Test Report issued under the responsibility of:

TEST REPORT
IEC 60950-1
Information technology equipment - Safety - Part 1: General requirements

Report Reference No ..... :	4786910624-14
Date of issue ..... :	2015-09-18
Total number of pages ..... :	120
CB Testing Laboratory ..... :	UL Japan, Inc.
Address ..... :	4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Applicant's name ..... :	TDK-LAMBDA CORP
Address ..... :	NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN
Test specification:	
Standard ..... :	IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60950_1F
Test Report Form originator ..... :	SGS Fimko Ltd
Master TRF ..... :	Dated 2014-02

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Test item description ..... :	Switching Power Supply
Trade Mark ..... :	TDK·Lambda or TDK·Lambda
Manufacturer ..... :	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN
Model/Type reference ..... :	ZWQ130 series, Model ZWQ130-522z/y z = B, 3, D, 5, 2, 4, /y = /L, /A, /FG, /LFG, /AFG, /LWQ, /LAC or blank
Ratings ..... :	Input: AC100-240V, 50/60Hz, 2.1A Output: Refer to “Product Description”

Testing procedure and testing location:		
[x]	**CB Testing Laboratory**	
	Testing location / address .....:	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
[ ]	**Associated CB Test Laboratory**	
	Testing location / address .....:	
	Tested by (name + signature).....:	Ayano Matsumoto A. Matsumoto
	Approved by (name + signature)....:	Tetsuo Iwasaki Tetsuo Iwasaki
[ ]	**Testing Procedure: TMP/CTF Stage 1**	
	Testing location / address .....:	
	Tested by (name + signature).....:	
	Approved by (name + signature)....:	
[ ]	**Testing Procedure: WMT/CTF Stage 2**	
	Testing location / address .....:	
	Tested by (name + signature).....:	
	Witnessed by (name + signature) ..:	
	Approved by (name + signature)....:	
[ ]	**Testing Procedure: SMT/CTF Stage 3 or 4**	
	Testing location / address .....:	
	Tested by (name + signature).....:	
	Approved by (name + signature)....:	
	Supervised by (name + signature) .:	
[ ]	**Testing Procedure: RMT**	
	Testing location / address .....:	
	Tested by (name + signature).....:	
	Approved by (name + signature)....:	
	Supervised by (name + signature) .:	

List of Attachments

National Differences (24 pages)
Enclosures (25 pages)

Summary Of Testing

Unless otherwise indicated, all tests were conducted at UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie,

516-0021, Japan.	
Tests performed (name of test and test clause)	**Testing location / Comments**
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)	
Humidity (2.9.1, 2.9.2, 5.2.2)	
Determination of Working Voltage; Working Voltage Measurement (2.10.2)	
Transformer and Wire /Insulation Electric Strength (2.10.5.13)	
Heating (4.5.1, 1.4.12, 1.4.13)	
Ball Pressure (4.5.5, 4.5)	
Touch Current (Single-Phase; TN/TT System) (5.1, Annex D)	
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)	
Summary of Compliance with National Differences:	
Countries outside the CB Scheme membership may also accept this report.	
List of countries addressed: CA, DE, DK, EU, FI, GB, KR, SE, SI, US	
The product fulfills the requirements of: EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013	

Copy of Marking Plate - Refer to Enclosure titled Marking Plate for copy.

Test item particulars :	
Equipment mobility ..... :	for building-in
Connection to the mains ..... :	not directly connected to the mains
Operating condition ..... :	continuous
Access location ..... :	built-in application
Over voltage category (OVC) ..... :	OVC II
Mains supply tolerance (%) or absolute mains supply values ..... :	-10%, +6%
Tested for IT power systems ..... :	Yes
IT testing, phase-phase voltage (V) ..... :	230 V
Class of equipment ..... :	Not classified
Considered current rating of protective device as part of the building installation (A) ..... :	16A (for Europe) , 20A (for Canada and USA)
Pollution degree (PD) ..... :	PD 2
IP protection class ..... :	Not rated, built-in application
Altitude of operation (m) ..... :	≤ 3000 m
Altitude of test laboratory (m) ..... :	< 1000 m
Mass of equipment (kg) ..... :	0.73kg (approx.)
Possible test case verdicts:	
- test case does not apply to the test object ..... :	N/A
- test object does meet the requirement ..... :	P(Pass)
- test object does not meet the requirement ..... :	F(Fail)
Testing:	
Date(s) of receipt of test item ..... :	N/A
Date(s) of Performance of tests ..... :	2006.05 to 2006.06
General remarks:	
"(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report. Throughout this report a point is used as the decimal separator.	
Manufacturer's Declaration per Sub Clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... When differences exist, they shall be identified in the General Product Information section.	Yes
Name and address of Factory(ies):	TDK-LAMBDA CORP 2704-1 SETTAYA-MACHI

NAGAOKA-SHI
NIIGATA-KEN 940-1195 JAPAN

TDK-LAMBDA MALAYSIA SDN BHD
PLO33 KAWASAN PERINDUSTRIAN SENAI
81400 SENAI MALAYSIA

TDK-LAMBDA MALAYSIA SDN BHD
LOT 2 & 3, BATU 9 3/4
KAWASAN PERINDUSTRIAN
BANDAR BARU JAYA GADING
26070 KUANTAN MALAYSIA

ALPS LOGISTICS FACILITIES CO LTD
593-1 NISHIOOHASHI
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Wuxi TDK-Lambda Electronics Co Ltd
NO 6
XING CHUANG ER LU
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SENDAN ELECTRONICS MFG CO LTD
1010 HABUSHIN
NANTO-SHI
TOYAMA-KEN 939-1756 JAPAN

ZHANGJIAGANG HUA YANG ELECTRONICS CO LTD
TONGXIN RD
ZHAOFENG ECONOMIC DEVELOPMENT ZONE
LEYU TOWN
ZHANGJIAGANG
JIANGSU 215622 CHINA

GENERAL PRODUCT INFORMATION:

Report Summary

All applicable tests according to the referenced standard(s) have been carried out.

Product Description

The product tested is a built-in type power supply for use in a general office environment. (Host equipment is not specified)

Models without /LWQ	Ouput V1	Ouput V2	Ouput V3	Ouput V4
ZWQ130-522B/y				2Vdc, 12.0/10.0A
ZWQ130-5223/y				2.0 – 3.63Vdc, 12.0/10.0A
ZWQ130-522D/y	5 – 5.25Vdc, 19/15A	12/15Vdc, 5.0/4.0A	-12/-15Vdc, 5.0/4.0A	4Vdc, 12.0/10.0A
ZWQ130-5225/y				2.0 – 5.25Vdc, 12.0/10.0A

ZWQ130-5222/y 11.4 – 12.6Vdc, 5.0/4.0A
ZWQ130-5224/y 22.8 – 25.2Vdc, 2.5/2.0A

Output current: (forced air cooling/convection cooling)

Max. total output power: 130W for convection cooling
170W for forced air cooling and peak current

Models with /LWQ	Ouput V1	Ouput V2	Ouput V3	Ouput V4
ZWQ130-522B/LWQ				2Vdc, 10.0/10.0A
ZWQ130-5223/LWQ				2.0 – 3.63Vdc, 10.0/10.0A
ZWQ130-522D/LWQ	5 – 5.25Vdc, 19/15A	12/15Vdc, 5.0/4.0A	-12/-15Vdc, 5.0/4.0A	4Vdc, 10.0/10.0A
ZWQ130-5225/LWQ				2.0 – 5.25Vdc, 10.0/10.0A
ZWQ130-5222/LWQ				11.4 – 12.6Vdc, 5.0/4.0A
ZWQ130-5224/LWQ				22.8 – 25.2Vdc, 2.5/2.0A

Output current: (forced air cooling/convection cooling)

Max. total output power: 130W for convection cooling
170W for forced air cooling and peak current

Model Differences

ZWQ130 series are identical each other except for output rating, winding of Transformer T1, and minor primary and secondary components.

Definition of variable(s):

Variable:	Range of variable:	Content:
z	B, 3, D, 5, 2, 4	Output voltage of Output V4 (see page 2 and 3)
/y	/L, /A, /FG, /LFG, /AFG, /LWQ, /LAC or blank	Blank: basic model (PWB type SWPS) /L : denotes models with chassis provided /A : denotes models with chassis and cover provided /FG: denotes models with capacitors (C2, C3) rated less than 2200pF and capacitor (C7) rated less than 1000pF. /LFG: denote models combination of /L and /FG /AFG: denote models combination of /A and /FG /LWQ: denotes models with optional chassis provided and output rated current changed. /LAC: denotes models with optional chassis provided and direction of input connector changed.

Additional Information

This report is a reissue of CBTR Ref. No.: 12027316 001, 12027316 002, CB Test Certificate Ref. No.JPTUV-045996, JPTUV-045996-M1. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product continues to comply with the standard.

Sample Received date is 2006-05-11.
Construction review was conducted on 2006-06-29.

Abbreviations used in the report.
- built-in application: B/I

Test conditions:
These serial of switching power supplies can be operated under convection and forced air cooling methods. When the switching power supply were operated under forced air cooling, tests were conducted with a 30cmf (0.85m^3/min) air flow located 100mm from the input terminal side. The max. output power is 130W when it was operated under convection cooling method while 170W under forced cooling method.
Testing was performed under different conditions considering of chassis, cover, cooling methods and mounting styles.
Normal heating tests were conducted to the representative models ZWQ130-5224 or ZWQ130-5224/A or ZWQ130-5224/L, the loads are separated into ten different test conditions:

Load No.	V1 +5V	V2 +12V	V3 -12V	V4 +24V	Total output power
With convection cooling					
1	15A	1.51A	1.5A	0.79A	130W
2	5.46A	4A	2.28A	1.14A	130W
3	5.46A	2.28A	4A	1.14A	130W
4	5.46A	2.28A	2.28A	2A	130W
5*	6.5A	2.7A	2.7A	1.37A	130W
With forced air cooling					
6	19A	2.08A	2.08A	1.05A	170W
7	7.32A	5A	3.06A	1.53A	170W
8	7.32A	3.06A	5A	1.53A	170W
9	7.32A	3.06A	3.06A	2.5A	170W
10*	8.52A	3.54A	3.54A	1.77A	170W

*Average value for all outputs.

In this Test Report, CENELEC mark license indicating compliance to EN standard was used to verify component compliance to IEC standard because the standards are technically equivalent.

It was considered that UL Standard has requirements that meet or exceed the relevant IEC requirements.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: See enclosure Id 7-01.
- The product is intended for use on the following power systems: TN
- The product was investigated to the following additional standards: 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).

Engineering Conditions of Acceptability

When installed in an end-product, consideration must be given to the following:

- The end-product Electric Strength Test is to be based upon a maximum working voltage of: max working voltage: 458 Vrms, 714 Vpk
- The following secondary output circuits are SELV: All output
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20 A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- An investigation of the protective bonding terminals has: Not been conducted
- 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): T1 (Class B)
- The following end-product enclosures are required: Fire, Electrical

Abbreviations used in the report:

- normal condition	N.C.	- single fault condition	S.F.C
- operational insulation	OP	- basic insulation	BI
- basic insulation between parts of opposite polarity:	BOP	- supplementary insulation	SI
- double insulation	DI	- reinforced insulation	RI

Indicate used abbreviations (if any)