Certificate of Compliance

Certificate Number **20130502**
Report Reference **E210157-A43**
Issue Date **2013 May 2**

Underwriters Laboratories

Issued to: ERICSSON AB

Farogatan 6
Stockholm, SE-164 80
Sweden

This is to certify that representative samples of

Power Interface Module
PIM 4328 P, PIM 4328 PD and PIM 4328 PDA
May be followed by alphanumeric suffix (not safety related).

Have been investigated by UL LLC in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: CSA C22.2 No. 60950-1-07 + A1:2011, UL 60950-1 2nd Ed. Revised 2011-12-19

Additional Information: See UL On-line Certification Directory at WWW.UL.COM for additional information, and the report E210157-A43for definition of suffixes.

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Look for the UL Recognized Component Mark on the product

William R. Carney
Director, North American Certification Programs
UL LLC

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UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12 (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)
Product:	Power Interface Module
Model:	PIM 4328 P, PIM 4328 PD and PIM 4328 PDA May be followed by alphanumeric suffix (not safety related), see Model Differences.
Rating:	All ratings are optional, Input rated: 36-72 V dc Outputs rated: output 1; Filtered Output rated, 36-72 V dc, 10 A output 2; 3.3 V dc, 3.6 A output 3; 5.0 V dc, 150 mA
Applicant Name and Address:	ERICSSON AB FAROGATAN 6 SE-164 80 STOCKHOLM SWEDEN

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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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.

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Prepared by: Stefan Gardenberg Reviewed by: Jan Jensen

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Supporting Documentation
The following documents located at the beginning of this Procedure supplement the requirements of this Test Report: A. Authorization - The Authorization page may include additional Factory Identification Code markings. B. Generic Inspection Instructions - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report. ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report. iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

Product Description

The product is a dual feed Power Interface Module with EMI filter, hot swap functionality, hold-up charge and management, isolated management power outputs and optional digital communication interface. The product has two different normal conditions: one for BASIC INSULATION and one for FUNCTIONAL INSULATION.

Model Differences

PIM 4328 P is the standard product with 5.33 mm pins, a suffix is added for other pin lengths.
Definition of suffixes:
LA - pins cut to 3.69 mm
LB - pins cut to 4.57 mm
PIM 4328 PD and PIM 4328 PDA are based on PIM 4328 P, with difference that they provide an optional digital interface for monitoring of input voltages, output current, hold up voltage and temperature. PIM 4328 PD is provided with PMBus interface and PIM 4328 PDA is provided with a I2C interface.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : not applicable
- Operating condition : continuous
- Access location : not applicable
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : not applicable
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : -
- Class of equipment : Special Application - TNV-2
- Considered current rating of protective device as part of the building installation (A) : not applicable
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : less than 2000 m
- Altitude of test laboratory (m) : 30 m
- Mass of equipment (kg) : 26g
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: normal conditions for BASIC INSULATION: opto coupler temperature: 110°C, transformer winding temperature: 90°C and normal conditions for FUNCTIONAL INSULATION: opto coupler temperature: 110°C, transformer winding temperature: 130°C. Refer to thermal considerations, enclosure 7-08.
- The product has been tested for Functional and Basic Insulation.
- The temperature of the product depends on many factors, for example ambient temperature, air flow, and board temperature. Forced cooling may be necessary to not exceed the normal conditions temperatures specified in the manufacturer's specification for BASIC INSULATION and FUNCTIONAL INSULATION. See additional information for the test setup with forced air cooling.

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 investigated Pollution Degree is: 2
- The following end-product enclosures are required: Fire
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing: normal conditions for BASIC INSULATION: opto coupler temperature: 110°C, transformer winding temperature: 90°C and normal conditions for FUNCTIONAL INSULATION: opto coupler temperature: 110°C, transformer winding temperature: 130°C. Refer to thermal considerations, enclosure 7-08.
- At normal conditions considering the source is centralized d.c. power system (DC mains voltage, treated as TNV-2 circuit (> 60 Vdc up to and including 80 Vdc) for FUNCTIONAL INSULATION output 2 and 3 voltages and alarm (supplied by output 2 or 3) are within SELV limits, if one of the following requirements is satisfied: 1) The input source to the DC/DC Converter is separated from primary circuit by DOUBLE/REINFORCED INSULATION (SELV or TNV-2 circuit). Confirmed for input source voltage up to 72Vdc by evaluation per sub-clause 2.2.4, 2.3.2 and 5.3.4 and demonstrated by e.g. fault condition testing where the FUNCTIONAL INSULATION barriers have been short circuited and by electric strength test conducted across insulation, or 2) The input source to the DC/DC Converter is separated from primary circuit by minimum BASIC INSULATION and the SELV circuits reliably connected to main earth terminal. Confirmed for input source voltage up to 72Vdc by evaluation per sub-clause 2.2.4, 2.3.2 and 5.3.4 and demonstrated by e.g. fault condition testing where the FUNCTIONAL INSULATION barriers have been short circuited and by electric strength test conducted across insulation, or 3) The input source to the DC/DC Converter is separated from primary circuit by BASIC or SUPPLEMENTARY INSULATION, the input source voltage shall not exceed 60 Vdc (ELV) and reliably connected to main earth terminal.
- It shall be protected by a 15 A time lag fuse in end-product.
- At normal conditions considering the source is centralized d.c. power system (DC mains voltage, treated as TNV-2 circuit (> 60 Vdc up to and including 80 Vdc) for BASIC INSULATION output 2 and 3 voltages and alarm (supplied by output 2 or 3) are within SELV limits, if one of the following requirements is satisfied: 1) The input source to the DC/DC Converter is separated from primary circuit by minimum SUPPLEMENTARY INSULATION, or 2) The input source to the DC/DC Converter is separated from primary circuit by minimum FUNCTIONAL INSULATION and the SELV circuits reliably connected to main earth terminal and the DC mains supply system shall be entirely within a single building.

Additional Information

Testing was performed with the product mounted on the manufacturer's dedicated test board, with the product's pins pressed into sockets (soldered pins have lower thermal and electrical resistance), during testing at normal conditions for BASIC INSULATION a fan was used to limit the temperature, UL R/C Sunon, type KD1204PFS2, 7.0 CFM, supplied by 12Vdc, located at a distance 30cm from the longer edge of the unit. Measured air velocity: 0.96m/s at the edge of the unit. See enclosure 4-04 for airflow direction.

Re-issue of CB report due to standard upgrade to IEC 60950-1 2nd ed amendment 1 was conducted, and all previous tests and test results reviewed to be able to judge any need for re-testing for the cause of the upgrade. Alternate models PIM 4328 PD and PIM 4328 PDA were added by this investigation, and therefore a new ES test was conducted. The address to the applicant and manufacturer was modified (from Isafjordsgatan 16B, to Farogatan 6). The critical component list was revised. The client has implemented a Quality Control Program to be able to use Table 2Q. The report E210157-A43-CB-2 shall replace previous issued reports (original dated 2010-12-30 and Amendment 1 dated 2011-03-26), and CBTC DK-21388 and DK-21388-A1.