

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CAN/CSA C22.2 No. 62368-1-14, 2nd Ed-(Audio/video, information and communication technology equipment Part 1: Safety requirements)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
<b>Complementary CCN:</b>	N/A
<b>Product:</b>	Switching Power Supply
<b>Model:</b>	X4-MMMMM-PPSSNN, X5-MMMMM-PPSSNN, X7-MMMMM-PPSSNN, X9-MMMMM-PPSSNN, X10-MMMMMMM-PPSSNN, X15-MMMMM-PPSSNN/ MMMMM-PPSSNN and XT16-MMMMMMM-PPSSNN  Where M can be blank or a combination of one number 1, 2, 3, 4, or 5 and one letter A-Z; Where P can be any number 0-9 or blank; Where S can be any number 0-9 or blank; Where N can be any number 0-9 or blank; "-" provided optionally).  Model X7-3D3J3J-230003-XD0142A (P/N 10011368)
<b>Rating:</b>	Input rated: X4-MMMMM-PPSSNN: 100-240VAC 50/60/440Hz 5.6A X5-MMMMM-PPSSNN: 100-240VAC 50/60/440Hz 7.0A X7-MMMMM-PPSSNN: 100-240VAC 50/60/440Hz 10.0A X7-3D3J3J-230003-XD0142A: 100-240VAC 50/60/440Hz 12A X9-MMMMM-PPSSNN: 100-240VAC 50/60/440Hz 12.7A X10-MMMMMMM-PPSSNN: 100-240VAC 50/60/440Hz 14.2A X15-MMMMM-PPSSNN/ MMMMM-PPSSNN: 100-240VAC 50/60Hz 20A XT16-MMMMMMM-PPSSNN: 342-528Vac, (3W+PE), 50/60/400 Hz, 5.5A PER PHASE (includes $\pm 10\%$ Tolerance, Nominal Input 380-480Vac)  Output rated: See model differences for details.
<b>Applicant Name and Address:</b>	XP POWER L L C 15641 RED HILL AVE, SUITE 100

TUSTIN CA 92780  
UNITED STATES

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.

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Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared By: Robert Leon / Project Handler

Reviewed By: Walid Beytoughan / 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 modular ac (single phase or three phase (3W+PE)) to dc power supply for building-in. The power supply consisting of an input power platform and various plug-in Output Modules. Each plug-in Output Module is either 2, 3 or 4 slot width. Each power platform supports 10-14 slots per platform, in any combination of 2, 3 or 4 slot plug-in modules.

Outputs can be connected in series or parallel. Provided with a metal chassis, incorporating primary and SELV components.

The main PWB is secured to the chassis studs by multiple machine screws.

**Model Differences**

All models provided with a power platform and maybe provided with various combinations of Output Modules.

Models within Model X4, X5, X6 and X7 Series are identical, with exception to the output wattage rating, and provided Plug-in output Modules. See output rating table provided below.

Model X9 Series is similar to X7 Series with exception to the power platform, number of output module slots, and the output wattage rating. See output rating table provided below.

Model X10 Series is similar to X7 Series with exception to the power platform, number of output module slots, and the output wattage rating. See output rating table provided below.

Model X7-3D3J3J-230003-XD0142A is identical to X7 series except cooling fan mounted externally (airflow outward) and alternate PWB.

Model X15 is a two output module bay design that consists of platforms and can accommodate the same output modules as the X7 Series.

Model XT16 is similar to X10 Series with exception to the platform, main PWB, 3 phase input rating and 1600W output rating.

**Output Rating:**

X4 Series: Max 400 W (100-180 Vac input)/Max 600 W (180-240Vac input): up to 5 output modules provided.

X5 Series: Max 500 W (100-180 Vac input)/Max 700 W (180-240 Vac input): up to 5 output modules provided.

X7 Series: Max 700 W (100-180 Vac input)/Max 900 W (180-240 Vac input): up to 5 output modules provided.

X9 Series: Max 900 W (100-180 Vac input)/Max 1100 W (180-240 Vac input): up to 6 output modules provided.

X10 Series: Max 1000 W (100-180 Vac input)/Max 1200 W (180-240 Vac input): up to 7 output modules provided.

X7-3D3J3J-230003-XD0142A (100-240Vac, 12A input): Rated Output 5Vdc/60A; 12Vdc/28A; 12Vdc/28A; Max 772W.

X15 Series: Max 1500 W (100-180 Vac input)/Max 2500 W (180-240 Vac input): up to 10 output modules provided.

XT16 Series: Max 1600W: up to 7 output modules provided.

**Output Module Ratings:**

Modules 1A-1Z: 2 Slot Module, 3.3 to 60 Vdc, Max. 20 A, Max. 126 W

Modules 2A-2Z: 2 Slot Module, 3.3 to 60 Vdc, Max. 40 A, Max. 252 W

Modules 3A-3Z: 3 Slot Module, 3.3 to 60 Vdc, Max. 60 A, Max. 420 W

Modules 4A-4Z: 4 Slot Module, 12.0 to 60 Vdc, Max 62.5A, Max 756W

Modules 5A-5Z: 2 Slot Module, Dual Output: V1=3.3 to 24 Vdc, Max. 10 A, Max, 150 W; V2 = 2.0 to 24 Vdc, Max. 10 A, Max. 150 W (V1+V2 150W Max.)

Modules 6A-6Z: 2 Slot Module, Dual Output: V1=5 to 24 Vdc, Max 10 A, Max, 175 W; V2=5 to 24 Vdc, Max 10 A, Max, 175 W (V1+V2 175W Max.)

**Test Item Particulars**

Classification of use by	Ordinary person
Supply Connection	AC Mains
Supply % Tolerance	+10%/-10%
Supply Connection – Type	For building-in
Considered current rating of protective device as part of building or equipment installation	All Models except Model X15 Series: 20 A Model X15 Series: 30 A 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)	Full-rated output load: 50°C. 75% of output load: 60°C. Half-rated output load: 70°C.
IP protection class	IPX0
Power Systems	TN IT - 480 V L-L
Altitude during operation (m)	4000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	2.25

**Technical Considerations**

- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of : Full-rated output load: 50°C. 75% of output load: 60°C. Half-rated output load: 70°C.
- The product is intended for use on the following power systems : TN
- The equipment disconnect device is considered to be : To be determined in the end-product.
- The product was investigated to the following additional standard : EN 62368-1:2014 + A11:2017
- Required Clearances have been adjusted by multiplying the clearance at sea level by a factor of 1.29 for operating at an altitude of 4000 meters. The correction factor is based on barometric pressure of 62kPa. If the calculated Clearance exceeded the Creepage, the Creepage was adjusted to the value of clearance.

**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 : Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of : For Model X4, X5, X7, X9, and X10 Series:, Primary-Earthed Dead Metal: 240 Vrms, 438 Vpk, Primary-SELV: 268 Vrms, 588 Vpk, For Model X15 Series:, Primary-SELV: 230 Vrms, 691 Vpk, For Model XT16 Series:, Primary-SELV: 375Vac, 472Vpk, Primary-Earth: 297Vac, 424Vpk
- The following output circuits are at ES1 energy levels : All Outputs, unless connected in series. See below C of A for Max Voltage
- The following output circuits are at ES2 energy levels : All Outputs, for certain combinations of output modules connected in series.
- The following output circuits are at ES3 energy levels : All Outputs, for certain combinations of output modules connected in series.
- The following output circuits are at PS3 energy levels : All Outputs
- The maximum investigated branch circuit rating is : All Models except Model X15 Series: 20 A, Model X15 Series: 30 A
- The investigated Pollution Degree is : 2
- Proper bonding to the end-product main protective earthing termination is : Required (Class I)
- An investigation of the protective bonding terminals has : Not been conducted except for Models X4, X5 and X7 Series provided with an appliance inlet.
- The following input terminals/connectors must be connected to the end-product supply neutral : Terminal marked "N" on the supply connector (J1), except when provided with an appliance inlet.
- The following end-product enclosures are required : Mechanical, Fire, Electrical
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJ2 insulation system with the indicated rating greater than Class A (105°C) : T1; Modules: T1, T2, and T3 (Class F)
- The equipment is suitable for direct connection to : AC mains supply
- The power supply was evaluated to be used at altitudes up to : "4000 m"
- When installed in a Class I end product, the power supply shall be mounted in a manner that provides the minimum required Clearance between the primary side of power supply and protectively earthed accessible conductive parts.
- Heatsinks are floating and considered live. They should not be accessible in the end-product.
- A suitable main disconnect device shall be provided in the end product.
- The power supplies covered by this report have a fuse in the neutral of the primary circuit. The need for a marking to warn a service person of the hazards associated with double pole/neutral fusing shall be considered in the end product.
- Consideration to repeating the Touch Current test should be given in the end-product evaluation.
- The power supplies in this report have been subject to Capacitance Discharge testing. Additionally, all associated component safeguards have been assessed to the applicable requirement in Annex G.10. Additional testing should not be needed if directly connected to mains e.g. using an appliance inlet, wiring terminals, etc.
- Printed Wiring Boards rated min 130°C. Electrolytic Capacitors rated min 105°C. All inductors providing Functional Insulation are suitable up to 130°C.
- The supply terminal (J1) is suitable for factory wiring. The output terminals and/or
- connectors have not been investigated for field wiring. Terminal block (J1) is suitable for copper
- wire only, 22-14 AWG, 10 lbs. torque, 110°C.
- For Model X4 Series, the maximum continuous output power shall not to exceed 400 W for input voltages 100-180 Vac or 600 W when the supply voltage is 180-240 Vac, when used with any combination of output modules.
- For Model X5 Series, the maximum continuous output power shall not to exceed 500 W for input voltages 100-180 Vac or 700 W when the supply voltage is 180-240 Vac, when used with any combination of output modules.
- For Model X7 Series, the maximum continuous output power shall not to exceed 700 W for input voltages 100-180 Vac or 900 W when the supply voltage is 180-240 Vac, when used with any combination of output modules.
- For Model X9 Series, the maximum continuous output power shall not to exceed 900 W for input voltages 100-180 Vac or 1100 W when the supply voltage is 180-240 Vac, when used with any combination of output modules.
- For Model X10 Series, the maximum continuous output power shall not to exceed 1000 W for input voltages 100-180 Vac or 1200 W when the supply voltage is 180-240 Vac, when used with any combination of output modules.
- For Model X15 Series, the maximum continuous output power shall not to exceed 1500 W for input

**Additional Information**

Marking Plates are representative of all models.

Technical amendment updates elevation from 3048M to 4000M, spacings tables, condition of acceptability, clause 5.4.2.5 and technical consideration updated.

This report is based on a previous evaluation to IEC 60950-1:2005 (2nd Ed.), Am1:2009 + Am2:20013 under CBTR Ref. No. E139109-A50-CB-3 including Amendments, CBTC Ref. No. US-25102-UL. Based on the previously conducted performance testing, only the tests conducted as part of this investigation were considered necessary.

The following tests were conducted under CTDSP SMT/CTF Stage 3 to IEC 60950-1 E2+A1+A2 at XP POWER LLC, 15641 RED HILL AVE, SUITE 100, TUSTIN, CA 92780, USA:

Input: Single-Phase (1.6.2)

Capacitance Discharge (2.1.1.7)

SELV Reliability Test Including Hazardous Voltage Measurements (2.2.2, 2.2.3, 2.2.4, Part 22 6.1)

Humidity (2.9.1, 2.9.2, 5.2.2)

Determination of Working Voltage; Working Voltage Measurement (2.10.2)

Distance Through Insulation Measurements (2.10.5)

Heating (4.5.1, 1.4.12, 1.4.13)

Ball Pressure (4.5.5, 4.5)

Electric Strength (5.2.2)

Component Failure (5.3.1, 5.3.4, 5.3.7)

Abnormal Operation (5.3.1 - 5.3.9)

Transformer Abnormal Operation (5.3.3, 5.3.7b, Annex C.1)

Power Supply Output Short-Circuit/Overload (5.3.7)

The following additional tests were conducted on a sample of model XT7-4Q4W3P in accordance with IEC 62368-1:2014 (Second Edition) at XP POWER LLC, 15641 RED HILL AVE, SUITE 100, TUSTIN, CA 92780 USA:

Electric Strength Test (5.4.9)

Prospective Touch Voltage and Touch Current Measurement (5.7)

The following additional tests were conducted on a sample of model XT16-4Q4W3P in accordance with IEC 62368-1:2014 (Second Edition) at XP POWER LLC, 15641 RED HILL AVE, SUITE 100, TUSTIN, CA 92780 USA:

Electric Strength Test (5.4.9)

Safeguards Against Capacitor Discharge After Disconnection of a Capacitor (5.5.2.2)

Prospective Touch Voltage and Touch Current Measurement (5.7)

Correction:

Corrected Tester's title.


Corrected Witnessed by name and signature.

Added reference to representative tests witnessed.

The following tests were selected as representative of the test program applicable to the models covered by this CBTR: Electric Strength Test (5.4.9), Safeguards Against Capacitor Discharge After Disconnection of a Capacitor (5.5.2.2) and Simulated Abnormal Operating Conditions (B.3). These tests have been witnessed for models selected as representative of the product family covered by this report and of the applicable test program.

Amendment (Technical):

Added X9 and X10 models to AC Inlet description in Table 4.1.2. Input Test and Temperature Test results were added to Tables.

<b>Additional Standards</b>	
The product fulfills the requirements of: EN 62368-1:2014 + A11:2017	
<b>Markings and Instructions</b>	
Clause Title	Marking or Instruction Details
Equipment identification marking – Manufacturer identification	Listee's or Recognized companys name, Trade Name, Trademark or File Number
Equipment identification marking – model identification	Model Number
Equipment rating marking – ratings	"Input Ratings (voltage, frequency/dc, current/power)", "Output Ratings (voltage, frequency/dc, current/power)"
Fuses – replaceable by skilled person	Models X4, X5 and X7: F1, F2 Ratings "12A, 250V", located on or adjacent to fuse or in service manual. Model X9 and Model X7-3D3J3J-230003-XD0142A: F1, F2 Ratings "15A, 250V", located on or adjacent to fuse or in service manual. Model X10: F1, F2 Ratings "20A, 250V", located on or adjacent to fuse or in service manual. Model X15: F101, F102 Ratings "30A, 250V", located on or adjacent to fuse or in service manual. XT16 platform: F1, F2, F3, Ratings "16A, 500V", located on or adjacent to fuse or in service manual.
Class I equipment -Terminal for main protective earthing	Provided adjacent to the main protective earthing terminal  (IEC 60417-5019)
Terminals for external primary power supply conductors	Capital letter "N" located adjacent to a terminal intended exclusively for connection of the primary power neutral conductor
Warning to service personnel	"CAUTION: Double pole, neutral fusing. Disconnect mains before servicing. "/"ATTENTION. Double pôle/fusible sur le neutre. Débrancher l'alimentation avant l'entretien."
<b>Special Instructions to UL Representative</b>	
The "Modules" and "Platforms" are manufactured at the following locations (Factory ID):  K (100101-437)  V (100574-113)	
The "Modules and "Platforms" are marked with the Split Inspection Marking described below and may be shipped to FS (407169-001) or P (198753-002) for final assembly:	



SPLIT INSPECTION MARKING FOR MODULES AND PLATFORMS, manufactured at K (100101-437): Made in China  
SPLIT INSPECTION MARKING FOR MODULES AND PLATFORMS, manufactured at V (100574-113): Made in Vietnam

The Split Inspection Marking is applied to the components that are manufactured only at K and V.

<b>BD1.0</b>	<b>TABLE: Production-Line Testing Requirements</b>					
<b>BD1.1</b>	<b>Electric Strength Test Special Constructions – Refer to Generic Inspection Instructions, Part AC for further information.</b>					
Model	Component	Removable parts	Test probe location	Test V rms	Test V dc	Test Time, s
Output Modules, except	T1-T3	--	Primary to Secondary	3000	4242	1
All Models, except X15 Series - Platforms	T1	--	Primary to Secondary	3000	4242	1
Model X15 Series - Platforms	T101, T201, T202	--	Primary to Secondary	3000	4242	1
<b>BD1.2</b>	<b>Earthing Continuity Test Exemptions – This test is not required for the following models:</b>					
	N/A					
<b>BD1.3</b>	<b>Electric Strength Test Exemptions – This test is not required for the following models:</b>					
	N/A					
<b>BD1.4</b>	<b>Electric Strength Test Component Exemptions – The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test.</b>					
	N/A					

<b>BE1.0</b>	<b>Sample and Test Specifics for Follow-Up Tests at UL</b>				
Model	Component	Material	Test	Sample (s)	Test Specifics
N/A	-	-	-	-	-