ENERGY EFFICIENCY CERTIFICATION (EEC): Test Report - Cover Page

Customer Name:	Lead Year Enterprise Co., Ltd.
Address:	3RD FL., 618 RUIGUANG RD., NEIHU DISTRICT, TAIPEI, 114 TAIWAN

Product Name / Type:	I.T.E. POWER SUPPLY
Product Category:	External Power Supplies
Brand Name(s):	(TIGER POWER)
Model Number(s):	TG-7601-ES
Representative (tested) Model:	TG-7601-ES
Model Differences:	N/A

The sample(s) tested is(are) compliant with the following applied standards/regulations:

US DOE: 10 CFR Parts 429 and 430, Energy Conservation Program

CEC: California Energy Commission - Title 20, Division 2, Chapter 4, Article 4, Section 1601-1609 Appliance Efficiency Regulation
NRCan: NRCan Energy Efficiency Regulation External Power Supplies

CAN/CSA C381.1-17 - Energy performance of external ac-dc and ac-ac power supplies - Second Edition

Quebec: Gazette Officielle Du Quebec, December 12, 2018, Vol. 150, No. 50

Ontario Regulation 509/18: Energy and Water Efficiency appliances and products

Australian (Greenhouse and Energy Minimum Standards (External Power Supplies) Determination 2014) and New Zealand (Minimum energy performance standards)
EU: EU 2019/1782 of 1 October 2019 laying down ecodesign requirements for external power supplies to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 278/2009
EU: EU Code of Conduct on Energy Efficiency of External Power Supplies Version 5.

Test Location Name:	Underwriters Laboratories Taiwan Co., Ltd					
Test Location Address:	No. 35, Sec. 2, Zhongyang S. Rd., Beitou Dist., Taipei City 112, Taiwan					
Testing Performed Under:	[X]	UL Lab	[]	Private Label	[]	WMTL
	[]	CTDP/SMTL	[]	EPA 3rd Party	[]	Other -

UL Project No.:	4790862697		
Evaluator:	Cavy Chen	**Reviewer:**	Yvonne Low
		Certifier:	Betty Chien
Issued: (yyyy-mm-dd)	2023-07-18	**Revised:** (yyyy-mm-dd)	N/A

Form-ULID-001234 (DCS: 00-VS-F0417), Version 8.0. The information and documentation involving UL Mark services are provided on behalf of UL Verification Services Inc. or any authorized licensee of UL Verification Services Inc. The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products.

Copyright© UL. All rights reserved. May not be reproduced without permission. THIS DOCUMENT IS CLASSIFIED CONFIDENTIAL. It is intended for Internal Use Only and may not be disclosed to any party that is not authorized to receive it.

Annex						
Regulatory Body	Test Method, Regulation or Program Evaluated to	Test Limit per Regulation or Program Requirement		Measurements		Other
		Average Efficiency In Active Mode	No-Load Mode Power	Average Efficiency In Active Mode	No-Load Mode Power	
US DOE	10 CFR Parts 429 and 430	≥ 88%	≤ 0.210W	88.56%	0.0611W	Complied
CEC	Appliance Efficiency Regulations, Sections 1601 through 1609	≥ 88%	≤ 0.210W	88.56%	0.0611W	Complied
NRCan	10 CFR Parts 429 and 430 or CAN/CSA-C381.1-17	≥ 88%	≤ 0.210W	88.56%	0.0611W	Complied
Quebec	10 CFR Parts 429 and 430 or CAN/CSA-C381.1-17	≥ 88%	≤ 0.210W	88.56%	0.0611W	Complied
Ontario	10 CFR Parts 429 and 430	≥ 88%	≤ 0.210W	88.56%	0.0611W	Complied
Australian (GEMS) and New Zealand	AS/NZS4665.1-2005+A1:2009; AS/NZS4665.2-2005+A1:2009	≥ 87%	≤ 0.500W	89.66%	0.0860W	'High efficiency' performance mark V; Mark VI mentioned in the IEMP
ErP	Annex II (1) Of COMMISSION REGULATION (EU) 2019/1782 of 1 October 2019	≥ 88%	≤ 0.210W	89.66%	0.0873W	Complied
CoC	Energy Efficiency of External Power Supplies Version 5	≥ 89% ≥ 79% @10% load	≤ 0.150W	89.66% 86.08% @10% load	0.0873W	Complied with Tier 2 requirements.
Additional Information: See Energy Efficiency Laboratory Data Package of Project No: 4790862697 for further details and test results.						

Project History: N/A

Form-ULID-001234 (DCS: 00-VS-F0417), Version 8.0. The information and documentation involving UL Mark services are provided on behalf of UL Verification Services Inc. or any authorized licensee of UL Verification Services Inc. The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products.

Copyright© UL. All rights reserved. May not be reproduced without permission. THIS DOCUMENT IS CLASSIFIED CONFIDENTIAL. It is intended for Internal Use Only and may not be disclosed to any party that is not authorized to receive it.

ATTACHMENT(S)

Results Summary of International Efficiency Marking Protocol.
Model TG-7601-ES, Basic-Voltage type EPS.

Test	Result	Compliant, Y/N
The roman numeral mark of International efficiency marking protocol, if applicable	VI	Yes

Form-ULID-001234 (DCS: 00-VS-F0417), Version 8.0. The information and documentation involving UL Mark services are provided on behalf of UL Verification Services Inc. or any authorized licensee of UL Verification Services Inc. The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products.

Copyright© UL. All rights reserved. May not be reproduced without permission. THIS DOCUMENT IS CLASSIFIED CONFIDENTIAL. It is intended for Internal Use Only and may not be disclosed to any party that is not authorized to receive it.

DATA PACKAGE INFORMATION SHEET

Applicant Information	Name:	Lead Year Enterprise Co., Ltd.	
	Address:	3RD FL., 618 RUIGUANG RD., NEIHU DISTRICT, TAIPEI, 114 TAIWAN	
Product Information	Standard(s) or Regulation(s)	[ ] US DoE: Office of Energy Efficiency and Renewable Energy 10 CFR Parts 429 and 430	
		[ ] US CEC: California Code of Regulations, Title 20, Division 2, Chapter 4, Article 4. Appliance Efficiency Regulations, Sections 1601 through 1609	
		[ ] NRCan: Amendment 14 to the Energy Efficiency Regulations for External Power Supplies in the Canada Gazette, Part II	
		[x] Australian (Greenhouse and Energy Minimum Standards (External Power Supplies) Determination 2014) and New Zealand (Minimum energy performance standards)	
		[ ] EU: COMMISSION REGULATION (EC) No 278/2009 of 6 April 2009	
		[ ] EU: COMMISSION REGULATION (EU) 2019/1782 of 1 October 2019	
		[x] EU: Code of Conduct on Energy Efficiency of External Power Supplies Version 5	
		[ ] Mexico: NORMA Oficial Mexicana NOM-029-ENER-2017	
		[x] Quebec: GAZETTE OFFICIELLE DU QUÉBEC, December 12, 2018, Vol. 150, No. 50	
		[ ] Ontario: O. Reg. 509/18: ENERGY AND WATER EFFICIENCY - APPLIANCES AND PRODUCTS, under Electricity Act, 1998, S.O. 1998, c. 15, Sched. A	
		[x] Other: US DoE: 10 CFR Parts 429 and 430, Energy Conservation Program	
		[x] Other: US CEC: California Energy Commission - Title 20, Division 2, Chapter 4, Article 4, Section 1601-1609 Appliance Efficiency Regulation	
		[x] Other: NRCan Energy Efficiency Regulation External Power Supplies	
		[x] Other: Ontario Regulation 509/18: Energy and Water Efficiency appliances and products	
		[x] Other: EU 2019/1782 of 1 October 2019 laying down ecodesign requirements for external power supplies to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 278/2009	
	Test method(s)	[x] 10 CFR part 430, subpart B, Appendix Z “Uniform Test Method for Measuring the Energy Consumption of External Power Supplies”	
		[ ] CAN/CSA-C381.1-17, May 2017	
		[x] EN 50563:2011+A1:2013, October 2013	
		[x] Test Method for Calculating the Energy Efficiency of Single-Voltage External AC-DC and AC-AC Power Supplies, dated August 11, 2004	
		[x] AS/NZS 4665.1-2005+A1:2009; AS/NZS 4665.2-2005+A1:2009	
		[x] Other: CAN/CSA C381.1-17 - Energy performance of external ac-dc and ac-ac power supplies - Second Edition	
	Protocol	[ ] International Efficiency Marking Protocol for External Power Supplies, Version 3.0	
		[x] Other: International Efficiency Marking Protocol for External Power Supplies, Level VI.	
	CCNs:	ENVP	
	Product Name/Type:	External Power Supply [x] AC-DC [ ] AC-AC	
	Model Number (s):	TG-7601-ES	
Test Location Information	DAP and UL:	[ ] CTDP [ ] TCP [ ] TPTDP [ ] WTDP [x] UL	
	Test Location Name:	Underwriters Laboratories Taiwan Co., Ltd	
	Test Location Address:	No. 35, Sec. 2, Zhongyang S. Rd., Beitou Dist., Taipei City 112, Taiwan	
	Tests Conducted By**:	Print Xavier Lin	

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

	**When all tests are conducted by one person, the printed name and signature can be inserted here instead of on each page containing data.	
	Authorized Signatory or TCP Reviewer:	Print --
		Date --
	UL WTDP Witness:	**[ ]** UL Staff conducting or witnessing testing (WTDP only) **[x]** UL Staff supervising UL Staff in training
		Print BRUCE YANG

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

INDEX

Test Name	Page
TEST SAMPLE IDENTIFICATION	6
TEST INSTRUMENTS REFERENCE LIST	7
POWER SUPPLY REFERENCE PAGE (ENGINEERING TO COMPLETE)	8
TECHNICIAN'S REFERENCE PAGE	9
ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST:	14
OFF MODE POWER CONSUMPTION TEST:	23
DURABILITY OF MARKING TEST for NOM-029-ENER-2017	24
WORKSHEETS	25

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Special Instructions:

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be recorded at the time the test is conducted.

For Test Methods:
1. 10 CFR part 430, subpart B, Appendix Z "Uniform Test Method for Measuring the Energy Consumption of External Power Supplies"
2. CAN/CSA-C381.1-17, May 2017

Ambient Temperature °C	Relative Humidity, RH %	Supply Voltage Tolerance %	Total Harmonic Distortion, THD %	Airspeed m/s	Supply Frequency Tolerance %
20±5	10-80 (For lab references)	±1	<2	≤0.5	±1

For Test Methods:
1. EN 50563:2011+A1:2013, October 2013
2. AS/NZS 4665.1-2005+A1:2009; AS/NZS 4665.2-2005+A1:2009
3. Test Method for Calculating the Energy Efficiency of Single-Voltage External AC-DC and AC-AC Power Supplies, dated August 11, 2004

Ambient Temperature °C	Relative Humidity, RH %	Supply Voltage Tolerance %	Total Harmonic Distortion, THD %	Airspeed m/s	Supply Frequency Tolerance %
23±5	10-80 (For lab references)	±1	<2	≤0.5	±1

NOTE:
1. The input voltage source shall be capable of delivering at least 10 times the nameplate input power of the UUT (as is specified in IEEE 1515-2000).

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Witness Test Data Program (WTDP) Information:

Environment:	
Accommodations and Environmental conditions, including proper power source meet the requirements of the test standard or UL default criteria (ISO/IEC 17025:2005 Clause 5.3.1, 5.3.2. 5.3.3, 5.3.4)	**[ ] Yes [ ] No [ ] N/A**
Personnel:	
Lab Management shall authorize personnel to operate particular types of equipment used in testing. (ISO/IEC 17025:2005 5.2.5)	**[ ] Yes [ ] No**
Equipment:	
Testing is being conducted within the test equipment calibration dates. (See Test Instrument Information Page and ISO/IEC 17025:2005 5.5.1, 5.5.2, 5.5.4, 5.5.5, 5.5.8,)	**[ ] Yes [ ] No**
Calibrations for testing equipment are traceable to SI Units. Refer to 00-OP-C0032 (Calibration Certificate Analysis). (ISO/IEC 17025:2005 5.6.2.2)	**[ ] Yes [ ] No**
Critical Consumables:	
Critical consumables are compliant with test standard requirements. (ISO/IEC 17025:2005 Clause 4.6)	**[ ] Yes [ ] No [ ] N/A**
Sample Identification:	
Identification of items to be tested has been made (e.g. model no., Serial No., etc.) (See Test Sample Identification page and ISO/IEC 17025:2005 Clause 5.8.2)	**[ ] Yes [ ] No**
Additional Requirements:	
Testing at a third party laboratory selected by UL and not part of the Third Party Test Data Program requires a Mutual Nondisclosure (NDA) and Confidentiality Agreement, 00-LE-F0025, or alternate agreement form approved by UL's Legal Department to be stored and included with the Test Package.	**[ ] Yes [ ] No [ ] N/A**
Summary:	
The test facility was deemed to have the environment and capabilities necessary to perform the tests included in this data package.	**[ ] Yes [ ] No**

[ ] The CAS Staff as indicated below, (a competent L1, L2 or L3 in a similar CCN/Standard for a similar test method) was utilized to conduct the witnessing of tests on behalf of the project handler. (Please complete the table below to document the rationale and approval.)

Name of UL Staff conducting WTDP	CCN/Standard to be witnessed	Test(s) to be witnessed	L1, L2 or L3 Competency	Similar CCN/Standard Competency

N/A Cavy Chen 2023-05-24

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

TEST SAMPLE IDENTIFICATION

The table below is to provide correlation of sample numbers to specific product related information. Refer to this table when a test identifies a test sample by "Sample No." only.

Sample Number	Sample Card Number	Date Received	Manufacturer, Product Identification and Ratings
6105327-S1~S3	6105327	2023-05-23	Lead Year Enterprise Co., Ltd. I.T.E. POWER SUPPLY Model: TG-7601-ES I/P: 100-240V~ 50-60Hz 2.0Amax. O/P: +24.0Vdc, 3.125A, 75.0W
Sampling Procedure (if used) :		--	

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

TEST INSTRUMENTS REFERENCE LIST

Instr. Code	Instrument I.D.	Instrument Type	Range and/or Function Used ***	Make and Model **	Calibration Date	
					Last	Due
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--

~~"Chamber setting(s) **[ ]** was **[ ]** were monitored to ensure that the setting(s) **[ ]** was **[ ]** were stable throughout the test time frame. Any deviations from the setting(s) are noted below.~~

N/A Cavy Chen 2023-05-24

Date	Test	Instrument Code	Time period of deviation	Setting(s)
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--

** Information to be recorded when tests are conducted at a non-UL facility.
*** Refer to specific data sheet for individual scale used.

[x] UL test equipment information is recorded on Meter Use in UL'S LabWare database. (This statement may be selected only if datasheets are completed at a UL facility).

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

POWER SUPPLY REFERENCE PAGE (ENGINEERING TO COMPLETE)

Product Name/Type:	External AC/DC Power Supply (EPS)	
Manufacturer:	Lead Year Enterprise Co., Ltd.	
Brand Name:	TIGER POWER (TIGER POWER)	
Model Number/Designation:	TG-7601-ES	
Representative Testing Model Number:	TG-7601-ES	
Model differences:	N/A	
Class A external power supply	**[x]** Yes **[ ]** No	
Adaptive external power supply	**[ ]** Yes **[x]** No	
Switch-selectable single voltage external power supply	**[ ]** Yes **[x]** No	
External Power Supply Product Class ID	**[x]** B	Direct Operation, AC-DC, Basic-Voltage
	[ ] C	Direct Operation, AC-DC, Low-Voltage (except those with nameplate output voltage less than 3 volts and nameplate output current greater than or equal to 1,000 milliamps that charge the battery of a product that is fully or primarily motor operated)
	[ ] D	Direct Operation, AC-AC, Basic-Voltage
	[ ] E	Direct Operation, AC-AC, Low-Voltage
	[ ] H	Direct Operation, High-Power
	[ ] N	Indirect Operation

Nameplate Rating:	Input:	100-240V~ 50-60Hz 2.0Amax.
	Output:	+24.0Vdc, 3.125A, 75.0W

Each sample was tested at:	**[x]** 115V, 60Hz **[ ]** 127V, 60Hz	**[x]** 230V, 50Hz	**[ ]** 240V, 50Hz
UUT Output Cord Length (±1 cm, AWG):	148cm, 16AWG (Total output cord including DC jack: 150 cm)		
UUT is a Replacement EPS:	**[ ]** Yes	**[x]** No	**[ ]** N/A
Presence of Input Power Switch (Y/N):	**[ ]** Yes	**[x]** No	**[ ]** N/A
Input Power Switch (ON/OFF):	**[ ]** ON	**[ ]** OFF	**[x]** N/A
End-Product Powered by the UUT:	N/A		

Notes/Comments: --

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

TECHNICIAN'S REFERENCE PAGE

DEFINITIONS

"UUT": an acronym for "unit under test," which in this case refers to the power supply sample being tested.

"Active mode": A condition in which the input of a power supply is connected to the line voltage ac and the output is connected to an ac or dc load, drawing a fraction of the power supply's nameplate output power.

"Active mode efficiency": The ratio which is expressed as a percentage, of the total active output power (ac or dc) produced by a power supply to the active input power (ac) required to produce the total active output power.

"Ambient temperature": The temperature which is the air immediately surrounding the unit under test (UUT).

"Average Active-Mode Efficiency": The average of the loading conditions (100%, 75%, 50%, and 25% of its nameplate output current) for which it can sustain the output current.

"Manual on-off switch": a switch activated by the user to control power reaching the device. This term does not apply to any mechanical, optical, or electronic switches that automatically disconnect mains power from the device when a load is disconnected from the device, or that control power to the load itself.

"Power Factor (True), PF": The true power factor is the ratio of the active or real power (P) consumed in watts to the apparent power (S), drawn in volt-amperes (VA).

"Crest Factor, CF": The measured peak current drawn by the product divided by the measured r.m.s current drawn by the product.

"Nameplate output current": The current output of the power supply as specified by the manufacturer on the label on the housing of the power supply, if absent from the housing, as provided by the manufacturer. This is also called rated output current. Alternatively, it is the nameplate output power divided by nameplate output voltage.

"Nameplate output power": the power output of the power supply as specified on the manufacturer's label on the power supply housing or, if absent from the housing, as specified in documentation provided by the manufacturer, or calculated by multiplying the nameplate output voltage by the nameplate output current (V•A).

"Nameplate Output Voltage": The voltage output of the power supply as specified by the manufacturer on the label on the housing of the power supply (either dc or ac). This is also called rated output voltage.

"No load": the mode of operation when an external power supply is connected to the main electricity supply and the output is not connected to a load.
Note: No-load modes include Standby mode and OFF mode.

"No-load power": the wattage of active power (ac) consumed by a power supply operating in the no-load condition.

"Off mode": the condition, applicable only to units with manual on-off switches, in which the external power supply is (1) connected to the main electricity supply; (2) the output is not connected to any load; and (3) all manual on-off switches are turned off.

"Basic-Voltage external power supply": An external power supply is not a low-voltage external power supply.

"Low voltage external power supply": An external power supply with a nameplate output voltage of less than 6 volts and a nameplate output current greater than or equal to 550 milliamperes.

"Direct Operation external power supply": An external power supply can operate a consumer product that is not a battery charger without the assistance of a battery.

"Indirect Operation external power supply": An external power supply cannot operate a consumer product that is not a battery charger without the assistance of a battery.

"Adaptive external power supply": An external power supply that can alter its output voltage during active-mode based on an established digital communication protocol with the end-use application without any user-generated action.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

TECHNICIAN'S REFERENCE PAGE (Cont'd)

"Switch-selectable single voltage external power supply": A single-voltage AC-AC or AC-DC power supply that allows users to choose from more than one output voltage.

"Maximum Current Ratio (MCR)": Crest Factor (CF)/Power Factor (PF)

POWER MEASUREMENT EQUIPMENT AND UNCERTAINTY

Any power measurements recorded, as well as any power measurement equipment utilized for testing, shall conform to the following:

Resolution and Uncertainty requirements are outlined in Section 4, "General conditions for measurements," as well as Annexes B, "Notes on the measurement of low power modes," and Annexes D, "Determination of uncertainty of measurement," of IEC 62301:2011 (incorporated by reference; see §430.3) and EN50564:2011.

EFFICIENCY CALCULATION

Efficiency shall be calculated by dividing the UUT's measured active output power at a given load condition by the active ac input power measured at that load condition. Average efficiency shall also be calculated and reported as the arithmetic mean of the efficiency values calculated at Load Conditions 1, 2, 3, and 4 in Table 1. This is a simple arithmetic average of active mode efficiency values, and is not intended to represent weighted average efficiency, which would vary according to the duty cycle of the product powered by the UUT.

POWER CONSUMPTION CALCULATION

Power consumption of the UUT at each Load Condition 1 – 4 is the difference between the active output power (W) at that Load Condition and the ac active input power (W) at that Load Condition. The power consumption of Load Condition 5 (no load) is equal to the ac active input power (W) at that Load Condition.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

TECHNICIAN'S REFERENCE PAGE (Cont'd)

General sampling requirements for selecting units to be tested. (10 CFR Part 429 Subpart B, 429.11)
(a) When testing of covered products or covered equipment is required to comply with section 323(c) of the Act, or to comply with rules prescribed under section 324, 325, or 342, 344, 345 or 346 of the Act, a sample comprised of production units (or units representative of production units) of the basic model being tested must be selected at random and tested, and must meet the criteria found in §§429.14 through 429.62 of this subpart. Components of similar design may be substituted without additional testing if the substitution does not affect energy or water consumption. Any represented values of measures of energy efficiency, water efficiency, energy consumption, or water consumption for all individual models represented by a given basic model must be the same, except for central air conditioners and central air conditioning heat pumps, as specified in §429.16 of this subpart.
(b) The minimum number of units tested shall be no less than two, except where:
(1) A different minimum limit is specified in §§429.14 through 429.65 of this subpart; or
(2) Only one unit of the basic model is produced, in which case, that unit must be tested and the test results must demonstrate that the basic model performs at or better than the applicable standard(s). If one or more units of the basic model are manufactured subsequently, compliance with the default sampling and representations provisions is required.

Sampling plan for External Power Supplies (10 CFR Part 429 Subpart B, 429.37)
(a) Sampling plan for selection of units for testing. (1) The requirements of §429.11 are applicable to external power supplies; and
(2) For each basic model of external power supply selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—
(i) Any represented value of the estimated energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:
(A) The mean of the sample, where:

$\overline{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$, and, $\overline{x}$ is the sample mean; n is the number of samples; and x_i is the i^{th} sample;

Or,
(B) The upper 97.5 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$UCL = \overline{x} + t_{.975}\left(\frac{s}{\sqrt{n}}\right)$ And $\overline{x}$ is the sample mean; s is the sample standard deviation; n is the number of sample; and $t_{0.975}$ is the t statistic for a 97.5% one − tailed confidence interval with $n - 1$ degrees of freedom (from Appendix A).

and
(ii) Any represented value of the estimated energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:
(A) The mean of the sample, where:

$\overline{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$, and, $\overline{x}$ is the sample mean; n is the number of samples; and x_i is the i^{th} sample;

Or,
(B) The lower 97.5 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$LCL = \overline{x} - t_{.975}\left(\frac{s}{\sqrt{n}}\right)$ And $\overline{x}$ is the sample mean; s is the sample standard deviation; n is the number of sample; and $t_{0.975}$ is the t statistic for a 97.5% one − tailed confidence interval with $n - 1$ degrees of freedom (from Appendix A).

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

TECHNICIAN'S REFERENCE PAGE (Cont'd)

Appendix A to Subpart B of Part 429—Student's t-Distribution Values for Certification Testing

[One-Sided]

Degrees of freedom (from Appendix A)	Confidence Interval			
	90%	95%	97.5%	99%
1	3.078	6.314	12.71	31.82
2	1.886	2.920	4.303	6.965
3	1.638	2.353	3.182	4.541
4	1.533	2.132	2.776	3.747
5	1.476	2.015	2.571	3.365
6	1.440	1.943	2.447	3.143
7	1.415	1.895	2.365	2.998
8	1.397	1.860	2.306	2.896
9	1.383	1.833	2.262	2.821
10	1.372	1.812	2.228	2.764
11	1.363	1.796	2.201	2.718
12	1.356	1.782	2.179	2.681
13	1.350	1.771	2.160	2.650
14	1.345	1.761	2.145	2.624
15	1.341	1.753	2.131	2.602
16	1.337	1.746	2.120	2.583
17	1.333	1.740	2.110	2.567
18	1.330	1.734	2.101	2.552
19	1.328	1.729	2.093	2.539
20	1.325	1.725	2.086	2.528

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

TECHNICIAN'S REFERENCE PAGE (Cont'd)

INSTRUCTIONS – TEST PREPARATION AND LOADING

There shall be no intentional cooling of the UUT such as by use of separately powered fans, air conditioners, or heat sinks. The UUT shall be conditioned, rested, and tested on a thermally non-conductive surface. A readily available material such as Styrofoam will be sufficient.

Any built-in switch in the UUT controlling power flow to the AC input must be in the "on" position for this measurement.

Test power supplies packaged for consumer use to power a product with the DC output cord supplied by the manufacturer. There are two options for connecting metering equipment to the output of this type of power supply: Cut the cord immediately adjacent to the DC output connector or attach leads and measure the efficiency from the output connector itself.

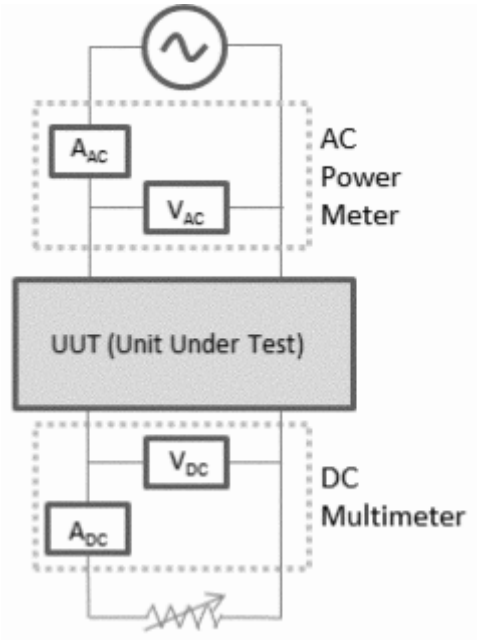
If the power supply is attached directly to the product that it is powering, cut the cord immediately adjacent to the powered product and connect DC measurement probes at that point. Any additional metering equipment such as voltmeters and/or ammeters used in conjunction with resistive or electronic loads must be connected directly to the end of the output cable of the UUT.

If the product has more than two output wires, including those that are necessary for controlling the product, the manufacturer must supply a connection diagram or test fixture that will allow the testing laboratory to put the unit under test into active-mode. Figure 1 provides one illustration of how to set up an EPS for test.

In order to load the power supply to produce all four active-mode load conditions, use a set of variable resistive or electronic loads. Although these loads may have different characteristics than the electronic loads power supplies are intended to power, they provide standardized and readily repeatable references for testing and product comparison.

Note that resistive loads need not be measured precisely with an ohmmeter; simply adjust a variable resistor to the point where the ammeter confirms that the desired percentage of nameplate output current is flowing. For electronic loads, adjust the desired output current in constant current (CC) mode rather than adjusting the required output power in constant power (CP) mode.

Figure 1 – Example connection diagram for EPS efficiency measurement.



COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST:

TESTING SEQUENCE:
The UUT shall be tested at each load condition specified in Table 1, testing consecutively from Load Condition 1 to 5. The UUT shall be operated at 100% of nameplate current output (Load Condition 1) for at least 30 minutes immediately prior to conducting efficiency measurements.

If AC input power is not stable over a 5 minutes period, the technician shall follow the guidelines established by IEC 62301 for measuring average power or accumulated energy over time for both ac input and dc output. Specify for EU Directive, the stability shall be determined in accordance with EN 50564:2011, 5.3.
Efficiency measurements shall be conducted in sequence from Load Condition 1 to Load Condition 5 as indicated in Table 1. If testing of additional, optional load conditions is desired, that testing should be conducted in accordance with this test procedure and subsequent to completing the sequence described above.

For NRCan, the regulations will provide this flexibility by allowing external power supplies to be tested to either the Canadian test standard, CAN/CSA C381.1 or the U.S. test procedure, 10 CFR part 430, Appendix Z.
NOTE: To ensure consistent unit, it is recommended that watt-hours and hours be used above, to give watts.

For Australia and New Zealand requirements, if the power supply nameplate input voltage is 240V only, conduct the testing at 240V ac, 50Hz and record in the 230V ac tables for ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST. The testing voltage, 240V ac, 50 Hz shall be recorded.

The above testing sequence shall be repeated on at least 2 UUT for Canadian test standard, CAN/CSA C381.1 or the U.S. test procedure 10 CFR part 430, Appendix Z.

Test switch-selectable single-voltage external power supplies twice, once at the highest nameplate output voltage and once at the lowest.

Test adaptive external power supplies twice, once at the highest achievable output voltage and once at the lowest.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST: (Cont'd)

Table 1 – Load Conditions

Load Conditions for UUT	Percentage of Nameplate Output Current
1	100% ± 2%(2)
2	75% ± 2%
3	50% ± 2%
4	25% ± 2%
5	0%

Note(s):
1. (2) The 2% allowance is of nameplate output current, not of the calculated current value.

2. For example, a UUT at Load Condition 3 may be tested in a range from 48% (min) to 52% (max) of rated output current.

3. It is mandatory for CoC. The UUT shall be considered 10% ± 2% of nameplate output current after load condition 4, warm up period is 0 minute and 5 minutes is for assessment period, and then continue load condition 5.

4. It is mandatory for COMMISSION REGULATION (EU) 2019/1782 of 1 October 2019. The UUT shall be considered 10% ± 1% of nameplate output current after load condition 4, warm up period is 0 minute and 5 minutes is for assessment period, and then continue load condition 5.

Comments:

1. If instantaneous power measurement is acceptable, technician record the instantaneous power measurement under the column "**Avg . Power (W)" and then shall fill cells of columns "Wh" and "Wh Interval" with "-" or leave them "blank.

2. If accumulated energy approach used, the average power is calculated by the following equation: Avg. Power (Watts) = [Wh X 60 minutes / hours] / Wh Interval (minutes).

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Tested by: _____ Tested by: _____ Test date: 2023-06-06

signature print

Sample # : 6105327-S1 Instrument Code / Range: _____

ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST: (Cont'd)

RESULTS FOR SAMPLE 1 @ 115V ac, 60 Hz

	External Power Supply Input Electric Data									
Load	**V**	**HZ**	**A**	**PF**	**CF**	**THD of Voltage**	**THD of Current**	**Wh**	**Avg. Power (W) (Pm)**	**Wh Interval [min]**
1 (100%)	115.22	60	1.275	0.5823	3.0589	0.31	133.92	7.1126	85.351	**5**
2 (75%)	115.26	60	0.972	0.5696	3.1693	0.25	140.25	5.3089	63.7069	**5**
3 (50%)	115.25	60	0.66	0.5588	3.2738	0.17	144.92	3.532	42.3839	**5**
4 (25%)	115.35	60	0.341	0.541	3.4065	0.09	150.34	1.77	21.2405	**5**
10%	115.37	60	0.146	0.5123	3.5836	0.06	149.51	0.7164	8.5964	**5**
5 (0%)	115.38	60	0.029	0.0218	1.414	0.06	3.35	"--	0.0611	**10**

				Power Measurement Uncertainty Calculation and Judgement			
Load	**Stability Assessment %**	***Measurement method used**	**Slope value (mW/h)**	**MCR**	**** Ue**	***** Upc**	**Complied?**
1 (100%)	0.14	Accumlated Energy	--	5.2531341	0.542038	--	Ue=Umr≦1.70702, complied.
2 (75%)	0.16	Accumlated Energy	--	5.5640801	0.333003	--	Ue=Umr≦1.274138, complied.
3 (50%)	0.12	Accumlated Energy	--	5.8586256	0.252006	--	Ue=Umr≦0.847678, complied.
4 (25%)	0.2	Accumlated Energy	--	6.2966728	0.127855	--	Ue=Umr≦0.42481, complied.
10%	0.54	Accumlated Energy	--	6.99512	0.056629	--	Ue=Umr≦0.171928, complied.
5 (0%)	22.53	Sampling	-41.24E-9	64.862385	0.005837	0.1077798	Ue≦0.02, complied.

	External Power Supply Output Electric Data			
Load	**V**	**A**	**Wh**	**Avg. Power (W)**
1 (100%)	24	3.1292	6.2684	75.2204
2 (75%)	24.07	2.3457	4.7104	56.5249
3 (50%)	24.12	1.5635	3.1465	37.7578
4 (25%)	24.16	0.7824	1.5777	18.9326
10%	24.19	0.3129	0.6316	7.5787

Power Consumed by UUT (W)					
100%	**75%**	**50%**	**25%**	**10%**	**No Load**
10.1306	7.182	4.6261	2.3079	1.0177	0.0611

Efficiency of Power Supply (after 5 min warm-up)					
100%	**75%**	**50%**	**25%**	**10%**	**Arithmetic Average of Efficiency at load 1 ~ 4**
88.13066	88.72649587	89.085242	89.134437	88.161323	88.76920879

* The measurement methods are defined in 5.3.2 or 5.3.3 of the standards, EN 50564:2011 and IEC62301:2011.

** Ue is the uncertainty relating to the measuring instrument.

*** Upc is the maximum permitted relative uncertainty for cases where the MCR is > 10.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Tested by: _____ Tested by: _____ Test date: 2023-06-06
signature print

Sample # : 6105327-S2 Instrument Code / Range: _____

ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST: (Cont'd)

RESULTS FOR SAMPLE 2 @ 115V ac, 60 Hz

	External Power Supply Input Electric Data									
Load	**V**	**HZ**	**A**	**PF**	**CF**	**THD of Voltage**	**THD of Current**	**Wh**	**Avg. Power (W) (Pm)**	**Wh Interval [min]**
1 (100%)	115.21	60	1.276	0.5809	3.0632	0.32	134.2	7.1066	85.2796	**5**
2 (75%)	115.22	60	0.975	0.5695	3.1656	0.25	140.37	5.3163	63.7957	**5**
3 (50%)	115.31	60	0.661	0.5581	3.2755	0.17	145.4	3.5358	42.429	**5**
4 (25%)	115.34	60	0.341	0.5408	3.4183	0.12	150.69	1.7714	21.257	**5**
10%	115.38	60	0.145	0.5125	3.5689	0.06	149.6	0.717	8.6044	**5**
5 (0%)	115.4	60	0.029	0.0209	1.4124	0.06	4.03	"--	0.0607	**10**

				Power Measurement Uncertainty Calculation and Judgement			
Load	**Stability Assessment %**	***Measurement method used**	**Slope value (mW/h)**	**MCR**	**** Ue**	***** Upc**	**Complied?**
1 (100%)	0.16	Accumlated Energy	--	5.2731968	0.54211	--	Ue=Umr≦1.705592, complied.
2 (75%)	0.11	Accumlated Energy	--	5.5585601	0.333381	--	Ue=Umr≦1.275914, complied.
3 (50%)	0.09	Accumlated Energy	--	5.8690199	0.25231	--	Ue=Umr≦0.84858, complied.
4 (25%)	0.13	Accumlated Energy	--	6.320821	0.127942	--	Ue=Umr≦0.42514, complied.
10%	0.55	Accumlated Energy	--	6.9637073	0.056656	--	Ue=Umr≦0.172088, complied.
5 (0%)	21.24	Sampling	102.92E-9	67.578947	0.006027	0.1121263	Ue≦0.02, complied.

	External Power Supply Output Electric Data			
Load	**V**	**A**	**Wh**	**Avg. Power (W)**
1 (100%)	24.05	3.1281	6.274	75.2882
2 (75%)	24.12	2.3463	4.7222	56.6669
3 (50%)	24.17	1.563	3.1525	37.8305
4 (25%)	24.22	0.7824	1.5811	18.9732
10%	24.24	0.3132	0.6334	7.6007

Power Consumed by UUT (W)					
100%	**75%**	**50%**	**25%**	**10%**	**No Load**
9.9914	7.1288	4.5985	2.2838	1.0037	0.0607

Efficiency of Power Supply (after 5 min warm-up)					
100%	**75%**	**50%**	**25%**	**10%**	**Arithmetic Average of Efficiency at load 1 ~ 4**
88.283951	88.82557915	89.161894	89.256245	88.335038	88.8819172

* The measurement methods are defined in 5.3.2 or 5.3.3 of the standards, EN 50564:2011 and IEC62301:2011.

** Ue is the uncertainty relating to the measuring instrument.

*** Upc is the maximum permitted relative uncertainty for cases where the MCR is > 10.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Tested by: _____ Tested by: _____ Test date: 2023-06-06

signature print

Sample # : 6105327-S3 Instrument Code / Range: _____

ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST: (Cont'd)

RESULTS FOR SAMPLE 3 @ 115V ac, 60 Hz

	External Power Supply Input Electric Data									
Load	**V**	**HZ**	**A**	**PF**	**CF**	**THD of Voltage**	**THD of Current**	**Wh**	**Avg. Power (W) (Pm)**	**Wh Interval [min]**
1 (100%)	115.23	60	1.285	0.5803	3.0727	0.3	135.24	7.1367	85.6405	**5**
2 (75%)	115.26	60	0.977	0.57	3.1597	0.25	140.15	5.3352	64.0222	**5**
3 (50%)	115.3	60	0.662	0.5591	3.2798	0.18	144.86	3.55	42.6002	**5**
4 (25%)	115.35	60	0.341	0.5418	3.3989	0.09	150.36	1.7768	21.3217	**5**
10%	115.37	60	0.145	0.5128	3.5822	0.05	149.29	0.7177	8.6125	**5**
5 (0%)	115.4	60	0.03	0.02	1.4133	0.07	3.52	"--	0.0609	**10**

				Power Measurement Uncertainty Calculation and Judgement			
Load	**Stability Assessment %**	***Measurement method used**	**Slope value (mW/h)**	**MCR**	**** Ue**	***** Upc**	**Complied?**
1 (100%)	0.12	Accumlated Energy	--	5.2950198	0.543632	--	Ue=Umr≦1.71281, complied.
2 (75%)	0.11	Accumlated Energy	--	5.5433333	0.334096	--	Ue=Umr≦1.280444, complied.
3 (50%)	0.19	Accumlated Energy	--	5.8662136	0.252811	--	Ue=Umr≦0.852004, complied.
4 (25%)	0.25	Accumlated Energy	--	6.2733481	0.128111	--	Ue=Umr≦0.426434, complied.
10%	0.38	Accumlated Energy	--	6.9855694	0.05668	--	Ue=Umr≦0.17225, complied.
5 (0%)	18.97	Sampling	-386.65E-9	70.665	0.006306	0.117064	Ue≦0.02, complied.

	External Power Supply Output Electric Data			
Load	**V**	**A**	**Wh**	**Avg. Power (W)**
1 (100%)	24.08	3.1268	6.2818	75.3814
2 (75%)	24.13	2.3451	4.7226	56.6718
3 (50%)	24.18	1.5626	3.1533	37.84
4 (25%)	24.23	0.7812	1.5794	18.9529
10%	24.25	0.3121	0.6317	7.58

Power Consumed by UUT (W)					
100%	**75%**	**50%**	**25%**	**10%**	**No Load**
10.2591	7.3504	4.7602	2.3688	1.0325	0.0609

Efficiency of Power Supply (after 5 min warm-up)					
100%	**75%**	**50%**	**25%**	**10%**	**Arithmetic Average of Efficiency at load 1 ~ 4**
88.020738	88.51898248	88.825874	88.890192	88.011611	88.56394652

* The measurement methods are defined in 5.3.2 or 5.3.3 of the standards, EN 50564:2011 and IEC62301:2011.

** Ue is the uncertainty relating to the measuring instrument.

*** Upc is the maximum permitted relative uncertainty for cases where the MCR is > 10.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Tested by: _____ Tested by: _____ Test date: 2023-06-06

signature print

Sample # : 6105327-S1 Instrument Code / Range: _____

ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST: (Cont'd)

RESULTS FOR SAMPLE 1 @ 230V ac, 50 Hz

	External Power Supply Input Electric Data									
Load	**V**	**HZ**	**A**	**PF**	**CF**	**THD of Voltage**	**THD of Current**	**Wh**	**Avg. Power (W) (Pm)**	**Wh Interval [min]**
1 (100%)	230.13	50	0.725	0.5044	3.6885	0.15	167.35	6.9888	83.8661	**5**
2 (75%)	230.15	50	0.548	0.4989	3.7556	0.16	168.46	5.2342	62.8107	**5**
3 (50%)	230.29	50	0.371	0.491	3.8217	0.11	167.78	3.4907	41.8879	**5**
4 (25%)	230.2	50	0.199	0.4637	3.9688	0.06	162.13	1.7603	21.1239	**5**
10%	230.24	50	0.096	0.3988	3.8479	0.04	112.37	0.7304	8.765	**5**
5 (0%)	230.24	50	0.049	0.0102	1.4151	0.04	1.32	"--	0.086	**10**

				Power Measurement Uncertainty Calculation and Judgement			
Load	**Stability Assessment %**	***Measurement method used**	**Slope value (mW/h)**	**MCR**	**** Ue**	***** Upc**	**Complied?**
1 (100%)	0.39	Accumlated Energy	--	7.3126487	0.522323	--	Ue=Umr≦1.677322, complied.
2 (75%)	0.45	Accumlated Energy	--	7.5277611	0.430703	--	Ue=Umr≦1.256214, complied.
3 (50%)	0.41	Accumlated Energy	--	7.7835031	0.264177	--	Ue=Umr≦0.837758, complied.
4 (25%)	1.04	Accumlated Energy	--	8.5589821	0.136624	--	Ue=Umr≦0.422478, complied.
10%	2.54	Accumlated Energy	--	9.6486961	0.061039	--	Ue=Umr≦0.1753, complied.
5 (0%)	49.18	Sampling	1.10E-6	138.73529	0.017101	0.2259765	Ue≦0.02, complied.

	External Power Supply Output Electric Data			
Load	**V**	**A**	**Wh**	**Avg. Power (W)**
1 (100%)	24	3.1286	6.2663	75.196
2 (75%)	24.06	2.3453	4.7088	56.5057
3 (50%)	24.11	1.5632	3.1454	37.7451
4 (25%)	24.16	0.7824	1.5776	18.9313
10%	24.19	0.313	0.6316	7.5797

Power Consumed by UUT (W)					
100%	**75%**	**50%**	**25%**	**10%**	**No Load**
8.6701	6.305	4.1428	2.1926	1.1853	0.086

Efficiency of Power Supply (after 5 min warm-up)					
100%	**75%**	**50%**	**25%**	**10%**	**Arithmetic Average of Efficiency at load 1 ~ 4**
89.661973	89.9619014	90.109793	89.620288	86.476897	89.83848886

* The measurement methods are defined in 5.3.2 or 5.3.3 of the standards, EN 50564:2011 and IEC62301:2011.

** Ue is the uncertainty relating to the measuring instrument.

*** Upc is the maximum permitted relative uncertainty for cases where the MCR is > 10.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Tested by: _____ Tested by: _____ Test date: 2023-06-06

signature print

Sample # : 6105327-S2 Instrument Code / Range: _____

ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST: (Cont'd)

RESULTS FOR SAMPLE 2 @ 230V ac, 50 Hz

	External Power Supply Input Electric Data									
Load	**V**	**HZ**	**A**	**PF**	**CF**	**THD of Voltage**	**THD of Current**	**Wh**	**Avg. Power (W) (Pm)**	**Wh Interval [min]**
1 (100%)	230.23	50	0.727	0.5028	3.6882	0.16	168.18	6.992	83.9041	**5**
2 (75%)	230.25	50	0.549	0.4984	3.7733	0.14	169.45	5.2382	62.8585	**5**
3 (50%)	230.17	50	0.372	0.491	3.8024	0.12	167.8	3.497	41.9641	**5**
4 (25%)	230.29	50	0.198	0.4636	3.9346	0.05	161.87	1.7619	21.1427	**5**
10%	230.22	50	0.095	0.3981	3.6897	0.03	124.35	0.7278	8.7337	**5**
5 (0%)	230.22	50	0.049	0.0098	1.4151	0.05	1.36	"--	0.0873	**10**

				Power Measurement Uncertainty Calculation and Judgement			
Load	**Stability Assessment %**	***Measurement method used**	**Slope value (mW/h)**	**MCR**	**** Ue**	***** Upc**	**Complied?**
1 (100%)	0.39	Accumlated Energy	--	7.3353222	0.523236	--	Ue=Umr≦1.678082, complied.
2 (75%)	0.43	Accumlated Energy	--	7.5708266	0.431058	--	Ue=Umr≦1.25717, complied.
3 (50%)	0.62	Accumlated Energy	--	7.7441955	0.264524	--	Ue=Umr≦0.839282, complied.
4 (25%)	1.14	Accumlated Energy	--	8.4870578	0.136729	--	Ue=Umr≦0.422854, complied.
10%	1.91	Accumlated Energy	--	9.2682743	0.060927	--	Ue=Umr≦0.174674, complied.
5 (0%)	41.7	Sampling	204.53E-9	144.39796	0.01807	0.2350367	Ue≦0.0205187069387755, complied.

	External Power Supply Output Electric Data			
Load	**V**	**A**	**Wh**	**Avg. Power (W)**
1 (100%)	24.06	3.1282	6.2795	75.3544
2 (75%)	24.11	2.3463	4.7213	56.6561
3 (50%)	24.17	1.5631	3.1522	37.8262
4 (25%)	24.21	0.7824	1.5811	18.9727
10%	24.24	0.3131	0.6333	7.5994

Power Consumed by UUT (W)					
100%	**75%**	**50%**	**25%**	**10%**	**No Load**
8.5497	6.2024	4.1379	2.17	1.1343	0.0873

Efficiency of Power Supply (after 5 min warm-up)					
100%	**75%**	**50%**	**25%**	**10%**	**Arithmetic Average of Efficiency at load 1 ~ 4**
89.810152	90.1327585	90.139429	89.73641	87.012377	89.95468743

* The measurement methods are defined in 5.3.2 or 5.3.3 of the standards, EN 50564:2011 and IEC62301:2011.

** Ue is the uncertainty relating to the measuring instrument.

*** Upc is the maximum permitted relative uncertainty for cases where the MCR is > 10.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Tested by: _____ Tested by: _____ Test date: 2023-06-06

signature print

Sample # : 6105327-S3 Instrument Code / Range: _____

ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST: (Cont'd)

RESULTS FOR SAMPLE 3 @ 230V ac, 50 Hz

	External Power Supply Input Electric Data									
Load	**V**	**HZ**	**A**	**PF**	**CF**	**THD of Voltage**	**THD of Current**	**Wh**	**Avg. Power (W) (Pm)**	**Wh Interval [min]**
1 (100%)	230.23	50	0.728	0.5035	3.7103	0.17	167.58	7.0139	84.1667	**5**
2 (75%)	230.19	50	0.55	0.499	3.776	0.14	168.44	5.256	63.0725	**5**
3 (50%)	230.27	50	0.372	0.4916	3.8222	0.12	167.51	3.505	42.0602	**5**
4 (25%)	230.3	50	0.199	0.4641	3.9565	0.06	159.67	1.7674	21.2086	**5**
10%	230.33	50	0.095	0.3977	3.7398	0.04	118.45	0.7336	8.8029	**5**
5 (0%)	230.31	50	0.049	0.0095	1.4148	0.04	1.08	"--	0.086	**10**

				Power Measurement Uncertainty Calculation and Judgement			
Load	**Stability Assessment %**	***Measurement method used**	**Slope value (mW/h)**	**MCR**	**** Ue**	**** Upc**	**Complied?**
1 (100%)	0.36	Accumlated Energy	--	7.3690169	0.524073	--	Ue=Umr≦1.683334, complied.
2 (75%)	0.48	Accumlated Energy	--	7.5671343	0.431846	--	Ue=Umr≦1.26145, complied.
3 (50%)	0.5	Accumlated Energy	--	7.7750203	0.264811	--	Ue=Umr≦0.841204, complied.
4 (25%)	1.25	Accumlated Energy	--	8.5251023	0.136974	--	Ue=Umr≦0.424172, complied.
10%	2.64	Accumlated Energy	--	9.4035705	0.061351	--	Ue=Umr≦0.176058, complied.
5 (0%)	52.97	Sampling	201.96E-9	148.92632	0.018337	0.2422821	Ue≦0.0208362610526316, complied.

	External Power Supply Output Electric Data			
Load	**V**	**A**	**Wh**	**Avg. Power (W)**
1 (100%)	24.07	3.1268	6.2804	75.3651
2 (75%)	24.13	2.345	4.7215	56.6575
3 (50%)	24.18	1.5626	3.153	37.836
4 (25%)	24.23	0.7811	1.5792	18.9499
10%	24.25	0.3121	0.6315	7.5784

Power Consumed by UUT (W)					
100%	**75%**	**50%**	**25%**	**10%**	**No Load**
8.8016	6.415	4.2242	2.2587	1.2245	0.086

Efficiency of Power Supply (after 5 min warm-up)					
100%	**75%**	**50%**	**25%**	**10%**	**Arithmetic Average of Efficiency at load 1 ~ 4**
89.542658	89.82916485	89.956776	89.350075	86.089811	89.66966842

* The measurement methods are defined in 5.3.2 or 5.3.3 of the standards, EN 50564:2011 and IEC62301:2011.

** Ue is the uncertainty relating to the measuring instrument.

*** Upc is the maximum permitted relative uncertainty for cases where the MCR is > 10.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Tested by: _____ Tested by: _____ Test date: _____
signature print

Sample # : _____ Instrument Code / Range: _____

ACTIVE/NO-LOAD MODE POWER CONSUMPTION TEST: (Cont'd)

RESULTS @ 127V ac, 60 Hz

	External Power Supply Input Electric Data									
Load	V	HZ	A	PF	CF	THD of Voltage	THD of Current	Wh	Avg. Power (W) (Pm)	Wh Interval [min]
1 (100%)										
2 (75%)										
3 (50%)										
4 (25%)										
10%										
5 (0%)										

				Power Measurement Uncertainty Calculation and Judgement			
Load	Stability Assessment %	*Measurement method used	Slope value (mW/h)	MCR	** Ue	*** Upc	Complied?
1 (100%)						--	--
2 (75%)						--	--
3 (50%)						--	--
4 (25%)						--	--
10%						--	--
5 (0%)						--	--

	External Power Supply Output Electric Data			
Load	V	A	Wh	Avg. Power (W)
1 (100%)				
2 (75%)				
3 (50%)				
4 (25%)				
10%				

Power Consumed by UUT (W)					
100%	75%	50%	25%	10%	No Load

Efficiency of Power Supply (after 5 min warm-up)					
100%	75%	50%	25%	10%	Arithmetic Average of Efficiency at load 1 ~ 4

* The measurement methods are defined in 5.3.2 or 5.3.3 of the standards, EN 50564:2011 and IEC62301:2011.

** Ue is the uncertainty relating to the measuring instrument.

*** Upc is the maximum permitted relative uncertainty for cases where the MCR is > 10.

N/A Cavy Chen 2023-05-24

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Tested by: _____ Tested by: _____ Test date: _____
signature print

Sample # : _____ Instrument Code / Range: _____

OFF MODE POWER CONSUMPTION TEST:

If the external power supply UUT incorporates manual ON-OFF switches, all manual ON-OFF switches shall be placed in the "OFF" position for the OFF mode measurement, and measure and record its power consumption at “Load Condition 5” in Table 1.

The UUT is considered stable if, over 5 minutes with samples taken at least once every second, the AC input power does not drift from the maximum value observed by more than 1 percent or 50 milliwatts, whichever is greater. Measure the off-mode power consumption of a switch-selectable single-voltage external power supply twice—once at the highest nameplate output voltage and once at the lowest.

	External Power Supply Input Electric Data									
Sample #	V	HZ	A	PF	CF	THD of Voltage	THD of Current	Wh	Avg. Power (W) (Pm)	Wh Interval [min]

				Power Measurement Uncertainty Calculation and Judgement			
Sample #	Stability Assessment %	*Measurement method used	Slope value (mW/h)	MCR	** Ue	*** Upc	Complied?
						--	--
						--	--
						--	--
						--	--
						--	--
						--	--

* The measurement methods are defined in 5.3.2 or 5.3.3 of the standards, EN 50564:2011 and IEC62301:2011.

** Ue is the uncertainty relating to the measuring instrument.

*** Upc is the maximum permitted relative uncertainty for cases where the MCR is > 10.

Base on Table 2, this results is [greater than] [not greater than] 0.500 Watt as Maximum Energy Consumption in No-Load Mode.

N/A Cavy Chen 2023-05-24

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Tested by: _____ Tested by: _____ Test date: _____
signature print

Sample # : _____ Instrument Code / Range: _____

DURABILITY OF MARKING TEST for **NOM-029-ENER-2017**

METHOD

A sample of the marking label was subjected to this test. The surface of each marking as noted below was rubbed by hand for a period of 15 seconds with a water soaked cloth.

RESULTS

TEST OBSERVATIONS:	
	Water
Any Damage?	
Legible?	
Curled?	
Edge Lifted?	
Easily Removed Intact?	

The marking [was] [was not] durable and legible. The label [was] [was not] easily removed and [did] [did not] show curling.

Comments:

N/A Cavy Chen 2023-05-24

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

WORKSHEETS

The measured is the following:

[x] International Efficiency Marking Protocol (IEMP) for External Power Supplies: (at 115/230V ac, 60/50 Hz

	Efficiency (%):	Sample No.:
Minimum Average Efficiency in Active Mode	88.56	6105327-S3
Maximum Power In No-Load Condition	0.0873	6105327-S2

Base on Table 2, this EPS is complied with the requirements for level: VI at 115V ac; level: VI at 230V ac;
The calculated Minimum Average Efficiency in Active Mode is: 0.880 (88 %) at 115V ac; 0.880 (88 %) at 230V ac and Maximum Energy Consumption in No-Load Mode is not greater than 0.210 Watt at 115V ac; 0.210 Watt at 230V ac.

[ ] The true power factor was 0.9 or greater at 100% of rated load when tested at 115V, 60Hz. This requirement applies only to Level V power supplies with input power greater than or equal to 100W at 115V, 60Hz.

[x] 10 CFR part 430, subpart B, Appendix Z "Uniform Test Method for Measuring the Energy Consumption of External Power Supplies": (at 115V ac, 60Hz)

[x] CAN/CSA-C381.1-17, May 2017

The sampling plan calculation following 10CFR 429.1 and 429.37

	Sample mean	*LCL/0.95	The lower of sample mean or LCL/0.95
Average efficiency in active mode	0.887	0.929	0.887
	Sample mean	**UCL/1.05	The higher of sample mean or UCL/1.05
No-load mode power	0.0609	0.0585	0.0609

* the lower 97.5 percent confidence limit (LCL) of the true mean divided by 0.95
** the upper 97.5 percent confidence limit (UCL) of the true mean divided by 1.05

Base on Table 2, the calculated Minimum Average Efficiency in Active Mode is: 0.880 (88 %), and Maximum Energy Consumption in No-Load Mode is not greater than 0.210 Watt.
Any represented value of the estimated energy consumption of a basic model in Active Mode could be certified in the following range.

Based on Table 2, the calculated Minimum Average Efficiency		The represented value ~~[is declared by manufacturer]~~		Based on sampling plan, the lower of sample mean or LCL/0.95
0.880	≤	0.8856	≤	0.887

Any represented value of the estimated energy consumption of a basic model in No-Load condition could be certified in the following range.

Based on sampling plan, the higher of sample mean or UCL/1.05		The represented value ~~[is declared by manufacturer]~~		Based on table 2, the Maximum Energy Consumption
0.0609	≤	0.0611	≤	0.210

This comply with requirements in:

[ ] Office of Energy Efficiency and Renewable Energy 10 CFR Parts 429 and 430

[ ] California Code of Regulations, Title 20, Division 2, Chapter 4, Article 4. Appliance Efficiency Regulations, Sections 1601 through 1609

[ ] Amendment 14 to the Energy Efficiency Regulations for External Power Supplies in the Canada Gazette, Part II

[x] Quebec:	**GAZETTE OFFICIELLE DU QUÉBEC, December 12, 2018, Vol. 150, No. 50**
[x] Ontario:	**Ontario Regulation 509/18: Energy and Water Efficiency appliances and products**
[x] Others:	**10 CFR Parts 429 and 430, Energy Conservation Program**
[x] Others:	**California Energy Commission - Title 20, Division 2, Chapter 4, Article 4, Section 1601-1609 Appliance Efficiency Regulation**
[x] Others:	**NRCan Energy Efficiency Regulation External Power Supplies**

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

WORKSHEETS (CONT'D)

[ ] MEXICO : NORMA Official Mexicana NOM-029-ENER-2017: (at 127V ac, 60 Hz)

	Efficiency (%):	Sample No.:
Minimum Average Efficiency in Active Mode		
Maximum Power In No-Load Condition		

Base on Table 11, the calculated Minimum Average Efficiency in Active Mode is: _____ (_____ %), and Maximum Energy Consumption in No-Load Mode is not greater than _____ Watt.
This [comply] [does not comply] with requirements for **NOM-029-ENER-2017, Eficiencia energética de fuentes de alimentación externa. Límites, métodos de prueba, marcado y etiquetado**.

N/A Cavy Chen 2023-05-24

[x] AS/NZS 4665.1-2005+A1:2009; AS/NZS 4665.2-2005+A1:2009: (at 230V ac or 240V ac, 50Hz)

Input Voltage (V ac): 230V ac, 50 Hz	Efficiency (%):	Sample No.:
Minimum Average Efficiency in Active Mode	89.66	6105327-S3
Maximum Power In No-Load Condition	0.0860	6105327-S3
[ ] Input Voltage (V ac): 240 V ac, 50 Hz	**Efficiency (%):**	**Sample No.:**
Minimum Average Efficiency in Active Mode	--	--
Maximum Power In No-Load Condition	--	--

Base on Table 2, the calculated Minimum Average Efficiency in Active Mode is: 0.870 (87 %), and Maximum Energy Consumption in No-Load Mode is not greater than 0.500 Watt.

This [comply] [does not comply] with performance mark **[III] ; [IV] ; [V]** requirements in:

Australian Greenhouse and Energy Minimum Standards (External Power Supplies) Determination 2014 and New Zealand Energy Efficiency (Energy Using Products) Regulations 2002

Note:

For **Australian**, according to Clause 8(1)(b) in Greenhouse and Energy Minimum Standards (External Power Supplies) Determination 2014, if a product exceeds the energy performance requirements for Mark V as mentioned in Appendix A of AS/NZS 4665.1:2005 and meets the performance requirements for Mark VI mentioned in the IEMP then the product may be labelled in accordance with the requirements for:
(i) Mark V mentioned in Appendix A of AS/NZS 4665.1:2005 and sections 4.2 and 5 of AS/NZS 4665.2:2005 (Energy Performance Mark); or (ii) Mark VI mentioned in the IEMP.

[x] European Union (EU) Code of Conduct: (at 230V ac, 50Hz)

Input Voltage (V ac): 230V ac, 50 Hz	Efficiency (%):	Sample No.:
Minimum Average Efficiency in Active Mode	89.66	6105327-S3
Minimum 10% Load Average Efficiency in Active Mode	86.08	6105327-S3
Maximum Power In No-Load Condition	0.0873	6105327-S2

Base on Table 6, 7, 8, 9, and 10, the calculated Minimum Average Efficiency in Active Mode is: 0.890 (89 %), at 10% Load is: 0.790 (79 %), and Maximum Energy Consumption in No-Load Mode is not greater than 0.150 Watt.
This [comply] [does not comply] with requirements for **Code of Conduct on Energy Efficiency of External Power Supplies, Version 5**.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

WORKSHEETS (CONT'D)

[x] European Union (EU) Energy-related Products (ErP): (at 230V ac, 50Hz)

Input Voltage (V ac): 230V ac, 50 Hz	Efficiency (%):	Sample No.:
Minimum Average Efficiency in Active Mode	89.66	6105327-S3
Minimum 10% Load Average Efficiency in Active Mode	86.08	6105327-S3
Maximum Power In No-Load Condition	0.0873	6105327-S2

~~Base on Table 3, 4 and 5, the calculated Minimum Average Efficiency in Active Mode is: _____ (_____ %), and Maximum Energy Consumption in No-Load Mode is not greater than _____ Watt.~~
~~This [comply] [does not comply] with requirements for~~

N/A Cavy Chen 2023-05-24

~~**[ ] COMMISSION REGULATION (EC) No 278/2009 of 6 April 2009, implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for no-load condition electric power consumption and average active efficiency of external power supplies**~~

Base on Table 12, the calculated Minimum Average Efficiency in Active Mode is: 0.880 (88 %), and Maximum Energy Consumption in No-Load Mode is not greater than 0.210 Watt.
This ~~[~~ comply ~~] [does not comply]~~ with requirements for

[x] COMMISSION REGULATION (EU) 2019/1782 of 1 October 2019, laying down ecodesign requirements for external power supplies pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 278/2009

Testing ambient condition records:

Test date (YYYY-MM-DD)	Ambient Temperature, °C / Relative Humidity, RH %	Airspeed near UUT, m/s
2023-06-06	23.1/64.9	<0.5

Note:PA175, The Harmonics traceable calibration range is from 0.1%~40%. Xavier Lin 2023-06-06

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Table 2: International Efficiency Marking Protocol for External Power Supplies, Version 3.0

Mark	Performance Requirements				
	Nameplate Output Power (P_{no})[2]	No-Load Mode Power[3]	Nameplate Output Power (P_{no})	Average Efficiency in Active Mode[4]	Power Factor
I	Used if none of the other criteria are met.				
II	0 to ≤ 10 W	≤ 0.75	0 to < 1 W	≥ 0.39 * P_{no}	Not Applicable
	> 10 to 250 W	≤ 1.0	1 to < 49 W	≥ 0.107 * ln(P_{no}) + 0.39	
			> 49 W	≥ 0.82	
III	0 to < 10 W	≤ 0.5	0 to 1 W	≥ 0.49 * P_{no}	Not Applicable
	10 to 250 W	≤ 0.75	> 1 to 49 W	≥ 0.09 * ln(P_{no}) + 0.49	
			> 49 to 250 W	≥ 0.84	
IV	0 to 250 W	≤ 0.5	0 to < 1 W	≥ 0.5 * P_{no}	Not Applicable
			1 to 51 W	≥ 0.09 * ln(P_{no}) + 0.5	
			> 51 to 250 W	≥ 0.85	
V	0 to < 50 W	AC-DC: ≤ 0.3 AC-AC: ≤ 0.5	0 to ≤ 1 W	Basic Voltage: ≥ 0.480 * P_{no} + 0.140 Low Voltage[5]: ≥ 0.497 * P_{no} + 0.067	EPSs with ≥ 100 watts **input** power must have a true power factor ≥ 0.9 at 100% of rated load when tested at 115 volts/60Hz.
			> 1 to ≤ 49 W	Basic Voltage: ≥ 0.0626 * ln(P_{no}) + 0.622 Low Voltage: ≥ 0.0750 * ln(P_{no}) + 0.561	
	≥ 50 to ≤ 250 W	≤ 0.5	> 49 to 250 W	Basic Voltage: ≥ 0.870 Low Voltage: ≥ 0.860	
VI	Single-Voltage				Not Applicable
	0 to ≤ 49 W	AC-DC: ≤ 0.100 AC-AC: ≤ 0.210	0 to ≤ 1 W	Basic Voltage: ≥ 0.5 * P_{no} + 0.16 Low Voltage: ≥ 0.517 * P_{no} + 0.087	
			> 1 to ≤ 49 W	Basic Voltage: ≥ 0.071 * ln(P_{no}) – 0.0014 * P_{no} + 0.67 Low Voltage: ≥ 0.0834 * ln(P_{no}) – 0.0014 * P_{no} + 0.609	
	> 49 to ≤ 250 W	≤ 0.210	> 49 to ≤ 250 W	Basic Voltage: ≥ 0.880 Low Voltage: ≥ 0.870	
	> 250 W	≤ 0.500	> 250 W	≥ 0.875	
	Multiple-Voltage				
	Any	≤ 0.300	0 to ≤ 1 W	≥ 0.497 * P_{no} + 0.067	
			> 1 to ≤ 49 W	≥ 0.075 * ln(P_{no}) + 0.561	
			> 49 W	≥ 0.860	
VII	Reserved for future use.				

[2] P_{no} is the Nameplate Output Power of the unit under test.
[3] In Australia and New Zealand, AC-AC external power supplies are not required to meet the no-load mode power requirements.
[4] "ln" refers to the natural logarithm.
[5] A low-voltage model is an EPS with nameplate output voltage of less than 6 volts and nameplate output current greater than or equal to 550 milliamperes. A basic-voltage model is an EPS that is not a low-voltage model.

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Table 3: ErP Energy-Efficiency Criteria for AC-AC and AC-DC EPS in Active Mode: Standard Models

Nameplate Output Power (P_o)	Minimum Average Efficiency in Active Mode (expressed as a decimal)
0 to ≤ 1 Watt	≥ 0.480 * P_o + 0.140
> 1 to ≤ 51 Watts	≥ [0.063 * Ln (P_o)] + 0.622
> 51 Watts	≥ 0.870
Note: All efficiency values shall be rounded to the hundredths place.	

Table 4: ErP Energy-Efficiency Criteria for AC-AC and AC-DC EPS in Active Mode: Low Voltage Models

Nameplate Output Power (P_o)	Minimum Average Efficiency in Active Mode (expressed as a decimal)
0 to ≤ 1 Watt	≥ 0.497 * P_o + 0.067
> 1 to ≤ 51 Watts	≥ [0.0750 * Ln (P_o)] + 0.561
> 51 Watts	≥ 0.860
Note: All efficiency values shall be rounded to the hundredths place.	

Table 5: ErP Power Consumption Criteria for No-Load

Nameplate Output Power (P_o)	Maximum Power in No-Load		
	Ac-Ac EPS	Ac-Dc EPS	Low Voltage EPS
0 to ≤ 51 watts	≤ 0.5 watts	≤ 0.3 watts	≤ 0.3 watts
> 51 watts	≤ 0.5 watts	≤ 0.5 watts	n/a

Table 6: CoC Energy-Efficiency Criteria for AC-AC and AC-DC EPS in Active Mode: Standard Models

Nameplate Output Power (P_{no})	Minimum Four Point Average Efficiency in Active Mode (expressed as a decimal)	
	Tier 1 – Jan 1st, 2014	Tier 2 – January 1st, 2016
0.3 to ≤ 1 Watt	≥ 0.500 * P_{no} + 0.146	≥ 0.500 * P_{no} + 0.169
> 1 to ≤ 49 Watts	≥ 0.0626 * Ln (P_{no}) + 0.646	≥ 0.071 * Ln (P_{no}) – 0.00115 * P_{no} + 0.670
> 49 to ≤ 250 Watts	≥ 0.890	≥ 0.890
Note: All efficiency values shall be rounded to the hundredths place.		

Table 7: CoC Energy-Efficiency Criteria for AC-AC and AC-DC EPS in Active Mode: Low Voltage Models

Nameplate Output Power (P_{no})	Minimum Four Point Average Efficiency in Active Mode (expressed as a decimal)	
	Tier 1 – Jan 1st, 2014	Tier 2 – January 1st, 2016
0.3 to ≤ 1 Watt	≥ 0.500 * P_{no} + 0.086	≥ 0.517 * P_{no} + 0.091
> 1 to ≤ 49 Watts	≥ 0.0755 * Ln (P_{no}) + 0.586	≥ 0.0834 * Ln (P_{no}) – 0.0011 * P_{no} + 0.609
> 49 to ≤ 250 Watts	≥ 0.880	≥ 0.880
Note: All efficiency values shall be rounded to the hundredths place.		

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Table 8: CoC Energy-Efficiency Criteria for AC-AC and AC-DC EPS in Active Mode: Standard Models

Nameplate Output Power (P_{no})	Minimum 10% Load Average Efficiency in Active Mode (expressed as a decimal)	
	Tier 1 – Jan 1st, 2014	Tier 2 – January 1st, 2016
0.3 to ≤ 1 Watt	≥ 0.500 * P_{no} + 0.046	≥ 0.5 * P_{no} + 0.060
> 1 to ≤ 49 Watts	≥ 0.0626 * Ln (P_{no}) + 0.546	≥ 0.071 * Ln (P_{no}) – 0.00115 * P_{no} + 0.570
> 49 to ≤ 250 Watts	≥ 0.790	≥ 0.790
Note: All efficiency values shall be rounded to the hundredths place.		

Table 9: CoC Energy-Efficiency Criteria for AC-AC and AC-DC EPS in Active Mode: Low Voltage Models

Nameplate Output Power (P_{no})	Minimum 10% Load Average Efficiency in Active Mode (expressed as a decimal)	
	Tier 1 – Jan 1st, 2014	Tier 2 – January 1st, 2016
0.3 to ≤ 1 Watt	≥ 0.500 * P_{no}	≥ 0.517 * P_{no}
> 1 to ≤ 49 Watts	≥ 0.072 * Ln (P_{no}) + 0.500	≥ 0.0834 * Ln (P_{no}) – 0.00127 * P_{no} + 0.518
> 49 to ≤ 250 Watts	≥ 0.780	≥ 0.780
Note: All efficiency values shall be rounded to the hundredths place.		

Table 10: CoC Power Consumption Criteria for No-Load

Nameplate Output Power (P_{no})	Maximum Power in No-Load	
	Tier 1 – Jan 1st, 2014	Tier 2 – January 1st, 2016
≥ 0.3 to < 49 Watts	≤ 0.150 watts	≤ 0.075 watts
≥ 49 to < 250 Watts	≤ 0.250 watts	≤ 0.150 watts
Mobile handheld battery driven and < 8 W	≤ 0.075 watts	≤ 0.075 watts

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0

Table 11 - Límite de eficiencia energética en modo activo y potencia en modo de no carga que deben cumplir las FAE

Clasificación según su nivel de tensión de salida	Tensión nominal de salida en c.c.	Con una Potencia de salida (P_o)	Nivel de Eficiencia	Límite mínimo de eficiencia energética en modo activo, mayor o igual que:	Límite máximo de potencia en modo de no carga menor o igual que:
Tensión de salida USB	5,0 V ± 0,25 V	Menor o igual que 1,0 W	V	0,497 x P_o + 0,067	0,30
			VI	0,517 x P_o + 0,087	0,10
		Mayor que 1,0 W y menor o igual que 49,0 W	V	0,075 x [L_n (P_o)] + 0,561	0,30
			VI	0,0834 x [L_n (P_o)] - 0,0014 x P_o + 0,609	0,10
		Mayor que 49,0 W y menor o igual que 250,0 W	V	0,86	0,50
			VI	0,87	0,21
Baja tensión de salida	Menor a 6,0 V	Menor o igual que 1,0 W	V	0,497 x P_o + 0,067	0,30
			VI	0,517 x P_o + 0,087	0,10
		Mayor que 1,0 W y menor o igual que 49,0 W	V	0,075 x [L_n (P_o)] + 0,561	0,30
			VI	0,0834 x [L_n (P_o)] - 0,0014 x Po + 0,609	0,10
		Mayor que 49,0 W y menor o igual que 250,0 W	V	0,86	0,50
			VI	0,87	0,21
Tensión de salida genérica	Mayor o igual a 6,0 V	Menor o igual que 1,0 W	V	0,480 x P_o + 0,140	0,30
			VI	0,5 x P_o + 0,16	0,10
		Mayor que 1,0 W y menor o igual que 49,0 W	V	0,0626 x [L_n (P_o)] + 0,622	0,30
			VI	0,071 x (L_n (P_o)) - 0,0014 x Po + 0,67	0,10
		Mayor que 49,0 W y menor o igual que 250,0 W	V	0,87	0,50
VI	0,88				0,21

En donde:

L_n: Logaritmo natural. El orden de las operaciones algebraicas requiere que el cálculo del logaritmo natural se realiza primero.

P_O: Potencia de salida de la FAE

Table 12 - Ecodesign Energy efficiency requirements for external power supplies

Nameplate Output Power (Po)	AC-AC external power supplies	AC-DC external power supplies	Low voltage external power supplies
the no-load condition power consumption shall not exceed the following values			
$P_O \leq 49,0$ W	0,21 W	0,10 W	0,10 W
$P_O > 49,0$ W	0,21 W	0,21 W	0,21 W
the average active efficiency shall be not less than the following values			
$P_O \leq 1,0$ W	0,5 xP_O /1W+ 0,160	0,5 xP_O /1W+ 0,160	0,517 xP_O /1W+ 0,087
1 W < $P_O \leq 49,0$ W	0,071 x ln(P_O /1W) – 0,0014 xP_O /1W+ 0,67	0,071 x ln(P_O /1W) – 0,0014 xP_O /1W+ 0,67	0,0834 x ln(P_O /1W) – 0,0014 xP_O /1W+ 0,609
$P_O > 49,0$ W	0,880	0,880	0,870

========== END OF DATASHEET PACKAGE. ==========

COPYRIGHT© UL LLC. ALL RIGHTS RESERVED. MAY NOT BE REPRODUCED WITHOUT PERMISSION. **UL PROPRIETARY AND CONFIDENTIAL. FOR UL INTERNAL USE ONLY.** THIS DOCUMENT IS CONTROLLED AND HAS BEEN RELEASED ELECTRONICALLY. THE VERSION ON THE UL INTRANET IS THE UP-TO-DATE DOCUMENT. HARD COPIES ARE UNCONTROLLED AND MAY NOT BE UP-TO-DATE. USERS OF HARD COPIES SHOULD CONFIRM THE REVISION BY COMPARING IT WITH THE ELECTRONICALLY CONTROLLED VERSION.
00-VS-F0861 - ISSUE 12.0