Observation
		Charging voltage (V)	Charging current (A)	Temp (°C )	
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--

Supplementary Information:

Abbreviation: SC= short circuit; OC= open circuit; MSCV= maximum specified charging voltage; MSCC= maximum specified charging current; HSCT= highest specified charging temperature; LSCT= lowest specified charging temperature

Annex Q.1		Table: Circuits intended for interconnection with building wiring (LPS)					N/A
Output Circuit	Condition	U <sub>oc</sub> (V)	Time (s)	I <sub>sc</sub> (A)		S (VA)	
				Meas.	Limit	Meas.	Limit
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--

Supplementary Information:

Abbreviation: SC= short circuit; OC= open circuit; MSCV= maximum specified charging voltage; MSCC= maximum specified charging current; HSCT= highest specified charging temperature; LSCT= lowest specified charging temperature





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<b>T.2, T.3, T.4, T.5</b>		<b>TABLE: Steady force test</b>				<b>P</b>
Part/Location	Material	Thickness (mm)	Probe	Force(N)	Test Duration(s)	Observation
Enclosure	Metal	2.0mm	Push-Pull tester	30	5	All safeguard remains effective.
Supplementary information:--						

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

T.7	TABLE: Drop tests				P
Part/Location	Material	Thickness (mm)	Drop Height (mm)	Observation	
Enclosure	Metal	2.0mm	1000	All safeguard remains effective.	
Supplementary information: --					

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

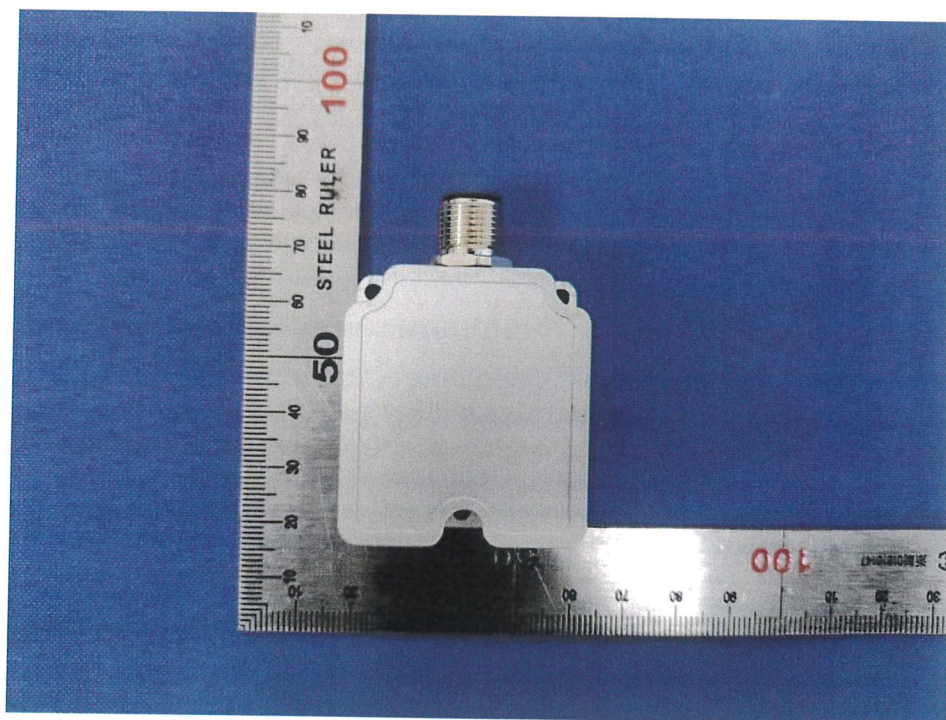


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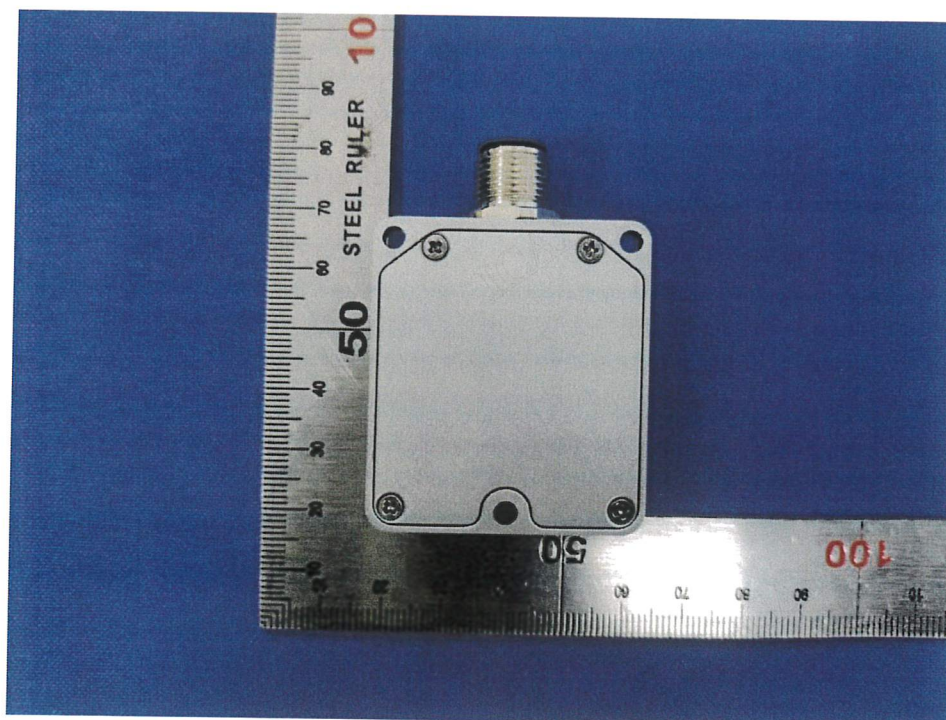
Date: 2023-08-04

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Appendix – Sample Photos

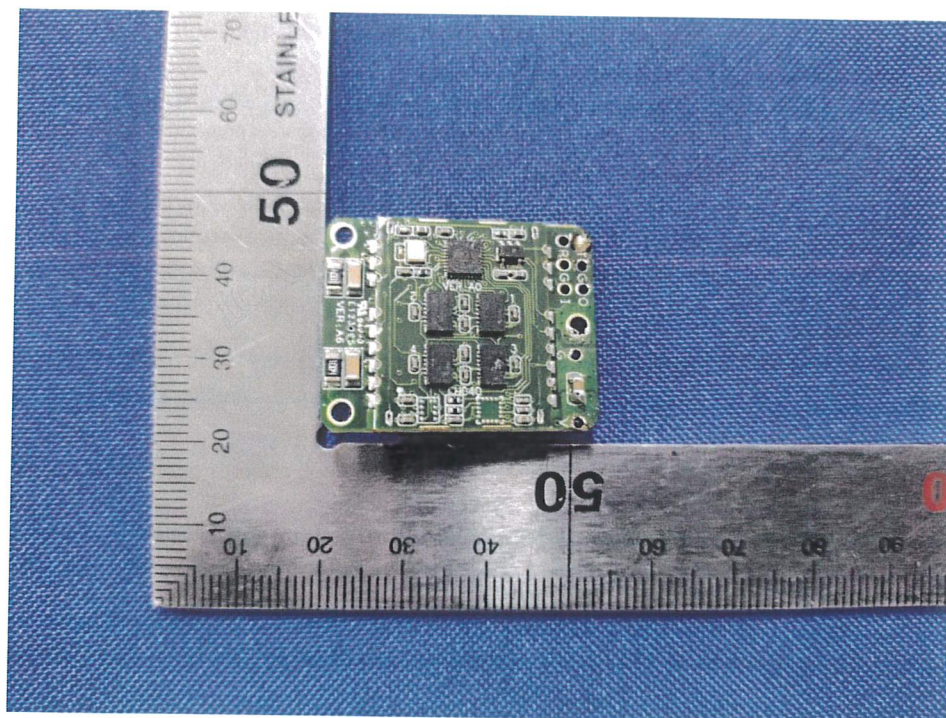


Top

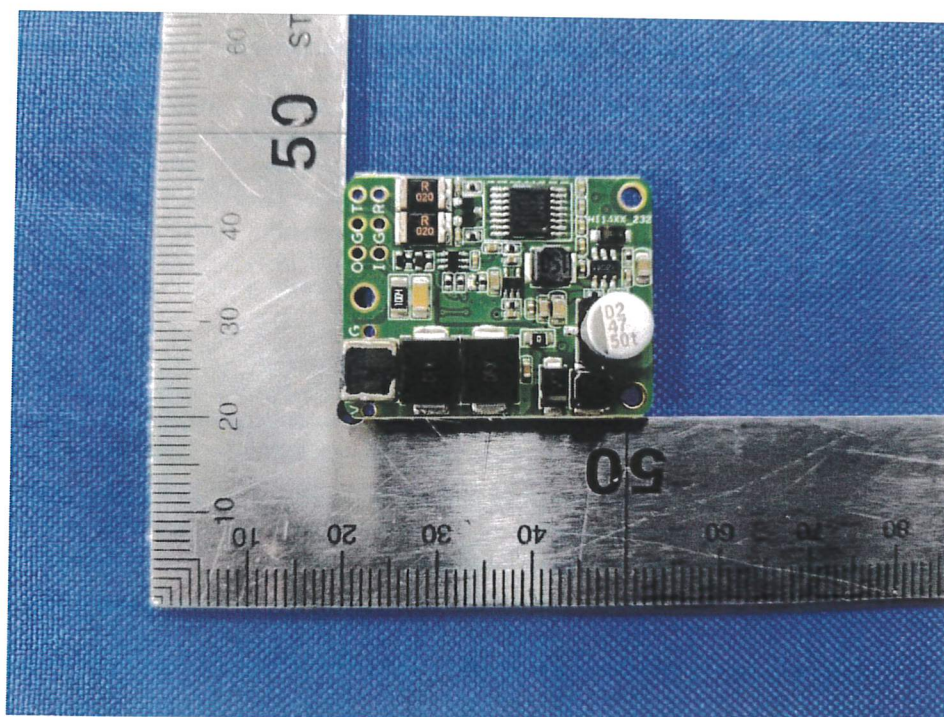


Rear





Internal 1



Internal 2

This photo is limited to ICAS used this report  
\*\*\*End of Report\*\*\*



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