**Test Report issued under the responsibility of:**

TÜVRheinland®

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

| | |
|---|---|
| **Report Number ..... :** | **50197367 001** |
| Date of issue ..... : | 2020-05-18 |
| Total number of pages ..... : | 88 (excluding attachments, refer to page 3) |
| **Applicant's name..... :** | TDK-Lambda (China) Electronics Co., Ltd. |
| Address ..... : | No. 95, Zhujiang Road, Xinwu District, Wuxi 214028 Jiangsu, P.R. China |
| **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 ..... : | Switching Power Supply |
| Trade Mark ..... : | TDK·Lambda |
| Manufacturer ..... : | Same as applicant |
| Model/Type reference ..... : | CUS30M-zzxxxxxxx; CME30A-zzxxxxxxx<br>(zz = 12, 15, 18, 24, 36 or 48; xxxxxxx = A, U, ADJ, M, CO, SF, P or other alphanumeric character)<br>Refer to page 10 for definition of variables |
| Ratings ..... : | See the model list on page 9 for details |

| | | | |
|---|---|---|---|
| Testing procedure and testing location: | | | |
| ☒ | CB Testing Laboratory: | TÜV Rheinland Shanghai Co., Ltd. | |
| Testing location/ address .....: | | No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China | |
| ☐ | Associated CB Testing Laboratory: | | |
| Testing location/ address .....: | | | |
| Tested by (name + signature) .....: | | Tim Song<br>Technical Expert | |
| Approved by (name + signature) .....: | | Sunny Sun<br>Technical Reviewer | |
| | | | |
| ☐ | 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) .....: | | | |

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

- ATTACHMENT – Measurement Section (5 pages)
- ATTACHMENT – National Differences (35 pages)
- ATTACHMENT – Photo documentation (8 pages)

Note: Total number of pages in each attachment is indicated in individual attachment.

**Summary of testing:**

**Tests performed (name of test and test clause):**

This report is based on original CB report 50088660 001, 50088660 002 with certificate ref. no. JPTUV-082335 and JPTUV-082335-M1 respectively with following changes:

1. Change Applicant and Manufacturer from TDK-Lambda Corp. Nagaoka Technical Center to TDK-Lambda (China) Electronics Co., Ltd.
2. Add additional new factory TDK-Lambda (China) Electronics Co., Ltd.
3. Update test standard from IEC 60950-1 to IEC 62368-1.

All applicable tests as described in test case and appended table were performed. See test cases and appended tables for details.

Unless otherwise specified, throughout this report, all tests were performed on models CUS30M-12/ADJ, CUS30M-18/ADJ and CUS30M-48/ADJ, and perform construction check on model CUS30M-48 to represent other similar models.

The test samples are pre-production without serial numbers.

The maximum specified operation ambient temperature is 70°C.

Specified ambient temperature for operation is according to manufacturer's specification. (see chart of convection cooling on below on below)

The load conditions used during testing: Maximum normal load according to clause B.2.5 for this equipment is the operation with the maximum specified DC-load with maximum power condition according to the manufacturer specified.

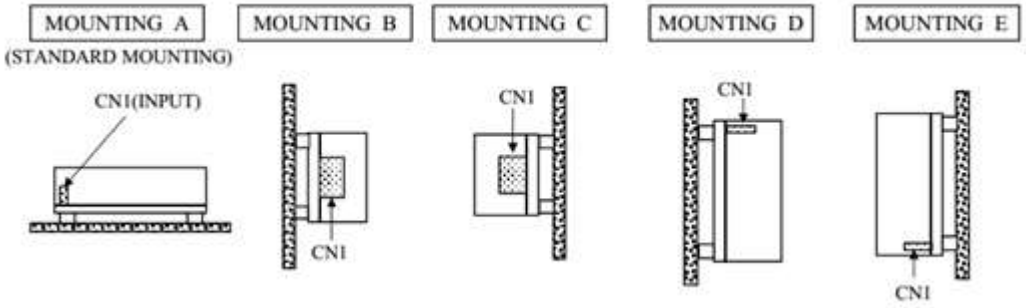
The equipment is operated up to 5000m above sea level as declared by manufacturer. Clearances have been evaluated according to IEC 60664-1 table A.2 with a multiplication factor of 1.48 throughout this report.

**Testing location:**

TÜV Rheinland Shanghai Co. Ltd.

No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China

**Mounting position:**



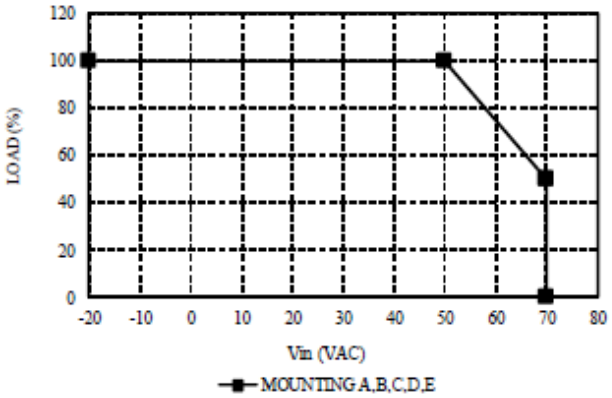

**Derating Curve:**

For CUS30M (excluding CUS30M-/A) series

**(1) 12V,15V,24V,36V model**

Convection Cooling: Mounting A,B,C,D,E

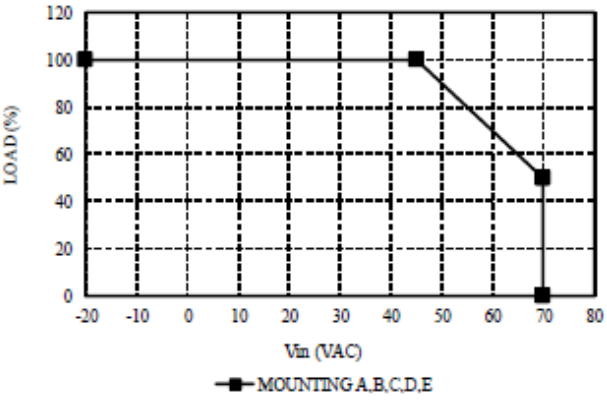
| Ta (°C) | Load (%) |
|---|---|
| -20 - +50 | 100 |
| 70 | 50 |




**(2)18V,48V model**

Convection Cooling: Mounting A,B,C,D,E

| Ta (°C) | Load (%) |
|---|---|
| -20 - +45 | 100 |
| 70 | 50 |

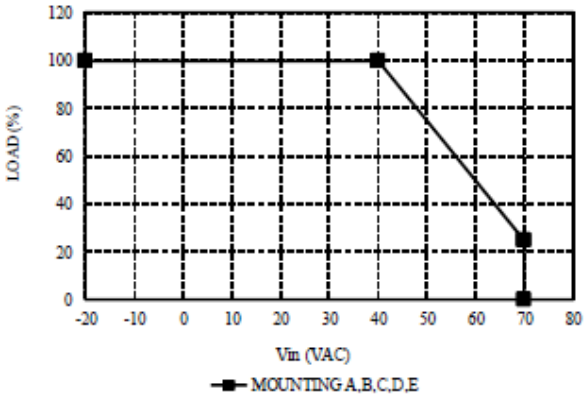



For CUS30M-/A series

(1) 12V,15V,24V,36V model

Convection Cooling: Mounting A,B,C,D,E

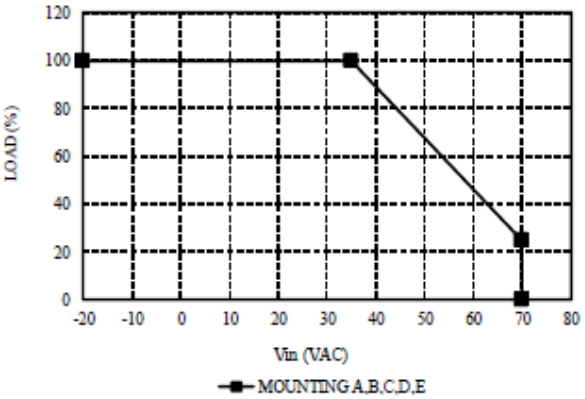
| Ta (°C) | Load (%) |
|---|---|
| -20 - +40 | 100 |
| 70 | 25 |




(2)18V,48V model

Convection Cooling: Mounting A,B,C,D,E

| Ta (°C) | Load (%) |
|---|---|
| -20 - +35 | 100 |
| 70 | 25 |




**Summary of compliance with National Differences:**

**List of countries addressed**

EU Group Differences, EU Special National Conditions, AU, CA, DK, JP, NZ, US

Explanation of used codes:

AU = Australia; CA = Canada; DK = Denmark; JP = Japan; NZ = New Zealand; US = United States of America

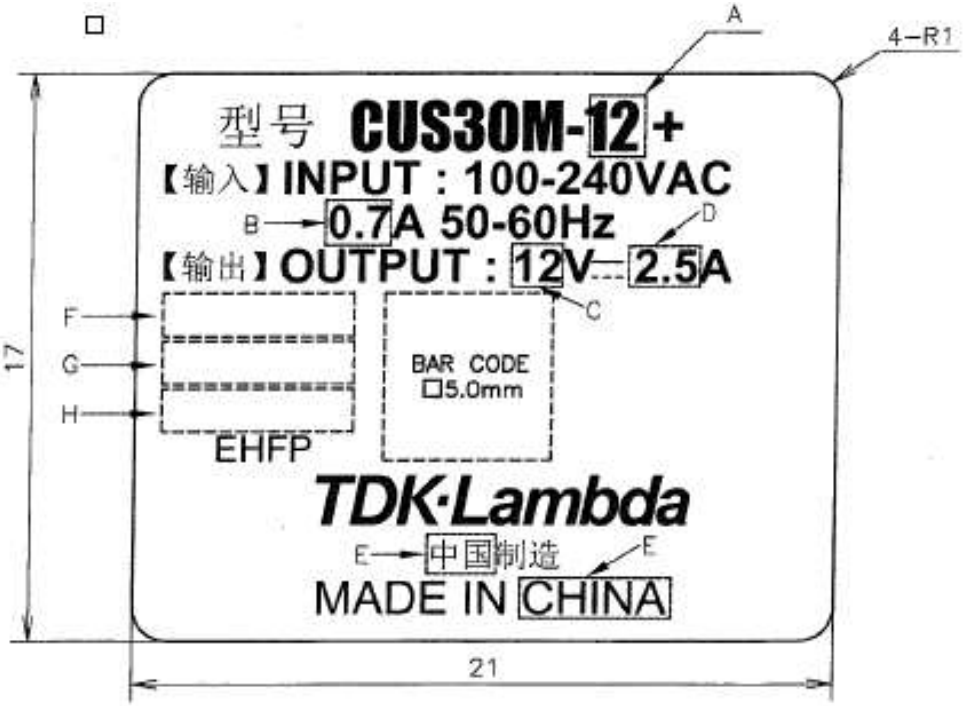
☒ **The product fulfils the requirements of**

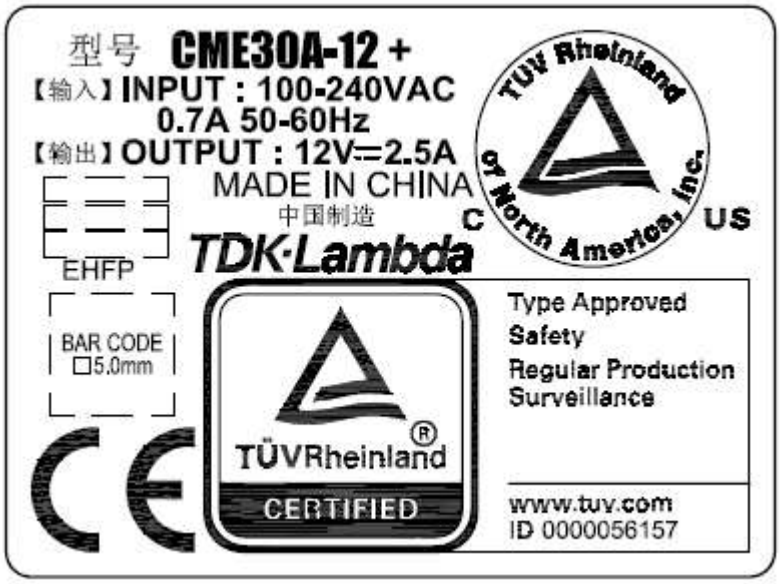
**IEC 62368-1:2014 (Second Edition),**
**EN 62368-1:2014+A11:2017 and**
**CSA/UL 62368-1:2014**

**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.

**<Representative>**




Note: The rating labels of all models have the same design as above except for the model designation and output ratings.

| **TEST ITEM PARTICULARS:** | |
|---|---|
| Classification of use by.....: | ☒ Ordinary person<br>☒ Instructed person<br>☒ Skilled person<br>☐ Children likely to be present |
| Supply Connection .....: | ☒ AC Mains ☐ DC Mains<br>☐ External Circuit - not Mains connected<br>- ☐ ES1 ☐ ES2 ☐ ES3 |
| Supply % Tolerance .....: | ☒ +10%/-10%<br>☐ +20%/-15%<br>☐ None |
| Supply Connection – Type .....: | ☐ pluggable equipment type A -<br>☐ non-detachable supply cord<br>☐ appliance coupler<br>☐ direct plug-in<br>☐ mating connector<br>☐ pluggable equipment type B -<br>☐ non-detachable supply cord<br>☐ appliance coupler<br>☒ permanent connection<br>☐ mating connector ☒ other:Terminal block |
| Considered current rating of protective device as part of building or equipment installation.....: | 16 A or 20 A (for US/CSA)<br>Installation location: ☒ building; ☐ equipment |
| Equipment mobility.....: | ☐ movable ☐ hand-held ☐ transportable<br>☐ stationary ☒ for building-in ☐ direct plug-in ☐ rack-mounting ☐ wall-mounted |
| Over voltage category (OVC) .....: | ☐ OVC I ☒ OVC II ☐ OVC III<br>☐ OVC IV ☐ other: _____ |
| Class of equipment .....: | ☐ Class I ☐ Class II ☐ Class III<br>☒ Not classified |
| Access location .....: | ☒ restricted access location ☐ N/A |
| Pollution degree (PD) .....: | ☐ PD 1 ☒ PD 2 ☐ PD 3 |
| Manufacturer's specified maxium operating ambient.....: | 70 °C |
| IP protection class .....: | ☒ IPX0 ☐ IP___ |
| Power Systems .....: | ☒ TN ☐ TT ☒ IT - 230 V $_{L-L}$ |
| Altitude during operation (m) .....: | ☐ 2000 m or less ☒ up to 5000 m |
| Altitude of test laboratory (m) .....: | ☒ 2000 m or less ☐ _____ m |
| Mass of equipment (kg) .....: | ≅0.19kg (with chassis and cover)<br>≅0.06kg (without chassis and cover) |

| | |
|---|---|
| **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 ..... : | 2017-05-22 (CB No. 50088660 001)<br>2018-12-07 (CB No. 50088660 002)<br>2020-04-27 (this report) |
| Date (s) of performance of tests ..... : | 2017-05-27 to 2017-06-30 (CB No. 50088660 001)<br>2018-12-07 (CB No. 50088660 002)<br>2020-04-27 to 2020-05-06 (this report) |
| | |
| **GENERAL REMARKS:** | |
| **"(See Enclosure #)" refers to additional information appended to the report.**<br>**"(See ATTACHMENT #)" refers to additional information appended to the report.**<br>**"(See appended table)" refers to a table appended to the report.**<br><br>**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**<br>☐ **Not applicable** |
| **When differences exist; they shall be identified in the General product information section.** | |
| **Name and address of factory (ies).....** | 1. TDK-Lambda (China) Electronics Co., Ltd.<br>No. 95, Zhujiang Road, Xinwu District, Wuxi 214028<br>Jiangsu, P.R. China<br>2. Zhangjiagang Hua Yang Electronics Co., Ltd.<br>Zhao Feng Industrial Zone, Leyu Town<br>Zhangjiagang, 215622 Jiangsu, P.R. China<br>3. Sendan Electronics Mfg. Co., Ltd.<br>1010 Habushin Nanto-shi, Toyama 939-1756 Japan<br>4. ALPS Logistics Facilities Co., Ltd.<br>593-1 Nishi-Ohashi, Tsukuba-shi, Ibaraki, 305-0831<br>Japan<br>5. TDK-Lambda Corp. Nagaoka Technical Center<br>2704-1 Settaya-machi, Nagaoka-shi, Niigata 940-1195 Japan |
| **GENERAL PRODUCT INFORMATION:** | |

**General product information:**

The EUT is component type switching mode power supply, which intended for the earthed construction or non-earthed IT equipment in the scope of this standard.

- For earthed construction (Class I), the SMPS need to be reliably earthed and professionally installed and fixed with metal screws.
- For non-earthed construction (Class II), no earthing connection is required. The SMPS need to be fixed so, that it is insulated from any unearthed accessible conductive part by reinforced insulation.

Model CME30A-zzxxxxxxx is identical to model CUS30M-zzxxxxxxx except for model name.

All models are identical, except of the optional chassis, cover, turns of Transformer and the rating of some components which results in different output ratings. See Model List below for details.

**For rating differences between the models see below tables:**

| Series Model | I/p voltage (Vac) | Freq (Hz) | I/p current (A) | Minimal output | Rated output (typical) | Maximum output |
|---|---|---|---|---|---|---|
| CUS30M-12xxxxxxx<br>CME30A-12xxxxxxx | 100-240 | 50-60 | 0.7 | 11.7Vdc | 12Vdc | 12.3Vdc |
| | | | | 2.5A | 2.5A | 2.44A |
| CUS30M-15xxxxxxx<br>CME30A-15xxxxxxx | 100-240 | 50-60 | 0.7 | 14.63Vdc | 15Vdc | 15.38Vdc |
| | | | | 2A | 2A | 1.95A |
| CUS30M-18xxxxxxx<br>CME30A-18xxxxxxx | 100-240 | 50-60 | 0.7 | 17.55Vdc | 18Vdc | 18.45Vdc |
| | | | | 1.7A | 1.7A | 1.66A |
| CUS30M-24xxxxxxx<br>CME30A-24xxxxxxx | 100-240 | 50-60 | 0.7 | 23.4Vdc | 24Vdc | 24.6Vdc |
| | | | | 1.25A | 1.25A | 1.22A |
| CUS30M-36xxxxxxx<br>CME30A-36xxxxxxx | 100-240 | 50-60 | 0.7 | 35.1Vdc | 36Vdc | 36.9Vdc |
| | | | | 0.84A | 0.84A | 0.82A |
| CUS30M-48xxxxxxx<br>CME30A-48xxxxxxx | 100-240 | 50-60 | 0.7 | 46.8Vdc | 48Vdc | 49.2Vdc |
| | | | | 0.63A | 0.63A | 0.61A |
| CUS30M-12/ADJ<br>CME30A-12/ADJ | 100-240 | 50-60 | 0.7 | 10.8Vdc | 12Vdc | 13.2Vdc |
| | | | | 2.5A | 2.5A | 2.27A |
| CUS30M-15/ADJ<br>CME30A-15/ADJ | 100-240 | 50-60 | 0.7 | 13.5Vdc | 15Vdc | 16.5Vdc |
| | | | | 2A | 2A | 1.82A |
| CUS30M-18/ADJ<br>CME30A-18/ADJ | 100-240 | 50-60 | 0.7 | 16.2Vdc | 18Vdc | 19.8Vdc |
| | | | | 1.7A | 1.7A | 1.55A |
| CUS30M-24/ADJ<br>CME30A-24/ADJ | 100-240 | 50-60 | 0.7 | 21.6Vdc | 24Vdc | 26.4Vdc |
| | | | | 1.25A | 1.25A | 1.14A |
| CUS30M-36/ADJ<br>CME30A-36/ADJ | 100-240 | 50-60 | 0.7 | 32.4Vdc | 36Vdc | 39.6Vdc |
| | | | | 0.84A | 0.84A | 0.76A |
| CUS30M-48/ADJ<br>CME30A-48/ADJ | 100-240 | 50-60 | 0.7 | 43.2Vdc | 48Vdc | 52.8Vdc |
| | | | | 0.63A | 0.63A | 0.57A |
| Remark: Operating temp.: up to +70ºC (operating temperature depending on equipment's load, mounting position, for details refer to instruction manual). | | | | | | |

**Additional Information:**

- The product is a component type switching power supply, the overall compliance shall be investigated in the complete end system/equipment, in particular as:

- Fire enclosure
- Mechanical enclosure
- Electrical enclosure

- Some components are **pre-certified**, which have been evaluated according to the relevant requirements of IEC 62368-1, are employed in this product. Their suitability of use has been checked according to clauses 4.1.1 and 4.1.2.
- The product is to be operated up to 5000 m above sea level, the minimum clearances were multiplied by the factor given in Table A.2 of IEC 60664-1: 1.48.
- The label is draft of artwork for marking plates pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.

**Markings and Instructions**

- The installation instruction contains instructions for connection to an IT power distribution system. (See subclause 1.7.2.4):
- Fuse Identification (See subclause 1.7.6): F1A/F1B : T1.6A 250Vac

**The product also marked with:**

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE.

**Definition of variable(s):**

CUS30M-zzxxxxxxx; CME30A-zzxxxxxxx (zz = 12,15,18,24,36 or 48; xxxxxxx = A, U, ADJ, M, CO, SF, P or other alphanumeric character)

Note: Suffix options would be used shown below or used together.

| Variable: | Range of variable: | Content: |
|---|---|---|
| zz | 12, 15, 18, 24, 36 or 48 | Denotes for output voltage |
| xxxxxxx | A | Denotes for chassis & cover |
| | U | Denotes for U shape chassis |
| | ADJ | Denotes for output adjust |
| | M | Denotes for Molex connector |
| | CO | Denotes for PWB coating |
| | SF | Denotes for single fuse |
| | P | Denotes for solderable copper pins type. |
| | other alphanumeric character | For market purposes, no construction differences and no safety impact. |

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

The equipment is a component intended for incorporation in IT equipment, the overall compliance shall be investigated in the complete end system.

The power supply cord set was not evaluated together with the equipment. The suitable certified power supply cord set has to be provided in the country where the equipment is sold.

| **ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:** | |
|---|---|
| (Note 1: Identify the following six (6) energy source forms based on the origin of the energy.)<br>(Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3. | |
| **Electrically-caused injury (Clause 5):**<br>(Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification)<br>Example: +5 V dc input ES1 | |
| **Source of electrical energy** | **Corresponding classification (ES)** |
| Primary circuits | ES3 |
| DC output terminal | ES1 |
| **Electrically-caused fire (Clause 6):**<br>(Note: List sub-assembly or circuit designation and corresponding energy source classification)<br>Example: Battery pack (maximum 85 watts): PS2 | |
| **Source of power or PIS** | **Corresponding classification (PS)** |
| Primary circuits | PS3 |
| **Injury caused by hazardous substances (Clause 7)**<br>(Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.)<br>Example: Liquid in filled component Glycol | |
| **Source of hazardous substances** | **Corresponding chemical** |
| N/A | N/A |
| **Mechanically-caused injury (Clause 8)**<br>(Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.)<br>Example: Wall mount unit MS2 | |
| **Source of kinetic/mechanical energy** | **Corresponding classification (MS)** |
| Sharp edges and corners | MS1 |
| Equipment mass – mass < 7 kg | MS1 |
| **Thermal burn injury (Clause 9)**<br>(Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.)<br>Example: Hand-held scanner – thermoplastic enclosure TS1 | |
| **Source of thermal energy** | **Corresponding classification (TS)** |
| Metal chassis | The evaluation shall be made during the final system approval |
| **Radiation (Clause 10)**<br>(Note: List the types of radiation present in the product and the corresponding energy source classification.)<br>Example: DVD – Class 1 Laser Product RS1 | |
| **Type of radiation** | **Corresponding classification (RS)** |
| N/A | N/A |

| ENERGY SOURCE DIAGRAM |
| --- |
| Indicate which energy sources are included in the energy source diagram. Insert diagram below |
| See “ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE”<br><br>☒ **ES** ☒ **PS** ☒ **MS** ☐ **TS** ☐ **RS** |

| OVERVIEW OF EMPLOYED SAFEGUARDS | | | | |
|---|---|---|---|---|
| **Clause** | **Possible Hazard** | | | |
| 5.1 | Electrically-caused injury | | | |
| Body Part (e.g. Ordinary) | Energy Source (ES3: Primary Filter circuit) | Safeguards | | |
| | | Basic | Supplementary | Reinforced |
| Ordinary (output circuit assumed to be accessible by ordinary person in end product) | ES3: Primary circuits | -- | -- | Isolating Transformers<br>Optocouplers<br>Bridging Y-capacitor |
| Ordinary (metal chassis assumed to be direct or indirect accessible by ordinary person in end product) | ES3: Primary circuits | Certified Y-Capacitor | Protectively bonding chassis | N/A |
| Ordinary | ES1: Output | N/A | N/A | N/A |
| 6.1 | Electrically-caused fire | | | |
| Material part (e.g. mouse enclosure) | Energy Source (PS2: 100 Watt circuit) | Safeguards | | |
| | | Basic | Supplementary | Reinforced |
| Combustible materials | PS3: > 100 Watt circuit (Primary circuits) | Equipment safeguards (no ignition occurs and no such temp. attained specified in 6.3.1 a) | Equipment safeguards (e.g. rated V-0 PCB, combustible material rated V-2 min., metal fire barrier or enclosure; see 6.4.5 and 6.4.6) | N/A |
| Combustible materials | PS2: ≤ 100 Watt circuit (Secondary circuits) | Equipment safeguards (no ignition occurs and no such temp. attained specified in 6.3.1 a) | N/A | N/A |
| 7.1 | Injury caused by hazardous substances | | | |
| Body Part (e.g., skilled) | Energy Source (hazardous material) | Safeguards | | |
| | | Basic | Supplementary | Reinforced |
| N/A | N/A | N/A | N/A | N/A |
| 8.1 | Mechanically-caused injury | | | |
| Body Part (e.g. Ordinary) | Energy Source (MS3:High Pressure Lamp) | Safeguards | | |
| | | Basic | Supplementary | Reinforced |
| Ordinary | MS1: Sharp edge and corners | Rounded edge and corners | N/A | N/A |

| | | | | |
|---|---|---|---|---|
| Ordinary | MS1: Equipment mass – mass < 7 kg | ≅0.19kg (with chassis and cover)<br>≅0.06kg (without chassis and cover) | N/A | N/A |
| 9.1 | Thermal Burn | | | |
| Body Part (e.g., Ordinary) | Energy Source (TS2) | Safeguards | | |
| | | Basic | Supplementary | Reinforced |
| N/A | N/A | N/A | N/A | N/A |
| 10.1 | Radiation | | | |
| Body Part (e.g., Ordinary) | Energy Source (Output from audio port) | Safeguards | | |
| | | Basic | Supplementary | Reinforced |
| N/A | N/A | N/A | N/A | N/A |
| Supplementary Information:<br>(1) See attached energy source diagram for additional details.<br>(2) “N” – Normal Condition; “A” – Abnormal Condition; “S” Single Fault | | | | |