



TEST REPORT IEC 62368-1 Audio/video, information and communication technology equipment Part 1: Safety requirements	
Report Number.....	300398-1
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Name of Testing Laboratory preparing the Report	SGS Fimko Ltd.
Applicant's name	Silicon Laboratories Finland Oy
Address	Bertel Jungin aukio 3, FI-02600 Espoo, Finland
Test specification:	
Standard	IEC 62368-1: 2018
Test procedure.....	National
Non-standard test method.....	N/A
Test Report Form No.....	IEC62368_1C
Test Report Form(s) Originator....	UL(US)
Master TRF	Dated 2019-01-17
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Test item description	Bluetooth LE and Zigbee wireless radio modules		
Trade Mark	Silicon Labs		
Manufacturer	Silicon Laboratories Finland Oy		
Model/Type reference	BGM111, MGM111		
Ratings	Input: 1,85 - 3,8 VDC		
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
<input checked="" type="checkbox"/>	CB Testing Laboratory:	SGS Fimko Ltd.	
Testing location/ address		Takomotie 8 FI-00380 Helsinki Finland	
Tested by (name, function, signature)		Mika Kangas	
Approved by (name, function, signature) ..		Jari Karlsson	
<input type="checkbox"/>	Testing procedure: CTF Stage 1:		
Testing location/ address			
Tested by (name, function, signature)			
Approved by (name, function, signature) ..			
<input type="checkbox"/>	Testing procedure: CTF Stage 2:		
Testing location/ address			
Tested by (name + signature)			
Witnessed by (name, function, signature) .			
Approved by (name, function, signature) ..			
<input type="checkbox"/>	Testing procedure: CTF Stage 3:		
<input type="checkbox"/>	Testing procedure: CTF Stage 4:		
Testing location/ address			
Tested by (name, function, signature)			
Witnessed by (name, function, signature) .			
Approved by (name, function, signature) ..			
Supervised by (name, function, signature) :			

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

- Attachment 1: Technical documentation and pictures, 4 pages
- Attachment 2: European Group Differences and National Differences, 23 pages

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

No testing but verification according to IEC/EN 62368-1

Testing location:

SGS Fimko Ltd.
Takomotie 8 , FI-00380 Helsinki
Finland

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

European Group Differences and national differences of DE, DK, FI, GB, IE, NO, SE

☒ The product fulfils the requirements of EN IEC 62368-1:2020+A11:2020

Copy of marking plates:

BGM111A**BGM111E****MGM111A****MGM111E**

Test item particulars:			
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"/> Children likely present <input type="checkbox"/> Instructed person <input checked="" type="checkbox"/> Skilled person		
Supply connection	<input type="checkbox"/> AC mains <input type="checkbox"/> DC mains <input checked="" type="checkbox"/> not mains connected: <input checked="" type="checkbox"/> ES1 <input type="checkbox"/> ES2 <input type="checkbox"/> ES3		
Supply tolerance	<input type="checkbox"/> +10%/-10% <input type="checkbox"/> +20%/-15% <input type="checkbox"/> + %/ - % <input checked="" type="checkbox"/> None		
Supply connection – type	<input type="checkbox"/> pluggable equipment type A - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> direct plug-in <input type="checkbox"/> pluggable equipment type B - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> permanent connection <input type="checkbox"/> mating connector <input checked="" type="checkbox"/> other: solderable IC chip		
Considered current rating of protective device	<input type="checkbox"/> A; Location: <input type="checkbox"/> building <input type="checkbox"/> equipment <input checked="" type="checkbox"/> N/A		
Equipment mobility	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> direct plug-in <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> wall/ceiling-mounted <input type="checkbox"/> SRME/rack-mounted <input type="checkbox"/> other:		
Overvoltage category (OVC)	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input checked="" type="checkbox"/> other: DC supply		
Class of equipment	<input type="checkbox"/> Class I <input type="checkbox"/> Class II <input checked="" type="checkbox"/> Class III <input type="checkbox"/> Not classified <input type="checkbox"/>		
Special installation location	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> restricted access area <input type="checkbox"/> outdoor location <input type="checkbox"/>		
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3		
Manufacturer's specified T_{ma}	85 °C <input type="checkbox"/> Outdoor: minimum °C		
IP protection class	<input type="checkbox"/> IPX0 <input checked="" type="checkbox"/> IP class not verified in this project		
Power systems	<input type="checkbox"/> TN <input type="checkbox"/> TT <input type="checkbox"/> IT - V _{L-L} <input checked="" type="checkbox"/> not AC mains		
Altitude during operation (m)	<input checked="" type="checkbox"/> 2000 m or less <input type="checkbox"/> m		
Altitude of test laboratory (m)	<input checked="" type="checkbox"/> 2000 m or less <input type="checkbox"/> m		
Mass of equipment (kg)	2 g		

Possible test case verdicts: - test case does not apply to the test object: N/A - test object does meet the requirement.....: P (Pass) - test object does not meet the requirement.....: F (Fail)	
Testing: Date of receipt of test item: - Date (s) of performance of tests: -	
General remarks: "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator. <i>This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx</i> <i>Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law."</i> <i>Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.</i>	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC60060-2:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) : Silicon Laboratories Finland Oy Bertel Jungin aukio 3 FI-02600 Espoo Finland	

General product information and other remarks:

Models: BGM111, MGM111

BGM111 is a Bluetooth Low Energy wireless radio module with full stack.

MGM111 is a Zigbee wireless radio module with full stack.

BGM111A and BGM111E and MGM111A and MGM111E where the ending "A" further denotes the hardware variant with the integrated antenna, whereas the ending "E" further denotes the hardware variant with the U.FL connector for the use with an external antenna.

Safety wise the products above verified in this test report 300398-1 are similar. Modules are inherently safe (see Energy Source Diagram on p.9)

Testing/verification is based on EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 test report 281857-5, dated 2.3.2016 and its amendments.

Temperature and supply voltage limits need to be evaluated in the final product so that the requirements of the module are met. Heating caused by BGM111 and MGM111 and other features need to be considered when the temperature limits for the final product are set. The module was tested in the evaluation card supplied by the manufacturer.

OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS				
Clause	Possible Hazard			
5	Electrically-caused injury			
Class and Energy Source (e.g. ES3: Primary circuit)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
-	-	-	-	-
6	Electrically-caused fire			
Class and Energy Source (e.g. PS2: 100 Watt circuit)	Material part (e.g. Printed board)	Safeguards		
		B	1 st S	2 nd S
-	-	-	-	-
7	Injury caused by hazardous substances			
Class and Energy Source (e.g. Ozone)	Body Part (e.g., Skilled)	Safeguards		
		B	S	R
-	-	-	-	-
8	Mechanically-caused injury			
Class and Energy Source (e.g. MS3: Plastic fan blades)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
-	-	-	-	-
9	Thermal burn			
Class and Energy Source (e.g. TS1: Keyboard caps)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
-	-	-	-	-
10	Radiation			
Class and Energy Source (e.g. RS1: PMP sound output)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
-	-	-	-	-
Supplementary Information:				
“B” – Basic Safeguard; “S” – Supplementary Safeguard; “R” – Reinforced Safeguard				

ENERGY SOURCE DIAGRAM
<p>Optional. Manufacturers are to provide the energy sources diagram identify declared energy sources and identifying the demarcations are between power sources. Recommend diagram be provided included in power supply and multipart systems.</p> <p>Insert diagram below. Example diagram designs are; Block diagrams; image(s) with layered data; mechanical drawings</p>
<div><div><div>Input: max 3,8 VDC ES1, PS1</div><div>Data connection pins</div><div>Enclosure TS1 MS1</div><div>RF connection pins, RS1</div></div><p>Tested product is a IC component soldered to an evaluation board.</p><div><input checked="" type="checkbox"/> ES <input checked="" type="checkbox"/> PS <input checked="" type="checkbox"/> MS <input checked="" type="checkbox"/> TS <input checked="" type="checkbox"/> RS</div></div>

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL REQUIREMENTS		P
4.1.1	Acceptance of materials, components and subassemblies		P
4.1.2	Use of components		P
4.1.3	Equipment design and construction		P
4.1.4	Specified ambient temperature for outdoor use (°C) :	-	N/A
4.1.5	Constructions and components not specifically covered		N/A
4.1.8	Liquids and liquid filled components (LFC)	(See G.15)	N/A
4.1.15	Markings and instructions	(See Annex F)	P
4.4.3	Safeguard robustness		P
4.4.3.1	General		N/A
4.4.3.2	Steady force tests		N/A
4.4.3.3	Drop tests		N/A
4.4.3.4	Impact tests		N/A
4.4.3.5	Internal accessible safeguard tests		N/A
4.4.3.6	Glass impact tests		N/A
4.4.3.7	Glass fixation 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		N/A
4.4.3.10	Accessibility, glass, safeguard effectiveness		N/A
4.4.4	Displacement of a safeguard by an insulating liquid		N/A
4.4.5	Safety interlocks		N/A
4.5	Explosion		N/A
4.5.1	General		N/A
4.5.2	No explosion during normal/abnormal operating condition		N/A
	No harm by explosion during single fault conditions		N/A
4.6	Fixing of conductors		N/A
	Fix conductors not to defeat a safeguard		N/A
	Compliance is checked by test :	-	N/A
4.7	Equipment for direct insertion into mains socket-outlets		N/A
4.7.2	Mains plug part complies with relevant standard .. :	-	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.7.3	Torque (Nm) :	-	N/A
4.8	Equipment containing coin/button cell batteries		N/A
4.8.1	General		N/A
4.8.2	Instructional safeguard :	-	N/A
4.8.3	Battery compartment door/cover construction		N/A
	Open torque test		N/A
4.8.4.2	Stress relief test		N/A
4.8.4.3	Battery replacement test		N/A
4.8.4.4	Drop test		N/A
4.8.4.5	Impact test		N/A
4.8.4.6	Crush test		N/A
4.8.5	Compliance		N/A
	30N force test with test probe		N/A
	20N force test with test hook		N/A
4.9	Likelihood of fire or shock due to entry of conductive object		N/A
4.10	Component requirements		N/A
4.10.1	Disconnect Device		N/A
4.10.2	Switches and relays		N/A

5	ELECTRICALLY-CAUSED INJURY		P
5.2	Classification and limits of electrical energy sources		P
5.2.2	ES1, ES2 and ES3 limits		P
5.2.2.2	Steady-state voltage and current limits :	(See appended table 5.2)	P
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		P
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons	ES1 only	N/A
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

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Accessibility to outdoor equipment bare parts		N/A
5.3.2.2	Contact requirements		N/A
	Test with test probe from Annex V		-
5.3.2.2 a)	Air gap – electric strength test potential (V)	-	N/A
5.3.2.2 b)	Air gap – distance (mm)	-	N/A
5.3.2.3	Compliance		N/A
5.3.2.4	Terminals for connecting stripped wire		N/A
5.4	Insulation materials and requirements		P
5.4.1.2	Properties of insulating material	Functional insulation only	P
5.4.1.3	Material is non-hygroscopic		N/A
5.4.1.4	Maximum operating temperature for insulating materials	(See appended table)	P
5.4.1.5	Pollution degrees	PD2	P
5.4.1.5.2	Test for pollution degree 1 environment and for an insulating compound		N/A
5.4.1.5.3	Thermal cycling test		N/A
5.4.1.6	Insulation in transformers with varying dimensions		N/A
5.4.1.7	Insulation in circuits generating starting pulses		N/A
5.4.1.8	Determination of working voltage	Max 3,8 VDC	P
5.4.1.9	Insulating surfaces		P
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted		N/A
5.4.1.10.2	Vicat test.....	-	N/A
5.4.1.10.3	Ball pressure test	-	N/A
5.4.2	Clearances	Functional insulation only	P
5.4.2.1	General requirements		N/A
	Clearances in circuits connected to AC Mains, Alternative method		N/A
5.4.2.2	Procedure 1 for determining clearance		N/A
	Temporary overvoltage	-	—
5.4.2.3	Procedure 2 for determining clearance		N/A
5.4.2.3.2.2	a.c. mains transient voltage	-	—
5.4.2.3.2.3	d.c. mains transient voltage	-	—
5.4.2.3.2.4	External circuit transient voltage.....	Shall be considered in the final assembly	—
5.4.2.3.2.5	Transient voltage determined by measurement	-	—

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
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	Functional insulation only	P
5.4.3.1	General		N/A
5.4.3.3	Material group	IIIb	—
5.4.3.4	Creepage distances measurement	-	N/A
5.4.4	Solid insulation		N/A
5.4.4.1	General requirements		N/A
5.4.4.2	Minimum distance through insulation		N/A
5.4.4.3	Insulating compound forming solid insulation		N/A
5.4.4.4	Solid insulation in semiconductor devices		N/A
5.4.4.5	Insulating compound forming cemented joints		N/A
5.4.4.6	Thin sheet material		N/A
5.4.4.6.1	General requirements		N/A
5.4.4.6.2	Separable thin sheet material		N/A
	Number of layers (pcs)	-	N/A
5.4.4.6.3	Non-separable thin sheet material		N/A
	Number of layers (pcs)	-	N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material	-	N/A
5.4.4.6.5	Mandrel test		N/A
5.4.4.7	Solid insulation in wound components		N/A
5.4.4.9	Solid insulation at frequencies >30 kHz, E_P , K_R , d , V_{PW} (V)	-	N/A
	Alternative by electric strength test, tested voltage (V), K_R	-	N/A
5.4.5	Antenna terminal insulation	Antenna terminal insulation shall be considered in the final assembly	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 Ω)	-	N/A
	Electric strength test	-	N/A
5.4.6	Insulation of internal wire as part of supplementary safeguard		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.7	Tests for semiconductor components and for cemented joints		N/A
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 type test of solid insulation..... :	-	N/A
5.4.9.2	Test procedure for routine test		N/A
5.4.10	Safeguards against transient voltages from external circuits		N/A
5.4.10.1	Parts and circuits separated from external circuits	Protection against transient voltages shall be considered in the final assembly.	N/A
5.4.10.2	Test methods		N/A
5.4.10.2.1	General		N/A
5.4.10.2.2	Impulse test :	-	N/A
5.4.10.2.3	Steady-state test..... :	-	N/A
5.4.10.3	Verification for insulation breakdown for impulse test..... :	-	N/A
5.4.11	Separation between external circuits and earth		N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A
5.4.11.2	Requirements		N/A
	SPDs bridge separation between external circuit and earth		N/A
	Rated operating voltage U_{op} (V)..... :	-	—
	Nominal voltage U_{peak} (V)..... :	-	—
	Max increase due to variation ΔU_{sp} :	-	—
	Max increase due to ageing ΔU_{sa} :	-	—
5.4.11.3	Test method and compliance :	-	N/A
5.4.12	Insulating liquid		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

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.5.2.1	General requirement		N/A
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector..... :	-	N/A
5.5.3	Transformers		N/A
5.5.4	Optocouplers		N/A
5.5.5	Relays		N/A
5.5.6	Resistors		N/A
5.5.7	SPDs		N/A
5.5.8	Insulation between the mains and an external circuit consisting of a coaxial cable :	-	N/A
5.5.9	Safeguards for socket-outlets in outdoor equipment		N/A
	RCD rated residual operating current (mA) :	-	—
5.6	Protective conductor		N/A
5.6.2	Requirement for protective conductors		N/A
5.6	Protective conductor		N/A
5.6.2	Requirement for protective conductors		N/A
5.6.2.1	General requirements		N/A
5.6.2.2	Colour of insulation		N/A
5.6.3	Requirement for protective earthing conductors		N/A
	Protective earthing conductor size (mm ²) :	-	—
	Protective earthing conductor serving as a reinforced safeguard		N/A
	Protective earthing conductor serving as a double safeguard		N/A
5.6.4	Requirements for protective bonding conductors		N/A
5.6.4.1	Protective bonding conductors		N/A
	Protective bonding conductor size (mm ²). :	-	—
5.6.4.2	Protective current rating (A)..... :	-	N/A
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Terminal size for connecting protective earthing conductors (mm)..... :	-	N/A
	Terminal size for connecting protective bonding conductors (mm) :	-	N/A
5.6.5.2	Corrosion		N/A
5.6.6	Resistance of the protective bonding system		N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method..... :	-	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.6.6.3	Resistance (Ω) or voltage drop..... :	-	N/A
5.6.7	Reliable connection of a protective earthing conductor		N/A
5.6.8	Functional earthing		N/A
	Conductor size (mm^2)..... :	-	N/A
	Class II with functional earthing marking	-	N/A
	Appliance inlet cl & cr (mm)	-	N/A
5.7	Prospective touch voltage, touch current and protective conductor current		N/A
5.7.2	Measuring devices and networks		N/A
5.7.2.1	Measurement of touch current		N/A
5.7.2.2	Measurement of voltage		N/A
5.7.3	Equipment set-up, supply connections and earth connections		N/A
5.7.4	Unearthed accessible parts	-	N/A
5.7.5	Earthed accessible conductive parts	-	N/A
5.7.6	Requirements when touch current exceeds ES2 limits		N/A
	Protective conductor current (mA)..... :	-	N/A
	Instructional Safeguard..... :	-	N/A
5.7.7	Prospective touch voltage and touch current associated with external circuits		N/A
5.7.7.1	Touch current from coaxial cables		N/A
5.7.7.2	Prospective touch voltage and touch current associated with paired conductor cables		N/A
5.7.8	Summation of touch currents from external circuits		N/A
	a) Equipment connected to earthed external circuits, current (mA)	-	N/A
	b) Equipment connected to unearthed external circuits, current (mA)	-	N/A
5.8	Backfeed safeguard in battery backed up supplies		N/A
	Mains terminal ES.....:	-	N/A
	Air gap (mm)	-	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
6	ELECTRICALLY- CAUSED FIRE		P
6.2	Classification of PS and PIS		P
6.2.2	Power source circuit classifications	PS1	P
6.2.3	Classification of potential ignition sources		P
6.2.3.1	Arcing PIS	Open circuit voltage 3,8 VDC	N/A
6.2.3.2	Resistive PIS	-	N/A
6.3	Safeguards against fire under normal operating and abnormal operating conditions		N/A
6.3.1	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials	-	N/A
	Combustible materials outside fire enclosure	-	N/A
6.4	Safeguards against fire under single fault conditions		N/A
6.4.1	Safeguard method		N/A
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits		P
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits		N/A
6.4.3.1	Supplementary safeguards		N/A
6.4.3.2	Single Fault Conditions	-	N/A
	Special conditions for temperature limited by fuse		N/A
6.4.4	Control of fire spread in PS1 circuits		P
6.4.5	Control of fire spread in PS2 circuits		N/A
6.4.5.2	Supplementary safeguards		N/A
6.4.6	Control of fire spread in PS3 circuits		N/A
6.4.7	Separation of combustible materials from a PIS		N/A
6.4.7.2	Separation by distance		N/A
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers		N/A
6.4.8.2	Fire enclosure and fire barrier material properties		N/A
6.4.8.2.1	Requirements for a fire barrier		N/A
6.4.8.2.2	Requirements for a fire enclosure		N/A
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

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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	(See Clause S.3)	N/A
	Instructional Safeguard..... :	-	N/A
6.4.8.3.5	Side openings and properties		N/A
	Openings dimensions (mm)..... :	-	N/A
6.4.8.3.6	Integrity of a fire enclosure, condition met: a), b) or c)	-	N/A
6.4.8.4	Separation of a PIS from a fire enclosure and a fire barrier distance (mm) or flammability rating	-	N/A
6.4.9	Flammability of insulating liquid	-	N/A
6.5	Internal and external wiring		N/A
6.5.1	General requirements		N/A
6.5.2	Requirements for interconnection to building wiring	-	N/A
6.5.3	Internal wiring size (mm ²) for socket-outlets..... :	-	N/A
6.6	Safeguards against fire due to the connection to additional equipment		N/A

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

8	MECHANICALLY-CAUSED INJURY		P
8.2	Mechanical energy source classifications		P
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		N/A
8.5	Safeguards against moving parts		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
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 containing moving parts		N/A
8.5.4.1	General		N/A
8.5.4.2	Equipment containing work cells with MS3 parts		N/A
8.5.4.2.1	Protection of persons in the work cell		N/A
8.5.4.2.2	Access protection override		N/A
8.5.4.2.2.1	Override system		N/A
8.5.4.2.2.2	Visual indicator		N/A
8.5.4.2.3	Emergency stop system		N/A
	Maximum stopping distance from the point of activation (m).....:	-	N/A
	Space between end point and nearest fixed mechanical part (mm):	-	N/A
8.5.4.2.4	Endurance requirements		N/A
	Mechanical system subjected to 100 000 cycles of operation		N/A
	- Mechanical function check and visual inspection		N/A
	- Cable assembly:	-	N/A
8.5.4.3	Equipment having electromechanical device for destruction of media		N/A
8.5.4.3.1	Equipment safeguards		N/A
8.5.4.3.2	Instructional safeguards against moving parts:	-	N/A
8.5.4.3.3	Disconnection from the supply		N/A
8.5.4.3.4	Cut type and test force (N).....:	-	N/A
8.5.4.3.5	Compliance		N/A
8.5.5	High pressure lamps		N/A
	Explosion test.....:	-	N/A
8.5.5.3	Glass particles dimensions (mm):	-	N/A
8.6	Stability of equipment		N/A
8.6.1	General		N/A
	Instructional safeguard:	-	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.6.2	Static stability		N/A
8.6.2.2	Static stability test	-	N/A
8.6.2.3	Downward force test		N/A
8.6.3	Relocation stability		N/A
	Wheels diameter (mm)	-	—
	Tilt test		N/A
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test	-	N/A
8.7	Equipment mounted to wall, ceiling or other structure		N/A
8.7.1	Mount means type	-	N/A
8.7.2	Test methods		N/A
	Test 1, additional downwards force (N).....	-	N/A
	Test 2, number of attachment points and test force (N)	-	N/A
	Test 3 Nominal diameter (mm) and applied torque (Nm).....	-	N/A
8.8	Handles strength		N/A
8.8.1	General		N/A
8.8.2	Handle strength test		N/A
	Number of handles.....	-	—
	Force applied (N)	-	—
8.9	Wheels or casters attachment requirements		N/A
8.9.2	Pull test		N/A
8.10	Carts, stands and similar carriers		N/A
8.10.1	General		N/A
8.10.2	Marking and instructions	-	N/A
8.10.3	Cart, stand or carrier loading test		N/A
	Loading force applied (N)	-	N/A
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Force applied (N)	-	—
8.10.6	Thermoplastic temperature stability		N/A
8.11	Mounting means for slide-rail mounted equipment (SRME)		N/A
8.11.1	General		N/A
8.11.2	Requirements for slide rails		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Instructional Safeguard	-	N/A
8.11.3	Mechanical strength test		N/A
8.11.3.1	Downward force test, force (N) applied	-	N/A
8.11.3.2	Lateral push force test		N/A
8.11.3.3	Integrity of slide rail end stops		N/A
8.11.4	Compliance		N/A
8.12	Telescoping or rod antennas		N/A
	Button/ball diameter (mm)	-	—

9	THERMAL BURN INJURY		P
9.2	Thermal energy source classifications		P
9.3	Touch temperature limits		N/A
9.3.1	Touch temperatures of accessible parts	-	N/A
9.3.2	Test method and compliance		N/A
9.4	Safeguards against thermal energy sources		N/A
9.5	Requirements for safeguards		N/A
9.5.1	Equipment safeguard		N/A
9.5.2	Instructional safeguard	-	N/A
9.6	Requirements for wireless power transmitters		N/A
9.6.1	General		N/A
9.6.2	Specification of the foreign objects		N/A
9.6.3	Test method and compliance	-	N/A

10	RADIATION		P
10.2	Radiation energy source classification		P
10.2.1	General classification	RS1	P
	Lasers	-	—
	Lamps and lamp systems	-	—
	Image projectors	-	—
	X-Ray	-	—
	Personal music player	-	—
10.3	Safeguards against laser radiation		N/A
	The standard(s) equipment containing laser(s) comply	-	N/A
10.4	Safeguards against optical radiation from lamps and lamp systems (including		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	LED types)		
10.4.1	General requirements		N/A
	Instructional safeguard provided for accessible radiation level needs to exceed		N/A
	Risk group marking and location :	-	N/A
	Information for safe operation and installation		N/A
10.4.2	Requirements for 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 :	-	—
10.5.3	Maximum radiation (pA/kg) :	-	—
10.6	Safeguards against acoustic energy sources		N/A
10.6.1	General		N/A
10.6.2	Classification		N/A
	Acoustic output $L_{Aeq,T}$, dB(A) :	-	N/A
	Unweighted RMS output voltage (mV) :	-	N/A
	Digital output signal (dBFS) :	-	N/A
10.6.3	Requirements for dose-based systems		N/A
10.6.3.1	General requirements		N/A
10.6.3.2	Dose-based warning and automatic decrease		N/A
10.6.3.3	Exposure-based warning and requirements		N/A
	30 s integrated exposure level (MEL30) :	-	N/A
	Warning for MEL ≥ 100 dB(A) :	-	N/A
10.6.4	Measurement methods		N/A
10.6.5	Protection of persons		N/A
	Instructional safeguards :	-	N/A
10.6.6	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.6.1	Corded listening devices with analogue input		N/A
	Listening device input voltage (mV) :	-	N/A
10.6.6.2	Corded listening devices with digital input		N/A
	Max. acoustic output $L_{Aeq,T}$, dB(A) :	-	N/A
10.6.6.3	Cordless listening devices		N/A
	Max. acoustic output $L_{Aeq,T}$, dB(A) :	-	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
B	NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS		P
B.1	General		P
B.1.5	Temperature measurement conditions	(See appended table 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		P
B.2.5	Input test	(See appended table B.2.5)	P
B.3	Simulated abnormal operating conditions		P
B.3.1	General		P
B.3.2	Covering of ventilation openings		N/A
	Instructional safeguard	-	N/A
B.3.3	DC mains polarity test		N/A
B.3.4	Setting of voltage selector		N/A
B.3.5	Maximum load at output terminals		N/A
B.3.6	Reverse battery polarity		N/A
B.3.7	Audio amplifier abnormal operating conditions		N/A
B.3.8	Safeguards functional during and after abnormal operating conditions	-	N/A
B.4	Simulated single fault conditions		N/A
B.4.1	General		N/A
B.4.2	Temperature controlling device		N/A
B.4.3	Blocked motor test		N/A
B.4.4	Functional insulation		N/A
B.4.4.1	Short circuit of clearances for functional insulation		N/A
B.4.4.2	Short circuit of creepage distances for functional insulation		N/A
B.4.4.3	Short circuit of functional insulation on coated printed boards		N/A
B.4.5	Short-circuit and interruption of electrodes in tubes and semiconductors		N/A
B.4.6	Short circuit or disconnection of passive components		N/A
B.4.7	Continuous operation of components		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
B.4.8	Compliance during and after single fault conditions	(See appended table B.4)	N/A
B.4.9	Battery charging and discharging under single fault conditions	(See Annex M)	N/A
C	UV RADIATION		N/A
C.1	Protection of materials in equipment from UV radiation		N/A
C.1.2	Requirements		N/A
C.1.3	Test method		N/A
C.2	UV light conditioning test		N/A
C.2.1	Test apparatus..... :	-	N/A
C.2.2	Mounting of test samples		N/A
C.2.3	Carbon-arc light-exposure test		N/A
C.2.4	Xenon-arc light-exposure test		N/A
D	TEST GENERATORS		N/A
D.1	Impulse test generators		N/A
D.2	Antenna interface test generator		N/A
D.3	Electronic pulse generator		N/A
E	TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS		N/A
E.1	Electrical energy source classification for audio signals		N/A
	Maximum non-clipped output power (W)..... :	-	—
	Rated load impedance (Ω)	-	—
	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 (Ω)	-	—
	Requirements for temperature measurement	-	N/A
E.3	Audio amplifier abnormal operating conditions	-	N/A
F	EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS		P
F.1	General		P
	Language	English	—
F.2	Letter symbols and graphical symbols		N/A
F.2.1	Letter symbols according to IEC60027-1		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
F.2.2	Graphic symbols according to IEC, ISO or manufacturer specific		N/A
F.3	Equipment markings		P
F.3.1	Equipment marking locations		P
F.3.2	Equipment identification markings		P
F.3.2.1	Manufacturer identification	Silicon Labs	P
F.3.2.2	Model identification	BGM111, MGM111	P
F.3.3	Equipment rating markings		N/A
F.3.3.1	Equipment with direct connection to mains		N/A
F.3.3.2	Equipment without direct connection to mains		P
F.3.3.3	Nature of the supply voltage	DC	P
F.3.3.4	Rated voltage.....	3,8 V	P
F.3.3.5	Rated frequency	-	N/A
F.3.3.6	Rated current or rated power.....	-	N/A
F.3.3.7	Equipment with multiple supply connections		N/A
F.3.4	Voltage setting device		N/A
F.3.5	Terminals and operating devices		N/A
F.3.5.1	Mains appliance outlet and socket-outlet markings	-	N/A
F.3.5.2	Switch position identification marking.....	-	N/A
F.3.5.3	Replacement fuse identification and rating markings	-	N/A
	Instructional safeguards for neutral fuse	-	N/A
F.3.5.4	Replacement battery identification marking	-	N/A
F.3.5.5	Neutral conductor terminal		N/A
F.3.5.6	Terminal marking location		N/A
F.3.6	Equipment markings related to equipment classification		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	-	N/A
F.3.6.3	Functional earthing terminal marking	-	N/A
F.3.7	Equipment IP rating marking	-	N/A
F.3.8	External power supply output marking	-	N/A
F.3.9	Durability, legibility and permanence of marking		P

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
F.3.10	Test for permanence of markings		P
F.4	Instructions		P
	a) Information prior to installation and initial use		P
	b) Equipment for use in locations where children not likely to be present		N/A
	c) Instructions for installation and interconnection		P
	d) Equipment intended for use only in restricted access area		N/A
	e) Equipment intended to be fastened in place		P
	f) Instructions for audio equipment terminals		N/A
	g) Protective earthing used as a safeguard		N/A
	h) Protective conductor current exceeding ES2 limits		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		N/A
	l) Equipment containing insulating liquid		N/A
	m) Installation instructions for outdoor equipment		N/A
F.5	Instructional safeguards		N/A
G	COMPONENTS		N/A
G.1	Switches		N/A
G.1.1	General		N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A
G.1.3	Test method and compliance		N/A
G.2	Relays		N/A
G.2.1	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
G.3	Protective devices		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

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.3.1.2	Test method and compliance		N/A
G.3.2	Thermal links		N/A
G.3.2.1	a) Thermal links tested separately according to IEC 60691 with specifics		N/A
	b) Thermal links tested as part of the equipment		N/A
G.3.2.2	Test method and compliance		N/A
G.3.3	PTC thermistors		N/A
G.3.4	Overcurrent protection devices		N/A
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.4		N/A
G.3.5.1	Non-resettable devices suitably rated and marking provided		N/A
G.3.5.2	Single faults conditions :	-	N/A
G.4	Connectors		N/A
G.4.1	Spacings		N/A
G.4.2	Mains connector configuration..... :	-	N/A
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely		N/A
G.5	Wound components		N/A
G.5.1	Wire insulation in wound components		N/A
G.5.1.2	Protection against mechanical stress		N/A
G.5.2	Endurance test		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Test time (days per cycle) :	-	—
	Test temperature (°C)..... :	-	—
G.5.2.3	Wound components supplied from the mains		N/A
G.5.2.4	No insulation breakdown		N/A
G.5.3	Transformers		N/A
G.5.3.1	Compliance method..... :	-	N/A
	Position :	-	N/A
	Method of protection :	-	N/A
G.5.3.2	Insulation		N/A
	Protection from displacement of windings..... :	-	—
G.5.3.3	Transformer overload tests		N/A
G.5.3.3.1	Test conditions		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.5.3.3.2	Winding temperatures		N/A
G.5.3.3.3	Winding temperatures - alternative test method		N/A
G.5.3.4	Transformers using FIW		N/A
G.5.3.4.1	General		N/A
	FIW wire nominal diameter :	-	—
G.5.3.4.2	Transformers with basic insulation only		N/A
G.5.3.4.3	Transformers with double insulation or reinforced insulation..... :	-	N/A
G.5.3.4.4	Transformers with FIW wound on metal or ferrite core		N/A
G.5.3.4.5	Thermal cycling test and compliance		N/A
G.5.3.4.6	Partial discharge test		N/A
G.5.3.4.7	Routine test		N/A
G.5.4	Motors		N/A
G.5.4.1	General requirements		N/A
G.5.4.2	Motor overload test conditions		N/A
G.5.4.3	Running overload test		N/A
G.5.4.4.2	Locked-rotor overload test		N/A
	Test duration (days) :	-	—
G.5.4.5	Running overload test for DC motors		N/A
G.5.4.5.2	Tested in the unit		N/A
G.5.4.5.3	Alternative method		N/A
G.5.4.6	Locked-rotor overload test for DC motors		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature :	-	N/A
G.5.4.6.3	Alternative method		N/A
G.5.4.7	Motors with capacitors		N/A
G.5.4.8	Three-phase motors		N/A
G.5.4.9	Series motors		N/A
	Operating voltage :	-	—
G.6	Wire Insulation		N/A
G.6.1	General		N/A
G.6.2	Enamelled winding wire insulation		N/A
G.7	Mains supply cords		N/A
G.7.1	General requirements		N/A
	Type..... :	-	—

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.7.2	Cross sectional area (mm ² or AWG) :	-	N/A
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		N/A
G.7.3.2	Cord strain relief		N/A
G.7.3.2.1	Requirements		N/A
	Strain relief test force (N)..... :	-	N/A
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm) :	-	N/A
G.7.3.2.4	Strain relief and cord anchorage material		N/A
G.7.4	Cord Entry		N/A
G.7.5	Non-detachable cord bend protection		N/A
G.7.5.1	Requirements		N/A
G.7.5.2	Test method and compliance		N/A
	Overall diameter or minor overall dimension, <i>D</i> (mm) :	-	—
	Radius of curvature after test (mm) :	-	—
G.7.6	Supply wiring space		N/A
G.7.6.1	General requirements		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Requirements		N/A
G.7.6.2.2	Test with 8 mm strand		N/A
G.8	Varistors		N/A
G.8.1	General requirements		N/A
G.8.2	Safeguards against fire		N/A
G.8.2.1	General		N/A
G.8.2.2	Varistor overload test		N/A
G.8.2.3	Temporary overvoltage test		N/A
G.9	Integrated circuit (IC) current limiters		N/A
G.9.1	Requirements		N/A
	IC limiter output current (max. 5A)..... :	-	—
	Manufacturers' defined drift :	-	—
G.9.2	Test Program		N/A
G.9.3	Compliance		N/A
G.10	Resistors		N/A
G.10.1	General		N/A
G.10.2	Conditioning		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.10.3	Resistor test		N/A
G.10.4	Voltage surge test		N/A
G.10.5	Impulse test		N/A
G.10.6	Overload test		N/A
G.11	Capacitors and RC units		N/A
G.11.1	General requirements		N/A
G.11.2	Conditioning of capacitors and RC units		N/A
G.11.3	Rules for selecting capacitors		N/A
G.12	Optocouplers		N/A
	Optocouplers comply with IEC 60747-5-5 with specifics		N/A
	Type test voltage $V_{ini,a}$:	-	—
	Routine test voltage, $V_{ini,b}$	-	—
G.13	Printed boards		N/A
G.13.1	General requirements		N/A
G.13.2	Uncoated printed boards		N/A
G.13.3	Coated printed boards		N/A
G.13.4	Insulation between conductors on the same inner surface		N/A
G.13.5	Insulation between conductors on different surfaces		N/A
	Distance through insulation	-	N/A
	Number of insulation layers (pcs)	-	—
G.13.6	Tests on coated printed boards		N/A
G.13.6.1	Sample preparation and preliminary inspection		N/A
G.13.6.2	Test method and compliance		N/A
G.14	Coating on components terminals		N/A
G.14.1	Requirements	-	N/A
G.15	Pressurized liquid filled components		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

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.15.3	Compliance		N/A
G.16	IC including capacitor discharge function (ICX)		N/A
G.16.1	Condition for fault tested is not required		N/A
	ICX with associated circuitry tested in equipment		N/A
	ICX tested separately		N/A
G.16.2	Tests		N/A
	Smallest capacitance and smallest resistance specified by ICX manufacturer for impulse test..... :		—
	Mains voltage that impulses to be superimposed on :		—
	Largest capacitance and smallest resistance for ICX tested by itself for 10000 cycles test :		—
G.16.3	Capacitor discharge test..... :	-	N/A
H	CRITERIA FOR TELEPHONE RINGING SIGNALS		N/A
H.1	General		N/A
H.2	Method A		N/A
H.3	Method B		N/A
H.3.1	Ringling signal		N/A
H.3.1.1	Frequency (Hz) :	-	—
H.3.1.2	Voltage (V) :	-	—
H.3.1.3	Cadence; time (s) and voltage (V) :	-	—
H.3.1.4	Single fault current (mA):..... :	-	—
H.3.2	Tripping device and monitoring voltage		N/A
H.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N/A
H.3.2.2	Tripping device		N/A
H.3.2.3	Monitoring voltage (V) :	-	N/A
J	INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION		N/A
J.1	General		N/A
	Winding wire insulation :	-	—
	Solid round winding wire, diameter (mm) :	-	N/A
	Solid square and rectangular (flatwise bending) winding wire, cross-sectional area (mm ²)..... :	-	N/A
J.2/J.3	Tests and Manufacturing		—
K	SAFETY INTERLOCKS		N/A
K.1	General requirements		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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
K.6.1	Endurance requirement		N/A
K.6.2	Test method and compliance	-	N/A
K.7	Interlock circuit isolation		
K.7.1	Separation distance for contact gaps & interlock circuit elements		N/A
	In circuit connected to mains, separation distance for contact gaps (mm).....	-	N/A
	In circuit isolated from mains, separation distance for contact gaps (mm).....	-	N/A
	Electric strength test before and after the test of K.7.2	-	N/A
K.7.2	Overload test, Current (A)	-	N/A
K.7.3	Endurance test		N/A
K.7.4	Electric strength test		N/A
L	DISCONNECT DEVICES		N/A
L.1	General requirements		N/A
L.2	Permanently connected equipment		N/A
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
M	EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS		N/A
M.1	General requirements		N/A
M.2	Safety of batteries and their cells		N/A
M.2.1	Batteries and their cells comply with relevant IEC standards	-	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
	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 a portable 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 (m ³ /h) :	-	N/A
M.7.3	Ventilation tests		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
M.7.3.1	General		N/A
M.7.3.2	Ventilation test – alternative 1		N/A
	Hydrogen gas concentration (%) :		N/A
M.7.3.3	Ventilation test – alternative 2		N/A
	Obtained hydrogen generation rate :		N/A
M.7.3.4	Ventilation test – alternative 3		N/A
	Hydrogen gas concentration (%) :		N/A
M.7.4	Marking :		N/A
M.8	Protection against internal ignition from external spark sources of batteries with aqueous electrolyte		N/A
M.8.1	General		N/A
M.8.2	Test method		N/A
M.8.2.1	General		N/A
M.8.2.2	Estimation of hypothetical volume V_2 (m ³ /s) :	-	—
M.8.2.3	Correction factors :	-	—
M.8.2.4	Calculation of distance d (mm) :	-	—
M.9	Preventing electrolyte spillage		N/A
M.9.1	Protection from electrolyte spillage		N/A
M.9.2	Tray for preventing electrolyte spillage		N/A
M.10	Instructions to prevent reasonably foreseeable misuse		N/A
	Instructional safeguard :	-	N/A
N	ELECTROCHEMICAL POTENTIALS		N/A
	Material(s) used :	-	—
O	MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES		N/A
	Value of X (mm) :	-	—
P	SAFEGUARDS AGAINST CONDUCTIVE OBJECTS		N/A
P.1	General		N/A
P.2	Safeguards against entry or consequences of entry of a foreign object		N/A
P.2.1	General		N/A
P.2.2	Safeguards against entry of a foreign object		N/A
	Location and Dimensions (mm) :	-	—
P.2.3	Safeguards against the consequences of entry of a foreign object		N/A
P.2.3.1	Safeguard requirements		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The ES3 and PS3 keep-out volume in Figure P.3 not applicable to transportable equipment		N/A
	Transportable equipment with metalized plastic parts..... :	-	N/A
P.2.3.2	Consequence of entry test..... :	-	N/A
P.3	Safeguards against spillage of internal liquids		N/A
P.3.1	General		N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Compliance		N/A
P.4	Metallized coatings and adhesives securing parts		N/A
P.4.1	General		N/A
P.4.2	Tests		N/A
	Conditioning, T _c (°C) :	-	—
	Duration (weeks) :	-	—
Q	CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING		N/A
Q.1	Limited power sources		N/A
Q.1.1	Requirements		N/A
	a) Inherently limited output		N/A
	b) Impedance limited output		N/A
	c) Regulating network limited output		N/A
	d) Overcurrent protective device limited output		N/A
	e) IC current limiter complying with G.9		N/A
Q.1.2	Test method and compliance :	-	N/A
	Current rating of overcurrent protective device (A) :	-	N/A
Q.2	Test for external circuits – paired conductor cable		N/A
	Maximum output current (A) :	-	N/A
	Current limiting method :	-	—
R	LIMITED SHORT CIRCUIT TEST		N/A
R.1	General		N/A
R.2	Test setup		N/A
	Overcurrent protective device for test :	-	—
R.3	Test method		N/A
	Cord/cable used for test :	-	—

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
R.4	Compliance		N/A
S	TESTS FOR RESISTANCE TO HEAT AND FIRE		N/A
S.1	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material	-	—
	Wall thickness (mm)	-	—
	Conditioning (°C)	-	—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	- Material not consumed completely		N/A
	- Material extinguishes within 30s		N/A
	- No burning of layer or wrapping tissue		N/A
S.2	Flammability test for fire enclosure and fire barrier integrity		N/A
	Samples, material	-	—
	Wall thickness (mm)	-	—
	Conditioning (°C)	-	—
S.3	Flammability test for the bottom of a fire enclosure		N/A
S.3.1	Mounting of samples		N/A
S.3.2	Test method and compliance		N/A
	Mounting of samples	-	—
	Wall thickness (mm)	-	—
S.4	Flammability classification of materials		N/A
S.5	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power exceeding 4 000 W		N/A
	Samples, material	-	—
	Wall thickness (mm)	-	—
	Conditioning (°C)	-	—
T	MECHANICAL STRENGTH TESTS		N/A
T.1	General		N/A
T.2	Steady force test, 10 N	-	N/A
T.3	Steady force test, 30 N	-	N/A
T.4	Steady force test, 100 N	-	N/A
T.5	Steady force test, 250 N	-	N/A
T.6	Enclosure impact test		N/A
	Fall test		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Swing test		N/A
T.7	Drop test :	-	N/A
T.8	Stress relief test..... :	-	N/A
T.9	Glass Impact Test :	-	N/A
T.10	Glass fragmentation test		N/A
	Number of particles counted..... :	-	N/A
T.11	Test for telescoping or rod antennas		N/A
	Torque value (Nm) :	-	N/A
U	MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION		N/A
U.1	General		N/A
	Instructional safeguard :		N/A
U.2	Test method and compliance for non-intrinsically protected CRTs		N/A
U.3	Protective screen		N/A
V	DETERMINATION OF ACCESSIBLE PARTS		N/A
V.1	Accessible parts of equipment		N/A
V.1.1	General		N/A
V.1.2	Surfaces and openings tested with jointed test probes		N/A
V.1.3	Openings tested with straight unjointed test probes		N/A
V.1.4	Plugs, jacks, connectors tested with blunt probe		N/A
V.1.5	Slot openings tested with wedge probe		N/A
V.1.6	Terminals tested with rigid test wire		N/A
V.2	Accessible part criterion		N/A
X	ALTERNATIVE METHOD FOR DETERMINING CLEARANCES FOR INSULATION IN CIRCUITS CONNECTED TO AN AC MAINS NOT EXCEEDING 420 V PEAK (300 V RMS)		N/A
	Clearance :	-	N/A
Y	CONSTRUCTION REQUIREMENTS FOR OUTDOOR ENCLOSURES		N/A
Y.1	General		N/A
Y.2	Resistance to UV radiation		N/A
Y.3	Resistance to corrosion		N/A
Y.3	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

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

IEC 62368-1							
Clause	Requirement + Test				Result - Remark		Verdict
5.2	TABLE: Classification of electrical energy sources						P
Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters				ES Class
			U (V)	I (mA)	Type ¹⁾	Additional Info ²⁾	
3,8	Input	Normal	3,8	-	SS	DC	ES1
Supplementary information: Values from test report 281857-5.							
1) Type: Steady state (SS), Capacitance (CP), Single pulse (SP), Repetitive pulses (RP), etc.							
2) Additional Info: Frequency, Pulse duration, Pulse off time, Capacitance value, etc.							

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

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

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

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

IEC 62368-1				
Clause	Requirement + Test		Result - Remark	Verdict
5.4.4.2	TABLE: Minimum distance through insulation			N/A
Distance through insulation (DTI) at/of	Peak voltage (V)	Insulation	Required DTI (mm)	Measured DTI (mm)
Supplementary information:				

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

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

5.5.2.2	TABLE: Stored discharge on capacitors					N/A
Location	Supply voltage (V)	Operating and fault condition ¹⁾	Switch position	Measured voltage (Vpk)	ES Class	
Supplementary information:						
X-capacitors installed for testing: <input type="checkbox"/> bleeding resistor rating: <input type="checkbox"/> ICX:						
1) Normal operating condition (e.g., normal operation, or open fuse), SC= short circuit, OC= open circuit						

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

IEC 62368-1						
Clause	Requirement + Test			Result - Remark		Verdict
5.7.4	TABLE: Unearthed accessible parts					N/A
Location	Operating and fault conditions	Supply Voltage (V)	Parameters			ES class
			Voltage (V _{rms} or V _{pk})	Current (A _{rms} or A _{pk})	Freq. (Hz)	
Supplementary information:						
Abbreviation: SC= short circuit; OC= open circuit						

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

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

6.2.2	TABLE: Power source circuit classifications					P
Location	Operating and fault condition	Voltage (V)	Current (A)	Max. Power ¹⁾ (W)	Time (S)	PS class
Input	Normal	3,8	0,008	0,03	3	PS1
Supplementary information: Values from test report 281857-5.						
Abbreviation: SC= short circuit; OC= open circuit						
1) Measured after 3 s for PS1 and measured after 5 s for PS2 and PS3.						

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

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

6.2.3.2	TABLE: Determination of resistive PIS			N/A
Location		Operating and fault condition	Dissipate power (W)	Arcing PIS? Yes / No
Supplementary information:				
Abbreviation: SC= short circuit; OC= open circuit				

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

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:									

5.4.1.4, 9.3, B.1.5, B.2.6	TABLE: Temperature measurements							P
Supply voltage (V)..... :			5 VDC*					—
Ambient temperature during test T_{amb} (°C) :			25					—
Maximum measured temperature T of part/at:			T (°C)					Allowed T_{max} (°C)
Chip top			32,6					85**
PCB bottom			32.5					85**
Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class	
Supplementary information:								

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

* Temperature measurements were performed with EUT installed on evaluation card supplied by the manufacturer. The evaluation card is powered from USB where the voltage is 5 VDC. There is a DC-DC converter on the evaluation card which provides the correct supply voltage for the EUT.

** The maximum temperature according to manufacturer. Thermal limit needs to be evaluated in the final product where the IC chip module is used so that the total heating caused by the final product and IC chip temperature will not exceed 85 °C

Values from test report 281857-5.

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

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

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

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

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

Q.1	TABLE: Circuits intended for interconnection with building wiring (LPS)						N/A
Output Circuit	Condition	U _{oc} (V)	Time (s)	I _{sc} (A)		S (VA)	
				Meas.	Limit	Meas.	Limit
Supplementary Information:							

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

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

IEC 62368-1				
Clause	Requirement + Test		Result - Remark	
T.7	TABLE: Drop test			N/A
Location/part	Material	Thickness (mm)	Height (mm)	Observation
Supplementary information:				

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

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

4.1.2	TABLE: Critical components information					N/A
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Supplementary information:						
¹⁾ Provided evidence ensures the agreed level of compliance. See OD-2039. ²⁾ Description line content is optional. Main line description needs to clearly detail the component used for testing.						

List of test equipment used:

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date