

TEST REPORT EN 60950-1 Information technology equipment – Safety – Part 1: General requirements	
Report Number.....	STR15128160S
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Testing laboratory	Shenzhen SEM.Test Technology Co., Ltd.
Address	1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101)
Testing location	As above
Applicant's name	Shenzhen Hi-Link Electronic Co., Ltd
Address	3F, 5# Building, Minxing Industrial Park, Minkang Rd., Minzhi, Longhua District, Shenzhen, China
Test specification:	
Standard.....	EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
Test procedure.....	CE Attestation
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
This test report is specially limited to the above client company and product model only. It may not be duplicated without prior written consent of SEM. Test.	
Tel: +86-755-33663308	Fax: +86-755-33663309 http://www.semtest.com.cn
Test item description.....	AC-DC Module
Trade Mark.....	HI-LINK
Manufacturer	Same as applicant
Model/Type reference	HLK-PM01, HLK-PM03, HLK-PM09, HLK-PM12
Ratings	Input: 100-240V~, 50-60Hz, 0.1A Output: see model list for detail

Summary of testing:

Tests performed (name of test and test clause):

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

The submitted samples were found to comply with the requirements of above specification.

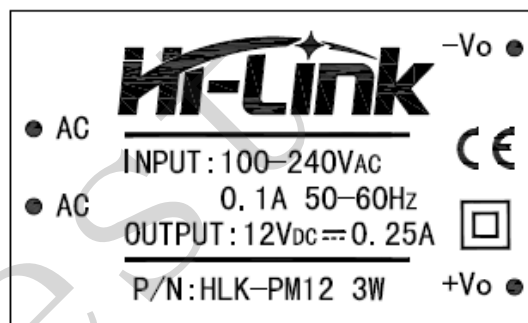
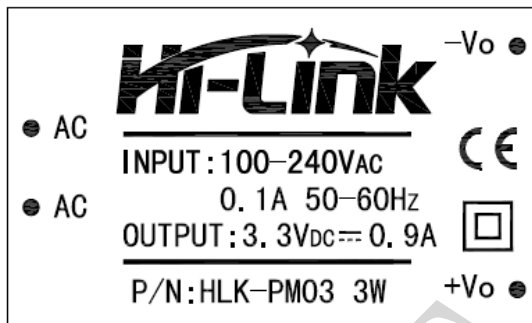
Testing location:

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101)

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.

(Additional requirements for markings. See 1.7 NOTE)



Note:

---The heights of graphical symbols aren't less than 5 mm.

---The heights of letters and numerals either shown separately or with or as part of symbols aren't less than 2 mm.

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
☐ direct plug-in
☐ 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 :

 $\pm 10\%$

Tested for IT power systems:

☐ Yes ☒ No

IT testing, phase-phase voltage (V) :

Class of equipment : Considered current rating of protective device as part of the building installation (A) Pollution degree (PD): IP protection class.....: Altitude during operation (m): Altitude of test laboratory (m): Mass of equipment (kg)..... :	<input type="checkbox"/> Class I <input checked="" type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified 16A <input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3 IP20 <2000m <2000m : 0.021Kg																	
Possible test case verdicts: - test case does not apply to the test object..... : N/A (or N) - test object does meet the requirement..... : P (Pass) - test object does not meet the requirement : F (Fail)																		
Testing : Date of receipt of test item..... : Dec. 19, 2015 Date(s) of performance of tests : Dec. 19, 2015 – March 13, 2016																		
General remarks: <p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. “(see Enclosure #)” refers to additional information appended to the report. “(see appended table)” refers to a table appended to the report.</p> <p>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p>																		
General product information: 1. The AC-DC Module models HLK-PM01, HLK-PM03, HLK-PM09 and HLK-PM12 building-in type switching power supplies for use in information technology equipment. 2. All models are different model names, output rating and output component. 3. The equipment disconnect device is considered to be in the end product.																		
Model List and Different																		
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>No.</th> <th>Model No.</th> <th>Input voltage (Vac)</th> <th>Rated current (A)</th> <th>Output voltage (V)</th> <th>Output current (A)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>HLK-PM01</td> <td rowspan="2">100-240Vac, 50-60Hz</td> <td>0.1</td> <td>5.0</td> <td>0.6</td> </tr> <tr> <td>2.</td> <td>HLK-PM03</td> <td>0.1</td> <td>3.3</td> <td>0.9</td> </tr> </tbody> </table>		No.	Model No.	Input voltage (Vac)	Rated current (A)	Output voltage (V)	Output current (A)	1.	HLK-PM01	100-240Vac, 50-60Hz	0.1	5.0	0.6	2.	HLK-PM03	0.1	3.3	0.9
No.	Model No.	Input voltage (Vac)	Rated current (A)	Output voltage (V)	Output current (A)													
1.	HLK-PM01	100-240Vac, 50-60Hz	0.1	5.0	0.6													
2.	HLK-PM03		0.1	3.3	0.9													



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	3.	HLK-PM09		0.1	9.0	0.33	
	4.	HLK-PM12		0.1	12.0	0.25	

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)

SEM. Test

EN60950-1			
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
1.5.4	Transformers	Transformer used is suitable for its intended application and comply with relevant parts of this standard and particularly Annex C.	P
1.5.5	Interconnecting cables		N
1.5.6	Capacitors bridging insulation	Y1 cap. According to IEC 60384-14, VDE approved.	P
1.5.7	Resistors bridging insulation	No such resistors	N
1.5.7.1	Resistors bridging functional, basic or supplementary insulation		N
1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits	No such resistors	N
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable	No such resistors	N
1.5.8	Components in equipment for IT power systems		N
1.5.9	Surge suppressors		N
1.5.9.1	General		N
1.5.9.2	Protection of VDRs		N
1.5.9.3	Bridging of functional insulation by a VDR		N
1.5.9.4	Bridging of basic insulation by a VDR		N
1.5.9.5	Bridging of supplementary, double or reinforced insulation by a VDR		N
1.6	Power interface		P
1.6.1	AC power distribution systems		P
1.6.2	Input current	See appended table 1.6.2	P
1.6.3	Voltage limit of hand-held equipment	Not hand-held equipment	N
1.6.4	Neutral conductor		P
1.7	Marking and instructions		P
1.7.1	Power rating and identification markings		P
1.7.1.1	Power rating marking		P

EN60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Multiple mains supply connections.....:		N
	Rated voltage(s) or voltage range(s) (V)	100-240V~	P
	Symbol for nature of supply, for d.c. only		N
	Rated frequency or rated frequency range (Hz):	50-60Hz	P
	Rated current (mA or A)	0.1A	P
1.7.1.2	Identification markings		P
	Manufacturer's name or trade-mark or identification mark	Shenzhen Hi-Link Electronic Co., Ltd.	P
	Model identification or type reference	HLK-PM01, HLK-PM03, HLK-PM09, HLK-PM12	P
	Symbol for Class II equipment only	Class II symbol (IEC 60417-1, symbol No. 5172) is applied to the label.	P
	Other markings and symbols	The additional marking does not give rise to misunderstandings.	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		N
1.7.2.4	IT power distribution systems		N
1.7.2.5	Operator access with a tool	No operator accessible area that needs to be accessed by the use of a tool.	N
1.2.7.6	Ozone	No ozone	N
1.7.3	Short duty cycles	Continuous operation	N
1.7.4	Supply voltage adjustment		N
	Methods and means of adjustment; reference to installation instructions		N
1.7.5	Power outlets on the equipment	No such power outlets.	N
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference)		N
1.7.7	Wiring terminals		N
1.7.7.1	Protective earthing and bonding terminals		N
1.7.7.2	Terminals for a.c. mains supply conductors		N
1.7.7.3	Terminals for d.c. mains supply conductors	No d.c. mains supply	N
1.7.8	Controls and indicators		N
1.7.8.1	Identification, location and marking		N
1.7.8.2	Colours		—
1.7.8.3	Symbols according to IEC 60417		N
1.7.8.4	Markings using figures		N

EN60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7.9	Isolation of multiple power sources	No multiple power sources	N
1.7.10	Thermostats and other regulating devices	No thermostats or other regulating devices.	N
1.7.11	Durability	The label was subjected to the permanence of marking test. The label was rubbed with cloth soaked with water for 15 s and then again for 15 s with the cloth soaked with petroleum spirit. After this test there was no damage to the label. The marking on the label did not fade. There was no curling nor lifting of the label edge.	P
1.7.12	Removable parts		N
1.7.13	Replaceable batteries		N
	Language(s)		—
1.7.14	Equipment for restricted access locations.....		N
2	PROTECTION FROM HAZARDS		P
2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas	Building-in component	N
2.1.1.1	Access to energized parts		N
	Test by inspection		N
	Test with test finger (Figure 2A)		N
	Test with test pin (Figure 2B)		N
	Test with test probe (Figure 2C)		N
2.1.1.2	Battery compartments		N
2.1.1.3	Access to ELV wiring		N
	Working voltage (V_{peak} or V_{rms}); minimum distance through insulation (mm)		—
2.1.1.4	Access to hazardous voltage circuit wiring		N
2.1.1.5	Energy hazards		N
2.1.1.6	Manual controls	No shafts of knobs etc.	N
2.1.1.7	Discharge of capacitors in equipment		N
	Measured voltage (V); time-constant (s).....		—
2.1.1.8	Energy hazards – d.c. mains supply		N
	a) Capacitor connected to the d.c. mains supply ..:		N
	b) Internal battery connected to the d.c. mains supply		N
2.1.1.9	Audio amplifiers		N

EN60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.1.2	Protection in service access areas	No such service access areas	N
2.1.3	Protection in restricted access locations	No such restricted access locations	N
2.2	SELV circuits		P
2.2.1	General requirements		P
2.2.2	Voltages under normal conditions (V)	< 60V d.c.	P
2.2.3	Voltages under fault conditions (V)	< 60V d.c.	P
2.2.4	Connection of SELV circuits to other circuits		P
2.3	TNV circuits		N
2.3.1	Limits		N
	Type of TNV circuits		—
2.3.2	Separation from other circuits and from accessible parts		N
2.3.2.1	General requirements		N
2.3.2.2	Protection by basic insulation		N
2.3.2.3	Protection by earthing		N
2.3.2.4	Protection by other constructions		N
2.3.3	Separation from hazardous voltages		N
	Insulation employed		N
2.3.4	Connection of TNV circuits to other circuits		N
	Insulation employed		—
2.3.5	Test for operating voltages generated externally		N
2.4	Limited current circuits		P
2.4.1	General requirements		P
2.4.2	Limit values		P
	Frequency (Hz).....	See appended table 2.4.2	—
	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
2.5	Limited power sources		P
	a) Inherently limited output		N
	b) Impedance limited output		N

EN60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	c) Regulating network limited output under normal operating and single fault condition		P
	d) Overcurrent protective device limited output		N
	Max. output voltage (V), max. output current (A), max. apparent power (VA)	See appended table 2.5	—
	Current rating of overcurrent protective device (A) ..		—
	Use of integrated circuit (IC) current limiters		N
2.6	Provisions for earthing and bonding		N
2.6.1	Protective earthing	Checked on final equipment.	N
2.6.2	Functional earthing		N
2.6.3	Protective earthing and protective bonding conductors		N
2.6.3.1	General		N
2.6.3.2	Size of protective earthing conductors		N
	Rated current (A), cross-sectional area (mm ²), AWG		—
2.6.3.3	Size of protective bonding conductors		N
	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)		N
2.6.3.5	Colour of insulation		N
2.6.4	Terminals		N
2.6.4.1	General		N
2.6.4.2	Protective earthing and bonding terminals		N
	Rated current (A), type, nominal thread diameter (mm)		—
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N
2.6.5	Integrity of protective earthing		N
2.6.5.1	Interconnection of equipment		N
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		N
2.6.5.3	Disconnection of protective earth		N
2.6.5.4	Parts that can be removed by an operator		N
2.6.5.5	Parts removed during servicing		N

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Clause	Requirement + Test	Result - Remark	Verdict
2.6.5.6	Corrosion resistance		N
2.6.5.7	Screws for protective bonding		N
2.6.5.8	Reliance on telecommunication network or cable distribution system		N
2.7	Overcurrent and earth fault protection in primary circuits		N
2.7.1	Basic requirements	Checked on final equipment.	N
	Instructions when protection relies on building installation		N
2.7.2	Faults not simulated in 5.3.7		N
2.7.3	Short-circuit backup protection		N
2.7.4	Number and location of protective devices		N
2.7.5	Protection by several devices		N
2.7.6	Warning to service personnel		N
2.8	Safety interlocks		N
2.8.1	General principles		N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
	Protection against extreme hazard		N
2.8.5	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches, relays and their related circuits		N
2.8.7.1	Separation distances for contact gaps and their related circuits (mm)		N
2.8.7.2	Overload test		N
2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test		N
2.8.8	Mechanical actuators		N
2.9	Electrical insulation		P
2.9.1	Properties of insulating materials	Neither natural rubber, materials containing asbestos nor hygroscopic materials are used as insulation. No driving belts or couplings used.	P
2.9.2	Humidity conditioning	Humidity treatment performed at 48 hr.	P
	Relative humidity (%), temperature (°C)	25°C, 93%, 48h, No dielectric breakdown	—

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Clause	Requirement + Test	Result - Remark	Verdict
2.9.3	Grade of insulation	Insulation complies with sub-clauses 2.10, 4.5.a and 5.2.	P
2.9.4	Separation from hazardous voltages	Insulation is considered to be functional, basic, double or reinforced insulation.	P
	Method(s) used	Method 1 used.	—
2.10	Clearances, creepage distances and distances through insulation		P
2.10.1	General	See below	P
2.10.1.1	Frequency	Considered	P
2.10.1.2	Pollution degrees	Pollution degree 2	P
2.10.1.3	Reduced values for functional insulation	See 5.3.4	N
2.10.1.4	Intervening unconnected conductive parts		N
2.10.1.5	Insulation with varying dimensions	No such transformer used.	N
2.10.1.6	Special separation requirements	Special separation is not used.	N
2.10.1.7	Insulation in circuits generating starting pulses	The circuit will not generate starting pulse.	N
2.10.2	Determination of working voltage		P
2.10.2.1	General	Refer below	P
2.10.2.2	RMS working voltage	See apended table 2.10.2	P
2.10.2.3	Peak working voltage	See apended table 2.10.2	P
2.10.3	Clearances	See apended table 2.10.3 and 2.10.4	P
2.10.3.1	General	Refer below	P
2.10.3.2	Mains transient voltages		N
	a) AC mains supply		N
	b) Earthed d.c. mains supplies		N
	c) Unearthed d.c. mains supplies		N
	d) Battery operation		N
2.10.3.3	Clearances in primary circuits	See apended table 2.10.3 and 2.10.4	P
2.10.3.4	Clearances in secondary circuits		P
2.10.3.5	Clearances in circuits having starting pulses	The circuit will not generate starting pulse.	N
2.10.3.6	Transients from a.c. mains supply		N
2.10.3.7	Transients from d.c. mains supply	Not connected to d.c mains supply	N

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Clause	Requirement + Test	Result - Remark	Verdict
2.10.3.8	Transients from telecommunication networks and cable distribution systems	Not connected to telecommunication networks and cable distribution systems.	N
2.10.3.9	Measurement of transient voltage levels		N
	a) Transients from a mains supply		N
	For an a.c. mains supply		N
	For a d.c. mains supply		N
	b) Transients from a telecommunication network :		N
2.10.4	Creepage distances		P
2.10.4.1	General		P
2.10.4.2	Material group and comparative tracking index	Material group IIIb is assumed to be used	P
	CTI tests		—
2.10.4.3	Minimum creepage distances	See appended table 2.10.3 and 2.10.4	P
2.10.5	Solid insulation	See below	P
2.10.5.1	General	Considered.	P
2.10.5.2	Distances through insulation	See appended table 2.10.5.	P
2.10.5.3	Insulating compound as solid insulation	No such construction used.	N
2.10.5.4	Semiconductor devices		P
2.10.5.5	Cemented joints	Not used cemented joints.	N
2.10.5.6	Thin sheet material – General		N
2.10.5.7	Separable thin sheet material		P
	Number of layers (pcs)	2 layers	—
2.10.5.8	Non-separable thin sheet material	Not used.	N
2.10.5.9	Thin sheet material – standard test procedure	Not used.	N
	Electric strength test		—
2.10.5.10	Thin sheet material – alternative test procedure		P
	Electric strength test	See appended table.	—
2.10.5.11	Insulation in wound components		N
2.10.5.12	Wire in wound components		N
	Working voltage		—
	a) Basic insulation not under stress		—
	b) Basic, supplementary, reinforced insulation		—
	c) Compliance with Annex U		—
	Two wires in contact inside wound component; angle between 45° and 90°		N

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Clause	Requirement + Test	Result - Remark	Verdict
2.10.5.13	Wire with solvent-based enamel in wound components		N
	Electric strength test		—
	Routine test		N
2.10.5.14	Additional insulation in wound components		N
	Working voltage		N
	- Basic insulation not under stress		N
	- Supplementary, reinforced insulation		N
2.10.6	Construction of printed boards		P
2.10.6.1	Uncoated printed boards		P
2.10.6.2	Coated printed boards		N
2.10.6.3	Insulation between conductors on the same inner surface of a printed board		N
2.10.6.4	Insulation between conductors on different layers of a printed board		N
	Distance through insulation		N
	Number of insulation layers (pcs).....		N
2.10.7	Component external terminations		N
2.10.8	Tests on coated printed boards and coated components		N
2.10.8.1	Sample preparation and preliminary inspection		N
2.10.8.2	Thermal conditioning		N
2.10.8.3	Electric strength test		N
2.10.8.4	Abrasion resistance test		N
2.10.9	Thermal cycling		N
2.10.10	Test for Pollution Degree 1 environment and insulating compound		N
2.10.11	Tests for semiconductor devices and cemented joints		N
2.10.12	Enclosed and sealed parts		N
3	WIRING, CONNECTIONS AND SUPPLY		P
3.1	General		P
3.1.1	Current rating and overcurrent protection	Adequate cross sectional areas on internal wiring.	P

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Clause	Requirement + Test	Result - Remark	Verdict
3.1.2	Protection against mechanical damage	Wireways are smooth and free from edges. Wires are adequately fixed to prevent excessive strain on wire and terminals and avoiding damage to the insulation of the conductors.	P
3.1.3	Securing of internal wiring	No internal wiring	N
3.1.4	Insulation of conductors	Insulation on internal conductors is considered to be of adequate quality and suitable for the application and the working voltage involved.	P
3.1.5	Beads and ceramic insulators	No beads or similar ceramic insulators on conductors.	N
3.1.6	Screws for electrical contact pressure	No electric screw connection.	N
3.1.7	Insulating materials in electrical connections		N
3.1.8	Self-tapping and spaced thread screws	Thread-cutting or space thread screws are not used for electrical connections.	N
3.1.9	Termination of conductors	All conductors are reliable secured.	P
	10 N pull test		—
3.1.10	Sleeving on wiring		N
3.2	Connection to a mains supply		N
3.2.1	Means of connection	Checked on final equipment.	N
3.2.1.1	Connection to an a.c. mains supply		N
3.2.1.2	Connection to a d.c. mains supply		N
3.2.2	Multiple supply connections		N
3.2.3	Permanently connected equipment		N
	Number of conductors, diameter of cable and conduits (mm)		—
3.2.4	Appliance inlets		N
3.2.5	Power supply cords		N
3.2.5.1	AC power supply cords		N
	Type		—
	Rated current (A), cross-sectional area (mm ²), AWG		—
3.2.5.2	DC power supply cords		N

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Clause	Requirement + Test	Result - Remark	Verdict
3.2.6	Cord anchorages and strain relief		N
	Mass of equipment (kg), pull (N)		—
	Longitudinal displacement (mm)		—
3.2.7	Protection against mechanical damage		N
3.2.8	Cord guards		N
	Diameter or minor dimension D (mm); test mass (g)		—
	Radius of curvature of cord (mm).....		—
3.2.9	Supply wiring space		N
3.3	Wiring terminals for connection of external conductors		N
3.3.1	Wiring terminals		N
3.3.2	Connection of non-detachable power supply cords		N
3.3.3	Screw terminals		N
3.3.4	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross-sectional area (mm ²)		—
3.3.5	Wiring terminal sizes		N
	Rated current (A), type, nominal thread diameter (mm)		—
3.3.6	Wiring terminal design		N
3.3.7	Grouping of wiring terminals		N
3.3.8	Stranded wire		N
3.4	Disconnection from the mains supply		N
3.4.1	General requirement	Checked on final equipment.	N
3.4.2	Disconnect devices		N
3.4.3	Permanently connected equipment		N
3.4.4	Parts which remain energized		N
3.4.5	Switches in flexible cords		N
3.4.6	Number of poles – single-phase and d.c. equipment		N
3.4.7	Number of poles – three-phase equipment		N
3.4.8	Switches as disconnect devices		N
3.4.9	Plugs as disconnect devices		N
3.4.10	Interconnected equipment		N
3.4.11	Multiple power sources		N
3.5	Interconnection of equipment		P

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Clause	Requirement + Test	Result - Remark	Verdict
3.5.1	General requirements		P
3.5.2	Types of interconnection circuits		P
3.5.3	ELV circuits as interconnection circuits		N
3.5.4	Data ports for additional equipment		N
4	PHYSICAL REQUIREMENTS		P
4.1	Stability		N
	Angle of 10°		N
	Test force (N)		N
4.2	Mechanical strength		P
4.2.1	General	Complies with the requirement also after tests described below are applied.	P
	Rack-mounted equipment.		N
4.2.2	Steady force test, 10 N		P
4.2.3	Steady force test, 30 N		N
4.2.4	Steady force test, 250 N		P
4.2.5	Impact test		N
	Fall test		—
	Swing test		—
4.2.6	Drop test; height (mm)	Checked on final equipment.	N
4.2.7	Stress relief test	Checked on final equipment.	N
4.2.8	Cathode ray tubes	CRT not used in the equipment.	N
	Picture tube separately certified		N
4.2.9	High pressure lamps	No high pressure lamps in the equipment.	N
4.2.10	Wall or ceiling mounted equipment; force (N)	Not intended to be mounted on a wall or ceiling.	N
4.2.11	Rotating solid media		N
	Test to cover on the door.....		N
4.3	Design and construction		P
4.3.1	Edges and corners	All edges and corners are rounded smoothed.	P
4.3.2	Handles and manual controls; force (N).....	No knobs, grips, handles, lever etc.	N
4.3.3	Adjustable controls		N

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.4	Securing of parts	Mechanical fixings in such a way designed that they will withstand mechanical stress occurring in normal use.	P
4.3.5	Connection by plugs and sockets		N
4.3.6	Direct plug-in equipment		N
	Torque		—
	Compliance with the relevant mains plug standard		N
4.3.7	Heating elements in earthed equipment		N
4.3.8	Batteries		N
	- Overcharging of a rechargeable battery		N
	- Unintentional charging of a non-rechargeable battery		N
	- Reverse charging of a rechargeable battery		N
	- Excessive discharging rate for any battery		N
4.3.9	Oil and grease	No oil and grease.	N
4.3.10	Dust, powders, liquids and gases	No dust, powders, liquids and gases.	N
4.3.11	Containers for liquids or gases	No containers for liquid and gases.	N
4.3.12	Flammable liquids	No flammable liquid.	N
	Quantity of liquid (l)		N
	Flash point (°C)		N
4.3.13	Radiation		N
4.3.13.1	General		N
4.3.13.2	Ionizing radiation		N
	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	The equipment does not produce UV radiation.	N
	Part, property, retention after test, flammability classification		N
4.3.13.4	Human exposure to ultraviolet (UV) radiation	The equipment does not produce UV radiation.	N
4.3.13.5	Lasers (including laser diodes) and LEDs		N
4.3.13.5.1	Lasers (including laser diodes)		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Laser class		—
4.3.13.5.2	Light emitting diodes (LEDs)		N
4.3.13.6	Other types		N
4.4	Protection against hazardous moving parts		N
4.4.1	General		N
4.4.2	Protection in operator access areas		N
	Household and home/office document/media shredders		N
4.4.3	Protection in restricted access locations		N
4.4.4	Protection in service access areas		N
4.4.5	Protection against moving fan blades		N
4.4.5.1	General		N
	Not considered to cause pain or injury. A).....		N
	Is considered to cause pain, not injury. B)		N
	Considered to cause injury. C)		N
4.4.5.2	Protection for users		N
	Use of symbol or warning		N
4.4.5.3	Protection for service persons		N
	Use of symbol or warning		N
4.5	Thermal requirements		P
4.5.1	General		P
4.5.2	Temperature tests		P
	Normal load condition per Annex L		—
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		N
4.6.1	Top and side openings		N
	Dimensions (mm)		—
4.6.2	Bottoms of fire enclosures		N
	Construction of the bottom, dimensions (mm) ..		—
4.6.3	Doors or covers in fire enclosures		N
4.6.4	Openings in transportable equipment		N
4.6.4.1	Constructional design measures		N
	Dimensions (mm)		—

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Clause	Requirement + Test	Result - Remark	Verdict
4.6.4.2	Evaluation measures for larger openings		N
4.6.4.3	Use of metallized parts		N
4.6.5	Adhesives for constructional purposes		N
	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		N
4.7.2	Conditions for a fire enclosure		N
4.7.2.1	Parts requiring a fire enclosure		N
4.7.2.2	Parts not requiring a fire enclosure		N
4.7.3	Materials		P
4.7.3.1	General		P
4.7.3.2	Materials for fire enclosures		P
4.7.3.3	Materials for components and other parts outside fire enclosures		N
4.7.3.4	Materials for components and other parts inside fire enclosures	Internal components except small parts are V-2 or better.	P
4.7.3.5	Materials for air filter assemblies	No air filter assemblies.	N
4.7.3.6	Materials used in high-voltage components	No high-voltage components used.	N
5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
5.1	Touch current and protective conductor current		N
5.1.1	General		N
5.1.2	Configuration of equipment under test (EUT)		N
5.1.2.1	Single connection to an a.c. mains supply		N
5.1.2.2	Redundant multiple connections to an a.c. mains supply		N
5.1.2.3	Simultaneous multiple connections to an a.c. mains supply		N
5.1.3	Test circuit		N
5.1.4	Application of measuring instrument		N
5.1.5	Test procedure		N
5.1.6	Test measurements		N
	Supply voltage (V) :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Measured touch current (mA)		—
	Max. allowed touch current (mA)		—
	Measured protective conductor current (mA)		—
	Max. allowed protective conductor current (mA)....		—
5.1.7	Equipment with touch current exceeding 3,5 mA		N
5.1.7.1	General		N
5.1.7.2	Simultaneous multiple connections to the supply		N
5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks		N
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system		N
	Supply voltage (V)		—
	Measured touch current (mA)		—
	Max. allowed touch current (mA)		—
5.1.8.2	Summation of touch currents from telecommunication networks		N
	a) EUT with earthed telecommunication ports		N
	b) EUT whose telecommunication ports have no reference to protective earth		N
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		N
5.3.3	Transformers		P
5.3.4	Functional insulation.....		P
5.3.5	Electromechanical components		N
5.3.6	Audio amplifiers in ITE		N
5.3.7	Simulation of faults	Result see appended table 5.3	P
5.3.8	Unattended equipment		N
5.3.9	Compliance criteria for abnormal operating and fault conditions	No flame emitted, no molten material emitted, no deformation of enclosure	P

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Clause	Requirement + Test	Result - Remark	Verdict
5.3.9.1	During the tests		P
5.3.9.2	After the tests		P
6	CONNECTION TO TELECOMMUNICATION NETWORKS		N
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1	Protection from hazardous voltages		N
6.1.2	Separation of the telecommunication network from earth		N
6.1.2.1	Requirements		N
	Supply voltage (V)		—
	Current in the test circuit (mA)		—
6.1.2.2	Exclusions		N
6.2	Protection of equipment users from overvoltages on telecommunication networks		N
6.2.1	Separation requirements		N
6.2.2	Electric strength test procedure		N
6.2.2.1	Impulse test		N
6.2.2.2	Steady-state test		N
6.2.2.3	Compliance criteria		N
6.3	Protection of the telecommunication wiring system from overheating		N
	Max. output current (A)		—
	Current limiting method		—
7	CONNECTION TO CABLE DISTRIBUTION SYSTEMS		N
7.1	General		N
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
7.3	Protection of equipment users from overvoltages on the cable distribution system		N
7.4	Insulation between primary circuits and cable distribution systems		N
7.4.1	General		N
7.4.2	Voltage surge test		N
7.4.3	Impulse test		N
A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		N

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Clause	Requirement + Test	Result - Remark	Verdict
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.1.1	Samples		—
	Wall thickness (mm).....		—
A.1.2	Conditioning of samples; temperature (°C)		N
A.1.3	Mounting of samples		N
A.1.4	Test flame (see IEC 60695-11-3)		N
	Flame A, B, C or D		—
A.1.5	Test procedure		N
A.1.6	Compliance criteria		N
	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.2.1	Samples, material		—
	Wall thickness (mm).....		—
A.2.2	Conditioning of samples; temperature (°C)		N
A.2.3	Mounting of samples		N
A.2.4	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C		—
A.2.5	Test procedure		N
A.2.6	Compliance criteria		N
	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
	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.3.1	Mounting of samples		N
A.3.2	Test procedure		N
A.3.3	Compliance criterion		N

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Clause	Requirement + Test	Result - Remark	Verdict
B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		N
B.1	General requirements		N
	Position		—
	Manufacturer		—
	Type		—
	Rated values		—
B.2	Test conditions		N
B.3	Maximum temperatures		N
B.4	Running overload test		N
B.5	Locked-rotor overload test		N
	Test duration (days)		—
	Electric strength test: test voltage (V)		—
B.6	Running overload test for d.c. motors in secondary circuits		N
B.6.1	General		N
B.6.2	Test procedure		N
B.6.3	Alternative test procedure		N
B.6.4	Electric strength test; test voltage (V)		N
B.7	Locked-rotor overload test for d.c. motors in secondary circuits		N
B.7.1	General		N
B.7.2	Test procedure		N
B.7.3	Alternative test procedure		N
B.7.4	Electric strength test; test voltage (V)		N
B.8	Test for motors with capacitors		N
B.9	Test for three-phase motors		N
B.10	Test for series motors		N
	Operating voltage (V)		—
C	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		P
	Position	T1	—
	Manufacturer	See appended table 1.5.1.	—
	Type		—
	Rated values		—
	Method of protection	Protection by circuit design.	—
C.1	Overload test	(see appended table 5.3)	P
C.2	Insulation	(see appended table 5.2)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Protection from displacement of windings		—
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
E	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13)		N
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
G.1	Clearances		N
G.1.1	General		N
G.1.2	Summary of the procedure for determining minimum clearances		N
G.2	Determination of mains transient voltage (V)		N
G.2.1	AC mains supply		N
G.2.2	Earthed d.c. mains supplies		N
G.2.3	Unearthed d.c. mains supplies		N
G.2.4	Battery operation		N
G.3	Determination of telecommunication network transient voltage (V)		N
G.4	Determination of required withstand voltage (V)		N
G.4.1	Mains transients and internal repetitive peaks		N
G.4.2	Transients from telecommunication networks		N
G.4.3	Combination of transients		N
G.4.4	Transients from cable distribution systems		N
G.5	Measurement of transient voltages (V)		N
	a) Transients from a mains supply		N
	For an a.c. mains supply		N
	For a d.c. mains supply		N
	b) Transients from a telecommunication network		N
G.6	Determination of minimum clearances		N
H	ANNEX H, IONIZING RADIATION (see 4.3.13)		N
J	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		N
	Metal(s) used		—

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Clause	Requirement + Test	Result - Remark	Verdict
K	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.8)		N
K.1	Making and breaking capacity		N
K.2	Thermostat reliability; operating voltage (V)		N
K.3	Thermostat endurance test; operating voltage (V)		N
K.4	Temperature limiter endurance; operating voltage (V)		N
K.5	Thermal cut-out reliability		N
K.6	Stability of operation	(see appended table 5.3)	N
L	ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.2)		N
L.1	Typewriters		N
L.2	Adding machines and cash registers		N
L.3	Erasers		N
L.4	Pencil sharpeners		N
L.5	Duplicators and copy machines		N
L.6	Motor-operated files		N
L.7	Other business equipment		N
M	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		N
M.1	Introduction		N
M.2	Method A		N
M.3	Method B		N
M.3.1	Ringing signal		N
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
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2	Tripping device		N
M.3.2.3	Monitoring voltage (V)		N
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
N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N

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Clause	Requirement + Test	Result - Remark	Verdict
P	ANNEX P, NORMATIVE REFERENCES		—
Q	ANNEX Q, Voltage dependent resistors (VDRs) (see 1.5.9.1)		N
	a) Preferred climatic categories		N
	b) Maximum continuous voltage		N
	c) Pulse current		—
R	ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES		N
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6.2)		N
R.2	Reduced clearances (see 2.10.3)		N
S	ANNEX S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)		N
S.1	Test equipment		N
S.2	Test procedure		N
S.3	Examples of waveforms during impulse testing		N
T	ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)		N
			—
U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		N
			—
V	ANNEX V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1)		N
V.1	Introduction		N
V.2	TN power distribution systems		N
W	ANNEX W, SUMMATION OF TOUCH CURRENTS		N
W.1	Touch current from electronic circuits		N
W.1.1	Floating circuits		N
W.1.2	Earthed circuits		N
W.2	Interconnection of several equipments		N
W.2.1	Isolation		N
W.2.2	Common return, isolated from earth		N
W.2.3	Common return, connected to protective earth		N
X	ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS (see clause C.1)		N
X.1	Determination of maximum input current		N
X.2	Overload test procedure		N

EN60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
Y	ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3)		N
Y.1	Test apparatus		N
Y.2	Mounting of test samples		N
Y.3	Carbon-arc light-exposure apparatus		N
Y.4	Xenon-arc light exposure apparatus		N
Z	ANNEX Z, OVERVOLTAGE CATEGORIES (see 2.10.3.2 and Clause G.2)		N
AA	ANNEX AA, MANDREL TEST (see 2.10.5.8)		N
BB	ANNEX BB, CHANGES IN THE SECOND EDITION		—
CC	ANNEX CC, Evaluation of integrated circuit (IC) current limiters		N
CC.1	General		N
CC.2	Test program 1.....		N
CC.3	Test program 2.....		N
DD	ANNEX DD, Requirements for the mounting means of rack-mounted equipment		N
DD.1	General		N
DD.2	Mechanical strength test, variable N.....		N
DD.3	Mechanical strength test, 250N, including end stops.....		N
DD.4	Compliance.....		N
EE	ANNEX EE, Household and home/office document/media shredders		N
EE.1	General		N
EE.2	Markings and instructions		N
	Use of markings or symbols.....		N
	Information of user instructions, maintenance and/or servicing instructions.....		N
EE.3	Inadvertent reactivation test.....		N
EE.4	Disconnection of power to hazardous moving parts:		N
	Use of markings or symbols.....		N
EE.5	Protection against hazardous moving parts		N
	Test with test finger (Figure 2A)		N
	Test with wedge probe (Figure EE1 and EE2)		N

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_1B_II
Attachment Originator	SGS Fimko Ltd
Master Attachment.....:	Date 2011-08
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EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013 – CENELEC COMMON MODIFICATIONS


IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications (EN))						
Clause	Requirement + Test		Result – Remark	Verdict		
Contents	Add the following annexes:			P		
(A2:2013)	Annex ZA (normative)	Normative references to international publications with their corresponding European publications				
	Annex ZB (normative) Annex ZD (informative)	Special national conditions IEC and CENELEC code designations for flexible cords				
General	Delete all the “country” notes in the reference document according to the following list:			P		
	1.4.8	Note 2	1.5.1	Note 2 & 3	1.5.7.1	Note
	1.5.8	Note 2	1.5.9.4	Note	1.7.2.1	Note 4, 5 & 6
	2.2.3	Note	2.2.4	Note	2.3.2	Note
	2.3.2.1	Note 2	2.3.4	Note 2	2.6.3.3	Note 2 & 3
	2.7.1	Note	2.10.3.2	Note 2	2.10.5.13	Note 3
	3.2.1.1	Note	3.2.4	Note 3.	2.5.1	Note 2
	4.3.6	Note 1 & 2	4.7	Note 4	4.7.2.2	Note
	4.7.3.1	Note 2	5.1.7.1	Note 3 & 4	5.3.7	Note 1
	6	Note 2 & 5	6.1.2.1	Note 2	6.1.2.2	Note
	6.2.2	Note 6.	6.2.2.1	Note 2	6.2.2.2	Note
	7.1	Note 3	7.2	Note	7.3	Note 1 & 2
	G.2.1	Note 2	Annex H	Note 2		
General (A1:2010)	Delete all the “country” notes in the reference document(IEC 60950-1:2005/A1:2010) according to the following list:					P
	1.5.7.1	Note	6.1.2.1	Note 2		
	6.2.2.1	Note 2	EE.3	Note		

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.	N
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
(A12: 2011)	In EN 60950-1:2006/A12:2011 Delete the addition of 1.3.Z1/ EN60950-1:2006 Delete the definition 1.2.3.Z1/ EN60950-1:2006/A1:2010	P
1.5.1	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	P
1.7.2.1	Add the following NOTE: NOTE Z1 In addition, the instructions shall include, as far as applicable, a warning that excessive sound pressure from earphones and headphones can cause hearing loss	N
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
	ZX Protection against excessive sound pressure from personal music player	N

	<p>Zx.1 General</p> <p>This sub-clause specifies equipments for protection against excessive sound pressure from personal music player that are closely coupled to the ear, It also specifies equipments for earphones and headphones intended for use with personal music player.</p> <p>A personal music player is portable equipment for personal use, that,</p> <ul style="list-style-type: none"> -is designed to allow the user to listen to recorded or broadcast sound or video; and -primarily uses headphones or earphones that can be worn in or on or around the ears; and -allows the user to walk around while in use. <p>NOTE 1 examples are hand-held or body-worn portable CD players, MP3 audio player, mobile phone 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 player shall comply with the requirements of this sub-clause.</p> <p>The requirements in this sub-clause are valid for music or video mode only.</p> <p>The requirements do not apply:</p> <ul style="list-style-type: none"> -while the personal music player is connected to an external amplifier; or -while the headphones or earphones are not used. <p>NOTE 2 An external amplifier is an amplifier which is not part of the personal music player or the listening device, but which is intended to music as a standalone music player.</p>		N
	The requirements do not apply to :		

	<p>-hearing aid equipment and professional equipment;</p> <p>NOTE 3 Professional equipment is equipment sold through special sales channels, all products sold through normal electronics stores are considered not to be professional equipment.</p> <p>-analogue personal music player(personal music player without any kind of digital processing of the sound signal) that are brought to the market before the end of 2015.</p> <p>NOTE 4 this exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer</p> <p>Exist, This exemption will not be extended to other technologies.</p> <p>For equipment which is clearly designed or intended for use by young children, the limits of EN 71-1 apply.</p>		
	<p>Zx.2 Equipment requirements</p> <p>No safety provision is required for equipment that complies with the following:</p> <ul style="list-style-type: none"> - equipment provision as a package(personal music player with its listening device), where the acoustic output $L_{Abq,T}$ 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>All other equipment shall:</p> <ol style="list-style-type: none"> protect the user from unintentional acoustic outputs exceeding those mentioned above; and have a standard acoustic output level not exceeding those mentioned above, and automatically return to an output level not exceeding those mentioned above when the power is switched off; and 		N
	<ol style="list-style-type: none"> provide a means to actively inform the user of the increased sound pressure when the 		

	<p>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 operating which allows for an acoustic output exceeding those mentioned above, the acknowledgement does not need to be repeated more than once every 20h 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 20h 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 exceeding the following:</p> <p>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" as described in EN 50332-1; and</p> <p>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" as described in EN 50332-1,</p> <p>For music where the average sound pressure (long term $L_{Aq,T}$) 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 average sound pressure (long term $L_{Aq,T}$) 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>		
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	<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 5mm; and -the following wordingm, 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
	Zx.4 Requirements for listening devices(headphones and earphones)		N
	<p>Zx.4.1 Wired listening devices with analogue input</p> <p>With 94 dBA sound pressure output $L_{Aq,T}$, the input voltage of the fixed " programme simulation noise" as 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 -75mV correspond with 85 dBA -27mV and 100 dBA -150mV.</p>		N
	<p>Zx.4.2 Wire listening devices with digital input</p> <p>With any playing devices playing the fixed" programme simulation noise" as 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 $L_{Aq,T}$ of the listening device shall be ≤ 100 dBA.</p>		N

	<p>The 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
	<p>Zx.4.3 Wireless listening devices</p> <p>In wirelss mode:</p> <ul style="list-style-type: none"> -with any playing anf 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 setting 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 $L_{Aq,T}$ of the listening device shall be ≤ 100 dBA. <p>NOTE An example of a wireless listening devices is a bluetooth headphone.</p>		N
	<p>Zx.5 Measurement methods</p> <p>Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable.</p> <p>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
2.7.1	<p>Replace the subclause as follows:</p> <p>Basic requirements</p> <p>To protect against excessive current, short-circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c):</p> <p>a) except as detailed in b) and c), protective devices necessary to comply with the requirements of 5.3 shall be included as parts of the equipment;</p>		P

2.7.1	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;		N
	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.		N
2.7.2	This subclause has been declared 'void'.		N
3.2.3	Delete the NOTE in Table 3A, and delete also in this table the conduit sizes in parentheses.		N
3.2.5.1	Replace "60245 IEC 53" by "H05 RR-F"; "60227 IEC 52" by "H03 VV-F or H03 VVH2-F"; "60227 IEC 53" by "H05 VV-F or H05 VVH2-F2". In Table 3B, replace the first four lines by the following: 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
3.2.5.1 (A2:2013)	NOTE Z1 The harmonised code designations corresponding to the IEC cord types are given in Annex ZD		N
3.3.4	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		N

4.3.13.6	Replace the existing NOTE by the following: NOTE Z1 Attention is drawn to 1999/519/EC: Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz. And 2006/25/EC: Directive on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artificial optical radiation)		N
	Standards taking into account this Recommendation which demonstrate compliance with the applicable EU Directive are indicated in the OJEC.		N
Annex H	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 μ Sv/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.		N
Bibliography	Additional EN standards.		—
ZA	NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS		—
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		—
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
1.2.13.14	In Norway and Sweden , for requirements see 1.7.2.1 and 7.3 of this annex.		N
1.5.7.1	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
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
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

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.</p> <p>The marking text in the applicable countries shall be as follows:</p> <p>In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"</p>		N
	<p>In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag" 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 Projector 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> <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>		N

	<p>Translation to Norwegian (the Swedish text will also be accepted in Norway): "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: "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
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: In Denmark: "Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord."</p>		N
1.7.5	<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

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>	No socket-outlet provided.	N
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
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
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
2.6.3.3	In the United Kingdom , the current rating of the circuit shall be taken as 13 A, not 16 A.		N
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
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
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>		N

	<p>SEV 6533-2.1991 Plug Type 11 L+N 250 V, 10 A</p> <p>SEV 6534-2.1991 Plug Type 12 L+N+PE 250 V, 10 A</p> <p>In general, EN 60309 applies for plugs for currents exceeding 10 A. However, a 16 A plug and 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
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
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

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.</p> <p>Supply cords of single-phase equipment having a rated current not exceeding 2,5 A shall be provided with a plug according to UNE-EN 50075:1993.</p>		N
	<p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994.</p> <p>If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2.</p>		N
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
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
3.2.4	<p>In Switzerland, for requirements see 3.2.1.1 of this annex.</p>		N
3.2.5.1	<p>In the United Kingdom, a power supply cord with conductor of 1,25 mm² is allowed for equipment with a rated current over 10 A and up to and including 13 A.</p>		N
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

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
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
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
6.1.2.1	In Finland, Norway and Sweden , add the following text between the first and second paragraph of the compliance clause: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either - two layers of thin sheet material, each of which shall pass the electric strength test below, or		N

6.1.2.1	<p>- one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below.</p> <p>If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition</p> <p>- 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</p> <p>- is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV.</p>		N
6.1.2.1	<p>It is permitted to bridge this insulation with a capacitor complying with EN 132400:1994, subclass Y2.</p> <p>A capacitor classified Y3 according to EN 132400:1994, may bridge this insulation under the following conditions:</p> <p>- the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 132400, 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;</p> <p>- the additional testing shall be performed on all the test specimens as described in EN 132400;</p> <p>- the impulse test of 2,5 kV is to be performed before the endurance test in EN 132400, in the sequence of tests as described in EN 132400.</p>		N
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

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.		N
7.3	In Norway and Sweden , for requirements see 1.2.13.14 and 1.7.2.1 of this annex.		N
7.3	In Norway , for installation conditions see EN 60728-11:2005.		N

SEM TEST

1.5.1	TABLE: List of critical components				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity1)
Plastic Enclosure	SABIC INNOVATIVE PLASTICS B V	945U(f2)(GG)	V-0, 115°C, min 0.8mm thickness	UL94, UL746C	UL E45329
Glue	SHENZHEN SISUN SILICONE TECHNOLOGY CO LTD	XS211-A RTV	V-0, 105°C	UL746	UL E332810
Bridge Diodes (ZLQ)	Various	Various	Min. 600V, Min. 0.5A	--	--
Electrolytic capacitor (C1)	Various	Various	400V, 4.7μF, 105°C	--	--
Transformer(T1)	SHEN ZHEN HENGYUANXIN G ELECTRONIC CO., LTD.	EPC3	Class B	EN 60950-1	Test with equipment
-Primary winding	SHENZHEN CHENGWEI INDUSTRY CO LTD	2UEW	130°C	ANSI/UL 1446	UL E227475
Alt.	Various	Various	130°C	ANSI/UL 1446	UL
-Triple insulation wire	Suzhou Yusheng Electronic Co., Ltd.	TIW-B/TWE-3	130°C	IEC 60950-1 UL 60950-1	VDE 40033527 UL E332529
-Bobbin	CHANG CHUN PLASTICS CO LTD	T375HF	V-0, 150°C	UL94, UL746C	UL E59481
-Tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	1350B-1, 1350F-1, 56, 1318B-1	130°C	UL510	UL E165111
-Varnish	YUEYANG GREEN TECHNOLOGY CO LTD	JX-1150	Min. 130°C	ANSI/UL 1446	UL E303754
-Tube	DONGGUAN LING FREE HARDWARE PLASTICS PRODUCT CO LTD	"LING FREE PTFE TUBE"	Min. 150V, 200°C	ANSI/UL 1446	UL E352366
Y-Capacitor (CY1)	Murata Mfg. Co., Ltd.	KX	1000pF, 250V, 125°C	IEC 60384-14	VDE 40002831 UL E187963

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Opto-coupler (U1)	Toshiba Corporation Semiconductor & Storage Products Company	TLP185	Di≥0.4mm, int.dcr≥5.0mm, ext.dcr. ≥5.0mm, 110°C	IEC/EN 60747-5-2 IEC/EN 60950-1	VDE 40009347
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB-2150, KB-2150G, KB-2150GC,	V-0, 105°C	UL94, UL796	UL E123995
Alt.	Various	Various	V-0, 105°C	UL94, UL796	UL
1) An asterisk indicates a mark which assures the agreed level of surveillance.					
Supplementary information: N/A					

SEM TEST

1.6.2	TABLE: Electrical data (in normal conditions)					P
U (V)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
Model: HLK-PM12						
90V/50Hz	0.071	--	4.1	External fuse	0.071	Normal operation
90V/60Hz	0.071	--	4.1	External fuse	0.071	
100V/50Hz	0.064	0.1	3.9	External fuse	0.064	
100V/60Hz	0.064	0.1	4.0	External fuse	0.064	
240V/50Hz	0.034	0.1	4.3	External fuse	0.034	
240V/60Hz	0.033	0.1	4.4	External fuse	0.033	
264V/50Hz	0.032	--	4.5	External fuse	0.032	
264V/60Hz	0.031	--	4.5	External fuse	0.031	
Model: HLK-PM03						
90V/50Hz	0.097	--	5.3	External fuse	0.097	Normal operation
90V/60Hz	0.091	--	5.2	External fuse	0.091	
100V/50Hz	0.077	0.1	4.9	External fuse	0.077	
100V/60Hz	0.078	0.1	5.0	External fuse	0.078	
240V/50Hz	0.038	0.1	4.8	External fuse	0.038	
240V/60Hz	0.036	0.1	4.8	External fuse	0.036	
264V/50Hz	0.035	--	4.9	External fuse	0.035	
264V/60Hz	0.034	--	5.0	External fuse	0.034	
Supplementary information: N/A						

2.1.1.5	TABLE: max. V, A, VA test				P
Voltage (rated) (V)	Current (rated) (A)	Voltage (max.) (V)	Current (max.) (A)	VA (max.) (VA)	
Model: HLK-PM12					
12.0	0.25	12.01	0.47	7.8	
Model: HLK-PM03					
3.0	0.9	3.35	2.0	6.87	
supplementary information:					

2.1.1.7	TABLE: discharge test			N
Condition	V_0 (V pk)	37% V_0 (V pk)	37%(t) (ms)	$t_u \rightarrow 1s$ (V pk)
--	--	--	--	--
Note(s):				

2.2	TABLE: evaluation of voltage limiting components in SELV circuits			P
Component (measured between)		max. voltage (V) (normal operation)		Voltage Limiting Components
		V peak	V d.c.	
T1 Pin 5 to pin 6 (Model: HLK-PM12)		46.8	--	--
T1 Pin 5 to pin 6 (Model: HLK-PM03)		23.2	--	--
Fault test performed on voltage limiting components		Voltage measured (V) in SELV circuits (V peak or V d.c.)		
D3		--	0	--
supplementary information:				

2.4.2	TABLE: limited current circuit measurement				P
Location	Voltage (V)	Current (mA)	Freq. (KHz)	Limit (mA)	Comments
CY1 sec. pin to earth	0.13	0.065	0.5	0.7	CY1= 1000pF
Note(s):					
Test voltage: 264V/50Hz					

2.5	TABLE: limited power source measurement			P
	Limits	Measured	Verdict	
Model: HLK-PM12				
Uoc=12.01V				
According to Table 2B (normal condition)				
Current (in A)	≤8.0	0.47	--	
apparent power (in VA)	≤100	7.8	--	
D3 short-circuited:				
Current (in A)	≤8.0	0	--	
apparent power (in VA)	≤100	0	--	
Opto-coupler (U1) Pin 1-2 short-circuited:				

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Current (in A)	≤ 8.0	0	--
apparent power (in VA)	≤ 100	0	--
Opto-coupler (U1) Pin 3-4 short-circuited:			
Current (in A)	≤ 8.0	0	--
apparent power (in VA)	≤ 100	0	--
Opto-coupler (U1) Pin 1 open-circuited:			
Current (in A)	≤ 8.0	0	--
apparent power (in VA)	≤ 100	0	--
Opto-coupler (U1) Pin 3 open-circuited:			
Current (in A)	≤ 8.0	0	--
apparent power (in VA)	≤ 100	0	--
Note(s):			
Test voltage: 264V/50Hz			

2.5	TABLE: limited power source measurement		P
	Limits	Measured	Verdict
Model: HLK-PM03			
Uoc=3.35V			
According to Table 2B (normal condition)			
Current (in A)	≤ 8.0	2.0	--
apparent power (in VA)	≤ 100	6.87	--
D3 short-circuited:			
Current (in A)	≤ 8.0	0	--
apparent power (in VA)	≤ 100	0	--
Opto-coupler (U1) Pin 1-2 short-circuited:			
Current (in A)	≤ 8.0	0	--
apparent power (in VA)	≤ 100	0	--
Opto-coupler (U1) Pin 3-4 short-circuited:			
Current (in A)	≤ 8.0	0	--
apparent power (in VA)	≤ 100	0	--
Opto-coupler (U1) Pin 1 open-circuited:			
Current (in A)	≤ 8.0	0	--
apparent power (in VA)	≤ 100	0	--
Opto-coupler (U1) Pin 3 open-circuited:			

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Current (in A)	≤ 8.0	0	--
apparent power (in VA)	≤ 100	0	--
Note(s):			
Test voltage: 264V/50Hz			

2.10.2	Table: working voltage measurement			P
Location		RMS voltage (V)	Peak voltage (V)	Comments
Model: HLK-PM12				
Transformer (T1)				
Pin 1 to 5	225	376		
Pin 1 to 6	226	412		
Pin 2 to 5	225	384		
Pin 2 to 6	225	368		
Pin 3 to 5	236	464		
Pin 3 to 6	243	472	Maximum Voltage	
Pin 4 to 5	207	384		
Pin 4 to 6	206	344		
Opto-coupler (U1)				
Pin 1 to 3	231	376		
Pin 1 to 4	232	380		
Pin 2 to 3	231	376		
Pin 2 to 4	232	380		
CY1 pin to pin	226	368		
Model: HLK-PM03				
Transformer (T1)				
Pin 1 to 5	229	440		
Pin 1 to 6	230	456		
Pin 2 to 5	227	376		
Pin 2 to 6	228	372		
Pin 3 to 5	231	476	Maximum Peak Voltage	
Pin 3 to 6	240	448	Maximum RMS Voltage	
Pin 4 to 5	206	360		
Pin 4 to 6	207	348		
Opto-coupler (U1)				
Pin 1 to 3	230	372		
Pin 1 to 4	231	376		

Pin 2 to 3	230	372	
Pin 2 to 4	231	376	
CY1 pin to pin	228	372	
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)	
Between L to N	420	250	2.0	2.6	2.5	2.6	
Y-cap. (CY1) pin to pin	420	250	4.0	7.5	5.0	8.0	
Opto-coupler (U1) pri. to sec.	420	250	4.0	5.2	5.0	5.2	
PCB of Primary circuit to Secondary circuit	476	250	4.2	8.2	5.0	8.2	
Primary winding to Secondary winding of transformer	476	250	4.2	6.0	5.0	6.0	
Sec. pin to core of Transformer	476	250	4.2	6.3	5.0	6.3	
Core of transformer to C7	476	250	4.2	5.4	5.0	5.4	
Primary component C1 to enclosure outside	476	250	4.2	5.4	5.0	5.4	
Supplementary information: supply voltage: 240V/50Hz							

2.10.5	TABLE: Distance through insulation measurements					P
Distance through insulation (DTI) at/of:	U peak (V)	U rms (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)	
Plastic Enclosure	420	240	3000 Vac	0.4	0.81	
Supplementary information:--						

4.3.8	TABLE: Batteries								N
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?									
	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
- Explosion of the battery									N
- Emission of flame or expulsion of molten metal									N
- Electric strength tests of equipment after completion of tests									N
Supplementary information:									

4.3.8	TABLE: Batteries										N
Battery category.....:											--
Manufacturer.....:											--
Type / model.....:											--
Voltage.....:											--
Capacity.....:											--
Tested and Certified by (incl. Ref. No.).....:											--
Circuit protection diagram:											--

4.5	TABLE: Thermal requirements (Model: HLK-PM12)						P
	Supply voltage (V)	90V/60Hz		264V/50Hz		--	—
	Ambient T_{min} (°C)	--	--	--	--	--	—
	Ambient T_{max} (°C)	--	--	--	--	--	—
Maximum measured temperature T of part/at:		T (°C)					Allowed T_{max} (°C)
C1 body		53.8	--	56.3	--	--	105
PCB near ZLQ		55.6	--	58.6	--	--	105
PCB near IC1		59.4	--	64.8	--	--	105
T1 coil		54.4	--	58.0	--	--	110
T1 core		53.1	--	56.7	--	--	110
Opto-coupler (U1)		53.4	--	56.8	--	--	110
CY1 body		52.5	--	55.7	--	--	125
C7 body		51.5	--	54.9	--	--	105
C8 body		50.2	--	53.5	--	--	105
L1 winding		51.0	--	54.3	--	--	105
PCB near D3		56.4	--	60.5	--	--	105
Enclosure inside above T1		54.1	--	58.2	--	--	--
Enclosure outside above T1		51.3	--	54.7	--	--	95
Enclosure outside under T1		47.9	--	50.6	--	--	95
Ambient		24.2	--	24.0	--	--	--
Supplementary information: H represents horizontal, V represents vertical							
Temperature T of winding:		t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)
--		--	--	--	--	--	--
--		--	--	--	--	--	--
Supplementary information:N/A							

4.5	TABLE: Thermal requirements (model: HLK-PM03)						P
	Supply voltage (V)	90V/60Hz		264V/50Hz		--	—
	Ambient T_{min} (°C)	--	--	--	--	--	—
	Ambient T_{max} (°C)	--	--	--	--	--	—
Maximum measured temperature T of part/at:		T (°C)					Allowed T_{max} (°C)
C1 body		70.5	--	68.4	--	--	105
PCB near ZLQ		73.9	--	70.6	--	--	105
PCB near IC1		82.8	--	80.6	--	--	105
T1 coil		72.2	--	70.8	--	--	110
T1 core		71.0	--	70.1	--	--	110
Opto-coupler (U1)		73.6	--	72.6	--	--	110
CY1 body		72.0	--	71.1	--	--	125
C7 body		76.7	--	75.9	--	--	105
C8 body		71.3	--	70.6	--	--	105
L1 winding		75.9	--	75.1	--	--	105
PCB near D3		85.8	--	85.0	--	--	105
Plastic Enclosure inside above T1		76.9	--	75.7	--	--	--
Plastic Enclosure outside above T1		73.4	--	71.3	--	--	95
Plastic Enclosure outside under T1		63.2	--	61.5	--	--	95
Ambient		25.0	--	25.0	--	--	--
Supplementary information: H represents horizontal, V represents vertical							
Temperature T of winding:		t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)
--		--	--	--	--	--	--
--		--	--	--	--	--	--
Supplementary information:N/A							

4.5.5	TABLE: Ball pressure test of thermoplastic parts			P
	Allowed impression diameter (mm)	≤ 2 mm		—
Part		Test temperature (°C)	Impression diameter (mm)	
Bobbin of T1		125	0.7	
Supplementary information:--				

4.7	TABLE: Resistance to fire					P
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence	
Plastic Enclosure	SABIC INNOVATIVE PLASTICS B V	945U(f2)(GG)	0.81	V-0	UL	
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB-2150	0.83	V-0	UL	
Supplementary information:--						

5.1	TABLE: touch current measurement			N
Measured between:		Measured (mA)	Limit (mA)	Comments/conditions
--		--	--	--
supplementary information:				

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)	Breakdown Yes / No
L/N to plastic enclosure with metal foil		AC	3000	No
L/N to to output teminal		AC	3000	No
T1: primary and secondary		AC	3000	No
T1: secondary and core		AC	3000	No
One layer insulation type of T1		AC	3000	No
supplementary information:--				

5.3	TABLE: Fault condition tests					P
Ambient temperature (°C)					See below	—
Power source for EUT: Manufacturer, model/type, output rating					See page 1	—
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Model: HLK-PM03						
ZLQ Pin 1-3	S-C	240V/50 Hz	1s	External fuse	0	External fuse open, ZLQ damaged, no hazard.
C1	S-C	240V/50 Hz	1s	External fuse	0	External fuse open, ZLQ damaged, no hazard.

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IC1 Pin 1-5	S-C	240V/50 Hz	1s	External fuse	0	External fuse open, IC1 damaged, no hazard.
T1 output	S-C	240V/50 Hz	30 min.	External fuse	0.059 to 0 to 0.059	Unit shutdown immediately, no hazard, no damage.
Opto-coupler (U1) pin 1-2	S-C	240V/50 Hz	30 min.	External fuse	0	Unit shutdown immediately, no hazard, no damage.
Opto-coupler (U1) pin 3-4	S-C	240V/50 Hz	30 min.	External fuse	0.014	Unit shutdown immediately, no hazard, no damage.
Opto-coupler (U1) pin 1	O-C	240V/50 Hz	30 min.	External fuse	0.014	Unit shutdown immediately, no hazard, no damage.
Opto-coupler (U1) pin 3	O-C	240V/50 Hz	30 min.	External fuse	0	Unit shutdown immediately, no hazard, no damage.
C8	S-C	240V/50 Hz	30 min.	External fuse	0.072 to 0 to 0.072	Unit shutdown immediately, no hazard, no damage.
D3	S-C	240V/50 Hz	30 min.	External fuse	0.055 to 0 to 0.055	Unit shutdown immediately, no hazard, no damage.
Output	S-C	240V/50 Hz	30 min.	External fuse	0.069 to 0 to 0.069	Unit shutdown immediately, no hazard, no damage.
Output	O-L	240V/50 Hz	6hr.	External fuse	0.038A to 0.066A to 0.097A ↔0 to 0.087A ↔0 to 0	When the load from 3A to 8A, the temperature no change, and continue to increase the output, also no change. So short the output. At last U1 damage, no hazard. The max. temperature: T1 coil: 115.2°C, T1 core: 113.9°C, ambient: 24.7°C.
Model: HLK-PM12						
T1 output	S-C	240V/50 Hz	30 min.	External fuse	0.056 to 0 to 0.056	Unit shutdown immediately, no hazard, no damage.
Opto-coupler (U1) pin 1-2	S-C	240V/50 Hz	30 min.	External fuse	0	Unit shutdown immediately, no hazard, no damage.
Opto-coupler (U1) pin 3-4	S-C	240V/50 Hz	30 min.	External fuse	0.012	Unit shutdown immediately, no hazard, no damage.
Opto-coupler (U1) pin 1	O-C	240V/50 Hz	30 min.	External fuse	0.012	Unit shutdown immediately, no hazard, no damage.
Opto-coupler (U1) pin 3	O-C	240V/50 Hz	30 min.	External fuse	0	Unit shutdown immediately, no hazard, no damage.
C8	S-C	240V/50 Hz	30 min.	External fuse	0.070 to 0 to 0.070	Unit shutdown immediately, no hazard, no damage.

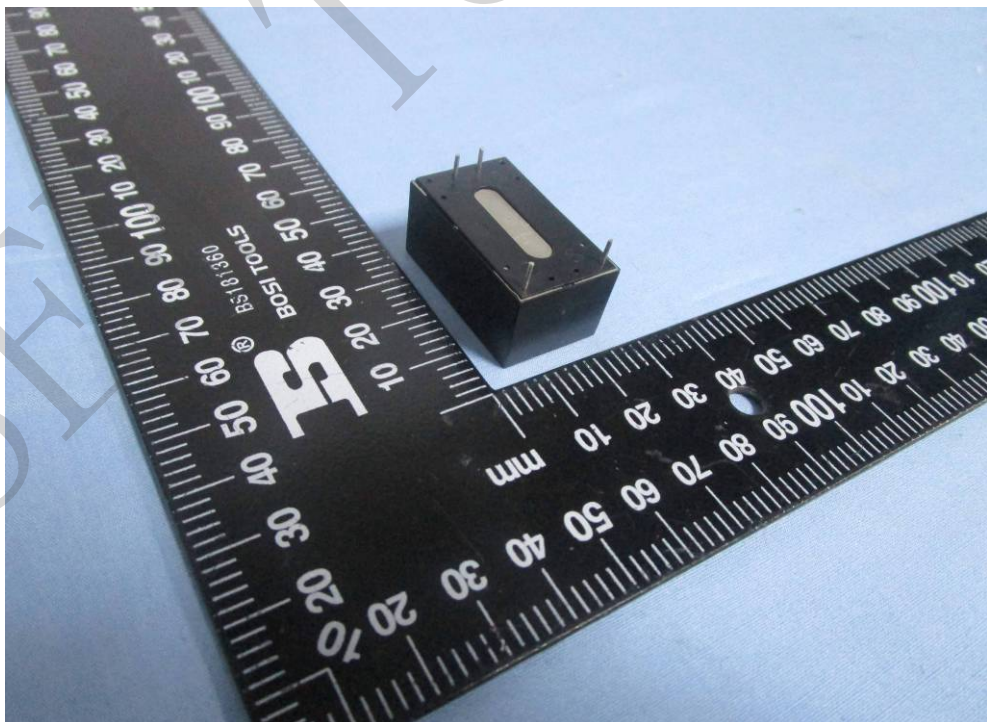
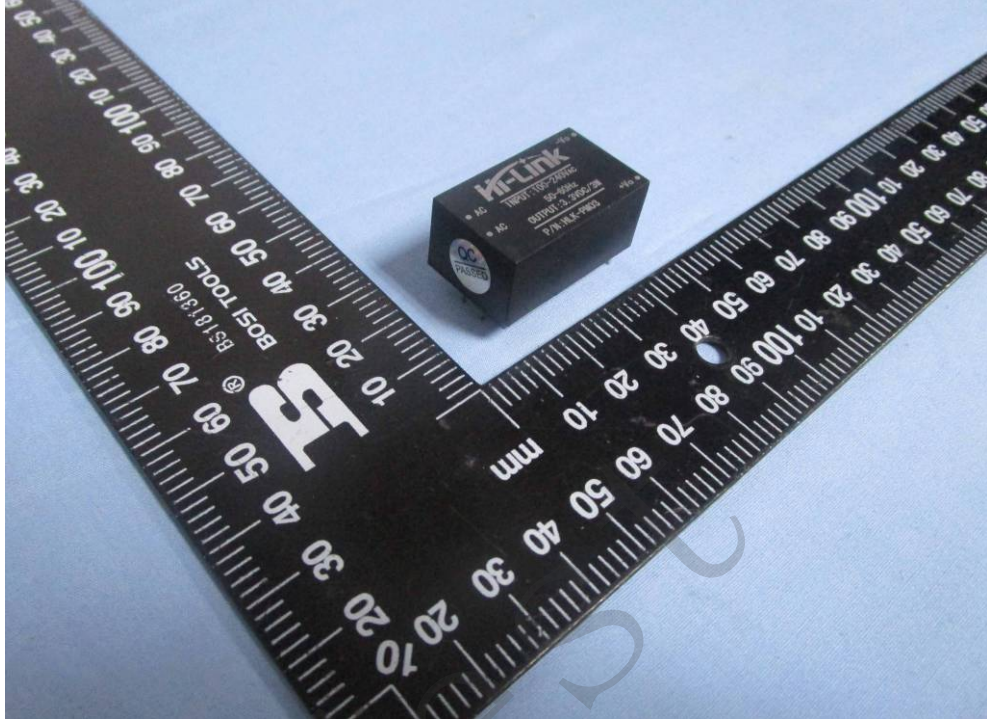


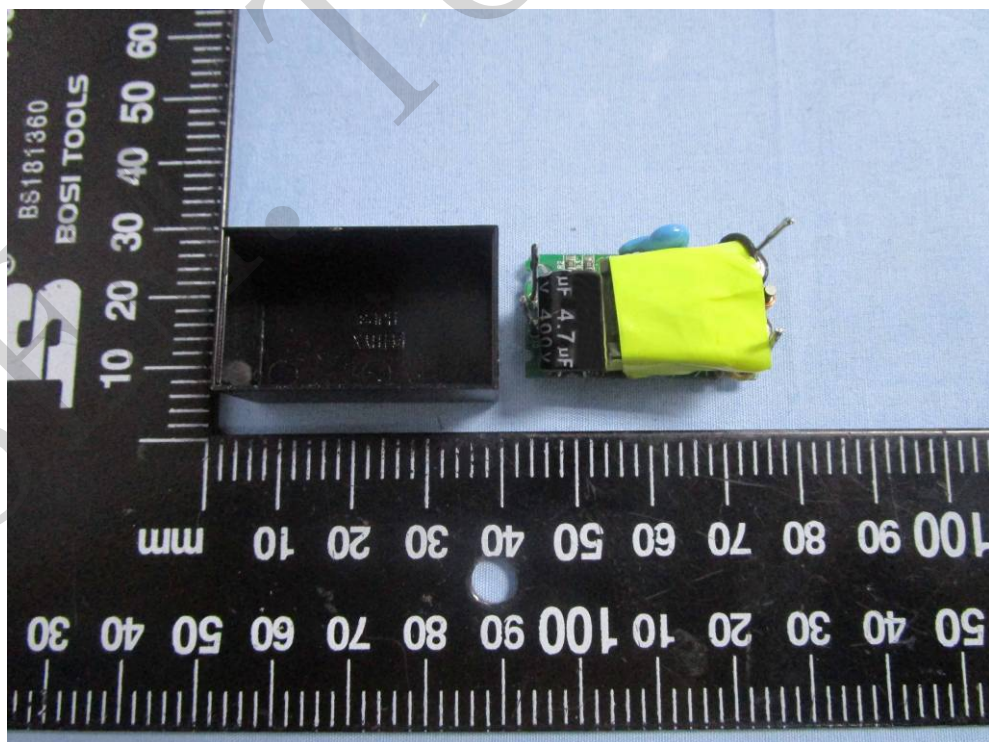
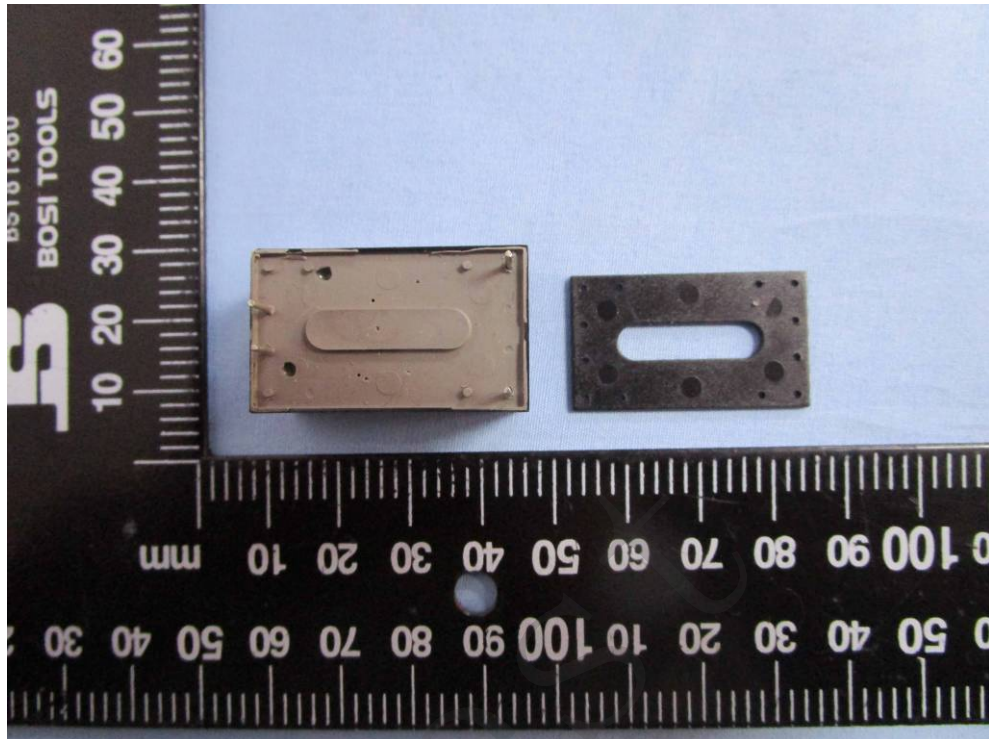
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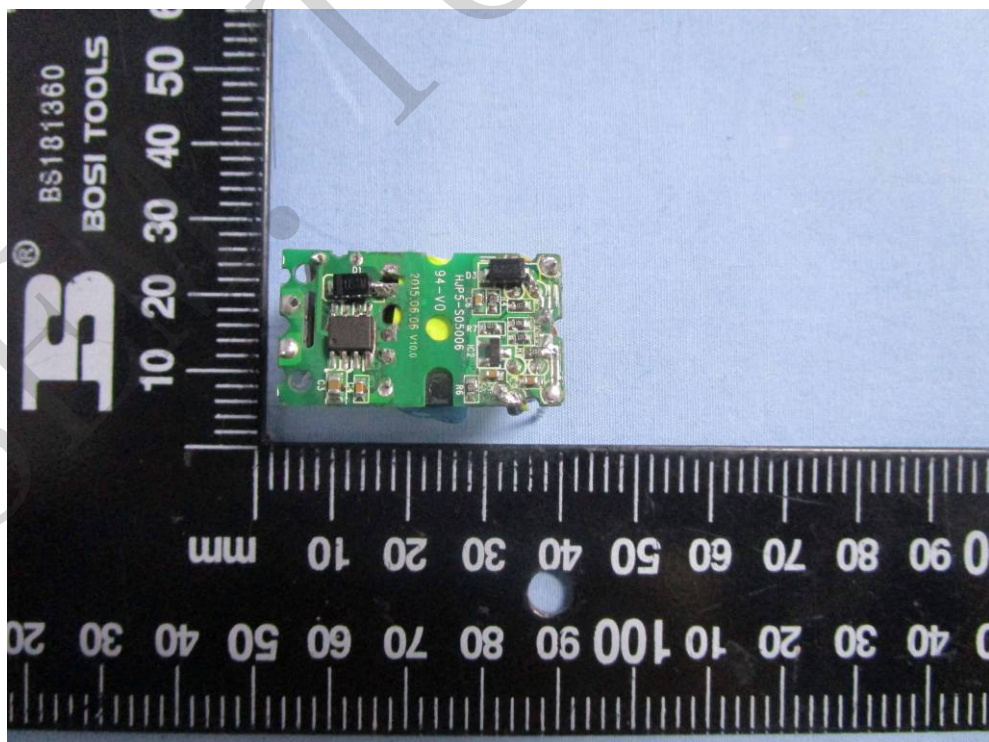
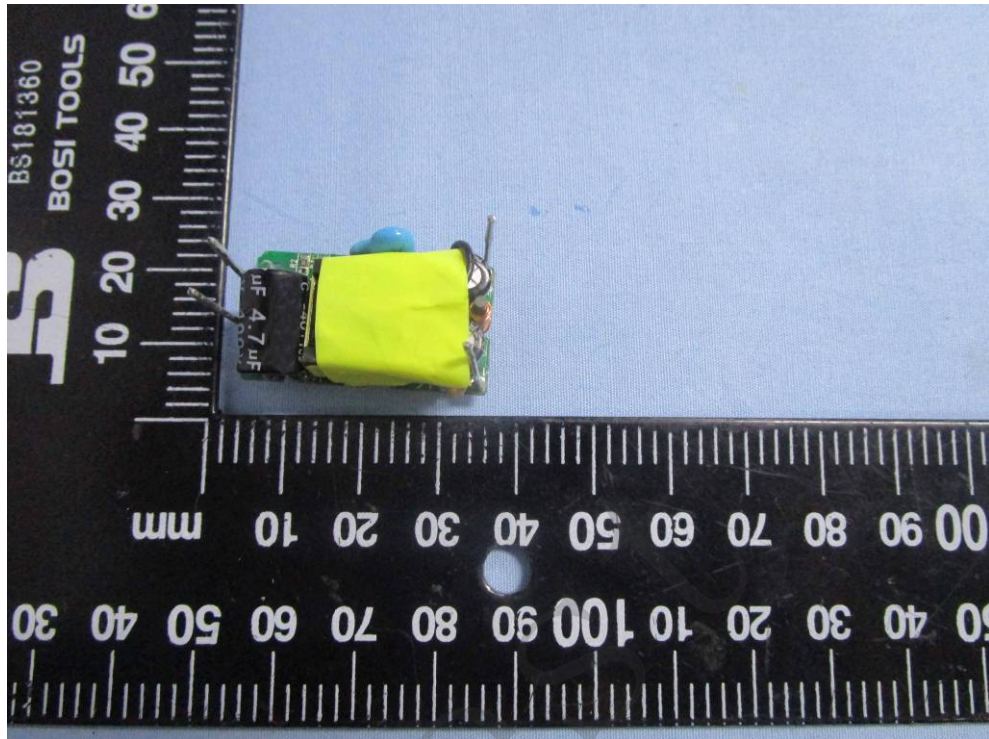
D3	S-C	240V/50 Hz	30 min.	External fuse	0.053 to 0 to 0.053	Unit shutdown immediately, no hazard, no damage.
Output	S-C	240V/50 Hz	30 min.	External fuse	0.068 to 0 to 0.068	Unit shutdown immediately, no hazard, no damage.
Output	O-L	240V/50 Hz	7hr.	External fuse	0.034A-0.056A-0.059A-0.010A	Unit shutdown, no hazard. The max. load: 0.47A. The max. temperature: T1 coil: 109.4°C, T1 core: 101.5°C, ambient: 24.5°C.
Supplementary information: O-C: open-circuit S-C: short-circuit						

Photos

Model: HLK-PM03







*****End of Test Report*****