

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CAN/CSA C22.2 No. 62368-1-14, 2nd Ed (Audio/video, information and communication technology equipment Part 1: Safety requirements)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
<b>Complementary CCN:</b>	N/A
<b>Product:</b>	Switching Power Supply for building-in
<b>Model:</b>	NPS63-M, NPS65-M, NPS62-M, NPS64-M
<b>Rating:</b>	<p>INPUT: AC 100-250 V, 50/60 Hz, 2.5 A DC 140 V (min.) - 300 V (max.), 2.5 A</p> <p>OUTPUT:</p> <p>Model NPS63-M: DC + 12 V, 5.0 A max</p> <p>Model NPS65-M: DC + 24 V, 2.5 A max.</p> <p>Model NPS62-M: DC + 5 V, 11.0 A max.</p> <p>Model NPS64-M: DC + 15 V, 4.0 A max.</p> <p>MAXIMUM OUTPUT POWER: Models NPS63-M, NPS65-M and NPS64-M: 60 W with 30CFM Forced Air Cooling at 50 deg C maximum ambient 60 W with Convection Cooling at 50 deg C maximum ambient</p> <p>Model NPS62-M: 55W with 30CFM Forced Air Cooling at 50 deg C maximum ambient 55W with Convection Cooling at 50 deg C maximum ambient</p> <p>Output power derates at 2.5% per °C from 50 °C to 80°C ambient temperature</p>

<b>Applicant Name and Address:</b>	ASTEC INTERNATIONAL LTD 16TH FL LU PLAZA 2 WING YIP ST, KWUN TONG KOWLOON HONG KONG HONG KONG
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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: Tony yeung / Project Handler      Reviewed By: Paul Wan / Reviewer

**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 has been evaluated for use in Class I or Class II application. When the power supply is used as Class II equipment, all PE traces and components connected to PE on the primary side will be treated as primary part for spacing and insulation considerations.

Reinforced safeguard is provided between primary circuit to secondary circuit and basic safeguard is provided between primary circuit to earth.

**Model Differences**

Model NPS62-M is identical to Models NPS63-M and NPS65-M except for model designation, output power rating, power transformer T1, common mode choke L1, switching mosfet Q1, Bulk capacitor C6, and dimension of secondary heatsink (HTSK2).

NPS65-M is identical with NPS63-M except for power transformer T1 and electrical output rating.

NPS64-M is identical with NPS63-M except for common mode choke L1, power transformer T1 and electrical output rating.

**Test Item Particulars**

Classification of use by	Skilled person
Supply Connection	AC Mains DC Mains
Supply % Tolerance	+10%/-10% for AC input only, 140 - 300V for DC
Supply Connection – Type	To be considered in the end system
Considered current rating of protective device as part of building or equipment installation	20 A; building;
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Class I Class II
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer’s specified maximum operating ambient	50 °C
IP protection class	IPX0

Power Systems	TN TT
Altitude during operation (m)	4000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	less than 1 kg

**Technical Considerations**

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer’s specification of : 50 °C and up to 80 °C at derated power.
- The product is intended for use on the following power systems : TN, TT
- Considered current rating of protective device as part of the building installation (A) : 20
- Mains supply tolerance (%) or absolute mains supply values : +10%/-10% for AC input only. 40-300V for DC input.
- The equipment disconnect device is considered to be : To be considered in the end system
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The Clearances and Creepage distances have additionally been assessed for suitability up to maximum 13,120 ft (4,000 m) elevation. Clearance distance are calculated according to IEC60661-1 table A-2 multiplier factor is 1.29
- This power supply except Model NPS62-M has been evaluated for use in 50 °C maximum ambient temperature at 60 W load with natural convection cooling and 60 W load with 30 CFM Forced Air Cooling. Output power derates at 2.5% per °C from 50 °C to 80 °C ambient temperature
- Model NPS62-M has been evaluated for use in 50 °C maximum ambient temperature at 55 W load with natural convection cooling and 55 W load with 30 CFM Forced Air Cooling. Output power derates at 2.5% per °C from 50 °C to 80 °C ambient temperature.
- This power supply is component level power supply intended for use in Class I or Class II application. Secondary PE traces are separated from Primary PE traces when used in Class II application

**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 product-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 : The end-product Electric Strength Test is to be based upon a maximum working voltage of: (NPS63-M) Primary-Earthed Dead Metal: 328.8 Vrms, 628 Vpk Primary-SELV: 327.1 Vrms, 645 Vpk (NPS65-M) Primary-Earthed Dead Metal: 338.6 Vrms, 557 Vpk Primary-SELV: 338.6 Vrms, 557 Vpk (NPS62-M) Primary-Earthed Dead Metal: 332.9 Vrms, 610 Vpk Primary-SELV: 332.1 Vrms, 610 Vpk (NPS64-M) Primary-Earthed Dead Metal: 329.0 Vrms, 601 Vpk Primary-SELV: 326.9 Vrms, 628 Vpk
- The following output circuits are at ES1 energy levels : All output circuits
- The following output circuits are at ES3 energy levels : All circuits except output circuits
- The following output circuits are at PS3 energy levels : All output circuits
- 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 end-product enclosures are required : Mechanical, Electrical, Fire
- 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) : T1 (Class F) designated 155-10C
- The equipment is suitable for direct connection to : AC mains supply
- The power supply was evaluated to be used at altitudes up to : "4,000 m"
- The products are Class I equipment, and shall be properly earth or bonded to earth in the end use.
- Earthing continuity test should be conducted in end system if the unit is considered as Class I construction.
- Electrical enclosure for protection against electric shock is required in the end-product.
- The maximum continuous power supply output (Watts) relied on forced air cooling from: 30 CFM Forced air cooling at 60 W for Models NPS63-M, NPS64-M and NPS65-M; 30CFM Forced air cooling at 55 W for Model NPS62-M.
- Overcurrent releases of adequate breaking capacity must be employed in the end product.
- AC connector is not considered as disconnect device for AC/DC input application. This should be considered in End Product Application.
- Temperature test for accessible surfaces was conducted with acceptable result at ambient temperature higher than 20-25 deg C during power supply investigation. The acceptability of test result should be further determined during end system investigation.
- The unit is not suitable for direct connection to DC mains supply.  
The DC input voltage 300 Vdc is rectified from AC mains supply. Further evaluation must be considered if the unit is directly connected to DC mains supply