

TEST REPORT

EN 60950-1:2006

Product	Network attached storage	
Name and address of the applicant	QNAP Systems Inc. 21F, No. 77, Sec. 1, Xintai 5 th Rd., Xizhi City, Taipei County, Taiwan.	
Name and address of the manufacturer	QNAP Systems Inc. 21F, No. 77, Sec. 1, Xintai 5 th Rd., Xizhi City, Taipei County, Taiwan.	
Name and address of the factory	QNAP Systems Inc. 21F, No. 77, Sec. 1, Xintai 5 th Rd., Xizhi City, Taipei County, Taiwan.	
Rating and principal characteristics	100-240Vac, 6-2.8A, 50/ 60Hz	
Class of equipment	Class I equipment	
Trade mark	QNAP	
Model/type	TS-809 Pro, TS-809, TS-809 Pro II, TS-809 II, TS-809 Pro-G, TS-809G, iNAS-809 Pro, iNAS-809, TS-809 Pro-M, TS-809M, VioStor-8040, VioStor-8040P, VioStor-8040A, VioStor-8040V, VioStor-8040 Pro, NV-8040, NV-8040P, NV-8040V, NV-8040 Pro, VioStor-8036, VioStor-8036P, VioStor-8036A, VioStor-8036V, VioStor-8036 Pro, VioStor-8032, VioStor-8032P, VioStor-8032A, VioStor-8032V, VioStor-8032 Pro, VioStor-8025, VioStor-8025P, VioStor-8025A, VioStor-8025V, VioStor-8025 Pro, NV-8025, NV-8025P, NV-8025A, NV-8025V, NV-8025 Pro, VioStor-809, VioStor-809P, VioStor-809A, VioStor-809V, VioStor-809 Pro.	
Serial no	Test sample without serial numbers	
Tested according to	EN 60950-1:2006	
	Safety of information technology equipment	
Name and address of the testing laboratory	International Standards Laboratory	Telephone (+886) 3 407-1718
	No.120, Lane 180, San Ho Tsuen, Hsin Ho Road, Lung-Tan Hsiang, Tao Yuan County, Taiwan	Fax (+886) 3 407-1738
Tested by	<i>Berry Wu</i>	
	Signature Berry Wu / Engineer name in block letters	date 2008-01-16
Approved by	<i>Jack Lin</i>	
	Signature Jack Lin / Director name in block letters	Date 2009-01-20



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Particulars: test item vs. test requirements	
Equipment mobility	Movable equipment
Operating condition	continuous
Mains supply tolerance (%).....	not connect to mains
Tested for IT power systems	not connect to mains
IT testing, phase-phase voltage (V)	N.A.
Class of equipment	Class I
Mass of equipment (kg)	12.9Kg
Protection against ingress of water	IP20
Test case verdicts	
Test case does not apply to the test object ..	N/A
Test item does meet the requirement	P(ass)
Test item does not meet the requirement ...	F(ail)
Testing	
Date of receipt of test item	2008-12-29
Date(s) of performance of test	2009-01-16
Total pages of report	47 (Report: 40; Photos:3; Circuit: 4)
General remarks	
<u>Comments:</u>	
The EUT is a Class I Network attached storage for general office used.	
All interior servicing is to be performed by qualified service personnel, which requires the use of a tool.	
The internal AC power supply (Class I) approved by TUV-rh Certificate No. R 50130069	
The test sample is pre-production sample without serial number.	
Maximum recommended ambient (Tmra): 35°C	
Dimensions: 272 x 298 x 198 mm	

Copy of marking plate(s):



1	GENERAL		P
1.5	Components		P
1.5.1	General		P
	Comply with IEC 60950 or relevant component standard	Components, which were found to affect safety aspects, comply with the requirements of this standard or within the safety aspects of the relevant IEC/EN component standards (see appended table 1.5.1).	P
1.5.2	Evaluation and testing of components	Components, which are certified to IEC and/or national standards, are used correctly within their ratings. Components not covered by IEC/EN standards are tested under the conditions present in the equipment.	P
1.5.3	Thermal controls	No thermal controls provided.	N
1.5.4	Transformers		N
1.5.5	Interconnecting cables	No interconnecting cables.	N
1.5.6	Capacitors in primary circuits		N
1.5.7	Resistors bridging insulation		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		N
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		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	Highest load according to Max. Normal load for this equipment is the 8 set of Hard Disk Device permanently accessed and add dummy load USB 5V/0.5A * 5 ports.	P

1.6.3	Voltage limit of hand-held equipment	This appliance is not hand-held equipment.	—
1.6.4	Neutral conductor	In approved AC power supply.	P
1.7	Marking and instructions		P
1.7.1	Power rating	The required marking is located on the equipment.	P
	Rated voltage(s) or voltage range(s) (V)	100-240Vac	P
	Symbol for nature of supply, for d.c. only.....		N
	Rated frequency or rated frequency range (Hz) :	50 / 60	P
	Rated current (Ma or A)	6-2.8A	P
	Manufacturer's name or trademark or identification mark	QNAP	P
	Type/model or type reference	Refer to page 1	P
	Symbol for Class II equipment only	Class I equipment	N
	Other symbols		N
1.7.2	Safety instructions and marking	See below.	P
1.7.2.1	General	The user's manual provided.	P
1.7.2.2	Disconnect devices		N
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		N
1.7.2.6	Ozone		N
1.7.3	Short duty cycles	The equipment is intended for continuous operation.	N
1.7.4	Supply voltage adjustment	No voltage selector	N
	Methods and means of adjustment; reference to installation instructions		—
1.7.5	Power outlets on the equipment	No power outlet	N
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference)	In approved AC power supply.	P
1.7.7	Wiring terminals	In approved AC power supply.	P
1.7.7.1	Protective earthing and bonding terminals	In approved AC power supply.	P
1.7.7.2	Terminal for a.c. mains supply conductors	In approved AC power supply.	P
1.7.7.3	Terminals for d.c. mains supply conductors		—
1.7.8	Controls and indicators	Refer to below	N
1.7.8.1	Identification, location and marking	No controls affecting safety are using figures.	N
1.7.8.2	Colours	Only functional indicators use colours.	N
1.7.8.3	Symbols according to IEC 60417.....	No switches in the equipment.	N



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1.7.8.4	Markings using figures	No controls affecting safety are using figures	N
1.7.9	Isolation of 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	No required markings placed on removable parts.	N
1.7.13	Replaceable batteries	Lithium battery is exchangeable. Warning sentence is printed in the user's manual.	P
	Language(s)	Language shall be accepted for the country in which the equipment is to be sold.	P
1.7.14	Equipment for restricted access locations	No restricted access location	N

2	PROTECTION FROM HAZARDS		P
2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas		P
2.1.1.1	Access to energized parts	Refer below:	P
	Test by inspection	Operator can not contact with any parts with only Function insulation to SELV.	P
	Test with test finger	No access with test finger to any parts with only Function insulation to SELV.	P
	Test with test pin	The test pin cannot touch hazardous voltage through and openings or seams of the whole enclosure.	P
	Test with test probe	No TNV circuits in the equipment.	N
2.1.1.2	Battery compartments	No battery compartment.	N
2.1.1.3	Access to ELV wiring	No ELV wiring provided	N
	Working voltage (V_{peak} or V_{rms}); minimum distance (mm) through insulation		—



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2.1.1.4	Access to hazardous voltage circuit wiring	No hazardous voltage wiring in operator accessible area.	P
2.1.1.5	Energy hazards	No energy hazard in user access area	P
2.1.1.6	Manual controls	The equipment does not contain any knobs, handles, levers, or the like.	N
2.1.1.7	Discharge of capacitors in equipment	Supplied by SELV only	N
	Time-constant (s); measured voltage (V)		—
2.1.1.8	Energy hazards		N
	a) Capacitor connected to the d.c. mains supply		N
	b) Internal battery connected to the d.c. mains supply		N
2.1.19	Audio amplifiers		N
2.1.2	Protection in service access areas	Considered.	N
2.1.3	Protection in restricted access locations	The unit is not intended to be used in restricted locations.	N

2.2	SELV circuits		P
2.2.1	General requirements	SELV limits are not exceeded under normal condition and after a single fault.	P
2.2.2	Voltages under normal conditions (V)	Between any SELV circuits 42.4V peak or 60VDC are not exceeded.	P
2.2.3	Voltages under fault conditions (V)	Single fault did not cause excessive voltage in accessible SELV circuits. Limits of 71V peak and 120Vd.c. were not exceeded within 0.2 s and limits 42.4 V peak and 60 Vd.c. were not exceeded for longer than 0.2 s.	P
2.2.4	Connection of SELV circuits to other circuits.....	SELV circuits are only connected to other SELV circuits.	P

2.3	TNV circuits		N
2.3.1	Limits	No TNV circuits in the equipment.	N
	Type of TNV circuits		—
2.3.2	Separation from other circuits and from accessible parts		N
	Insulation employed.....		—
2.3.3			N
	Insulation employed.....		—



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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		N
2.4.1	General requirements	No LCC within the equipment	N
2.4.2	Limit values		N
	Frequency (Hz).....:		—
	Measured current (mA).....:		—
	Measured voltage (V).....:		—
	Measured capacitance (μ F).....:		—
2.4.3	Connection of limited current circuits to other circuits		N

2.5	Limited power sources		P
	Inherently limited output	See table 2.5	P
	Impedance limited output		N
	Overcurrent protective device limited output		N
	Regulating network limited output under normal operating and single fault condition		N
	Regulating network limited output under normal operating conditions and overcurrent protective device limited output under single fault condition		N
	Output voltage (V), output current (A), apparent power (VA).....:		—
	Current rating of overcurrent protective device (A)		—

2.6	Provisions for earthing and bonding		P
2.6.1	Protective earthing	In approved AC power supply.	P
2.6.2	Functional earthing		N
2.6.3	Protective earthing and protective bonding conductors		N
2.6.3.1	General	No power cord is provided.	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.....:		—

2.6.3.4	Resistance (Ω) of earthing conductors and their terminations, test current (A).....:		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 and nominal thread diameter (mm).....:		—
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		—
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
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		P
2.7.1	Basic requirements	In approved AC power supply.	P
	Instructions when protection relies on building installation		N
2.7.2	Faults not covered 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	No safety interlock.	N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
2.8.5	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches and relays		N



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2.8.7.1	Contact gaps (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	In approved AC power supply.	P
2.9.2	Humidity conditioning	48Hrs	P
	Humidity (%)	95%	—
	Temperature (°C)	25°C	—
2.9.3	Grade of insulation	In approved AC power supply.	P
2.9.4	Separation from hazardous voltages		N
	Method(s) used		N

2.10	Clearances, creepage distances and distances through insulation		P
2.10.1	General	In approved AC power supply.	P
2.10.1.1	Frequency		N
2.10.1.2	Pollution degrees		N
2.10.1.3	Reduced values for functional insulation		N
2.10.1.4	Intervening unconnected conductive parts		N
2.10.1.5	Insulation with varying dimensions		N
2.10.1.6	Special separation requirements		N
2.10.1.7	Insulation in circuits generating starting pulses		N
2.10.2	Determination of working voltage		N
2.10.2.1	General		N
2.10.2.2	RMS working voltage		N
2.10.2.3	Peak working voltage		N
2.10.3	Clearances		N
2.10.3.1	General		N
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		N
2.10.3.4	Clearances in secondary circuits		N



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2.10.3.5	Clearances in circuits having starting pulses		N
2.10.3.6	Transients from a.c. mains supply		N
2.10.3.7	Transients from d.c. mains supply		N
2.10.3.8	Transients from 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		N
2.10.4.1	General		N
2.10.4.2	Material group and comparative tracking index		N
	CTI tests.....:		—
2.10.4.3	Minimum creepage distances		N
2.10.5	Solid insulation		N
2.10.5.1	General		N
2.10.5.2	distance through insulation		N
	Number of layers (pcs)		—
	Electric strength test		—
2.10.5.3	Insulating compound as solid insulation		N
	Distance through insulation		N
	Electric strength test for thin sheet insulating material		—
	Number of layers (pcs)		N
2.10.5.4	Semiconductor devices		N
	Number of layers (pcs)		N
	Two wires in contact inside wound component; angle between 45° and 90°		N
2.10.5.5	Cemented joints		N
2.10.5.6	Thin sheet material – General	In approved AC power supply.	P
2.10.5.7	Separable thin sheet material		N
	Number of layers (pcs)		N
2.10.5.8	Nonseparable thin sheet material		N
2.10.5.9	Thin sheet material – standard test procedure	In approved AC power supply.	P
	Electric strength test		N
2.10.5.10	Thin sheet material – alternative test procedure		N
	Electric strength test		N

2.10.5.11	Insulation in wound components		N
2.10.5.12	wire in wound components		N
	Working voltage		N
	a) Basic insulation not under stress		N
	b) Basic, supplementary, reinforced insulation		N
	c) Compliance with Annex U		N
	Two wires in contact inside wound component; angle between 45° and 90°		N
2.10.5.13	Wire with solventbased enamel in wound components		N
	Electric strength test		N
	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		N
2.10.6.1	Uncoated printed boards		N
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
2.10.6.5	Electric strength test		—
2.10.6.6	Abrasion resistance test		N
	Electric strength test		—
2.10.7	Component external terminations		N
	Temperature $T_1 = T_2 + T_{ma} - T_{amb} + 10K (^{\circ}C) \dots$		N
2.10.8	Tests on coated printed boards and coated components		N
2.10.8.1	Sample preparation and preliminary inspection		—
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



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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	All internal wires are UL recognized wiring which is PVC insulated, rated VW-1, min. 80 °C. Internal wiring gauge is suitable for current intended to be carried. No internal wire for primary power distribution.	P
3.1.2	Protection against mechanical damage	Wires do not touch sharp edges and heatsinks which could damage the insulation and cause hazard	P
3.1.3	Securing of internal wiring	The wires are secured by soldering so that a loosening of the terminal connection is unlikely	P
3.1.4	Insulation of conductors	The insulation of the individual conductors are suitable for the application and the working voltage. For the insulation material see 3.1.1.	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 electrical contact pressure.	N
3.1.7	Insulating materials in electrical connections	No contact pressure through insulating material.	N
3.1.8	Self-tapping and spaced thread screws	No such screws provided.	N
3.1.9	Termination of conductors	All conductors are reliably secured.	P
	10 N pull test	Considered.	P
3.1.10	Sleeving on wiring	No sleeving used.	N

3.2	Connection to an a.c. mains supply or a d.c. mains supply		P
3.2.1	Means of connection	See below.	P
3.2.1.1	Connection to an a.c. mains supply	An appliance inlet is used.	P
3.2.1.2	Connection to a d.c. mains supply		N
3.2.2	Multiple supply connections		—

3.2.3	Permanently connected equipment		—
	Number of conductors, diameter (mm) of cable and conduits		—
3.2.4	Appliance inlets	Comply with IEC 60309 or IEC 60320-1	P
3.2.5	Power supply cords		N
3.2.5.1	AC power supply cords	Not provided	N
	Type		—
	Rated current (A), cross-sectional area (mm ²), AWG		—
3.2.5.2	DC power supply cords	Not connect to DC mains.	N
3.2.6	Cord anchorages and strain relief		—
	Mass of equipment (kg), pull (N)		—
	Longitudinal displacement (mm)		—
3.2.7	Protection against mechanical damage	No parts under this unit likely to damage the power supply cords. Enclosure without sharp edges.	P
3.2.8	Cord guards	No cord guard is provided.	N
	D (mm); test mass (g)		—
	Radius of curvature of cord (mm)		—
3.2.9	Supply wiring space		—
3.3	Wiring terminals for connection of external conductors		P
3.3.1	Wiring terminals	Direct connection to Mains.	P
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 and nominal thread diameter (mm)		—
3.3.6	Wiring terminals design		N
3.3.7	Grouping of wiring terminals		N
3.3.8	Stranded wire		N
3.4	Disconnection from the mains supply		P
3.4.1	General requirement	See below.	P

3.4.2	Disconnect devices	Appliance inlet is used as disconnect device.	P
3.4.3	Permanently connected equipment		N
3.4.4	Parts which remain energized	When the power cord is removed form the inlet.	P
3.4.5	Switches in flexible cords		N
3.4.6	Single-phase equipment and d.c. equipment		N
3.4.7	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
3.5.1	General requirements	Considered.	P
3.5.2	Types of interconnection circuits.....:	Interconnection circuits of SELV through Sec. O/p cable No ELV interconnection Circuits.	P
3.5.3	ELV circuits as interconnection circuits	No ELV interconnections.	N

4	PHYSICAL REQUIREMENTS		P
4.1	Stability		P
	Angle of 10°	The unit does not create any hazards overbalance at 10°.	P
	Test: force (N)	The unit is not floor-standing	N

4.2	Mechanical strength		P
4.2.1	General	Considered.	P
4.2.2	Steady force test, 10 N	Considered	P
4.2.3	Steady force test, 30 N	Considered for SPS enclosure.	P
4.2.4	Steady force test, 250 N	250N applied to all outer enclosure. No energy or other hazards.	P
4.2.5	Impact test	Considered	P
	Fall test		N
	Swing test		—
4.2.6	Drop test		N
4.2.7	Stress relief test	Metal enclosure	N

4.2.8	Cathode ray tubes	CRT is 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

4.3	Design and construction		P
4.3.1	Edges and corners	All edges and corners are rounded and/or smoothed.	P
4.3.2	Handles and manual controls; force (N)	No handles and manual controls.	N
4.3.3	Adjustable controls	No hazardous adjustable controls.	N
4.3.4	Securing of parts	No connection likely to be exposed to mechanical stress are provided in unit.	N
4.3.5	Connection of plugs and sockets	No mismatching connector, plug or socket possible.	N
4.3.6	Direct plug-in equipment	Not intended to plug directly into a wall socket-outlet.	N
	Dimensions (mm) of mains plug for direct plug-in:		—
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N)		—
4.3.7	Heating elements in earthed equipment	No heating elements provided.	
4.3.8	Batteries	For non-rechargeable lithium type RTC battery : There is no reverse polarity installation could be happen due to design of socket. The battery is protected from reverse charging by diode D12 pin A2-C and R413. Result see appended table 5.3	P
	Overcharging of a rechargeable battery		N
	Unintentional charging of a nonrechargeable battery		N
	Reverse charging of a rechargeable battery		N
	Excessive discharging rate for any battery		N
4.3.9	Oil and grease	Insulation is not exposed to oil, grease etc.	N



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4.3.10	Dust, powders, liquids and gases	The equipment does not generate ionising radiation or use a laser, and does not contain flammable liquids or gases.	N
4.3.11	Containers for liquids or gases	No containers for liquids or gases in the equipment.	N
4.3.12	Flammable liquids	The equipment does not contain flammable liquid.	N
	Quantity of liquid (l)		N
	Flash point (°C)		N
4.3.13	Radiation; type of radiation	The equipment does not generate ionizing radiation or uses a laser, and does not contain flammable liquids or gases.	P
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		N
	Part, property, retention after test, flammability classification		N
4.3.13.4	Human exposure to ultraviolet (UV) radiation		N
4.3.13.5	Laser (including LEDs)		N
	Laser class		—
4.3.13.6	Other types		N
4.4	Protection against hazardous moving parts		P
4.4.1	General		P
4.4.2	Protection in operator access areas	No hazardous moving part in operator access areas.	P
4.4.3	Protection in restricted access locations	No hazardous moving part in restricted access areas	N
4.4.4	Protection in service access areas		N
4.5	Thermal requirements		P
4.5.1	General	See table 4.5	P
4.5.2	Temperature tests	See table 4.5	P
	Normal load condition per annex L	See table 1.6.2	P



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4.5.3	Temperature limits for materials	See tabl 1.5.1	P
4.5.4	Touch temperature limits		N
4.5.5	Resistance to abnormal heat		N

4.6	Openings in enclosures		P
4.6.1	Top and side openings Equipment is for building in and shall be evaluated in end product	No opening.	P
	Dimension		—
4.6.2	Bottoms of fire enclosures	No opening.	P
	Construction of the bottom; Dimension(mm).....:		—
4.6.3	Doors or covers in fire enclosures	No doors or covers.	N
4.6.4	Openings in transportable equipment		N
4.6.4.1	Constructional design measures		N
	Dimensions (mm)		N
4.6.4.2	Evaluation measures for larger openings		N
4.6.4.3	Use of etalised parts		N
4.6.5	Adhesives for constructional purposes	No barrier secured by adhesive inside enclosure.	N
	Conditioning temperature (°C)/time (weeks)		—

4.7	Resistance to fire		P
4.7.1	Reducing the risk of ignition and spread of flame	Metal enclosure.	P
	Method 1, selection and application of components wiring and materials		—
	Method 2, application of all of simulated fault condition tests		—
4.7.2	Conditions for a fire enclosure	With having the following components: - components with windings - wiring - semiconductor devices, transistors, diodes, integrated circuits. - resistors, capacitors, inductors. Metal enclosure.	P
4.7.2.1	Parts requiring a fire enclosure	Metal enclosure.	P
4.7.2.2	Parts not requiring a fire enclosure		N
4.7.3	Materials		P
4.7.3.1	General	Metal enclosure. Refer to “List of Critical Components”.	P



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4.7.3.2	Materials for fire enclosures	Metal enclosure. Components in compliance with relevant component standard.	P
4.7.3.3	Materials for components and other parts outside fire enclosures	No parts outside the fire enclosure.	N
4.7.3.4	Materials for components and other parts inside fire enclosures	Other materials inside fire enclosure are minimum 94V-2 materials	P
4.7.3.5	Materials for air filter assemblies	No air filters in the equipment.	N
4.7.3.6	Materials used in high-voltage components	No parts exceeding 4kV.	N

5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
5.1	Touch current and protective conductor current		P
5.1.1	General		P
5.1.2	Configuration of equipment under test (EUT)	See below.	P
5.1.2.1	Single connection to an a.c. mains supply	In approved AC power supply.	P
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	Class I equipment	P
	Test voltage (V)	See table 5.1	—
	Measured touch current (mA)	See table 5.1	P
	Max. allowed touch current (mA)	3.5	—
	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 and from telecommunication networks and cable distribution systems and from telecommunication networks	No TNV circuit.	N
5.1.8.1	Limitation of the touch current to a telecommunication network and a cable distribution system		N
	Test 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	Class I equipment	P
5.2.2	Test procedure	Refer to table 5.2.2	P

5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation	Ventilation openings blocked and the DC fan rotor locked tests was considered as foreseeable misuse.	P
5.3.2	Motors	Approved DC fans used.	P
5.3.3	Transformers	No safety insulating transformers.	N
5.3.4	Functional insulation.....	Complies with c).	P
5.3.5	Electromechanical components	No electromechanical components.	N
5.3.6	Audio amplifiers in ITE		N
5.3.7	Simulation of faults	see appended table 5.3	P
5.3.8	Unattended equipment		N
5.3.9	Compliance criteria for abnormal operating and fault conditions	see appended table 5.3	P
5.3.9.1	During the tests	No fire or molten metal occurred and no deformation of enclosure during the tests.	P
5.3.9.2	After the tests	No reduction of clearance and creepage distances.	P

6	CONNECTION TO TELECOMMUNICATION NETWORKS (No TNV connections provided.)		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
	Test 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
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		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
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; test time (h)		N
B.7.4	Electric strength test		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)		N
	Position		—
	Manufacturer		—
	Type		—
	Rated values		—
	Method of protection.....		—
C.1	Overload test		N
C.2	Insulation		N
	Protection from displacement of windings.....		N
D	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)		N
D.1	Measuring instrument	Figure D.1 used.	N
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)		N
G	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N
G.1	Clearance		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 DC mains supply		N
G.2.3	Unearth DC mains supply		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 levels (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 used		—
K	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.7)		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		N
L	ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.1)		P
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	The equipment is operated according to the most unfavorable way of operation given in the operating instructions	P

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 z) (H.....:		—
M.3.1.2	Voltage (V)		—
M.3.1.3	Cadence; time (s), voltage (V)		N
M.3.1.4	Single fault current (mA).....:		—
M.3.2	Tripping device and monitoring voltage		—
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 2.10.3.4, 6.2.2.1, 7.3.2 and clause G.5)		N
N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N

P	ANNEX P, NORMATIVE REFERENCES		N
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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		N

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)		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
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



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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		N

EN 60950-1:2006 – CENELEC COMMON MODIFICATIONS																																						
Contents	Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions Annex ZC (informative) A-deviations	P																																				
General	Delete all the “country” notes in the reference document according to the following list: <table border="0" style="width: 100%;"> <tr> <td>1.4.8 Note 2</td> <td>1.5.1 Note 2 & 3</td> <td>1.5.7.1 Note</td> </tr> <tr> <td>1.5.8 Note 2</td> <td>1.5.9.4 Note</td> <td>1.7.2.1 Note 4, 5 & 6</td> </tr> <tr> <td>2.2.3 Note</td> <td>2.2.4 Note</td> <td>2.3.2 Note</td> </tr> <tr> <td>2.3.2.1 Note 2</td> <td>2.3.4 Note 2</td> <td>2.6.3.3 Note 2 & 3</td> </tr> <tr> <td>2.7.1 Note</td> <td>2.10.3.2 Note 2</td> <td>2.10.5.13 Note 3</td> </tr> <tr> <td>3.2.1.1 Note</td> <td>3.2.4 Note</td> <td>3. 2.5.1 Note 2</td> </tr> <tr> <td>4.3.6 Note 1 & 2</td> <td>4.7 Note 4</td> <td>4.7.2.2 Note</td> </tr> <tr> <td>4.7.3.1 Note 2</td> <td>5.1.7.1 Note 3 & 4</td> <td>5.3.7 Note 1</td> </tr> <tr> <td>6 Note 2 & 5</td> <td>6.1.2.1 Note 2</td> <td>6.1.2.2 Note</td> </tr> <tr> <td>6.2.2 Note</td> <td>6. 2.2.1 Note 2</td> <td>6.2.2.2 Note</td> </tr> <tr> <td>7.1 Note 3</td> <td>7.2 Note</td> <td>7.3 Note 1 & 2</td> </tr> <tr> <td>G.2.1 Note 2</td> <td>Annex H Note 2</td> <td></td> </tr> </table>	1.4.8 Note 2	1.5.1 Note 2 & 3	1.5.7.1 Note	1.5.8 Note 2	1.5.9.4 Note	1.7.2.1 Note 4, 5 & 6	2.2.3 Note	2.2.4 Note	2.3.2 Note	2.3.2.1 Note 2	2.3.4 Note 2	2.6.3.3 Note 2 & 3	2.7.1 Note	2.10.3.2 Note 2	2.10.5.13 Note 3	3.2.1.1 Note	3.2.4 Note	3. 2.5.1 Note 2	4.3.6 Note 1 & 2	4.7 Note 4	4.7.2.2 Note	4.7.3.1 Note 2	5.1.7.1 Note 3 & 4	5.3.7 Note 1	6 Note 2 & 5	6.1.2.1 Note 2	6.1.2.2 Note	6.2.2 Note	6. 2.2.1 Note 2	6.2.2.2 Note	7.1 Note 3	7.2 Note	7.3 Note 1 & 2	G.2.1 Note 2	Annex H Note 2		P
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																																				
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4.3.6 Note 1 & 2	4.7 Note 4	4.7.2.2 Note																																				
4.7.3.1 Note 2	5.1.7.1 Note 3 & 4	5.3.7 Note 1																																				
6 Note 2 & 5	6.1.2.1 Note 2	6.1.2.2 Note																																				
6.2.2 Note	6. 2.2.1 Note 2	6.2.2.2 Note																																				
7.1 Note 3	7.2 Note	7.3 Note 1 & 2																																				
G.2.1 Note 2	Annex H Note 2																																					
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																																				
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	N																																				
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																																				



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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>b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation;</p> <p>c) it is permitted for PLUGGABLE EQUIPMENT TYPE B or PERMANENTLY CONNECTED EQUIPMENT, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions.</p> <p>If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.</p>	
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	<p>Replace "60245 IEC 53" by "H05 RR-F";</p> <p>"60227 IEC 52" by "H03 VV-F or H03 VVH2-F";</p> <p>"60227 IEC 53" by "H05 VV-F or H05 VVH2-F2".</p> <p>In Table 3B, replace the first four lines by the following:</p> <p> Up to and including 6 0,75 a) </p> <p> Over 6 up to and including 10 (0,75) b) 1,0 </p> <p> Over 10 up to and including 16 (1,0) c) 1,5 </p> <p>In the conditions applicable to Table 3B delete the words "in some countries" in condition a).</p> <p>In NOTE 1, applicable to Table 3B, delete the second sentence.</p>	N
3.3.4	<p>In Table 3D, delete the fourth line: conductor sizes for 10 to 13 A, and replace with the following:</p> <p> Over 10 up to and including 16 1,5 to 2,5 1,5 to 4 </p> <p>Delete the fifth line: conductor sizes for 13 to 16 A.</p>	N
4.3.13.6	<p>Add the following NOTE:</p> <p>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. Standards taking into account this Recommendation which demonstrate compliance with the applicable EU Directive are indicated in the OJEC.</p>	N



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Annex H	<p>Replace the last paragraph of this annex by: At any point 10 cm from the surface of the OPERATOR ACCESS AREA, the dose rate shall not exceed 1 $\mu\text{Sv/h}$ (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.</p>	N
Bibliography	Additional EN standards.	—
ZA	<p>NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS</p>	—

Annex ZB	Special National Conditions	P
1.2.4.1	In Denmark, certain types of Class I appliances(see3.2.1.1)maybe provided with a plug not establishing earthing conditions when inserted into Danish socket outlets.	N
1.5.7.1	In Finland, Norway and Sweden, resistors bridging BASIC INSULATION in CLASS I PLUGGABLE EQUIPMENT TYPE A must comply with there quirements in 1.5.7.2.	N
1.5.8	In Norway, due to the IT power system used (seeannexV,FigureV.7),capacitors are required to be rated for the applicable line to line voltage (230V).	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	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 suppress or s are connected between the network terminals and accessible parts, have a marking stating that thee quipment must be connected to an earthed mains socket outlet. The marking text in the applicable countries shall be as follows: InFinland:"Laiteonliitettäväsuojamaadoituskoskettimillavarustettuunpistorasiaan" InNorway:"Apparatetmåtilkoplesjordetstikkontakt" InSweden:"Apparatenskallanslutastilljordatuttag"	N
1.7.5	InDenmark,socketoutletsforprovidingpowertootherequipmentshallbeinaccordance withtheHeavyCurrentRegulations,Section1072D1,StandardSheetDK13a,DK15aor DK17a,whenusedonClasslequipment.ForSTATIONARYEQUIPMENTthesocketoutletshallbeinaccordancewithStandardSheetDK11borDK15a.	N
2.2.4	InNorway,forrequirementssee1.7.2.1,6.1.2.1and6.1.2.2ofthisannex.	N
2.3.2	InFinland,NorwayandSwedenthereareadditionalrequirementsfortheinsulation.See6.1.2.1and6.1.2.2ofthisannex.	N
2.3.4	InNorway,forrequirementssee1.7.2.1,6.1.2.1and6.1.2.2ofthisannex.	N
2.6.3.3	IntheUnited Kingdom,thecurrentratingofthecircuitshallbetakenas13A,not16A.	N
2.7.1	IntheUnited Kingdom,toprotectagainstexcessivecurrentsandshortcircuitsinthePRIMARYCIRCUITofDIRECTPLUGINEQUIPMENT,testsaccordingto5.3shallbeconducted,usingane xternalprotectivedevicerated30Aor32A.Ifthesetestsfail,suitableprotectivedevicesshallbeincludedasintegralpartsoftheDIRECTPLUGINEQUIPMENT,sothattherequirementsof5.3aremet.	N
2.10.5.13	In Finland, Norway and Sweden,there are additional requirements for the insulation, see 6.1.2.1and 6.1.2.2 of this annex.N	N

3.2.1.1	<p>In Switzerland, supply cords of equipment having a RATED CURRENT not exceeding 10A shall be provided with a plug complying with SEV 1011 or IEC 608841 and one of the following dimension sheets:</p> <p>SEV65322.1991 Plug Type 153P+N+PE250/400V, 10A</p> <p>SEV65332.1991 Plug Type 11L+N250V, 10A</p> <p>SEV65342.1991 Plug Type 12L+N+PE250V, 10A In general, EN60309 applies for plugs for currents exceeding 10A. However, a 16A plug and socket outlet system is being introduced in Switzerland, the plugs of which are according to the following dimension sheets, published in February 1998:</p> <p>SEV59322.1998 Plug Type 253L+N+PE230/400V, 16A</p> <p>SEV59332.1998 Plug Type 21L+N250V, 16A</p> <p>SEV59342.1998 Plug Type 23L+N+PE250V, 16A</p>	N
3.2.1.1	<p>In Denmark, supply cords of single phase equipment having a rated current not exceeding 13A shall be provided with a plug according to the Heavy Current Regulations, Section 1072D1. CLASS I EQUIPMENT provided with socket outlet with earth contacts or which are intended to be used in locations where protection against in direct contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK21a or DK25a. If poly phase equipment and single phase equipment having a RATED CURRENT exceeding 13A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations, Section 1072D1 or EN603092.</p>	N
3.2.1.1	<p>In Spain, supply cords of single phase equipment having a rated current not exceeding 10A shall be provided with a plug according to UNE20315:1994. Supply cords of single phase equipment having a rated current not exceeding 2,5A shall be provided with a plug according to UNEEN50075:1993. CLASS I EQUIPMENT provided with socket outlets with earth contacts or which are intended to be used in locations where protection against in direct contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE20315:1994. If poly phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNEEN 603092.</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 BS1363 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. NOTE 'Standard plug' is defined in SI1768:1994 and essentially means an approved plug conforming to BS1363 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 13A plug in accordance with Statutory Instrument 525:1997 National Standards Authority of Ireland (section 28) (13A 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 1,25mm² is allowed for equipment with a rated current over 10A and up to and including 13A.</p>	N
3.3.4	<p>In the United Kingdom, the range of conductor sizes of flexible cord to be accepted by terminals for equipment with a RATED CURRENT of over 10A up to and including 13A is: •1,25mm² to 1,5mm² nominal cross sectional area.</p>	N



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4.3.6	In the United Kingdom, the torque test is performed using a socket outlet complying with BS1363 part1:1995, including Amendment1:1997 and Amendment2:2003 and the plug part of DIRECT PLUG IN EQUIPMENT shall be assessed to BS1363:Part1,12.1,12.2,12.3,12.9,12.11,12.12,12.13,12.16 and12.17, 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), there quire ments 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 (Section28) (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 3,5mA r.m.s. are permitted only for the following equipment:• STATIONARY PLUGGABLE EQUIPMENT TYPE A that <ul style="list-style-type: none"> - is intended to be used in a RESTRICTE DACCESS 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	<p>In Finland, Norway and Sweden, add the following text between the first and second paragraph of the compliance clause:</p> <p>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either</p> <ul style="list-style-type: none"> - two layers of thin sheet material, each of which shall pass the electric strength test below, or - one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. <p>If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition</p> <ul style="list-style-type: none"> - passes the tests and inspection criteria of 2.10.11 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.10 shall be performed using 1,5 kV), and - is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV. <p>It is permitted to bridge this insulation with a capacitor complying with EN132400:1994, subclass Y2.</p> <p>A capacitor classified Y3 according to EN 132400:1994, may bridge this insulation under the following conditions:</p> <ul style="list-style-type: none"> - the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 132400, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in EN 609501:2006, 6.2.2.1; - the additional testing shall be performed on all the test specimens as described in EN 132400; - 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 	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	<p>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</p>	N
7.3	<p>In Norway and Sweden, there are many buildings where the screen of the coaxial cable is normally not connected to the earth in the building installation</p>	N
7.3	<p>In Norway, for installation conditions see EN 6072811:2005.</p>	N

ZC	A-DEVIATIONS (informative)	P
1.5.1	Sweden (Ordinance 1990:944) Add the following: NOTE In Sweden, switches containing mercury are not permitted.	N
1.5.1	Switzerland (Ordinance on environmentally hazardous substances SR 814.081, Annex 1.7, Mercury Annex 1.7 of SR 814.81 applies for mercury.) Add the following: NOTE In Switzerland, switches containing mercury such as thermostats, relays and level controllers are not allowed.	N
1.7.2.1	Denmark (Heavy Current Regulations) Supply cords of CLASS I EQUIPMENT, which is delivered without a plug, must be provided with a visible tag with the following text: Vigtigt! Lederen med grøn/gul isolation må kun tilsluttes en klemme marked eller If essential for the safety of the equipment, the tag must in addition be provided with a diagram, which shows the connection of the other conductors, or be provided with the following text: "For tilslutning af de øvrige ledere, se medfølgende installationsvejledning."	N
1.7.2.1	Germany (Gesetz über technische Arbeitsmittel und Verbraucherprodukte (Geräte- und Produktsicherheitsgesetz – GPSG) [Law on technical labour equipment and consumer products], of 6th January 2004, Section 2, Article 4, Clause (4), Item 2). If for the assurance of safety and health certain rules during use, amending or maintenance of a technical labour equipment or readymade consumer product are to be followed, a manual in German language has to be delivered when placing the product on the market. Of this requirement, rules for use even only by SERVICE PERSONS are not exempted.	N
1.7.5	Denmark (Heavy Current Regulations) With the exception of CLASS II EQUIPMENT provided with a socket outlet in accordance with the Heavy Current Regulations, Section 1072D1, Standard Sheet DK 14a, CLASS II EQUIPMENT shall not be fitted with socket outlets for providing power to other equipment.	N
1.7.13	Switzerland (Ordinance on chemical hazardous risk reduction SR 814.81, Annex 2.15 Batteries) Annex 2.15 of SR 814.81 applies for batteries.	N
5.1.7.1	Denmark (Heavy Current Regulations, Chapter 707, clause 707.4) TOUCH CURRENT measurement results exceeding 3,5 mA r.m.s. are permitted only for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B.	N



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1.5.1	TABLE: list of critical components					P
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity ¹ .	
Metal Enclosure	Various	Various	Metal,	--	--	
Front plastic Enclosure	Various	Various	94-HB or better, min. 60°C	UL94	UL	
PWB	Various	Various	94V-0 or better, min. 105°C	UL 94	UL	
Power supply	Channel Well technology Co. Ltd.	PSG350H-80	i/p: 100-240Vac, 50/60Hz, 6.3A o/p:+3.3Vdc/ 18A, +5Vdc/ 18A, +12V1dc/ 18A, +12V2dc/ 18A, -12Vdc/ 0.8A, +5Vsb/ 2.5A, Class I	IEC 60950- 1:2001(ed.1) EN 60950- 1/A11:2004	CB, TUV	
System Fan (Two provided)	ADDA Corporation	AD1212LB-A7BGL	12Vdc, 0.24A, 72 CFM	EN 60950- 1:2001+A11, UL 507	TUV, UL	
RTC battery	MATSUSHITA ELECTRIC INDUSTRIAL CO LTD PANASONIC CORP OF NORTH AMERICA	CR2032	3Vdc, Max. Abnormal Charging current 5 mA.	UL1642	UL	
Polyswitch (F1, F2, F3, F4, F5)	Polytronics technology Cor.	SMD1812P150TF/8	8V dc, 1.5A	EN 60730- 1 :2000 UL 1434	TUV, UL	
Hard Disk Driver (four are provided)	Various	Various	5Vdc , 1.0A max. ,	IEC 60950-1 EN 60950-1	TUV	
Note(s):						



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1.6.2 TABLE: electrical data (in normal conditions)						P
Fuse #	Irated (A)	U (V)	P (W)	I (mA)	Ifuse (mA)	Condition/status
F1	--	90V/50Hz	123	1330	1330	Max Normal Load
F1	--	90V/60Hz	127	1420	1420	Max Normal Load
F1	6	100V/50Hz	121	1210	1210	Max Normal Load
F1	6	100V/60Hz	122	1250	1250	Max Normal Load
F1	2.8	240V/50Hz	121	500	500	Max Normal Load
F1	2.8	240V/60Hz	122	490	490	Max Normal Load
F1	--	254V/50Hz	120	490	490	Max Normal Load
F1	--	254V/60Hz	122	480	480	Max Normal Load
F1	--	264V/50Hz	121	460	460	Max Normal Load
F1	--	264V/60Hz	116	450	450	Max Normal Load

Note(s): 8 set of Hard Disk Device continuously accessed and add dummy load USB 5V/0.5A * 5 ports.

2.5 TABLE: limited power source measurement			P
	Limits	Measured	Verdict
Uoc = 5 V (measured under no load conditions, for front USB port)			
current (in A)	≤8	3	P
power (in VA)	≤5*Uoc(25VA)	10.7	P
Uoc = 5 V (measured under no load conditions, for rear USB port up #1)			
current (in A)	≤8	2.9	P
power (in VA)	≤5*Uoc(25VA)	10.7	P
Uoc = 5 V (measured under no load conditions, for rear USB port up #2)			
current (in A)	≤8	2.9	P
power (in VA)	≤5*Uoc(25VA)	10.6	P
Uoc = 5 V (measured under no load conditions, for rear USB port down #1)			
current (in A)	≤8	2.9	P
power (in VA)	≤5*Uoc(25VA)	10.8	P
Uoc = 5 V (measured under no load conditions, for rear USB port down #2)			
current (in A)	≤8	2.78	P
power (in VA)	≤5*Uoc(25VA)	10.5	P
Note:			

2.6.3.3 TABLE: ground continue test		P
Location	Resistance measured (mΩ)	Comments



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Earth to metal enclosure	9	25A, 1 min
Note(s):		

4.5.1	TABLE: maximum temperatures		P
	test voltage (V)	90V, 60Hz / 264V,60Hz	—
	t1 (°C)	Max Normal Load	—
	t2 (°C)	--	—
Maximum temperature T of part/at:		T (°C)	allowed T _{max} (°C)
	--	90V/60HZ 264V/60HZ	--
1.Inlet near L pin	34(49)	32(48)	70
2.CY1 Body	35(50)	32(48)	85
3.CX2 Body	33(48)	30(46)	100
4.LF1 coil	32(47)	29(45)	130
5.BD1 near PCB	55(70)	39(55)	105
6.Q14 near PCB	40(55)	36(52)	105
7.T2 coil	45(60)	39(55)	130
8.C21 Body	42(57)	39(55)	105
9.Q4 near PCB	48(63)	47(63)	105
10.U1 near PCB	36(51)	35(51)	105
11.U5 near PCB	35(50)	34(50)	105
12.U7 near PCB	32(47)	31(47)	105
13.T5 coil	42(57)	42(58)	110
14.T5 core	42(57)	41(57)	110
15.T3 coil	49(64)	49(65)	110
16.T3 core	56(71)	56(72)	110
17.CY5 Body	41(56)	41(57)	125
18.CPU HSK near PCB	34(49)	32(48)	105
19.U19 near PCB	40(55)	38(54)	105
20.U17 near PCB	56(71)	54(70)	105
21.RTC Body	55(70)	53(69)	100
22.HDD Body	38(53)	38(54)	--



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23.LF3 coil		39(54)	38(54)	130	
24.Plastic enclosure outside near HDD		22(37)	21(37)	60	
25.Metal outside near Power		26(41)	25(41)	70	
26. Ambient		20(35)	19(35)	--	
Temperature T of winding:	R ₁ (Ω)	R ₂ (Ω)	T (°C)	allowed T _{max} (°C)	insulation class
Note(s):					
1. The temperatures were measured under worst case normal mode defined in Max. Normal Load and as described in 1.6.2 at voltages as above.					
2. With a specified ambient temperature of 35°C, the max. temperature rise is calculated as follows:					
Electrolyte capacitor or components with:					
- maximum absolute temp. of 85°C (CY1)/ 100°C (CX2)/ 105°C (C21) / 125°C (CY5)					
Transformer:					
- maximum temp. of 110 °C (Class B ->120-10=110)					
Touchable surfaces:					
- maximum temp. of 95 °C (plastic)					
- maximum temp. of 70 °C (metal)					

5.1.6	TABLE: touch current measurement				P
Condition	L→ terminal A (mA)	N → terminal A (mA)	Limit (mA)	Comments	
Metal Enclosure	0.38	0.4	3.5	switch "e" opened	
Plastic Enclosure	0.001	0.001	0.25	switch "e" closed	
Note(s):					

5.2	TABLE: electric strength tests and impulse tests			P
Test voltage applied between:		Test voltage (V)	Breakdown	
Unit : Primary to Secondary		4242Vdc	No	
Unit : Primary to Earth		2718Vdc	No	
Note(s):				

5.3	TABLE: fault condition tests			P
	ambient temperature (°C)	See below	—	
	model/type of power supply	See table 1.5.1	—	
	manufacturer of power supply	See table 1.5.1	—	



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		rated markings of power supply					--	—
No.	Component no.	Fault	Test voltage (V)	Test time	Fuse no.	Fuse current (A)	Result	
1.	Ventilation	Blocked	240V	7hrs	F1	0.49	NC,NT, No damage T5 coil =42°C, T5 core=43°C, T3 coil =48°C, T3 core=53°C, Ambient=19°C	
2.	System fan #1	Locked	240Vdc	7hrs	F1	0.49	NC,NT, No damage T5 coil =42°C, T5 core=42°C, T3 coil =49°C, T3 core=54°C, Ambient=23°C	
3.	System fan #2 lock	Locked	240Vdc	7hrs	F1	0.49	NC,NT, No damage T5 coil =43°C, T5 core=42°C, T3 coil =49°C, T3 core=53°C, Ambient=22°C	
4.	Power fan	Locked	240Vdc	7hrs	F1	0.5	Unit shutdown, NC,NT, No damage T5 coil =84°C, T5 core=79°C, T3 coil =86°C, T3 core=91°C, Ambient=20°C	
5.	R413	Short	240V	--	--	--	For RTC battery, abnormal charging current=0mA	
6	D12 (A2-C)	short	240V	--	--	--	For RTC battery, abnormal charging current=3mA	

Note(s): S-c = Short-circuit, O-c = Open circuit, Dis = Disconnection, O-l = Overload, o/p = output
NC = Cheesecloth remained intact, NT = Tissue paper remained intact



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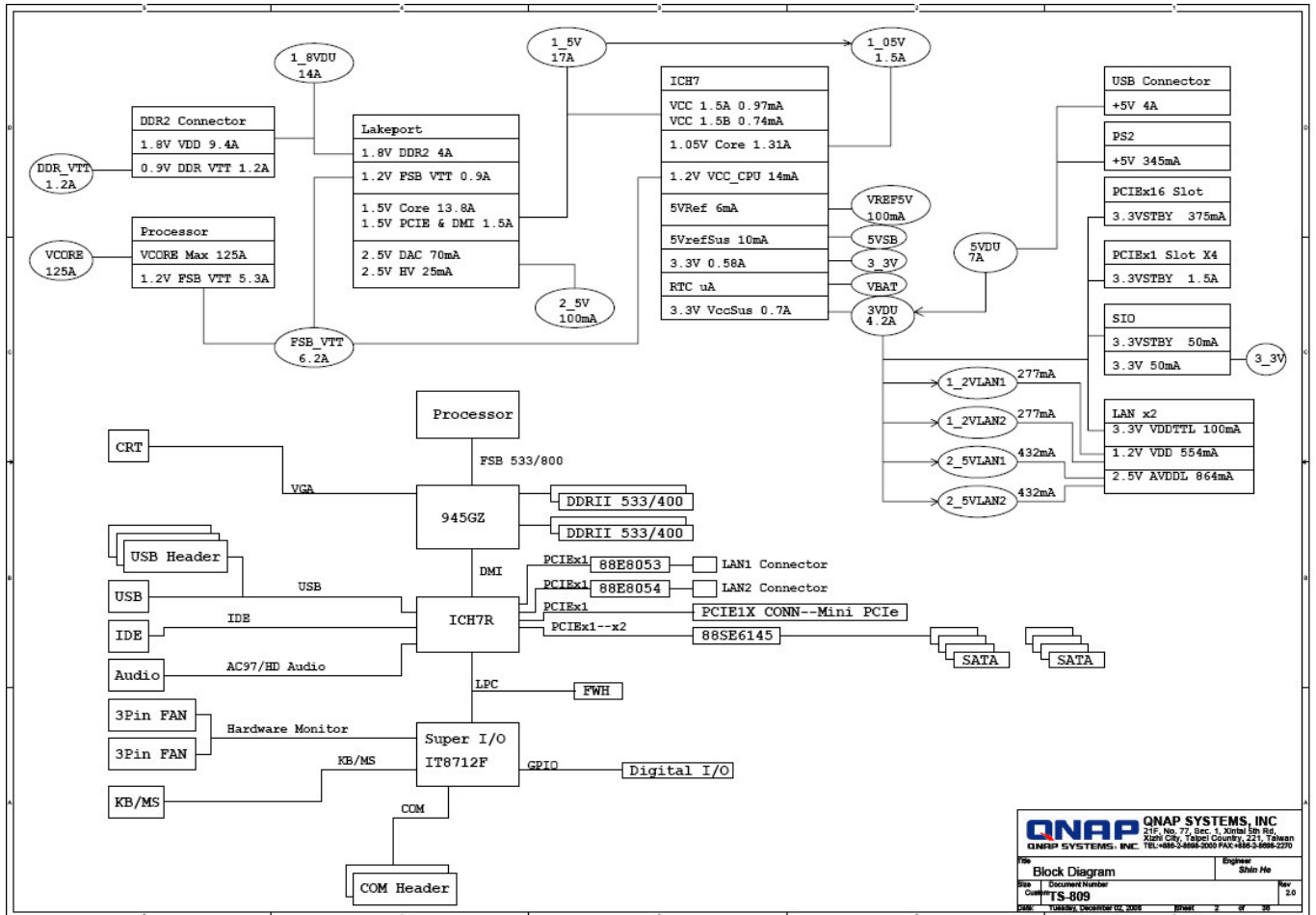


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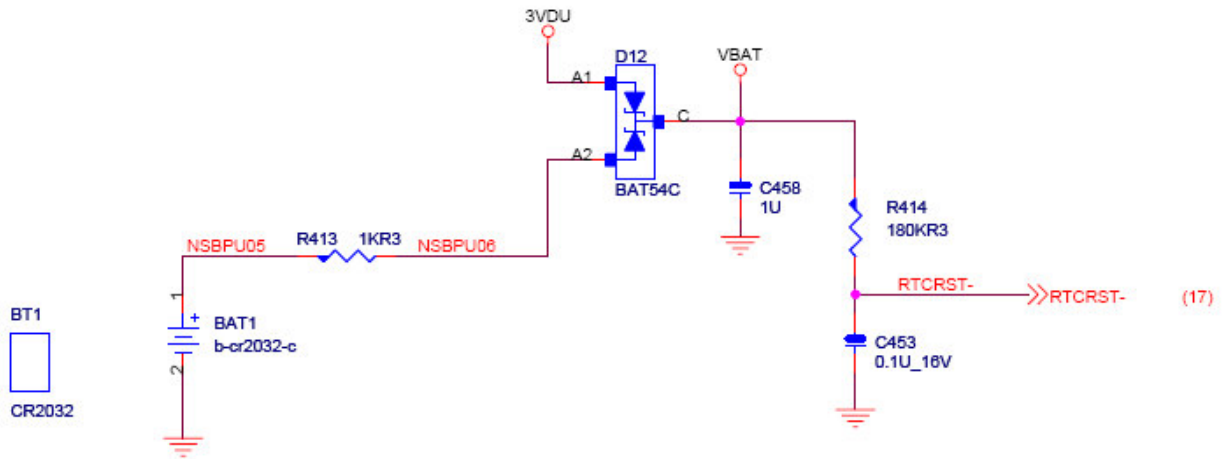


Block diagram

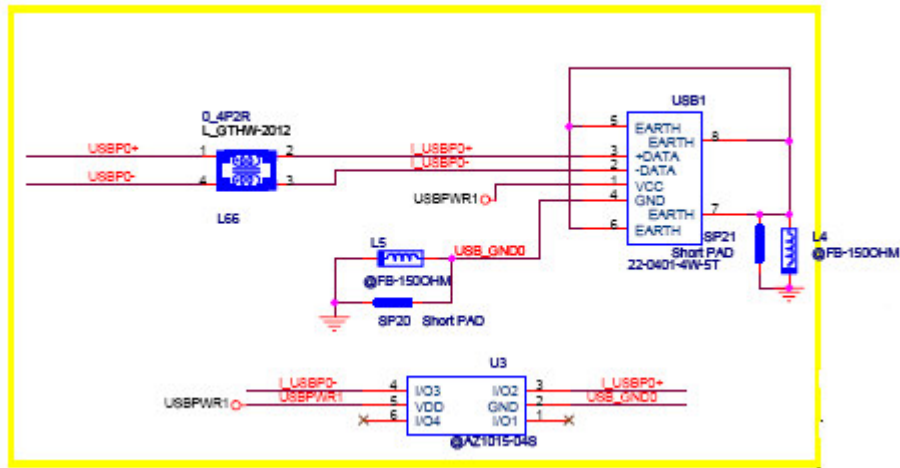




RTC

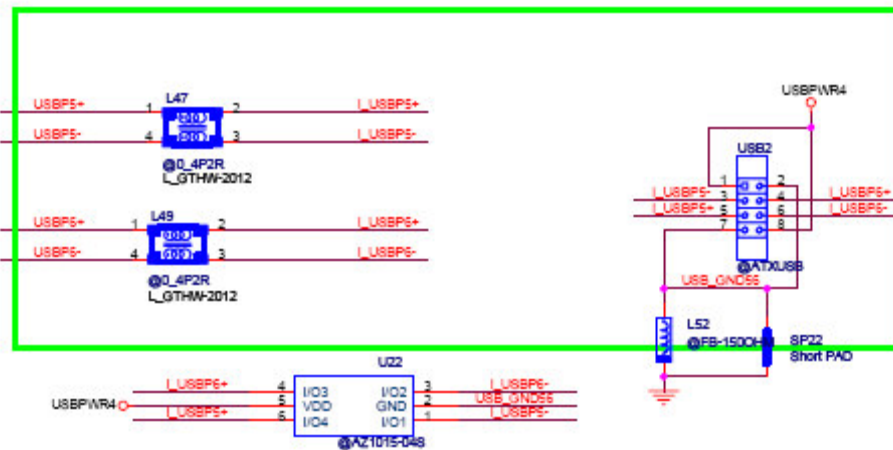
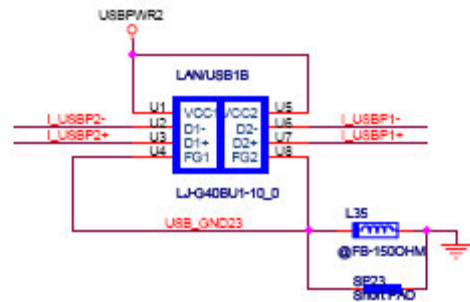
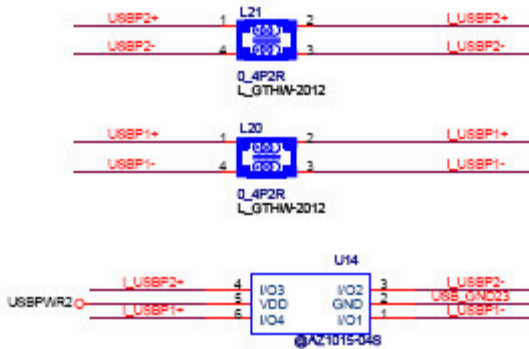
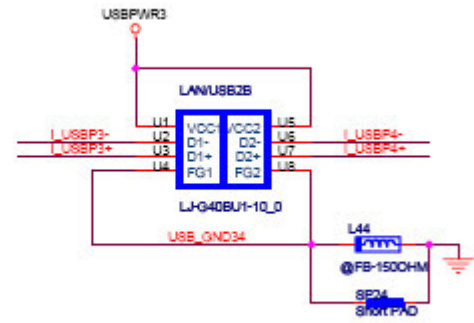
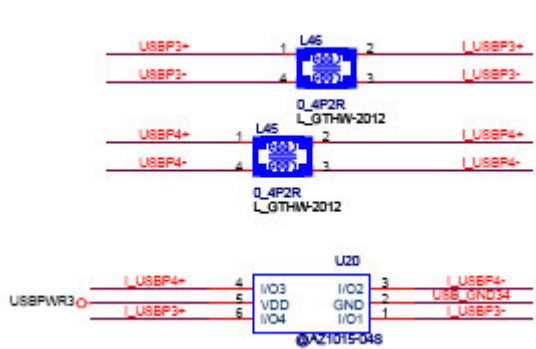


USB



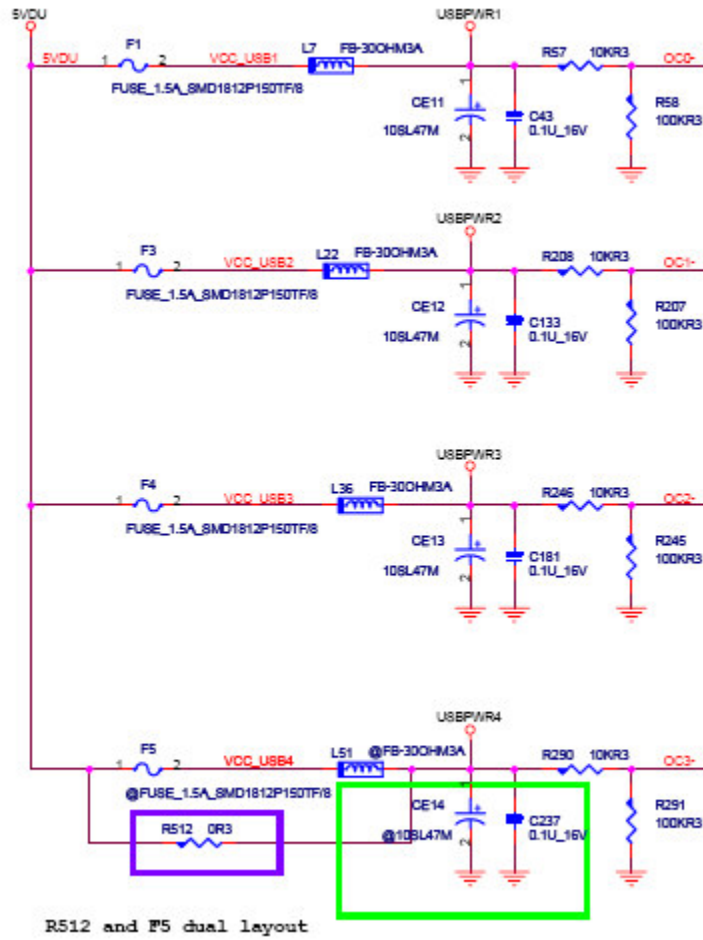


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R512 and F5 dual layout

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