

**NOVAsom 6  
NOVAsom 7  
NOVAsom 8**  
**Product code: NI240613-FS01-01**

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

**Date Test:** : 03/12/2014-05/12/2014  
**PlaceTest:** Novasis Laboratories in Limbiate (MB) - Italy  
**Test Engineer:** Stefano Ferronato (AE)  
**Check for Customer:** -  
**Result:** Pass

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<b>Author:</b>	Stefano Ferronato- AE	<b>Controlled</b>	Teodoro Bove- BM-PM	<b>Approved by</b>	Christian Carrieri- GM-CEO
	<i>S Ferronato</i>		<i>T Bove</i>		<i>C Carrieri</i>
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## MODIFICATION LIST

Date	Version	Author	Description	Major Impact
03/12/2014	0	SF	first issue	

## REFERENCE DOCUMENTS/ANNEXES

Item	Code/Version	Document
RD1	NI240613-FS01-se-01	Novasom 6/7/8 Board – Schematics

## TERMS AND DEFINITIONS

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<b>NOVASOM</b>	Novasis System On Module Board
<b>N/A</b>	Not Applicable
<b>N.C.</b>	Normal Conditions
<b>S.F.C</b>	single fault conditions
<b>OP</b>	functional insulation
<b>DI</b>	double insulation
<b>BI</b>	basic insulation
<b>SI</b>	supplementary insulation
<b>BOP</b>	between parts of opposite polarity
<b>RI</b>	reinforced insulation
<b>PCB</b>	Printed Circuit board



## SUMMARY

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# 1. Scope

Execution of assessment Safety report in compliance to norms IEC 60950-1 for NOVAsoM6, NOVAsoM7, NOVAsoM8 product line.

**Testing Laboratory**.....: Novasis Ingegneria Laboratory in Limbiate (MB)  
**Address** .....: Via Monte Rosa, 27 20812 Limbiate (MB) - Italy

**Applicant's name**.....: Novasis Ingegneria s.r.l.  
**Address** .....: Via Orbassano 2/A – 10048 Vinovo (TO) - Italy

**Manufacturer's name**.....: Novasis Ingegneria s.r.l.  
**Address** .....: Via Orbassano 2/A – 10048 Vinovo (TO) - Italy

**Test specification:**  
**Standard**.....: IEC 60950-1:2005 (Second Edition) + Am 1:2009

**Test procedure** .....: Conformity Assessment Report

**Non-standard test method**.....: N/A

**Test item description** .....: Industrial SOM Computing solution

**Trade Mark** .....: Novasis

**Manufacturer** .....: Novasis Ingegneria s.r.l.

**Model/Type reference** .....: Novasom6/Novasom7/Novasom7

**Ratings** .....: 6-30Vdc

**Summary of compliance with National Differences:** US Standard. See Annex 1



## 2. Applicability

This document is applicable to the project Novasis RD1.

## 3. Conventions

N/A

## 4. Tools and Instruments

N/A



## 5. TEST PERFORMED LIST

Item	Tests performed (name of test and test clause)	Applicable/Not Applicable	Result (Pass/Not Pass/N/A)
5.1.5	Components	Applicable	Pass
5.1.6	Power interface	Not Applicable	N/A
5.1.7	Marking and instruction	Applicable	Pass
5.2.1	Protection from hazard	Not Applicable	N/A
5.2.2	SELV circuits	Applicable	Pass
5.2.3	TNV circuits	Not Applicable	N/A
5.2.4	Limited current circuits	Not Applicable	N/A
5.2.5	Limited power sources	Applicable	Pass
5.2.6	Provisions for earthing and bonding	Not Applicable	N/A
5.2.7	Overcurrent and earth fault protection in primary circuits	Not Applicable	N/A
5.2.8	Safety interlocks	Not Applicable	N/A
5.2.9	Electrical insulation	Applicable	Pass
5.2.10	Clearances, creepage distances and distances through insulation	Applicable	Pass
5.3.1	Wiring, connections and supply	Not Applicable	N/A
5.3.2	Connection to a mains supply	Not Applicable	N/A
5.3.3	Wiring terminals for connection of external conductors	Not Applicable	N/A
5.3.4	Disconnection from the mains supply	Not Applicable	N/A
5.3.5	Interconnection of equipment	Applicable	Pass
5.4.1	Stability	Not Applicable	N/A
5.4.2	Mechanical strength	Not Applicable	N/A
5.4.3	Design and construction	Applicable	Pass
5.4.4	Protection against hazardous moving parts	Not Applicable	N/A
5.4.5	Thermal requirements	Applicable	Pass
5.4.6	Openings in enclosures	Not Applicable	N/A
5.4.7	Resistance to fire	Applicable	Pass





## Test item particulars

Equipment mobility.....:  movable  hand-held  transportable  
 stationary  for building-in  direct plug-in

Connection to the mains .....:  pluggable equipment  type A  type B  
 permanent connection  
 detachable power supply cord  
 non-detachable power supply cord  
 not directly connected to the mains

Operating condition.....:  continuous  
 rated operating / resting time:

Access location .....:  operator accessible  
 restricted access location

Over voltage category (OVC) .....:  OVC I  OVC II  OVC III  OVC IV  
 other:

Mains supply tolerance (%) or absolute mains  
supply values .....: 10%

Not directly connected to the mains  
Tested for IT power systems .....:  Yes  No

IT testing, phase-phase voltage (V) .....:  
Class of equipment .....:  Class I  Class II  Class III  
 Not classified

Considered current rating of protective device as  
part of the building installation (A) .....: Not directly connected to the mains

Pollution degree (PD) .....:  PD 1  PD 2  PD 3

IP protection class .....: Open frame

Mass of equipment (kg) .....: 0,08

### 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..... : 2014-12-03

Date(s) of performance of tests..... : 2014-12- 03 / 2014-12-05

### General remarks:

The test results presented in this report relate only to the object tested.

**Manufacturer's Declaration per sub-clause 6.2.5 of IECEE 02:**

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)**..... : Novasis Ingegneria s.r.l.  
Via Orbassano 2/A – 10048 Vinovo (TO) - Italy

**General product information:**

Novasom6/Novasom7/Novasom8 is a single board computer designed with a system on module (SOM) architecture on a core ARM Cortex A9. Novasom are powerful general purpose CPU that can be integrated and customized for specific application.

Designed with the latest generation, high performance microprocessor Novasom can be used in many distinct industrial application.

On-board connectivity solutions, advanced multimedia and other standard peripherals allow our customers quick and easy integration into numerous innovative, high-tech product applications.



## 5.1 GENERAL

### 5.1.5 Components

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.1.5.1	General		Pass
	Comply with IEC 60950-1 or relevant component standard	(see appended Tables 1.5.1)	Pass
5.1.5.2	Evaluation and testing of components		Pass
5.1.5.3	Thermal controls	Not Applicable	N/A
5.1.5.4	Transformers	Not Applicable	N/A
5.1.5.5	Interconnecting cables	Not Applicable	N/A
5.1.5.6	Capacitors bridging insulation	Not Applicable	N/A
5.1.5.7	Resistors bridging insulation N/A	Not Applicable	N/A
5.1.5.7.1	Resistors bridging functional, basic or supplementary insulation	Not Applicable	N/A
5.1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits	Not Applicable	N/A
5.1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable	Not Applicable	N/A
5.1.5.8	Components in equipment for IT power systems	Not Applicable	N/A
5.1.5.9	Surge suppressors	Not Applicable	N/A



## 5.1.6 Power interface

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.1.6	Power interface		
5.1.6.1	AC power distribution systems Not directly connected to the mains	Not Applicable	N/A
5.1.6.2	Input current	(see appended Table 1.6.2)	N/A
5.1.6.3	Voltage limit of hand-held equipment	Not Applicable	N/A
5.1.6.4	Neutral conductor	Not Applicable	N/A

## 5.1.7 Marking and Instruction

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.1.7.1	Power rating and identification markings Not directly connected to the mains. For building-in appliance	Not Applicable	N/A
5.1.7.1.1	Power rating marking		
	Multiple mains supply connections:	Not Applicable	N/A
	Rated voltage(s) or voltage range(s) (V):	Not Applicable	N/A
	Symbol for nature of supply, for d.c. only:	Not Applicable	N/A
	Rated frequency or rated frequency range (Hz):	Not Applicable	N/A
	Rated current (mA or A) :	Not Applicable	N/A
5.1.7.1.2	Identification markings	On product data sheet	Pass
	Manufacturer's name or trade-mark or identification mark:	Novasis	Pass
	Model identification or type reference :	Novasom6 Novasom7 Novasom8	Pass
	Symbol for Class II equipment only :	Not Applicable	N/A



	Other markings and symbols :	Not Applicable	N/A
5.1.7.2	Safety instructions and marking	Not relevant for safety	N/A
5.1.7.2.1	General	Not Applicable	N/A
5.1.7.2.2	Disconnect devices	Not directly connected to the mains	N/A
5.1.7.2.3	Overcurrent protective device	Not Applicable	N/A
5.1.7.2.4	IT power distribution systems	Not Applicable	N/A
5.1.7.2.5	Operator access with a tool	For built-in appliance	N/A
5.1.7.2.6	Ozone	Not Applicable	N/A
5.1.7.3	Short duty cycles	Not Applicable	N/A
5.1.7.4	Supply voltage adjustment:	Not Applicable	N/A
	Methods and means of adjustment; reference to installation instructions	Not Applicable	N/A
5.1.7.5	Power outlets on the equipment :	Not Applicable	N/A
5.1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference)	Not Applicable	N/A
5.1.7.7	Wiring terminals	Not Applicable	N/A
5.1.7.7.1	Protective earthing and bonding terminals:	Not Applicable	N/A
5.1.7.7.2	Terminals for a.c. mains supply conductors	Not Applicable	N/A
5.1.7.7.3	Terminals for d.c. mains supply conductors	Not Applicable	N/A
5.1.7.8	Controls and indicators	Not relevant for safety	N/A
5.1.7.8.1	Identification, location and marking :	Not Applicable	N/A
5.1.7.8.2	Colours:	Not Applicable	N/A
5.1.7.8.3	Symbols according to IEC 60417:	Not Applicable	N/A
5.1.7.8.4	Markings using figures:	Not Applicable	N/A
5.1.7.9	Isolation of multiple power sources:	Not Applicable	N/A
5.1.7.10	Thermostats and other regulating devices:	Not Applicable	N/A
5.1.7.11	Durability	Not Applicable	N/A
5.1.7.12	Removable parts	Not Applicable	N/A
5.1.7.13	Replaceable batteries:	Not Applicable	N/A
	Language(s) :		
5.1.7.14	Equipment for restricted access locations:	Not Applicable	N/A



## 5.2 Protection from Hazards

### 5.2.1 Protection from electric shock and energy hazards

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.2.1	Protection from electric shock and energy hazards :		
5.2.1.1	Protection in operator access areas	Open frame Class III appliance for building-in	N/A
5.2.1.1.1	Access to energized parts Test by inspection:	Not Applicable	N/A
	Test with test finger (Figure 2A) :	Not Applicable	N/A
	Test with test pin (Figure 2B) :	Not Applicable	N/A
	Test with test probe (Figure 2C)	Not Applicable	N/A
5.2.1.1.2	Battery compartments	Not Applicable	N/A
5.2.1.1.3	Access to ELV wiring	Not Applicable	N/A
	Working voltage ( $V_{peak}$ or $V_{rms}$ ); minimum distance through insulation (mm)	(see appended Tables 2.10.2 and 2.10.5)	N/A
5.2.1.1.4	Access to hazardous voltage circuit wiring	Not Applicable	N/A
5.2.1.1.5	Energy hazards:	(see appended Tables 2.1.1.5)	N/A
5.2.1.1.6	Manual controls	Not Applicable	N/A
5.2.1.1.7	Discharge of capacitors in equipment	Not Applicable	N/A
	Measured voltage (V); time-constant (s):	Not Applicable	N/A
5.2.1.1.8	Energy hazards – d.c. mains supply	Not Applicable	N/A
	a) Capacitor connected to the d.c. mains supply :	Not Applicable	N/A
	b) Internal battery connected to the d.c.	Not Applicable	N/A



	mains supply:		
5.2.1.1.9	Audio amplifiers:	See cl. 5.2.1.1.1 See separate test report IEC/EN 60065	N/A
5.2.1.2	Protection in service access areas	Not Applicable	N/A
5.2.1.3	Protection in restricted access locations	Not Applicable	N/A

## 5.2.2 SELV Circuits

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.2.2.1	General requirements	(see appended Table 2.2)	Pass
5.2.2.2	Voltages under normal conditions (V) : $\leq 30$		Pass
5.2.2.3	Voltages under fault conditions (V) : $\leq 30$		Pass
5.2.2.4	Connection of SELV circuits to other circuits:	Only to other SELV circuit	Pass

## 5.2.3 TNV Circuits

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.2.3.1	Limits	Not Applicable	N/A
	Type of TNV circuits:		
5.2.3.2	Separation from other circuits and from accessible parts	Not Applicable	N/A
5.2.3.2.1	General requirements	Not Applicable	N/A
5.2.3.2.2	Protection by basic insulation	Not Applicable	N/A
5.2.3.2.3	Protection by earthing	Not Applicable	N/A
5.2.3.2.4	Protection by other constructions:	Not Applicable	N/A
5.2.3.3	Separation from hazardous voltages	Not Applicable	N/A
	Insulation employed:	Not Applicable	N/A



5.2.3.4	Connection of TNV circuits to other circuits	Not Applicable	N/A
	Insulation employed.: –	Not Applicable	N/A
5.2.3.5	2.3.5 Test for operating voltages generated externally N/A	Not Applicable	N/A

## 5.2.4 Limited current Circuits

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.2.4.1	General requirements	Not Applicable	N/A
5.2.4.2	Limit values	Not Applicable	N/A
	Frequency (Hz):		-
	Measured current (mA) :		-
	Measured voltage (V):		-
	Measured circuit capacitance (nF or $\mu$ F):		-
5.2.4.3	Connection of limited current circuits to other circuits	Not Applicable	N/A

## 5.2.5 Limited power sources

Item	Requirement and Test	Comments (see appended Table 2.5)	Result (Pass/Not Pass/N/A)
5.2.5	a) Inherently limited output		Pass
	b) Impedance limited output	Not Applicable	N/A
	c) Regulating network limited output under normal operating and single fault condition	Not Applicable	N/A
	d) Overcurrent protective device limited output	Not Applicable	N/A
	Max. output voltage (V), max. output current (A), max. apparent power (VA) :	$\leq 30$ ; $\leq 3$ ; $\leq 100$	
	Current rating of overcurrent protective device (A):	External power supply	N/A





	Use of integrated circuit (IC) current limiters	(See Annex CC)	N/A
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## 5.2.6 Provisions for earthing and bonding

Item	Requirement and Test	Comments (see appended Table 2.5)	Result (Pass/Not Pass/N/A)
5.2.6.1	Protective earthing N/A	Not Applicable	N/A
5.2.6.2	Functional earthing N/A	Not Applicable	N/A
5.2.6.3	Protective earthing and protective bonding conductors	Not Applicable	N/A
5.2.6.3.1	General	Not Applicable	N/A
5.2.6.3.2	Size of protective earthing conductors	Not Applicable	N/A
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG:		-
5.2.6.3.3	Size of protective bonding conductors	Not Applicable	N/A
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG:		-
	Protective current rating (A), cross-sectional area (mm <sup>2</sup> ), AWG:		-
5.2.6.3.4	Resistance of earthing conductors and their terminations; resistance ( $\Omega$ ), voltage drop (V), test current (A), duration (min):	Not Applicable	N/A
5.2.6.3.5	Colour of insulation:	Not Applicable	N/A
5.2.6.4	Terminals	Not Applicable	N/A
5.2.6.4.1	General	Not Applicable	N/A
5.2.6.4.2	Protective earthing and bonding terminals	Not Applicable	N/A
	Rated current (A), type, nominal thread diameter (mm):		-
5.2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors	Not Applicable	N/A
5.2.6.5	Integrity of protective earthing	Not Applicable	N/A
5.2.6.5.1	Interconnection of equipment	Not Applicable	N/A
5.2.6.5.2	Components in protective earthing conductors and protective bonding conductors	Not Applicable	N/A
5.2.6.5.3	Disconnection of protective earth	Not Applicable	N/A



5.2.6.5.4	Parts that can be removed by an operator	Not Applicable	N/A
5.2.6.5.5	Parts removed during servicing	Not Applicable	N/A
5.2.6.5.6	Corrosion resistance	Not Applicable	N/A
5.2.6.5.7	Screws for protective bonding	Not Applicable	N/A
5.2.6.5.8	2.6.5.8 Reliance on telecommunication network or cable distribution system	Not Applicable	N/A

## 5.2.7 Overcurrent and earth fault protection in primary circuits

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.2.7.1	Basic requirements	Not directly connected to the mains	N/A
	Instructions when protection relies on building installation	Not Applicable	N/A
5.2.7.2	Faults not simulated in 5.3.7	Not Applicable	N/A
5.2.7.3	Short-circuit backup protection	Not Applicable	N/A
5.2.7.4	Number and location of protective devices:	Not Applicable	N/A
5.2.7.5	Protection by several devices	Not Applicable	N/A
5.2.7.6	Warning to service personnel :	Not Applicable	N/A

## 5.2.8 Safety interlocks

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.2.8.1	General principles	Not directly connected to the mains	N/A
5.2.8.2	Protection requirements	Not Applicable	N/A
5.2.8.3	Inadvertent reactivation	Not Applicable	N/A
5.2.8.4	Fail-safe operation	Not Applicable	N/A
	Protection against extreme hazard	Not Applicable	N/A
5.2.8.5	Moving parts	Not Applicable	N/A
5.2.8.6	Overriding	Not Applicable	N/A
5.2.8.7	Switches, relays and their related circuits	Not Applicable	N/A



5.2.8.7.1	Separation distances for contact gaps and their related circuits (mm) :	Not Applicable	N/A
5.2.8.7.2	Overload test	Not Applicable	N/A
5.2.8.7.3	Endurance test	Not Applicable	N/A
5.2.8.7.4	Electric strength test	(see appended Table 5.2)	N/A
5.2.8.8	Mechanical actuators	Not Applicable	N/A

## 5.2.9 Electrical insulation

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.2.9.1	Properties of insulating materials	Natural rubber, hygroscopic materials and materials containing asbestos not used	Pass
5.2.9.2	Humidity conditioning	According to 5.2.9.1, 5.2.10.8.3, 5.2.10.10 or 5.2.10.11 humidity conditioning not required	N/A
	Relative humidity (%), temperature (°C)		-
5.2.9.3	Grade of insulation	Functional only	Pass
5.2.9.4	Separation from hazardous voltages	Appliance for building-in. To be verified in the final installation	N/A
	Method(s) used:		-



## 5.2.10 Clearances, creepage distances and distances through insulation

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.2.10.1	General		Pass
5.2.10.1.1	Frequency. :	dc	N/A
5.2.10.1.2	Pollution degrees :	2	Pass
5.2.10.1.3	Reduced values for functional insulation	See 5.5.3.4a	Pass
5.2.10.1.4	Intervening unconnected conductive parts		N/A
5.2.10.1.5	Insulation with varying dimensions		N/A
5.2.10.1.6	Special separation requirements		N/A
5.2.10.1.7	Insulation in circuits generating starting pulses		N/A
5.2.10.2	Determination of working voltage		-
5.2.10.2.1	General		Pass
5.2.10.2.2	RMS working voltage	$\leq 30Vdc$	Pass
5.2.10.2.3	Peak working voltage		Pass
5.2.10.3	Clearances		-
5.2.10.3.1	General		Pass
5.2.10.3.2	Mains transient voltages		N/A
	a) AC mains supply :		N/A
	b) Earthed d.c. mains supplies :		N/A
	c) Unearthed d.c. mains supplies :		N/A
	d) Battery operation :		N/A
5.2.10.3.3	Clearances in primary circuits	(see appended Table 2.10.3 and 2.10.4)	N/A
5.2.10.3.4	Clearances in secondary circuits	(see appended Table 2.10.3 and 2.10.4)	N/A
5.2.10.3.5	Clearances in circuits having starting pulses	(see appended Table 2.10.3 and 2.10.4)	N/A
5.2.10.3.6	Transients from a.c. mains supply :		N/A
5.2.10.3.7	Transients from d.c. mains supply :		N/A
5.2.10.3.8	Transients from telecommunication networks and cable distribution systems :		N/A
5.2.10.3.9	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
5.2.10.4	Creepage distances		-
5.2.10.4.1	General		Pass
5.2.10.4.2	Material group and comparative tracking index		Pass
	CTI tests :	Material group IIIb is assumed to be used	-
5.2.10.4.3	Minimum creepage distances	(see appended Table 2.10.3 and 2.10.4)	N/A
<b>5.2.10.5</b>	<b>Solid insulation</b>		-
5.2.10.5.1	General		N/A
5.2.10.5.2	Distances through insulation	(see appended Table 2.10.5)	N/A
5.2.10.5.3	Insulating compound as solid insulation		N/A
5.2.10.5.4	Semiconductor devices		N/A
5.2.10.5.5	Cemented joints	(see appended Table 2.10.3 and 2.10.4)	N/A
5.2.10.5.6	Thin sheet material – General		N/A
5.2.10.5.7	Separable thin sheet material		N/A
	Number of layers (pcs) :		-
5.2.10.5.8	Non-separable thin sheet material		N/A
5.2.10.5.9	Thin sheet material – standard test procedure		N/A
	Electric strength test	(see appended Table 2.10.5)	-
5.2.10.5.10	Thin sheet material – alternative test procedure		
	Electric strength test	(see appended Table 2.10.5)	-
5.2.10.5.11	Insulation in wound components		N/A
5.2.10.5.12	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
5.2.10.5.13	Wire with solvent-based enamel in wound components		N/A
	Electric strength test	(see appended Table 2.10.5)	-
5.2.10.5.14	Additional insulation in wound components		N/A
	Working voltage :		N/A
	- Basic insulation not under stress :		N/A
	- Supplementary, reinforced insulation :		N/A
<b>5.2.10.6</b>	<b>Construction of printed boards</b>		N/A
5.2.10.6.1	Uncoated printed boards	(see appended Table 2.10.3 and 2.10.4)	N/A
5.2.10.6.2	Coated printed boards	(see appended Table 2.10.3 and 2.10.4)	N/A
5.2.10.6.3	Insulation between conductors on the same inner surface of a printed board	(see appended Table 2.10.3 and 2.10.4)	N/A
5.2.10.6.4	Insulation between conductors on different layers of a printed board		N/A
	Distance through insulation	(see appended Table 2.10.5)	N/A
	Number of insulation layers (pcs) :		N/A
<b>5.2.10.7</b>	<b>Component external terminations</b>	(see appended Table 2.10.3 and 2.10.4)	N/A
5.2.10.8	Tests on coated printed boards and coated components		N/A
5.2.10.8.1	Sample preparation and preliminary inspection		N/A
5.2.10.8.2	Thermal conditioning		N/A
5.2.10.8.3	Electric strength test	(see appended Table 5.2)	N/A
5.2.10.8.4	Abrasion resistance test		N/A
5.2.10.8.5	Thermal cycling		N/A
5.2.10.10	Test for Pollution Degree 1 environment and insulating compound		N/A
5.2.10.11	Tests for semiconductor devices and cemented joints		N/A
5.2.10.12	Enclosed and sealed parts		N/A



## 5.3 WIRING, CONNECTIONS AND SUPPLY

### 5.3.1 General

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.3.1.1	Current rating and overcurrent protection		N/A
5.3.1.2	Protection against mechanical damage		N/A
5.3.1.3	Securing of internal wiring		N/A
5.3.1.4	Insulation of conductors	(see appended Table 5.2)	N/A
5.3.1.5	Beads and ceramic insulators		N/A
5.3.1.6	Screws for electrical contact pressure		N/A
5.3.1.7	Insulating materials in electrical connections		N/A
5.3.1.8	Self-tapping and spaced thread screws		N/A
5.3.1.9	Termination of conductors		N/A
	10 N pull test		N/A
5.3.1.10	Sleeving on wiring		N/A

### 5.3.2 Connection to a mains supply

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.3.2.1	Means of connection		N/A
5.3.2.1.1	Connection to an a.c. mains supply		N/A
5.3.2.1.2	Connection to a d.c. mains supply		N/A
5.3.2.2	Multiple supply connections		N/A
5.3.2.3	Permanently connected equipment		N/A
	Number of conductors, diameter of cable and conduits (mm) :		N/A
5.3.2.4	Appliance inlets		N/A
5.3.2.5	Power supply cords		N/A
5.3.2.5.1	AC power supply cords		N/A



	Type:		-
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG:		-
5.3.2.5.2	DC power supply cords		N/A
5.3.2.6	Cord anchorages and strain relief		N/A
	Mass of equipment (kg), pull (N) :		-
	Longitudinal displacement (mm):		-
5.3.2.7	Protection against mechanical damage		N/A
5.3.2.8	Cord guards		N/A
	Diameter or minor dimension D (mm); test mass (g) :		-
	Radius of curvature of cord (mm) :		-
5.3.2.9	Supply wiring space		N/A

### 5.3.3 Wiring terminals for connection of external conductors

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.3.3.1	Wiring terminals		N/A
5.3.3.2	Connection of non-detachable power supply cords		N/A
5.3.3.3	Screw terminals		N/A
5.3.3.4	Conductor sizes to be connected		N/A
	Rated current (A), cord/cable type, cross-sectional area (mm <sup>2</sup> ) ..... :		-
5.3.3.5	Wiring terminal sizes		
	Rated current (A), type, nominal thread diameter (mm) ..... :		-
5.3.3.6	Wiring terminal design		N/A
5.3.3.7	Grouping of wiring terminals		N/A
5.3.3.8	Stranded wire		N/A





### 5.3.4 Disconnection from the mains supply

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.3.4.1	General requirement	Not directly connected to the mains	N/A
5.3.4.2	Disconnect devices		N/A
5.3.4.3	Permanently connected equipment		N/A
5.3.4.4	Parts which remain energized		N/A
5.3.4.5	Switches in flexible cords		N/A
5.3.4.6	Number of poles - single-phase and d.c. equipment		N/A
5.3.4.7	Number of poles - three-phase equipment		N/A
5.3.4.8	Switches as disconnect devices		N/A
5.3.4.9	Plugs as disconnect devices		N/A
5.3.4.10	Interconnected equipment		N/A

### 5.3.5 Interconnection of equipment

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.3.5.1	General requirements		Pass
5.3.5.2	Types of interconnection circuits:	SELV circuit	Pass
5.3.5.3	ELV circuits as interconnection circuits		N/A
5.3.5.4	Data ports for additional equipment		Pass



## 5.4 PHYSICAL REQUIREMENTS

### 5.4.1 Stability

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.4.1	Stability		
	Angle $\phi$ 10°	Open frame - For builting-in appliance	N/A
	Test force (N) :		N/A

### 5.4.2 Mechanical strength

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.4.2.1	General	Open frame - For builting-in appliance	
	Rack-mounted equipment.	(see Annex DD)	N/A
5.4.2.2	Steady force test, 10 N		N/A
5.4.2.3	Steady force test, 30 N		N/A
5.4.2.4	Steady force test, 250 N		N/A
5.4.2.5	Impact test		N/A
	Fall test		N/A
	Swing test		N/A
5.4.2.6	Drop test; height (mm) :		N/A
5.4.2.7	Stress relief test		N/A
5.4.2.8	Cathode ray tubes		N/A
	Picture tube separately certified :		N/A
5.4.2.9	High pressure lamps		N/A
5.4.2.10	Wall or ceiling mounted equipment; force (N):		N/A



### 5.4.3 Design and construction

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.4.3.1	Edges and corners	Open frame - For building-in appliance	N/A
5.4.3.2	Handles and manual controls; force (N):		N/A
5.4.3.3	Adjustable controls		N/A
5.4.3.4	Securing of parts		N/A
5.4.3.5	Connection by plugs and sockets		N/A
5.4.3.6	Direct plug-in equipment		N/A
	Torque:		–
	Compliance with the relevant mains plug standard:		N/A
5.4.3.7	Heating elements in earthed equipment		N/A
5.4.3.8	Batteries	(see appended Tables 4.3.8)	Pass
	- 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
5.4.3.9	Oil and grease		N/A
5.4.3.10	Dust, powders, liquids and gases		N/A
5.4.3.11	Containers for liquids or gases		N/A
5.4.3.12	Flammable liquids :		N/A
	Quantity of liquid (l):		N/A
	Flash point (°C) :		N/A
5.4.3.13	Radiation		–
5.4.3.13.1	General		Pass
5.4.3.13.2	Ionizing radiation		N/A
	Measured radiation (pA/kg) :		–
	Measured high-voltage (kV) :		–
	Measured focus voltage (kV) :		–
	CRT markings :		–



5.4.3.13.3	Effect of ultraviolet (UV) radiation on materials		N/A
	Part, property, retention after test, flammability classification:		N/A
5.4.3.13.4	Human exposure to ultraviolet (UV) radiation :		N/A
5.4.3.13.5	Lasers (including laser diodes) and LEDs	Indicating lights	Pass
5.4.3.13.5.1	Lasers (including laser diodes)		N/A
	Laser class:		-
5.4.3.13.5.2	Light emitting diodes (LEDs)		
5.4.3.13.6	Other types :		N/A

#### 5.4.4 Protection against hazardous moving parts

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.4.4.1	General		N/A
5.4.4.2	Protection in operator access areas :		N/A
	Household and home/office document/media shredders	(see Annex EE)	N/A
5.4.4.3	Protection in restricted access locations :		N/A
5.4.4.4	Protection in service access areas		N/A
5.4.4.5	Protection against moving fan blades		N/A
5.4.4.5.1	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
5.4.4.5.2	Protection for users		N/A
	Use of symbol or warning:		N/A
5.4.4.5.3	Protection for service persons		N/A
	Use of symbol or warning:		N/A



### 5.4.5 Thermal requirements

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.4.5.1	General		Pass
5.4.5.2	Temperature tests		Pass
	Normal load condition per Annex L:		–
5.4.5.3	Temperature limits for materials	(see appended Table 4.5)	Pass
5.4.5.4	Touch temperature limits	(see appended Table 4.5)	N/A
5.4.5.5	Resistance to abnormal heat .....	(see appended Table 4.5)	N/A

### 5.4.6 Openings in enclosures

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.4.6.1	Top and side openings	Open frame appliance	N/A
	Dimensions (mm):		–
5.4.6.2	Bottoms of fire enclosures		N/A
	Construction of the bottom, dimensions (mm) :		–
5.4.6.3	Doors or covers in fire enclosures		N/A
5.4.6.4	Openings in transportable equipment		N/A
5.4.6.4.1	Constructional design measures		N/A
	Dimensions (mm):		–
5.4.6.4.2	Evaluation measures for larger openings		N/A
5.4.6.4.3	Use of metallized parts		N/A
5.4.6.5	Adhesives for constructional purposes		N/A
	Conditioning temperature (°C), time (weeks):		–



## 5.4.7 Resistance to fire

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.4.7.1	Reducing the risk of ignition and spread of flame		Pass
	Method 1, selection and application of components wiring and materials	(see appended Table 4.7)	N/A
	Method 2, application of all of simulated fault condition tests	(see appended Table 5.3)	Pass
5.4.7.2	Conditions for a fire enclosure		-
5.4.7.2.1	Parts requiring a fire enclosure		N/A
5.4.7.2.2	Parts not requiring a fire enclosure	All components in secondary circuits supplied by limited power sources complying with 2.5 and mounted on V-0 class material (PCB)	Pass
5.4.7.3	Materials		-
5.4.7.3.1	General	Open frame appliance	N/A
5.4.7.3.2	Materials for fire enclosures		N/A
5.4.7.3.3	Materials for components and other parts outside fire enclosures		N/A
5.4.7.3.4	Materials for components and other parts inside fire enclosures		N/A
5.4.7.3.5	Materials for air filter assemblies		N/A
5.4.7.3.6	Materials used in high-voltage components		N/A



## 5.5 ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS

### 5.5.1 Touch current and protective conductor current

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.5.1.1	General	(see appended Table 5.1)	N/A
5.5.1.2	Configuration of equipment under test (EUT)		N/A
5.5.1.2.1	Single connection to an a.c. mains supply		N/A
5.5.1.2.2	Redundant multiple connections to an a.c. mains supply		N/A
5.5.1.2.3	Simultaneous multiple connections to an a.c. mains supply		N/A
5.5.1.3	Test circuit		N/A
5.5.1.4	Application of measuring instrument		N/A
5.5.1.5	Test procedure		N/A
5.5.1.6	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) :		–
5.5.1.7	Equipment with touch current exceeding 3,5 mA		N/A
5.5.1.7.1	General :		N/A
5.5.1.7.2	Simultaneous multiple connections to the supply		N/A
5.5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks		N/A
5.5.1.8.1	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) :		–
5.5.1.8.2	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

### 5.5.2 Electric strength

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.5.2.1	General	(see appended Table 5.2)	N/A
5.5.2.2	Test procedure		N/A

### 5.5.3 Abnormal operating and fault conditions

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.5.3.1	Protection against overload and abnormal operation	(see appended Table 5.3)	N/A
5.5.3.2	Motors	(see appended Annex B)	N/A
5.5.3.3	Transformers	(see appended Annex C)	N/A
5.5.3.4	Functional insulation :	According to 5.5.3.4c	Pass
5.5.3.5	Electromechanical components		N/A
5.5.3.6	Audio amplifiers in ITE :		N/A
5.5.3.7	Simulation of faults	See 5.2.5 and 5.5.3.4	N/A
5.5.3.8	Unattended equipment		N/A
5.5.3.9	Compliance criteria for abnormal operating and fault conditions		N/A
5.5.3.9.1	During the tests		Pass
5.5.3.9.2	After the tests		Pass





## 5.6 CONNECTION TO TELECOMMUNICATION NETWORKS

### 5.6.1 Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N/A
5.6.1.1	Protection from hazardous voltages		N/A
5.6.1.2	Separation of the telecommunication network from earth		N/A
5.6.1.2.1	Requirements	(see appended Table 5.2)	N/A
	Supply voltage (V) :		–
	Current in the test circuit (mA) :		–
5.6.1.2.2	Exclusions :		N/A

### 5.6.2 Protection of equipment users from overvoltages on telecommunication networks

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.6.2.1	Separation requirements		N/A
5.6.2.2	Electric strength test procedure		N/A
5.6.2.2.1	Impulse test	(see appended Table 5.2)	N/A
5.6.2.2.2	Steady-state test	(see appended Table 5.2)	N/A
5.6.2.2.3	Compliance criteria		N/A



### 5.6.3 Protection of the telecommunication wiring system from overheating

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
	Max. output current (A) :		–
	Current limiting method:		–

## 5.7 CONNECTION TO CABLE DISTRIBUTION SYSTEMS

### 5.7.1 General

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
5.7.1	General		N/A
5.7.2	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N/A
5.7.3	Protection of equipment users from overvoltages on the cable distribution system		N/A
5.7.4	Insulation between primary circuits and cable distribution systems		N/A
5.7.4.1	General		N/A
5.7.4.2	Voltage surge test	(see appended Table 5.2)	N/A



## 5.8 ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE

### 5.8.1 A.1 - Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 5.4.7.3.2)		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)		–
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



## 5.9 ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS

(see 5.4.7.2.2 and 5.5.3.2)

### 5.9.1 B.1 - General requirements

Item	Requirement and Test	Comments	Result (Pass/Not Pass/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):		–

## 5.10 ANNEX C, TRANSFORMERS

(see 5.1.5.4 and 5.5.3.3)

### 5.10.1 C.1 - General requirements

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
	Position :		–
	Manufacturer:		–
	Type :		–
	Rated values :		–
	Method of protection :		–
C.1	Overload test	(see appended Table 5.3)	N/A
C.2	Insulation	(see appended Tables 5.2 and C2)	N/A
	Protection from displacement of windings :		N/A

## 5.11 ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS

(see 5.1.5.4)

### 5.11.1 D.1 - Measuring instrument

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
D.1	Measuring instrument		N/A
D.2	Alternative measuring instrument		N/A



## 5.12 ANNEX E, TEMPERATURE RISE OF A WINDING

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
E	TEMPERATURE RISE OF A WINDING	(see 5.1.4.13)	N/A

## 5.13 ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
F	MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES	(see 5.2.10 and Annex G)	N/A

## 5.14 ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES

Item	Requirement and Test	Comments	Result (Pass/Not Pass/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
	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

### 5.15 ANNEX H, IONIZING RADIATION

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
H	IONIZING RADIATION	(see 5.4.3.13)	N/A

### 5.16 ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
J	TABLE OF ELECTROCHEMICAL POTENTIALS	(see 5.2.6.5.6)	N/A
	Metal(s) used:		-





## 5.17 ANNEX K, THERMAL CONTROLS

(see 5.1.5.3 AND 5.5.3.38)

Item	Requirement and Test	Comments	Result (Pass/Not Pass/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		N/A

## 5.18 ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT

(see 5.1.2.2.1 AND 5.4.2)

Item	Requirement and Test	Comments	Result (Pass/Not Pass/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

## 5.19 ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS

(see 5.2.3.1)



Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
M.1	Introduction		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

## 5.20 ANNEX N, IMPULSE TEST GENERATORS

(see 5.1.5.7.2, 5.1.5.7.3, 5.2.10.3.9, 5.6.2.2.1, 5.7.3.2, 5.7.4.3 and Clause G.5)

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
N.1	ITU-T impulse test generators		N/A
N.2	IEC 60065 impulse test generator		N/A



## 5.21 ANNEX P, NORMATIVE REFERENCES

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
P	NORMATIVE REFERENCES		-

## 5.22 ANNEX Q, Voltage dependent resistors (VDRs)

(see 5.1.5.9.1)

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
	a) Preferred climatic categories. :		N/A
	b) Maximum continuous voltage :		N/A
	c) Pulse current :		N/A

## 5.23 ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
R.1	Minimum separation distances for unpopulated coated printed boards (see 5.2.10.6.2)		N/A
R.2	Reduced clearances (see 5.2.10.3)		N/A



## **5.24 ANNEX S, PROCEDURE FOR IMPULSE TESTING**

(see 5.6.2.2.3)

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
S.1	Test equipment		N/A
S.2	Test procedure		N/A
S.3	Examples of waveforms during impulse testing		N/A

## **5.25 ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER**

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
T	GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER	(see 5.1.1.2)	-

## **5.26 ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)**

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
U	INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION	(see 5.2.10.5.4)	-



## 5.27 ANNEX V, AC POWER DISTRIBUTION SYSTEMS

(see 5.1.6.1)

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
V.1	Introduction		N/A
V.2	TN power distribution systems		N/A

## 5.28 ANNEX W, SUMMATION OF TOUCH CURRENTS

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
W.1	Touch current from electronic circuits		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

## 5.29 ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS

(see clause C.1)

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
X.1	Determination of maximum input current		N/A
X.2	Overload test procedure		N/A



### 5.30 ANNEX X, ULTRAVIOLET LIGHT CONDITIONING TEST

(see 5.4.3.13.3)

Item	Requirement and Test	Comments	Result (Pass/Not Pass/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

### 5.31 ANNEX Z, OVERVOLTAGE CATEGORIES

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
Z	OVERVOLTAGE CATEGORIES	(see 5.2.10.3.2 and Clause G.2)	N/A

### 5.32 ANNEX AA, MANDREL TEST

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
AA	MANDREL TEST	(see 5.2.10.5.8)	N/A



### **5.33 ANNEX BB, CHANGES IN THE SECOND EDITION**

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
BB	CHANGES IN THE SECOND EDITION		-

### **5.34 ANNEX BB, CHANGES IN THE SECOND EDITION**

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
BB	CHANGES IN THE SECOND EDITION		-

### **5.35 ANNEX CC, Evaluation of integrated circuit (IC) current limiters**

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
CC.1	General		N/A
CC.2	Test program 1:		N/A
CC.3	Test program 2:		N/A

### **5.36 ANNEX DD, Requirements for the mounting means of rack-mounted equipment**

Item	Requirement and Test	Comments	Result (Pass/Not Pass/N/A)
DD.1	General		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



### 5.37 ANNEX EE, Household and home/office document/media shredders

Item	Requirement and Test	Comments	Result (Pass/Not Pass/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





**5.38 TABLE 1.5.1**

1.5.1	TABLE: List of critical components				
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity <sup>1)</sup>
PCB	CLAB CIRCUITS	NI240613- FS01-ge-01	FR4; 1 mm ; Flame class V0	UNE-EN-60249 UNE 20621	CLAB Quality Certificate

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

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..... :

Supplementary information:



### 5.39 TABLE 1.6.2

<b>1.6.2</b>	<b>TABLE: Electrical data (in normal conditions)</b>					N/A
U (V)	I (A)	I <sub>rated</sub> (A)	P (W)	Fuse #	I <sub>fuse</sub> (A)	Condition/status
Supplementary information:						

### 5.40 TABLE 2.1.1.5

<b>2.1.1.5 c) 1)</b>	<b>TABLE: max. V, A, VA test</b>					N/A
Voltage (rated) (V)	Current (rated) (A)	Voltage (max.) (V)	Current (max.) (A)	VA (max.) (VA)		
Supplementary information:						
<b>2.1.1.5 c) 2)</b>	<b>TABLE: stored energy</b>					N/A
Capacitance C (μF)	Voltage U (V)		Energy E (J)			
Supplementary information:						

### 5.41 TABLE 2.2

<b>2.2</b>	<b>TABLE: evaluation of voltage limiting components in SELV circuits</b>				Pass
Component (measured between)	max. voltage (V) (normal operation)		Voltage Limiting Components		
	V peak	V d.c.			
External power supply, SELV, power limited	-	≤ 30V	-		
Fault test performed on voltage limiting components	Voltage measured (V) in SELV circuits (V peak or V d.c.)				
External power supply separately approved	-				
Supplementary information:					



### 5.42 TABLE 2.5

2.5		TABLE: Limited power sources				Pass
Circuit output tested:						
Note: Measured Uoc (V) with all load circuits disconnected:						
Components	Sample No.	Uoc (V)	Isc (A)		VA	
			Meas.	Limit	Meas.	Limit
External power supply	-	Declared by manufacturer $\leq 30\text{Vdc}$		Declared by manufacturer $\leq 3\text{ A}$		Declared by manufacturer $\leq 100\text{VA}$
supplementary information: <b>Not checked</b>						
Sc=Short circuit, Oc=Open circuit						

### 5.43 TABLE 2.10.2

2.10.2		Table: working voltage measurement			Pass
Location	RMS voltage (V)	Peak voltage (V)	Comments		
Input from external power supply	30Vdc	30Vdc	Declared by manufacturer		
supplementary information:					

### 5.44 TABLE 2.10.3 and 2.10.4

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 r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)	
Functional:							
Basic/supplementary:							
Reinforced:							
Supplementary information:							



### 5.45 TABLE 2.10.5

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:						

### 5.46 TABLE 4.3.8

4.3.8	TABLE: Batteries								Pass
The tests of 4.3.8 are applicable only when appropriate battery data is not available									
Is it possible to install the battery in a reverse polarity position?								NO	
	Non-rechargeable batteries			Rechargeable batteries					
	Discharging		Un-intentional	Charging		Discharging		Reversed	
	Meas. Current	Manuf. Specs.		Meas. Current	Manuf. Specs.	Meas. Current	Manuf. Specs.	Meas. Current	Manuf. Specs.
Max. current during normal condition	N/A	N/A	N/A	0,3 mA	1.2 mA	0,25 $\mu$ A	See battery datasheet curve	N/A	N/A
Max. current during fault condition	N/A	N/A	N/A	N/A	N/A	N/A	11 mA	N/A	N/A
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:									





### 5.48 TABLE 4.5.5

4.5.5	<b>TABLE: Ball pressure test of thermoplastic parts</b>			N/A
	Allowed impression diameter (mm) .....:	≤ 2 mm		
Part		Test temperature (°C)	Impression diameter (mm)	
Supplementary information:				

### 5.49 TABLE 4.7

4.7	<b>TABLE: Resistance to fire</b>				Pass
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence
PCB	Various	FR4	1	V0	CLAB Quality Certificate
supplementary information:					

### 5.50 TABLE 5.1

5.1	<b>TABLE: touch current measurement</b>			N/A
Measured between:	Measured (mA)	Limit (mA)	Comments/conditions	
supplementary information:				



**5.51 TABLE 5.2**

<b>5.2</b>	<b>TABLE: Electric strength tests, impulse tests and voltage surge tests</b>				N/A
Test voltage applied between:	Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Breakdown Yes / No		
Functional: (*)					
Basic/supplementary:					
Reinforced:					
Supplementary information: (*) According to 5.3.4c for functional insulation					

**5.52 TABLE 5.3**

<b>5.3</b>	<b>TABLE: Fault condition tests</b>						N/A
	Ambient temperature (°C) .....						-
	Power source for EUT: Manufacturer, model/type, output rating .....						-
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation	
Supplementary information: According to 2.5 and 5.3.4							



### 5.53 TABLE C.2

C.2	TABLE: transformers						N/A
Loc.	Tested insulation	Working voltage peak / V (2.102)	Working voltage rms / V (2.102)	Required electric strength (52)	Required clearance / mm (2.103)	Required creepage distance / mm (2.104)	Required distance thr. insul. (2.105)
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
Transformer							





## 6. ANNEX 1- TEST REPORT IEC 60950-1 U.S.A. NATIONAL DIFFERENCES

### ATTACHMENT TO TEST REPORT IEC 60950-1 U.S.A. NATIONAL DIFFERENCES

#### Information technology equipment – Safety –

#### Part 1: General requirements

Differences according to UL 60950-1-07

Attachment Form No. US\_ND\_IEC60950\_1C

Attachment Originator TÜV SÜD Product Service GmbH

Master Attachment Date (2012-08)

Clause	Requirement/Test	Comment	Result (Pass/Not Pass/N/A)
1.1.1	All equipment is to be designed to allow installation in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part I, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2.	For building-in appliance	Pass
	Also, unless marked or otherwise identified, installation is allowed per the Standard for the Protection of Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75.		N/A
1.4.14	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A.		N/A
1.5.5	For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g., DP, CL2) specified in the CEC/NEC.		N/A
	For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies that are not types specified in the CEC are required to have special construction features and identification markings.		N/A
1.7.1	Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings.		N/A



	A voltage rating that exceeds an attachment plug cap rating is only permitted if it does not exceed the extreme operating conditions in Table 2 of CAN/CSA C22.2 No. 235, and		N/A
	- if it is part of a range that extends into the Table 2 "Normal Operating Conditions."		N/A
	A voltage rating is not to be lower than the specified "Normal Operating Conditions," unless it is part of a range that extends into the "Normal Operating Conditions."		N/A
1.7.7	Wiring terminals intended to supply Class 2 outputs in accordance with CEC Part 1 or NEC are marked with the voltage rating and "Class 2" or equivalent.		N/A
	- Marking is located adjacent to the terminals		N/A
	- Marking is visible during wiring		N/A
2.5	Fuse providing Class 2, Limited Power Source, or TNV current limiting is not operator-accessible unless it is not interchangeable.		N/A
2.6.3.3	Modify first column on Table 2D to "Smaller of the RATED CURRENT of the equipment or the PROTECTIVE CURRENT RATING of the circuit under consideration."		N/A
2.7.1	Suitable NEC/CEC branch circuit protection rated at the maximum circuit rating is provided for all standard supply outlets and receptacles (such as supplied in power distribution units) if the supply branch circuit protection is not suitable.		N/A



	Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, provided with special transformer overcurrent protection.		N/A
3.2	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains is in accordance with the NEC/CEC.		N/A
3.2.1	Attachment plugs of power supply cords are rated not less than 125 per cent of the rated current of the equipment.		N/A
3.2.1.2	Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment comply with special earthing, wiring, marking and installation instruction requirements.		N/A
3.2.3	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.		N/A
3.2.5	Power supply cords are no longer than 4.5 m in length.		N/A
	Minimum cord length is 1.5 m, with certain constructions such as external power supplies allowed to consider both input and output cord lengths into the requirement.		N/A
	Flexible power supply cords are compatible with Article 400 of the NEC, and Tables 11 and 12 of the CEC.		N/A
3.2.9	Permanently connected equipment have a suitable wiring compartment and wire bending space.		N/A



3.3	Wiring terminals and associated spacings for field wiring connections comply with CSA C22.2 No. 0.		N/A
3.3.3	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm <sup>2</sup> ).		N/A
3.3.4	Terminals for permanent wiring, including protective earthing terminals, are suitable for Canadian/US wire gauge sizes, are		N/A
	- rated 125 per cent of the equipment rating, and		N/A
	- are specially marked when specified (1.7.7).		N/A
3.3.5	Revise first column of Table 3E to "Smaller of the RATED CURRENT of the equipment or the PROTECTIVE CURRENT RATING of the circuit under consideration."		N/A
3.4.2	Motor control devices are provided for cord-connected equipment with a motor if the equipment is rated more than 12 A,		N/A
	- or if the motor has a nominal voltage rating greater than 120 V		N/A
	- or is rated more than 1/3 hp (locked rotor current over 43 A)		N/A



3.4.8	Vertically-mounted disconnect switches and circuit breakers have the "on" position indicated by the handle in the up position.		N/A
3.4.11	For computer room applications, equipment with battery systems capable of supplying 750 VA for five minutes have a battery disconnect means that may be connected to the computer room remote power-off circuit.		N/A
4.3.12	The maximum quantity of flammable liquid stored in equipment complies with NFPA 30.		N/A
4.3.13.5	Equipment with lasers meet the Canadian Radiation Emitting Devices Act, REDR C1370 and/or Code of Federal Regulations 21 CFR 1040, as applicable.		N/A
4.7	For computer room applications, automated information storage systems with combustible media greater than 0.76 m <sup>3</sup> (27 cu ft) have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.		N/A
4.7.3.1	For computer room applications, enclosures with combustible material measuring greater than 0.9 m <sup>2</sup> (10 sq ft) or a single dimension greater than 1.8 m (6 ft) have a flame spread rating of 50 or less.		N/A
	For other applications, enclosures with the same dimensions require a flame spread rating of 200 or less.		N/A
Annex H	Equipment that produces ionizing radiation complies with U.S. Code of Federal Regulations, 21 CFR 1020 (and the Canadian Radiation Emitting Devices Act, REDR C1370).		N/A
	Other National Differences		—



1.5.1	Some components and materials associated with the risk of fire, electric shock, or personal injury have component or material ratings in accordance with the applicable national (Canadian and/or U.S.) component or material standard requirements.	PCB	Pass
1.6.1.2	A circuit for connection to the DC Mains Supply is classified as either a SELV Circuit, TNV-2 Circuit or Hazardous Voltage Circuit depending on the maximum operating voltage of the supply.	SELV circuit	Pass
	This maximum operating voltage includes consideration of the battery charging "float voltage" associated with the intended supply system, regardless of the marked power rating of the equipment.		N/A
2.3.1	For TNV-2 and TNV-3 circuits with other than ringing signals and with voltages exceeding 42.4 V <sub>peak</sub> or 60 V <sub>d.c.</sub> , the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 mA d.c. under normal operating conditions.		N/A
2.3.2.1	In the event of a single fault between TNV and SELV circuits, the limits of 2.2.3 apply to SELV Circuits and accessible conductive parts.		N/A
2.6.3.4	Protective bonding conductors of non-standard protective bonding constructions (e.g., printed circuit traces) may be subjected to the additional limited short circuit test conditions specified.		N/A
4.2.8.1	Enclosures around CRTs with a face diameter of 160 mm or more reduce the risk of injury due to the implosion of the CRT.		N/A
4.3.2	Equipment with handles complies with special loading tests.		N/A
5.1.8.3	Equipment intended to receive telecommunication ringing signals comply with a special touch current measurement tests.		N/A



5.3.7	Internal (e.g., card cage) SELV circuit connectors and printed wiring board connectors that are accessible to the operator and that deliver power are overloaded.		N/A
	During abnormal operating testing, if a circuit is interrupted by the opening of a component, the test shall be repeated twice (three tests total) using new components as necessary		N/A
6.4	Equipment intended for connection to telecommunication network outside plant cable is protected against overvoltage from power line crosses in accordance with 6.4 and Annex NAC.		N/A
Annex EE	Articulated accessibility probe (Fig EE.3) is used for assessing accessibility to document/media shredders instead of the Figure 2A test finger.		N/A
Annex M.2	Continuous ringing signals up to 16 mA only are permitted if the equipment is subjected to special installation and performance restrictions.		N/A
Annex NAD	Equipment connected to a telecommunication and cable distribution networks and supplied with an earphone intended to be held against, or in the ear comply with special acoustic pressure requirements.		N/A



## 7. ANNEX 2- DUT PHOTOS

