Test Report issued under the responsibility of:

TEST REPORT
IEC 62368-1
Audio/video, information and communication technology equipment
Part 1: Safety requirements

Report Number .....:	E220248-A6005-CB-1
Date of issue.....:	2019-09-18
Total number of pages .....:	56
Applicant's name.....:	**TDK-LAMBDA AMERICAS INC**
Address .....:	**SUITE 100** **3320 MATRIX DR** **RICHARDSON TX 75082** **UNITED STATES**
Name of Test Laboratory preparing the Report .....:	UL RTP 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA
Test specification:	
Standard.....:	IEC 62368-1:2014 (Second Edition)
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC62368_1B
Test Report Form(s) Originator .....:	UL(US)
Master TRF.....:	2014-03

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory.
The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test Item description :	DC-DC Converter
Trade Mark .....:	TDK
Manufacturer .....:	TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES
Model/Type reference .....:	i3A4W***A%%%V-0xx(-R) Where 4W represents input Voltage between 9 - 53 VDC 10 A Max input current *** represents rated output current between 0 A - 10A, %%% represents rated output voltage between 0 V dc to 30 Vdc. and 0xx indicates a number of alphanumeric characters to denote non safety features. It may also be followed by optional "-R " to denote RoHS compliance. Model examples: i3A4W005A150V-0xx(-R) i3A4W008A033V-0xx(-R)
Ratings .....:	Optional: Rated input Voltage 9-53 VDC Rated Input Current 10 A Rated Power 100 W Rated output: 30 VDC max; 10 A max.
Testing procedure and testing location:	
☒ CB Testing Laboratory:	
Testing location/ address ..... :	UL RTP, 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA
Tested by (name + signature).....:	Mengis Tesfay / Project Handler
Approved by (name + signature) .....:	Scott Shepler / Reviewer
☐ Testing procedure: CTF Stage 1	
Testing location/ address..... :	

Tested by (name + signature).....:		
Approved by (name + signature) .....:		
☒ Testing procedure: CTF Stage 2		
Testing location/ address..... :	TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES	
Tested by (name + signature).....:	See previously issued VDE CBTR for names, functions, and signatures / --	See previously issued VDE CBTR for names, functions, and signatures
Witnessed by (name + signature).....:	See previously issued VDE CBTR for names, functions, and signatures / --	See previously issued VDE CBTR for names, functions, and signatures
Approved by (name + signature) .....:	See previously issued VDE CBTR for names, functions, and signatures / --	See previously issued VDE CBTR for names, functions, and signatures
☐ Testing procedure: CTF Stage 3		
☐ Testing procedure: CTF Stage 4		
Testing location/ address..... :		
Tested by (name + signature).....:		
Witnessed by (name + signature).....:		
Approved by (name + signature) .....:		
Supervised by (name + signature) .....:		

List of Attachments (including a total number of pages in each attachment): National Differences (30 pages) Enclosures (57 pages)	
Summary of testing:	
Tests performed (name of test and test clause):	**Testing Location:** **CTF Stage 2: TDK-LAMBDA AMERICAS INC** **SUITE 100** **3320 MATRIX DR** **RICHARDSON TX 75082** **UNITED STATES**
INPUT TEST: SINGLE PHASE (B.2.5)	Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.
NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT (B.2.6)	Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.
SIMULATED ABNORMAL OPERATING CONDITIONS (B.3)	Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.
SIMULATED SINGLE FAULT CONDITIONS (B.4)	Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.

Summary of compliance with National Differences:

List of countries addressed: AU,NZ, JP, EU Group Differences, US,CA

☒ **The product fulfils the requirements of:** EN 62368-1:2014 + A11:2017

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Note: The above markings are the minimum requirements required by the safety lab. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

TEST ITEM PARTICULARS:	
Classification of use by	Instructed person
Supply Connection	External Circuit - not Mains connected ES1
Supply % Tolerance	None
Supply Connection – Type	For building in. To be considered in end system
Considered current rating of protective device as part of building or equipment installation	N/A
Equipment mobility	for building-in
Over voltage category (OVC)	OVC I
Class of equipment	Not classified
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	25
IP protection class	IPX0
Power Systems	N/A
Altitude during operation (m)	2000 m or less
Altitude of test laboratory (m)	180 m m
Mass of equipment (kg)	0.1
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 of receipt of test item..... :	2017-02-20, 2019-09-04
Date (s) of performance of tests..... :	2017-02-20 to 2017-05-16, 2019-09-04
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 ☐ comma / ☒ 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 location 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 ..... :	☒ **Yes** ☐ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES TDK-LAMBDA MALAYSIA SDN BHD PLO33 KAWASAN PERINDUSTRIAN SENAI 81400 SENAI JOHOR MALAYSIA

GENERAL PRODUCT INFORMATION:

Report Summary

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

Product Description

EUT is high density non-Isolated DC-DC Converter modules. The converters are provided with input terminal pins for factory installation onto a printed wiring board with a connection to a dc source of supply and output terminal pins.

Model Differences

All models are identical except for minor changes to the components based upon the output voltage rating of the unit.

Additional application considerations – (Considerations used to test a component or sub-assembly) -

This report is based on VDE CB report references 236795-CI3-1 and CB Test Certificate Ref. DE1-58783 respectively which was previously evaluated to UL/CSA/IEC 60950-1, 2nd edition, + Amendment 1 & 2. Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required per IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014. Testing correlation explanation provided in Enclosure.

All original sample and test dates are noted in the testing portion of this report. No test is conducted on 2019-09-04. The date is noted for construction review only. Construction Review dated 2019-09-04 was done at the CBTL.

Marking label provided represents all models in series.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 25 °C
- The product is intended for use on the following power systems : No direct connection
- Considered current rating of protective device as part of the building installation (A) : For building in. To be considered in end system. Device was evaluated with a 20 A external overcurrent protective device.
- Mains supply tolerance (%) or absolute mains supply values : No direct connection
- The equipment disconnect device is considered to be : To be considered in end system
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standards : EN 62368-1:2014 + A11:2017

Engineering Conditions of Acceptability

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

- The following output circuits are at ES1 energy levels : All input and output
- The following output circuits are at PS3 energy levels : Outputs: 1.8 Vdc, 2.5 Vdc and 3.3 Vdc
- The maximum investigated branch circuit rating is : For building in. To be considered in end system. Device was evaluated with a 20 A external overcurrent protective device.
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Fire, Electrical
- A heating test shall be considered in the end product. The PWB is rated 130°C.