UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Component Recognition
CCN:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Complementary CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Product:	Switching Power Supply Series
Model:	101912, F3-MMM-PPRR, FF-MMM-PPRR, F4-MMMM-PPRR, F6-MMMM-PPRR, F7-MMMM-PPRR, F8-MMMMMM-PPRR, FX-MMMMMM-PPRR (Where M can be a combination of letter A-K and any number 0-9; where P can be an any number 0-6 or blank; where R can be a combination of a number 1-2 and a letter R or S, "-" provided optionally)
Rating:	Input rated: F3-MMM-PPRR: 100-120/200-240VAC 50/60 Hz, 6.0/3.0 A FF-MMM-PPRR: 100-120/200-240VAC 50/60 Hz 6.0/3.0 A F4-MMMM-PPRR: 100-120/200-240VAC 50/60 Hz, 6.0/3.0 A F6-MMMM-PP-RR: 100-120/200-240VAC 50/60 Hz 9.0/4.0 A F7-MMMM-PPRR: 100-120/200-240 50/60 Hz 11.5 A F8-MMMMMM-PPRR: 100-240VAC 50/60 HZ 11.5A FX-MMMMMM-PPRR : 100-240VAC 50/60 Hz 17.0A 101912: 100-240VAC 50/60 Hz 11.5A Output rated: See model differences for details.
Applicant Name and Address:	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.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

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

Prepared by: Patrick Lan / Project Handler Reviewed by: Gregory Ray / 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 to dc power supply for building-in. The power supply consists of an input power platform and various plug-in Output Modules. Each plug-in Output Module is either 1,2 or 3 slot width. Power platform Models F3 and FF supports 1-3 slots, power platform Models F4, F6, and F7 supports 1-4 slots and power platform Models F8 and FX supports 1 to 6 slots, in any combination of 1, 2 or 3 slot plug-in modules.

Model Differences

All models are provided with a power platform that is provided with various combinations of Output Modules.

Models within Model F3 Series and FF Series are identical, with exception to the output wattage rating, enclosure length dimensions, and dc fan options. See output rating table provided below.

Models within Models F4 Series, F6 Series, and F7 Series are identical, with exception to the output wattage rating and enclosure length dimensions. See output rating table provided below.

Model F8 Series and FX Series are identical, with exception to the output wattage rating and enclosure length dimensions. See output rating table provided below.

Model 101912 consists of a F7 Platform and E1, A6 and G2 Output Modules. PWB's are provided with an acrylic conformal coating and suitable for 4500m.

Output Rating at 50°C:
F3 Series: Max. 300 W (100-120/200-240 Vac input): up to 3 output modules provided.
FF Series: Max. 350 W (100-120/200-240 Vac input): up to 3 output modules provided.
F4 Series: Max. 400 W (100-120/200-240 Vac input): up to 4 output modules provided.
F6 Series: Max. 600 W (100-120/200-240 Vac input): up to 4 output modules provided.
F7 Series: Max. 700 W (100-120/200-240 Vac input): up to 4 output modules provided.
F8 Series: Max. 800 W (100-240 Vac input): up to 6 output modules provided.
FX Series: Max. 1000 W (100-240 Vac input): up to 6 output modules provided.

Output Module Ratings:
Module A0: 62.5 Vdc, 2A
Modules AX (where X may be 0-6, 7, 8, 9): 1 Slot Module, 2.0 to 60 Vdc, Max. 20 A, Max.144 W
Modules A$ (where $ may be A-C, G, H, J, M, P, and S): 1 Slot Module, 2.2 to 54 Vdc, Max. 135 W
Modules BX (where X may be 1 to 9, A to H, J, K, M, N, P, and R): 2 Slot Module, 2 to 48 Vdc, Max. 60 A, Max. 400 W

Modules CX (where X may be 1-3 and 6-9, and CK): 3 Slot Module, 2 to 48 Vdc, Max. 100 A, Max. 504 W
Modules C% (where % may be A-F, M, N, P, and R): 3 Slot Module, 2.2 to 42 Vdc, Max. 100 A, Max. 520 W
Modules DX (where X may be 1-4): 2 Slot Module, Dual Output: V1=5 to 15 Vdc, Max. 10 A, 249 W, V2=12 to 25 Vdc, Max. 10 A, Max 249 W
Modules EX (where X may be 1-3): 2 Slot Module, Triple Output: V1=1 to 12 Vdc, Max. 14 A, 102 W, V2=12 to 15 Vdc, Max. 102 W
Modules GX (where X may be 1-7): 1 Slot Module, Dual Output: V1=5.0 to 24 Vdc, Max. 8 A, Max. 48 W, V2=5.0 to 24 Vdc, Max. 8 A, Max. 48 W,
Modules HX (where X may be 3-6): 1 Slot Module, 5.0 to 24 Vdc, Max 8 A, Max. 48 W
Modules H@ (where @ may be C, D, H, and J): 1 Slot Module, 5.2 to 14 Vdc, Max. 8 A, Max 44 W
Modules J# (where # may be 1-9 or A-H or J, K, M, N, P, R, S, and T): 1 Slot Module, 2.0 to 60 Vdc, Max. 35 A, 210 W
Modules K# (where # may be 1-8): 1 Slot Module, 3.3 V to 48 Vdc, Max. 10 A, Max. 180 W

Output Module Differences - All models are identical, except as specifically described below:

Module A$ Series are identical to Module AX Series, except for minor secondary components changes that are not related to safety.
Module BX Series are identical, except for transformer windings and minor differences in the (SELV) circuit which do not affect safety.
Module C% Series are identical to Module CX Series, except for minor secondary components change not related to safety.
Models in the Module DX Series are identical, except for number of turns in the transformers winding and minor changes to the secondary components not related to safety.
Models in the Module EX Series are identical, except for number of turns in the transformers winding and minor secondary components not related to safety.
Models in the Module GX Series are identical, except for number of turns in the transformers winding and minor secondary components not related to safety.
Module H@ Series are identical to Module HX Series, except for minor secondary components not related to safety.
Models in the Module J# Series are identical, except for minor secondary components not related to safety.
Module K# Series are similar to Module J# except for secondary components and component to accommodate a 2nd voltage outputs.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : To be determined in the end product
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20 A for all Platform Models, 30A for Models F8 and FX.
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : 3048 m; 4500 m for Model 101912

- § Altitude of test laboratory (m) : 100 m
- § Mass of equipment (kg) : 1.80
- § The product was submitted and evaluated for use at the maximum ambient temperature (Tma) 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 means of connection to the mains supply is: For building-in, to be determined in the end-product.
- § The product is intended for use on the following power systems: TN
- § The equipment disconnect device is considered to be: For building-in, to be determined in the end-product.
- § The product was investigated to the following additional standards: UL 62368-1 - Edition 2 - Issue Date 2014-12-01, CSA C22.2 NO. 62368-1-14 - Edition 2 - Issue Date 2014-12-01; EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011+A2:2013 (which includes all European national differences, including those specified in this test report).
- § According to IEC60664-1, Table A2, required Clearances have been adjusted by multiplying the clearance at sea level by a factor of 1.15 for operating at an altitude of 3048 meters and 1.29 for operating at an altitude of 4000 meters. The correction factor is based on barometric pressure of 70kPa and Overvoltage Category II. If the calculated Clearance exceeded the Creepage, the Creepage was adjusted to the value of clearance. No other additional requirements were considered at this time as they are not explicitly addressed in 60950-1.

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:

- § 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) for Models F3 and FF Series is suitable for factory wiring. The output terminals and/or connectors have not been investigated for field wiring. Terminal block (TB1) is suitable for copper wire only, 22-14 AWG, 10 lb. torque, 110°C.
- § For Model F3 Series, the maximum continuous output power shall not to exceed 300 W for input voltages 100-240 Vac, when used with any combination of output modules.
- § For Model FF Series, the maximum continuous output power shall not to exceed 350 W for input voltages 100-240 Vac when used with any combination of output modules.
- § For Model F4 Series, the maximum continuous output power shall not to exceed 400 W for input voltages 100-240 Vac, when used with any combination of output modules.
- § For Model F6 Series, the maximum continuous output power shall not to exceed 600 W for input voltages 100-240 Vac, when used with any combination of output modules.
- § For Model F7 Series, the maximum continuous output power shall not to exceed 700 W for input voltages 100-240 Vac, when used with any combination of output modules.
- § For Model F8 Series, the maximum continuous output power shall not to exceed 800 W for input voltages 100-240 Vac, when used with any combination of output modules.
- § For Model FX Series, the maximum continuous output power shall not to exceed 1000 W for input voltages 100-240 Vac, when used with any combination of output modules.
- § GDT, meeting basic insulation, provided in series with Line to Ground VDR in order to meet the requirements of sub-clause 1.5.9.4.
- § The following Production-Line tests are conducted for this product: Earthing Continuity, Electric Strength
- § The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-

Earthed Dead Metal: 240 Vrms, Primary-SELV: 314 Vrms, 538 Vpk

- § The following secondary output circuits are SELV: All outputs, except for Module A0.
- § The following secondary output circuits are at hazardous energy levels: All outputs
- § The power supply terminals and/or connectors are: Suitable for factory wiring only
- § The maximum investigated branch circuit rating is: 20 A for all Platform Models, except for Models F8 and FX, the maximum investigated branch circuit rating is 30 A.,
- § The investigated Pollution Degree is: 2
- § Proper bonding to the end-product main protective earthing termination is: Required
- § An investigation of the protective bonding terminals has: Not been conducted
- § The following input terminals/connectors must be connected to the end-product supply neutral: Terminal marked "N" on the supply connector (J1) for Models F3 and FF only.,
- § The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): Platform: T1, L1, L2, L3 (Class F); Modules: T3 (Class F),
- § The following end-product enclosures are required: Mechanical, Fire
- § The equipment is suitable for direct connection to: AC mains supply
- § Fans: The fan provided in this sub-assembly is provided with a fan guard to reduce the risk of operator contact with the stator. Compliance shall be determined in the end-product.
- § 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 UL 62368-1 Annex G.10. Additional testing should not be needed if directly connected to mains e.g. using an appliance inlet, wiring terminals, etc.

Additional Information

This CB Report is a reissue of CBTR Ref. No. E139109-A60-CB-2 (issued on 2013-04-30), CB Test Certificate Ref. No. US-21485-UL. Based on previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, it has been determined that the product complies with the standard. All required testing was carried out under the original investigation. No testing was considered necessary to upgrade the report to IEC 60950-1, Second Edition, Amendment 2.

Required values for clearance are adjusted for 3048 m (1.15 correction factor as per IEC 60664-1, Table A2), Model 101912 clearance values are adjusted for 4500 m (1.4 correction factor as per IEC 60664-1, Table A2).

The nameplate markings provided as an Enclosure - Marking Plate are considered representative of the entire series.

Manufacturer to provide up to date IEC Licensed for component licenses greater than 3 years upon request.

The need for the additional testing and evaluation shall be determined in the end product investigation.

Additional Standards

The product fulfills the requirements of: EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011+A2:2013; UL 62368-1 - Edition 2 - Issue Date 2014-12-01, CSA C22.2 NO. 62368-1-14 - Edition 2 - Issue Date 2014-12-01

Markings and instructions

Clause Title	Marking or Instruction Details