

Safety Checklist Test Report

Sentrius Gateway

EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013

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INTRODUCTION

Purpose and Scope

The purpose of this document is to provide a product safety checklist for EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 as it applies to the Sentrius Gateway with Sentrius M2.COM LoRaWAN Adapter Card. This checklist is to be used to validate compliance with article 3.1a of the Radio and Telecommunications Terminal Equipment (R&TTE) Directive used for Declaration of Conformity (DOC) and CE marking.

Revision History

Table 1: Revision history

Revision	Date	Change Description	ECN
1.0	19 June 2017	Initial release	

REPORT SUMMARY

Standard	Title
EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011 +A2:2013	Information Technology Equipment – Safety – Part 1: General Requirements

Date of Issue: June 19, 2016

Manufacturer's Information

Name	Laird
Address	Saturn House, Mercury Park Wycombe Lane Wooburn Green Bucks HP10 0HH United Kingdom
Equipment	Sentrius Gateway with Sentrius RG186-M2 LoRaWAN Adapter Card
Model Name	RG186

Overview

The RG186 with RG186-M2 LoRaWAN adapter card is a LoRaWAN gateway that contains an 868 MHz LoRaWAN radio transceiver. The RG186 is designed to transmit and receive data signals between various electronic products, wired via the Ethernet connection or wirelessly via the RG186-M2 LoRaWAN wireless transceiver, 802.11a/b/g/n radio transceiver, or Bluetooth 4.0 radio transceiver.

Model Similarities and Differences

N/A

Ratings

Model	Electrical Ratings			Dimensions (L x W x H mm)	Equipment Mobility
	Volts	Amps _{MAX} (@ 12 V _{DC})	Hz		
RG186	9-15 V _{DC}	350 mA	N/A	276 x 125 x 31	Stationary

Operating Condition	Protection Class	Enclosure Protection Rating	Electrical Power Supply Electrical Ratings		
			Volts	Amps	Hz
Continuous	Class III	IP20	Input: 100-240 V _{AC} Output: 12 V _{DC}	Input: 600 mA Output: 2A	Input: 50-60 Hz Output: N/A

Conclusion

The purpose of this report is to demonstrate compliance with accepted standards for product safety and as proof of compliance to the EU's Low Voltage Directive. Subsequent pages give the details of this investigation.

This report is based on the following standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013. The wording of the requirements listed in this test report are provided for reference and informational purposes only and should not be considered a precise transcription of the standard as adopted by CENELEC. In case of doubt, reference should be made to the aforementioned standard.

TESTING SUMMARY

Test Performed (Name of Test and Test Clause)	Testing Location
4.5 Temperature	Laird W66 N220 Commerce Ct Cedarburg, WI. 53012

Supplementary Information

EVALUATION CHECKLIST

Test Item Particulars			
Equipment mobility	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input checked="" type="checkbox"/> stationary <input type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in		
Connection to the mains	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> type A <input type="checkbox"/> type B <input type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input checked="" type="checkbox"/> not directly connected to the mains		
Operating condition	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating/resting time:		
Access location	<input checked="" type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location		
Over voltage category (OVC)	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input checked="" type="checkbox"/> other: not directly connected to the mains		
Mains supply tolerance (%) or absolute mains supply values	N/A		
Tested for IT power systems	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
IT testing, phase-phase voltage (V)	N/A		
Class of equipment	<input type="checkbox"/> Class I <input type="checkbox"/> Class II <input checked="" type="checkbox"/> Class III <input type="checkbox"/> Not classified		
Considered current rating (A)	0.35		
Pollution degree (PD)	<input type="checkbox"/> PD 1	<input checked="" type="checkbox"/> PD 2	<input type="checkbox"/> PD 3
IP protection class	IP20		
Altitude during operation (m)			
Altitude during test (m)			
Mass of equipment (kg)	0.34		

Possible Test Case Verdicts	
Test case that 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(s) of performance of tests	6/15/2017

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1	GENERAL		P
1.5	Components		P
1.5.1	General		P
	Comply with IEC 60950-1 or relevant component standard	(See appended tables 1.5.1)	P
1.5.2	Evaluation and testing of components	Components used within their ratings	P
1.5.3	Thermal controls	Not used	N/A
1.5.4	Transformers	Not used	N/A
1.5.5	Interconnecting cables	SELV interconnecting cables are UL VW-1 or UL-1685 rated	P
1.5.6	Capacitors bridging insulation	Not used	N/A
1.5.7	Resistors bridging insulation	Not used	N/A
1.5.7.1	Resistors bridging functional, basic or supplementary insulation	Not used	N/A
1.5.7.2	Resistors bridging double or reinforced insulation between AC mains and other circuits	Not used	N/A
1.5.7.3	Resistors bridging double or reinforced insulation between AC mains and antenna or coaxial cable	Not used	N/A
1.5.8	Components in equipment for IT power systems	Not used	N/A
1.5.9	Surge suppressors	Not used	N/A
1.5.9.1	General	Not used	N/A
1.5.9.2	Protection of VDRs	Not used	N/A
1.5.9.3	Bridging of functional insulation by a VDR	Not used	N/A
1.5.9.4	Bridging of basic insulation by a VDR	Not used	N/A
1.5.9.5	Bridging of supplementary, double or reinforced insulation by a VDR	Not used	N/A
1.6	Power interface	Class III Equipment	
1.6.1	AC power distribution systems		N/A
1.6.2	Input current		N/A
1.6.3	Voltage limit of hand-held equipment		N/A
1.6.4	Neutral conductor	No mains connections	N/A
1.7	Marking and instructions		
1.7.1	Power rating and identification markings	No mains connection	N/A
1.7.1.1	Power rating marking	No mains connection	N/A
	Multiple mains supply connections		N/A
	Rated voltage(s) or voltage range(s) (V)		N/A
	Symbol for nature of supply, for DC only		N/A
	Rated frequency or rated frequency range (Hz)		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Rated current (mA or A)		N/A
1.7.1.2	Identification markings		P
	Manufacturer's name or trade-mark or identification mark	Logo and <i>Laird</i>	P
	Model identification or type reference	RG186	P
	Symbol for Class II equipment only	Class III	N/A
	Other markings and symbols	CE	P
1.7.2	Safety instructions and marking	No hazard likely	N/A
1.7.2.1	General		N/A
1.7.2.2	Disconnect devices		N/A
1.7.2.3	Overcurrent protective device		N/A
1.7.2.4	IT power distribution systems		N/A
1.7.2.5	Operator access with a tool		N/A
1.7.2.6	Ozone		N/A
1.7.3	Short duty cycles	No operation time restrictions	N/A
1.7.4	Supply voltage adjustment		N/A
	Methods and means of adjustment; reference to installation instructions		N/A
1.7.5	Power outlets on the equipment	No power outlets	N/A
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference)	None used	N/A
1.7.7	Wiring terminals	No terminals	N/A
1.7.7.1	Protective earthing and bonding terminals		N/A
1.7.7.2	Terminals for AC mains supply conductors		N/A
1.7.7.3	Terminals for DC mains supply conductors		N/A
1.7.8	Controls and indicators	For functional indication LEDs light when the equipment is operating	N/A
1.7.8.1	Identification, location and marking		N/A
1.7.8.2	Colours		N/A
1.7.8.3	Symbols according to IEC 60417		N/A
1.7.8.4	Markings using figures		N/A
1.7.9	Isolation of multiple power sources	No multiple power sources	N/A
1.7.10	Thermostats and other regulating devices	None used	N/A
1.7.11	Durability		P
1.7.12	Removable parts	No removable parts	N/A
1.7.13	Replaceable batteries	None used	N/A
	Language(s)		-
1.7.14	Equipment for restricted access locations	Not for restricted access location	N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2	PROTECTION FOR HAZARDS		P
2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas	Class III	N/A
2.1.1.1	Access to energized parts		N/A
	Test by inspection		N/A
	Test with test finger (Figure 2A)		N/A
	Test with test pin (Figure 2B)		N/A
	Test with test probe (Figure 2C)		N/A
2.1.1.2	Battery compartments		N/A
2.1.1.3	Access to ELV wiring		N/A
	Working voltage (V _{peak} or V _{rms}); minimum distance through insulation (mm)		-
2.1.1.4	Access to hazardous voltage circuit wiring		N/A
2.1.1.5	Energy hazards		N/A
2.1.1.6	Manual controls		N/A
2.1.1.7	Discharge of capacitors in equipment		N/A
	Measured voltage (V); time-constant (s)		-
2.1.1.8	Energy hazards - DC mains supply		N/A
	a) Capacitor connected to the DC mains supply		N/A
	b) Internal battery connected to the DC mains supply		N/A
2.1.1.9	Audio amplifiers		N/A
2.1.2	Protection in service access areas		N/A
2.1.3	Protection in restricted access locations		N/A
2.2	SELV circuits		P
2.2.1	General requirements	SELV limits are not exceeded under normal condition and after a single fault	P
2.2.2	Voltages under normal conditions (V)	Within SELV limits	P
2.2.3	Voltages under fault conditions (V)	Moreover a limit of 71 V peak or 120 V d.c. shall not be exceeded	P
2.2.4	Connection of SELV circuits to other circuits	SELV circuits are only connected to other SELV circuits	P
2.3	TNV circuits		N/A
2.3.1	Limits	No TNV circuits	N/A
	Type of TNV circuits		-
2.3.2	Separation from other circuits and from accessible parts		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.3.2.1	General requirements		N/A
2.3.2.2	Protection by basic insulation		N/A
2.3.2.3	Protection by earthing		N/A
2.3.2.4	Protection by other constructions		N/A
2.3.3	Separation from hazardous voltages		N/A
	Insulation employed		-
2.3.4	Connection of TNV circuits to other circuits		N/A
	Insulation employed		-
2.3.5	Test for operating voltages generated externally		N/A
2.4	Limited current circuits		N/A
2.4.1	General requirements	Not a limited current circuit	N/A
2.4.2	Limit values		N/A
	Frequency (Hz)		-
	Measured current (mA)		-
	Measured voltage (V)		-
	Measured circuit capacitance (nF or μ F)		-
2.4.3	Connection of limited current circuits to other circuits		N/A
2.5	Limited current circuits		N/A
	a) Inherently limited output	Not LPS	N/A
	b) Impedance limited output		N/A
	c) Regulating network limited output under normal operating and single fault condition		N/A
	d) Overcurrent protective device limited output		N/A
	Max. output voltage (V), max. output current (A), max. apparent power (VA)		-
	Current rating of overcurrent protective device (A)		-
	Use of integrated circuit (IC) current limiters		
2.6	Provisions for earthing and bonding		N/A
2.6.1	Protective earthing	No earthing used	N/A
2.6.2	Functional earthing		N/A
2.6.3	Protective earthing and protective bonding conductors		N/A
2.6.3.1	General		N/A
	Size of protective earthing conductors		N/A
2.6.3.2	Rated current (A), cross-sectional area (mm ²), AWG		-
	Size of protective bonding conductors		N/A
2.6.3.3	Rated current (A), cross-sectional area (mm ²), AWG		-

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Protective current rating (A), cross-sectional area (mm ²), AWG		-
2.6.3.4	Resistance of earthing conductors and their terminations; resistance (Y), voltage drop (V), test current (A), duration (min)		N/A
2.6.3.5	Colour of insulation		N/A
2.6.4	Terminals		N/A
2.6.4.1	General		N/A
2.6.4.2	Protective earthing and bonding terminals		N/A
	Rated current (A), type, nominal thread diameter (mm)		-
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N/A
2.6.5	Integrity of protective earthing		N/A
2.6.5.1	Interconnection of equipment		N/A
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		N/A
2.6.5.3	Disconnection of protective earth		N/A
2.6.5.4	Parts that can be removed by an operator		N/A
2.6.5.5	Parts removed during servicing		N/A
2.6.5.6	Corrosion resistance		N/A
2.6.5.7	Screws for protective bonding		N/A
2.6.5.8	Reliance on telecommunication network or cable distribution system		N/A
2.7	Overcurrent and earth fault protection in primary circuits		N/A
2.7.1	Basic requirements	No primary circuits	N/A
	Instructions when protection relies on building installation		N/A
2.7.2	Faults not simulated in 5.3.7		N/A
2.7.3	Short-circuit backup protection		N/A
2.7.4	Number and location of protective devices		N/A
2.7.5	Protection by several devices		N/A
2.7.6	Warning to service personnel		N/A
2.8	Safety interlocks		N/A
2.8.1	General principles	No safety interlocks	N/A
2.8.2	Protection requirements		N/A
2.8.3	Inadvertent reactivation		N/A
2.8.4	Fail-safe operation		N/A
	Protection against extreme hazard		N/A
2.8.5	Moving parts		N/A
2.8.6	Overriding		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.8.7	Switches, relays and their related circuits		N/A
2.8.7.1	Separation distances for contact gaps and their related circuits (mm)		N/A
2.8.7.2	Overload test		N/A
2.8.7.3	Endurance test		N/A
2.8.7.4	Electric strength test		N/A
2.8.8	Mechanical actuators		N/A
2.9	Electrical insulation		N/A
2.9.1	Properties of insulating materials	None used	N/A
2.9.2	Humidity conditioning		N/A
	Relative humidity (%), temperature (°C)		-
2.9.3	Grade of insulation		N/A
2.9.4	Separation from hazardous voltages		N/A
	Method(s) used		-
2.10	Clearances, creepage distances and distances through insulation		N/A
2.10.1	General	Not required	N/A
2.10.1.1	Frequency		N/A
2.10.1.2	Pollution degrees		P
2.10.1.3	Reduced values for functional insulation		P
2.10.1.4	Intervening unconnected conductive parts		N/A
2.10.1.5	Insulation with varying dimensions		N/A
2.10.1.6	Special separation requirements		N/A
2.10.1.7	Insulation in circuits generating starting pulses		N/A
2.10.2	Determination of working voltage		P
2.10.2.1	General		P
2.10.2.2	RMS working voltage		N/A
2.10.2.3	Peak working voltage		N/A
2.10.3	Clearances		N/A
2.10.3.1	General		N/A
2.10.3.2	Mains transient voltages	No mains connections	N/A
	a) AC mains supply		N/A
	b) Earthed DC mains supplies		N/A
	c) Unearthed DC mains supplies		N/A
	d) Battery operation		N/A
2.10.3.3	Clearances in primary circuits		N/A
2.10.3.4	Clearances in secondary circuits		N/A
2.10.3.5	Clearances in circuits having starting pulses		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.10.3.6	Transients from AC mains supply		N/A
2.10.3.7	Transients from DC mains supply		N/A
2.10.3.8	Transients from telecommunication networks and cable distribution systems		N/A
2.10.3.9	Measurement of transient voltage levels		N/A
	a) Transients from a mains supply		N/A
	For an AC mains supply		N/A
	For a DC mains supply		N/A
	b) Transients from a telecommunication network		N/A
2.10.4	Creepage distances	Not required	N/A
2.10.4.1	General		N/A
2.10.4.2	Material group and comparative tracking index		N/A
	CTI tests		-
2.10.4.3	Minimum creepage distances		N/A
2.10.5	Solid insulation		N/A
2.10.5.1	General		N/A
2.10.5.2	Distances through insulation		N/A
2.10.5.3	Insulating compound as solid insulation		N/A
2.10.5.4	Semiconductor devices		N/A
2.10.5.5.	Cemented joints		N/A
2.10.5.6	Thin sheet material - General		N/A
2.10.5.7	Separable thin sheet material		N/A
	Number of layers (pcs)		-
2.10.5.8	Non-separable thin sheet material		N/A
2.10.5.9	Thin sheet material - standard test procedure		N/A
	Electric strength test		-
2.10.5.10	Thin sheet material - alternative test procedure		N/A
	Electric strength test		-
2.10.5.11	Insulation in wound components		N/A
2.10.5.12	Wire in wound components		N/A
	Working voltage		N/A
	a) Basic insulation not under stress		N/A
	b) Basic, supplementary, reinforced insulation		N/A
	c) Compliance with Annex U		N/A
	Two wires in contact inside wound component; angle between 45° and 90°		N/A
2.10.5.13	Wire with solvent-based enamel in wound components		N/A
	Electric strength test		-

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Routine test		N/A
2.10.5.14	Additional insulation in wound components		N/A
	Working voltage		N/A
	-Basic insulation not under stress		N/A
	-Supplementary, reinforced insulation		N/A
2.10.6	Construction of printed board		P
2.10.6.1	Uncoated printed boards	Certified PCB used	P
2.10.6.2	Coated printed boards		N/A
2.10.6.3	Insulation between conductors on the same inner surface of a printed board		N/A
2.10.6.4	Insulation between conductors on different layers of a printed board		N/A
	Distance through insulation		N/A
	Number of insulation layers (pcs)		N/A
2.10.7	Component external terminations		N/A
2.10.8	Tests on coated printed boards and coated components		N/A
2.10.8.1	Sample preparation and preliminary inspection		N/A
2.10.8.2	Thermal conditioning		N/A
2.10.8.3	Electric strength test		N/A
2.10.8.4	Abrasion resistance test		N/A
2.10.9	Thermal cycling		N/A
2.10.10	Test for Pollution Degree 1 environment and insulating compound	Pollution degree 1 not applied	N/A
2.10.11	Tests for semiconductor devices and cemented joints	No such parts	N/A
2.10.12	Enclosed and sealed parts	No such parts	N/A
3	WIRING, CONNECTIONS AND SUPPLY		P
3.1	General	SELV and no hazards exist	P
3.1.1	Current rating and overcurrent protection		N/A
3.1.2	Protection against mechanical damage		N/A
3.1.3	Securing of internal wiring		N/A
3.1.4	Insulation of conductors		N/A
3.1.5	Beads and ceramic insulators		N/A
3.1.6	Screws for electrical contact pressure		N/A
3.1.7	Insulating materials in electrical connections		N/A
3.1.8	Self-tapping and spaced thread screws		N/A
3.1.9	Termination of conductors		N/A
	10 N pull test		N/A
3.1.10	Sleeving on wiring		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
3.2	Connection to a mains supply	Class III	N/A
3.2.1	Means of connection		N/A
3.2.1.1	Connection to an AC mains supply		N/A
3.2.1.2	Connection to a DC mains supply		N/A
3.2.2	Multiple supply connections		N/A
3.2.3	Permanently connected equipment		N/A
	Number of conductors, diameter of cable and conduits (mm)		-
3.2.5	Power supply cords		N/A
3.2.5.1	AC power supply cords		N/A
	Type		-
	Rated current (A), cross-sectional area (mm ²), AWG		-
3.2.5.2	DC power supply cords		N/A
3.2.6	Cord anchorages and strain relief		N/A
	Mass of equipment (kg), pull (N)		-
	Longitudinal displacement (mm)		-
3.2.7	Protection against mechanical damage		N/A
3.2.8	Cord guards		N/A
	Diameter or minor dimension D (mm); test mass (g)		-
	Radius of curvature of cord (mm)		
3.2.9	Supply wiring space		N/A
3.3	Wiring terminals for connection of external conductors	Class III	N/A
3.3.1	Wiring terminals		N/A
3.3.2	Connection of non-detachable power supply cords		N/A
3.3.3	Screw terminals		N/A
3.3.4	Conductor sizes to be connected		N/A
	Rated current (A), cord/cable type, cross-sectional area (mm ²)		-
3.3.5	Wiring terminal sizes		N/A
	Rated current (A), type, nominal thread diameter (mm)		-
3.3.6	Wiring terminal design		N/A
3.3.7	Grouping of wiring terminals		N/A
3.3.8	Stranded wire		N/A
3.4	Disconnection from the mains supply	Class III	N/A
3.4.1	General requirement		N/A
3.4.2	Disconnect devices		N/A
3.4.3	Permanently connected equipment		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
3.4.4	Parts which remain energized		N/A
3.4.5	Switches in flexible cords		N/A
3.4.6	Number of poles - single-phase and DC equipment		N/A
3.4.7	Number of poles - three-phase equipment		N/A
3.4.8	Switches as disconnect devices		N/A
3.4.9	Plugs as disconnect devices		N/A
3.4.10	Interconnected equipment		N/A
3.4.11	Multiple power sources		N/A
3.5	Interconnection of equipment		P
3.5.1	General requirements	Considered	P
3.5.2	Types of interconnection circuits	SELV circuits	P
3.5.3	ELV circuits as interconnection circuits	No ELV interconnection	N/A
3.5.4	Data ports for additional equipment		P
4	PHYSICAL REQUIREMENTS		N/A
4.1	Stability		N/A
	Angle of 10°		N/A
	Test force (N)		N/A
4.2	Mechanical strength		N/A
4.2.1	General	No hazards exist	N/A
	Rack-mounted equipment.		N/A
4.2.2	Steady force test, 10 N		N/A
4.2.3	Steady force test, 30 N		N/A
4.2.4	Steady force test, 250 N		N/A
4.2.5	Impact test		N/A
	Fall test		N/A
	Swing test		N/A
4.2.6	Drop test; height (mm)		N/A
4.2.7	Stress relief test		N/A
4.2.8	Cathode ray tubes		N/A
	Picture tube separately certified		N/A
4.2.9	High pressure lamps		N/A
4.2.10	Wall or ceiling mounted equipment; force (N)		N/A
4.2.11	Rotating solid media		N/A
	Test to cover on the door		N/A
4.3	Design and construction		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.3.1	Edges and corners	No sharp edges	P
4.3.2	Handles and manual controls; force (N)	No handles or manual controls	N/A
4.3.3	Adjustable controls	No adjustable controls	N/A
4.3.4	Securing of parts		P
4.3.5	Connection by plugs and sockets		N/A
4.3.6	Direct plug-in equipment	Not direct plug in	N/A
	Torque		-
	Compliance with the relevant mains plug standard		-
4.3.7	Heating elements in earthed equipment	No heating elements	N/A
4.3.8	Batteries	No batteries used	N/A
	- Overcharging of a rechargeable battery		N/A
	- Unintentional charging of a non-rechargeable battery		N/A
	- Reverse charging of a rechargeable battery		N/A
	- Excessive discharging rate for any battery		N/A
4.3.9	Oil and grease	Insulation not exposed to oil or grease	N/A
4.3.10	Dust, powders, liquids and gases	No exposure to dust, powders, liquids, or gases	N/A
4.3.11	Containers for liquids or gases	No liquids or gases used	N/A
4.3.12	Flammable liquids	Not used	N/A
	Quantity of liquid (l)		N/A
	Flash point (oC)		N/A
4.3.13	Radiation		P
4.3.13.1	General		P
4.3.13.2	Ionizing radiation	None	N/A
	Measured radiation (pA/kg)		N/A
	Measured high-voltage (kV)		N/A
	Measured focus voltage (kV)		N/A
	CRT markings		N/A
4.3.13.3	Effect of ultraviolet (UV) radiation on materials	None	N/A
	Part, property, retention after test, flammability classification		N/A
4.3.13.4	Human exposure to ultraviolet (UV) radiation	None	N/A
4.3.13.5	Lasers (including laser diodes) and LEDs		P
4.3.13.5.1	Lasers (including laser diodes)		N/A
	Laser class		N/A
4.3.13.5.2	Light emitting diodes (LEDs)		P
4.3.13.6	Other types		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.4	Protection against hazardous moving parts		N/A
4.4.1	General	No moving parts	N/A
4.4.2	Protection in operator access areas		N/A
	Household and home/office document/media shredders		N/A
4.4.3	Protection in restricted access locations		N/A
4.4.4	Protection in service access areas		N/A
4.4.5	Protection against moving fan blades		N/A
4.4.5.1	General		N/A
	Not considered to cause pain or injury. a)		N/A
	Is considered to cause pain, not injury. b)		N/A
	Considered to cause injury. c)		N/A
4.4.5.2	Protection for users		N/A
	Use of symbol or warning		N/A
4.4.5.3	Protection for service persons		N/A
	Use of symbol or warning		N/A
4.5	Thermal requirements		P
4.5.1	General		P
4.5.2	Temperature tests	Materials and components adequate selected	P
	Normal load condition per Annex L	RF transmit until steady conditions established.	-
4.5.3	Temperature limits for materials	(see appended table 4.5)	P
4.5.4	Touch temperature limits	(see appended table 4.5)	N/A
4.5.5	Resistance to abnormal heat	(see appended table 4.5.5)	N/A
4.6	Openings in enclosures		P
4.6.1	Top and side openings	No hazards exist	N/A
	Dimensions (mm)		-
4.6.2	Bottoms of fire enclosures	No hazards exist	N/A
	Construction of the bottom, dimensions (mm)		
4.6.3	Doors or covers in fire enclosures		N/A
4.6.4	Openings in transportable equipment		N/A
4.6.4.1	Constructional design measures		N/A
	Dimensions (mm)		-
4.6.4.2	Evaluation measures for larger openings		N/A
4.6.4.3	Use of metallized parts		N/A
4.6.5	Adhesives for constructional purposes		N/A
	Conditioning temperature (oC), time (weeks)		-

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.7	Resistance to fire		P
4.7.1	Reducing the risk of ignition and spread of flame	Appropriate use of components and suitable construction. No excessive temperature, no easily burning materials employed.	P
	Method 1, selection and application of components wiring and materials		P
	Method 2, application of all of simulated fault condition tests		N/A
4.7.2	Conditions for a fire enclosure	No fire enclosure required	N/A
4.7.2.1	Parts requiring a fire enclosure		N/A
4.7.2.2	Parts not requiring a fire enclosure		P
4.7.3	Materials		P
4.7.3.1	General		N/A
4.7.3.2	Materials for fire enclosures		N/A
4.7.3.3	Materials for components and other parts outside fire enclosures		N/A
4.7.3.4	Materials for components and other parts inside fire enclosures		N/A
4.7.3.5	Materials for air filter assemblies		N/A
4.7.3.6	Materials used in high-voltage components		N/A
5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		N/A
5.1	Touch current of equipment under test (EUT)	N/A	5.1
5.1.1	General		Class III
5.1.2	Configuration of equipment under test (EUT)		N/A
5.1.2.1	Single connection to an AC mains supply		N/A
5.1.2.2	Redundant multiple connections to an AC mains supply		N/A
5.1.2.3	Simultaneous multiple connections to an AC mains supply		N/A
5.1.3	Test circuit		N/A
5.1.4	Application of measuring instrument		N/A
5.1.5	Test procedure		N/A
5.1.6	Test measurements		N/A
	Supply voltage (V)		-
	Measured touch current (mA)		-
	Max. allowed touch current (mA)		-
	Measured protective conductor current (mA)		-
	Max. allowed protective conductor current (mA)		-
5.1.7	Equipment with touch current exceeding 3,5 mA		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.1.7.1	General		N/A
5.1.7.2	Simultaneous multiple connections to the supply		N/A
5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks		N/A
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system		N/A
	Supply voltage (V)		-
	Measured touch current (mA)		-
	Max. allowed touch current (mA)		-
5.1.8.2	Summation of touch currents from telecommunication networks		N/A
	a) EUT with earthed telecommunication ports		N/A
	b) EUT whose telecommunication ports have no reference to protective earth		N/A
5.2	Electrical strength		N/A
5.2.1	General	None used	N/A
5.2.2	Test procedure		N/A
5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation	No hazards exist	N/A
5.3.2	Motors	None used	N/A
5.3.3	Transformers	None used	N/A
5.3.4	Functional insulation	None used	N/A
5.3.5	Electromechanical components	None used	N/A
5.3.6	Audio amplifiers in ITE	None used	N/A
5.3.7	Simulation of faults	No hazards exist	N/A
5.3.8	Unattended equipment	None used	N/A
5.3.9	Compliance criteria for abnormal operating and fault conditions	No hazards exist	N/A
5.3.9.1	During the tests		N/A
5.3.9.2	After the tests		N/A
6	CONNECTION TO TELECOMMUNICATIONS NETWORKS		N/A
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N/A
6.1.1	Protection from hazardous voltages		N/A
6.1.2	Separation of the telecommunication network from earth		N/A
6.1.2.1	Requirements		N/A
	Supply voltage (V)		-

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Current in the test circuit (mA)		-
6.1.2.2	Exclusions		N/A
6.2	Protection of equipment users from overvoltages on telecommunication networks		N/A
6.2.1	Separation requirements		N/A
6.2.2	Electric strength test procedure		N/A
6.2.2.1	Impulse test		N/A
6.2.2.2	Steady-state test		N/A
6.2.2.3	Compliance criteria		N/A
6.3	Protection the telecommunication wiring system from overheating		N/A
	Max. output current (A)		-
	Current limiting method		-
7	CONNECTION TO CABLE DISTRIBUTION SYSTEMS		N/A
7.1	General		N/A
7.2	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N/A
7.3	Protection of equipment users from overvoltages on the cable distribution system		N/A
7.4	Insulation between primary circuits and cable distribution systems		N/A
7.4.1	General		N/A
7.4.2	Voltage surge test		N/A
7.4.3	Impulse test		N/A
A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		N/A
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)	Less than 18kg	N/A
A.1.1	Samples		-
	Wall thickness (mm)		-
A.1.2	Conditioning of samples; temperature (oC)		N/A
A.1.3	Mounting of samples		N/A
A.1.4	Test flame (see IEC 60695-11-3)		N/A
	Flame A, B, C or D		-
A.1.5	Test procedure		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
A.1.6	Compliance criteria		N/A
	Sample 1 burning time (s)		-
	Sample 2 burning time (s)		
	Sample 3 burning time (s)		-
A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		N/A
A.2.1	Samples, material		-
	Wall thickness (mm)		-
A.2.2	Conditioning of samples; temperature (°C)		N/A
A.2.3	Mounting of samples		N/A
A.2.4	Test flame (see IEC 60695-11-4)		N/A
	Flame A, B or C		-
A.2.5	Test procedure		N/A
A.2.6	Compliance criteria		N/A
	Sample 1 burning time (s)		-
	Sample 2 burning time (s)		-
	Sample 3 burning time (s)		-
A.2.7	Alternative test acc. to IEC 60695-11-5, cl. 5 and 9		N/A
	Sample 1 burning time (s)		-
	Sample 2 burning time (s)		-
	Sample 3 burning time (s)		-
A.3	Hot flaming oil test (see 4.6.2)		N/A
A.3.1	Mounting of samples		N/A
A.3.2	Test procedure		N/A
A.3.3	Compliance criterion		N/A
B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		N/A
B.1	General requirements	No motors used	N/A
	Position		-
	Manufacturer		-
	Type		-
	Rated values		-
B.2	Test conditions		N/A
B.3	Maximum temperatures		N/A
B.4	Running overload test		N/A
B.5	Locked-rotor overload test		N/A
	Test duration (days)		-

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Electric strength test; test voltage (V)		-
B.6	Running overload test for DC motors in secondary circuits		N/A
B.6.1	General		N/A
B.6.2	Test procedure		N/A
B.6.3	Alternative test procedure		N/A
B.6.4	Electric strength test; test voltage (V)		N/A
B.7	Locked-rotor overload test for DC motors in secondary circuits		N/A
B.7.1	General		N/A
B.7.2	Test procedure		N/A
B.7.3	Alternative test procedure		N/A
B.7.4	Electric strength test; test voltage (V)		N/A
B.8	Test for motors with capacitors		N/A
B.9	Test for three-phase motors		N/A
B.10	Test for series motors		N/A
	Operating voltage (V)		-
C	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		N/A
	Position	No transformers used	-
	Manufacturer		-
	Type		-
	Rated values		-
	Method of protection		-
C.1	Overload test		N/A
C.2	Insulation		N/A
	Protection from displacement of windings		N/A
D	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)		N/A
D.1	Measuring instrument		N/A
D.2	Alternative measuring instrument		N/A
E	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13)		N/A
F	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10 and Annex G)		N/A
G	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N/A
G.1	Clearances		N/A
G.1.1	General		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.1.2	Summary of the procedure for determining minimum clearances		N/A
G.2	Determination of mains transient voltage (V)		N/A
G.2.1	AC mains supply		N/A
G.2.2	Earthed DC mains supplies		N/A
G.2.3	Unearthed DC mains supplies		N/A
G.2.4	Battery operation		N/A
G.3	Determination of telecommunication network transient voltage (V)		N/A
G.4	Determination of required withstand voltage (V)		N/A
G.4.1	Mains transients and internal repetitive peaks		N/A
G.4.2	Transients from telecommunication networks		N/A
G.4.3	Combination of transients		N/A
G.4.4	Transients from cable distribution systems		N/A
G.5	Measurement of transient voltages (V)		N/A
	a) Transients from a mains supply		N/A
	For an AC mains supply		N/A
	For a DC mains supply		N/A
	b) Transients from a telecommunication network		N/A
G.6	Determination of minimum clearances		N/A
H	ANNEX H, IONIZING RADIATION (see 4.3.13)		N/A
J	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		N/A
	Metal(s) used	None used	-
K	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.8)		N/A
K.1	Making and breaking capacity	None used	N/A
K.2	Thermostat reliability; operating voltage (V)		N/A
K.3	Thermostat endurance test; operating voltage (V)		N/A
K.4	Temperature limiter endurance; operating voltage (V)		N/A
K.5	Thermal cut-out reliability		N/A
K.6	Stability of operation		N/A
L	ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.2)		N/A
L.1	Typewriters	Not business equipment	N/A
L.2	Adding machines and cash registers		N/A
L.3	Erasers		N/A
L.4	Pencil sharpeners		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
L.5	Duplicators and copy machines		N/A
L.6	Motor-operated files		N/A
L.7	Other business equipment		N/A
M	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		N/A
M.1	Introduction	No ringing signals	N/A
M.2	Method A		N/A
M.3	Method B		N/A
M.3.1	Ringing signal		N/A
M.3.1.1	Frequency (Hz)		-
M.3.1.2	Voltage (V)		-
M.3.1.3	Cadence; time (s), voltage (V)		-
M.3.1.4	Single fault current (mA)		-
M.3.2	Tripping device and monitoring voltage		N/A
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N/A
M.3.2.2	Tripping device		N/A
M.3.2.3	Monitoring voltage (V)		N/A
N	ANNEX N, IMPULSE TEST GENERATORS (see 1.5.7.2, 1.5.7.3, 2.10.3.9, 6.2.2.1, 7.3.2, 7.4.3, and Clause G.5)		N/A
N.1	ITU-T impulse test generators		N/A
N.2	IEC 60065 impulse test generators		N/A
P	ANNEX P, NORMATIVE REFERENCES		-
Q	ANNEX Q, VOLTAGE DEPENDENT RESISTORS (VDRS) (see 1.5.9.1)		N/A
	a) Preferred climatic categories	None used	N/A
	b) Maximum continuous voltage		N/A
	c) Pulse current		N/A
R	ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES		N/A
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6.2)	No such board	N/A
R.2	Reduced clearances (see 2.10.3)		N/A
S	ANNEX S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)		N/A
S.1	Test equipment	No telecommunication connections	N/A
S.2	Test procedure		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
S.3	Examples of waveforms during impulse testing		N/A
T	ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)		N/A
		Not rated for ingress protection	-
U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		N/A
		No windings	-
V	ANNEX V, AC POWER DISTRIBUTION SYSTEMES (see 1.6.1)		N/A
V.1	Introduction	No power distribution	N/A
V.2	TN power distribution systems		N/A
W	ANNEX W, SUMMATION OF TOUCH CURRENTS		N/A
W.1	Touch current from electronic circuits	No AC connection	N/A
W.1.1	Floating circuits		N/A
W.1.2	Earthed circuits		N/A
W.2	Interconnection of several equipments		N/A
W.2.1	Isolation		N/A
W.2.2	Common return, isolated from earth		N/A
W.2.3	Common return, connected to protective earth		N/A
X	ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS (see clause C.1)		N/A
X.1	Determination of maximum input current	No transformers	N/A
X.2	Overload test procedure		N/A
Y	ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3)		N/A
Y.1	Test apparatus	No UV exposure	N/A
Y.2	Mounting of test samples		N/A
Y.3	Carbon-arc light-exposure apparatus		N/A
Y.4	Xenon-arc light exposure apparatus		N/A
Z	ANNEX Z, OVERVOLTAGE CATEGORIES (see 2.10.3.2 and clause G.2)		N/A
AA	ANNEX AA, MANDREL TEST (see 2.10.5.8)		N/A
BB	ANNEX B, CHANGES IN THE SECOND EDITION		-
CC	ANNEX CC, EVALUATION OF INTEGRATED CIRCUIT (IC) CURRENT LIMITERS		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
CC.1	General	Not used	N/A
CC.2	Test program 1		N/A
CC.3	Test program 2		N/A
DD	ANNEX DD, REQUIREMENTS FOR THE MOUNTING MEANS OF RACK-MOUNTED EQUIPMENT		N/A
DD.1	General	Not rack mounted	N/A
DD.2	Mechanical strength test, variable N		N/A
DD.3	Mechanical strength test, 250N, including end stops		N/A
DD.4	Compliance		N/A
EE	ANNEX EE, HOUSEHOLD AND HOME/OFFICE DOCUMENT/MEDIA SHREDDERS		N/A
EE.1	General	Not a shredder	N/A
EE.2	Markings and instructions		N/A
	Use of markings or symbols		N/A
	Information of user instructions, maintenance and/or servicing instructions		N/A
EE.3	Inadvertent reactivation test		N/A
EE.4	Disconnection of power to hazardous moving parts		N/A
	Use of markings or symbols		N/A
EE.5	Protection against hazardous moving parts		N/A
	Test with test finger (Figure 2A)		N/A
	Test with wedge probe (Figure EE1 and EE2)		N/A

IEC 60950-1					
Clause	Requirement + Test			Result - Remark	Verdict
1.5.1	Table: List of critical components				P
Object/Part No	Manufacturer/ Trademark	Type/Model	Technical Data	Standard (Edition/Year)	Mark(s) of Conformity ¹
PCB (Note 1)	Various	Various	UL 94V-0	UL	
Enclosure (Note 2)	Polylac	PA-764B	UL 94V-0	UL	
Power Supply	Mean Well	GST25E			CE, TUV, UL
USB Cable	Monoprice	5458	UL VW-1	UL	
Ethernet Cable	Monoprice	2139	UL-1685	UL E305668	

1. An asterisk indicates a mark which assures the agreed level of surveillance

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.5.1	Table: List of critical components		P

Supplementary information

Note 1: The PCB fab notes state the following:

MINIMUM FLAMMABILITY RATING UL 94V-0

- UL DATE/LOGO AND VENDOR INFORMATION SHALL BE IN SILKSCREEN NOMENCLATURE WHERE SPACE PERMITS

Note 2: UL File Number E56070

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Clause	Requirement + Test	Result - Remark	Verdict
1.5.1	Table: Opto Electronic Devices		N/A

Manufacturer

Type

Separately tested

Bridging insulation

External creepage distance

Internal creepage distance

Distance through insulation

Tested under the following conditions

Input

Output

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6.2	Table: Electrical data (in normal conditions)		N/A

U (VDC)	I (mA)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Conditions/Status

Supplementary information

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.1.1.5 c) 1)	Table: Maximum V, A, VA test		N/A

Voltage (rated) (V)	Current (rated) (A)	Voltage (max) (V)	Current (max) (A)	VA (max) (VA)

Supplementary information

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.1.1.5 c) 1)	Table: Stored energy		N/A
Capacitance C (μF)	Voltage U (V)	Energy E (J)	
Supplementary information			

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.2	Table: Evaluation of voltage limiting components in SELV circuits		N/A
Component (measured between)	max voltage (V) (normal operation)		Voltage Limiting Components
	V peak	VDC	
Fault test performed on voltage limiting components	Voltage measured (V) in SELV circuits (V peak or VDC)		
Supplementary information			

IEC 60950-1				
Clause	Requirement + Test		Result - Remark	Verdict
2.5	Table: Limited power sources			N/A
Circuit output tested:				
Measured Uoc (V) with all load circuits disconnected:				
	ISC (A)		VA	
	Meas.	Limit	Meas.	Limit
Normal condition				
Single fault: Sc battery connectors				
Single fault: Sc charging management circuit				
Supplementary information				
Sc=Short circuit, Oc=Open circuit				

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.10.2	TABLE: Working voltage measurement		N/A
Location	RMS voltage (V)	Peak voltage (V)	Comments
Supplementary information			

IEC 60950-1						
Clause	Requirement + Test	Result - Remark				Verdict
2.10.3 and 2.10.4	Table: Clearance and creepage distance measurements					N/A
Clearance (cl) and creepage Distance (cr) at/of/between:	U peak (V)	U rms (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Supplementary information						

IEC 60950-1					
Clause	Requirement + Test	Result - Remark			Verdict
2.10.5	Table: Distance through insulation measurements				N/A
Distance through insulation (DTI) at/of:	U peak (V)	U rms (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)
Supplementary information					

IEC 60950-1									
Clause	Requirement + Test					Result - Remark		Verdict	
4.3.8	Table: Batteries							N/A	
The tests of 4.3.8 are applicable only when appropriate battery data is not available								N/A	
Is it possible to install the battery in a reverse polarity position?								N/A	
	Non-rechargeable batteries			Rechargeable batteries					
	Discharging		Unintentional Charging	Charging		Discharging		Reverse Charging	
	Meas. Current	Manuf. Specs.		Meas. Current	Manuf. Specs.	Meas. Current	Manuf. Specs.	Meas. Current	Manuf. Specs.
Max Current During Normal Condition									
Max Current During Fault Condition									
Test results:								Verdict	
Chemical leaks								N/A	
Explosion of the battery								N/A	
Emission of flame or expulsion of molten metal								N/A	
Electric strength tests of equipment after completion of tests								N/A	
Supplementary information									

IEC 60950-1			
Clause	Requirement + Test		Verdict
4.3.8	Table: Batteries		N/A
Battery Category			
Manufacturer			
Type/Model			
Voltage			
Capacity			
Tested and Certified by (incl. Ref. No.)			
Circuit protection diagram		See below	

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.3.8	Table: Batteries		N/A
MARKINGS AND INSTRUCTIONS (1.7.12, 1.7.15)			N/A
Location of replaceable battery			
Language(s)			
Close to the battery			
In the servicing instructions			
In the operating instructions			

IEC 60950-1							
Clause	Requirement + Test			Result - Remark			Verdict
4.5	Table: Thermal requirements						P
	Supply voltage (V)	12.0					
	Ambient Tmin (oC)	22					
	Ambient Tmax (oC)	24					
Maximum measured temperature T of part/at:		T (oC)					Allowed Tmax (oC)
Most hot spot on the enclosure (1)(2)		36.5					

Supplementary information

Testing done with Fluke 52 K/J Thermometer on 6/15/2017.

LoRa Settings – Continuous Transmit Mode. LoRa Modulation, 28dBm, 869.525 MHz

WiFi Settings – Channel 11, 2.412GHz, 30 dBm, 6Mb Data Rate

Temperature T of winding	T1 (oC)	R1 (Ω)	T2 (oC)	R2 (Ω)	T (oC)	Allowed Tmax (oC)	Insulation class

Supplementary information

IEC 60950-1			
Clause	Requirement + Test		Verdict
4.5.5	Table: Ball pressure test of thermoplastic parts		N/A
	Allowed impression diameter (mm)	≤ 2 mm	-
Part		Test temperature (°C)	Impression diameter (mm)
Supplementary information			

IEC 60950-1						
Clause	Requirement + Test			Result - Remark		Verdict
4.7	TABLE: Resistance to fire					N/A
Part		Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence
Supplementary information						
by appropriate use of (flame retardant) material						
by appropriate use of components						
by limiting the maximum temperature of components						
by limiting the power available in a circuit						
by use of metal, ceramic material or glass						
by use of a fire enclosure						
by simulation of fault tests in 5.3.6						
Supplementary information						

IEC 60950-1			
Clause	Requirement + Test		Verdict
5.1	TABLE: Touch current measurement		N/A
Measured between	Measured (mA)	Limit (mA)	Comments/conditions

Supplementary information

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.2	TABLE: Electrical strength tests, impulse tests and voltage surge tests		N/A
Test voltage applied between		Voltage shape (AC, DC, impulse, surge)	Test voltage (V)
			Breakdown Yes/No
Functional:			
Basic/supplementary:			
Reinforced:			

Supplementary information

IEC 60950-1						
Clause	Requirement + Test				Result - Remark	Verdict
5.3	TABLE: Fault condition tests					N/A
	Ambient temperature (oC)					-
	Power source for EUT: Manufacturer, model/type, output rating					-
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation

Supplementary information

IEC 60950-1							
Clause	Requirement + Test				Result - Remark		Verdict
C.2	TABLE: Transformers						N/A
Loc.	Tested insulation	Working voltage peak/V (2.10.2)	Working voltage rms/V (2.10.2)	Required electric strength (5.2)	Required clearance /mm (2.10.3)	Required creepage distance /mm (2.10.4)	Required distance thr. insul. (2.10.5)
Loc.	Tested insulation			Test voltage/V	Measured clearance /mm	Measured creepage dist./mm	Measured distance thr. insul./mm; Number of layers
Supplementary information							

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
C.2	TABLE: Transformers		N/A

Transformer

List of test equipment used				
Clause	Measurement/testing	Testing/measuring equipment/material used	Range used	Calibration date
4.5	Temperature	Fluke 52 K/J Thermometer	°C	12/21/2016

List of test equipment used				
Clause	Measurement/testing	Testing/measuring equipment/material used	Range used	Calibration date
4.5	Voltage supply	HP 6201B DC Power Supply	V	ICO

NCR = No calibration required; ICO = Initial calibration only

ATTACHMENT TO TEST REPORT IEC 60950-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
Information technology equipment – Safety –
Part 1: General requirements

Differences according to: EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013

Attachment Form No.: EU_GD_IEC60950_1F
Attachment Originator: SGS Fimko Ltd
Master Attachment: Date 2014-02

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EN 60950-1:A11:2009/A1:2010/A12:2011/A2:2013 - CENELEC COMMON MODIFICATIONS

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)							
Clause	Requirements + Test				Result – Remark		Verdict
	Clauses, subclauses, tables and figures which are additional to those in IEC60950-1 and it’s amendments are prefixed “Z”						-
Contents (A2:2013)	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 ZD (informative)		IEC and CENELEC code designations for flexible cords				
General	Delete all the “country” notes in the reference document (IEC 60950-1:2005) according to the following list:						P
	1.4.8	Note 2	1.5.1	Note 2 & 3	1.5.7.1	Note	
	1.5.8	Note 2	1.5.9.4	Note	1.7.2.1	Note 4, 5 & 6	
	2.2.3	Note	2.2.4	Note	2.3.2	Note	
	2.3.2.1	Note 2	2.3.4	Note 2	2.6.3.3	Note 2 & 3	
	2.7.1	Note	2.10.3.2	Note 2	2.10.5.13	Note 3	
	3.2.1.1	Note	3.2.4	Note 3	2.5.1	Note 2	
	4.3.6	Note 1 & 2	4.7	Note 4	4.7.2.2	Note	
	4.7.3.1	Note 2	5.1.7.1	Note 3 & 4	5.3.7	Note 1	
	6	Note 2 & 5	6.1.2.1	Note 2	6.1.2.2	Note	
	6.2.2	Note 6	2.2.1	Note 2	6.2.2.2	Note	
	7.1	Note 3	7.2	Note	7.3	Note 1 & 2	
	G.2.1	Note 2	Annex H	Note 2			
General (A1:2010)	Delete all the “country” notes in the reference document (IEC 60950-1:2005/A1:2010) according to the following list:						P
	1.5.7.1	Note		6.1.2.1	Note 2		
	6.2.2.1	Note 2		EE.3	Note		

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)				
Clause	Requirements + Test			Result – Remark
General (A2:2013)	Delete all the “country” notes in the reference document (IEC 60950-1:2005/A2:2013) according to the following list.			
	2.7.1	Note *	2.10.3.1	Note 2
	6.2.2	Note		
	* Note of secretary: Text of Common Modification remains unchanged.			
1.1.1 (A1:2010)	Replace the text of NOTE 3 by the following. NOTE 3 The requirements of EN 60065 may also be used to meet safety requirements for multimedia equipment. See IEC Guide 112, Guide on the safety of multimedia equipment. For television sets EN 60065 applies.			
1.3.Z1	Add the following subclause: 1.3.Z1 Exposure to excessive sound pressure The apparatus shall be so designed and constructed as to present no danger when used for its intended purpose, either in normal operating conditions or under fault conditions, particularly providing protection against exposure to excessive sound pressures from headphones or earphones. NOTE Z1 A new method of measurement is described in EN 50332-1, Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 1: General method for “one package equipment”, and in EN 50332-2, Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 2: Guidelines to associate sets with headphones coming from different manufacturers.			
(A12:2011)	In EN 60950-1:2006/A12:2011 Delete the addition of 1.3.Z1/EN 60950-1:2006 Delete the definition 1.2.3.Z1/EN 60950-1:2006/A1:2010			
1.5.1 (Added Info*)	Add the following NOTE: NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2002/95/EC New Directive 2011/65/11 *			

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
1.7.2.1 (A1:2010)	In addition, for a PORTABLE SOUND SYSTEM, the instructions shall include a warning that excessive sound pressure from earphones and headphones can cause hearing loss.		N/A
1.7.2.1 (A12:2011)	In EN 60950-1:2006/A12:2011 Delete NOTE Z1 and the addition for Portable Sound System. Add the following clause and annex to the existing standard and amendments.		N/A

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
Zx	Protection against excessive sound pressure from personal music players		N/A
	<p>Zx.1 General</p> <p>This sub-clause specifies requirements for protection against excessive sound pressure from personal music players that are closely coupled to the ear. It also specifies requirements for earphones and headphones intended for use with personal music players.</p> <p>A personal music player is a portable equipment for personal use, that:</p> <ul style="list-style-type: none"> – is designed to allow the user to listen to recorded or broadcast sound or video; and – primarily uses headphones or earphones that can be worn in or on or around the ears; and – allows the user to walk around while in use. <p>Note 1: Examples include hand-held or body-worn portable CD players, MP3 audio players, mobile phones with MP3 type features, PDA's, or similar equipment.</p> <p>A personal music player and earphones or headphones intended to be used with personal music players shall comply with the requirements of this sub-clause.</p> <p>The requirements in this sub-clause are valid for music or video mode only.</p> <p>The requirements do not apply:</p> <ul style="list-style-type: none"> – while the personal music player is connected to an external amplifier; or – while the headphones or earphones are not used. <p>Note 2: An external amplifier is an amplifier which is not part of the personal music player or the listening device, but which is intended to play the music as a standalone music player.</p> <p>The requirements do not apply to:</p> <ul style="list-style-type: none"> – hearing aid equipment and professional equipment; 	No such components	N/A


IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
	<p>Note 3: Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment.</p> <ul style="list-style-type: none"> – analogue personal music players (personal music players without any kind of digital processing of the sound signal) that are brought to the market before the end of 2015. <p>Note 4: This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies.</p> <p>For equipment which is clearly designed or intended for use by young children, the limits of EN 71-1 apply.</p>		
	<p>Zx.2 Equipment requirements</p> <p>No safety provision is required for equipment that complies with the following:</p> <ul style="list-style-type: none"> – equipment provided as a package (personal music player with its listening device), where the acoustic output $L_{Aeq,T} \leq 85$ dBA measured while playing the fixed “programme simulation noise” as described in EN 50332-1; and – a personal music player provided with an analogue electrical output socket for a listening device, where the electrical output is ≤ 27 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” as described in EN 50332-1. <p>Note 1: Wherever the term acoustic output is used in this clause, the 30 s A-weighted equivalent sound pressure level $L_{Aeq,T}$ is meant. See also Zx.5 and Annex Zx.</p> <p>All other equipment shall:</p> <ol style="list-style-type: none"> Protect the user from unintentional acoustic outputs exceeding those mentioned above; and Have a standard acoustic output level not exceeding those mentioned above, and automatically return to an output level not exceeding those mentioned above when the power is switched off; and Provide a means to actively inform the user of the increased sound pressure when the equipment is operated with an acoustic output exceeding those mentioned above. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an acoustic output exceeding those mentioned above. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time; and 		N/A

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)

Clause	Requirements + Test	Result – Remark	Verdict
	<p>Note 2: Examples of means include visual or audible signals. Action from the user is always required.</p> <p>Note 3: The 20 hour listening time is the accumulative listening time, independent how often and how long the personal music player has been switched off.</p> <p>d) Have a warning as specified in Zx.3; and</p> <p>e) Not exceed the following:</p> <ol style="list-style-type: none"> 1) Equipment provided as a package (player with its listening device), the acoustic output shall be ≤ 100 dBA measured while playing the fixed “programme simulation noise” described in EN 50332-1; and 2) A personal music player provided with an analogue electrical output socket for a listening device, the electrical output shall be ≤ 150 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” described in EN 50332-1. <p>For music where the average sound pressure (long term LAeq,T) measured over the duration of the song is lower than the average produced by the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA. In this case T becomes the duration of the song.</p> <p>Note 4: Classical music typically has an average sound pressure (long term LAeq,T) which is much lower than the average programme simulation noise. Therefore, if the layer is capable to analyse the song and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA.</p> <p>For example, if the player is set with the programme simulation noise to 85 dBA, but the average music level of the song is only 65 dBA, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dBA.</p>		

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)

Clause	Requirements + Test	Result – Remark	Verdict
	<p>Zx.3 Warning</p> <p>The warning shall be placed on the equipment, or on the packaging, or in the instruction manual and shall consist of the following:</p> <ul style="list-style-type: none"> – The symbol of Figure 1 with a minimum height of 5 mm; and – The following wording, or similar: “To prevent possible hearing damage, do not listen at high volume levels for long periods.” 		

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
	 <p>Figure 1: Warning label (IEC 60417-6044)</p> <p>Alternatively, the entire warning may be given through the equipment display during use, when the user is asked to acknowledge activation of the higher level.</p>		
	Zx.4 Requirements for listening devices (headphones and earphones)		N/A
	<p>Zx.4.1 Wired listening devices with analogue input</p> <p>With 94 dBA sound pressure output LAeq,T, the input voltage of the fixed “programme simulation noise” described in EN 50332-2 shall be ≥ 75 mV.</p> <p>This requirement is applicable in any mode where the headphones can operate (active or passive), including any available setting (for example built-in volume level control).</p> <p>Note: The values of 94 dBA - 75 mV correspond with 85dBA - 27 mV and 100 dBA - 150 mV.</p>		

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
	<p>Zx.4.2 Wired listening devices with digital input</p> <p>With any playing device playing the fixed “programme simulation noise” described in EN 50332-1 (and respecting the digital interface standards, where a digital interface standard exists that specifies the equivalent acoustic level), the acoustic output LAeq,T of the listening device shall be ≤ 100 dBA.</p> <p>This requirement is applicable in any mode where the headphones can operate, including any available setting (for example built-in volume level control, additional sound feature like equalization, etc.).</p> <p>Note: An example of a wired listening device with digital input is a USB headphone.</p>		N/A
	<p>Zx.4.3 Wireless listening devices</p> <p>In wireless mode:</p> <ul style="list-style-type: none"> – With any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and 		N/A

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
	<ul style="list-style-type: none"> – Respecting the wireless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and – With volume and sound settings in the listening device (for example built-in volume level control, additional sound feature like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the abovementioned programme simulation noise, the acoustic output LAeq,T of the listening device shall be ≤ 100 dBA. <p>Note: An example of a wireless listening device is a Bluetooth headphone.</p>		
	<p>Zx.5 Measurement methods</p> <p>Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable. Unless stated otherwise, the time interval T shall be 30 s.</p> <p>Note: Test method for wireless equipment provided without listening device should be defined.</p>		N/A

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
2.7.1	<p>Replace the sub-clause as follows:</p> <p>Basic requirements</p> <p>To protect against excessive current, short-circuits and earth faults in PRIMARY CIRCUITS, 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 5.3 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 PLUGGABLE EQUIPMENT TYPE B or PERMANENTLY CONNECTED EQUIPMENT, 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 PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.</p>		N/A

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
2.7.2	This sub-clause has been declared 'void'.		N/A
3.2.3	Delete the Note in Table 3A Delete the conduit sizes in parentheses (in this table)		N/A
3.2.5.1	Replace 60245 IEC 53 by H05 RR-F; 60227 IEC 52 by H03 VV-F or H03 VVH2-F; 60227 IEC 53 by H05 VV-F or H05 VVH2-F2 In Table 3B, replace the first four lines by the following: <i>Up to and including 6 0,75 a) </i> <i>Over 6 up to and including 10 (0,75) b) 1,0 </i> <i>Over 10 up to and including 16 (1,0) c) 1,5 </i> In the conditions applicable to Table 3B, delete the words <i>in some countries</i> in condition a). In Note 1 , applicable to Table 3B, delete the second sentence.		N/A
3.2.5.1 (A2:2013)	Note Z1: The harmonized code designations corresponding to the IEC cord types are given in Annex ZD		N/A

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
3.3.4	In Table 3D, delete the fourth line: conductor sizes for 10 to 13 A, and replace with the following: <i>Over 10 up to and including 16 1,5 to 2,5 1,5 to 4 </i> Delete the fifth line: conductor sizes for 13 to 16 A		N/A
4.3.13.6 (A1:2010)	Replace the existing NOTE by the following: NOTE Z1: Attention is drawn to: 1999/519/EC: Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz, and 2006/25/EC: Directive on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artificial optical radiation).		N/A
	Standards taking into account mentioned Recommendation and Directive which demonstrate compliance with the applicable EU Directive are indicated in the OJEC.		N/A

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirements + Test	Result – Remark	Verdict
Annex H	<p>Replace the last paragraph of this annex by:</p> <p>At any point 10 cm from the surface of the OPERATOR ACCESS AREA, the dose rate shall not exceed 1 μSv/h (0,1 mR/h) (see NOTE).</p> <p>Account is taken of the background level.</p> <p>Replace the notes as follows:</p> <p>NOTE These values appear in Directive 96/29/Euratom.</p> <p>Delete NOTE 2.</p>		N/A
Bibliography	Additional EN standards.		-

ZA	NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS	-
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ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirements + Test	Result – Remark	Verdict
1.2.4.1	In Denmark, certain types of Class I appliances (see 3.2.1.1) may be provided with a plug not establishing earthing conditions when inserted into Danish socket-outlets.		N/A
1.2.13.14 (A11:2009)	In Norway and Sweden, for requirements see 1.7.2.1 and 7.3 of this annex.		N/A
1.5.7.1 (A11:2009)	In Finland, Norway and Sweden, resistors bridging BASIC INSULATION in CLASS I PLUGGABLE EQUIPMENT TYPE A must comply with the requirements in 1.5.7.1. In addition when a single resistor is used, the resistor must withstand the resistor test in 1.5.7.2.		N/A
1.5.8	In Norway, due to the IT power system used (see annex V, Figure V.7), capacitors are required to be rated for the applicable line-to-line voltage (230 V).		N/A
1.5.9.4	In Finland, Norway and Sweden, the third dashed sentence is applicable only to equipment as defined in 6.1.2.2 of this annex.		N/A
1.7.2.1 (A11:2009)	In Finland, Norway and Sweden, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet.		N/A

ZB ANNEX (normative)

SPECIAL NATIONAL CONDITIONS (EN)

Clause	Requirements + Test	Result – Remark	Verdict
	<p>The marking text in the applicable countries shall be as follows:</p> <p>In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"</p> <p>In Norway: "Apparatet må tilkoples jordet stikkontakt"</p> <p>In Sweden: "Apparaten skall anslutas till jordat uttag"</p> <p>In Norway and Sweden, the screen of the cable 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 need 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 e.g. a retailer.</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>"Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard.</p> <p>Connection to a cable distribution system has therefore 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 installations of cable distribution systems, 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. Translation to Norwegian (the Swedish text will also be accepted in Norway):</p> <p>"Utstyr som er koplet til beskyttelsesjord via ettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel-TV nettet."</p> <p>Translation to Swedish:</p> <p>"Utrustning 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 utrustningen till kabel-TV</p>		

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirements + Test	Result – Remark	Verdict
	nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.”		
1.7.2.1 (A2:2013)	In Denmark, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet. The marking text in Denmark shall be as follows: In Denmark: “Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.”		N/A
1.7.5	In Denmark, socket-outlets for providing power to other equipment shall be in accordance with the Heavy Current Regulations, Section 107-2-D1, Standard Sheet DK 1-3a, DK 1-5a or DK 1-7a, when used on Class I equipment. For STATIONARY EQUIPMENT the socket-outlet shall be in accordance with Standard Sheet DK 1-1b or DK 1-5a. For CLASS II EQUIPMENT the socket outlet shall be in accordance with Standard Sheet DKA 1-4a.		N/A
1.7.5 (A2:2013)	In Denmark, socket-outlets for providing power to other equipment shall be in accordance with the DS 60884-2-D1:2011. For class I equipment the following Standard Sheets are applicable: DK 1-3a, DK 1-1c, DK 1-1d, DK 1-5a or DK 1-7a, with the exception for STATIONARY EQUIPMENT where the socketoutlets shall be in accordance with Standard Sheet DK 1-1b, DK 1-1c, DK 1-1d or DK 1-5a. Socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance with DS 60884-2-D1 standard sheet DKA 1-4a. Other current rating socket outlets shall be in compliance with by DS 60884-2-D1 Standard Sheet DKA 1-3a or DKA 1-3b. Justification the Heavy Current Regulations, 6c		N/A
2.2.4	In Norway, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.		N/A
2.3.2	In Finland, Norway and Sweden there are additional requirements for the insulation. See 6.1.2.1 and 6.1.2.2 of this annex.		N/A
2.3.4	In Norway, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.		N/A
2.6.3.3	In the United Kingdom, the current rating of the circuit shall be taken as 13 A, not 16 A.		N/A
2.7.1	In the United Kingdom, to protect against excessive currents and short-circuits in the PRIMARY CIRCUIT of DIRECT PLUG-IN		N/A

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirements + Test	Result – Remark	Verdict
	EQUIPMENT, tests according to 5.3 shall be conducted, using an external protective device rated 30 A or 32 A. If these tests fail, suitable protective devices shall be included as integral parts of the DIRECT PLUG-IN EQUIPMENT, so that the requirements of 5.3 are met.		
2.10.5.13	In Finland, Norway and Sweden, there are additional requirements for the insulation, see 6.1.2.1 and 6.1.2.2 of this annex.		N/A
3.2.1.1	<p>In Switzerland, supply cords of equipment having a RATED CURRENT not exceeding 10 A shall be provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets:</p> <p>SEV 6532-2.1991 Plug Type 15 3P+N+PE 250/400 V, 10 A</p> <p>SEV 6533-2.1991 Plug Type 11 L+N 250 V, 10 A</p> <p>SEV 6534-2.1991 Plug Type 12 L+N+PE 250 V, 10 A</p> <p>In general, EN 60309 applies for plugs for currents exceeding 10 A. However, a 16 A plug and socketoutlet system is being introduced in Switzerland, the plugs of which are according to the following dimension sheets, published in February 1998:</p> <p>SEV 5932-2.1998 Plug Type 25 3L+N+PE 230/400 V, 16 A</p> <p>SEV 5933-2.1998 Plug Type 21 L+N 250 V, 16 A</p> <p>SEV 5934-2.1998 Plug Type 23 L+N+PE 250 V, 16 A</p>		N/A
3.2.1.1	<p>In Denmark, supply cords of single-phase equipment having a rated current not exceeding 13 A shall be provided with a plug according to the Heavy Current Regulations, Section 107-2-D1. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p> <p>If poly-phase equipment and single-phase equipment having a RATED CURRENT exceeding 13 A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations, Section 107-2-D1 or EN 60309-2.</p>		N/A
3.2.1.1 (A2:2013)	<p>In Denmark, supply cords of single-phase equipment having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1.</p> <p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where</p>		N/A

ZB ANNEX (normative)

SPECIAL NATIONAL CONDITIONS (EN)

Clause	Requirements + Test	Result – Remark	Verdict
	<p>protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p> <p>If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2.</p> <p>Justification the Heavy Current Regulations, 6c</p>		
3.2.1.1	<p>In Spain, supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to UNE 20315:1994. Supply cords of single-phase equipment having a rated current not exceeding 2,5 A shall be provided with a plug according to UNE-EN 50075:1993.</p> <p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994.</p> <p>If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2.</p>		N/A
3.2.1.1	<p>In the United Kingdom, apparatus 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 and plug, shall be fitted with a 'standard plug' in accordance with Statutory Instrument 1768:1994 - The Plugs and Sockets etc. (Safety) Regulations 1994, 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
3.2.1.1	<p>In Ireland, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to I.S. 411 by means of that flexible cable or cord and plug, shall be fitted with a 13 A plug in accordance with Statutory Instrument 525:1997 - National Standards Authority of Ireland (section 28) (13 A Plugs and Conversion Adaptors for Domestic Use) Regulations 1997.</p>		N/A
3.2.4	In Switzerland, for requirements see 3.2.1.1 of this annex.		N/A
3.2.5.1	In the United Kingdom, a power supply cord with conductor of 1,25 mm ² is allowed for equipment with a rated current over 10 A and up to and including 13 A.		N/A

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirements + Test	Result – Remark	Verdict
3.3.4	In the United Kingdom, the range of conductor sizes of flexible cords to be accepted by terminals for equipment with a RATED CURRENT of over 10 A up to and including 13 A is: • 1,25 mm ² to 1,5 mm ² nominal cross-sectional area.		N/A
4.3.6	In the United Kingdom, the torque test is performed using a socket outlet complying with BS 1363 part 1:1995, including Amendment 1:1997 and Amendment 2:2003 and 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.		N/A
4.3.6	In Ireland, DIRECT PLUG-IN EQUIPMENT is known as plug similar devices. Such devices shall comply with Statutory Instrument 526:1997 - National Standards Authority of Ireland (Section 28) (Electrical plugs, plug similar devices and sockets for domestic use) Regulations, 1997.		N/A
5.1.7.1	In Finland, Norway and Sweden TOUCH CURRENT measurement results exceeding 3,5 mA r.m.s. are permitted only for the following equipment: • STATIONARY PLUGGABLE EQUIPMENT TYPE A that is intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, for example, in a telecommunication centre; and has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR; and is provided with instructions for the installation of that conductor by a SERVICE PERSON; • STATIONARY PLUGGABLE EQUIPMENT TYPE B; • STATIONARY PERMANENTLY CONNECTED EQUIPMENT.		N/A
6.1.2.1 (A1:2010)	In Finland, Norway and Sweden, add the following text between the first and second paragraph of the compliance clause: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either - two layers of thin sheet material, each of which shall pass the electric strength test below, or - one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below.		N/A

ZB ANNEX (normative)

SPECIAL NATIONAL CONDITIONS (EN)

Clause	Requirements + Test	Result – Remark	Verdict
	<p>Alternatively for components, there is no distance through insulation requirements 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"> - passes the tests and inspection criteria of 2.10.11 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.10 shall be performed using 1,5 kV), and - is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV. <p>It is permitted to bridge this insulation with an optocoupler complying with 2.10.5.4 b).</p> <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"> - 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 EN 60950-1:2006, 6.2.2.1; - the additional testing shall be performed on all the test specimens as described in EN 60384-14; - the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14. 		
.1.2.2	<p>In Finland, Norway and Sweden, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT, PLUGGABLE EQUIPMENT TYPE B and equipment intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, e.g. in a telecommunication centre, and which has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR and is provided with instructions for the installation of that conductor by a SERVICE PERSON.</p>		N/A
7.2	<p>In Finland, Norway and Sweden, for requirements see 6.1.2.1 and 6.1.2.2 of this annex.</p> <p>The term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM.</p>		N/A
7.3 (A11:2009)	<p>In Norway and Sweden, for requirements see 1.2.13.14 and 1.7.2.1 of this annex.</p>		N/A

ANNEX ZD (informative)		
IEC and CENELEC code designations for flexible cords		
Type of flexible cord	Code designations	
	IEC	CENELEC
PVC insulated cords		
Flat twin tinsel cord	60227 IEC 41	
Light polyvinyl chloride sheathed flexible cord	60227 IEC 52	H03VH-Y H03VV-F
Ordinary polyvinyl chloride sheathed flexible cord	60227 IEC 53	H03VVH2-F H05VV-F H05VVH2-F
Rubber insulated cords		
Braided cord	60245 IEC 51	H03RT-F
Ordinary tough rubber sheathed flexible cord	60245 IEC 53	H05RR-F
Ordinary polychloroprene sheathed flexible cord	60245 IEC 57	H05RN-F
Heavy polychloroprene sheathed flexible cord	60245 IEC 66	H07RN-F
Cords having high flexibility		
Rubber insulated and sheathed cord	60245 IEC 86	H03RR-H
Rubber insulated, crosslinked PVC sheathed cord	60245 IEC 87	H03RV4-H
Crosslinked PVC insulated and sheathed cord	60245 IEC 88	H03V4V4-H

PHOTOGRAPHS



Figure 2: Sentrius Gateway kit



Figure 3: Sentrius (top)



Figure 4: Sentrius (bottom)



Figure 5: Sentrius (front)



Figure 6: Sentrius (back)



Figure 7: Sentrius (cover open)



Figure 8: Sentrius (top of PCBA)

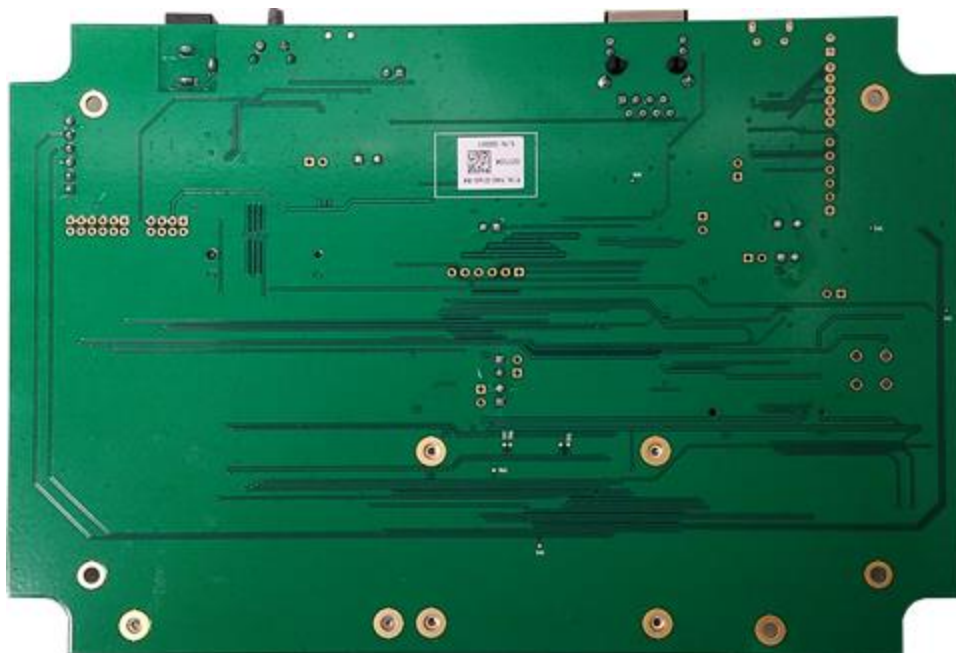


Figure 9: Sentrius (bottom of PCBA)

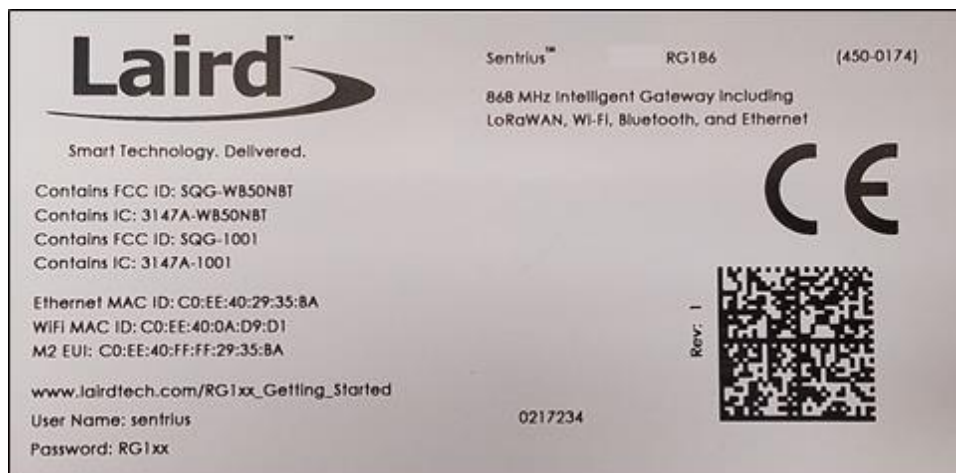


Figure 10: Sentrius Gateway - Bottom Label