UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (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:	Switching Power Supply
Model:	CNS653-M#-XXX (Where "#" can be E, F or U; and "-XXX" can be any alphanumeric character or blank which represents customer identity that do not affect safety.) CNS655-MU-XXX (Where "-XXX" can be any alphanumeric character or blank which represents customer identity that do not affect safety.) CNS658-MU-XXX (Where "-XXX" can be any alphanumeric character or blank which represents customer identity that do not affect safety.)
Rating:	Input: 100-240Vac, 9.2A, 50/60Hz or DC 127Vmin - 350Vmax, 9.2A DC Output: (For CNS653-M#-XXX) +12V, 54.2Amax +12V FAN, 1Amax +5Vsb, 2Amax (For CNS655-MU-XXX) +24V, 27.1Amax +12V FAN, 1Amax +5Vsb, 2Amax (For CNS658-MU-XXX) +48V, 13.55Amax +12V FAN, 1Amax +5Vsb, 2Amax Maximum Output Power: 410W Convection Cooling (for CNS653-MU-XXX, CNS653-MF-XXX, CNS655-MU-XXX and CNS658-MU-XXX only) 650W Forced Air Cooling
Applicant Name and Address:	ASTEC INTERNATIONAL LTD 16TH FLOOR, LU PLAZA 2 WING YIP STREET, KWUN TONG, KOWLOON, HONGKONG

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: KinSang Tang Reviewed by: Brian Wong

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 an AC/DC switching power supply intended for building-in as a component used in information technology equipment which employs isolating transformers.

This equipment is intended for used in Class I.

Reinforced insulation is provided between primary and secondary circuits and basic insulation is provided between primary circuits and Earth.

Model Differences

CNS653-MF-XXX, CNS653-ME-XXX and CNS653-MU-XXX are identical (same PCB, same electric circuitry) except for mechanical construction.

CNS653-MF-XXX is an open frame power supply with heatsink on D1.
CNS653-MU-XXX is the same as CNS653-MF-XXX, but employs additional U-base chassis and without heatsink on D1.
CNS653-ME-XXX is the same as CNS653-MU-XXX, but employs additional Fan Panel Chassis (with AC inlet connected to the input terminal block) and enclosure cover.

CNS655-MU-XXX is identical to CNS653-MU-XXX except for power transformer (T1), output ratings, and model name designation.

CNS658-MU-XXX is identical to CNS653-MU-XXX except for power transformer (T1), output ratings, and model name designation.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : pluggable A for CNS653-ME-XXX; Must also be considered in the end system.
- Operating condition : continuous
- Access location : To be considered in the end system
- 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
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : 5000
- Altitude of test laboratory (m) : less than 2000 meters
- Mass of equipment (kg) : less than 1 kg
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 50°C for full load; 80°C for derated load
- The means of connection to the mains supply is: Pluggable A for CNS653-ME-XXX only. Must also be considered in the end system.
- The product is intended for use on the following power systems: TT, TN
- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 (which includes all European national differences, including those specified in this test report).,
- The following accessible locations (with circuit/schematic designation) are within a limited current circuit: C90 and C91
- The following were investigated as part of the protective earthing/bonding: Printed wiring board trace (refer to Enclosure - Schematics + PWB for layouts)
- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
- The power supply in this equipment was: Investigated to IEC 60950-1. As part of the investigation of this product, the power supply and its test report were reviewed and found to comply with IEC 60950-1., .
- The Clearance and Creepage distances have additionally been assessed for suitability up to 5000 meters elevation. Clearance distance are calculated according to IEC60664-1 table A-2 multiplication factor 1.48.
- +12V FAN and +5Vsb outputs should be considered part of the maximum output power (410W for convection cooling, 650W for forced air cooling).
- For CNS653-MU-XXX, CNS653-MF-XXX, CNS655-MU-XXX and CNS658-MU-XXX using convection cooling: The maximum continuous output power is 410W at AC180-264V or DC254-350V input ; or 400W at AC110-179V or DC155-253V input; or 372.5W at AC100V or DC141V input; or 345W at AC90V or DC127V input at 50degC maximum ambient temperature. Output power derates at 2.5% per degC from 50degC to 80degC.
- For CNS653-MU-XXX, CNS653-MF-XXX, CNS655-MU-XXX and CNS658-MU-XXX using forced-air cooling: The maximum continuous output power is 650W AC90-264V or DC127-350V input at 50degC maximum ambient temperature with min. 400LFM fan airflow (for CNS653-MU-XXX, CNS653-MF-XXX, CNS655-MU-XXX and CNS658-MU-XXX using ventilation position 1 and 2) or min. 300LFM (for CNS653-MF-XXX using ventilation position 3 and 4). Output power derates at 2.5% per degC from 50degC to 80degC.
- For CNS653-ME-XXX: The maximum continuous output power is 650W AC90-264V or DC127-350V input at 50degC maximum ambient temperature. Output power derates at 2.5% per degC from 50degC to 80degC.

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: Earthing Continuity, Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-Earthed Dead Metal: 428.7 Vrms, 634Vpk, Primary-SELV: 390.4 Vrms, 606 Vpk,
- The following secondary output circuits are SELV: All outputs covered in this report.
- The following secondary output circuits are at hazardous energy levels: +12V (for CNS653-M#-XXX), +24V (for CNS655-MU-XXX), +48V (for CNS658-MU-XXX)
- The following secondary output circuits are at non-hazardous energy levels: +12V FAN and +5Vsb.
- The following secondary output circuits are Limited Current Circuits: secondary pin Bridging capacitor C91 (Y-capacitor)
- The power supply terminals and/or connectors are: Not investigated for field wiring,
- 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): T900, T1, T2, T3 (Class F) designated 155-10C
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The maximum continuous power supply output (Watts) relied on forced air cooling from: Minimum of 400LFM (using ventilation position 1 and 2 for models CNS653-MU-XXX, CNS653-MF-XXX CNS655-MU-XXX and CNS658-MU-XXX only) or 300LFM (using ventilation position 3 and 4 for model CNS653-MF-XXX only) forced air cooling for total output power of 650W at 50 deg C ambient. At above 50 deg C the power shall be derated at 2.5% per deg C up to 80 deg C.
- The equipment is suitable for direct connection to: AC mains supply
- Ultracapacitors: The following cautionary markings shall be provided in the servicing instructions:
- Earthing continuity test should be conducted in the end system.
- This equipment was not evaluated for the system mounting. When installed in the end system, proper evaluation should be considered.
- For CNS653-M#-XXX: Additional evaluations have been considered for +12V +/-10% output adjustability.
- The following cautionary markings shall be provided in the servicing instructions: Caution: Double Pole / Neutral Fusing.
- For CNS655-MU-XXX: Additional evaluations have been considered for +24V +/-10% output adjustability.
- Overcurrent releases of adequate breaking capacity must be employed in the end product.
- AC inlet is not considered as disconnect device for DC input application. This should be considered in End Product Application.
- For CNS658-M#-XXX: Additional evaluations have been considered for +48V +/-10% output adjustability.