



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** ..... : CB 156788-70210727  
 Date of issue ..... : 2019-01-24  
 Total number of pages..... : 84


**Applicant's name**..... : **SL POWER ELECTRONICS CORP**  
 Address..... : BLDG A, 6050 KING DR, VENTURA, CA 93003 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

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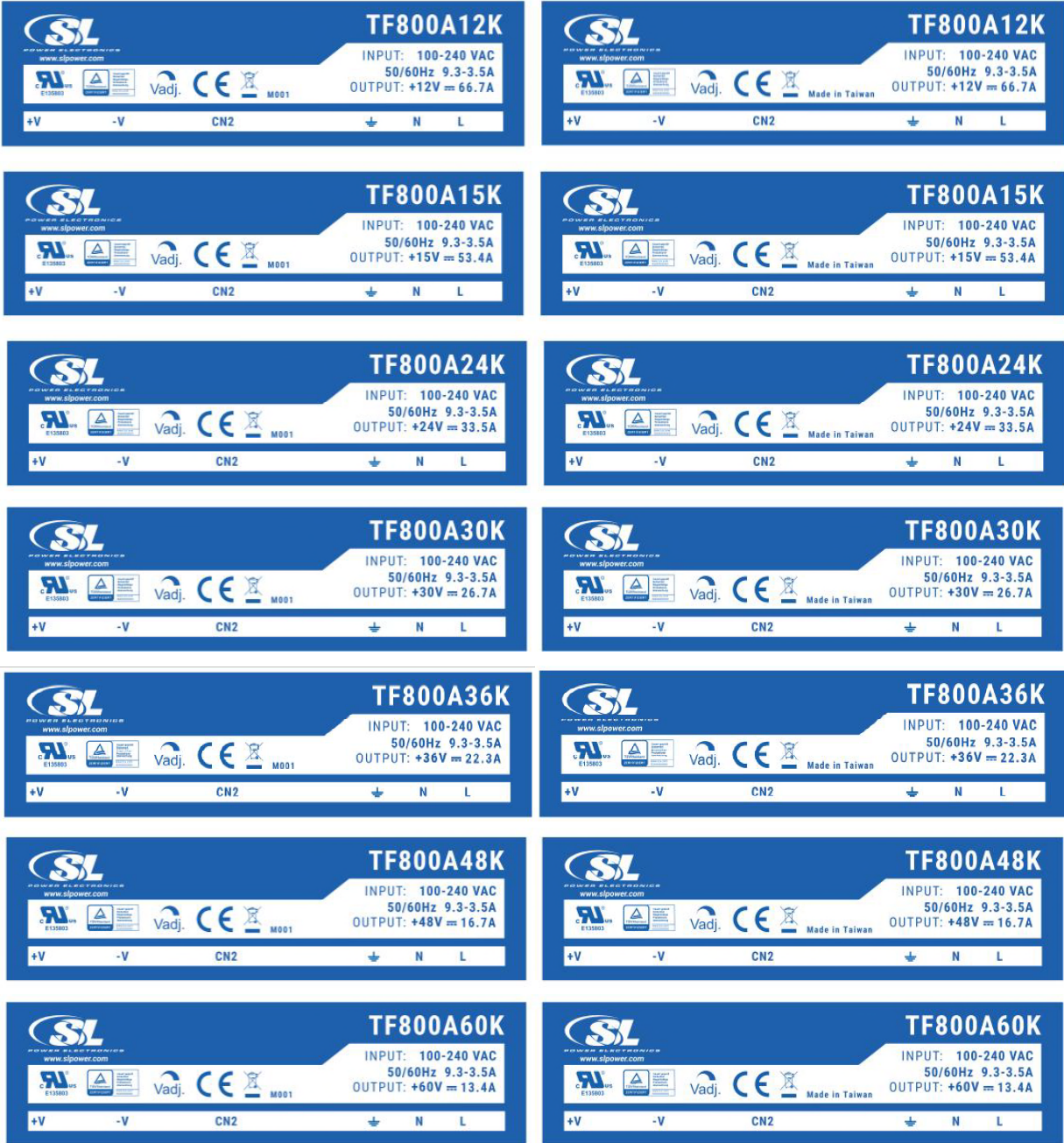
Test Item description .....	Power Supply
Trade Mark.....	
Manufacturer .....	Same as Applicant
Model/Type reference.....	TF800A12K, TF800A15K, TF800A24K, TF800A30K, TF800A36K, TF800A48K, TF800A60K
Rating.....	Input: 100-240Vac, 50/60 Hz, 9.3-3.5 A Output: See page 7 for detail

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	CSA Group - Taiwan Canadian Standards Association (Far East Operations) Ltd.
Testing location/ address .....		No.26, Fuxing 3rd Road, Guishan District, Taoyuan City 333, Taiwan Chinese Taipei.
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address .....		
Tested by (name + signature) .....		Allen Huang/ Certifier
		<i>Allen Huang</i>
Approved by (name + signature) .....		Gawain Chen/Reviewer
		<i>Gawain Chen</i>
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1	
Testing location/ address .....		
Tested by (name + signature) .....		
Approved by (name + signature) .....		
<input type="checkbox"/>	Testing procedure: WMT/CTF Stage 2	
Testing location/ address .....		
Tested by (name + signature) .....		
Witnessed by (name + signature) .....		
Approved by (name + signature) .....		
<input type="checkbox"/>	Testing procedure: SMT/CTF Stage 3 or 4	
Testing location/ address .....		
Tested by (name + signature) .....		
Approved by (name + signature) .....		
Supervised by (name + signature) .....		

<b>List of Attachments (including a total number of pages in each attachment):</b>	
<b>Att. 1 National Differences</b>	<b>( 39 pages )</b>
<b>Att. 2 Photographs</b>	<b>( 4 pages )</b>
<b>Att. 3 Drawings</b>	<b>( 6 pages )</b>
<b>Att. 4 Transformer spec</b>	<b>( 30 pages )</b>
<b>Att. 5 PWB Layout</b>	<b>( 6 pages )</b>
<b>Att. 6 Additional Testing Tables</b>	<b>( 15 pages )</b>
<b>Summary of testing:</b>	
<p><b>Tests performed (name of test and test clause):</b></p> <p>5.2 – Classification of electrical energy sources</p> <p>5.4.1.4, 6.3.2, 9.0, B.2.6 – Temperature measurements</p> <p>5.4.1.10.3 – Ball pressure test of thermoplastics</p> <p>5.4.2.2, 5.4.2.4, 5.4.3 – Minimum clearances/ creepage distances</p> <p>5.4.8 – Humidity conditioning</p> <p>5.4.9 – Electric strength test</p> <p>5.5.2.2 – Capacitor Discharge</p> <p>5.6.6.2 – Resistance of protective conductors and terminations</p> <p>5.7 – Prospective touch voltage, touch current and protective conductor current</p> <p>5.7.2.2, 5.7.4 - Earthed accessible conductive part</p> <p>6.2.2 – Electrical power sources (PS) measurement for classification</p> <p>B.2.5 – Input test</p> <p>B.3 – Abnormal operating condition tests</p> <p>B.4 – Fault condition tests</p> <p>T – Mechanical and Stress Relief test</p>	<p><b>Testing location:</b></p> <p>CSA Group - Taiwan Canadian Standards Association (Far East Operations) Ltd.</p> <p>No.26, Fuxing 3rd Road, Guishan District, Taoyuan City 333, Taiwan Chinese Taipei.</p>
<b>Summary of compliance with National Differences:</b>	
<b>List of countries addressed</b>	
<p><b>CENELEC member countries (EU group differences): Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Cyprus (CY), the Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), Former Yugoslav Republic of Macedonia (MK), France (FR), Germany (DE), Greece (GR), Hungary (HU), Iceland (IS), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), the Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), Turkey (TR) and the United Kingdom (GB).</b></p> <p><b>Australia (AU), Canada (CA), New Zealand (NZ), United States (US)</b></p>	
<p><input checked="" type="checkbox"/> <b>The product fulfils the requirements of national and group differences according to EN 62368-1:2014+A11:2017</b></p> <p><input checked="" type="checkbox"/> <b>The product fulfils the requirements of national differences according to CSA C22.2 No. 62368-1-14, UL 62368-1, 2<sup>nd</sup> edition</b></p> <p><input checked="" type="checkbox"/> <b>The product fulfils the requirements of national differences according to AS/NZS 62368.1:2018</b></p> <p><input checked="" type="checkbox"/> <b>The product fulfils the requirements of national differences according to J62368-1 (H30)</b></p>	

**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.



TEST ITEM PARTICULARS:	
Classification of use by.....:	<input checked="" type="checkbox"/> Ordinary person <input type="checkbox"/> Instructed person <input type="checkbox"/> Skilled person <input type="checkbox"/> Children likely to be present
Supply Connection.....:	<input checked="" type="checkbox"/> AC Mains <input type="checkbox"/> DC Mains <input type="checkbox"/> External Circuit - not Mains connected - <input type="checkbox"/> ES1 <input type="checkbox"/> ES2 <input checked="" type="checkbox"/> ES3
Supply % Tolerance .....	<input checked="" type="checkbox"/> +10%/-10% <input type="checkbox"/> +20%/-15% <input type="checkbox"/> ___%/ ___% <input type="checkbox"/> None
Supply Connection – Type .....	<input type="checkbox"/> pluggable equipment type A - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> direct plug-in <input type="checkbox"/> mating connector <input type="checkbox"/> pluggable equipment type B - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> permanent connection <input type="checkbox"/> mating connector <input checked="" type="checkbox"/> other: Terminal block.
Considered current rating of protective device as part of building or equipment installation.....:	16 A, 13 A (GB) or 20 A (US and Canada) Installation location: <input checked="" type="checkbox"/> building; <input type="checkbox"/> equipment
Equipment mobility .....	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in <input type="checkbox"/> rack-mounting <input type="checkbox"/> wall-mounted
Over voltage category (OVC) .....	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other: _____
Class of equipment .....	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III
Access location .....	<input type="checkbox"/> restricted access location <input checked="" type="checkbox"/> N/A
Pollution degree (PD) .....	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
Manufacturer's specified maxium operating ambient:	+50°C (output at full load) and +70°C (for output at half load)
IP protection class .....	<input checked="" type="checkbox"/> IPX0 <input type="checkbox"/> IP__
Power Systems .....	<input checked="" type="checkbox"/> TN <input type="checkbox"/> TT <input checked="" type="checkbox"/> IT - <u>230V</u> L-L
Altitude during operation (m) .....	<input checked="" type="checkbox"/> 2000 m or less <input type="checkbox"/> 4000 m
Altitude of test laboratory (m) .....	<input checked="" type="checkbox"/> 2000 m or less <input type="checkbox"/> _____ m
Mass of equipment (kg) .....	<input checked="" type="checkbox"/> 1.58 kg
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)
<b>TESTING:</b>	
Date of receipt of test item..... :	2018-12-17
Date (s) of performance of tests..... :	2018-12-17 to 2019-01-16
<b>GENERAL REMARKS:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.          "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p> <p><b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC60335-1:</b></p>	
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..... :	<input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies)..... :</b>	<ol style="list-style-type: none"> <li>1. Cotek Electronic Industrial Co., Ltd. No. 33, Sec. 2, Renhe Rd., Daxi Township, Taoyuan County 33548 Taiwan</li> <li>2. DONG GUAN TEKVERT POWER CO., LTD Building 121, Arising Sun Industrial City, No.13, Xinan Road, Lin Village, Tangxia Town, Dongguan City, Guangdong Province 523710, P. R. China</li> </ol>
<b>GENERAL PRODUCT INFORMATION:</b>	

**Report History –**

New certification.

**Product Description –**

The equipment are switching mode power supplies intended for building-in into Class I audio/video, information and communication technology equipment.

**Model Differences –**

All models are similar to each other except for output rating, transformer (T1), rating of components (R82, R83, R84, VR5, R121, C29, C30 to C37, Q18 to Q23, C6, C44 to C47, R43, R116, R118, L11, L13, U18, U19, R67, R81, R105 to R115, D11 to D15, D65, R128, R129, RS1 to RS4) and model designation. All sources of transformer (T1) are similar to each other except for turns of primary and secondary winding and diameter of secondary winding.

**Markings of fuse –**

The fuse is located within the equipment and not replaceable by an ordinary person or an instructed person. The fuse marking is marked on PCB near fuse: F1 T or F 15A/250V; F2 T1A/250V

**The following PCB boards are used –**

- Main board include primary circuits, secondary circuits and earth
- CN6A board include primary and secondary circuits
- CT2 board with primary circuit only
- CN5A board with secondary circuit only

**Output rating:**

Model	Output
TF800A12K	12Vdc / 66.7A
TF800A15K	15Vdc / 53.4A
TF800A24K	24Vdc / 33.5A
TF800A30K	30Vdc / 26.7A
TF800A36K	36Vdc / 22.3A
TF800A48K	48Vdc / 16.7A
TF800A60K	60Vdc / 13.4A

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

- The product is a component intended for incorporation in audio/video, information and communication technology equipment, the overall compliance shall be investigated in the complete audio/video, information and communication technology equipment.
- The test samples are pre-production without serial numbers.
- The product was submitted and tested for use at the maximum ambient temperature (Tma) permitted by the manufacturer’s specification of: 50°C (output at full load) and 70°C (for output at half load).
- By manufacturer’s specification, test for input 90V with output 90% load; test for input 100V with output 100% load.

- Load conditions:
  - a. For model AE-800-12: +12V/66.7A
  - b. For model AE-800-60: +60V/13.4A
- Unless otherwise indicated, all tests were conducted on models AE-800-12 and AE-800-60 to represent other similar models.
- Tests were performed with min. 10.91CFM airflow of DC fan (inward) details see table 4.1.2.

**Abbreviations used in the report:**

- normal conditions	N.C.	- single fault conditions	S.F.C
- functional insulation	OP	- basic insulation	BI
- double insulation	DI	- supplementary insulation	SI
- between parts of opposite Polarity	BOP	- reinforced insulation	RI

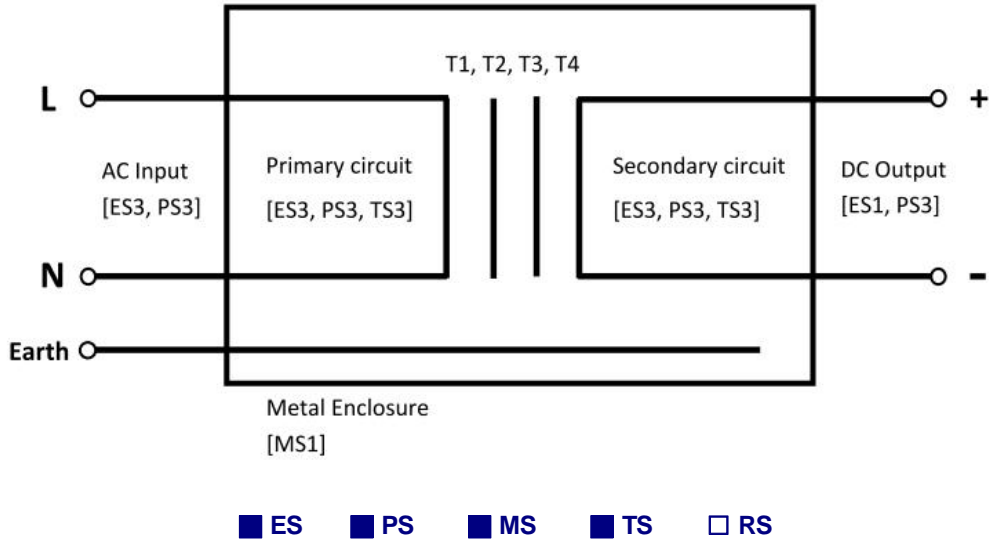
**Indicate used abbreviations (if any)**



<b>ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:</b>	
<p>(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.)            (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.)</p>	
<p><b>Electrically-caused injury (Clause 5):</b>            (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification)            Example: +5 V dc input</p>	
	ES1
<b>Source of electrical energy</b>	<b>Corresponding classification (ES)</b>
X-capacitors connected between L and N	ES3
All circuits except for output circuits	ES3
Output circuit (connector)	ES1
<p><b>Electrically-caused fire (Clause 6):</b>            (Note: List sub-assembly or circuit designation and corresponding energy source classification)            Example: Battery pack (maximum 85 watts):</p>	
	PS2
<b>Source of power or PIS</b>	<b>Corresponding classification (PS)</b>
Primary circuits	PS3
Output circuit (connector)	PS3
<p><b>Injury caused by hazardous substances (Clause 7)</b>            (Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.)            Example: Liquid in filled component</p>	
	Glycol
<b>Source of hazardous substances</b>	<b>Corresponding chemical</b>
N/A	N/A
<p><b>Mechanically-caused injury (Clause 8)</b>            (Note: List moving part(s), fan, special installations, etc. &amp; corresponding MS classification based on Table 35.)            Example: Wall mount unit</p>	
	MS2
<b>Source of kinetic/mechanical energy</b>	<b>Corresponding classification (MS)</b>
Sharp edges and corners	MS1
Moving parts (DC fan, plastic fan blade)	MS3
Equipment mass – mass < 7 kg	MS1
<p><b>Thermal burn injury (Clause 9)</b>            (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.)            Example: Hand-held scanner – thermoplastic enclosure</p>	
	TS1
<b>Source of thermal energy</b>	<b>Corresponding classification (TS)</b>
Metal chassis	The evaluation shall be made during the final system approval
<p><b>Radiation (Clause 10)</b>            (Note: List the types of radiation present in the product and the corresponding energy source classification.)            Example: DVD – Class 1 Laser Product</p>	
	RS1
<b>Type of radiation</b>	<b>Corresponding classification (RS)</b>
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**ENERGY SOURCE DIAGRAM**

Indicate which energy sources are included in the energy source diagram. Insert diagram below



Supplementary Information:

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 (Enclosure)
Ordinary, instructed	ES3: X-capacitors connected between L and N	N/A	N/A	A safeguard provided by bleeder resistors
Ordinary, instructed	ES3: Primary circuits	N/A	N/A	Transformers , opto-couplers, isolation IC
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
Combustible materials within equipment fire barrier	PS3: > 100 Watt circuit (Primary and secondary circuits)	Equipment safeguards (no ignition occurs and no such temp. attained specified in 6.3 (a))	Equipment safeguards (e.g. min rated V-1 PWB, combustible material rated V-2 min., metal fire enclosure; see 6.4.5 and 6.4.6)	N/A
Internal wiring material	PS3: > 100 Watt circuit (primary and secondary circuits)	See above and subclause 6.3.1 (a)	Equipment safeguards (rated VW-1, see 6.5 for details)	N/A
Component material	PS1: < 15 Watt circuit	N/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 (Enclosure)
Ordinary Person	MS1: Sharp edges and corners (none)	N/A	N/A	N/A
Ordinary Person	MS1: Equipment mass – mass < 7 kg	N/A	N/A	N/A
Ordinary Person	Moving parts (DC fan), shall be made the evaluation during the final system approval	N/A	N/A	N/A
9.1	Thermal Burn			

Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary Person	Metal chassis shall be made the evaluation during the final system approval	N/A	N/A	N/A
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
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<b>Supplementary Information:</b> (1) See attached energy source diagram for additional details. (2) "N" – Normal Condition; "A" – Abnormal Condition; "S" Single Fault				