UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Component Recognition
CCN:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Product:	Power Supply, (Medical: QQHM2, QQHM8)
Model:	TOPS-PS210-M, mPCSL-210
Rating:	Input: 2.9-1.2A, 100-240V, 50/60Hz Output: 10A, +5V; 10A, +3.3V; 12A, +12V; 0.3A, -12V; 1.5A, +5VSB (Outputs are provided derate rating, see Additional Information.)
Applicant Name and Address:	NIPRON CO LTD 2-57 OHAMA-CHO AMAGASAKI-SHI HYOGO-KEN 660-0095 JAPAN

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 UL LLC ('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.

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

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

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Supporting Documentation

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.

Product Description

This equipment is a power supply which is intended to be installed in office, home or patient care equipment.

Model Differences

Model TOPS-PS210-M is the basic model in this report.

Model mPCSL-210 is identical to model TOPS-PS210-M except for model designation.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : pluggable A
- Operating condition : continuous
- Access location : N/A
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : -15%, +10%
- Tested for IT power systems : N/A for UL/cUL certification
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Class I (earthed)
- Considered current rating (A) : 20 A (Branch circuit)

- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : For IT use (QQGQ2/8): Up to 2000 m, For Medical use (QQHM2/8): Up to 3000 m
- Altitude of test laboratory (m) : approximately 10 to 20 m
- Mass of equipment (kg) : Approx. 1.4kg
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 45°C at 100% loaded, 47.5°C at 95% loaded, 50°C at 90% loaded, 60°C at 50% loaded
- The means of connection to the mains supply is: Pluggable A, Detachable power cord
- The product is intended for use on the following power systems: TN
- The product was investigated to the following additional standards: UL 60601-1, 1st Edition, 2006-04-26 (Medical Electrical Equipment, Part 1: General Requirements for Safety), CAN/CSA-C22.2 No. 601.1-M90, 2005 (Medical Electrical Equipment - Part 1: General Requirements for Safety), EN 60601-1: 1990 + A1:1993 + A2:1995, ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) (includes Deviations for United States), CAN/CSA-C22.2 No. 60601-1 (2008) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) (includes National Differences for Canada), EN 60601-1: 2006 + CORR: 2010 (Medical electrical equipment Part 1: General requirements for basic safety and essential performance)
- (UL 60601-1, 1st edition and CAN/CSA-C22.2 No. 601.1-M90) The product was not investigated to the following standards or clauses:: Clause 36, Electromagnetic Compatibility (IEC 601-1-2), Clause 48, Biocompatibility (ISO 10993-1), Clause 52.1, Programmable Electronic Systems (IEC 601-1-4)
- (ANSI/AAMI ES60601-1:2005 and CAN/CSA-C22.2 No. 60601-1:2008) The product was not investigated to the following standards or clauses:: Biocompatibility (ISO 10993-1), Clause 14, Programmable Electronic Systems, Electromagnetic Compatibility (IEC 60601-1-2)
- Unless otherwise indicated, all tests were conducted on the power supply with being placed 10 cm from the wall at the inlet side and 3 cm from the wall at the fan side.
- Power supply has been evaluated with a protective earth and could be used in Class I applications. To be further evaluated in the end product.
- This power supply also has been judged on the basis of the required creepage and Clearances in the First Edition of the Standard for Medical Electrical Equipment, UL 60601-1, Sub clause 57.10, CAN/CSA C22.2 No. 601.1-M90, Sub clause 57.10 and ANSI/AAMI ES60601-1: 2005, Sub clause

8.9 and CAN/CSA-C22.2 No. 60601-1 (2008), Sub clause 8.9.

- (ANSI/AAMI ES60601-1:2005 and CAN/CSA-C22.2 No. 60601-1:2008) The multiplication factor of 1.14 for altitude up to 3000 m from Table 8 was applied to MOOP air clearances.

Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The following Production-Line tests are conducted for this product: Electric Strength, Earthing Continuity
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 396 Vrms, 950 Vpk, Primary-Earthed Dead Metal: 396 Vrms, 950 Vpk
- The following secondary output circuits are SELV: All secondary outputs
- The following secondary output circuits are at hazardous energy levels: Output of +12V
- The following secondary output circuits are at non-hazardous energy levels: Output of +3.3V, +5V, -12V and +5VSB
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20 A
- The investigated Pollution Degree is: 2
- An investigation of the protective bonding terminals has: Been conducted
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): T101 (Class B)
- The following end-product enclosures are required: Fire, Electrical
- The equipment is suitable for direct connection to: AC mains supply
- The following part was evaluated as Fire and , Electrical enclosure: Front enclosure (AC Inlet side) as top and side enclosure
- (UL 60601-1, 1st edition and CAN/CSA-C22.2 No. 601.1-M90) If this equipment is used in patient care equipment and nonpatient equipment in medical environments, the center tap connection

should be used for input line.

- Leakage current tests should be repeated in the end-product application.
- This secondary circuit of this power supply has not been evaluated for patient connected applications.
- This equipment have not been evaluated for use in the presence of flammable anesthetic mixture with air, oxygen, or nitrous oxide. The output circuits have not been evaluated for direct patient connection (Type B, BF or CF).
- The product has some ventilation openings, however, Abnormal Operation Test for Blocked ventilation openings has not been conducted due to building-in type component. The evaluation shall be checked in end product.
- (ANSI/AAMI ES60601-1:2005 and CAN/CSA-C22.2 No. 60601-1:2008) Power supply provides the following MOOP (means of operator protection): 1MOOP between Primary and Earth/Chassis, 2MOOP between Primary to Secondary, based upon a working voltage 396 Vrms, 950 Vpk.

Additional Information

Max. outputs were specified as below.
1. +5V plus +3.3V: Max. 83W. +5V plus +3.3V plus +12V: Max. 199.7W, Total: Max. 210.8W
2. +12V: Max. 144W
3. .12V: Max. 3.6W
4. +5VSB: Max. 7.5W

Derate rating (Linearity): 85V, 95% to 90V, 100%, 45°C, 100% to 60°C, 50%

Maximum recommended ambient (Tma):
45°C at 100% loaded.
47.5°C at 95% loaded.
50°C at 90% loaded.
60°C at 50% loaded.

For Y-Capacitor (C114) and Bridging Capacitor (C115), the capacitance is as below:
Building-in to Patient Care Equipment: C114: Max. 470pF, C115: Max. 1000pF
Building-in to Other Equipment: C114: Max. 1000pF, C115: Max. 2200pF

Additional Standards

The product fulfills the requirements of: UL 60601-1, 1st Edition, CAN/CSA-C22.2 No. 601.1-M90, 2005, EN 60601-1: 1990 + A1:1993 + A2:1995, ANSI/AAMI ES60601-1(2005 + C1:09 + A2:10)(includes Deviations for United States), CAN/CSA-C22.2 No. 60601-1 (2008)(includes National Differences for Canada) and EN 60601-1: 2006 + CORR: 2010

Markings and instructions

Clause Title	Marking or Instruction Details
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
Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.
Symbols - On/Off switch	All other controls to be marked with | symbol for "ON" (60417-2-IEC-5007) and ○ symbol for "OFF" (60417-2-IEC-5008)
Special Instructions to UL Representative Inspect the Transformers listed in BD1.1 per AA1.1 - C. When the tests are conducted at other location, inspect Test Record and Specification Sheet provided by the Component Manufacturer. Verify the Specification Sheet indicates 100% Routine.	

Production-Line Testing Requirements

Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.

Model	Component	Removable Parts	Test probe location	V rms	V dc	Test Time, s
TOPS-PS210-M, mPCSL-210	Transformer, T101	--	Primary to secondary	4000	--	1sec
TOPS-PS210-M, mPCSL-210	Transformer, T102	--	Primary to secondary	4000	--	1sec
TOPS-PS210-M, mPCSL-210	Transformer, T103	--	Primary to secondary	4000	--	1sec
TOPS-PS210-M, mPCSL-210	Complete Unit	--	Primary to GND/Secondary	1776	--	1sec

Earthing Continuity Test Exemptions - This test is not required for the following models:

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Electric Strength Test Exemptions - This test is not required for the following models:

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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:

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Sample and Test Specifics for Follow-Up Tests at UL

Model	Component	Material	Test	Sample(s)	Test Specifics
N/A	--	--	--	--	--