UL TEST REPORT AND PROCEDURE

Standard:	ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10)(Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) CAN/CSA-C22.2 No. 60601-1 (2008) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance)
Certification Type:	Component Recognition
CCN:	QQHM2, QQHM8 (Power Supplies, Medical and Dental)
Product:	Switching Power Supply
Model:	LPQ200A-M, LPQ201-M, LPQ200C-M and LPQ202-M
Rating:	AC INPUT RATING: 100-250V, 50/60Hz, 3.5A DC INPUT RATING: 120-300V, 3.0A DC OUTPUT RATING: Refer to operating instruction (See Id 4-11, 6-01 and 6-02 for details.)
Applicant Name and Address:	ASTEC INTERNATIONAL LTD - PHILIPPINE BRANCH 16TH FL LU PLAZA 2 WING YIP ST KWUN TONG KOWLOON HONG KONG

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

Models LPQ200A-M, LPQ201-M, LPQ200C-M and LPQ202-M are component switching mode power supply for building in.

MOPP insulation was provided.

Model Differences

Models LPQ200A-M, LPQ201-M and LPQ200C-M, LPQ202-M are identical excepted for the rating and relevant secondary circuit of output V3.

Models LPQ200A-M and LPQ200C-M employing alternate Models Designation LPQ201-M and LPQ202-M respectively.

Technical Considerations

- Classification of installation and use : Component to be installed in end-product
- Device type (component/sub-assembly/ equipment/ system) : Component
- Intended use (Including type of patient, application location) : Component - to be evaluated in end product
- Mode of operation : Continuous
- Supply connection : Input Connector
- Accessories and detachable parts included : None
- Other options include : None
- The product was investigated to the following additional standards:: CAN/CSA-C22.2 No. 60601-1 (2008) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) Edition 2 - Revision Date 2011/06/01., ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) - Edition 1 - Revision Date 2012/01/01,
- The product was not investigated to the following standards or clauses:: Electromagnetic Compatibility (IEC 60601-1-2), Clause 14, Programmable Electronic Systems, Biocompatibility (ISO 10993-1)
- The degree of protection against harmful ingress of water is:: Ordinary
- The mode of operation is:: Continuous
- The product is suitable for use in the presence of a flammable anesthetics mixture with air or oxygen or with nitrous oxide:: No
- The product is Recognized only to the following hazards: Casualty, Fire, Shock.

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 power supplies have been judged on the basis of the required creepage and clearances in the Standard for Medical Electrical Equipment, ANSI/AAMI ES 60601-1, Sub clause 8.9.
- This power supply has not been evaluated for patient connected applications.
- Consideration should be given to measuring the temperatures on power electronic components and transformer windings when the power supply is installed in the end-use equipment. The transformers (T1 and T2) incorporate a Class 155 (F) insulation system.
- The power supply was evaluated as 2 MOPP Insulation between Primary and Secondary, and as 1

MOPP Insulation between Primary and Earth. See insulation diagram for details.

- The end-product Electric Strength Test is to be based upon a maximum working voltage of: T1 Primary to Secondary: 295.3 Vrms, 867 Vp-p; T2 Primary to Secondary: 305.4 Vrms, 875 Vp-p.
- Additional UL Recognized DC Fuse must be provided in end-system for DC input.
- Leakage current test need to be repeated in end-product investigation.
- Earthing terminal at input connector is not considered protective earthing terminal, but is considered bonding terminal. Power supply chassis is to be reliably bonded earthing in end use equipment before energized.
- Instructions and equipment marking shall be provided in a language, which is acceptable in the country in which the equipment is to be installed.
- This power supply was tested on a 20 A branch circuit. If used on a branch circuit greater than this, additional testing may be necessary. The fuse employed didn't fractured and remained intact during the single fault condition testing and short circuit testing performed in client's facility.
- Input terminal/connector shall be connected to the supply neutral in the end use for simultaneous disconnection of all supply poles.
- The insulation between accessible parts and live part must be re-evaluated in end product.
- Maximum Operating Temperature Tmax (°C) is 50 deg. C for full load and 70 deg. C for half of the full load.
- End product Risk Management Process to include consideration of requirements specific to the Power Supply.
- End product Risk Management Process to consider the need for different orientations of installation during testing.
- End product to determine the acceptability of risk in conjunction to the movement of components as part of the power supply.
- End product to determine the acceptability of risk in conjunction to the routing of wires away from moving parts and sharp edges as part of the power supply.
- Temperature Test was conducted without Test Corner. End product to determine the acceptability of risk in conjunction to temperature testing without test corner as part of the power supply.
- End product Risk Management Process to consider the need for simultaneous fault condition testing.
- End product to determine the acceptability of risk in conjunction to the selection of components as it pertains to the intended use, essential performance, transport, storage conditions as part of the power supply.
- A suitable Electrical, Mechanical and Fire Enclosure shall be provided by end use equipment.
- This unit is not intended to be used for permanent connection.
- The secondary output circuits of Transformer (T1) are complied with Low Voltage Reliability. (Subclause 16e Requirement)
- The output connectors are not acceptable for field connection and are only intended for connections to mating connectors of internal wiring inside the end use product. The acceptability of these and the mating connectors relative to secureness, insulating materials, and temperatures shall be considered in the end-use product.
- Depending on the end product application, additional markings and documentation may be required. This is to be evaluated in the end product.
- The clearance and creepage distance have additionally been assessed for suitability up to 3000m elevation.

- This power supply shall be installed in compliance with the enclosure, mounting, spacing, casualty, markings and segregation requirements of the end-use application.
- Suitability for the PE tab to be used with quick-connect connector needs to be evaluated in end-product.
- Fuses F1 and F2 are not intended to be accessible by user. Final application to be determined in the end-product investigation (e.g., Fuse rating/marking are to be provided in the end use application).
- Built-in switching power supply. Applicability of the following is to be determined in End Product Evaluation: 8.4.2 - Accessible Parts Including Applied Parts.