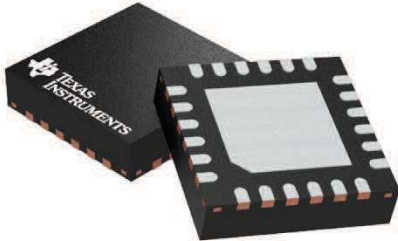


<b>Prüfbericht-Nr.:</b> <i>Test Report No.:</i>	<b>50286950 001</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	168129141	Seite 1 von 19 <i>Page 1 of 19</i>
<b>Kunden-Referenz-Nr.:</b> <i>Client Reference No.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	26 Aug., 2019	
<b>Auftraggeber:</b> <i>Client:</i>	<b>Texas Instruments</b> 12500 TI Boulevard 75243, Dallas			
<b>Prüfgegenstand:</b> <i>Test item:</i>	Charger IC			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	BQ24297			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	AK approval			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	IEC 62368-1:2018			
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	26 Aug., 2019			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	A000977775-016 to 017 A001015270 001 - 003			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	08 Oct., 2019 – 06 Nov., 2019			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass			
<b>geprüft von / tested by:</b>		<b>kontrolliert von / reviewed by:</b>		
<p style="text-align: center;"><i>Crystal Ye</i></p> <p>2019-12-06    Crystal Ye / Project Engineer</p>		<p style="text-align: center;"><i>Paddy Qiu</i></p> <p>2019-12-06    Paddy Qiu / Technical Certifier</p>		
<b>Datum</b>	<b>Name/Stellung</b>	<b>Unterschrift</b>	<b>Datum</b>	<b>Name/Stellung</b>
<i>Date</i>	<i>Name/Position</i>	<i>Signature</i>	<i>Date</i>	<i>Name/Position</i>
<b>Sonstiges/ Other Aspects:</b>				
This report contains:				
(1) Main report 19 pages including this cover page;				
(2) Attachment 1: National deviation (10 pages);				
(3) Attachment 2: Photo document (1 page).				
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b>		<b>Prüfmuster vollständig und unbeschädigt</b>		
Condition of the test item at delivery:		Test item complete and undamaged		
* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend
	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	5 = mangelhaft
Legend:	1 = very good	2 = good	3 = satisfactory	4 = sufficient
	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	5 = poor
				N/T = nicht getestet
				N/T = not tested
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b>				
<i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				
v04				

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

**Report Number**..... : 50286950 001  
**Date of issue** ..... : See cover page  
**Total number of pages** ..... : See cover page

**Name of Testing Laboratory preparing the Report** ..... : See cover page

**Applicant's name** ..... : See cover page  
**Address** ..... : See cover page

**Test specification:**

**Standard** ..... : See cover page  
**Test procedure**..... : See cover page  
**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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If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

**This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.**

**General disclaimer:**

The test results presented in this report relate only to the object tested.  
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

<b>Test item description</b> .....	Charger IC	
<b>Trade Mark</b> .....	TEXAS INSTRUMENTS	
<b>Manufacturer</b> .....	Same as client.	
<b>Model/Type reference</b> .....	BQ24297	
<b>Ratings</b> .....	6.2Vdc Max.	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	<b>TÜV Rheinland (Shenzhen) Co., Ltd.</b>
<b>Testing location/ address</b> .....	1F East & 2-4F, Cybio Technology Building No. 1, No. 16 Kejibei 2nd Road, High-Tech Industrial Park North Nanshan District 518057, Shenzhen, China	
<b>Tested by (name, function, signature)</b> .....	See cover page	
<b>Approved by (name, function, signature) ..</b> :	See cover page	
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 1:</b>	
<b>Testing location/ address</b> .....		
<b>Tested by (name, function, signature)</b> .....		
<b>Approved by (name, function, signature) ..</b> :		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 2:</b>	
<b>Testing location/ address</b> .....		
<b>Tested by (name + signature)</b> .....		
<b>Witnessed by (name, function, signature) .</b> :		
<b>Approved by (name, function, signature) ..</b> :		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 3:</b>	
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 4:</b>	
<b>Testing location/ address</b> .....		
<b>Tested by (name, function, signature)</b> .....		
<b>Witnessed by (name, function, signature) .</b> :		
<b>Approved by (name, function, signature) ..</b> :		
<b>Supervised by (name, function, signature) :</b>		

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

See cover page.

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

G.9 Integrated circuit (IC) current limiters

**Testing location:**

**TUV Rheinland (Shenzhen) Co., Ltd.**  
 1F East & 2-4F, Cybio Technology Building No.1,  
 No.16 Kejibei 2nd Road, High-Tech Industrial Park  
 North Nanshan District, 518057, Shenzhen, China

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

EU Group Differences, EU Special National Conditions, AT, BE, CH, CZ, DE, FI, FR, GB, GR, HU, IT, NL, NO, PL, SE, SI, SK

Explanation of used codes: AT=Austria, BE=Belgium, CH=Switzerland, CZ=Czech Republic, DE=Germany, FI=Finland, FR=France, GB=United Kingdom, GR=Greece, HU=Hungary, IT=Italy, NL=The Netherlands, NO=Norway, PL=Poland, SE=Sweden, SI=Slovenia, SK=Slovakia

For National Differences see attachment 1 of this test report.

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

**Copy of marking plate:**

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

Marking on IC body:



Marking on package:



Note:

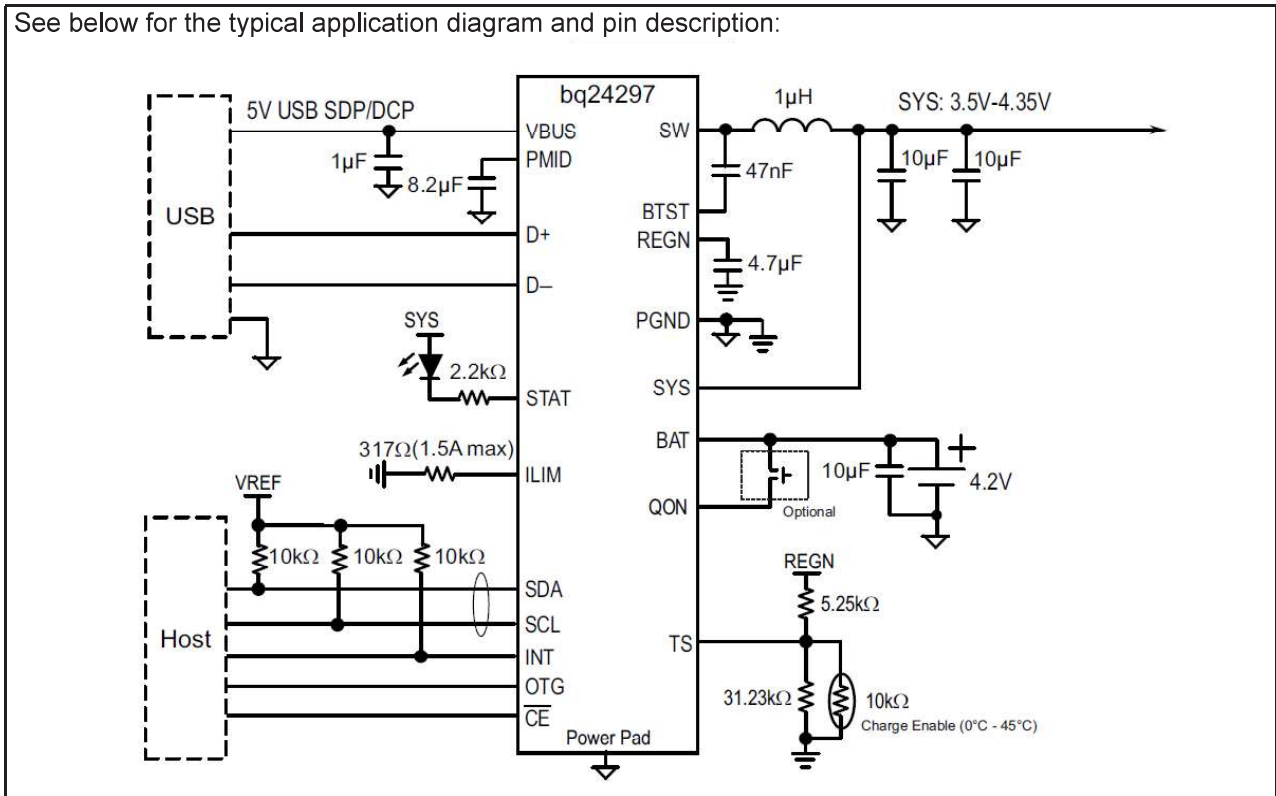
1. 1943 means date code and 19 means last two numbers of year and 43 means week;
2. RGER after model no. BQ24297 is the package information code, no technical concern.

3. Trademark “  TEXAS INSTRUMENTS ” marked on package label.

<b>Test item particulars:</b>			
<b>Product group</b> .....	<input type="checkbox"/> end product	<input checked="" type="checkbox"/> built-in component	
<b>Classification of use by</b> .....	<input type="checkbox"/> Ordinary person	<input type="checkbox"/> Children likely present	
	<input type="checkbox"/> Instructed person		
	<input checked="" type="checkbox"/> Skilled person		
<b>Supply connection</b> .....	<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
<b>Supply tolerance</b> .....	<input type="checkbox"/> +10%/-10%		
	<input type="checkbox"/> +20%/-15%		
	<input type="checkbox"/> +30%/-10%		
	<input checked="" type="checkbox"/> None		
<b>Supply connection – type</b> .....	<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: built-in component, to be soldered onto PCB		
<b>Considered current rating of protective device</b> .....	<input type="checkbox"/> A;		
	Location:	<input type="checkbox"/> building	<input type="checkbox"/> equipment
	<input checked="" type="checkbox"/> N/A		
<b>Equipment mobility</b> .....	<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:		
<b>Overvoltage category (OVC)</b> .....	<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: not directly connected to the mains	
<b>Class of equipment</b> .....	<input type="checkbox"/> Class I	<input type="checkbox"/> Class II	<input checked="" type="checkbox"/> Class III
	<input type="checkbox"/> Not classified	<input type="checkbox"/>	
<b>Special installation location</b> .....	<input checked="" type="checkbox"/> N/A		
	<input type="checkbox"/> restricted access area		
	<input type="checkbox"/> outdoor location		
<b>Pollution degree (PD)</b> .....	<input type="checkbox"/> PD 1	<input checked="" type="checkbox"/> PD 2	<input type="checkbox"/> PD 3
<b>Manufacturer's specified T<sub>ma</sub></b> .....	85 °C	<input type="checkbox"/> Outdoor: minimum	°C
<b>IP protection class</b> .....	<input checked="" type="checkbox"/> IPX0	<input type="checkbox"/> IP__	
<b>Power systems</b> .....	<input type="checkbox"/> TN	<input type="checkbox"/> TT	<input type="checkbox"/> IT - V <sub>L-L</sub>
	<input checked="" type="checkbox"/> not AC mains		
<b>Altitude during operation (m)</b> .....	<input type="checkbox"/> 2000 m or less	<input checked="" type="checkbox"/> 5000 m	
<b>Altitude of test laboratory (m)</b> .....	<input checked="" type="checkbox"/> 2000 m or less	<input type="checkbox"/> m	
<b>Mass of equipment (kg)</b> .....	<0.1 kg		



See below for the typical application diagram and pin description:



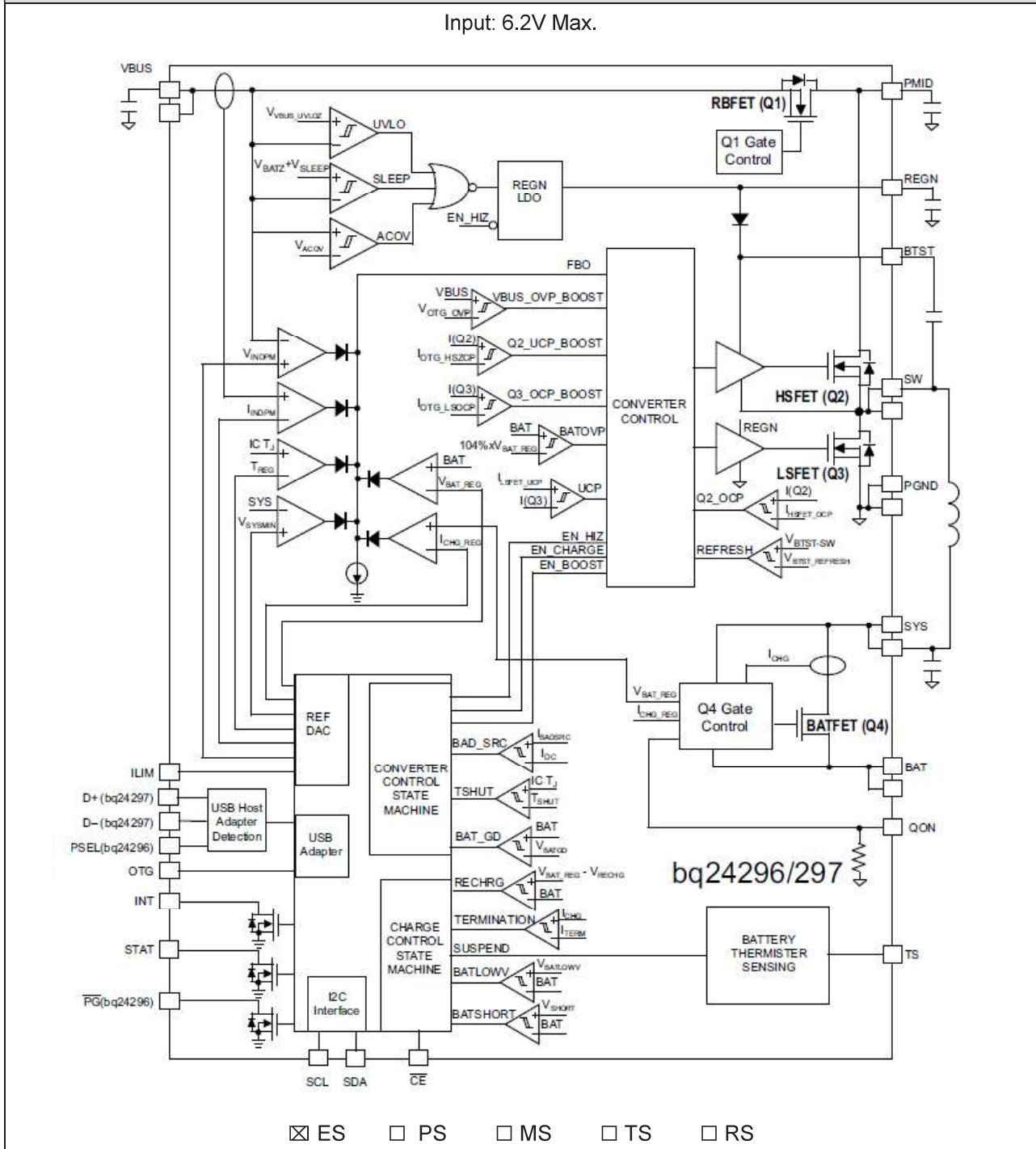


<b>OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS</b>				
<b>Clause</b>	<b>Possible Hazard</b>			
5	Electrically-caused injury			
Class and Energy Source (e.g. ES3: Primary circuit)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
ES1: All circuits including supplying circuits	Skilled	N/A	N/A	N/A
6	Electrically-caused fire			
Class and Energy Source (e.g. PS2: 100 Watt circuit)	Material part (e.g. Printed board)	Safeguards		
		B	1 <sup>st</sup> S	2 <sup>nd</sup> S
PS2: All circuits including supplying circuits	Combustible materials inside the equipment	N/A*	N/A	N/A
7	Injury caused by hazardous substances			
Class and Energy Source (e.g. Ozone)	Body Part (e.g., Skilled)	Safeguards		
		B	S	R
N/A (no such sources)	N/A	N/A	N/A	N/A
8	Mechanically-caused injury			
Class and Energy Source (e.g. MS3: Plastic fan blades)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
MS1: Edges and corners	Skilled	N/A	N/A	N/A
MS1: Mass of the unit	Skilled	N/A	N/A	N/A
9	Thermal burn			
Class and Energy Source (e.g. TS1: Keyboard caps)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
*	*	*	*	*
10	Radiation			
Class and Energy Source (e.g. RS1: PMP sound output)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
N/A	Skilled	N/A	N/A	N/A
Supplementary Information: *built-in component, to be evaluated in end-product.				
“B” – Basic Safeguard; “S” – Supplementary Safeguard; “R” – Reinforced Safeguard				

ENERGY SOURCE DIAGRAM

**Optional.** Manufacturers are to provide the energy sources diagram identify declared energy sources and identifying the demarcations are between power sources. Recommend diagram be provided included in power supply and multipart systems.

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



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>4</b>	<b>GENERAL REQUIREMENTS</b>		P
4.1.1	Acceptance of materials, components and subassemblies		P
4.1.2	Use of components	Component not covered by IEC standards are tested under the conditions present in the equipment. See also Annex G	P
4.1.3	Equipment design and construction	Built-in component, to be evaluated in end-product	N/A
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)		N/A
4.1.15	Markings and instructions	(See Annex F)	P
4.4.3	Safeguard robustness	Built-in component, to be evaluated in end-product	N/A
4.4.4	Displacement of a safeguard by an insulating liquid		N/A
4.4.5	Safety interlocks		N/A
<b>4.5</b>	<b>Explosion</b>		N/A
<b>4.6</b>	<b>Fixing of conductors</b>		N/A
<b>4.7</b>	<b>Equipment for direct insertion into mains socket-outlets</b>		N/A
<b>4.8</b>	<b>Equipment containing coin/button cell batteries</b>		N/A
<b>4.9</b>	<b>Likelihood of fire or shock due to entry of conductive object</b> <i>Built-in component only</i>		N/A
<b>4.10</b>	<b>Component requirements</b>		N/A

<b>5</b>	<b>ELECTRICALLY-CAUSED INJURY</b>		P
<b>5.2</b>	<b>Classification and limits of electrical energy sources</b>		P
5.2.2	ES1, ES2 and ES3 limits	ES1	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	Ringing signals		N/A
5.2.2.7	Audio signals		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>5.3</b>	<b>Protection against electrical energy sources</b>		N/A
		<i>Only ES1 exist</i>	
<b>5.4</b>	<b>Insulation materials and requirements</b>		N/A
<b>5.5</b>	<b>Components as safeguards</b>		N/A
<b>5.6</b>	<b>Protective conductor</b>		N/A
<b>5.6</b>	<b>Protective conductor</b>		N/A
<b>5.7</b>	<b>Prospective touch voltage, touch current and protective conductor current</b>		N/A
<b>5.8</b>	<b>Backfeed safeguard in battery backed up supplies</b>		N/A

<b>6</b>	<b>ELECTRICALLY- CAUSED FIRE</b>		P
<b>6.2</b>	<b>Classification of PS and PIS</b>		P
6.2.2	Power source circuit classifications .....	PS2 assumed (See appended table 6.2.2)	P
6.2.3	Classification of potential ignition sources	Built-in component, to be evaluated in end-product	N/A
6.2.3.1	Arcing PIS .....		N/A
6.2.3.2	Resistive PIS .....		N/A
<b>6.3</b>	<b>Safeguards against fire under normal operating and abnormal operating conditions</b>		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 .....	Built-in component, to be evaluated in end-product	N/A
	Combustible materials outside fire enclosure .....		N/A
<b>6.4</b>	<b>Safeguards against fire under single fault conditions</b>		N/A
<b>6.5</b>	<b>Internal and external wiring</b>		
<b>6.6</b>	<b>Safeguards against fire due to the connection to additional equipment</b>		N/A

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

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>8</b>	<b>MECHANICALLY-CAUSED INJURY</b>		P
<b>8.2</b>	<b>Mechanical energy source classifications</b>	<i>MS1</i>	P
<b>8.3</b>	<b>Safeguards against mechanical energy sources</b>		N/A
<b>8.4</b>	<b>Safeguards against parts with sharp edges and corners</b>		N/A
<b>8.5</b>	<b>Safeguards against moving parts</b>		N/A
<b>8.6</b>	<b>Stability of equipment</b>		N/A
<b>8.7</b>	<b>Equipment mounted to wall, ceiling or other structure</b>		N/A
<b>8.8</b>	<b>Handles strength</b>		N/A
<b>8.9</b>	<b>Wheels or casters attachment requirements</b>		N/A
<b>8.10</b>	<b>Carts, stands and similar carriers</b>		N/A
<b>8.11</b>	<b>Mounting means for slide-rail mounted equipment (SRME)</b>		N/A
<b>8.12</b>	<b>Telescoping or rod antennas</b>		N/A
<b>9</b>	<b>THERMAL BURN INJURY</b>	<i>Built-in component only, to be evaluated in end-product</i>	N/A
<b>10</b>	<b>RADIATION</b>	<i>Built-in component only, no laser or radiation hazards</i>	N/A
<b>10.2</b>	<b>Radiation energy source classification</b>		N/A
<b>10.3</b>	<b>Safeguards against laser radiation</b>		N/A
<b>10.4</b>	<b>Safeguards against optical radiation from lamps and lamp systems (including LED types)</b>		N/A
<b>10.5</b>	<b>Safeguards against X-radiation</b>		N/A
<b>10.6</b>	<b>Safeguards against acoustic energy sources</b>		N/A
<b>B</b>	<b>NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS</b>	<i>Built-in component, see annex G.9 only.</i>	N/A
<b>C</b>	<b>UV RADIATION</b>		N/A
<b>D</b>	<b>TEST GENERATORS</b>		N/A
<b>E</b>	<b>TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS</b>		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>F</b>	<b>EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS</b>		P
<b>F.1</b>	<b>General</b>		N/A
	Language .....		—
<b>F.2</b>	<b>Letter symbols and graphical symbols</b>		N/A
F.2.1	Letter symbols according to IEC60027-1		N/A
F.2.2	Graphic symbols according to IEC, ISO or manufacturer specific		N/A
<b>F.3</b>	<b>Equipment markings</b>		P
F.3.1	Equipment marking locations	See below	P
F.3.2	Equipment identification markings		P
F.3.2.1	Manufacturer identification .....		N/A
F.3.2.2	Model identification .....	Model no. marked	P
F.3.3	Equipment rating markings		N/A
<b>F.4</b>	<b>Instructions</b>		N/A
<b>F.5</b>	<b>Instructional safeguards</b>		N/A
<b>G</b>	<b>COMPONENTS</b>		P
<b>G.1</b>	<b>Switches</b>		N/A
<b>G.2</b>	<b>Relays</b>		N/A
<b>G.3</b>	<b>Protective devices</b>		N/A
<b>G.4</b>	<b>Connectors</b>		N/A
<b>G.5</b>	<b>Wound components</b>		N/A
<b>G.6</b>	<b>Wire Insulation</b>		N/A
<b>G.7</b>	<b>Mains supply cords</b>		N/A
<b>G.8</b>	<b>Varistors</b>		N/A
<b>G.9</b>	<b>Integrated circuit (IC) current limiters</b>		P
G.9.1	Requirements	See appended table G.9	P
	IC limiter output current (max. 5A).....	3A	—
	Manufacturers' defined drift .....		—
G.9.2	Test Program		P
G.9.3	Compliance	After the test program, the device still can limit the current in accordance with its specification as applicable	P
<b>G.10</b>	<b>Resistors</b>		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>G.11</b>	<b>Capacitors and RC units</b>		N/A
<b>G.12</b>	<b>Optocouplers</b>		N/A
<b>G.13</b>	<b>Printed boards</b>		N/A
<b>G.14</b>	<b>Coating on components terminals</b>		N/A
<b>G.15</b>	<b>Pressurized liquid filled components</b>		N/A
<b>G.16</b>	<b>IC including capacitor discharge function (ICX)</b>		N/A
<b>H</b>	<b>CRITERIA FOR TELEPHONE RINGING SIGNALS</b>		N/A
<b>J</b>	<b>INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION</b>		N/A
<b>K</b>	<b>SAFETY INTERLOCKS</b>		N/A
<b>L</b>	<b>DISCONNECT DEVICES</b>		N/A
<b>M</b>	<b>EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS</b>		N/A
<b>N</b>	<b>ELECTROCHEMICAL POTENTIALS</b>		N/A
<b>O</b>	<b>MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES</b>		N/A
<b>P</b>	<b>SAFEGUARDS AGAINST CONDUCTIVE OBJECTS</b>		N/A
<b>Q</b>	<b>CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING</b>		N/A
<b>R</b>	<b>LIMITED SHORT CIRCUIT TEST</b>		N/A
<b>S</b>	<b>TESTS FOR RESISTANCE TO HEAT AND FIRE</b>		N/A
<b>T</b>	<b>MECHANICAL STRENGTH TESTS</b>		N/A
<b>U</b>	<b>MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION</b>		N/A
<b>V</b>	<b>DETERMINATION OF ACCESSIBLE PARTS</b>		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
X	<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
Y	<b>CONSTRUCTION REQUIREMENTS FOR OUTDOOR ENCLOSURES</b>		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 <sup>1)</sup>	Additional Info <sup>2)</sup>	
6.2Vdc max.	Supply circuits	Normal	6.2	--	SS	--	ES1
Supplementary information:							
1) Type: Steady state (SS), Capacitance (CP), Single pulse (SP), Repetitive pulses (RP), etc.							
2) Additional Info: Frequency, Pulse duration, Pulse off time, Capacitance value, etc.							

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	
Power source circuit	--	--	--	--	--	PS2*	
Remark:							
* As the input for the IC is designed to connect to a 5V USB port, therefore PS2 was assumed.							

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>G.9</b>	<b>Integrated circuit (IC) current limiters</b>		P
Sample 1	10 000 cycles of turning enable pin on and off at 25°C with max. rated input voltage and max. rated output load	After 10000 cycles, the IC current limiter can limit current accordance with its specification as applicable	P
Sample 2	1. 50 cycles of turning enable pin on and off at 70°C with max. rated input voltage and 0Ω  470μF* output load; 2. 50 cycles of turning enable pin on and off at -30°C with max. rated input voltage and 0Ω  470μF* output load.	No fail after test	P
Sample 3	1. 50 cycles of turning input power pin on and off at 70°C with max. rated input voltage, enable pin held active and 0Ω  470μF* output load; 2. 50 cycles of turning input power pin on and off at -30°C with max. rated input voltage, enable pin held active and 0Ω  470μF* output load.	No fail after test	P
Sample 4	50 cycles at 70°C with max. rated input voltage, enable pin held active and output load change between open circuit and short circuit (0Ω).	No fail after test	P
Sample 5	50 cycles of turning enable pin on and off at 25°C with max. rated input voltage and 150% of max. output load	Due to the features of the IC, overload for the output is impossible, so max. rated output load applied which had considered in test for sample 1, no additional test necessary.	N/A
Sample 6	50 cycles of turning input power pin on and off at 25°C with max. rated input voltage, enable pin held active and 150% of max. output load	Due to the features of the IC, overload for the output is impossible, so max. rated output load applied, no fail after test	P
Remark: <ol style="list-style-type: none"> <li>*    = in parallel</li> <li>Temperature tolerance is ±2°C</li> <li>Sample conditioned 3 h before test</li> <li>Above tests are performed together with the ancillary circuits provided by IC manufacturer to simulated the related operation mode.</li> </ol>			

**List of test equipment used:**

	Eq. No.	Name	Manufacturer	Model No.	Date of Calibration	Date of next Calibration
<input checked="" type="checkbox"/>	1.951	DC power supply	NRP 3630 Power supply	NRP-3630	2019.01.16	2020.01.15
<input checked="" type="checkbox"/>	1.965	Battery Test System	Repower	CTS 5V-5A	2019.07.09	2020.07.08
<input checked="" type="checkbox"/>	1.975	Thermal cycling chamber	YinHe (ChongQing) Testing Equipment Co.Ltd	GLH605F	2019.01.16	2020.01.15
<input checked="" type="checkbox"/>	1.976	Timer	ZHUIRI	PS-80	2019.08.12	2020.08.11
<input checked="" type="checkbox"/>	1.994	DC Electronic Load	ITECH	IT8812C 120V/60A/250W	2019.01.16	2020.01.15
<input checked="" type="checkbox"/>	2.081	Multimeter	Fluke	179C	2019.07.04	2020.07.03
<input checked="" type="checkbox"/>	2.082	Multimeter	Fluke	179C	2019.07.04	2020.07.03

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

**ATTACHMENT TO TEST REPORT**  
**IEC 62368-1**  
**EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES**  
 (Audio/video, information and communication technology equipment - Part 1: Safety requirements)

**Differences according to** ..... : EN 62368-1:2014+A11:2017

**Attachment Form No.** ..... : EU\_GD\_IEC62368\_1B\_II

**Attachment Originator** ..... : Nemko AS

**Master Attachment**..... : Date 2017-09-22

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**CENELEC COMMON MODIFICATIONS (EN)**

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2014 are prefixed "Z". P

**CONTENTS** **Add** the following annexes: P

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

**Delete** all the "country" notes in the reference document (IEC 62368-1:2014) according to the following list: P

0.2.1	Note	1	Note 3	4.1.15	Note
4.7.3	Note 1 and 2	5.2.2.2	Note	5.4.2.3.2.2 Table 13	Note c
5.4.2.3.2.4	Note 1 and 3	5.4.2.5	Note 2	5.4.5.1	Note
5.5.2.1	Note	5.5.6	Note	5.6.4.2.1	Note 2 and 3
5.7.5	Note	5.7.6.1	Note 1 and 2	10.2.1 Table 39	Note 2, 3 and 4
10.5.3	Note 2	10.6.2.1	Note 3	F.3.3.6	Note 3

For special national conditions, see Annex ZB. P

1	<p><b>Add</b> the following note:</p> <p>NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.</p>		P
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IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
4.Z1	<p><b>Add</b> the following new subclause after 4.9:</p> <p>To protect against excessive current, short-circuits and earth faults in circuits connected to an a.c. <b>mains</b>, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c):</p> <p>a) except as detailed in b) and c), protective devices necessary to comply with the requirements of B.3.1 and B.4 shall be included as parts of the equipment;</p> <p>b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation;</p> <p>c) it is permitted for <b>pluggable equipment type B</b> or <b>permanently connected equipment</b>, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions.</p> <p>If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for <b>pluggable equipment type A</b> the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.</p>	Not mains connected product.	N/A
5.4.2.3.2.4	<p><b>Add</b> the following to the end of this subclause:</p> <p>The requirement for interconnection with <b>external circuit</b> is in addition given in EN 50491-3:2009.</p>		N/A
10.2.1	<p>Add the following to <sup>c)</sup> and <sup>d)</sup> in table 39:</p> <p>For additional requirements, see 10.5.1.</p>	No radiation.	N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.5.1	<p><b>Add</b> the following after the first paragraph:  <i>For RS 1 compliance is checked by measurement under the following conditions:</i></p> <p><i>In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those internal adjustments or presets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made.</i></p> <p>NOTE Z1 Soldered joints and paint lockings are examples of adequate locking.</p> <p><i>The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm<sup>2</sup>, at any point 10 cm from the outer surface of the apparatus.</i></p> <p><i>Moreover, the measurement shall be made under fault conditions causing an increase of the high-voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made.</i></p> <p><i>For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level.</i></p> <p>NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.</p>		N/A
10.6.1	<p><b>Add</b> the following paragraph to the end of the subclause:  EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.</p>		N/A
10.Z1	<p><b>Add</b> the following new subclause after 10.6.5.  <b>10.Z1 Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz</b></p> <p>The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz).</p> <p>For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body-mounted devices, attention is drawn to EN 50360 and EN 50566</p>	Built-in component only, to be evaluated in end product	N/A
G.7.1	<p><b>Add</b> the following note:  NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.</p>		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Bibliography	<p><b>Add</b> the following standards:</p> <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
<b>ZB</b>	<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:</p> <p><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>	Not class I equipment	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

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.2.2.2	<p><b>Denmark</b></p> <p>After the 2nd paragraph add the following: A warning (marking <b>safeguard</b>) for high <b>touch current</b> is required if the <b>touch current</b> exceeds the limits of 3,5 mA a.c. or 10 mA d.c.</p>		N/A
5.4.11.1 and Annex G	<p><b>Finland and Sweden</b></p> <p>To the end of the subclause the following is added: For separation of the telecommunication network from earth the following is applicable: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either</p> <ul style="list-style-type: none"> <li>• two layers of thin sheet material, each of which shall pass the electric strength test below, or</li> <li>• one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below.</li> </ul> <p>If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition</p> <ul style="list-style-type: none"> <li>• passes the tests and inspection criteria of 5.4.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 5.4.9 shall be performed using 1,5 kV), and</li> <li>• is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5kV.</li> </ul> <p>It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2.</p> <p>A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions:</p> <ul style="list-style-type: none"> <li>• the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in 5.4.11;</li> <li>• the additional testing shall be performed on all the test specimens as described in EN 60384-14;</li> </ul> <p>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.</p>		N/A



IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.5.2.1	<p><b>Norway</b></p> <p>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).</p>		N/A
5.5.6	<p><b>Finland, Norway and Sweden</b></p> <p>To the end of the subclause the following is added: Resistors used as <b>basic safeguard</b> or bridging <b>basic insulation in class I pluggable equipment type A</b> shall comply with G.10.1 and the test of G.10.2.</p>		N/A
5.6.1	<p><b>Denmark</b></p> <p><b>Add</b> to the end of the subclause</p> <p>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.</p> <p><i>Justification:</i> In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.</p>		N/A
5.6.4.2.1	<p><b>Ireland and United Kingdom</b></p> <p>After the indent for <b>pluggable equipment type A</b>, the following is added: – the <b>protective current rating</b> is taken to be 13 A, this being the largest rating of fuse used in the <b>mains</b> plug.</p>		N/A
5.6.5.1	<p>To the second paragraph the following is added: The range of conductor sizes of flexible cords to be accepted by terminals for equipment with a rated current over 10 A and up to and including 13 A is: 1,25 mm<sup>2</sup> to 1,5 mm<sup>2</sup> in cross-sectional area.</p>		N/A
5.7.5	<p><b>Denmark</b></p> <p>To the end of the subclause the following is added: The installation instruction shall be affixed to the equipment if the <b>protective conductor current</b> exceeds the limits of 3,5 mA a.c. or 10 mA d.c.</p>		N/A

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

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.7.6.2	<p><b>Denmark</b></p> <p>To the end of the subclause the following is added: The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA .</p>		N/A
B.3.1 and B.4	<p><b>Ireland and United Kingdom</b></p> <p>The following is applicable: To protect against excessive currents and short-circuits in the primary circuit of <b>direct plug-in equipment</b>, tests according to Annexes B.3.1 and B.4 shall be conducted using an external miniature circuit breaker complying with EN 60898-1, Type B, rated 32A. If the equipment does not pass these tests, suitable protective devices shall be included as an integral part of the <b>direct plug-in equipment</b>, until the requirements of Annexes B.3.1 and B.4 are met</p>		N/A
G.4.2	<p><b>Denmark</b></p> <p>To the end of the subclause the following is added: Supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1:2011. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a. If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2. Mains socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance DS 60884-2-D1:2011 standard sheet DKA 1-4a. Other current rating socket outlets shall be in compliance with Standard Sheet DKA 1-3a or DKA 1-1c. Mains socket-outlets with earth shall be in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a <i>Justification:</i> Heavy Current Regulations, Section 6c</p>		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
G.4.2	<p><b>United Kingdom</b></p> <p>To the end of the subclause the following is added: The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.</p>		N/A
G.7.1	<p><b>United Kingdom</b></p> <p>To the first paragraph the following is added: Equipment which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord shall be fitted with a 'standard plug' in accordance with the Plugs and Sockets etc (Safety) Regulations 1994, Statutory Instrument 1994 No. 1768, unless exempted by those regulations.</p> <p>NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.</p>		N/A
G.7.1	<p><b>Ireland</b></p> <p>To the first paragraph the following is added: Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, "13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. S.I. 525 provides for the recognition of a standard of another Member State which is equivalent to the relevant Irish Standard</p>		N/A
G.7.2	<p><b>Ireland and United Kingdom</b></p> <p>To the first paragraph the following is added: A power supply cord with a conductor of 1,25 mm<sup>2</sup> is allowed for equipment which is rated over 10 A and up to and including 13 A.</p>		N/A

## IEC62368\_1B - ATTACHMENT

Clause	Requirement + Test	Result - Remark	Verdict
<b>ZC</b>	<b>ANNEX ZC, NATIONAL DEVIATIONS (EN)</b>		N/A
10.5.2	<p><b>Germany</b></p> <p>The following requirement applies: For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking.</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

Product: Charger IC

Type Designation: BQ24297

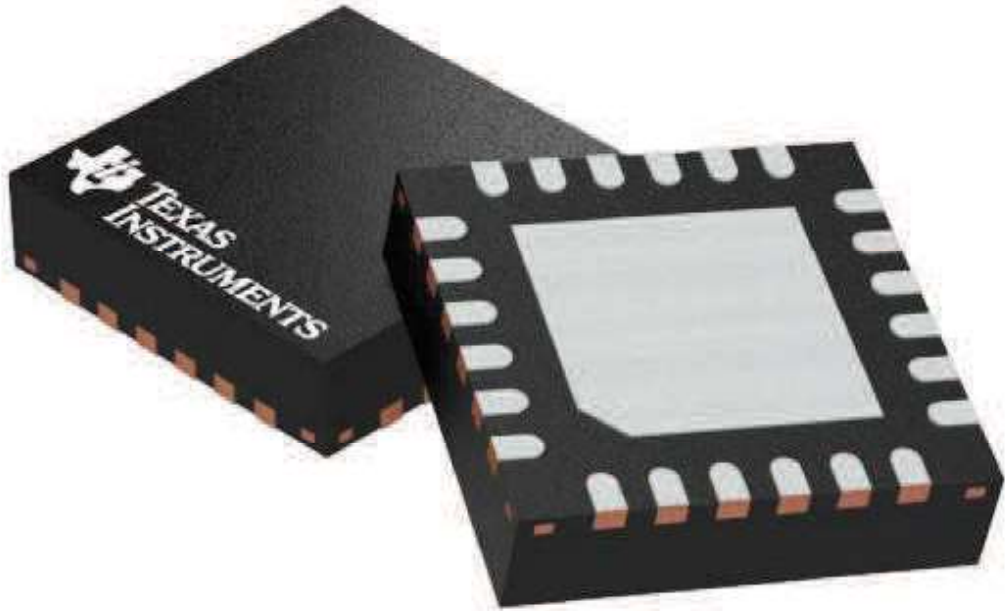


Figure 1 Overall view