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-A6033-CB-1
Date of issue .....:	2022-02-07 ; Amendment 1 : 2024-02-27
Total number of pages.....:	18
Name of Testing Laboratory preparing the Report.....:	UL Solutions RTP
Applicant's name.....:	**TDK-LAMBDA AMERICAS INC**
Address .....:	**3000 TECHNOLOGY DR, SUITE 100** **PLANO TX 75074** **UNITED STATES**
Test specification:	
Standard .....:	IEC 62368-1: 2018
Test procedure.....:	CB Scheme
Non-standard test method.....:	N/A
TRF template used .....:	IECEE OD-2020-F1:2021, Ed.1.4
Test Report Form No.....:	IEC62368_1E
Test Report Form(s) Originator...:	UL(US)
Master TRF .....:	Dated 2022-04-14

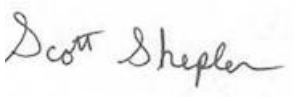
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

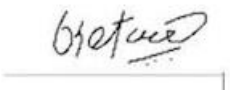
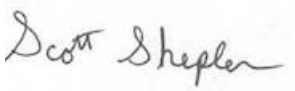
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

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 :	Component DC-DC Power Supply
Trade Mark(s) .....:	None
Manufacturer.....:	TDK-LAMBDA AMERICAS INC 3000 Technology Dr, Suite 100 Plano TX 75074 UNITED STATES
Model/Type reference .....:	i7Azz***A%%%V-#xx(-R) Where where zz may be 4W or 2W or can be any two alpha numeric characters that represents input voltage between 4.5-60Vdc input, 100A max input current, *** represents rated output current between 0A - 100A, %%% represents rated output voltage between 0.8Vdc – 32Vdc, # could be any alphanumeric character and xx indicates a number or alphanumeric character which do not affect safety related features. May be followed by Optional –R indicating RoHS compliance
Ratings .....:	Optional Input: 4.5 - 60 VDC, 100 A Max Output: 0.8 - 32 VDC, 100 A Max 1000 Watts Max

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**		
Testing location/ address .....:		UL Solutions RTP 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA	
Tested by (name, function, signature).....:		Mengis Tesfay / Project Handler	
Approved by (name, function, signature) ..:		Scott Shepler / Reviewer	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address .....:			
Tested by (name, function, signature).....:			

Approved by (name, function, signature) .. :		
☒ **Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :	TDK-LAMBDA AMERICAS INC 3000 Technology Dr, Suite 100 Plano TX 75074 UNITED STATES	
Tested by (name, function, signature)..... :	Ketan Patel / Tester	
Witnessed by (name, function, signature) . :	Mengis Tesfay / Project Handler	
Approved by (name, function, signature) .. :	Scott Shepler / Reviewer	
☐ **Testing procedure: CTF Stage 3:**		
☐ **Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :		
Tested by (name, function, signature)..... :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

National Differences (14 pages)
Enclosures (2 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing Location:**
B.2.5 – INPUT TEST: SINGLE PHASE B.2.6, 5.4.1.4, 6.3, 9.3, B.1.5 – NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT B.3 – SIMULATED ABNORMAL OPERATING CONDITIONS B.4 – SIMULATED SINGLE FAULT CONDITIONS	**CTF Stage 2: TDK-LAMBDA AMERICAS INC** **3000 Technology Dr, Suite 100** **Plano TX 75074** **UNITED STATES**

Summary of compliance with National Differences (List of countries addressed):

Australia - AU, New Zealand - NZ, EU Group Differences, Japan - JP, Saudi Arabia - SA, United States of America - US, Canada - CA

EU Special National Conditions: Denmark, Finland, Norway, Sweden, United Kingdom, and France- Selected National Conditions are not applicable to the evaluated product as identified in the ND TRF.

☒ **The product fulfils the requirements of** EN IEC 62368-1:2020+A11:2020,
AS/NZS 62368.1:2022,
J62368-1(2023),
National standard SASO-IEC 62368-1:2020,
CSA/UL 62368-1:2019

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty (“simple acceptance” decision rule, previously known as “accuracy method”).

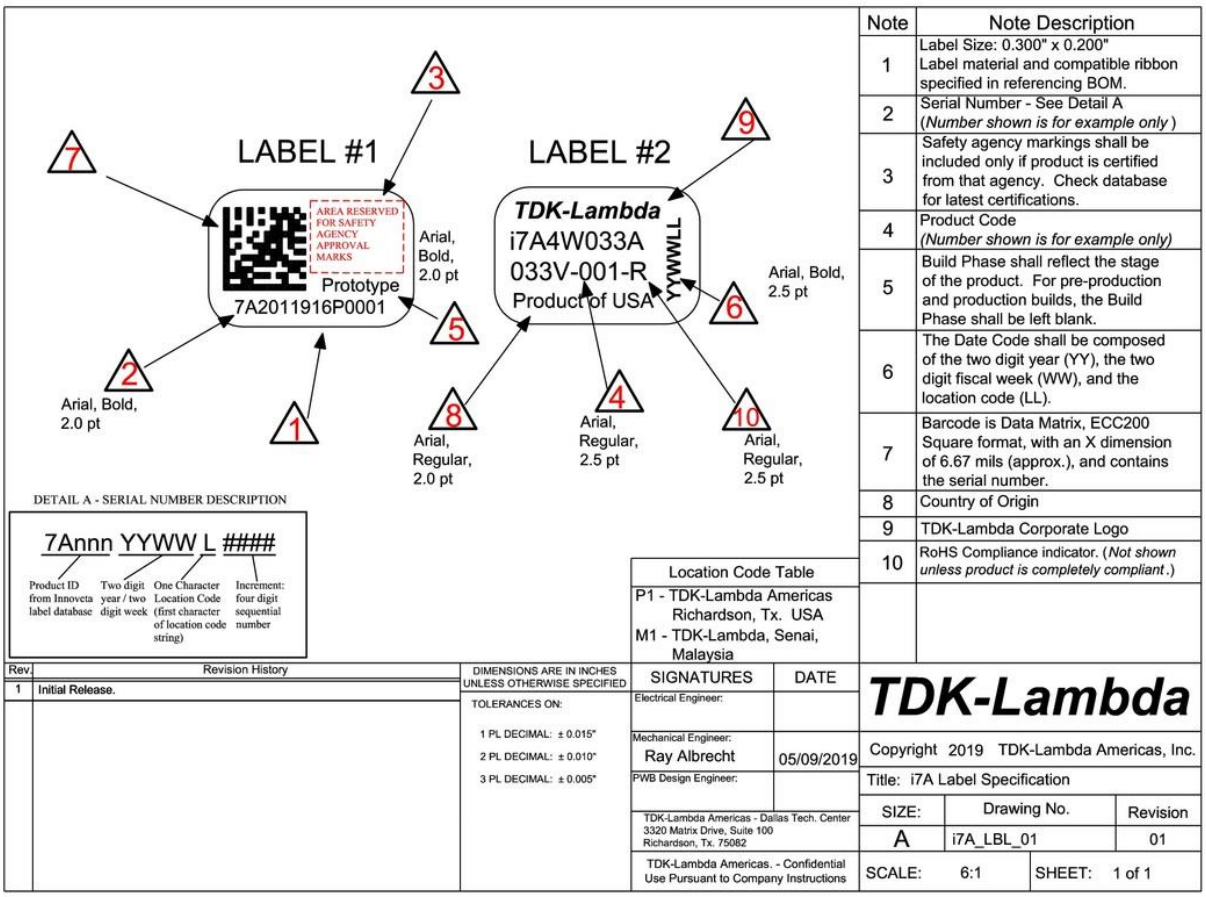
☐ Other:… (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE. IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

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:	
Product group	built-in component
Classification of use by	Instructed person
Supply Connection	not mains connected:
Supply tolerance	None
Supply connection – type	Not connected to Mains
Considered current rating of protective device	75 A. External fuse to be provided in the end product. A; Location: equipment
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Not Classified
Special installation location	N/A 0
Pollution degree (PD)	PD 2
Manufacturer's specified Tma (°C)	25°C, per client's provided de-rating curve
IP protection class	IPX0
Power systems	not AC mains
Altitude during operation (m)	2000 m or less
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	0.10

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 .....: 2023-10-26

Date (s) of performance of tests .....: 2024-01-19 to 2024-01-30

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 3000 Technology Dr, Suite 100 Plano TX 75074 UNITED STATES TDK-LAMBDA MALAYSIA SDN BHD PLO33 KAWASAN PERINDUSTRIAN SENAI 81400 SENAI JOHOR MALAYSIA

General product information and other remarks:

The original report was modified on 2024-02-27 to include the following changes/additions:

Technical Amendment 1: Report E220248-A6033-CB-1 is being updated to increase rating of model i7Azz***A%%%V-#xx(-R). Model input current and output current increase and power changed to 1000Watt. Limited testing was conducted.

Product Description

The i7A product family consists of non-isolated DC-DC power modules intended to be used as a component in an end-user's power system. The modules will be offered in multiple input voltage and output voltage ranges not exceeding ES1 level. The input ranges from 4.5 - 60Vdc input at 100 A max. The output voltage will be adjustable between 0.8V to 32Vdc.

Model Differences

All models within the series are similar except for input rating, output rating, and size of inductor.

Additional Information

Technical Amendment 1: Report E220248-A6033-CB-1 is being updated to increase rating of model i7Azz***A%%%V-#xx(-R). Model input current and output current increase and power changed to 1000Watt. Limited testing was conducted.

This report is based on CB report references E220248-A6002-CB-1, and Amendment 1, with CB Test Certificate Ref. US-33723-UL, and US-33723-M1-UL respectively, which was previously evaluated to UL 62368-1, 2nd Edition, 2014-12-01, CSA C22.2 No. 62368-1- 14, 2nd Edition, 2014-12, and IEC 62368-1:2014.

Testing conducted in accordance with UL 62368-1, 2nd Edition, 2014-12-01, CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12, and IEC 62368-1:2014, was deemed equivalent to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed.

All original sample and test dates are noted in the testing portion of this report.

The nameplate included in the report is representative of all models covered under this report.

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. See derating curve for more details
- 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) : External fast blow 75 A fuse to be provided in the end product.
- Mains supply tolerance (%) or absolute mains supply : No direct connection
- The equipment disconnect device is considered to be : For building in
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standard : EN IEC 62368-1:2020+A11:2020

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
- The following output circuits are at PS3 energy levels : All
- The investigated Pollution Degree is : 2
- An investigation of the protective bonding terminals has : Not been conducted
- The following end-product enclosures are required : Fire
- The maximum continuous power supply output (Watts) relied on forced air cooling from : Ranging from 5.2 to 70 CFM depending on ambient, and load. See Derating Curve
- The power supply was evaluated to be used at altitudes up to : "2,000 m"
- Test was conducted using fast blow external fuse rated 40 A. External fuse employed shall comply with IEC 60127.

  Model I7A24080A033V was tested using 75 A rated external fuses.
- Heating Test need to re-conducted as part of an end product evaluation to ensure the max temperature of 130 C or 155 C is not exceeded depending on PWB ratings.