UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12 (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)
Complementary CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Product:	Switching Power Supply
Model:	RWS50B-5, RWS50B-12, RWS50B-24, and RWS50B-48 Maybe followed by suffix "abcd" (a is /, b is CO2, c is FG, d is DIN; and "abcd" may be blank).
Rating:	Input: 100-240 Vac, 50-60 Hz, 1.1 A
Applicant Name and Address:	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 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.

Prepared by: Nao Maede Reviewed by: Tetsuo Iwasaki

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

The product covered in this Test Report is building-in type switching power supply with a single output circuit.

Output:
5 Vdc (4.5 Vdc - 5.75 Vdc), maximum 10 A (maximum 50 W) (for RWS50B-5)
12 Vdc (10.8 Vdc - 13.8 Vdc), maximum 4.3 A (maximum 51.6 W) (for RWS50B-12)
24 Vdc (21.6 Vdc - 27.6 Vdc), maximum 2.2 A (maximum 52.8 W) (for RWS50B-24)
48 Vdc (43.2 Vdc - 52.8 Vdc), maximum 1.1 A (maximum 52.8 W) (for RWS50B-48)

Model Differences

Each model is identical, except for model designation, output rating, secondary winding and internal construction of Transformer (T1), and secondary components.

RWS50B Series maybe followed by suffix "abcd" (a is /, b is CO2, c is FG, d is DIN; and "abcd" may be blank).
1. CO2: Model with optional thin coating (QMJU2) on both sides of PWB.
2. FG: Model with Low Leakage (the capacitances for Primary - FG reduced).
3. DIN: Model with Cover and DinRail Mounting Bracket.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : N/A
- Operating condition : continuous
- Access location : N/A (for building-in)
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20 A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0

- Altitude of operation (m) : Up to 3000 m
- Altitude of test laboratory (m) : approximately 10 to 20 m
- Mass of equipment (kg) : approximately 0.23 kg
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: See Enclosure Id. 7-01.
- The product is intended for use on the following power systems: TN

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 end-product Electric Strength Test is to be based upon a maximum working voltage of: [Model RWS50B-5] Primary-Secondary: 255 Vrms, 444 Vpk / Primary-Ground: 251 Vrms, 462 Vpk, [Model RWS50B-12] Primary-Secondary: 259 Vrms, 472 Vpk / Primary-Ground: 256 Vrms, 460 Vpk, [Model RWS50B-24] Primary-Secondary: 261 Vrms, 488 Vpk / Primary-Ground: 260 Vrms, 476 Vpk, [Model RWS50B-48] Primary-Secondary: 267 Vrms, 474 Vpk / Primary-Ground: 268 Vrms, 464 Vpk,
- The following secondary output circuits are SELV: Output of Models RWS50B-5, RWS50B-12, RWS50B-24, and RWS50B-48
- The following secondary output circuits are at non-hazardous energy levels: Output of Models RWS50B-5, RWS50B-12, RWS50B-24, and RWS50B-48.
- 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
- Proper bonding to the end-product main protective earthing termination is: Required
- An investigation of the protective bonding terminals has: Not 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): Transformer (T1) (Class 155(F) or Class 130(B))
- The following end-product enclosures are required: Electrical, Fire
- Earth terminal provided on Terminal Block (TB1) has not been evaluated as protective earthing terminal. This component is intended to be connected to a protective earth via earthed parts of end-product.
- Model RWS50B-5 was tested with Output Voltage Range of 4.5 - 5.75 Vdc (maximum 50 W). , Model RWS50B-12 was tested with Output Voltage Range of 10.8 - 13.8 Vdc (maximum 51.6 W). , Model HWS50B-24 was tested with Output Voltage Range of 21.6 - 27.6 Vdc (maximum 52.8 W). , Model RWS50B-48 was tested with Output Voltage Range of 43.2 - 52.8 Vdc (maximum 52.8 W). Adjustment was made via Variable Resistor (VR51).
- Line to Line Capacitor C1 have maximum 0.33 uF for capacitance, C4 have maximum 0.1 uF for capacitance. C1: 0.33 uF and C4: 0.1 uF were used in test. Therefore, consideration shall be given in conducting Discharge Test in the end product application with respect to the variation in C1 and C4.
- Line to ground Capacitors C2, C3, C5 has maximum 2200 pF for capacitance. C2, C3 and C5: 2200pF were used in , test. Therefore, consideration shall be given in conducting Touch Current Test in the end product application with respect to the variation in C2, C3 and C8.
- The following output circuits are at ES1 energy levels : Output of Models RWS50B-5, RWS50B-12 and RWS50B-24
- The following output circuits are at ES2 energy levels : Output of Model RWS50B-48
- The following output circuits are at PS3 energy levels : Output of Model RWS50B-5

- The power supply was evaluated to be used at altitudes up to : 3000 m
- Humidity conditioning has been conducted by tropical condition.
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/resistive PIS.
- This component has been evaluated in 'control of fire spread' method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS shall be considered.
- The following output circuits at PS2 (LPS) energy levels: Output of Models RWS50B-12, RWS50B-24, and RWS50B-48

Additional Information

The Clearances and Creepage Distances have additionally been assessed for suitability up to 3000 m elevation.

Additional Standards

The product fulfills the requirements of: The product fulfills the requirements of: The product fulfills the requirements of: The product fulfills the requirements of: The product fulfills the requirements of: The product fulfills the requirements of: The product fulfills the requirements of: UL 62368-1, 2nd Edition, 2014-12-01, CAN/CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12.

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.