



Test Report issued under the responsibility of:



TEST REPORT
IEC 60950-1
Information technology equipment – Safety –
Part 1: General requirements

Report reference No. : 15-EL-0364.S01

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CB Testing Laboratory : Electrosuisse

Address : Luppmenstrasse 1, 8320 Fehraltorf
SWITZERLAND



STS 001

Applicant's name : NetModule AG

Address : Meriedweg 11, 3172 Niederwangen
SWITZERLAND

Test specification:

Standard..... : IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013

Test procedure : Type testing for CE

Non-standard test method : N/A

Test Report Form No. : IEC60950_1F

Test Report Form(s) Originator..... : SGS Fimko Ltd

Master TRF : Dated 2014-02

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Test item description..... : Wireless Router

Trade Mark..... : netModule

Manufacturer : NetModule AG
Meriedweg 11, 3172 Niederwangen
SWITZERLAND

Model/Type reference : NB3700-Pb

Ratings : 50-136 VDC, 0.35 A, 15 W

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	Electrosuisse
Testing location/ address		Luppenstrasse 1, 8320 Fehraltorf SWITZERLAND
<input type="checkbox"/>	Associated CB Testing Laboratory:	Electrosuisse Albislab
Testing location/ address		Albisriederstrasse 199, 8047 Zürich SWITZERLAND
Tested by (name + signature)		Robert Kaufmann, Project Engineer 
Approved by (name + signature)		Jürg Hohl Project Engineer 
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1:	
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature)		
<input type="checkbox"/>	Testing procedure: WMT/CTF Stage 2:	
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name + signature)		
Approved by (name + signature)		
<input type="checkbox"/>	Testing procedure: SMT/CTF Stage 3 or 4:	
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name + signature)		
Approved by (name + signature)		
Supervised by (name + signature)		

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

- Appendix List of Test Equipment: 1 page
- ATTACHMENT TO TEST REPORT IEC 60950-1, EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES: 18 pages
- Appendix Photo Documentation: 5 pages

Summary of testing:

The equipment complies with this standard.

Tests performed (name of test and test clause):

1.5.1.....: List of critical components
 1.5.1.....: Opto Electronic Devices
 1.6.2.....: Electrical data (in normal conditions)
 2.1.1.5.....: Max. V, A, VA test / stored energy
 2.2.....: Evaluation of voltage limiting components in SELV circuits
 2.10.2.....: Working voltage measurement
 2.10.3/4.....: Clearance and creepage distance measurements
 2.10.5.....: Distance through insulation measurements
 4.5.....: Thermal requirements
 4.7.....: Resistance to fire
 5.1.....: Touch current measurement
 5.2.....: Electric strength tests, impulse tests and voltage surge tests
 5.3.....: Fault condition tests

Testing location:

Electrosuisse Albislab
Albisriederstrasse 199, 8047 Zürich
SWITZERLAND

Summary of compliance with National Differences:

List of countries addressed: CENELEC

☒ The product fulfils the requirements of EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013

Test Procedure:

- Type testing for CE

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.



Note: Depending on the implemented radio modules and the variant of power input, additional letters and numbers may be added to "NB3700", see "General product information".

Test item particulars	
Equipment mobility	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in
Connection to the mains.....	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> type A <input type="checkbox"/> type B <input checked="" 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 checked="" type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other:
Mains supply tolerance (%) or absolute mains supply values	50-136 VDC -10 % / +10 %
Tested for IT power systems	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
IT testing, phase-phase voltage (V).....	
Class of equipment.....	<input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input checked="" type="checkbox"/> Not classified
Considered current rating of protective device as part of the building installation (A)	N/A
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	IP20 (IP40 with SIM and USB covers mounted)
Altitude during operation (m)	2000 m
Altitude of test laboratory (m)	410 m
Mass of equipment (kg).....	1.15 kg
Possible test case verdicts:	
- test case does not apply to the test object.....	N/A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement.....	F (Fail)
Testing	
Date of receipt of test item	2015-10-23
Date (s) of performance of tests	2015-10-27 to 2015-11-17

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
 "(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60950-1:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:

☐ Yes
☒ Not applicable

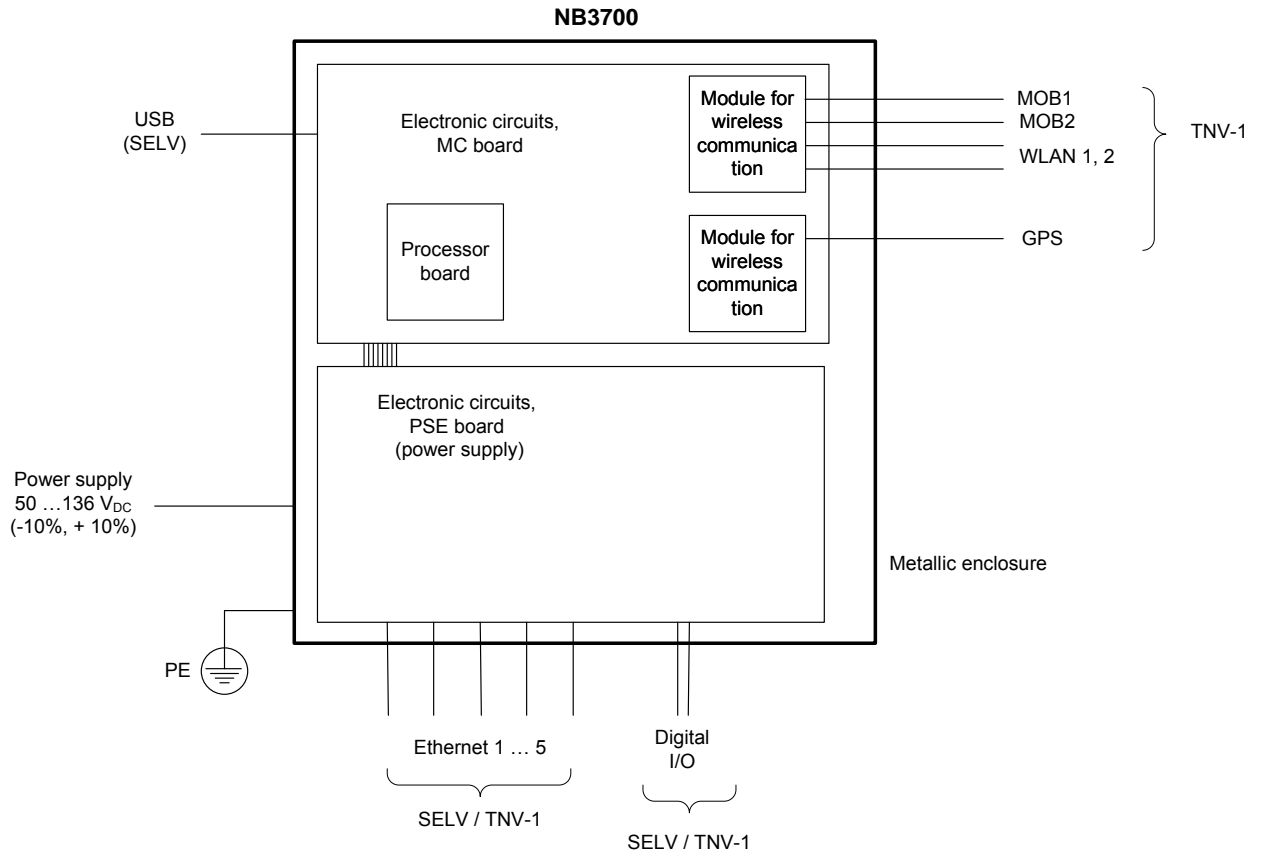
When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) :

NetModule AG
 Meriedweg 11
 3172 Niederwangen
 SWITZERLAND

General product information:

The EUT is a versatile router for a multiplicity of communication interfaces (wired and radio interfaces). It is intended to be used especially for vehicular applications.



Protective earthing required.

Overall size of equipment (W x D x H): 190 mm x 105 mm x 86 mm

Note: Depending on the implemented radio modules and the variant of power input, additional letters and numbers may be added to "NB3700".

Tested Equipment	Covered Variants ¹⁾	Explanation ²⁾
NB3700-LWPb-G	NB3700-H1...Hn-S1...Sn	<p>All covered NB3700 variants contain the same CP Modules and MC Boards, have the same case and the same form factor.</p> <p>They can host up to six communication and other interface modules. These modules can even include a GPS module. There can be up to 5 antenna connectors.</p> <p>The wireless communication modules applied have been CE and FCC certified in an independent way of the tested equipment.</p> <p>'H1...Hn' is a sequence of the following letters that identify the communication modules included:</p> <p>R: none, router only Ed: 2G = GPRS/EDGE U: 3G+ = 2G+UMTS/HSPA/HSPA+ L: 4G = 3G+ + LTE Ca: CDMA450 Gr: GSM-R Ge: GNSS W: WLAN a/b/g/n Client & Access Point A: Audio in/out C: CAN-bus Sa: RS-485 (on the same module as CAN) I: IBIS-bus Sb: RS-232 (on the same module as IBIS) Pb: Power supply 50 VDC – 136 VDC ... (more to follow)</p> <p>'S1...Sn' indicate the software options activated:</p> <p>G: GPS V: Voice gateway M: Mobile IP (Client) S: Server</p> <p>The following NB3700 variants with 50-136 VDC power supplies are currently available or planned:</p> <p>NB3700-RPb NB3700-WPb NB3700-UPb NB3700-UPb-G NB3700-UWPb NB3700-UWPb-G NB3700-LWPb</p>

¹⁾ This test report covers the all variants with additional letters "Pb" (power supply 50 VDC - 136 VDC), all other variants (power supply 12 VDC - 60 VDC) are covered by test report 12-EL-0088.01, dated 2012-07-23.

²⁾ According to information of the customer and not verified by Electrosuisse

Abbreviations used in the report:

- normal conditions	N.C.	- single fault conditions	S.F.C
- functional insulation	OP	- basic insulation	BI
- double insulation	DI	- supplementary insulation	SI
- between parts of opposite polarity	BOP	- reinforced insulation	RI

Indicate used abbreviations (if any)

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		P
1.5.3	Thermal controls		N/A
1.5.4	Transformers	Certified DC/DC converter	N/A
1.5.5	Interconnecting cables	Antenna cables	P
1.5.6	Capacitors bridging insulation		N/A
1.5.7	Resistors bridging insulation	No double or reinforced insulation	N/A
1.5.7.1	Resistors bridging functional, basic or supplementary insulation		N/A
1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits		N/A
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		N/A
1.5.8	Components in equipment for IT power systems		N/A
1.5.9	Surge suppressors		P
1.5.9.1	General		P
1.5.9.2	Protection of VDRs		N/A
1.5.9.3	Bridging of functional insulation by a VDR		N/A
1.5.9.4	Bridging of basic insulation by a VDR		N/A
1.5.9.5	Bridging of supplementary, double or reinforced insulation by a VDR		N/A
1.6	Power interface		P
1.6.1	AC power distribution systems	No mains	N/A
1.6.2	Input current	(see appended table 1.6.2)	P
1.6.3	Voltage limit of hand-held equipment		N/A
1.6.4	Neutral conductor		N/A
1.7	Marking and instructions		P
1.7.1	Power rating and identification markings		P
1.7.1.1	Power rating marking		P
	Multiple mains supply connections.....:	---	N/A
	Rated voltage(s) or voltage range(s) (V) :	50-136 VDC	P

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Symbol for nature of supply, for d.c. only :	---	P
	Rated frequency or rated frequency range (Hz) ... :	---	N/A
	Rated current (mA or A) :	15 W	P
1.7.1.2	Identification markings		P
	Manufacturer's name or trade-mark or identification mark :	netModule	P
	Model identification or type reference :	NB3700-Pb	P
	Symbol for Class II equipment only :	---	N/A
	Other markings and symbols :	See "Copy of marking plate"	P
1.7.1.3	Use of graphical symbols	See "Copy of marking plate"	P
1.7.2	Safety instructions and marking		P
1.7.2.1	General		P
1.7.2.2	Disconnect devices		P
1.7.2.3	Overcurrent protective device	Fuse Fs100, Fs102	P
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		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 :	---	N/A
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference) :	Non-replaceable by user	P
1.7.7	Wiring terminals		P
1.7.7.1	Protective earthing and bonding terminals :	Marked with symbol IEC 60417-5019, see appendix photo	P
1.7.7.2	Terminals for a.c. mains supply conductors		N/A
1.7.7.3	Terminals for d.c. mains supply conductors		P
1.7.8	Controls and indicators	No controls, no safety relevant indicators	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 :	---	N/A
1.7.10	Thermostats and other regulating devices :	---	N/A
1.7.11	Durability		P
1.7.12	Removable parts		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7.13	Replaceable batteries	No batteries	N/A
	Language(s)	---	---
1.7.14	Equipment for restricted access locations	---	N/A
2	PROTECTION FROM HAZARDS		P
2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas		P
2.1.1.1	Access to energized parts		P
	Test by inspection	No hazardous parts	P
	Test with test finger (Figure 2A)	No equivalent holes	P
	Test with test pin (Figure 2B)	No equivalent holes	P
	Test with test probe (Figure 2C)	No equivalent holes	P
2.1.1.2	Battery compartments	No battery	N/A
2.1.1.3	Access to ELV wiring	No ELV	N/A
	Working voltage (V _{peak} or V _{rms}); minimum distance through insulation (mm)	(see appended tables 2.10.2 and 2.10.5)	---
2.1.1.4	Access to hazardous voltage circuit wiring	No hazardous voltage	N/A
2.1.1.5	Energy hazards	(see appended tables 2.1.1.5)	P
2.1.1.6	Manual controls		N/A
2.1.1.7	Discharge of capacitors in equipment		P
	Measured voltage (V); time-constant (s).....	---	---
2.1.1.8	Energy hazards – d.c. mains supply		P
	a) Capacitor connected to the d.c. mains supply ..	See also 2.1.1.5	P
	b) Internal battery connected to the d.c. 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	(see appended table 2.2)	P
2.2.2	Voltages under normal conditions (V)	5.5 V _{DC}	P
2.2.3	Voltages under fault conditions (V)	Over voltage protection of certified DC/DC converter: 7.0 V _{DC}	P
2.2.4	Connection of SELV circuits to other circuits	TNV-1 separated by transformers and isolators	P

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.3	TNV circuits		P
2.3.1	Limits		P
	Type of TNV circuits..... :	TNV-1: Ethernet	—
2.3.2	Separation from other circuits and from accessible parts	Enclosure grounded	P
2.3.2.1	General requirements		P
2.3.2.2	Protection by basic insulation		P
2.3.2.3	Protection by earthing		P
2.3.2.4	Protection by other constructions :	---	N/A
2.3.3	Separation from hazardous voltages	No 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		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 power sources		N/A
	a) Inherently limited output	(see appended table 2.5)	N/A
	b) Impedance limited output	(see appended table 2.5)	N/A
	c) Regulating network or IC current limiter, limits output under normal operating and single fault condition	(see appended table 2.5)	N/A
	Use of integrated circuit (IC) current limiters	(See Annex CC)	N/A
	d) Overcurrent protective device limited output	(see appended table 2.5)	N/A
	Max. output voltage (V), max. output current (A), max. apparent power (VA)..... :	---	—
	Current rating of overcurrent protective device (A) :	---	—

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.6	Provisions for earthing and bonding		P
2.6.1	Protective earthing		P
2.6.2	Functional earthing		N/A
	Use of symbol for functional earthing :	---	N/A
2.6.3	Protective earthing and protective bonding conductors		P
2.6.3.1	General		P
2.6.3.2	Size of protective earthing conductors		N/A
	Rated current (A), cross-sectional area (mm ²), AWG :	No wire, screw on front side of housing	—
2.6.3.3	Size of protective bonding conductors		N/A
	Rated current (A), cross-sectional area (mm ²), AWG :	---	—
	Protective current rating (A), cross-sectional area (mm ²), AWG..... :	---	
2.6.3.4	Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min)..... :	0.014 Ω , 20 A, 2 min.	P
2.6.3.5	Colour of insulation :	---	N/A
2.6.4	Terminals		P
2.6.4.1	General		P
2.6.4.2	Protective earthing and bonding terminals		P
	Rated current (A), type, nominal thread diameter (mm)..... :	0.35 A, 6 mm	—
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N/A
2.6.5	Integrity of protective earthing		P
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	Aluminium / zinc steel (0.15 V)	P
2.6.5.7	Screws for protective bonding	M3, thread length: 5 mm	P
2.6.5.8	Reliance on telecommunication network or cable distribution system		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.7	Overcurrent and earth fault protection in primary circuits		P
2.7.1	Basic requirements		P
	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 :	2, both poles	P
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
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	(see appended table 5.2)	N/A
2.8.8	Mechanical actuators		N/A
2.9	Electrical insulation		P
2.9.1	Properties of insulating materials		P
2.9.2	Humidity conditioning		N/A
	Relative humidity (%), temperature (°C) :	No hygroscopic material	—
2.9.3	Grade of insulation	Functional, basic	P
2.9.4	Separation from hazardous voltages	No hazardous voltages	N/A
	Method(s) used :	---	—

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.10	Clearances, creepage distances and distances through insulation		P
2.10.1	General		P
2.10.1.1	Frequency	---	N/A
2.10.1.2	Pollution degrees	2	P
2.10.1.3	Reduced values for functional insulation	Test passed acc. 5.3.4 c)	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	Basic insulation implemented	P
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		P
2.10.2.3	Peak working voltage		P
2.10.3	Clearances		P
2.10.3.1	General		P
2.10.3.2	Mains transient voltages		P
	a) AC mains supply	No AC mains	N/A
	b) Earthed d.c. mains supplies	---	N/A
	c) Unearthed d.c. mains supplies	1'500 V _{PEAK}	P
	d) Battery operation	No battery	N/A
2.10.3.3	Clearances in primary circuits	(see appended table 2.10.3 and 2.10.4)	N/A
2.10.3.4	Clearances in secondary circuits	(see appended table 2.10.3 and 2.10.4)	P
2.10.3.5	Clearances in circuits having starting pulses	(see appended table 2.10.3 and 2.10.4)	N/A
2.10.3.6	Transients from a.c. mains supply	---	N/A
2.10.3.7	Transients from d.c. mains supply	1'500 V _{PEAK}	P
2.10.3.8	Transients from telecommunication networks and cable distribution systems	TNV-1	P
2.10.3.9	Measurement of transient voltage levels		N/A
	a) Transients from a mains supply		N/A
	For an a.c. mains supply	---	N/A
	For a d.c. mains supply	---	N/A
	b) Transients from a telecommunication network .:	---	N/A
2.10.4	Creepage distances		P
2.10.4.1	General		P
2.10.4.2	Material group and comparative tracking index		P

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	CTI tests..... :	Material group IIIb is assumed to be used	—
2.10.4.3	Minimum creepage distances	(see appended table 2.10.3 and 2.10.4)	P
2.10.5	Solid insulation		P
2.10.5.1	General		P
2.10.5.2	Distances through insulation	(see appended table 2.10.5)	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	(see appended table 2.10.3 and 2.10.4)	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	(see appended table 2.10.5)	—
2.10.5.10	Thin sheet material – alternative test procedure		N/A
	Electric strength test	(see appended table 2.10.5)	—
2.10.5.11	Insulation in wound components	Certified DC/DC converter	N/A
2.10.5.12	Wire in wound components	Certified DC/DC converter	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	(see appended table 2.10.5)	—
	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 boards		P
2.10.6.1	Uncoated printed boards	(see appended table 2.10.3 and 2.10.4)	P
2.10.6.2	Coated printed boards	(see appended table 2.10.3 and 2.10.4)	N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.10.6.3	Insulation between conductors on the same inner surface of a printed board	(see appended table 2.10.3 and 2.10.4)	P
2.10.6.4	Insulation between conductors on different layers of a printed board		P
	Distance through insulation	(see appended table 2.10.5)	N/A
	Number of insulation layers (pcs) :	---	N/A
2.10.7	Component external terminations	(see appended table 2.10.3 and 2.10.4)	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	(see appended table 5.2)	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		N/A
2.10.11	Tests for semiconductor devices and cemented joints		N/A
2.10.12	Enclosed and sealed parts		N/A
3	WIRING, CONNECTIONS AND SUPPLY		P
3.1	General		P
3.1.1	Current rating and overcurrent protection		P
3.1.2	Protection against mechanical damage		P
3.1.3	Securing of internal wiring		P
3.1.4	Insulation of conductors	(see appended table 5.2)	P
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		P
	10 N pull test		P
3.1.10	Sleeving on wiring		N/A
3.2	Connection to a mains supply		P
3.2.1	Means of connection		P
3.2.1.1	Connection to an a.c. mains supply		N/A
3.2.1.2	Connection to a d.c. mains supply		P
3.2.2	Multiple supply connections		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
3.2.3	Permanently connected equipment		P
	Number of conductors, diameter of cable and conduits (mm)	2, cable not part of the EUT	—
3.2.4	Appliance inlets		P
3.2.5	Power supply cords	Not part of the EUT	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	Not part of the EUT	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		P
3.3.1	Wiring terminals		P
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		P
3.3.7	Grouping of wiring terminals		P
3.3.8	Stranded wire		P
3.4	Disconnection from the mains supply		P
3.4.1	General requirement		P
3.4.2	Disconnect devices		P
3.4.3	Permanently connected equipment		P
3.4.4	Parts which remain energized		N/A
3.4.5	Switches in flexible cords		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
3.4.6	Number of poles – single-phase and d.c. equipment	All poles	P
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		P
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		P
3.5.2	Types of interconnection circuits	SELV, TNV-1, TNV-3	P
3.5.3	ELV circuits as interconnection circuits		N/A
3.5.4	Data ports for additional equipment		N/A
4	PHYSICAL REQUIREMENTS		P
4.1	Stability		P
	Angle of 10 °	Equipment for building-in	N/A
	Test force (N)	---	N/A
4.2	Mechanical strength		P
4.2.1	General		P
	Rack-mounted equipment.	(see Annex DD)	N/A
4.2.2	Steady force test, 10 N		P
4.2.3	Steady force test, 30 N		N/A
4.2.4	Steady force test, 250 N		P
4.2.5	Impact test		P
	Fall test		P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
4.3	Design and construction		P
4.3.1	Edges and corners		P
4.3.2	Handles and manual controls; force (N)	No such devices	N/A
4.3.3	Adjustable controls		N/A
4.3.4	Securing of parts		P
4.3.5	Connection by plugs and sockets		P
4.3.6	Direct plug-in equipment		N/A
	Torque	---	---
	Compliance with the relevant mains plug standard	---	N/A
4.3.7	Heating elements in earthed equipment	No heating elements	N/A
4.3.8	Batteries	No batteries (see appended tables 4.3.8)	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		N/A
4.3.10	Dust, powders, liquids and gases		N/A
4.3.11	Containers for liquids or gases		N/A
4.3.12	Flammable liquids	---	N/A
	Quantity of liquid (l)	---	N/A
	Flash point (°C)	---	N/A
4.3.13	Radiation	Approved radio modules	P
4.3.13.1	General		P
4.3.13.2	Ionizing radiation		N/A
	Measured radiation (pA/kg)	---	---
	Measured high-voltage (kV)	---	---
	Measured focus voltage (kV)	---	---
	CRT markings	---	---
4.3.13.3	Effect of ultraviolet (UV) radiation on materials		N/A
	Part, property, retention after test, flammability classification	---	N/A
4.3.13.4	Human exposure to ultraviolet (UV) radiation	---	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	---	---

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.13.5.2	Light emitting diodes (LEDs)	For indication purposes only	
4.3.13.6	Other types	---	N/A
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	(see Annex EE)	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		P
	Normal load condition per Annex L	No business equipment	—
4.5.3	Temperature limits for materials	(see appended table 4.5)	P
4.5.4	Touch temperature limits	(see appended table 4.5)	P
4.5.5	Resistance to abnormal heat	(see appended table 4.5.5)	P
4.6	Openings in enclosures		P
4.6.1	Top and side openings	Slots for SIM-cards: 1.5 mm x 16 mm	P
	Dimensions (mm)	---	—
4.6.2	Bottoms of fire enclosures	No openings	P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
4.6.4.3	Use of metallized parts		N/A
4.6.5	Adhesives for constructional purposes		N/A
	Conditioning temperature (°C), time (weeks) :	---	—
4.7	Resistance to fire		P
4.7.1	Reducing the risk of ignition and spread of flame		P
	Method 1, selection and application of components wiring and materials	(see appended table 4.7)	P
	Method 2, application of all of simulated fault condition tests	(see appended table 5.3)	N/A
4.7.2	Conditions for a fire enclosure		P
4.7.2.1	Parts requiring a fire enclosure		P
4.7.2.2	Parts not requiring a fire enclosure		P
4.7.3	Materials		P
4.7.3.1	General		P
4.7.3.2	Materials for fire enclosures	Metallic (aluminium)	P
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		P
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		P
5.1	Touch current and protective conductor current		P
5.1.1	General	(see appended Table 5.1)	P
5.1.2	Configuration of equipment under test (EUT)		N/A
5.1.2.1	Single connection to an a.c. mains supply		N/A
5.1.2.2	Redundant multiple connections to an a.c. mains supply		N/A
5.1.2.3	Simultaneous multiple connections to an a.c. 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) :	---	—

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Clause	Requirement + Test	Result - Remark	Verdict
	Max. allowed protective conductor current (mA) .. :	---	---
5.1.7	Equipment with touch current exceeding 3,5 mA		N/A
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		P
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		P
	a) EUT with earthed telecommunication ports	5 Ethernet interfaces, common local ground	P
	b) EUT whose telecommunication ports have no reference to protective earth		N/A
5.2	Electric strength		P
5.2.1	General	(see appended table 5.2)	P
5.2.2	Test procedure		P
5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors	(see appended Annex B)	N/A
5.3.3	Transformers	Certified DC/DC converter (see appended Annex C)	N/A
5.3.4	Functional insulation	Test passed acc. c) short circuit	P
5.3.5	Electromechanical components		N/A
5.3.6	Audio amplifiers in ITE	---	N/A
5.3.7	Simulation of faults		P
5.3.8	Unattended equipment		N/A
5.3.9	Compliance criteria for abnormal operating and fault conditions		P
5.3.9.1	During the tests		P
5.3.9.2	After the tests		P

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Clause	Requirement + Test	Result - Remark	Verdict
6	CONNECTION TO TELECOMMUNICATION NETWORKS		P
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		P
6.1.1	Protection from hazardous voltages		P
6.1.2	Separation of the telecommunication network from earth		P
6.1.2.1	Requirements	(see appended table 5.2)	P
	Supply voltage (V)	136 V _{DC} (max. 154 V _{DC})	—
	Current in the test circuit (mA)	0 mA	—
6.1.2.2	Exclusions	---	N/A
6.2	Protection of equipment users from overvoltages on telecommunication networks		P
6.2.1	Separation requirements		P
6.2.2	Electric strength test procedure		P
6.2.2.1	Impulse test	(see appended table 5.2)	N/A
6.2.2.2	Steady-state test	(see appended table 5.2)	P
6.2.2.3	Compliance criteria		P
6.3	Protection of 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	(see appended table 5.2)	N/A
7.4.3	Impulse test	(see appended table 5.2)	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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)		N/A
A.1.1	Samples	---	---
	Wall thickness (mm).....	---	---
A.1.2	Conditioning of samples; temperature (°C)	---	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
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).....	---	---

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Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
	Position	---	---
	Manufacturer	---	---
	Type	---	---
	Rated values	---	---
B.2	Test conditions		N/A
B.3	Maximum temperatures	(see appended table 5.3)	N/A
B.4	Running overload test	(see appended table 5.3)	N/A
B.5	Locked-rotor overload test		N/A
	Test duration (days)	---	---
	Electric strength test: test voltage (V)	---	---
B.6	Running overload test for d.c. 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 d.c. 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	(see appended table 5.3)	N/A
B.9	Test for three-phase motors	(see appended table 5.3)	N/A
B.10	Test for series motors		N/A
	Operating voltage (V)	---	---

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Clause	Requirement + Test	Result - Remark	Verdict
C	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		N/A
	Position	---	---
	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)		P
D.1	Measuring instrument		P
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)		P
G	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N/A
G.1	Clearances		N/A
G.1.1	General		N/A
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 d.c. mains supplies	---	N/A
G.2.3	Unearthed d.c. 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

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Clause	Requirement + Test	Result - Remark	Verdict
	a) Transients from a mains supply		N/A
	For an a.c. mains supply		N/A
	For a d.c. 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)		P
	Metal(s) used	Aluminium / zinc steel (0.15 V)	—
K	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.8)		N/A
K.1	Making and breaking capacity		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	(see appended table 5.3)	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		N/A
L.2	Adding machines and cash registers		N/A
L.3	Erasers		N/A
L.4	Pencil sharpeners		N/A
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)	---	—

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Clause	Requirement + Test	Result - Remark	Verdict
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 generator		N/A
P	ANNEX P, NORMATIVE REFERENCES		—
Q	ANNEX Q, Voltage dependent resistors (VDRs) (see 1.5.9.1)		N/A
	- Preferred climatic categories :	---	N/A
	- Maximum continuous voltage :	---	N/A
	- Combination pulse current :	---	N/A
	Body of the VDR Test according to IEC 60695-11-5..... :	---	N/A
	Body of the VDR. Flammability class of material (min V-1)..... :	---	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)		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		N/A
S.2	Test procedure		N/A
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
		See separate test report	—
U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		N/A
		See separate test report	—

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Clause	Requirement + Test	Result - Remark	Verdict
V	ANNEX V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1)		N/A
V.1	Introduction		N/A
V.2	TN power distribution systems		N/A
W	ANNEX W, SUMMATION OF TOUCH CURRENTS		P
W.1	Touch current from electronic circuits		P
W.1.1	Floating circuits		P
W.1.2	Earthed circuits		P
W.2	Interconnection of several equipments		P
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		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	---	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 BB, CHANGES IN THE SECOND EDITION		—
CC	ANNEX CC, Evaluation of integrated circuit (IC) current limiters		N/A
CC.1	General		N/A
CC.2	Test program 1.....	---	N/A
CC.3	Test program 2.....	---	N/A
CC.4	Test program 3.....	---	N/A
CC.5	Compliance	---	N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
DD	ANNEX DD, Requirements for the mounting means of rack-mounted equipment		N/A
DD.1	General		N/A
DD.2	Mechanical strength test, variable N..... :	---	N/A
DD.3	Mechanical strength test, 250 N, 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		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

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	
- Description:	PSE_Board					
PCB PSE_Board (5x_M12_front_72V_to_110V)	Wuerth Elektronik GmbH & Co or various	50 or various	FR-4 UL94 V-0 1.6 mm 130 °C	UL 796 CSA C22.2 No. 0.17	cURus E76251 or UL listed	
Fuse Fs100, Fs101	Schurter AG	OMF250 3403.0019	2 A F, 250 VDC	IEC 60127-4 UL 248-14 CSA C22.2 No. 248.14	VDE 106328 cURus E41599	
Varistor Rs100	Bourns Inc	MOV-14D201K	170 VDC	UL 1449 CSA C22.2 No. 269	cURus E313168	
DC/DC converter Ns152	Traco Electronic AG	TEN 20- 7211WIR	Input: 43 - 160 VDC, Output: 5 VDC, 4 A, Isolation: 1'500 VAC	IEC/EN 60950-1 UL 60950-1 CSA C22.2 60950-1	CB 1108126-CB cURus E188913	
Transient voltage suppressor Ds102	Pan Jit Electronics Co Ltd	SMCJ150CA	Bidirectional, 150 V	UL 497B	UR E210467	
	Diodes Inc	SMCJ150CA	Bidirectional, 150 V	UL 497B	UR E156346	
Ethernet Transformer Te200, Te201, Te202, Te300, Te301	Pulse	HX1188NL	10/100Base-T 1'500 VAC	IEEE 802.3 IEC/EN 60950-1	Tested in appliance	
Capacitor Ce205, Ce211, Ce217, Ce305, Ce310	AVX	1210GC102MA T1A	1 nF 2'000 V	IEC/EN 60950-1	Tested in appliance	
Capacitor Cs100, Cs105, Cs161, Cs162	Murata MFG Co Ltd	GA355DR7GF4 72KW01	Y2: 250 VAC 4.7 nF	IEC 60384-14 UL 60384-14 CSA C22.2 E60384-14	VDE, SEMKO cURus E37921	
Relay Ki100, Ki101	TE Connectivity Solutions GmbH	AXICOM P2 V23079-A1001- B301	5 V, 5 A 1'500 VAC	IEC/EN 60950 UL 508 CSA C22.2 No. 14-10	IEC Ref. Cert. No. 3271 cURus E111441	
I ² C Isolator Us301	Analog Devices Inc	ADM3260	400 VAC single prot. 2'500 VAC	UL 1577 CSA C22.2 60950-1	UR E214100 CSA 205078	
Connector Xs100	Molex	5569 Series 39-30-1020	600 V, 13 A 2-pol.	UL 1977	TÜV R72081037 UL E29179	
Choke Ls100	Schaffner EMV AG	RN 114-1/02	250 VAC 1 A 1'500 VAC	UL 1283	VDE UL E64388	

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	
- Description:	Other components					
Connector power input	Phoenix Contact GmbH	SACC-E-MS- 4CON-M16/0,5 SCO (1523450)	250 V, 4 A 4-pol.	UL 2238 CSA C22.2 No. 182.3	cURus E221474	
Choke at power input	Schaffner EMV AG	RN 114-2/02	250 VAC 2 A 1'500 VAC	UL 1283	VDE UL E64388	
WWAN module	Huawei Technologies	ME909u-521	compliant with communication standards	LTE, UMTS, GSM, GPRS, EDGE	CE0682 FCC	
WLAN module	Compex Systems	WLE200NX	compliant with communication standards	Dual-band 802.11n	CE FCC	
Enclosure	Astrel AG	KO LL 2 - 100 ME, KO HL 10 - 100 ME	Aluminium 1.9	IEC/EN 60950-1	Tested in appliance	
Supplementary information:						

1.5.1	TABLE: Opto Electronic Devices	P
Manufacturer : Toshiba Corp, Semiconductor Co		
Type..... : Single opto coupler TLP291 Ui101, Ui102 on PSE Board		
Separately tested : ---		
Bridging insulation : ---		
External creepage distance..... : ---		
Internal creepage distance : ---		
Distance through insulation : ---		
Tested under the following conditions : ---		
Input..... : ---		
Output..... : ---		
supplementary information		

1.5.1	TABLE: Opto Electronic Devices	P
Approved components: 3'750 VAC UL 1577, cURus E67349 EN 60950-1, SEMKO 1200315, BSI 9037		

1.6.2	TABLE: Electrical data (in normal conditions)						P
U (V)	I (A)	I _{rated} (A)	P (W)	Fuse #	I _{fuse} (A)	Condition/status	
43.2	0.156	0.35	6.74	Fs100 / Fs101	2	Data transfer via wireless module	
50.0	0.134	0.35	6.70	Fs100 / Fs101	2	Data transfer via wireless module	
136	0.0560	0.35	7.73	Fs100 / Fs101	2	Data transfer via wireless module	
154	0.0528	0.35	8.13	Fs100 / Fs101	2	Data transfer via wireless module	
Supplementary information:							

2.1.1.5 c) 1)	TABLE: max. V, A, VA test					N/A
Voltage (rated) (V)		Current (rated) (A)	Voltage (max.) (V)	Current (max.) (A)	VA (max.) (VA)	
supplementary information:						

2.1.1.5 c) 2)	TABLE: stored energy			P
Capacitance C (μF)		Voltage U (V)	Energy E (J)	
10		160	0.128	
supplementary information:				

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	V d.c.	
Fault test performed on voltage limiting components		Voltage measured (V) in SELV circuits (V peak or V d.c.)		
supplementary information:				

2.5	TABLE: Limited power sources					N/A	
Circuit output tested:							
Note: Measured Uoc (V) with all load circuits disconnected:							
Components	Sample No.	Uoc (V)	I _{sc} (A)		VA		
			Meas.	Limit	Meas.	Limit	
supplementary information:							
Sc=Short circuit, Oc=Open circuit							

2.10.2	Table: working voltage measurement			N/A
Location		RMS voltage (V)	Peak voltage (V)	Comments
supplementary information:				

2.10.3 and 2.10.4	TABLE: Clearance and creepage distance measurements						P
Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)	
Functional:							
---	---	---	---	---	---	---	
Basic/supplementary:							
Power input before fuses Fs100, Fs101	154	154	1.0	2.5	1.6	2.5	
DC/DC converter Ns152 (prim - sec)	154	154	1.0	3.7	1.6	3.7	
Separation of Digital I/Os Ui101, Ui102, Ki100, Ki101	60	60	1.0	2.0	1.25	2.0	
Reinforced:							
---	---	---	---	---	---	---	
Supplementary information:							

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:						

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		Un-intentional charging	Charging		Discharging		Reversed charging			
	Meas. current	Manuf. Specs.		Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.		
Max. current during normal condition											
Max. current during fault condition											
Test results:										Verdict	
- Chemical leaks										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:											

4.3.8	TABLE: Batteries		N/A
Battery category : (Lithium, NiMh, NiCad, Lithium Ion ...)			
Manufacturer :			
Type / model..... :			
Voltage :			
Capacity..... : mAh			
Tested and Certified by (incl. Ref. No.) :			
Circuit protection diagram:			

MARKINGS AND INSTRUCTIONS (1.7.13)	
Location of replaceable battery	No battery
Language(s)	---
Close to the battery	---
In the servicing instructions	---
In the operating instructions	---

4.5	TABLE: Thermal requirements						P
	Supply voltage (V)	154 V_{DC}					—
	Ambient T_{min} (°C)	24.8					—
	Ambient T_{max} (°C)	25.1					—
Maximum measured temperature T of part/at.....		T (°C)					Allowed T_{max} (°C)
Enclosure (top)		39	(84)				70
Heatsink of DC/DC converter Ns152		68	(113)				---
PCB below DC/DC converter Ns152		65	(110)				130
Ls101		42	(87)				125
Ls100		40	(85)				125
CPU (Connectivity Platform CPU Module)		56	(101)				--
Supplementary information: Slightly higher temperatures measured at a supply voltage of 160 V_{DC} (in comparison with 43.2 V_{DC}) Values in brackets: calculated temperatures according 1.4.12.3 (e.g. 70 °C - 25 °C + 39 °C = 84 °C) Note: This test covers only safety aspects; functional failures due to the temperatures are not considered							
Temperature T of winding:		t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)
Supplementary information:							

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:				

4.7	TABLE: Resistance to fire					P
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence	
Enclosure	Astrel AG	Aluminum	2.0 (min)	---	---	
Supplementary information: See also table 1.5.1 "List of critical components"						

5.1	TABLE: touch current measurement			P
Measured between:		Measured (mA)	Limit (mA)	Comments/conditions
supplementary information:				
5.1.8.2 Summation of touch currents from telecommunication networks: Presumption => 5 connections, each 0.25 mA => Itotal = 1.25 mA (Limit = max. 3.5 mA)				

5.2	TABLE: Electric strength tests, impulse tests and voltage surge tests			P
Test voltage applied between:		Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Break- down Yes / No
Functional:				
Ethernet - enclosure (including USB, power supply) ¹⁾		DC	1'414	No
Digital I/O - enclosure (including USB, power supply)		AC	1'000	No
Basic/supplementary:				
Power supply – PE/electronic circuits ²⁾		DC	2'121	No
Reinforced:				
---		---	---	---
Supplementary information: ¹⁾ According to 6.2.1 ²⁾ According to EN 50155 (EN 60950-1 requires only 1'414 V _{DC})				

5.3	TABLE: Fault condition tests					P
	Ambient temperature (°C)		25			—
	Power source for EUT: Manufacturer, model/type, output rating		Laboratory equipment			—
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Cs106	short circuit after fuses Fs100 and Fs101	154	10 min	Fs100, Fs101	2	Fuse blows, no overheating
Cs153	short circuit after DC/DC converter (Ns152)	--	--	--	--	Theoretical consideration: short circuit protected certified DC/DC converter (Ns152), no overheating
Cs218	short circuit 3.3 V supply	--	--	--	--	Theoretical consideration: short circuit and overtemperature protected step down regulator (Ns200)
Supplementary information: - all components within metallic enclosure without openings						

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:								

C.2	TABLE: transformers	N/A

List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to TMP/CTF stage 1 or WMT/CTF stage 2 procedure has been used.

Clause	Measurement / testing	Testing / measuring equipment / material used	Range used	Last calibration	Calibration due
all	Ambient conditions	PCE Deutschland GmbH, PCE-THB 40, Thermo-/Hygro-/Barometer	12.6632.12	11/2014	11/2015
1.6.2, 5.3	Electrical data, fault condition tests	Fluke, 189, Digital Multimeter	DV9771	09/2015	09/2016
1.6.2, 5.3	Electrical data, fault condition tests	Fluke, 189, Digital Multimeter	DV9992	01/2015	01/2016
2.1	Protection from electric shock and energy hazards	Siemens, IEC 61032 Fig. 2B, Test Pin IEC 60950-1	MG9701	10/2013	10/2016
2.1	Protection from electric shock and energy hazards	Siemens, EN 60950:2000, Test Probe IEC 60950-1 Fig. 2C	MG9703	07/2014	07/2017
2.10	Clearances, creepage distances	Etalon, 0 - 150 mm, Caliper Gauge	M9702	07/2015	07/2016
4.5, 5.3	Thermal requirements, fault condition tests	Fluke, 51, Digital Thermometer for K/J Thermocouples	DV9362	02/2015	02/2016
4.5, 5.3	Thermal requirements, fault condition tests	Roth+Co, Typ K, Thermoelement Typ K (NiCr-Ni)	11.6632.01	12/2014	12/2017
4.5, 5.3	Thermal requirements, fault condition tests	Roth+Co, Typ K, Thermoelement Typ K (NiCr-Ni)	11.6632.02	12/2014	12/2017
4.5, 5.3	Thermal requirements, fault condition tests	Roth+Co, Typ K, Thermoelement Typ K (NiCr-Ni)	11.6632.03	12/2014	12/2017
5.2, 6.2.2	Electric strength tests	ETL, ATS400, High Voltage Tester	14.6632.03	05/2015	05/2016

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 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013 – CENELEC COMMON MODIFICATIONS


IEC60950_1F - ATTACHMENT							
Clause	Requirement + Test				Result - Remark		Verdict
IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)							
Clause	Requirement + Test				Result - Remark		Verdict
	Clauses, subclauses, notes, tables and figures which are additional to those in IEC60950-1 and it's amendmets are prefixed "Z"						P
Contents (A2:2013)	Add the following annexes: 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						P
General	Delete all the "country" notes in the reference document (IEC 60950-1:2005) according to the following list: 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						P
General (A1:2010)	Delete all the "country" notes in the reference document (IEC 60950-1:2005/A1:2010) according to the following list: 1.5.7.1 Note 6.1.2.1 Note 2 6.2.2.1 Note 2 EE.3 Note						P
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.						P

IEC60950_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
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.		N/A
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.		N/A
(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		N/A
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 *		P
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

IEC60950_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
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
	Zx Protection against excessive sound pressure from personal music players		N/A
	<p>Zx.1 General 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: 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. NOTE 1 Examples are 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: – while the personal music player is connected to an external amplifier; or – while the headphones or earphones are not used. 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: – hearing aid equipment and professional equipment; 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>		N/A
	<p>– 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. 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>		N/A

IEC60950_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<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 $L_{Aeq,T}$ is ≤ 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> <ul style="list-style-type: none"> a) protect the user from unintentional acoustic outputs exceeding those mentioned above; and b) 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 		N/A

IEC60950_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>c) 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</p> <p>NOTE 2 Examples of means include visual or audible signals. Action from the user is always required.</p> <p>NOTE 3 The 20 h 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 $L_{Aeq,T}$) 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 $L_{Aeq,T}$) which is much lower than the average programme simulation noise. Therefore, if the player 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>		N/A

IEC60950_1F - ATTACHMENT			
Clause	Requirement + 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: <p>“To prevent possible hearing damage, do not listen at high volume levels for long periods.”</p>  <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>		N/A
	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 $L_{Aeq,T}$, 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>		N/A
	<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 $L_{Aeq,T}$ 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

IEC60950_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>Zx.4.3 Wireless listening devices 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 - 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 $L_{Aeq,T}$ of the listening device shall be ≤ 100 dBA. <p>NOTE An example of a wireless listening device is a Bluetooth headphone.</p>		N/A
	<p>Zx.5 Measurement methods 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
2.7.1	<p>Replace the subclause as follows: Basic requirements 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): 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; 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>	No primary circuits	N/A
	<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. 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
2.7.2	This subclause has been declared 'void'.		P
3.2.3	Delete the NOTE in Table 3A, and delete also in this table the conduit sizes in parentheses.	No mains	N/A

IEC60950_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
3.2.5.1	<p>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”.</p> <p>In Table 3B, replace the first four lines by the following: Up to and including 6 0,75 ^{a)} Over 6 up to and including 10 (0,75) ^{b)} 1,0 Over 10 up to and including 16 (1,0) ^{c)} 1,5 In the conditions applicable to Table 3B delete the words “in some countries” in condition ^{a)}. In NOTE 1, applicable to Table 3B, delete the second sentence.</p>	No mains cord	N/A
3.2.5.1 (A2:2013)	NOTE Z1 The harmonised code designations corresponding to the IEC cord types are given in Annex ZD		N/A
3.3.4	<p>In Table 3D, delete the fourth line: conductor sizes for 10 to 13 A, and replace with the following: Over 10 up to and including 16 1,5 to 2,5 1,5 to 4 Delete the fifth line: conductor sizes for 13 to 16 A</p>		N/A
4.3.13.6 (A1:2010)	<p>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).</p>		P
	Standards taking into account mentioned Recommendation and Directive which demonstrate compliance with the applicable EU Directive are indicated in the OJEC.		P
Annex H	<p>Replace the last paragraph of this annex by: 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). Account is taken of the background level. Replace the notes as follows: NOTE These values appear in Directive 96/29/Euratom. Delete NOTE 2.</p>		N/A
Bibliography	Additional EN standards.		—
ZA	NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS		—

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + 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

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
1.7.2.1	<p>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. 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>		N/A
1.7.2.1 (A11:2009)	<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. 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>		

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
	<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.</p> <p>Translation to Norwegian (the Swedish text will also be accepted in Norway):</p> <p>“Utstyr som er koplet til beskyttelsesjord via nettplugg 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 nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.”</p>		N/A
1.7.2.1 (A2:2013)	<p>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.</p> <p>The marking text in Denmark shall be as follows:</p> <p>In Denmark: “Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.”</p>		N/A
1.7.5 1.7.5 (A11:2009)	<p>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.</p> <p>For CLASS II EQUIPMENT the socket outlet shall be in accordance with Standard Sheet DKA 1-4a.</p>		N/A

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
1.7.5 (A2:2013)	<p>In Denmark, socket-outlets for providing power to other equipment shall be in accordance with the DS 60884-2-D1:2011.</p> <p>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 socket-outlets shall be in accordance with Standard Sheet DK 1-1b, DK 1-1c, DK 1-1d or DK 1-5a.</p> <p>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.</p> <p>Justification the Heavy Current Regulations, 6c</p>		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 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.		N/A
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>	No mains cord	N/A

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
	<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 16A plug and socket-outlet 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, 16A</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.</p> <p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p> <p>If 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 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>		N/A

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
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. 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
3.3.4	<p>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:</p> <ul style="list-style-type: none"> • 1,25 mm² to 1,5 mm² nominal cross-sectional area. 		N/A

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
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: <ul style="list-style-type: none"> • STATIONARY PLUGGABLE EQUIPMENT TYPE A that <ul style="list-style-type: none"> 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

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
6.1.2.1 (A1:2010)	<p>In Finland, Norway and Sweden, add the following text between the first and second paragraph of the compliance clause:</p> <p>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either</p> <ul style="list-style-type: none"> - 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. <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. 		N/A
	<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. 		N/A
6.1.2.2	<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

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
7.2	In Finland, Norway and Sweden , for requirements see 6.1.2.1 and 6.1.2.2 of this annex. The term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM.	No cable distribution system	N/A
7.3 (A11:2009)	In Norway and Sweden , for requirements see 1.2.13.14 and 1.7.2.1 of this annex.	No cable distribution system	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	H03VH-Y
Light polyvinyl chloride sheathed flexible cord	60227 IEC 52	H03VV-F H03VVH2-F
Ordinary polyvinyl chloride sheathed flexible cord	60277 IEC 53	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

ATTACHMENT TO TEST REPORT IEC 60950-1

Pictures of the EUT

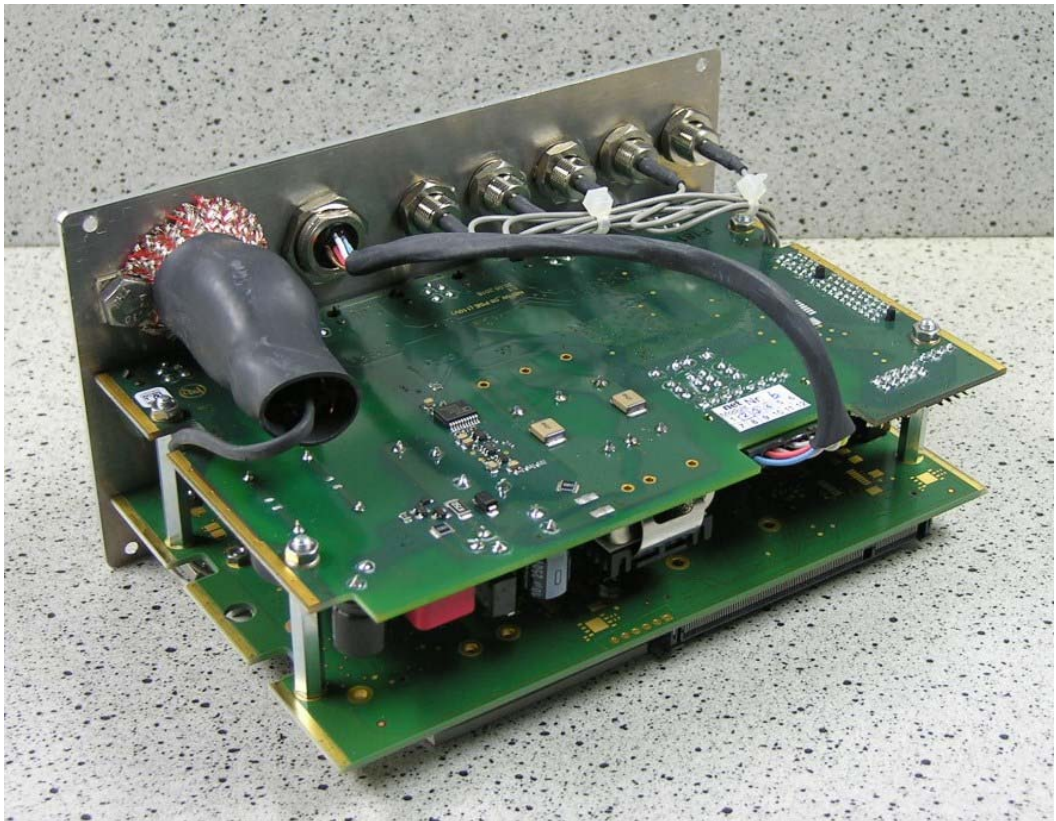


NB3700, total view

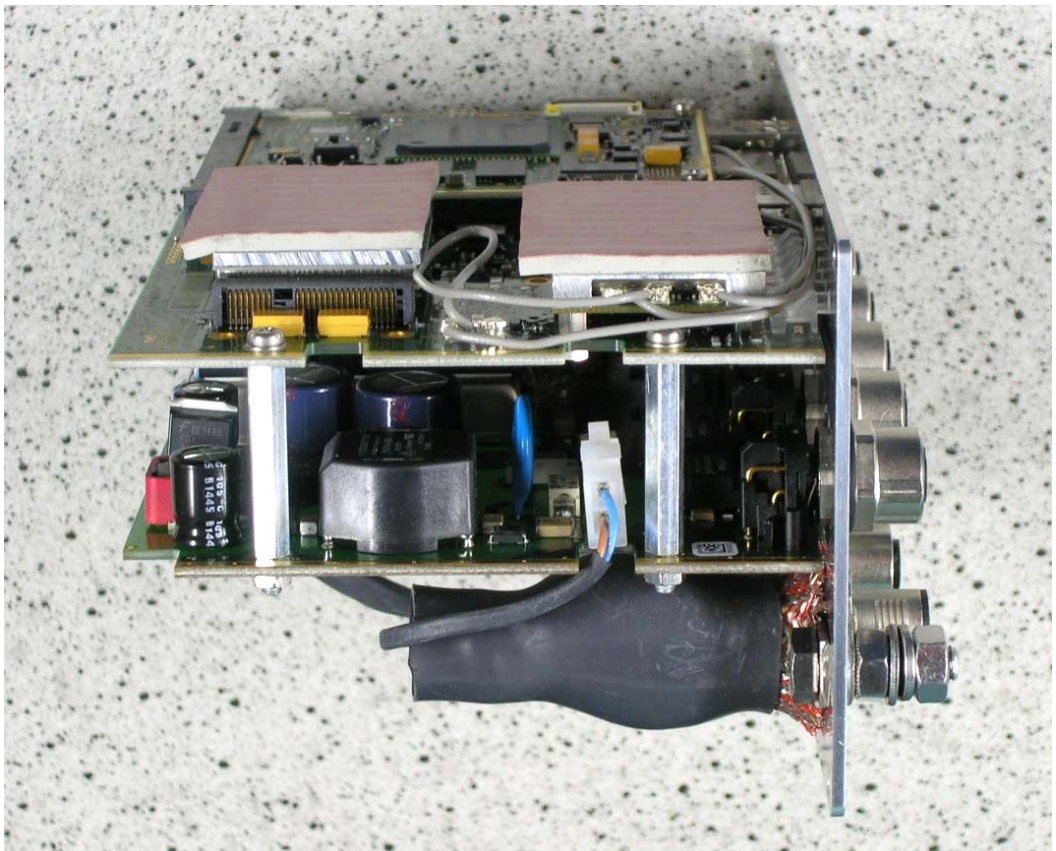


NB3700, rear view

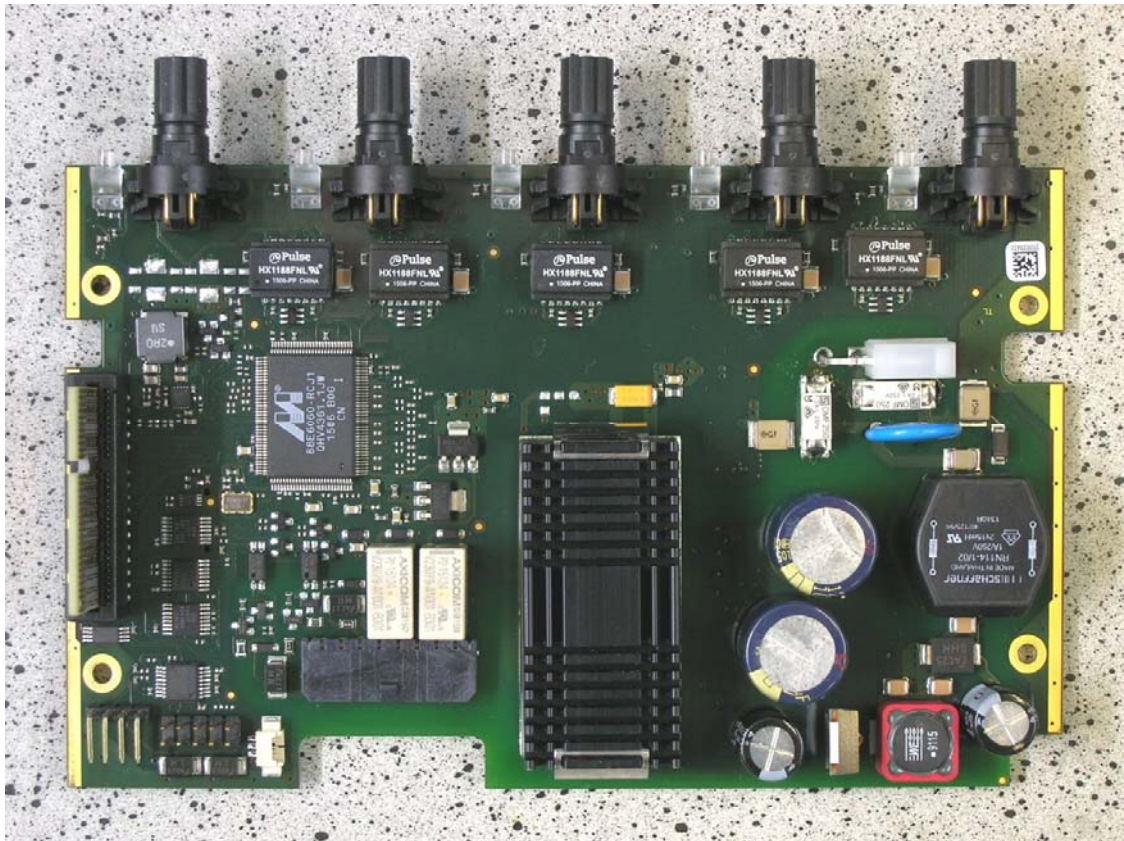
**NB3700, detail view of connectors**



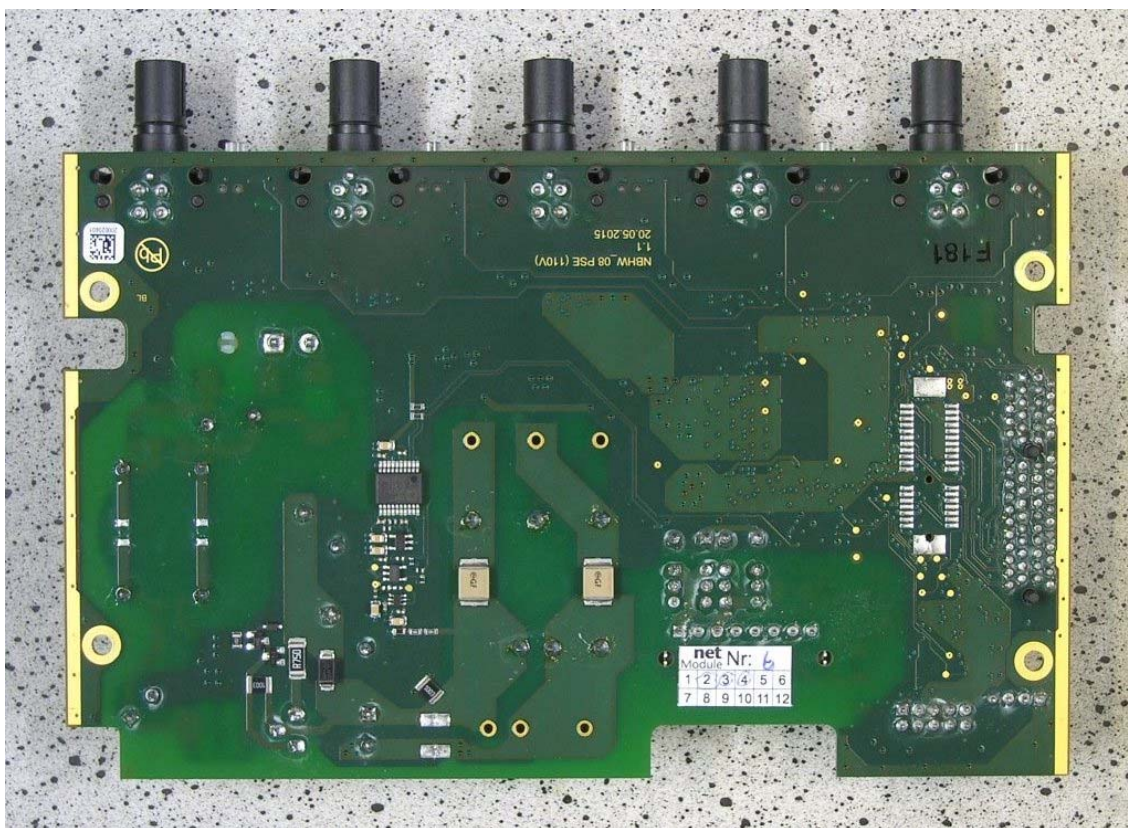
Cover of NB3700 removed, bottom view



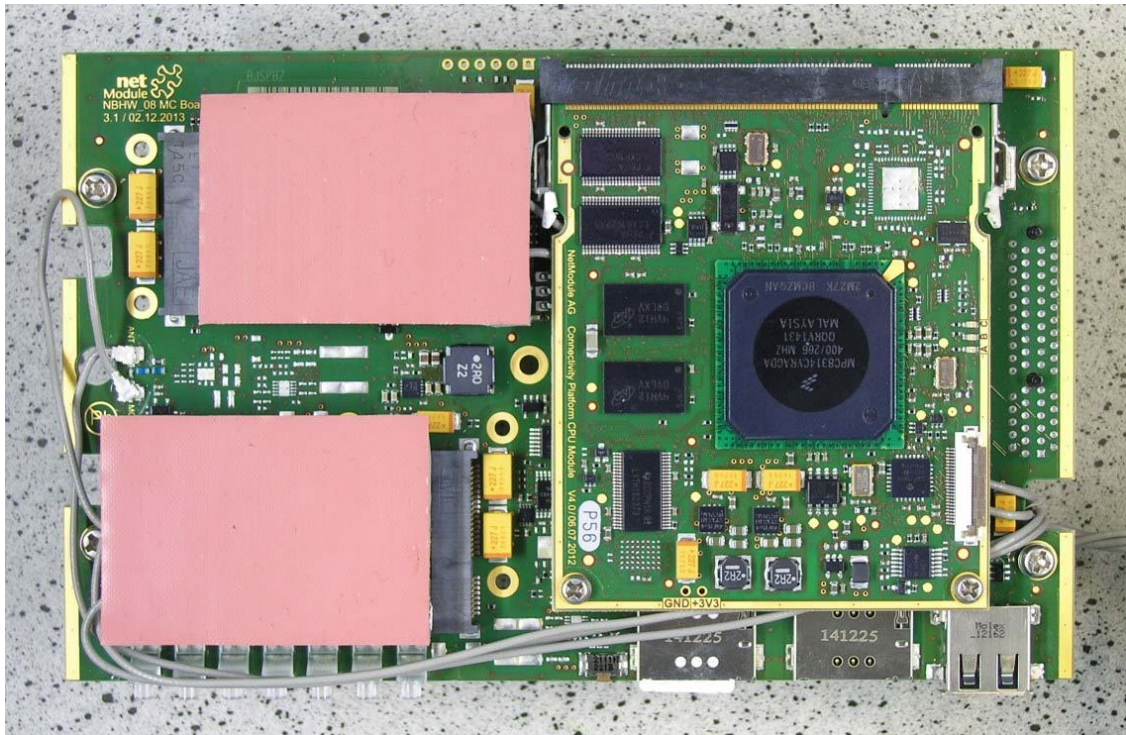
Detail view of power input area



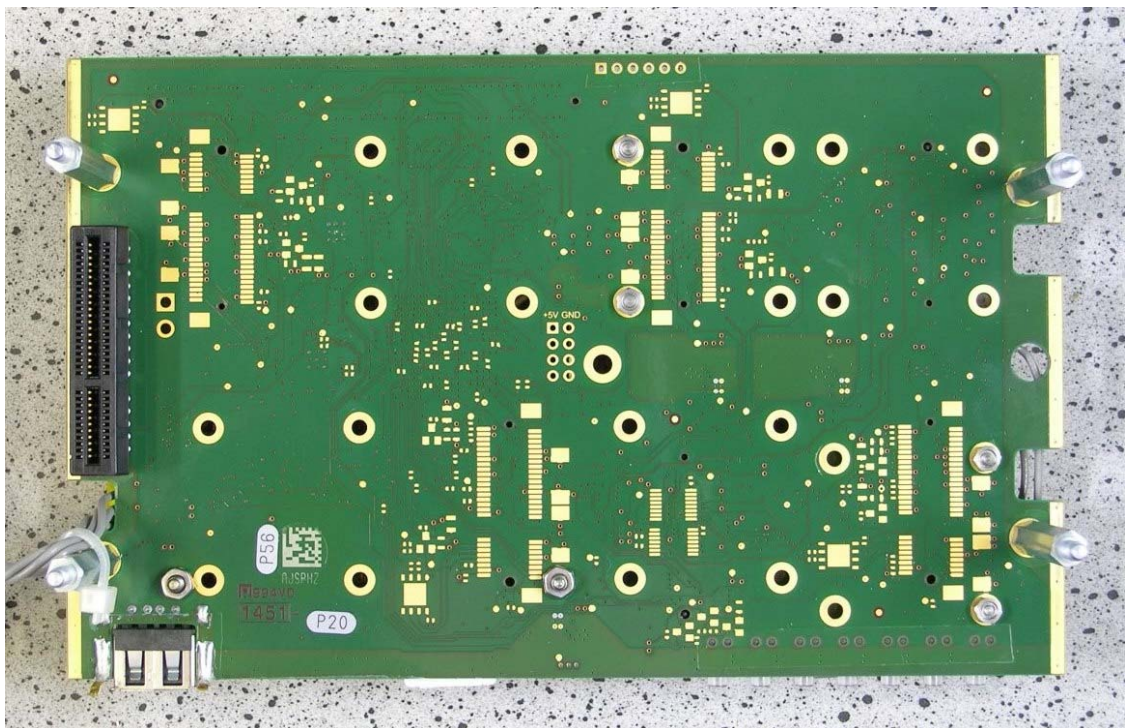
PSE (5x M12 front, 110 V), components side



PSE (5x M12 front, 110 V), soldering side



MC Board with Connectivity Platform CPU Module, top view



MC Board with Connectivity Platform CPU Module, bottom view