

UL TEST REPORT AND PROCEDURE

Standard:	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)
Certification Type:	Component Recognition
CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Complementary CCN:	N/A
Product:	Switching power supply
Model:	LCM600Q, LCM600W, LCM600Q-T-401, LCM600L, LCM600U, LCM600W-T-401, LCM600Q-T-405, LCM600Q-T-407, LCM600Q-N, LCM600N, LCM600Q-4-404, LCM600L-N, LCM600Q-T-409, LCM600W-N, LCM600W-T-N-5-411
Rating:	<p>AC input: 100-240Vac, 8.5A Max., 50/60Hz</p> <p>Models LCM600Q, LCM600Q-T-405, LCM600Q-N, LCM600Q-4-404: DC-outputs: +24Vdc, 27.0A Max., 600W Max.; +5.0Vsb, 2.0A Max. (Optional)</p> <p>Models LCM600W, LCM600W-N & LCM600W-T-401: DC-outputs: +48Vdc, 13.0A Max., 600W Max.; +5.0Vsb, 2.0A Max. (Optional)</p> <p>Model LCM600Q-T-401: DC-outputs: +24Vdc, 18.75A Max., 450W Max.; +5.0Vsb, 2.0A Max. (Optional)</p> <p>Model LCM600L, LCM600L-N: DC-outputs: +12Vdc, 52.0A Max., 600W Max.; +5.0Vsb, 2.0A Max. (Optional)</p> <p>Model LCM600U: DC-outputs: +36Vdc, 18.0A Max., 600W Max.; +5.0Vsb, 2.0A Max. (Optional)</p> <p>Model LCM600Q-T-407: DC-output: +24Vdc, 23.0A max, 500W Max.</p> <p>Model LCM600N: DC-outputs: +15Vdc, 44.0A Max., 600W Max.; +5.0Vsb, 2.0A Max</p>

	(Optional) Model LCM600Q-T-409: DC-outputs: +24Vdc, 27.0A Max., 600W Max. Model LCM600W-T-N-5-411: DC-outputs: +48Vdc, 13.0A Max., 600W Max.; +5.0Vsb, 1.0A Max. Output derates at 2.5% per degree C from 50 degree C to 70 degree C
Applicant Name and Address:	ASTEC INTERNATIONAL LTD 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.

Prepared By: Dennis Lam / 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

The equipment is a switching power supply, intended for building in as a component used in information technology equipment which employs isolating transformers.

Reinforced insulation is provided between Primary and Secondary. Basic insulation is provided between Primary and PE (Protective Earth).

Model Differences

Model LCM600W is identical to model LCM600Q except Output rating, Transformer T801 and PWB Layout.

Model LCM600Q-T-401 is identical to Model LCM600Q except different output rating and alternate Fan.

Model LCM600L is identical to Model LCM600Q, except for output rating, transformer (T801), choke(L302) and insulator.

Model LCM600U is identical to Model LCM600Q, except for output rating, transformer (T801), choke(L302) and insulator.

Model LCM600W-T-401 is identical to Model LCM600W except for model designation and 4 output terminals provided.

Model LCM600Q-T-405 is identical to Model LCM600Q except for model designation.

Model LCM600Q-N is identical to Model LCM600Q except for model designation and Fan.

Model LCM600Q-T-407 is identical to Model LCM600Q except for model designation and Fan filter.

Model LCM600N is identical to Model LCM600Q, except for output rating, transformer (T801), choke(L302) and insulator.

Model LCM600Q-4-404 is identical to Model LCM600Q-N, except for input cable assembly.

Model LCM600L-N is identical to Model LCM600L except for model designation, and fan used and alternate

insulator is for use across the whole series.

Model LCM600Q-T-409 is identical to Model LCM600Q except for model designation and it has no +5.0 Vsb output rating. Additional tests were conducted for customer requirement only.

Model LCM600W-N is identical to Model LCM600W except for model designation and alternate Fan.

Model LCM600W-T-N-5-411 is identical to Model LCM600W except for model designation, 5Vsb output, 5Vsb PWB, Housekeeping PWB, Auxiliary transformer (T607), bridging capacitors, insulator, output choke (L603), base enclosure and cover enclosure specifically for LCM600W-T-N-5-411.

Test Item Particulars

Classification of use by	Ordinary person
Supply Connection	AC Mains
Supply % Tolerance	+10%/-10%
Supply Connection – Type	pluggable equipment type A - appliance coupler To be considered in 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
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	50 °C and up to 70 °C at derated power
IP protection class	IPX0
Power Systems	TN
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	Approx. 1.25kg
Classification of use by	Ordinary person
Supply Connection	AC Mains
Supply % Tolerance	+10%/-10%
Supply Connection – Type	pluggable equipment type A - appliance coupler To be considered in 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
Access location	N/A
Pollution degree (PD)	PD 2
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Supply Connection	AC Mains
Supply % Tolerance	+10%/-10%
Supply Connection – Type	pluggable equipment type A - appliance coupler To be considered in 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
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	50 °C and up to 70 °C at derated power
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Classification of use by	Ordinary person
Supply Connection	AC Mains
Supply % Tolerance	+10%/-10%
Supply Connection – Type	pluggable equipment type A - appliance coupler To be considered in 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
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	50 °C and up to 70 °C at derated power
IP protection class	IPX0
Power Systems	TN
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	Approx. 1.25kg
Technical Considerations	

- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of : 50°C and up to 70°C at derated power
- The product is intended for use on the following power systems : TN
- Considered current rating of protective device as part of the building installation (A) : 20
- Mains supply tolerance (%) or absolute mains supply values : +10%/-10%
- The equipment disconnect device is considered to be : Appliance inlet or To be considered in end system
- The Risk Group of a lamp or lamp system (including LEDs) is : Exempt
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standards : EN 62368-1:2014 + A11:2017
- The creepage and clearance distances have additionally been assessed for suitability up to 5000m.
- The equipment is a component level power supply intended for use in Class I applications
- Model LCM600Q was tested at inhibit mode (fan off/ stop condition) at 50°C ambient temperature.

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 : For all models except for model LCM600U.; Primary-Secondary: 422.7Vrms/ 689Vpk, Primary – Earthed Dead Metal: 414.9Vrms/ 689Vpk, For model LCM600U.; Primary-Secondary: 397.7Vrms/ -990Vpk, Primary – Earthed Dead Metal: 398.0Vrms/ 663Vpk
- The following output circuits are at ES1 energy levels : All outputs (all models)
- The following output circuits are at PS3 energy levels : All outputs (all models)
- 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 : been conducted
- The following end-product enclosures are required : Electrical, Fire, Mechanical
- 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) : T302, T101, T801 (Class F), T607 (Class B)
- The equipment is suitable for direct connection to : AC mains supply
- The power supply was evaluated to be used at altitudes up to : "5,000 m"
- The secondary output connector has not been evaluated for field connections.
- The disconnection from the line should be considered in the end system.
- The equipment was not evaluated for system mounting. When installed in the end system, proper evaluation should be considered.
- For Model LCM600Q: Additional evaluation has been considered for the +24V +/- 20% Output voltage adjustability limited to the following combined conditions: maximum allowed 27A output current and 600W output power.
- For Model LCM600W: Additional evaluation has been considered for the +48V +/- 20% Output voltage adjustability limited to the following combined conditions: maximum allowed 13A output current and 600W output power.
- For Model LCM600L: Additional evaluation has been considered for the +12V +/- 20% Output voltage adjustability limited to the following combined conditions: maximum allowed 52A output current and 600W output power.
- For Model LCM600U: Additional evaluation has been considered for the +36V +/- 20% Output voltage adjustability limited to the following combined conditions: maximum allowed 18A output current and 600W output power
- For Model LCM600N: Additional evaluation has been considered for the +15.0V +30 % - 20% Output voltage adjustability limited to the following combined conditions: maximum allowed 44A output current and 600W output power
- Fans: The fan provided in this sub-assembly is provided with a fan guard to reduce the risk of operator contact with the stator.
- Suitability of all openings size will be considered in end system.

Additional Information

N/A

Additional Standards

The product fulfills the requirements of: EN 62368-1:2014 + A11:2017