SPECIFIC TECHNICAL CRITERIA

UL 60950-1, First Edition Information technology equipment - Safety- Part 1: General Requirements	
Report Reference No	E139359-A20-UL-1
Compiled by	George J. Daverin
Reviewed by	Scott Varner
Date of issue	2009-06-12
Standards	UL 60950-1, 1st Edition, 2007-10-31 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-03, 1st Edition, 2006-07 (Information Technology Equipment - Safety - Part 1: General Requirements)
Test procedure	Listing
Non-standard test method	N/A
Test item description	IP Network Server
Trademark	kontron
Model and/or type reference	NSN2U
Rating(s)	AC Units: 100-127/200-240Vac, 6/3 A, 50/60 Hz (Per each AC input) DC Units: -48Vdc to -60Vdc, 13 A (Per each DC input)

Particulars: test item vs. test requirements	
Equipment mobility	Stationary: Desktop (AC only) / Fixed (rack mounted)
Operating condition	continuous
Mains supply tolerance (%)	AC: +6%, -10%; DC: Client specified tolerance of -38 Vdc to -75 Vdc
Tested for IT power systems	No
IT testing, phase-phase voltage (V)	N/A
Class of equipment	AC: Class I (earthed); DC: Special Application: TNV-2
Mass of equipment (kg)	22.6
Protection against ingress of water	IP X0

Possible test case verdicts:	
- test case does not apply to the test object .....:	N / A
- test object does meet the requirement .....:	Pass
- test object does not meet the requirement .....:	Fail (acceptable only if a corresponding, less stringent national requirement is "Pass")

General remarks:

- "(see Enclosure #)" refers to additional information appended to the Test Report
- "(see appended table)" refers to a table appended to the Test Report
- Throughout the Test Report a point is used as the decimal separator

GENERAL PRODUCT INFORMATION:	
CA1.0	**Report Summary**
CA1.1	N/A
CB1.0	**Product Description**
CB1.1	The equipments under test are a IP Network Server for rack-mounting or desktop use (AC only). The equipment is provided with up to two PSUs (two DC supplies, two AC supplies or one DC supply and one AC supply), one DC/DC converter board (previously evaluated as backplane card in the PSU reports), one server motherboard, one server I/O board with network, USBs, fan connections, eight Hard Drives, one riser card with dual network card, I/O connectors. All circuits except power-supplies are SELV. Energy available in secondary circuits of power supplies, backplane card, and motherboard contains hazardous energy levels, all secondary outputs complies with LPS, no accessible energy hazards. The equipment can be provided in an AC configuration (AC unit), a DC configuration (DC unit) and in an AC/DC configuration (One AC PSU/One DC PSU). The only difference between these configurations is the PSU chassis and PSUs that are installed in the enclosure. The PSU chassis (AC, DC) are designed to accept two PSUs (a dual redundant configuration) either as AC/AC, DC/DC or AC/DC. When the equipment is provided with a single PSU a filler plate is provided for the second PSU slot. The PSU chassis and PSUs are both separately certified.
CC1.0	**Model Differences**
CC1.1	N/A
CD1.0	**Additional Information**
CD1.1	All user accessible connectors that extend from the unit's enclosure are protected from current overload by PTC devices. The devices have been evaluated as a part of the UL Recognized or UL Listed Accessory boards. The operator is only intended to replace pluggable type devices (peripheral drives) from the outside of the equipment, and is not intended to access the interior of the equipment for any operator servicing. All internal servicing is to be performed by technically qualified service personnel. The DC supplied units are for Restricted Access Locations (RAL) only. Amendment - Addition of optional Battery Pach, LSI Corp., type 25127.
CE1.0	**Technical Considerations**
CE1.2	The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 35°C
CE1.3	The means of connection to the mains supply is: AC unit is Pluggable A or B, DC unit is

	permanent connection, AC/DC unit is either Pluggable A or B and permanently connected,
CE1.4	The product is intended for use on the following power systems: TN or DC mains supply
CE1.5	The equipment disconnect device is considered to be: AC: Appliance inlet, DC: Provided as an element of the building installation (see Inspection Criteria for installation manual requirement)
CE1.14	The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
CE2.0	DC Mains input was evaluated as a TNV-2 source for applying insulation requirements only in accordance with US/CAN National Difference 1.6.1.2 (power supply provides Basic Insulation between input and output - evaluated under a separate investigation)

COVER PAGE FOR TEST REPORT

Product Category:	Information Technology Equipment Including Electrical Business Equipment
Product Category CCN:	NWGQ, NWGQ7
Test Procedure:	Listing
Product:	IP Network Server
Model/Type Reference:	NSN2U
Rating(s):	AC Units: 100-127/200-240Vac, 6/3 A, 50/60 Hz (Per each AC input) DC Units: -48Vdc to -60Vdc, 13 A (Per each DC input)
Standards:	UL 60950-1, 1st Edition, 2007-10-31 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-03, 1st Edition, 2006-07 (Information Technology Equipment - Safety - Part 1: General Requirements)
Applicant Name and Address:	KONTRON AMERICA INC 14118 STOWE DR POWAY CA 92064 UNITED STATES

This Report includes the following parts, in addition to this cover page:

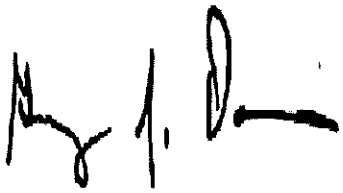
1. Specific Technical Criteria
2. Clause Verdicts
3. Critical Components
4. Enclosures

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of Underwriters Laboratories Inc. ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

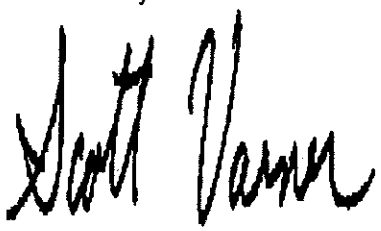
Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

Test Report By:



George J. Daverin
Staff Engineer
Underwriters Laboratories Inc.

Reviewed By:



Scott Varner
Manager
Underwriters Laboratories Inc.

SPECIFIC INSPECTION CRITERIA

BA1.0	**Special Instructions to UL Representative**
BA1.1	N/A

BB1.0	**Supporting Documentation**
BB1.1	The following documents located at the beginning of this Procedure supplement the requirements of this Test Report: A. Authorization - The Authorization page may include additional Factory Identification Code markings. B. Generic Inspection Instructions - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report. ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report. iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

BC1.0	**Markings and instructions**
BC1.1	The following markings and instructions are provided as indicated.
BC1.2	All clause references are from UL 60950-1, 1st Edition, 2007-10-31 (Information Technology Equipment - Safety - Part 1: General Requirements).

Standard Clause	Clause Title	Marking or Instruction Details
1.7	Safety Instructions - Rack Mount	"Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions: A) Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer. B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. C) Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical

		loading. D) Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern. E) Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips)."
1.7.1	Power rating - Ratings	Ratings (voltage, frequency/dc, current)
	Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
	Power rating - Model	Model Number
1.7.2	Disconnect device - Permanently connected equipment	Statement indicating that a readily accessible disconnect device shall be incorporated in the building installation wiring. (Instruction)
1.7.8.3	Symbols - Stand-by switch	"Stand-by" to be indicated by ⏻(60417-2-IEC-5009)
1.7.15	Replaceable batteries	"CAUTION: Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions."
Other	1.7.9 Marking - Multiple Power Sources	AC units: "CAUTION: This unit has more than one power supply cord. To reduce the risk of electrical shock, disconnect (2) power supply cords before servicing." DC units: "CAUTION: This unit has more than one DC voltage input wire. To reduce the risk of electrical shock, remove all (4) four wires from the DC input terminal block before servicing." or equivalent.
	1.7.17 Installation Manual - RAL	DC: The installation instructions indicate use in a Restricted Access Location only.
	2.6.3 Installation Manual - DC Earthing	The installation manual shall specify a minimum 14 AWG earth conductor to be secured to earth terminals of DC Configuration in UL Listed two-hole crimp terminal sized for minimum AWG employed.
	2.7.1 Installation Manual - Short Circuit/Overcurrent Protection - DC Mains	Installation instructions indicate UL Listed circuit breaker, rated minimum 10 A, 75 Vdc per feed to be provided as an element of the host rack equipment.

BD1.0	**Production-Line Testing Requirements**					
BD1.1	Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.					
	Model	Component	Removable Parts	Test probe location	Test Potential V rms	Test Potential V dc	Test Time, s
	N/A						
BD1.2	Earthing Continuity Test Exemptions - This test is not required for the following models:						
BD1.3	Electric Strength Test Exemptions - This test is not required for the following models:						
BD1.4	Electric Strength Test Component Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:						

BE1.0	**Sample and Test Specifics for Follow-Up Tests at UL**				
BE1.1	Model	Component	Material	Test	Sample(s)	Test Specifics
	N/A					

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

1.5.1	**TABLE: list of critical components**					Pass
Object/part No.	Manufacturer/ trademark	type/model	technical data	Product Category CCN(s)	Required Marks of Conformity	Supplement ID
Enclosure	–	–	Metal, minimum 1.5 mm thick. (Overall dimensions 43.2 cm by 60.9 cm by 8.9 cm)	–	–	
Filler Panels	Various	Metal	Provided for empty slots.	–	–	
Mini Front Bezel, CPU Fan Duct, PCI Fan Holder, PCI Card Support Bracket	SABIC Innovative Plastics	C2800	Minimum V-0, 1.5 mm thick	QMFZ2	UL	
Internal Plastics	Various	Various	Minimum V-2 at minimum thickness.	QMFZ2	UL	
Power Supply Unit (AC)	Delta	DPS-600TB XX	Up to two provided. (Input: 100-127/200-240 Vac, 8.9/4.5 A, 50-60 Hz; Output: +12Vdc, 49 A; -12Vdc, 0.5A; +5Vsb, 3.0 A. Output power 600W max.)	QQGQ2	UL	
Power Supply Unit (DC)	Delta	DPS-600TB-1 XX	Up to two provided. (Input: -48 to -60 Vdc, 20.5 A; Output: +12Vdc, 49 A; -12Vdc, 0.5A; +5Vsb, 2.5 A. Output power 600 W max.)	QQGQ2	UL	
Power Supply Unit Backplane Card	Delta	AC-077 XX	(Input: +12V, 49A; -12V, 0.5A; +5Vsb, 2.5A. Output: +3.3V, 20A; +5V, 26A; -12V, 0.5A; +5Vsb, 2.5A, +12V1, 16A; +12V2, 16A; +12V3, 16A; +12V4, 18A.	Tested with power supply units noted above.	–	

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

			Max. output power of 3.3V and 5V should not exceed 150W. Total output power should not exceed 580W max.)			
Server I/O board	Intel	Various	SELV (Lithium battery protection and I/O current limiting provided per UL R/C)	NWGQ2	UL	
Server Mainboard	Intel	Various	SELV (Lithium battery protection and I/O current limiting provided per UL R/C)	NWGQ2	UL	
I/O Fans (2 provided)	Nidec	V60E12BS1B5-07A01	12 Vdc, 1.6 A (62 CFM)	GPWV2	UL	
I/O Fans (2 provided) - Alternate	Various	Various	12 Vdc, 1.6 A, minimum 62 CFM, minimum V-2.	GPWV2	UL	
CPU Fans (2 provided)	Nidec	V80E12BS2A5-07A01	12 Vdc, 1.95 A (109 CFM)	GPWV2	UL	
CPU Fans (2 provided) - Alternate	Various	Various	12 Vdc, 1.95 A, minimum 109 CFM, minimum V-2.	GPWV2	UL	
PCI Riser Card	Various	Various	Rated minimum V-1, 105°C	ZPMV2	UL	
Hard Drive (Up to 8 provided)	Various	Various	SELV. Rated 5 V, 1.0 A; 12 V, 1.2 A	NWGQ2	UL	
CD/DVD Drive	Various	Various	SELV. Rated 5V or12V. Class I source.	NWGQ2	UL	
Printed Wiring Board	Various	Various	Rated minimum V-1, 105°C	ZPMV2	UL	
Connectors (SELV)	Various	Various	R/C or copper alloy pins housed in bodies of R/C (QMFZ2), V-2 minimum.	RTRT2 or ECBT2	UL	
Label	Various	Various	Suitable for use on surface applied.	PGDQ2 or PGJI2	UL	
Battery Pack (Optional)	LSI Corporation	25127	Supplied by SELV	NWGQ - Accessory	UL	

Test Record No. 1

Testing of the IP Network Server, Model NSN2U was not considered necessary based upon previous evaluation under the CB scheme. The CB Scheme Test Certificate Ref. No. NO52484 CB Test Report No. 126095 dated 18-May-09 were prepared by NEMKO AS, Gaustadallèen 30, Blindern, Oslo, Norway.

Test Record No. 2

No testing was considered necessary to add the following critical component based on similarity to existing construction:

- Optional Battery Pack: LSI Corp., Type 25127 (Listed Accessory)

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

1.6.2	**TABLE: electrical data (in normal conditions)**					N/A
fuse #	I rated (A)	U (V)	P (W)	I (mA)	I fuse (mA)	condition/status
supplementary information:						

2.10.3 and 2.10.4	**TABLE: clearance and creepage distance measurements**					N/A
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
supplementary information:						

2.10.5	**TABLE: distance through insulation measurements**				N/A
distance through insulation di at/of:	Up (V)	test voltage (V)	required di (mm)	di (mm)	
supplementary information:					

4.5	**TABLE: temperature rise measurements**						N/A
	test voltage (V)						—
	t1 (°C)						—
	t2 (°C)						—
maximum temperature T of part/at:		T (°C)					allowed Tmax (°C)
temperature T of winding:		R_1 (Ω)	R_2 (Ω)	T (°C)	allowed Tmax (°C)		insulation class
supplementary information:							

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5.2	**TABLE: ball pressure test of thermoplastics**		N/A
	allowed impression diameter (mm)..... :		—
part		test temperature (°C)	impression diameter (mm)
supplementary information:			

4.7	**TABLE: resistance to fire**			N/A
part	manufacturer of material	type of material	thickness(mm)	flammability class
supplementary information:				

5.2	**TABLE: electric strength tests, impulse tests and voltage surge tests**	N/A
test voltage applied between:	test voltage (V) a.c./d.c.	breakdown Yes / No
supplementary information:		

5.3	**TABLE: fault condition tests**						N/A
	ambient temperature (°C)..... :						—
	model/type of power supply ..... :						—
	manufacturer of power supply..... :						—
	rated markings of power supply..... :						—
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result	
supplementary information:							

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

Results Key: IP = Internal protection operated (component indicated) CT = Constant temperatures were obtained TW = Transformer winding opened CD = Components damaged (damaged components indicated) NB = No indication of dielectric breakdown YB = Dielectric breakdown (time and location indicated) NC = Cheesecloth remained intact YC = Cheesecloth charred or flamed NT = Tissue paper remained intact YT = Tissue paper charred or flamed

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1	**GENERAL**		Pass
1.5	Components		N/A
1.5.1	General		N/A
	Comply with IEC 60950 or relevant component standard		N/A
1.5.2	Evaluation and testing of components		N/A
1.5.3	Thermal controls		N/A
1.5.4	Transformers		N/A
1.5.5	Interconnecting cables		N/A
1.5.6	Capacitors in primary circuits.....:		N/A
1.5.7	Double insulation or reinforced insulation bridged by components		N/A
1.5.7.1	General		N/A
1.5.7.2	Bridging capacitors		N/A
1.5.7.3	Bridging resistors		N/A
1.5.7.4	Accessible parts		N/A
1.5.8	Components in equipment for IT power systems		N/A
1.6	**Power interface**		N/A
1.6.1	AC power distribution systems		N/A
1.6.2	Input current		N/A
1.6.3	Voltage limit of hand-held equipment		N/A
1.6.4	Neutral conductor		N/A
1.7	**Marking and instructions**		Pass
1.7.1	Power rating		N/A
	Rated voltage(s) or voltage range(s) (V) .....:		N/A
	Symbol for nature of supply, for d.c. only .....:		N/A
	Rated frequency or rated frequency range (Hz)....:		N/A
	Rated current (mA or A).....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Manufacturer's name or trademark or identification mark ..... :		N/A
	Type/model or type reference ..... :		N/A
	Symbol for Class II equipment only ..... :		N/A
	Other symbols ..... :		N/A
	Certification marks ..... :		N/A
1.7.2	Safety instructions		N/A
1.7.3	Short duty cycles		N/A
1.7.4	Supply voltage adjustment ..... :		N/A
1.7.5	Power outlets on the equipment ..... :		N/A
1.7.6	Fuse identification ..... :		N/A
1.7.7	Wiring terminals		N/A
1.7.7.1	Protective earthing and bonding terminals ..... :		N/A
1.7.7.2	Terminal for a.c. mains supply conductors		N/A
1.7.7.3	Terminals for d.c. mains supply conductors		N/A
1.7.8	Controls and indicators		N/A
1.7.8.1	Identification, location and marking ..... :		N/A
1.7.8.2	Colours ..... :		N/A
1.7.8.3	Symbols according to IEC 60417 ..... :		N/A
1.7.8.4	Markings using figures ..... :		N/A
1.7.9	Isolation of multiple power sources ..... :		N/A
1.7.10	IT power distribution systems		N/A
1.7.11	Thermostats and other regulating devices		N/A
1.7.12	Language ..... :	English	-
1.7.13	Durability		N/A
1.7.14	Removable parts		N/A
1.7.15	Replaceable batteries	The required warning is in the service manual.	Pass
	Language ..... :	English	-
1.7.16	Operator access with a tool ..... :		N/A
1.7.17	Equipment for restricted access locations ..... :		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2	**PROTECTION FROM HAZARDS**		N/A
2.1	Protection from electric shock and energy hazards		N/A
2.1.1	Protection in operator access areas		N/A
2.1.1.1	Access to energized parts		N/A
	Test by inspection.....:		N/A
	Test with test finger.....:		N/A
	Test with test pin.....:		N/A
	Test with test probe.....:		N/A
2.1.1.2	Battery compartments.....:		N/A
2.1.1.3	Access to ELV wiring		N/A
	Working voltage (V); minimum distance (mm) through insulation.....:		-
2.1.1.4	Access to hazardous voltage circuit wiring		N/A
2.1.1.5	Energy hazards.....:		N/A
2.1.1.6	Manual controls		N/A
2.1.1.7	Discharge of capacitors in equipment		N/A
	Time-constant (s); measured voltage (V).....:		-
2.1.2	Protection in service access areas		N/A
2.1.3	Protection in restricted access locations		N/A

2.2	**SELV circuits**		N/A
2.2.1	General requirements		N/A
2.2.2	Voltages under normal conditions (V).....:		N/A
2.2.3	Voltages under fault conditions (V).....:		N/A
2.2.3.1	Separation by double insulation or reinforced insulation (method 1)		N/A
2.2.3.2	Separation by earthed screen (method 2)		N/A
2.2.3.3	Protection by earthing of the SELV circuit (method 3)		N/A
2.2.4	Connection of SELV circuits to other circuits.....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.3	**TNV circuits**		N/A
2.3.1	Limits		N/A
	Type of TNV circuits.....:		-
2.3.2	Separation from other circuits and from accessible parts		N/A
	Insulation employed.....:		-
2.3.3	Separation from hazardous voltages		N/A
	Insulation employed.....:		-
2.3.4	Connection of TNV circuits to other circuits		N/A
	Insulation employed.....:		-
2.3.5	Test for operating voltages generated externally		N/A
2.4	**Limited current circuits**		N/A
2.4.1	General requirements		N/A
2.4.2	Limit values		N/A
	Frequency (Hz).....:		-
	Measured current (mA).....:		-
	Measured voltage (V).....:		-
	Measured capacitance (mF).....:		-
2.4.3	Connection of limited current circuits to other circuits		N/A
2.5	**Limited power sources**		N/A
	Inherently limited output		N/A
	Impedance limited output		N/A
	Overcurrent protective device limited output		N/A
	Regulating network limited output under normal operating and single fault condition		N/A
	Regulating network limited output under normal operating conditions and overcurrent protective device limited output under single fault condition		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Output voltage (V), output current (A), apparent power (VA): ..... :		-
	Current rating of overcurrent protective device (A):		-
2.6	**Provisions for earthing and bonding**		N/A
2.6.1	Protective earthing		N/A
2.6.2	Functional earthing		N/A
2.6.3	Protective earthing and protective bonding conductors		N/A
2.6.3.1	General		N/A
2.6.3.2	Size of protective earthing conductors		N/A
	Rated current (A), cross-sectional area (mm2), AWG..... :		-
2.6.3.3	Size of protective bonding conductors		N/A
	Rated current (A), cross-sectional area (mm2), AWG..... :		-
2.6.3.4	Resistance (Ohm) of earthing conductors and their terminations, test current (A) ..... :		N/A
2.6.3.5	Colour of insulation ..... :		N/A
2.6.4	Terminals		N/A
2.6.4.1	General		N/A
2.6.4.2	Protective earthing and bonding terminals		N/A
	Rated current (A), type and nominal thread diameter (mm)..... :		-
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N/A
2.6.5	Integrity of protective earthing		N/A
2.6.5.1	Interconnection of equipment		N/A
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		N/A
2.6.5.3	Disconnection of protective earth		N/A
2.6.5.4	Parts that can be removed by an operator		N/A
2.6.5.5	Parts removed during servicing		N/A

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.6.5.6	Corrosion resistance		N/A
2.6.5.7	Screws for protective bonding		N/A
2.6.5.8	Reliance on telecommunication network or cable distribution system		N/A
2.7	**Overcurrent and earth fault protection in primary circuits**		N/A
2.7.1	Basic requirements		N/A
	Instructions when protection relies on building installation		N/A
2.7.2	Faults not covered in 5.3		N/A
2.7.3	Short-circuit backup protection		N/A
2.7.4	Number and location of protective devices.....:		N/A
2.7.5	Protection by several devices		N/A
2.7.6	Warning to service personnel .....:		N/A
2.8	**Safety interlocks**		N/A
2.8.1	General principles		N/A
2.8.2	Protection requirements		N/A
2.8.3	Inadvertent reactivation		N/A
2.8.4	Fail-safe operation		N/A
2.8.5	Moving parts		N/A
2.8.6	Overriding		N/A
2.8.7	Switches and relays		N/A
2.8.7.1	Contact gaps (mm) .....:		N/A
2.8.7.2	Overload test		N/A
2.8.7.3	Endurance test		N/A
2.8.7.4	Electric strength test		N/A
2.8.8	Mechanical actuators		N/A
2.9	**Electrical insulation**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.9.1	Properties of insulating materials		N/A
2.9.2	Humidity conditioning		N/A
	Humidity (%) .....:		-
	Temperature (°C).....:		-
2.9.3	Grade of insulation		N/A
2.10	**Clearances, creepage distances and distances through insulation**		N/A
2.10.1	General		N/A
2.10.2	Determination of working voltage		N/A
2.10.3	Clearances		N/A
2.10.3.1	General		N/A
2.10.3.2	Clearances in primary circuit		N/A
2.10.3.3	Clearances in secondary circuits		N/A
2.10.3.4	Measurement of transient voltage levels		N/A
2.10.4	Creepage distances		N/A
	CTI tests.....:		-
2.10.5	Solid insulation		N/A
2.10.5.1	Minimum distance through insulation		N/A
2.10.5.2	Thin sheet material		N/A
	Number of layers (pcs).....:		-
	Electric strength test .....:		-
2.10.5.3	Printed boards		N/A
	Distance through insulation		N/A
	Electric strength test for thin sheet insulating material .....:		-
	Number of layers (pcs).....:		N/A
2.10.5.4	Wound components		N/A
	Number of layers (pcs).....:		N/A
	Two wires in contact inside wound component; angle between 45° and 90°.....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.10.6	Coated printed boards		N/A
2.10.6.1	General		N/A
2.10.6.2	Sample preparation and preliminary inspection		N/A
2.10.6.3	Thermal cycling		N/A
2.10.6.4	Thermal ageing (°C)..... :		N/A
2.10.6.5	Electric strength test ..... :		-
2.10.6.6	Abrasion resistance test		N/A
	Electric strength test ..... :		-
2.10.7	Enclosed and sealed parts ..... :		N/A
	Temperature T1=T2 = Tma - Tamb +10K (°C)..... :		N/A
2.10.8	Spacings filled by insulating compound..... :		N/A
	Electric strength test ..... :		-
2.10.9	Component external terminations		N/A
2.10.10	Insulation with varying dimensions		N/A
3	**WIRING, CONNECTIONS AND SUPPLY**		N/A
3.1	General		N/A
3.1.1	Current rating and overcurrent protection		N/A
3.1.2	Protection against mechanical damage		N/A
3.1.3	Securing of internal wiring		N/A
3.1.4	Insulation of conductors		N/A
3.1.5	Beads and ceramic insulators		N/A
3.1.6	Screws for electrical contact pressure		N/A
3.1.7	Insulating materials in electrical connections		N/A
3.1.8	Self-tapping and spaced thread screws		N/A
3.1.9	Termination of conductors		N/A
	10 N pull test		N/A
3.1.10	Sleeving on wiring		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
3.2	**Connection to an a.c. mains supply or a d.c. mains supply**		N/A
3.2.1	Means of connection		N/A
3.2.1.1	Connection to an a.c. mains supply		N/A
3.2.1.2	Connection to a d.c. mains supply		N/A
3.2.2	Multiple supply connections		N/A
3.2.3	Permanently connected equipment		N/A
	Number of conductors, diameter (mm) of cable and conduits.....:		-
3.2.4	Appliance inlets		N/A
3.2.5	Power supply cords		N/A
3.2.5.1	AC power supply cords		N/A
	Type .....:		-
	Rated current (A), cross-sectional area (mm²), AWG.....:		-
3.2.5.2	DC power supply cords		N/A
3.2.6	Cord anchorages and strain relief		N/A
	Mass of equipment (kg), pull (N).....:		-
	Longitudinal displacement (mm).....:		-
3.2.7	Protection against mechanical damage		N/A
3.2.8	Cord guards		N/A
	D (mm); test mass (g).....:		-
	Radius of curvature of cord (mm).....:		-
3.2.9	Supply wiring space		N/A

3.3	**Wiring terminals for connection of external conductors**		N/A
3.3.1	Wiring terminals		N/A
3.3.2	Connection of non-detachable power supply cords		N/A
3.3.3	Screw terminals		N/A
3.3.4	Conductor sizes to be connected		N/A
	Rated current (A), cord/cable type, cross-sectional area (mm²) .....:		-

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
3.3.5	Wiring terminal sizes		N/A
	Rated current (A), type and nominal thread diameter (mm)..... :		-
3.3.6	Wiring terminals design		N/A
3.3.7	Grouping of wiring terminals		N/A
3.3.8	Stranded wire		N/A
3.4	**Disconnection from the mains supply**		N/A
3.4.1	General requirement		N/A
3.4.2	Disconnect devices		N/A
3.4.3	Permanently connected equipment		N/A
3.4.4	Parts which remain energized		N/A
3.4.5	Switches in flexible cords		N/A
3.4.6	Single-phase equipment and d.c. equipment		N/A
3.4.7	Three-phase equipment		N/A
3.4.8	Switches as disconnect devices		N/A
3.4.9	Plugs as disconnect devices		N/A
3.4.10	Interconnected equipment		N/A
3.4.11	Multiple power sources		N/A
3.5	**Interconnection of equipment**		N/A
3.5.1	General requirements		N/A
3.5.2	Types of interconnection circuits ..... :		N/A
3.5.3	ELV circuits as interconnection circuits		N/A
4	**PHYSICAL REQUIREMENTS**		N/A
4.1	Stability		N/A
	Angle of 10°		N/A
	Test: force (N)..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.2	**Mechanical strength**		N/A
4.2.1	General		N/A
4.2.2	Steady force test, 10 N		N/A
4.2.3	Steady force test, 30 N		N/A
4.2.4	Steady force test, 250 N		N/A
4.2.5	Impact test		N/A
	Fall test		N/A
	Swing test		N/A
4.2.6	Drop test		N/A
4.2.7	Stress relief test		N/A
4.2.8	Cathode ray tubes		N/A
	Picture tube separately certified .....:		N/A
4.2.9	High pressure lamps		N/A
4.2.10	Wall or ceiling mounted equipment; force (N) .....:		N/A
4.3	**Design and construction**		N/A
4.3.1	Edges and corners		N/A
4.3.2	Handles and manual controls; force (N) .....:		N/A
4.3.3	Adjustable controls		N/A
4.3.4	Securing of parts		N/A
4.3.5	Connection of plugs and sockets		N/A
4.3.6	Direct plug-in equipment		N/A
	Dimensions (mm) of mains plug for direct plug-in .:		N/A
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N) .....:		N/A
4.3.7	Heating elements in earthed equipment		N/A
4.3.8	Batteries		N/A
4.3.9	Oil and grease		N/A
4.3.10	Dust, powders, liquids and gases		N/A
4.3.11	Containers for liquids or gases		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.12	Flammable liquids ..... :		N/A
	Quantity of liquid (l) ..... :		N/A
	Flash point (°C) ..... :		N/A
4.3.13	Radiation; type of radiation		N/A
4.3.13.1	General		N/A
4.3.13.2	Ionizing radiation		N/A
	Measured radiation (pA/kg) ..... :		-
	Measured high-voltage (kV) ..... :		-
	Measured focus voltage (kV) ..... :		-
	CRT markings ..... :		-
4.3.13.3	Effect of ultraviolet (UV) radiation on materials		N/A
	Part, property, retention after test, flammability classification ..... :		N/A
4.3.13.4	Human exposure to ultraviolet (UV) radiation ..... :		N/A
4.3.13.5	Laser (including LEDs)		N/A
	Laser class ..... :		-
4.3.13.6	Other types ..... :		N/A

4.4	**Protection against hazardous moving parts**		N/A
4.4.1	General		N/A
4.4.2	Protection in operator access areas		N/A
4.4.3	Protection in restricted access locations		N/A
4.4.4	Protection in service access areas		N/A

4.5	**Thermal requirements**		N/A
4.5.1	Maximum temperatures		N/A
	Normal load condition per Annex L ..... :		N/A
4.5.2	Resistance to abnormal heat		N/A

4.6	**Openings in enclosures**	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.6.1	Top and side openings		N/A
	Dimensions (mm).....:		-
4.6.2	Bottoms of fire enclosures		N/A
	Construction of the bottom.....:		-
4.6.3	Doors or covers in fire enclosures		N/A
4.6.4	Openings in transportable equipment		N/A
4.6.5	Adhesives for constructional purposes		N/A
	Conditioning temperature (°C)/time (weeks) .....:		-
4.7	**Resistance to fire**		N/A
4.7.1	Reducing the risk of ignition and spread of flame		N/A
	Method 1, selection and application of components wiring and materials		N/A
	Method 2, application of all of simulated fault condition tests		N/A
4.7.2	Conditions for a fire enclosure		N/A
4.7.2.1	Parts requiring a fire enclosure		N/A
4.7.2.2	Parts not requiring a fire enclosure		N/A
4.7.3	Materials		N/A
4.7.3.1	General		N/A
4.7.3.2	Materials for fire enclosures		N/A
4.7.3.3	Materials for components and other parts outside fire enclosures		N/A
4.7.3.4	Materials for components and other parts inside fire enclosures		N/A
4.7.3.5	Materials for air filter assemblies		N/A
4.7.3.6	Materials used in high-voltage components		N/A
5	**ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS**		N/A
5.1	Touch current and protective conductor current		N/A
5.1.1	General		N/A
5.1.2	Equipment under test (EUT)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.1.3	Test circuit		N/A
5.1.4	Application of measuring instrument		N/A
5.1.5	Test procedure		N/A
5.1.6	Test measurements		N/A
	Test voltage (V) ..... :		-
	Measured touch current (mA) ..... :		-
	Max. allowed touch current (mA) ..... :		-
	Measured protective conductor current (mA) ..... :		-
	Max. allowed protective conductor current (mA) ... :		-
5.1.7	Equipment with touch current exceeding 3.5 mA .. :		N/A
5.1.8	Touch currents to and from telecommunication networks and cable distribution systems and from telecommunication networks		N/A
5.1.8.1	Limitation of the touch current to a telecommunication network and a cable distribution system		N/A
	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

5.2	**Electric strength**		N/A
5.2.1	General		N/A
5.2.2	Test procedure		N/A

5.3	**Abnormal operating and fault conditions**		N/A
5.3.1	Protection against overload and abnormal operation		N/A
5.3.2	Motors		N/A
5.3.3	Transformers		N/A
5.3.4	Functional insulation ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.3.5	Electromechanical components		N/A
5.3.6	Simulation of faults		N/A
5.3.7	Unattended equipment		N/A
5.3.8	Compliance criteria for abnormal operating and fault conditions		N/A
6	**CONNECTION TO TELECOMMUNICATION NETWORKS**		N/A
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N/A
6.1.1	Protection from hazardous voltages		N/A
6.1.2	Separation of the telecommunication network from earth		N/A
6.1.2.1	Requirements		N/A
	Test voltage (V) ..... :		-
	Current in the test circuit (mA) ..... :		-
6.1.2.2	Exclusions ..... :		N/A
6.2	**Protection of equipment users from overvoltages on telecommunication networks**		N/A
6.2.1	Separation requirements		N/A
6.2.2	Electric strength test procedure		N/A
6.2.2.1	Impulse test		N/A
6.2.2.2	Steady-state test		N/A
6.2.2.3	Compliance criteria		N/A
6.3	**Protection of the telecommunication wiring system from overheating**		N/A
	Max. output current (A) ..... :		-
	Current limiting method ..... :		-
7	**CONNECTION TO CABLE DISTRIBUTION SYSTEMS**		N/A
7.1	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2	Protection of equipment users from overvoltages on the cable distribution system		N/A
7.3	Insulation between primary circuits and cable distribution systems		N/A
7.3.1	General		N/A
7.3.2	Voltage surge test		N/A
7.3.3	Impulse test		N/A
A	**Annex A, TESTS FOR RESISTANCE TO HEAT AND FIRE**		N/A
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)		N/A
A.1.1	Samples ..... :		-
	Wall thickness (mm)..... :		-
A.1.2	Conditioning of samples; temperature (°C) ..... :		N/A
A.1.3	Mounting of samples..... :		N/A
A.1.4	Test flame		N/A
A.1.5	Test procedure		N/A
A.1.6	Compliance criteria		N/A
	Sample 1 burning time (s)..... :		-
	Sample 2 burning time (s)..... :		-
	Sample 3 burning time (s)..... :		-
A.2	**Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)**		N/A
A.2.1	Samples, material ..... :		-
	Wall thickness (mm)..... :		-
A.2.2	Conditioning of samples		N/A
A.2.3	Mounting of samples		N/A
A.2.4	Test flame		N/A
A.2.5	Test procedure		N/A
A.2.6	Compliance criteria		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Sample 1 burning time (s):		-
	Sample 2 burning time (s):		-
	Sample 3 burning time (s):		-
A.2.7	Alternative test acc. to IEC 60695-2-2, cl. 4, 8		N/A
	Sample 1 burning time (s):		-
	Sample 2 burning time (s):		-
	Sample 3 burning time (s):		-
A.3	**Hot flaming oil test (see 4.6.2)**		N/A
A.3.1	Mounting of samples		N/A
A.3.2	Test procedure		N/A
A.3.3	Compliance criterion		N/A
B	**Annex B, MOTOR TESTS UNDER ABNORMAL CONDITIONS(see 4.7.2.2 and 5.3.2)**		N/A
B.1	General requirements		N/A
	Position:		-
	Manufacturer:		-
	Type:		-
	Rated values:		-
B.2	Test conditions		N/A
B.3	Maximum temperatures		N/A
B.4	Running overload test		N/A
B.5	Locked-rotor overload test		N/A
	Test duration (days):		-
	Electric strength test: test voltage (V):		-
B.6	Running overload test for d.c. motors in secondary circuits		N/A
B.7	Locked-rotor overload test for d.c. motors in secondary circuits		N/A
B.7.1	Test procedure		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.7.2	Alternative test procedure; test time (h)..... :		N/A
B.7.3	Electric strength test		N/A
B.8	Test for motors with capacitors		N/A
B.9	Test for three-phase motors		N/A
B.10	Test for series motors		N/A
	Operating voltage (V)..... :		-
C	**Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)**		N/A
	Position ..... :		-
	Manufacturer..... :		-
	Type ..... :		-
	Rated values..... :		-
	Method of protection ..... :		-
C.1	Overload test		N/A
C.2	Insulation		N/A
	Protection from displacement of windings ..... :		N/A
D	**Annex D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS**		N/A
D.1	Measuring instrument		N/A
D.2	Alternative measuring instrument		N/A
E	**Annex E, TEMPERATURE RISE OF A WINDING**		N/A
F	**Annex F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10)**		N/A
G	**Annex G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES**		N/A
G.1	Summary of the procedure for determining minimum clearances		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.2	Determination of mains transient voltage (V)		N/A
G.2.1	AC mains supply		N/A
G.2.2	DC mains supply		N/A
G.3	Determination of telecommunication network transient voltage (V) :		N/A
G.4	Determination of required withstand voltage (V) ... :		N/A
G.5	Measurement of transient levels (V) ..... :		N/A
G.6	Determination of minimum clearances ..... :		N/A
H	**ANNEX H, IONIZING RADIATION (see 4.3.13)**		N/A
J	**Annex J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)**		N/A
	Metal used ..... :		-
K	**ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.7)**		N/A
K.1	Making and breaking capacity		N/A
K.2	Thermostat reliability; operating voltage (V) ..... :		N/A
K.3	Thermostat endurance test; operating voltage (V) :		N/A
K.4	Temperature limiter endurance; operating voltage (V) ..... :		N/A
K.5	Thermal cut-out reliability		N/A
K.6	Stability of operation		N/A
L	**Annex L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.1)**		N/A
L.1	Typewriters		N/A
L.2	Adding machines and cash registers		N/A
L.3	Erasers		N/A
L.4	Pencil sharpeners		N/A
L.5	Duplicators and copy machines		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
L.6	Motor-operated files		N/A
L.7	Other business equipment		N/A
M	**Annex M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)**		N/A
M.1	Introduction		N/A
M.2	Method A		N/A
M.3	Method B		N/A
M.3.1	Ringing signal		N/A
M.3.1.1	Frequency (Hz) ..... :		-
M.3.1.2	Voltage (V) ..... :		-
M.3.1.3	Cadence; time (s), voltage (V) ..... :		-
M.3.1.4	Single fault current (mA) ..... :		-
M.3.2	Tripping device and monitoring voltage ..... :		N/A
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N/A
M.3.2.2	Tripping device		N/A
M.3.2.3	Monitoring voltage (V) ..... :		N/A
N	**Annex N, IMPULSE TEST GENERATORS (see 2.10.3.4, 6.2.2.1, 7.3.2 and clause G.5)**		N/A
N.1	ITU-T impulse test generators		N/A
N.2	IEC 60065 impulse test generator		N/A
P	**Annex P, NORMATIVE REFERENCES**		N/A
Q	**Annex Q, BIBLIOGRAPHY**		N/A
R	**Annex R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES**		N/A
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
R.2	Reduced clearances (see 2.10.3)		N/A
S	**Annex S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)**		N/A
S.1	Test equipment		N/A
S.2	Test procedure		N/A
S.3	Examples of waveforms during impulse testing		N/A
T	**Annex T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)**		N/A
	.....:		-
U	**Annex U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)**		N/A
	.....:		-

Enclosure

Miscellaneous

Supplement Id	Description
7-01	Label Artwork

Enclosure

National Differences

USA / Canada

IEC 60950-1			
SubClause	Difference + Test	Result - Remark	Verdict

The list of clauses, verdicts and results can be found in the original CB Test Report that serves as the basis for this UL Test Report.

Enclosure

Photographs

Supplement Id	Description
3-01	External - Top/Front/Right View
3-02	External - Front Panel
3-03	External - Rear View
3-04	Internal View
3-05	Internal View With Cover Removed